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An acoustic review of proposed Cuckoo's Nest Pub & Apartments, Greenhills Road, Kilnamanagh, Dublin 24.

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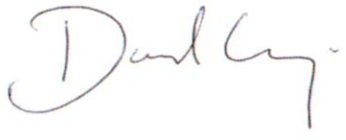
Organisation:	ICAN Acoustics
Date:	Friday 2nd December 2022

Signature Approvals:



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Executive Summary

A detailed acoustic study has been carried out in relation to the proposed bar/restaurant development titled the Cuckoo's Nest Pub & Apartments, Greenhills Road, Kilnamanagh, Dublin 24. Our assessment indicates that noise levels associated with the running of mechanical plant in the premises at the nearest residential locations are likely to be comfortably below the limiting levels set out in BS8233:2014 and guidance in the World Health Organisation Guidelines for Community Noise (1999). The development has been designed to consider the residential amenity within the vicinity.

The proposed roof design arrangement will effectively provide a rooftop barrier (using the development's lift/stair core) and offer adequate attenuation to the rooftop mechanical plant and plant outlets (vents) at the roof level at a designated location.

The designated smoking area has been strategically placed on the western and nothwestern side of the development. This building will also provide effective building barrier effects to patrons using this as an outdoor smoking area, which will offer noise screening to residential properties on the Southern and Eastern sides of the development.

This Report also sets out proposed operational details and the building's design strategies that can be applied to control noise from the proposed activities effectively.

In summary, based on matters detailed in this Report, the noise impact associated with the new development is considered to be within acceptable noise levels. It does not pose any significant noise impact on the surrounding environment.

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1 Introduction

ICAN Acoustics have been engaged by Armstrong Fenton Planning Consultants to carry out an acoustic review of specific elements relating to the proposed Cuckoo's Nest Pub & Apartments, Greenhills Road, Kilnamanagh, Dublin 24. The scope of our work includes a baseline noise study and a high-level review of the design arrangement concerning The Cuckoo's Nest Bar and Restaurant and its proximity to the nearest residential properties in the area. The proposed development will include a Gastropub offering on the ground floor with residential apartments on 1st, 2nd and 3rd floors.

1.1 Further Information Request

As part of the Planning Application (SD22A/0285) a Further Information request issued on 18th August 2022 is considered as part of our assessment. Figure 1 below reproduces item 11 as part of the Further Information Request as part of Planning Application SD22A/2085. Our review considers the potential of noise disturbance and assessment using BS8233:2014 as well as the 1999 World Health Guidelines on Community Noise. In addition, we consider the advice given in TGD-E,2014. Concerning Further Information Request item 11 (C), this is not considered within the brief of this Report. However, it will be referred to and responded to in the Armstrong Fenton Planning Consultant's response.

> 11. Noise.
> The applicant is requested to provide:
> (A) An assessment for the potential for noise nuisance from the operational use of the public house and retail unit.
> (B) Proposals to negate noise nuisance from the operational use of the public house and retail unit must be submitted to ensure compliance with BS 8233 Guidelines for Sound Insulation and Noise Reduction for Buildings.
> Additionally, the applicant should:
> (C) demonstrate that the proposed development would support Policy IE8 of the South Dublin County Development Plan 2022 - 2028.

Figure 1: Item 11 of Further Information Request as part of Planning Application SD22A/0285

1.2 Site Arrangement

The acoustic review considered in this Report relates to a specific site arrangement presented by Armstrong Fenton Planning Consultants in October/November 2022, as shown in Figure 2 below. To the West of the proposed development is the Temple Woods housing estate, which consists of several attached and detached residential houses. Directly south of the proposed development is a three-story apartment block on the southern boundary of the development. To the north of the site is a small car park and Tallaght Theatre, which includes a small betting office on the northern side of that. To the West of the site is Elmcastle Housing estate, with two intervening roads (Greenhill Road and Treepark Road).

