



Orchid Residential Ltd.

GOATSTOWN ROAD STUDENT RESIDENTIAL DEVELOPMENT, DUBLIN

Noise Impact Assessment Report

603045 (02)

MARCH 2022

The logo for RSK, consisting of the letters 'RSK' in a bold, green, sans-serif font. The letters are closely spaced and have a slight shadow effect, giving them a three-dimensional appearance.

EXECUTIVE SUMMARY

RSK Ireland Limited (RSK) was instructed by John Spain Associates Ltd, on behalf of Orchid Residential Ltd. to conduct an inward noise impact assessment and Acoustic Design Statement (ADS) in respect of a proposed student accommodation development at Goatstown Road, Dublin.

This report has been prepared following a request from John Spain Associates for an noise impact assessment to address the impact of traffic noise on the proposed development to accompany the planning application. The objective of this study is to assess the suitability of the site for residential development and to provide recommendations for noise mitigation measures, where necessary, to ameliorate potential impacts to future residents.

In conducting this assessment, reference is made to the *Dublin Agglomeration Environmental Noise Action Plan, December 2018 – July 2023, Volume 2, Dún Laoghaire-Rathdown County Council (NAP)*, and *The Professional Guidance on Planning & Noise (ProPG)*, May 2017. The two primary stages of the ProPG assessment are the “Stage 1” initial noise risk assessment of the proposed site and “Stage 2” detailed appraisal of the proposed development and preparation of an ADS.

The baseline noise environment at the development site has been determined through noise surveys over an extended period of 7-days. The site noise survey has also been used to assess the sites noise risk categories, as per the ProPG “Stage 1” assessment. The ProPG noise risk categories for the facades most exposed to road traffic noise are as follows:

Daytime: **Medium**

Night-time **Medium**

Other facades that are more sheltered from the Goatstown Road fall within the **Low** noise risk category.

Recommendation to mitigate noise emissions, as specified in the ProPG “Stage 2” ADS, include the following:

- Provision of development façades with minimum sound insulation properties as outlined in Table 14 of this document, and;
- Provision of acoustically attenuated ventilation with minimum sound insulation properties as outlined in Table 15 of this document.

In summary, it is considered that the site is suitable for student accommodation development, subject to the provision of the noise control recommendations as outlined in this report.

This document also sets out operational phase plant noise limits (derived in accordance with BS 4142:2014+A1:2019), for the proposed development, as well as a proposed programme for monitoring of construction noise and vibration, in order to protect the amenity of existing residents in the neighbourhood.



RSK GENERAL NOTES

Project No.: 603045 (02)

Title: Goatstown Road Student Residential Development, Dublin. Noise Impact Assessment Report

Client: Orchid Residential Ltd.

Date: 10th March 2022

Office: Dublin

Status: **FINAL**

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Date:	10 th March 2022	Date:	10 th March 2022

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Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Ireland Ltd.

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1 INTRODUCTION

RSK Ireland Limited (RSK) was instructed by John Spain Associates Ltd, on behalf of Orchid Residential Ltd. to conduct baseline noise surveys, and an inward noise impact assessment in respect of a proposed student accommodation development at Goatstown Road, Dublin.

The objective of this study is to assess the suitability of the site for residential development, and to provide recommendations for noise mitigation measures, where necessary, to ameliorate potential impacts to future residents.

This document also sets out operational phase plant noise limits for the proposed development, as well as a proposed programme for monitoring of construction noise and vibration, in order to protect the amenity of existing residents in the neighbourhood.

2 THE SITE

The site setting is predominately in a residential area with nearby dwellings to the north, east and south of the site, as well as on the opposite side of Goatstown Road, to the west.

The development will consist of demolition of the existing building (c.960sqm) and hard surface parking area on site and construction of a purpose built student accommodation development (including use as tourist or visitor accommodation outside the academic term) comprising:

- 221 no. student bedspaces (including 10 no. studios), all within a part single storey, part 4 no. storey and part 6 no. storey 'U'-Shaped building;
- The building is single to 4 no. storeys along the southern boundary (with roof terraces at 4th floor level) and part 5 and 6 storeys along Goatstown Road (with set backs) and boundary to the north (with roof terrace at 5th floor level fronting onto Goatstown Road);
- Amenity space equating to c. 2,025 sqm is provided across the site consisting of c. 1,516 sqm of external amenity in the form of a central courtyard at ground level and roof terraces at 4th and 5th floor levels;
- Internal amenity space equating to c. 509 sqm is provided in the form of 2 no. ground floor lounge/study areas, kitchen/tearoom, laundry, and concierge/office space;
- Provision of 210 no. bicycle parking spaces distributed within the central courtyard (stacked parking with glass roof cover) and adjacent to the front boundary (north);
- Provision for 6 no. carparking spaces comprising 2 no. disabled parking spaces and 4 no. setdown parking spaces adjacent to the front entrance to the site;
- Vehicular access to the site is via Goatstown Road from 2 no. entrance points [reduction from 3 no. entrances currently];
- Ancillary single storey ESB substation and switch room and refuse store are provided at ground level;
- Provision of surface water and underground attenuation and all ancillary site development works including site wide landscaping works, lighting, planting and boundary treatments.

The Goatstown Road runs to the west of the site, approximately 7 metres from the closest façade of the proposed site dwellings.

Figure 1 shows the proposed site location in the context of the surrounding environment.

Figure 1: Proposed Site Layout Plan



3 NOISE CRITERIA

In deriving noise criteria for the development, consideration has been given to the following documents:

- *Dublin Agglomeration Environmental Noise Action Plan, 2018 – 2023, Volume 2, Dún Laoghaire-Rathdown County Council (NAP);*
- *BS 5228: 2009+A1:2014 Code of practice for noise and vibration control on construction and open sites;*
- *BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound, and;*
- *The Professional Guidance on Planning & Noise (ProPG), May 2017.*

3.1 Construction Phase

During the construction phase, the range of activities with potential to generate noise and vibration emissions to off-site sensitive receptors will include site preparation works, demolition of the existing building, construction of the proposed development, landscaping and erection of any temporary buildings/compounds that may be required.

3.1.1 Noise

The closest neighbouring NSL's to the proposed development are the residential houses primarily to the south and east of the site. The distance between the construction site and nearby NSL's varies, the closest distance between the site and neighbouring dwelling will be approximately 6 metres. Generally, construction works will occur between 15 and 50 metres from existing dwellings, depending on the location where specific works are occurring.

Whilst no specific construction noise limits are set by Dun Laoghaire - Rathdown County Council, the Draft *Dublin Agglomeration Noise Action Plan 2018 to 2023, Volume 2 Dun Laoghaire-Rathdown County Council* states the following in relation to construction phase noise emissions:

“8.2.6 Noise Complaint Investigation and Control procedures

Although the noise maps and the Environmental Noise Regulations are aimed at developing strategic policy, it is acknowledged that when most people complain about noise, it relates more to local issues such as neighbour, entertainment and construction noises. However, it is envisaged that this noise action plan should solely concentrate on strategic issues identified by the noise mapping as systems are already in place to deal with noise nuisances, including neighbour, entertainment and construction noises. Local noise issues will be dealt with by each Local Authority as required by the Environmental Protection Agency Act 1992 (EPA Act 1992)”.

In lieu of no official guidance by Dun Laoghaire-Rathdown County Council on construction sites reference is made to the “Industry Standard” guidelines in relation to construction phase noise i.e. *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites.*

BS 5228:2009+A1:2014 is considered to represent the industry standard methodology for the assessment of construction noise and describes two methods for deriving noise significance thresholds for construction sites.

BS 5228:2009+A1:2014 (Appendix E.1) describes a method for identifying ‘*Potential significance based upon noise change*’. Following this methodology, BS 5228:2009+A1:2014 designates a noise sensitive location (NSL) into a specific category based on pre-existing ambient noise levels and then sets a threshold noise value that, if exceeded, indicates a significant construction noise impact.

Table 1 presents the threshold values for significant noise impacts for weekday daytime and Saturday morning activity.

Table 1 BS5228 Construction Noise Thresholds for Significant Effects

Assessment category and threshold value period (LAeq)	Threshold value, in decibels (dB)		
	Category A ^A	Category B ^B	Category C ^C
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

- A. Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.
- B. Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.
- C. Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.

Annex E.2 of BS 5228-1:2009+A1:2014 also provides the following comments in relation to ‘*Potential significance based on fixed noise limits*’:

“Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut. The noise can be measured with a simple sound level meter, as we hear it, in A-weighted decibels (dB(A))– see note below. Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:

- *70 decibels (dBA) in rural, suburban and urban areas away from main road traffic and industrial noise;*
- *75 decibels (dBA) in urban areas near main roads in heavy industrial areas.*

These limits are for daytime working outside living rooms and offices. In noise-sensitive situations, for example, near hospitals and educational establishments – and when working outside the normal hours say between 19.00 and 22.00 hours – the allowable noise levels from building sites will be less: such as the reduced values given in the contract specification or as advised by the Environmental Health Officer (a reduction of 10 dB(A) may often be appropriate). Noisy work likely to cause annoyance locally should not be permitted between 22.00 hours and 07.00 hours.”