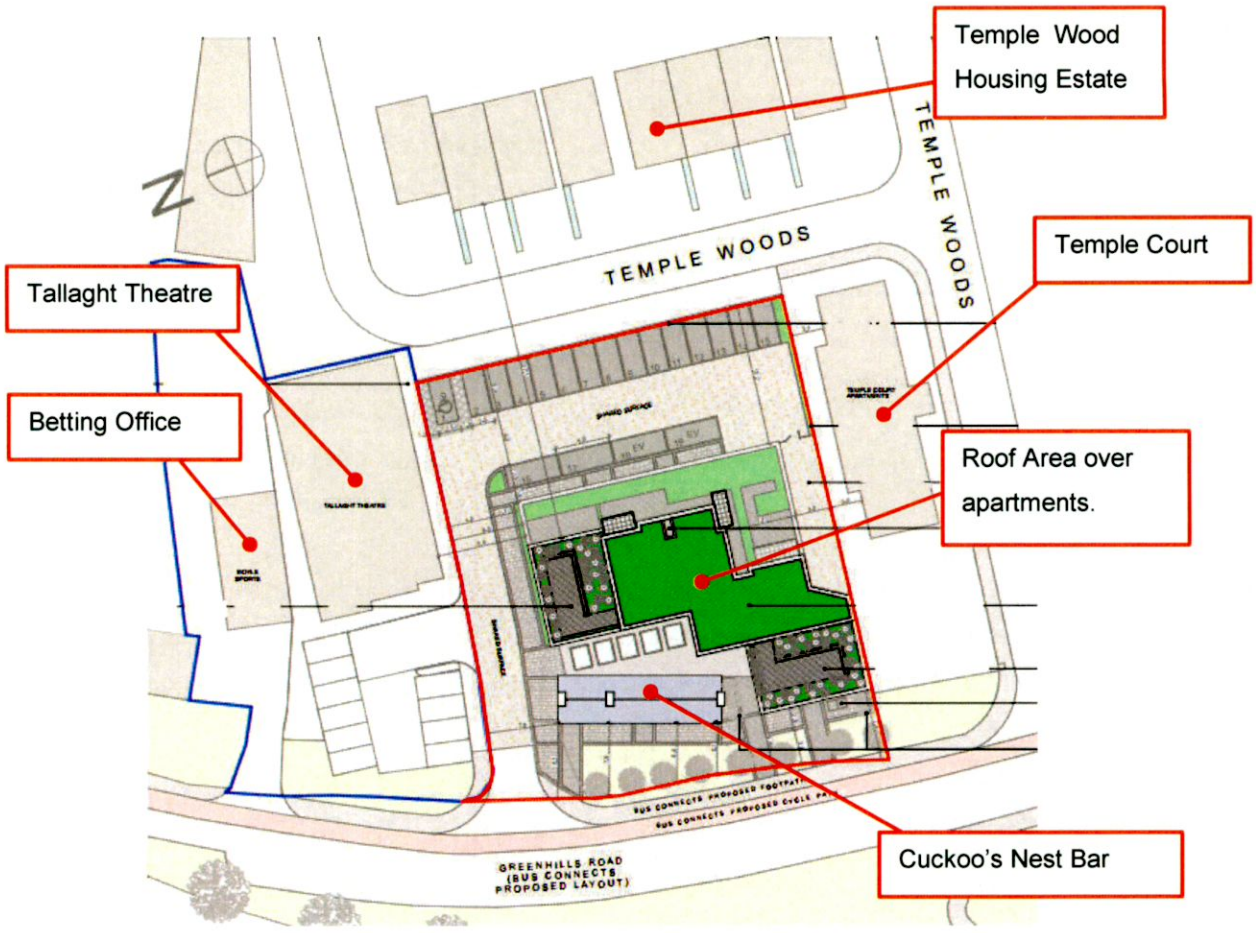

Figure 2: Plan view showing the proposed development relative to the Tallaght Theatre, Temple Woods housing Estate and Temple Court.

1.3 About the author of this Report

Diarmuid Keaney works as a noise and vibration consultant for ICAN Acoustics which originally commenced trading in 1998. ICAN Acoustics has a wide variety of clients ranging from state authorities, national power companies to industrial and private clients. Diarmuid holds a Master of Science in Applied acoustics awarded by Derby University, a Diploma in Acoustics in Noise Control and a BE Honours Degree from the National University of Ireland. Diarmuid was awarded a distinction on completion of his M.Sc. in Applied Acoustics and was graded an (A-) for his independent study project. He is a full member of the UK's Institute of Acoustics, the Acoustical Society of America and the Institute of Sound and Communication Engineers. Diarmuid is currently a serving member on the committee of the Irish Branch of the Institute of Acoustics since 2010. All measurement work and reporting in this Report was carried out by Diarmuid Keaney of ICAN Acoustics.

2 Proposed Design

2.1 Proposed Site Elevations

Figures 3~6 below show various elevations of the development proposed. Figure 3 shows the proposed west contiguous elevation, while Figure 4~6 shows building elevations from the south, east and north. It can be seen in Figure 3 that the older two-story building is to be retained and will remain the front façade of the proposed Gastropub to be located on the ground floor of the development. Adjacent to the premises (on the southern side of the development), it is proposed that a retail unit on the ground floor will not be considered a noise risk to the residential amenity.

Figure 3: Showing the proposed West contiguous elevation.

Figure 4 below shows a southern elevation of the proposed development, showing the southern elevation of the retail unit and proposed residential apartments on the development's 1st, 2nd and 3rd floors.

Figure 4: Showing the proposed South elevation.

Figure 5 below shows the Eastern elevation, with the rear of the retail unit and Gastropub on the ground floor, with apartments at 1st, 2nd and 3rd-floor levels.

Figure 5: Showing the proposed East elevation.

Figure 6 below shows the Northern elevation, showing the proposed Gastropub on the ground floor (and older building to be retained), with apartments at 1st, 2nd and 3rd-floor levels.

Figure 6: Showing the proposed North elevation.

2.2 Floor Plans

Figure 7 below shows the proposed plant/store to be located under the retail space, accessed from inside the Gastropub and serviced via a stock elevator. It is proposed that this location include keg storage, spirits storage, and an ancillary plant associated with the premises.

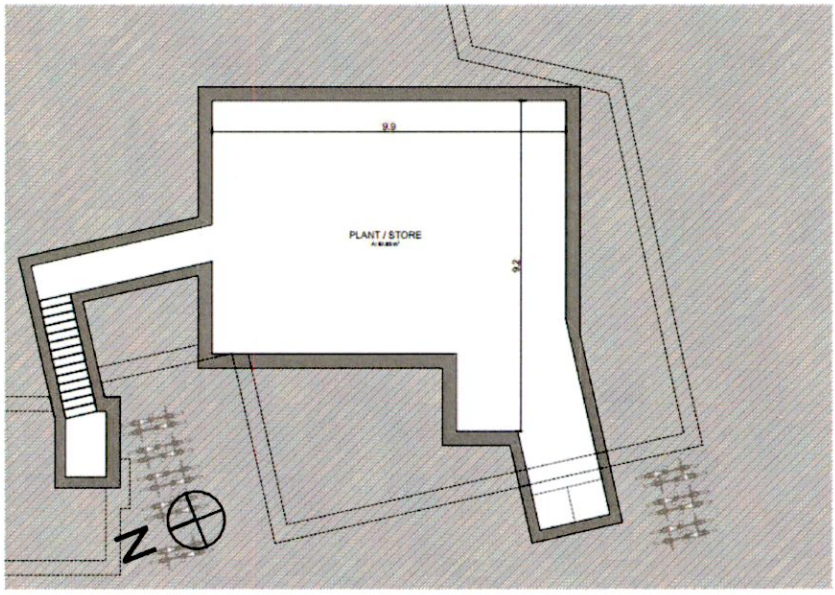

Figure 7: Proposed cellar under the retail space to service the plant/store requirements for the Gastropub.

Figure 8 below shows the plan view of the Gastropub and ground floor retail space.

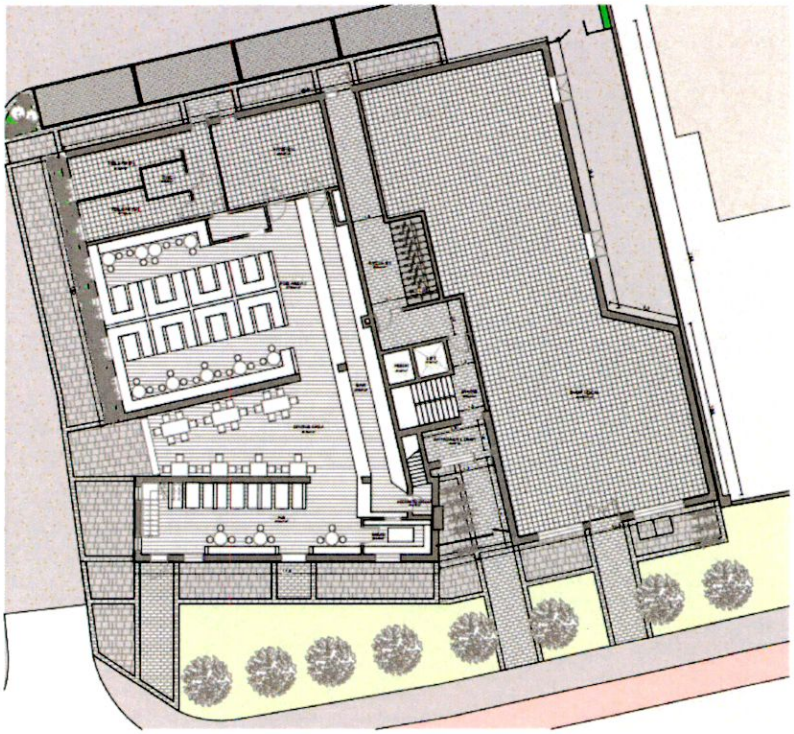

Figure 8: Proposed ground floor Gastropub and retail unit adjacent to the premises.

Figure 9 below shows the proposed apartments at 1st floor which will be located directly above the Gastropub and Retail Space on the ground floor. In addition to that, it shows the 1st floor of the Gastropub floor plan to be included as part of the retained existing building.

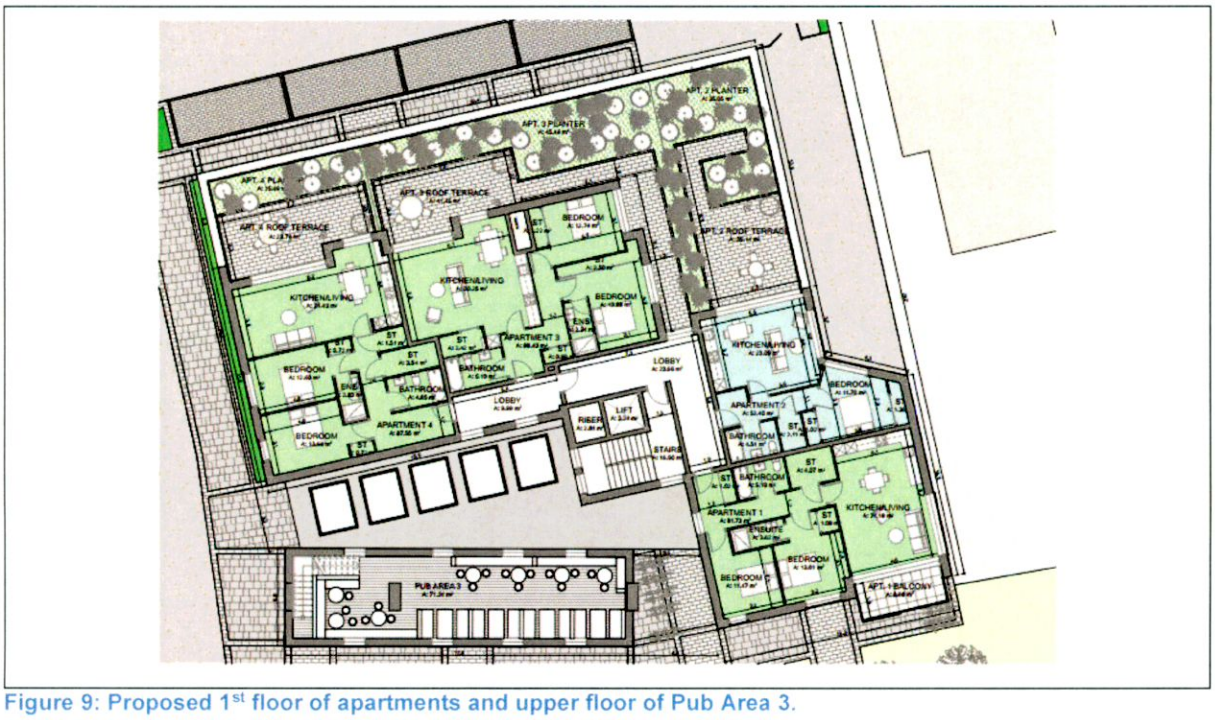

Figure 9: Proposed 1st floor of apartments and upper floor of Pub Area 3.

Figure 10 below shows the 2nd-floor level apartments to be located over 1st-floor apartments, within the footprint and of the ground-floor Gastropub and Retail space. In this Figure, you can see the roof of the existing building to be retained.