Taking account of the measured ambient noise levels and BS5228 significance thresholds, the recommended noise limits for construction activity are as follows:

Monday to Friday	08.00 – 19.00	70 dB $L_{Aeq,11hrs}$
Saturday	08.00 – 14.00	70 dB $L_{Aeq,6hrs}$

The proposed construction working hours have been amended from those proposed in BS5228 (i.e. Mon-Fri 07:00-19:00hrs and Saturday 07:00-13:00hrs) to the guideline standard times adopted by DLRCC (i.e. Mon-Fri 08:00-19:00hrs and Saturday 08:00-14:00hrs¹). It is assumed that construction works will take place during the above working hours only.

3.1.2 Vibration

Following the same approach, BS 5228-2:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites*. *Vibration* recommends that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above.

The standard also notes that below 12.5 mm/s PPV the risk of damage tends to zero. The recommended construction vibration criteria are presented in Table 2.

Table 2 Vibration Criteria During Construction Phase

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

3.2 Operational Phase

3.2.1 New Building Services Plant Noise Levels

Reference is made to British Standard BS4142:2014+A1:2019: *'Methods for Rating and Assessing Industrial and Commercial Sound'* in setting criteria for any new mechanical plant items. This standard outlines methods for analysing building services plant sound emissions to residential receptors. BS 4142:2014 is frequently referenced in DCC Planning Conditions and is considered the relevant assessment standard for noise from mechanical plant items in the Dublin region.

BS4142:2014 describes methods for rating and assessing sound of an industrial and/or commercial nature, using outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling upon which the sound is incident.

The BS4142:2014 assessment methodology compares the measured external background sound level (in the absence of plant items) to the rating sound level, of the plant items, when

¹ ref. <https://www.dlrcco.ie/en/environment/noise-pollution>

operational. Where sound emissions are found to be tonal, impulsive, intermittent or to have other sound characteristics that are readily distinctive against the residual acoustic environment, BS4142:2014 advises that penalties be applied to the specific level to arrive at the rating level.

Section 7 presents a summary of the plant noise limits proposed for this development to ensure that adverse impacts to neighbouring dwellings do not occur.

3.3 Inward Noise Impact

3.3.1 Dublin Agglomeration Environmental Noise Action Plan (2018 – 2023): Volume 2, Dun Laoghaire – Rathdown County Council

With regard to inward noise impact on the proposed dwellings reference is made to The *Dublin Agglomeration Environmental Noise Action Plan, December 2018 – July 2023, Volume 2, Dún Laoghaire-Rathdown County Council* (NAP) provides guidance for the scenario whereby a residential development is proposed in an area exposed to pre-existing levels of environmental noise. Section 8.2.3 discusses *Noise in the Planning Process*, and this section is reproduced below:

“8.2.3 Noise in the Planning Process

The planning system has the potential to exercise a significant influence on the control of future exposure to environmental noise and can play a key role in the improvement of amenity. The appropriate use of the planning system can help avoid, or minimise, the adverse impacts of noise without placing unreasonable restrictions on development. Scope exists within the planning and development management process to manage increased levels of noise arising from new development where exposure levels can be harmful to health.

There are two main scenarios in development where noise could be considered as being a material issue, namely:

1) Introducing people into potentially noisy areas through the provision new residential housing, hospital, schools nursing homes etc in the vicinity of existing road rail industrial or airport noise, or where there are potential high levels of noise with buildings or in adjoining gardens or public open spaces.

2) Introducing potentially noisy developments such as new or altered roads, railways, industrial sites, and airports, commercial or large sporting recreational developments into the vicinity of noise sensitive locations.

In the scenario where new residential development or other noise sensitive development is proposed in an area with an existing climate of environmental noise, there is currently no clear national guidance on appropriate noise exposure levels. The EPA has suggested that in the interim that Action Planning Authorities should examine the planning policy guidance notes issued in England titled, „ProPG Planning and Noise: Professional Practice Guidance on Planning and Noise“. This has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England”.

The noise levels measured on site will therefore be compared to relevant guidance for assessing the suitability of the site for residential development i.e. ProPG: *ProPG: Professional Practice guidance on Planning and Noise for new Residential Development* (May 2017).

3.3.2 ProPG: Professional Practice Guidance on Planning and Noise for new Residential Development

ProPG provides a two staged approach for evaluating noise exposure on a proposed residential development. The two stages of the approach can be summarised as follows:

Stage 1 - Involves a high-level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels.

Stage 2 – Involves a full detailed appraisal of the proposed development covering four “key elements” that include.:

Element 1 - Good Acoustic Design Process;

Element 2 - Noise Level Guidelines;

Element 3 - External Amenity Area Noise Assessment, and;

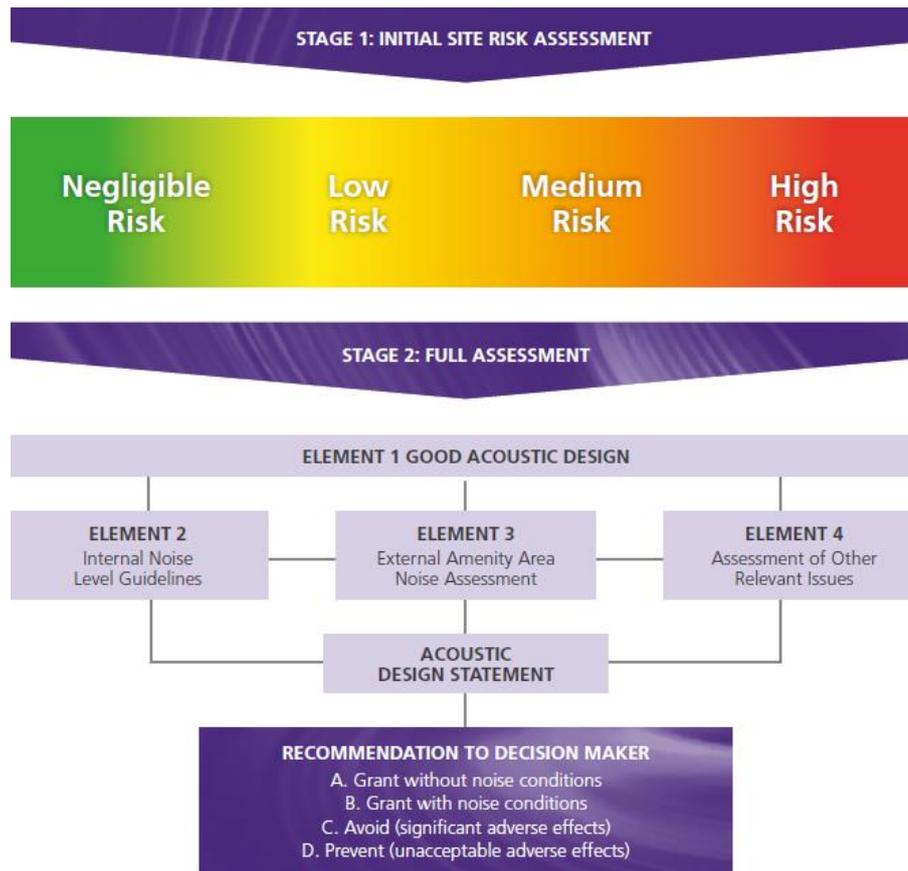
Element 4 - Other Relevant Issues.

An Acoustic Design Statement (ADS) is then prepared for submission to the planning authority. This ADS outlines the findings of the Stage 1 and Stage 2 assessments; and allows the planning authority to make an informed decision on the suitability of the site for development, with consideration of noise control measures where required. The ProPG document outlines the following potential outcome with respect of the ADS:

- 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”).

A summary of the ProPG approach is illustrated in Figure 2.

Figure 2: ProPG Assessment Strategy (Source: ProPG)



3.3.3 ProPG and BS 8233 *Guidance on sound insulation and noise reduction for buildings*

BS 8233 is referenced in ProPG with regard to internal noise levels within the proposed new dwellings. The following internal noise targets are presented as derived from BS 8233 (2014).

Table 3: ProPG Internal Noise Targets (derived from BS 8233:2014)

Activity	Location	Daytime (07:00 to 23:00hrs)	Night-time (23:00 to 07:00hrs)
Resting	Living room	35 dB L _{Aeq,16hr}	-
Dining	Dining room/area	40 dB L _{Aeq,16hr}	-
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq,16hr}	30 dB L _{Aeq,8hr} 45 dB L _{Amax,T} *

* internal L_{AFmax,T} noise level may be exceeded up to 10 times per night without a significant impact occurring.