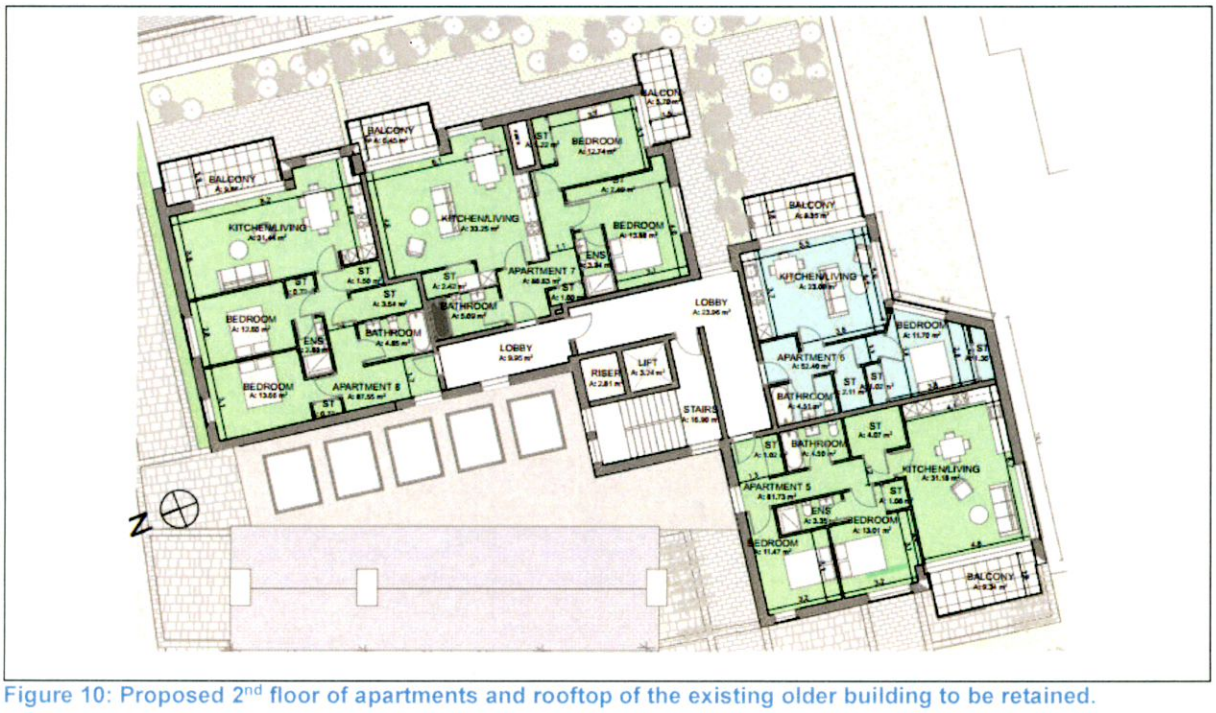

Figure 10: Proposed 2nd floor of apartments and rooftop of the existing older building to be retained.

Figure 11 below shows the proposed rooftop level. It is anticipated that this rooftop area will allow for the location of the external mechanical plant associated with the Gastropub and Retail space. This will include the kitchen supply and extract fans, air-conditioning units, fresh air ventilation, an air handling unit, external refrigeration condensers and other external but associated items. In addition, it is proposed that a designated plant compound will be included in the detailed design phase to have the plant items required to service both the Gastropub and Retail space. The proposed plant compound will be placed to maximise building screening effects and within a louvred enclosure close to the centre of the roof space to maximise noise screening benefits. The use of rooftop plant locations presents an ideal noise mitigation opportunity which avoids the placement of noise-generating equipment and sources on building facades, which can exist in traditional arrangements.

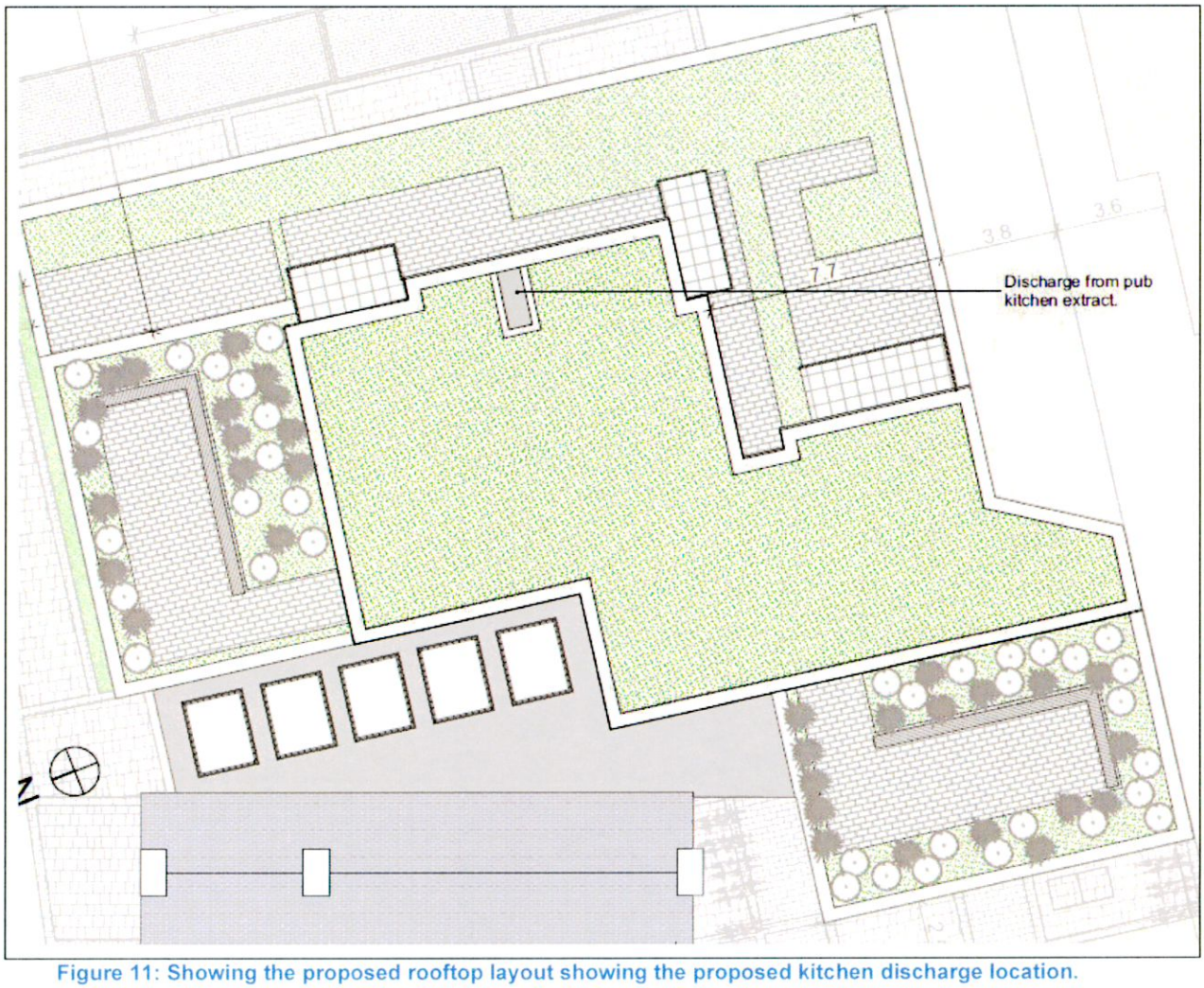

Figure 11: Showing the proposed rooftop layout showing the proposed kitchen discharge location.

3 Baseline Noise Study

In the first instance, it is essential to identify the receptors or dwellings located in the vicinity of the proposed development that may be sensitive to noise. Figure 12 below shows an aerial map of the general arrangement and the approximate boundary of the development site. It should be noted that the development is within the vicinity of the heavily trafficked M50 and heavily trafficked Greenhills Road. The dominant source of noise in the area is road traffic, with a notable contribution in all of our measurements. In addition to road traffic noise, there were some additional noise sources noted in the area, which have been detailed in subsequent sub-chapters and notes relating to each measurement location. All measurements were witnessed and attended to allow us to witness and quantify the noise climate during our survey. Weather conditions, compiled by Met Eireann at Casement Aerodrome, have been included.

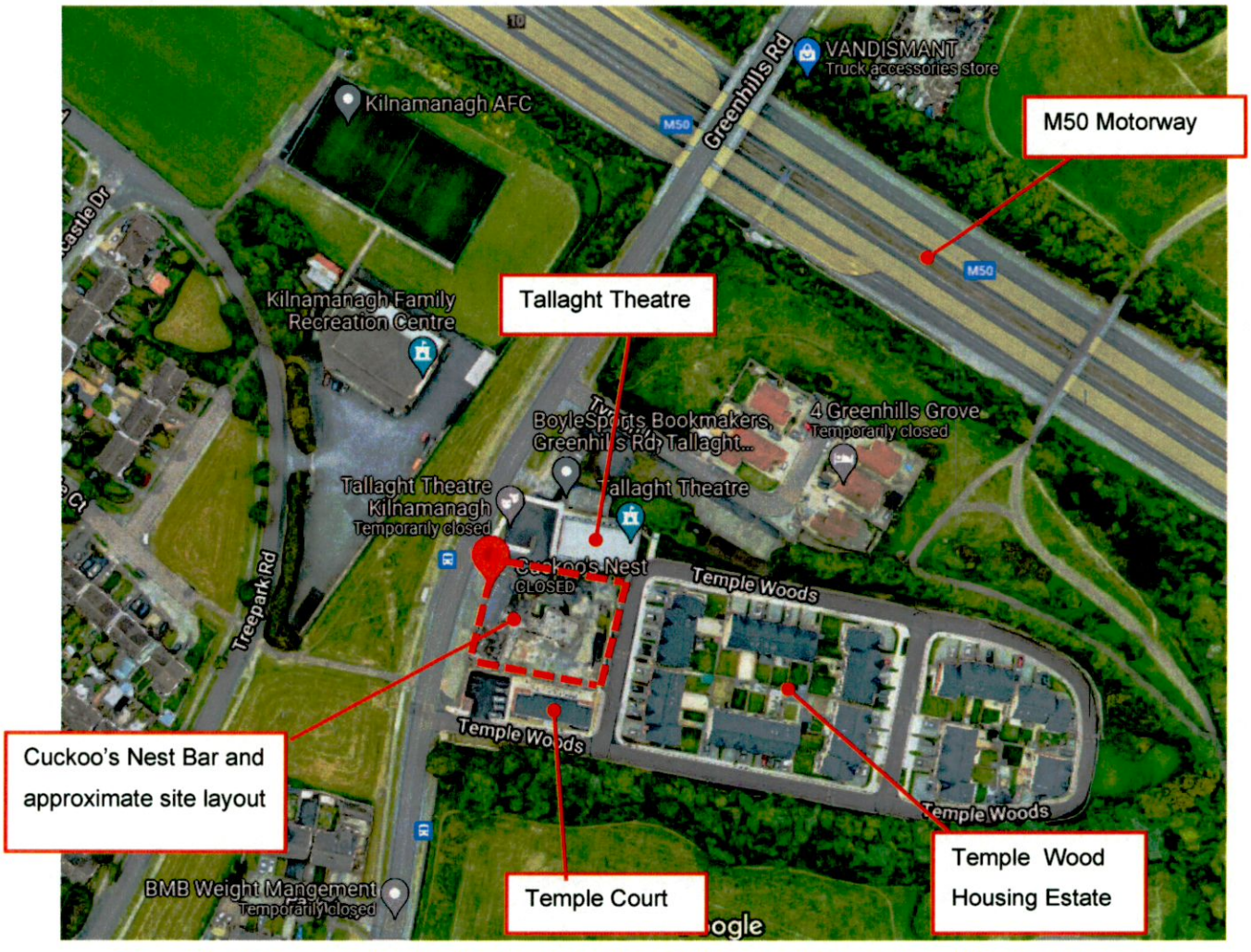

Figure 12: Aerial map of the site showing the location of the residential receptors within the vicinity of the development (Source: Google Maps, 2022).

3.1 Baseline Noise Survey

An environmental noise survey was conducted in November 2022 at the site to quantify the prevailing noise environment in the vicinity of the proposed development. The survey was conducted in accordance with ISO 1996: 2007: *Acoustics – Description, measurement and assessment of environmental noise.* Specific details are set out below. Figure 13 below shows baseline Location A, Location B and Location C, which was used to determine the baseline noise levels in the vicinity of the proposed development. Residential receptors in the area are located at Greenhills Grove, Temple Woods and Temple Court. Therefore, locations A, B and C were deemed suitable and appropriate to determine the baseline noise climate in the general area.