4 BASELINE NOISE SURVEYS

Environmental noise surveys have been conducted on site in order to establish the baseline noise environment. Noise survey have been conducted in accordance with ISO 1996-2:2017 “Acoustics -- Description, measurement and assessment of environmental noise -- Part 2: Determination of sound pressure levels”.

4.1 Monitoring Locations

A mix of attended and unattended noise measurements were conducted at Locations N1 to N5. The noise measurement locations are shown in Figure 3 with photographs of each measurement position shown adjacent to each location description.

Figure 3: Proposed Site Plan Showing Baseline Monitoring Positions



Location N1

to the north of the site with the microphone positioned at the most suitable location. This noise survey position comprised of unattended monitoring for an approximate 7-day period. Noise data captured at this location is used as reference in order to estimate noise levels at the proposed development facades during both day and night-time periods



Location N2

to the north-west of the site with the microphone positioned at ground floor level near to the Goatstown Road. This noise survey position comprised of attended daytime monitoring. The measurement location was approximately in-line with the façade of the proposed new development in this section of the site.



Location N3

to the south-west of the site with the microphone positioned at ground floor level. This noise survey position comprised of attended daytime monitoring. The measurement location was approximately in-line with the façade of the proposed new development in the south-western corner of the site.



Location N4

to the south of the site with the microphone positioned at ground floor level. This noise survey position comprised attended daytime monitoring. The measurement location was approximately in-line with the façade of the proposed new development in this section of the site.



Location N5

to the east of the site with the microphone positioned at ground floor level. This noise survey position comprised attended daytime monitoring. The measurement location was approximately in-line with the façade of the proposed new development in this section of the site.



4.2 Survey Periods

Noise measurements were conducted over the source of the following periods:

Table 4: Noise Survey Periods

Period	Location	Date	Start Time	Stop Time
Daytime 07:00 – 23:00hrs	N1	16 - 23 June 2020	16 June at 15:00	23 June at 15:15
	N2 to N5	16 June 2020	10:31	14:14
Night-time 23:00 – 07:00hrs	N1	16 - 23 June 2020	16 June at 23:00	23 Oct at 07:00

4.3 Weather

The weather during the attended survey of 16 June was cloudy and calm, temperatures were in the range 9 to 20 degrees Celsius and the wind direction was north north-easterly.

The weather during the unattended survey of 16 to 23 June 2020 is summarised as follows (ref. <https://www.met.ie/climate/available-data/daily-data>) from Casement met station.

Table 5: Weather Conditions

Date	Period	Temperature Degrees Celsius	Wind Direction	Wind Speed m/s	Precipitation
16 June 2020	Daytime	9 - 20	N	1 - 5	19:00 – 20:00, 22:00 – 23:00
16-17 June 2020	Night-time	12 - 14	NW	1 - 3	23:00 – 00:00, 05:00 – 07:00
17 June 2020	Daytime	12 - 16	NW	2 - 3	07:00 – 08:00
17-18 June 2020	Night-time	13 - 14	N	1 - 2	No
18 June 2020	Daytime	13 - 16	NE	0 - 3	16:00 – 18:00, 20:00 – 23:00
18-19 June 2020	Night-time	10 - 13	N	2 - 5	23:00 – 03:00, 04:00 – 07:00
19 June 2020	Daytime	10 - 15	NW	3 - 8	07:00 – 09:00, 11:00 – 13:00
19-20 June 2020	Night-time	9 - 13	N	1 - 3	No
20 June 2020	Daytime	8 - 19	S	3 - 10	21:00 – 23:00
20-21 June 2020	Night-time	11 - 14	SW	5 - 11	23:00 – 01:00
21 June 2020	Daytime	9 - 18	SW	3 - 10	No
21-22 June 2020	Night-time	9 - 13	S	3 - 7	05:00 – 07:00
22 June 2020	Daytime	10 - 19	SW	2 - 10	No
22-23 June 2020	Night-time	14 - 15	SW	3 - 7	06:00 – 07:00,
23 June 2020	Daytime	10 - 19	SW	2 - 6	08:00 – 11:00

In line with best practice, periods of rain and elevated winds have been omitted from the study.

4.4 Instrumentation

The noise measurements were undertaken using the following equipment.

Table 6: Survey Equipment

Equipment	Type	Serial No.	Calibration Date
Class 1 Sound Level Meter	Bruel & Kjaer Type 2250	2837940	24/08/2018
Class 1 Sound Level Meter	Bruel & Kjaer Type 2260	1984051	14/08/2019
Acoustic Calibrator	Bruel & Kjaer Type 4231 series	1471950	12/08/2019

The equipment used has a calibration history that is traceable to a certified calibration institution. The calibration of the sound level meter was field checked prior to commencing measurements and prior to removing the equipment from site upon completion. A calibration drift of -0.1dB was noted upon commencement of the survey and +0.1 upon survey completion. The sound level meter calibration certificates are included in Appendix B.

The sound level meter conformed to the Class 1 requirements of BS EN 61672-1:2013 '*Electroacoustics. Sound level meter, Specifications*'. The calibrator used conforms to the requirements of BS EN IEC 60942:2018 '*Electroacoustics. Sound calibrators*'.

4.5 Measurement Parameters

The noise survey results are presented in decibels (dB), using the following parameters:

$L_{Aeq,T}$	is the equivalent continuous sound level and is used to describe a fluctuating sound as a single value over the sample period (T).
$L_{AFmax,T}$	The maximum A-weighted sound pressure level occurring within a specified time period (T). Measured using the "Fast" time weighting.
$L_{AF10,T}$	Refers to those A-weighted noise levels in the top 10 percentile of the sampling interval; it is the level which is exceeded for 10% of the measurement period (T). It is used to determine the intermittent high noise level features of locally generated noise and usually gives an indicator of the level of road traffic. Measured using the "Fast" time weighting.
$L_{AF90,T}$	Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval (T). It is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to describe a background level without contribution from intermittent sources.

All sound levels in this report are expressed in terms of decibels (dB) relative to 2×10^{-5} Pa. Noise measurements use a reference time period (T) of 15-minutes.

4.6 Measurement Results

4.6.1 Location N1

Table 7 summarises the measured daytime (i.e. 07:00 to 23:00) noise levels at Location N1.

Table 7: Measured Daytime Noise Levels at Location N1

Period	Date	Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)				Notes
			L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}	
Daytime	16/06 Tue	15:00-23:00	64	81	68	46	Road traffic dominant, occasional aircraft, slight wind noise on nearby foliage, birdsong, occasional dog barking, occasional industrial activity from car showroom.
	17/06 Wed	07:00-23:00	66	85	70	49	
	18/06 Thu		66	86	70	49	
	19/06 Fri		66	102	69	49	
	20/06 Sat		64	88	68	48	
	21/06 Sun		63	81	67	44	
	22/06 Mon		61	92	69	51	
	23/06 Tue	07:00-16:00	66	88	70	52	

The daily daytime ambient noise levels were in the range 61 to 66 dB L_{Aeq,T}. Road traffic movements were noted to be the dominant source of noise at this measurement position.

Table 8 summarises the measured night-time (i.e. 23:00 to 07:00hrs) noise levels at Location N1.

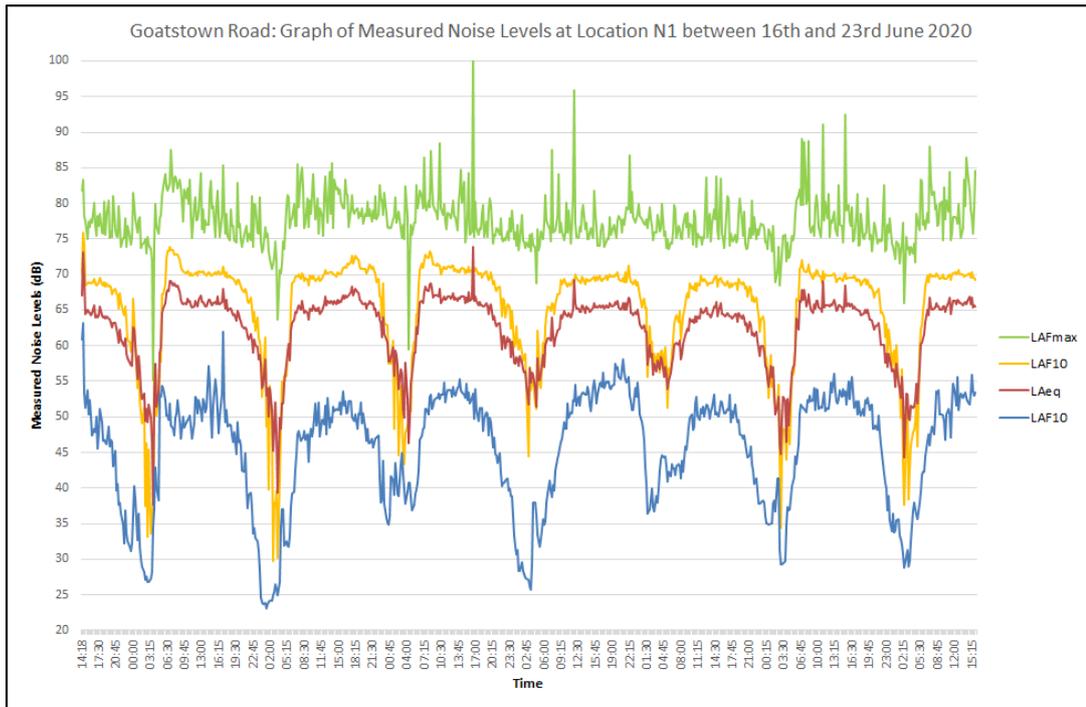
Table 8: Measured Night-time Noise Levels at Location N1