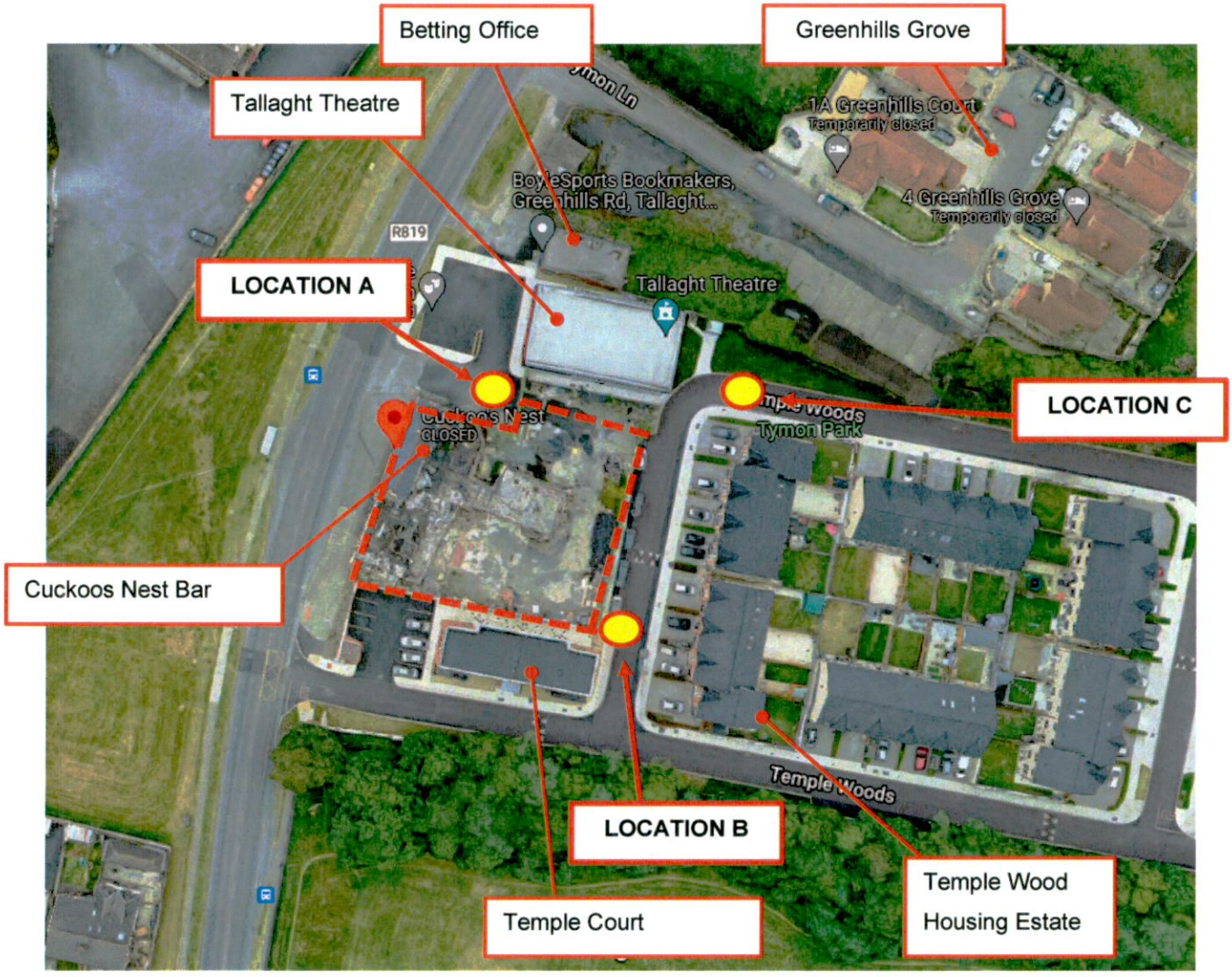

Figure 13: Aerial map of the site showing residential receptors and other buildings within the vicinity of the proposed development, which approximate site location outlines (Source: Google Maps, 2022).

3.2 Measurement Equipment Used

3.2.1 NTi Audio XL2 Sound Level Meter (SLM4)

Sound Level Meter, NTi Audio, Serial No: A2A-19921-E0

Calibration Certificate Dated: 29th October 2021 (2-year calibration)

Certificate Number: NTi Audio 44498-A2A-19921-E0

Type 1 instrument.

Calibration certification has been provided in Appendix A of this Report.

3.2.2 Field Calibration (Instrument A)

Using the Type 4231 Sound Level Calibrator, which produces a sound level of 93.8dB re.2x10-5 Pa, at a frequency of 1 kHz.

Calibrator, Bruel & Kjaer Type: 4231 with Serial No 2499109

NSAI Certificate Number: 224633

Date of Calibration: 3rd November 2022 (annual calibration)

Calibration certification has been provided in Appendix A of this Report

3.3 Baseline Measurement Parameters

The noise survey results are presented in terms of the following parameters.

LAeq This can be regarded as a notional level, which would, in the course of the measuring period (T), cause the same (A) weighted sound energy to be received as that due to the actual sound over the actual measuring period.

LAFMax The maximum of the sound pressure levels recorded of a measurement period with 'A' frequency weighting. The 'F' denotes a fast sampling rate, relating to the speed at which the instrument samples the noise being measured.

LAFMin The minimum of the sound pressure levels recorded of a measurement period with 'A' frequency weighting. The 'F' denotes a fast sampling rate, relating to the speed at which the instrument samples the noise being measured.

LA10 The percentile sound pressure level exceeded for 10% of the measurement period with 'A' frequency weighting calculated by statistical analysis.

LA90 The sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The 'A' suffix denotes the fact that the sound levels have been 'A-weighted' in order to account for the non-linear nature of human hearing. All sound levels in this Report are expressed in terms of decibels (dB) relative to 2x10-5 Pa.

3.4 Measurements at Location A

DAYTIME PERIOD(File: 1)

Description of the noise climate: The noise climate was dominated by local traffic from the heavily trafficked Greenhills Road (R819). Noise sources included cars, buses and motorbikes. In addition, during the lulls in local traffic, noise from the M50 Motorway. Other noise includes bottles in the bottle banks located at the Kilnnamanagh Family and Recreational Area.

Audit Intervals

Type	Start	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	2022-11-09 14:45:00	00:10:12	69.0	94.4	55.4	65.6	58.2
15'	2022-11-09 15:00:00	00:15:00	63.9	71.9	55.9	66.7	59.0
15'	2022-11-09 15:15:00	00:04:48	65.8	73.2	57.1	68.7	61.0

Figure 14: Daytime Interval at Location A

EVENING PERIOD (File: 4)

Description of the noise climate: The noise climate was dominated by local traffic from the heavily trafficked Greenhills Road (R819). Noise sources included cars, buses and motorbikes. In addition, during the lulls in local traffic, noise from the M50 Motorway.

Audit Intervals

Type	Start	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	2022-11-09 19:00:00	00:10:10	63.8	72.0	53.2	66.9	56.8
15'	2022-11-09 19:15:00	00:15:00	64.4	74.5	55.6	67.1	58.7
15'	2022-11-09 19:30:00	00:04:50	63.9	72.1	54.8	67.3	58.0

Figure 15: Evening Interval at Location A

NIGHT PERIOD (File: 8)

Description of the noise climate: The noise climate at this time was dominated by noise from the M50.

Results

Type	Start	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
Recorded	2022-11-09 23:00:04	00:15:00	54.9	70.7	48.0		
Project Result		00:15:00	54.9	70.7	48.0	56.9	51.6

Figure 16: Night Interval at Location A

3.5 Measurements at Location B

DAYTIME PERIOD (File: 2)

Description of the noise climate: The noise climate was dominated by local traffic from the heavily trafficked Greenhills Road (R819). Noise sources included cars, buses and motorbikes. There was a distant steady noise audible from the M50. Noise sources included some local traffic in the housing estate. At this location, it was possible to hear the bottle bins in use at the Kilnnamanagh Family and Recreational Area. Other sources included a military aircraft flyover at 15:36hrs.

Audit Intervals

Type	Start	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	2022-11-09 15:15:00	00:07:02	58.2	69.8	53.6	60.1	55.8
15'	2022-11-09 15:30:00	00:15:00	56.1	64.5	52.1	57.5	54.1
15'	2022-11-09 15:45:00	00:07:58	55.3	66.9	50.4	56.6	53.3

Figure 17: Daytime Interval at Location B

EVENING PERIOD (File: 6)

Description of the noise climate: The noise climate was dominated by local traffic from the heavily trafficked Greenhills Road (R819). Noise sources included cars, buses and motorbikes. In addition, there was a distant steady noise audible from the M50.

Audit Intervals

Type	Start	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	2022-11-09 19:45:00	00:08:54	63.5	73.4	54.4	66.9	57.1
15'	2022-11-09 20:00:00	00:14:56	64.2	76.9	55.2	67.1	58.0
15'	2022-11-09 20:15:00	00:06:09	63.8	72.2	54.0	66.8	57.8

Figure 18: Evening Interval at Location B

NIGHT PERIOD (File: 9)

Description of the noise climate: The noise climate at this time was dominated by noise from the M50.

Results

Type	Start	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
Recorded	2022-11-09 23:20:22	00:15:00	53.1	60.4	46.1		
Project Result		00:15:00	53.1	60.4	46.1	55.4	49.6

Figure 19: Night Interval at Location B

3.6 Measurements and Location C

DAYTIME PERIOD (File: 3)

Description of the noise climate: The noise climate was dominated by road traffic noise in the area from the local road and the M50. Other sources included birdsong and aircraft noise.

Audit Intervals

Type	Start	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	2022-11-09 16:00:00	00:14:54	54.8	69.0	50.3	56.1	52.9
15'	2022-11-09 16:15:00	00:15:00	54.4	65.4	50.9	56.0	52.6
15'	2022-11-09 16:30:00	00:00:06	52.2	53.5	50.9	53.1	51.5

Figure 20: Daytime Interval at Location C

EVENING PERIOD (File: 7)

Description of the noise climate: The noise climate was dominated by road traffic noise in the area from the local road and the M50.

Audit Intervals

Type	Start	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
15'	2022-11-09 21:00:00	00:13:02	56.9	73.9	52.4	58.4	54.7
15'	2022-11-09 21:15:00	00:15:00	56.7	72.5	51.7	58.3	54.4
15'	2022-11-09 21:30:00	00:01:58	54.9	61.5	51.2	57.0	52.4

Figure 21: Evening Interval at Location C

NIGHT PERIOD (File: 10)

Description of the noise climate: The noise climate at this time was dominated by noise from the M50.

Results

Type	Start	Duration	LAeq [dB]	LAFmax [dB]	LAFmin [dB]	L 10.0 % [dB]	L 90.0 % [dB]
Recorded	2022-11-09 23:37:30	00:15:00	58.3	74.0	44.9		
Project Result		00:15:00	58.3	74.0	44.9	62.7	48.8

Figure 22: Night Interval at Location C

3.6.1 The weather during the survey period.

Weather conditions were ideal. Locally wind did not exceed 5m/sec. The nearest weather station was Casement Aerodrome which is located 6km to the West of the Cuckoo's Nest location. The weather data from Casement Aerodrome has been included in Appendix B.

4 Irish EPA Noise Mapping

In support of the measurements witnessed during the baseline noise study, the Irish EPA noise contour maps show that noise levels in the general area of the Cuckoo's nest are in the order of 70~74dB, Lden and for the night period are 60~64dB, Lnight. This helps reduce the potential noise impact of any commercial development within the vicinity of the existing and proposed residential receptors.