Period	Date	Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)				Notes
			L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}	
Night-time	16-17/06	23:00-07:00	56	82	50	33	Local and distant traffic dominant
	17-18/06		58	81	54	30	
	18-19/06		54	82	45	40	
	19-20/06		58	81	59	33	
	20-21/06		57	78	58	38	
	21-22/06		56	77	54	36	
	22-23/06		55	77	53	33	

The night-time ambient noise level were in the range 54 to 58 dB L_{Aeq,8hr}. Local and distant road traffic were dominant noise sources during night-time periods.

Figure 4 shows the time-history graph of measured noise levels between 16 and 23 June 2020 at Location N1.

Figure 4: Profile of Baseline Noise Monitoring Results at Location B1



4.6.2 Location N2

Table 9 summarises the measured noise levels at Location N2.

Table 9: Measured Noise Level at Location N2

Period	Date	Start Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)				Notes
			L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}	
Daytime	16/06	10:31	67	81	76	48	Road traffic dominant.
		11:40	67	83	72	47	
		13:04	67	80	71	46	

The daytime ambient noise level was 67 dB L_{Aeq,15min}. Road traffic was the dominant source of noise. Birdsong, pedestrian noise and a distant sound from a nearby car wash were also audible as secondary sources.

4.6.3 Location N3

Table 10 summarises the measured noise levels at Location N3.

Table 10: Measured Noise Level at Location N3

Period	Date	Start Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)				Notes
			L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}	
Daytime	16/06	10:50	68	81	72	48	Road traffic dominant.
		11:56	69	89	72	50	
		13:24	68	86	72	47	

The daytime ambient noise levels were in the range 68 to 69 dB L_{Aeq,15min}. Road traffic was the dominant source of noise. Birdsong, pedestrian noise and a distant sound from a nearby car wash were also audible as secondary sources.

4.6.4 Location N4

Table 11 summarises the measured noise levels at Location N4.

Table 11: Measured Noise Level at Location N4

Period	Date	Start Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)				Notes
			L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}	
Daytime	16/06	11:07	52	65	55	44	Road traffic dominant.
		12:12	55	72	56	44	
		13:43	51	66	64	43	

The daytime ambient noise levels were in the range 51 to 55 dB L_{Aeq,15min}. Road traffic was the dominant source of noise. Birdsong, pedestrian noise and a distant sound from a nearby car wash were also audible as secondary sources.

4.6.5 Location N5

Table 12 summarises the measured noise levels at Location N5.

Table 12: Measured Noise Level at Location N5

Period	Date	Start Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)				Notes
			L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}	
Daytime	16/06	11:25	50	62	53	42	Road traffic dominant.
		12:27	50	61	54	41	
		13:59	55	67	61	43	

The daytime ambient noise levels were in the range 50 to 55 dB $L_{Aeq,15min}$. Road traffic was the dominant source of noise. Birdsong, pedestrian noise and a distant sound from a nearby car wash were also audible as secondary sources.

4.7 Traffic Flows

4.7.1 Impact of Covid-19 on Traffic Flows

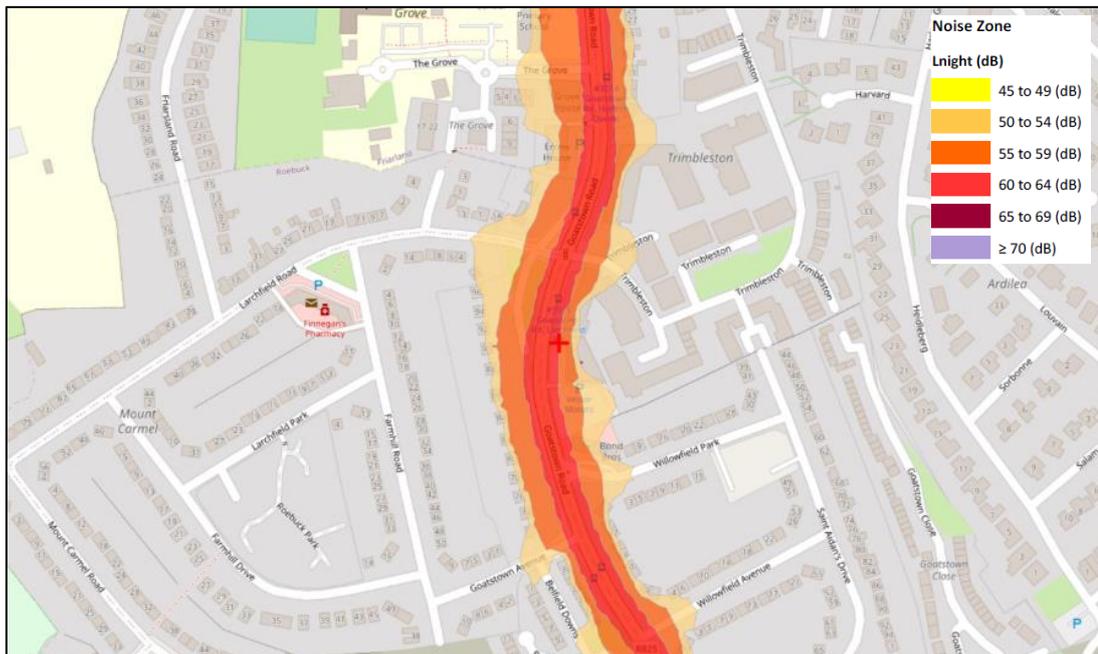
Due to the Covid-19 pandemic, there have been reduced traffic flows on many roads around the country. At the time of the baseline noise survey (i.e. 16-23 June 2020) there had been a second phase of the easing of Covid-19 travel restrictions (“Easing the COVID-19 restrictions on 8 June 2020 (Phase 2)”) and this was apparent upon conducting the site baseline noise surveys whereby the surrounding road network was witnessed to be generally busy.

Using the guidance outlined in the *Calculation of Road Traffic Noise* (CRTN), 1988, (HMSO), it is noted that a doubling of traffic flows on a road can be expected to increase noise levels by approximately 3dB. As the road network was witnessed to be busy, this would indicate that any change in noise level due to reduced traffic flows would be relatively small (i.e. less than 2dB), depending on the extent of the reduced traffic flows over the week of the baseline noise survey. To further investigate this, reference is made to published EPA noise mapping, which is compared to the baseline noise monitoring results in the following section.

4.7.2 EPA Published Noise Mapping

Reference is made to published noise mapping available on the EPA website (ref. <https://gis.epa.ie/EPAMaps/>) for the proposed site. Figure 5 present the published noise mapping in terms of the calculated L_{night} values for Road Traffic Sources.

Figure 5: L_{night} Noise Map, Round 3 (Approx. Site Location Indicated by +)



The L_{night} noise mapping values may be discussed in the context of the measured baseline values, in order to provide a comparison between on-site measurement data and noise mapping data. Figure 5 indicates L_{night} values of approx. 55 to 60 dB at the location of the baseline noise monitoring location N1. Reference to Table 8 presents measured night-time noise levels in the range 54 to 58 dB $L_{\text{Aeq},23:00 - 07:00\text{hrs}}$. The EPA noise mapping data, as well as the data collected during the baseline noise survey, will both be considered in preparation of ProPG noise risk categorisation, as well as the façade sound insulation performance specification.

5 PROPG ACOUSTIC DESIGN STATEMENT

ProPG outlines a systematic risk based 2 stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows:

Stage 1 - Comprises a high-level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels, and;

Stage 2 – Involves a full detailed appraisal of the proposed development covering four “key elements” that include:

- Element 1 - Good Acoustic Design Process;
- Element 2 - Noise Level Guidelines;
- Element 3 - External Amenity Area Noise Assessment, and;
- Element 4 - Other Relevant Issues.

ProPG is intended to outline the methodology and findings of the assessments, so as the planning authority can make an informed decision on the permission. ProPG outlines the following possible recommendations in relation to the findings:

- 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”).

The following sections present the results of both the Stage 1 and Stage 2 studies.

5.1 ProPG Stage 1 (Initial Noise Risk Assessment)

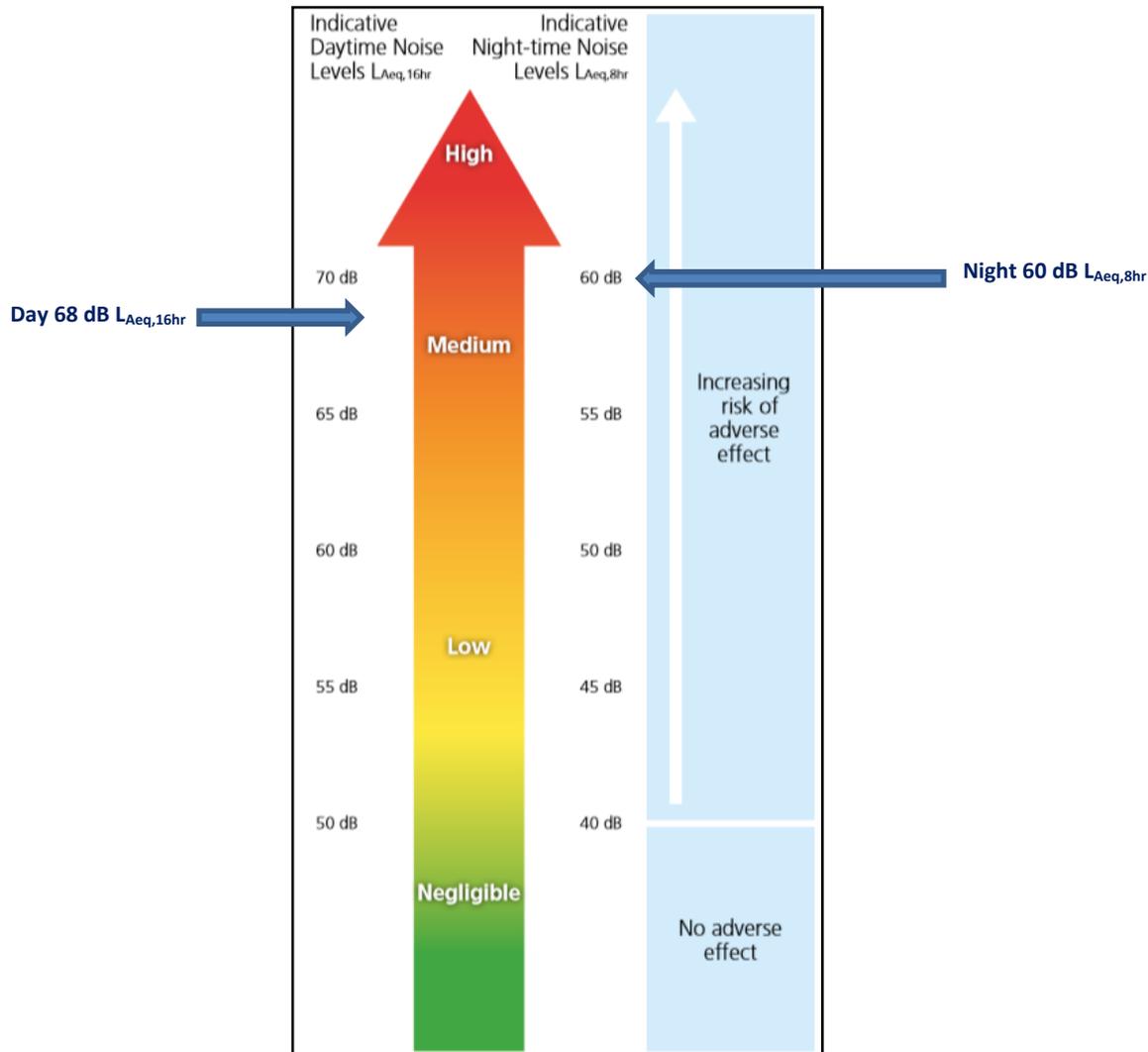
The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorization of the site as a negligible, low, medium or high risk based on the pre-existing noise environment.

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.”

Figure 6 presents the basis of the initial noise risk assessment; it provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on site. The highest daily measured noise levels on the site are indicated on Figure 6.

Figure 6 ProPG Stage 1 - Noise Risk Assessment Categories (Highest expected Site Noise Levels Indicated)



ProPG also states that a site should not be considered a negligible risk if more than 10 L_{AFmax} events exceed 60 dB during the night period and the site should be considered a high risk if the L_{AFmax} events exceed 80 dB more than 20 times a night. Reference to Figure 4 confirms that 80dB L_{AFmax} was not exceeded more than 20-times in any night, over the course of the 7-night survey, thus would not fall within the high risk category.

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.”

A Stage 1 noise risk assessment of the proposed site has been conducted, based on measured noise levels on site and expected noise levels on site in the foreseeable future, with comparison to the categories outlined in Figure 6.

With reference to the existing noise levels measured on site (as presented in Tables 7 to 12), the initial ProPG noise risk categories, for the facades most exposed to road traffic noise, are summarised as follows:

Daytime: **Medium**

Night-time: **Medium**

Other facades that are more sheltered from the Goatstown Road fall within the **Low** noise risk category.

5.2 ProPG Stage 2 (Acoustic Design Statement)

With consideration of the Stage 1 review, as presented above, it is considered that the site is suitable for residential development, provided that a appraisal of the proposed development is carried out, covering four key elements that include:

- Element 1 - Good Acoustic Design Process.
- Element 2 - Noise Level Guidelines.
- Element 3 - External Amenity Area Noise Assessment.
- Element 4 - Other Relevant Issues.

5.2.1 Element 1: Good Acoustic Design (GAD) Process

Good acoustic design should aim to deliver optimum acoustic design for a site without adversely affecting amenity or quality of life or compromising other sustainable design objectives ProPG states that good acoustic design is not equivalent to overdesign of all new development but that it seeks to deliver an optimum acoustic environment for a given site. ProPG outlines the following checklist for GAD:

- 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.

Each item listed above have been addressed in the following sections.

5.2.1.1 Relocation or Reduction of Noise from Source

The dominant noise source impacting upon the site is road traffic from the Goatstown Road. Given that the roads are located outside the site boundary, additional reduction of noise as source cannot be considered in respect of this development.

Additionally, the height of the proposed development, and access requirements, mean that an acoustic barrier between the Goatstown Road and the proposed development is not practical or feasible method of reducing noise ingress.

5.2.1.2 Planning, Layout and Orientation

Development buildings are set back from nearby roads in accordance with local planning guidelines. The layout of the site is such that the inner facing building facades, and the main open amenity space/gardens will all be screened by existing the proposed development buildings.

5.2.1.3 Select Construction Types for meeting Building Regulations

Concrete constructions will be used for external walls of dwellings. Solid concrete constructions provide high levels of sound insulation performance.

Glazing and ventilation paths are typically the weakest façade elements in terms of sound insulation performance. The provision of glazing and acoustic ventilators offering an appropriate level of sound insulation will therefore be provided.

Calculation indicate that it will possible to achieve the desirable internal acoustic environments when windows are open along the majority of building facades. Additional review of specific locations in provided in Section 5.2.2.4

It will be necessary to provide habitable rooms with acoustically rated ventilators along the building elevations most exposed to traffic noise. Occupants will have the options to open the windows if they so wish, however, doing so will increase the internal noise level. This approach to mitigation is acknowledged in ProPG, as reproduced below:

“2.22 Using fixed unopenable glazing for sound insulation purposes is generally unsatisfactory and should be avoided; occupants generally prefer the ability to have control over the internal environment using openable windows, even if the acoustic conditions would be considered unsatisfactory when open. Solely relying on sound insulation of the building envelope to achieve acceptable acoustic conditions in new residential development, when other methods could reduce the need for this approach, is not regarded as good acoustic design. Any reliance upon building envelope insulation with closed windows should be justified in supporting documents “

Note 5 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the “open” position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded

2.34 Where the LPA accepts that there is a justification that the internal target noise levels can only be practically achieved with windows closed, which may be the case in urban areas and at sites adjacent to transportation noise sources, special care must be taken to design the accommodation so that it provides good standards of acoustics, ventilation and thermal comfort without unduly compromising other aspects of the living environment. In such circumstances, internal noise levels can be assessed with windows closed but with any façade openings used to provide “whole dwelling ventilation” in accordance with Building Regulations Approved Document F (e.g. trickle ventilators) in the open position (see

Supplementary Document 2). Furthermore, in this scenario the internal L_{Aeq} target noise levels should not generally be exceeded."

It is therefore acceptable to provide building facades with appropriate sound insulation, with windows closed and vents open, that result in a good internal acoustic environment.

5.2.1.4 *Impact of noise control measures on fire, health and safety etc*

The proposed noise control measures do not have a significant impact on fire or other health and safety issues.

5.2.1.5 *Assess Viability of Alternative Solutions*

The major noise sources incident on the site are road traffic. Road traffic is mitigated by the distance from the road edge to the building, screening by existing/proposed structures, off and on-site buildings and orientation of windows. All the measures listed above aid in the control of noise intrusion to the living areas and bedrooms across the majority of the development.

5.2.1.6 *Assess External Amenity Area Noise*

ProPG advises the following in relation to external noise levels in amenity areas:

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 $L_{Aeq,16hr}$.

An assessment of noise within external amenity areas is addressed the relevant section of this document.

5.2.1.7 *GAD Summary*

It is considered that the principles of Good Acoustic Design have been applied to the development.

5.2.2 **Element 2: Internal Noise Level Guidelines**

5.2.2.1 *Internal Noise Criteria*

ProPG recommends internal noise targets as derived from BS 8233. These internal noise level targets are presented in Table 3.

ProPG acknowledges that there can be some flexibility given in cases where the development is necessary or desirable, and that a relaxation by up to 5dB of the internal L_{Aeq} values can still provide reasonable internal conditions.

5.2.2.2 *Assessed External Noise Levels*

Noise surveys have been conducted across the site in order to establish the range and magnitude of noise levels at various positions on-site. Table 13 presents the calculated noise levels that are expected at the proposed development facades that have been used for assessment purposes.

Table 13: Projected Road Traffic Noise Levels at Development Facades

Development Zone	Period	Façade Assessment Level (dB L _{Aeq,T})
Façades facing Goatstown Road	Daytime (07:00 to 23:00)	68
Internal Facing Development Façades		≤ 55
Façades facing Goatstown Road	Night-time (23:00 to 07:00)	60
Internal Facing Development Façades		≤ 45

Adjustments have been made to calculate noise levels at internal facing facades for the purposes of the specification of noise mitigation measures (i.e. glazing and acoustically rated ventilators).

5.2.2.3 Proposed Façade Acoustic Specification

The methodology to estimate internal noise level within a building is outlined in Annex G of BS 8233: 2014 and is derived from BS EN 12354-3: 2000: *Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound*. The methodology calculates internal noise levels based on a reference external noise level (i.e. octave band frequency data as measured in baseline noise surveys) and proposed façade constructions. The standard takes into account the following site-specific characteristics:

- External noise level;
- Area and type of each façade element (i.e. window, wall, etc.);
- Shape of the façade, and;
- Characteristics of the receiving room (i.e. room volume, reverberation time etc.)

This method has been used to determine the required sound insulation performance for the various building façade elements.

Figure 8: Façade Noise Level Designation (First to Third Floors)

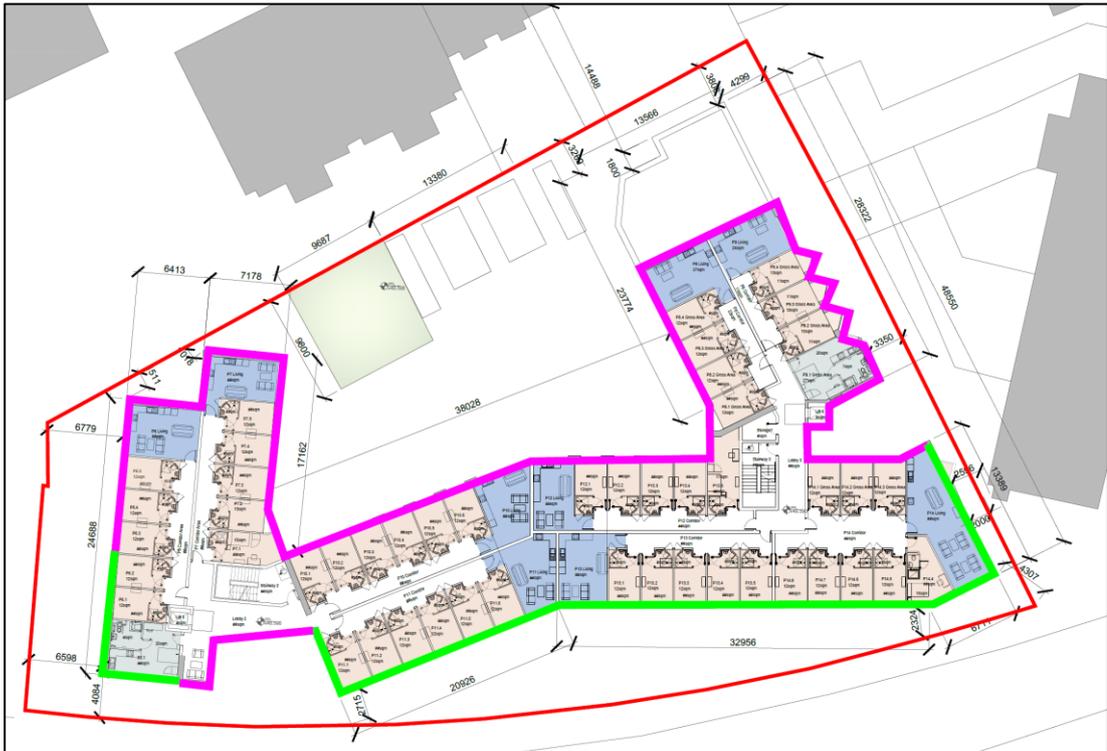
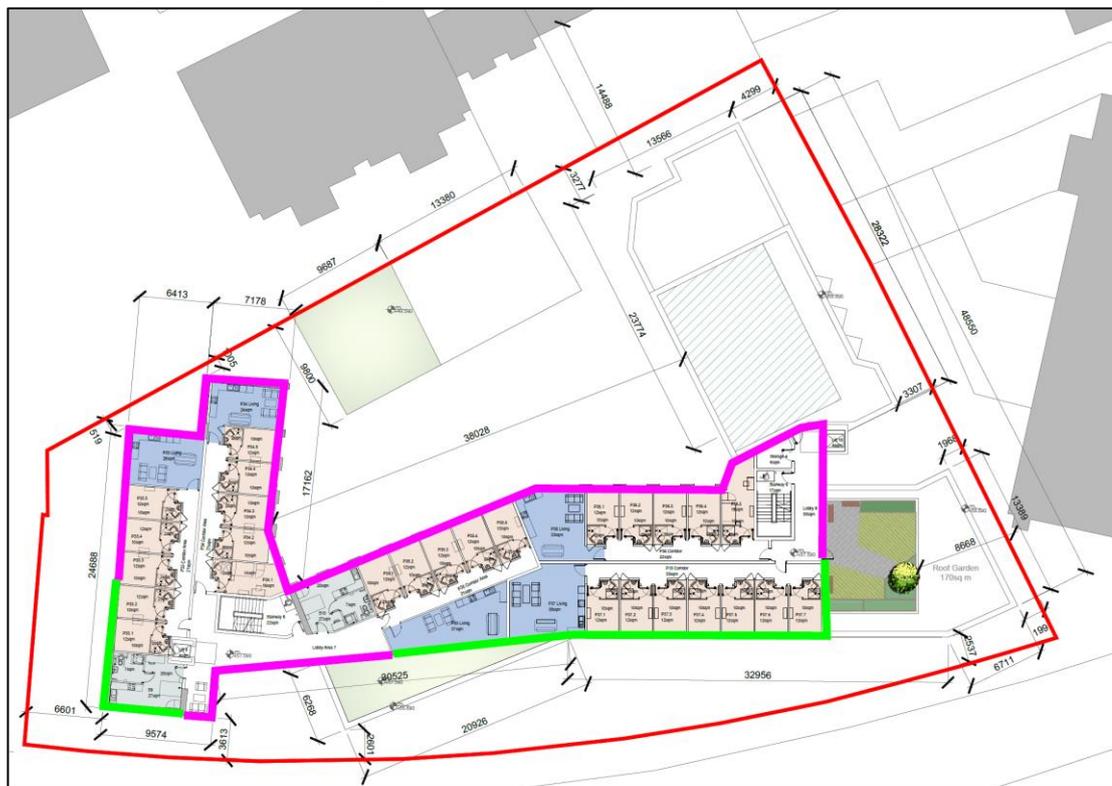


Figure 9: Façade Noise Level Designation (Fourth Floor)



that form part of the glazed element of the façade, i.e. glass, frames, seals, openable elements etc.

The window supplier shall provide laboratory tests confirming the sound insulation performance, (to British Standard 2750 Part 3:1980 and British Standard 5821, or British Standard EN ISO 140 Part 3 1995 and British Standard EN ISO 717, 1997).

Wall / Roof Constructions

Masonry wall and roof constructions with plasterboard linings typically offer sound insulation performance much greater than that offered by the glazed elements.

The calculated internal noise levels across the building façade have assumed a minimum sound reduction index of 50 dB R_w for these constructions. The performance of non-glazed elements of the façade will be confirmed as part of the detailed design phase.

5.2.2.4 Acoustically Rated Ventilators

Acoustic attenuation to ventilation systems shall be provided to the following rooms:

Table 15: Specification for Acoustic Ventilators to Dwellings (Ref. Figures 7 to 10)

Specification	Room Type	Required Overall dB $D_{n,e,w}$
Elevations Highlighted Green	Living Room, Dining Rooms and Bedrooms	39
Elevations Highlighted Magenta	-	Not required

The ventilation supplier shall provide evidence, consisting of calculations and/or laboratory tests confirming the acoustic performance of ventilation systems.

5.2.3 Element 3: External Amenity Area Noise Assessment

It is a ProPG requirement, as part of the acoustic design statement, to assess noise levels within external amenity spaces. ProPG refers to guidance contained in BS 8233 (2014) for this element of the assessment, the relevant extract of BS 8233 (2014) states:

“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 $L_{Aeq,T}$ which would be acceptable in noisier environments. 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.”

BS 8233 also comments that:

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”

In addition, ProPG, Element 3(v) states the following in relation to external amenity areas:

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

- *a relatively quiet facade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e. an enclosed balcony) as part of their dwelling; and/or;*
- *a relatively quiet alternative or additional external amenity space for sole use by a household, (e.g. a garden, roof garden or large open balcony in a different, protected, location); and/or;*
- *a relatively quiet, protected, nearby, external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or;*
- *a relatively quiet, protected, publically accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquility) 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.*

With consideration of the various open amenity spaces / gardens proposed as part of the development, the following comments are provided:

External Amenity Space

There is a ground floor external amenity space proposed as part of the development. The measured baseline daytime noise levels at Locations N4 and N5 (Ref. Figure 3) are considered to be a conservative estimation of the expected noise level in the proposed ground floor amenity space (i.e. ~ 50 to 55 dB $L_{Aeq,T}$). When the development is constructed, noise levels in this area of the site are expected to be lower than measured, due to the location of the proposed development buildings, which will further shield the amenity area from road traffic. There are also rooftop gardens at fourth and fifth floor level. These rooftop gardens will be shielded from road traffic by the proposed development buildings and the noise levels in these gardens are also expected fall below 55 dB $L_{Aeq,T}$.

The expected noise level in the proposed external amenity areas are within the recommended range of noise levels as outlined in ProPG Guidance i.e. *noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,T}$.*

5.2.4 Element 4: Assessment of Other Relevant Issues

ProPG defines a number of other issues that should be considered and may prove pertinent to the assessment:

- 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
- 4(v) acoustic design v wider planning objectives

Each of the above consideration is discussed below.

5.2.4.1 Compliance with Relevant National and Local Policy

Table 17 provides a comparison of the measured (corrected) site noise levels, when compared to the *Desirable Low* and *Undesirable High* Sound levels as presented in the DCC NAP.

Table 17: Review of Measured Noise Levels vs. NAP Desirable Low and Undesirable High Sound levels

Period	Expected Noise Level On Site	NAP <i>Desirable Low</i> Sound Level	NAP <i>Undesirable High</i> Sound Level	Comments
Daytime	50 - 68 dB $L_{Aeq,16hr}$ (L_{day})	< 55 dB(A) L_{day}	> 70 dB(A) L_{day}	Noise levels fall generally between <i>Desirable Low</i> and <i>Undesirable High</i> Category
Night-time	45 - 60 dB $L_{Aeq,8hr}$ (L_{night})	< 50 dB(A) L_{night}	> 55 dB(A) L_{night}	

The measured noise levels therefore fall generally between *Desirable Low* and *Undesirable High* sound level categories, indicating that the impact of environmental noise sources on the proposed development will not be significant. Where noise levels are approaching the *Undesirable High* sound level categories, noise mitigation measures have been designed and incorporated into the development to control noise ingress, in line with the requirements of ProPG. This report has therefore been prepared in compliance with the requirements of local policy.

5.2.4.2 Magnitude and extent of compliance with ProPG

The following conclusions are made in relation to the magnitude and extent of compliance with ProPG:

- All dwellings have been designed to achieve the good internal noise levels, as specified within ProPG, when windows are closed.
- The majority of dwellings that are screened by the development buildings can achieve good to reasonable internal noise levels with windows partially open.
- The remainder of dwellings can achieve good internal noise levels with windows closed and acoustic ventilators open.
- The open amenity areas have been assessed and is determined to be within the ProPG guidance for noise levels in external amenity areas.

It is therefore concluded that the proposed development is in compliance with the requirements of ProPG.

5.2.4.3 Likely occupants of the development

The development consists of a mixture of dwelling type and is designed for the purpose of student accommodation. The criteria adopted as part of this assessment are based on those recommended for permanent dwellings and are therefore considered robust and appropriate for the occupants.

5.2.4.4 Acoustic design v unintended adverse consequences

There have not been any unintended adverse consequences identified resulting from the acoustic design and control measures.

5.2.4.5 Acoustic design v wider planning objectives

Acoustic design has been considered in the context of wider planning objectives, particularly the National Planning Framework 2040. (NPF) The NPF is taken into consideration in the production of local planning policy/guidelines and plans. In following existing local / national guidelines and policies, it is considered that the acoustic design is compliant with wider planning objectives.

6 SCHEDULE FOR CONSTRUCTION NOISE & VIBRATION MONITORING

It is recommended that continuous construction noise and vibration monitoring be provided, to be maintained on an ongoing basis by the contractor for the duration of the project.

It is proposed that a noise monitor be installed at a location where construction noise levels are representative of those experienced at the dwellings adjoining the eastern site boundary (adjacent to baseline noise monitoring location N4). The monitoring equipment shall meet the following minimum specification (or similar approved):

- Logging of hourly L_{Aeq} , L_{AFMax} & PPV samples;
- E-mail alert on threshold exceedance;
- E-mail alert on low battery and low memory, and;
- Remote access to measured data.

Data shall be reported on a monthly basis.

7 PLANT NOISE EMISSIONS FROM PROPOSED DEVELOPMENT

There is a plant room proposed at fifth floor rooftop level (in the southern section of the site), as well as a plant area (ESB Substation, Swithroom and Water Tank Room) at ground floor level adjoining the eastern site boundary. Reference is made to BS 4142:2014+A1: 2019 in setting criteria for new mechanical plant items.

Based upon measured day and night-time background sound levels on the site (as referred in Section 4.0), appropriate plant noise criteria to nearby dwellings are as follows:

- Daytime (07:00 to 23:00hrs) 45 dB $L_{Aeq,1hr}$
- Night-time (23:00 to 07:00hrs) 35 dB $L_{Aeq,15-min}$

Plant noise emissions should not contain any characteristics that would warrant any acoustic feature penalties under the BS 4142:2014 assessment procedure.

At detailed design stage, noise emissions from new plant servicing the development shall be designed so as not to exceed the above limit values.

8 CONCLUSIONS

RSK Ireland Limited (RSK) was instructed by Orchid Residential Ltd to conduct baseline noise surveys, and a noise impact assessment in respect of a proposed student accommodation development at Goatstown, Dublin.

The objective of this study is to assess the suitability of the site for residential development, and to provide recommendations for noise mitigation measures, where necessary, to ameliorate potential impacts.

Baseline noise measurements were conducted, in accordance with ISO 1996-2:2017, at five locations representative of dwelling facades. Measurements were taken by RSK between 16th and 23rd June 2020.

Assessment methodologies use guidance from the *Dublin Agglomeration Environmental Noise Action Plan, December 2018 – July 2023, Volume 2, Dún Laoghaire-Rathdown County Council and The Professional Guidance on Planning & Noise (ProPG), May 2017*. The two primary stages of the ProPG assessment are the “Stage 1” initial noise risk assessment of the proposed site and “Stage 2” detailed appraisal of the proposed development and preparation of an Acoustic Design Statement.

The site noise survey has also been used to assess the sites noise risk categories, as per the ProPG “Stage 1” assessment. The ProPG noise risk categories for the facades most exposed to road traffic noise are as follows:

Daytime: **Medium**

Night-time **Medium**

Other facades that are more sheltered from the Goatstown Road fall within the **Low** noise risk category.

Recommendation to mitigate noise emissions, as specified in the “Stage 2” Acoustic Design Statement, include the following:

- Provision of glazing with minimum sound insulation properties as outlined in this document.
- Provision of acoustic ventilators to dwellings exposed to the highest levels of road traffic noise.

In summary, it is considered that the site is suitable for residential development subject to the provision of the noise control recommendations as outlined in this report.

This document also sets out operational phase plant noise limits (derived in accordance with BS 4142:2014+A1:2019), for the proposed development, as well as a proposed programme for monitoring of construction noise and vibration, in order to protect the amenity of existing residents in the neighbourhood.

APPENDIX A

SERVICE CONSTRAINTS

RSK ENVIRONMENT LIMITED SERVICE CONSTRAINTS

1. This report (the "Services") was compiled and carried out by RSK Ireland Limited (RSK) for Orchid Residential Ltd (the "client") in accordance with the terms of a contract between RSK and the "client". The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.
2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be** well advised to seek independent advice from a competent environmental consultant and/or lawyer.
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK 's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date hereof, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.
8. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site.



APPENDIX B

CALIBRATION CERTIFICATES

Brüel & Kjær 

The Calibration Laboratory
Skodsborgvej 307, DK-2850 Nærum, Denmark



CERTIFICATE OF CALIBRATION

No: CDK1806788

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CALIBRATION OF

Sound Level Meter:	Brüel & Kjær Type 2250	No: 2837940	Id: - 2837940
Microphone:	Brüel & Kjær Type 4189	No: 2799522	
Preamplifier:	Brüel & Kjær Type ZC-0032	No: 05085	
Supplied Calibrator:	None		
Software version:	BZ7222 Version 4.7.4	Pattern Approval:	PTB1.63-40478500 / 1.63-4078502
Instruction manual:	BE1712-22		

CUSTOMER

Enfonic Ltd
Level 2, Charlestown Centre
Dublin
D11 KXC7
Ireland

CALIBRATION CONDITIONS

Preconditioning: 4 hours at 23°C ± 3°C
Environment conditions: See actual values in *Environmental conditions* sections.

SPECIFICATIONS

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in IEC6162-1:2013 class 1. Procedures from IEC 61672-3:2013 were used perform the periodic tests. The accreditation assures the traceability of the international units system SI.

PROCEDURE

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 7.0 - DB: 7.00) by using procedure B&K proc 2250, 4189 (IEC61672:2013)

RESULTS

Calibration Mode: **Calibration as received.**

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2018-08-24

Date of issue: 2018-08-24


Mikail Önder

Calibration Technician


Susanne Jørgensen

Approved Signatory

Reproduction of the complete certificate is allowed. Parts of the certificate may only be reproduced after written permission.

<h2>Certificate of Calibration</h2> <p>Issued by University of Salford (Acoustics Calibration Laboratory) UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801</p>		
<p>Page 1 of 2</p>		
<p>APPROVED SIGNATORIES</p> <p>Claire Lomax [x] Andy Moorhouse [] <i>C. Lomax</i></p> <p>Gary Phillips [] Danny McCaul []</p>		<p>University of Salford MANCHESTER</p>
<p>acoustic calibration laboratory</p> <p>The University of Salford, Salford, Greater Manchester, M5 4WT, UK http://www.acoustics.salford.ac.uk t 0161 295 3030/0161 295 3319 f 0161 295 4456 e c.lomax1@salford.ac.uk</p>		

Certificate Number: 04367/2

Date of Issue: 15 August 2019

VERIFICATION OF A TYPE 1 SOUND LEVEL METER to BS7580 Part 1

FOR:	RSK (Dublin) Bluebell Business Centre Old Naas Road Bluebell Dublin DU0 12
FOR THE ATTENTION OF:	James Mangan
CALIBRATION DATE:	14/08/2019
TEST PROCEDURE:	CTP08 (Laboratory Manual)

Sound Level Meter					
Manu:	Bruel & Kjaer	Model:	2260	Serial No:	1894051
Microphone					
Manu:	Bruel & Kjaer	Model:	4189	Serial No:	2656004
Preamp					
Manu:	Bruel & Kjaer	Model:	ZC 0026	Serial No:	-
Associated Calibrator					
Manu:	Bruel & Kjaer	Model:	4230	Serial No:	1471950 Adaptor: DB 0311

Test Engineer (initial): *GP*

Name: Gary Phillips

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Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801

Page 2 of 2

Certificate Number: 04367/2

Date of Issue: 15 August 2019

SET-UP INFORMATION

The instrument was running software module BZ7202 Version 1.1. The reference range, reference SPL, primary indicator range, pulse range and linearity range as specified by the manufacturer have been used. The instrument was adjusted to read 94.2 dB (A) in response to the associated calibrator. This reading was obtained from the calibration certificate of the calibrator, 04367/1 and information in the manufacturer's instruction manual, with the instrument S.I. Correction set to Frontal, when the instrument is fitted with the supplied UA0237 windscreen.

MEASUREMENTS

The levels of self-generated noise were:

A:	13.8 dB
C:	16.2 dB
Lin:	22.3 dB

At the end of the tests the indication of the sound level meter in response to the associated sound calibrator was 94.2 dB (A) which corresponds to the following level at 101.325 kPa:

Sound Pressure Level 94.2 dB (A)

This reading should be used henceforth to set up the sound level meter for field use.

THE SOUND LEVEL METER WAS VERIFIED ACCORDING TO THE PROCEDURE GIVEN IN BS7580: Part 1 1997 WITH THE FOLLOWING EXCEPTIONS:

The microphone corrections applied as specified in BS 7580: Part 1: 1997 were obtained from a frequency response measurement by this Laboratory using the electrostatic actuator method. The response in isolation is not covered by our UKAS accreditation.

A stricter test than that specified in 5.5.10 and 5.5.11 of BS 7580 has been used by not applying the low level signal.

STATEMENT OF RESULT:

THE SOUND LEVEL METER CONFORMS TO THE TYPE 1 REQUIREMENTS OF BS7580: PART1 1997.

Instruments used in the verification procedure were traceable to National Standards. The method of acoustic calibration employed a standard sound pressure calibrator for the 1 kHz test whilst the tests at 125 Hz and 8 kHz were performed by the electrostatic actuator method. The uncertainty of the Laboratory's 1 kHz calibrator was ± 0.08 dB. The uncertainty of the standard calibrator is not included in the applied tolerances. It is assumed that the sound level meter was manufactured in accordance with BSEN60651: 1994 Type 1, and BSEN60804: 1994 Type 1.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements. All measurement results are retained at the acoustic calibration laboratory for at least four years.

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<h2>Certificate of Calibration</h2> <p>Issued by University of Salford (Acoustics Calibration Laboratory) UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801</p>		 <p>UKAS CALIBRATION 0801</p>
<p>Page 1 of 2</p>		
<p>APPROVED SIGNATORIES</p> <p>Claire Lomax [x] Andy Moorhouse [] <i>C. Lomax</i></p> <p>Gary Phillips [] Danny McCaul []</p>		<p>University of Salford MANCHESTER</p>
<p>acoustic calibration laboratory</p> <p>The University of Salford, Salford, Greater Manchester, M5 4WT, UK http://www.acoustics.salford.ac.uk t 0161 295 3030/0161 295 3319 f 0161 295 4456 e c.lomax1@salford.ac.uk</p>		

Certificate Number: 04367/1

Date of Issue: 12 August 2019

CALIBRATION OF A SOUND CALIBRATOR

FOR: RSK
Bluebell Business Centre
Old Naas Road
Bluebell
Dublin
DU0 12

FOR THE ATTENTION OF: James Mangan

DESCRIPTION: Calibrator with housing for one-inch microphones and adaptor type DB 0311 for half-inch microphones.

MANUFACTURER: Bruel & Kjaer

TYPE: 4230

SERIAL NUMBER: 1471950

DATE OF CALIBRATION: 12/08/2019

TEST PROCEDURE: CTP06 (Laboratory Manual)

Test Engineer (initial): *GP* Name: Gary Phillips

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Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801

Page 2 of 2

Certificate Number: 04367/1

Date of Issue: 12 August 2019

MEASUREMENTS

The sound pressure level generated by the calibrator was measured using a calibrated, WS2P condenser microphone as specified in this certificate. The calibration was carried out with the calibrator in the half-inch configuration.

Five determinations of the sound pressure level, frequency and total distortion were made.

The results have been corrected to the reference pressure of 101.325 kPa using manufacturer's data.

RESULTS

Coupler configuration:	Half-inch
Microphone type:	GRAS 40AG
Output level (dB re 20 μ Pa):	94.08 dB \pm 0.11 dB
Frequency (Hz):	990.78 Hz \pm 0.12 Hz
Total Distortion (%):	1.00 % \pm 0.32 %

Average environmental conditions at the time of measurement were:

Pressure:	100.976 kPa \pm 0.015 kPa
Temperature:	23.1 °C \pm 0.4 °C
Relative humidity:	50.3 % \pm 2.4 %

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

All measurement results are retained at the acoustic calibration laboratory for at least four years.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to the units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full except with the prior written approval of the issuing laboratory.