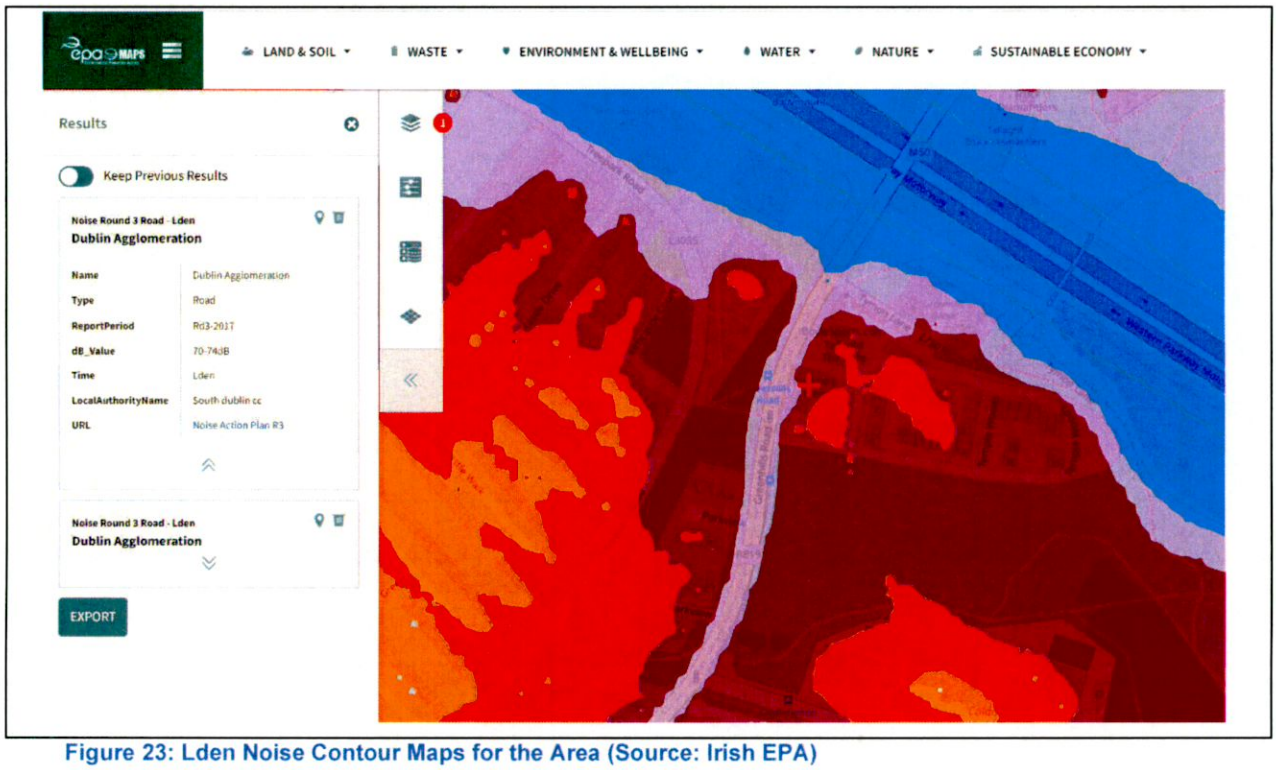

Figure 23: Lden Noise Contour Maps for the Area (Source: Irish EPA)

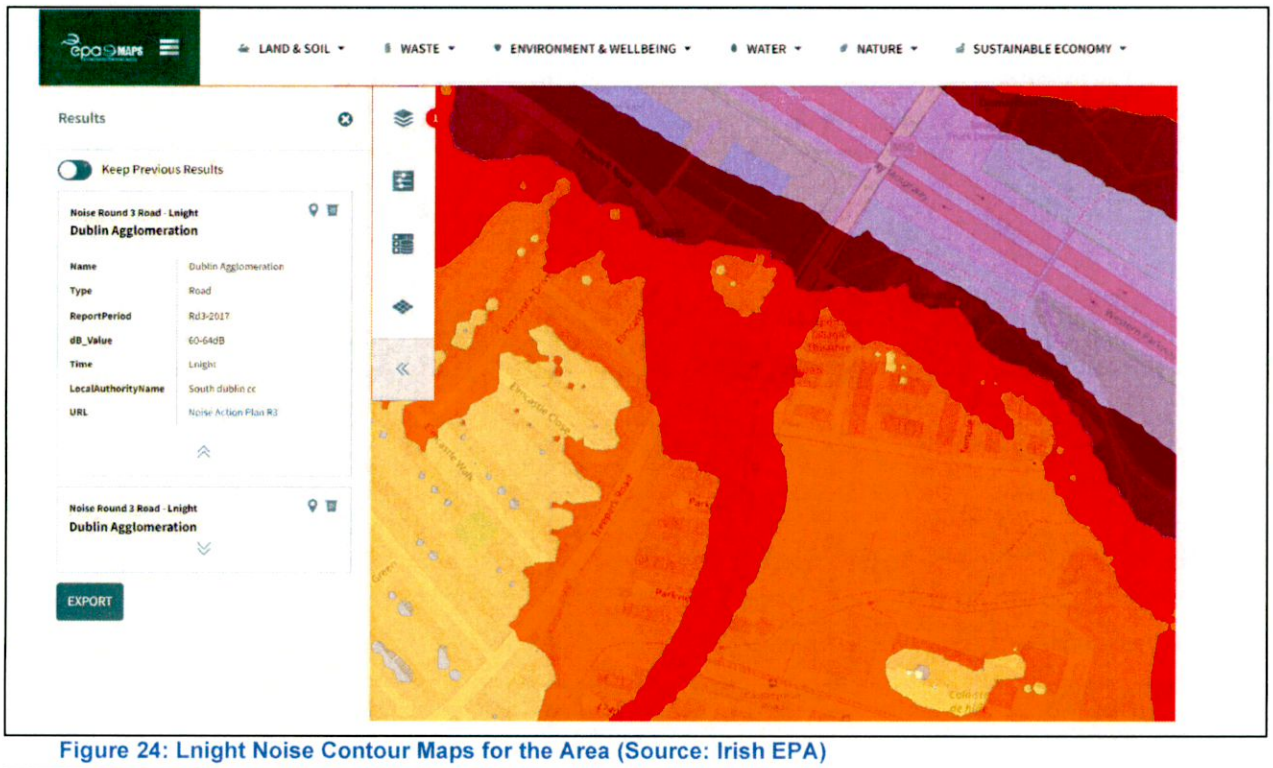

Figure 24: Lnight Noise Contour Maps for the Area (Source: Irish EPA)

5 Noise Sources

5.1 Fixed Plant & Building Services Noise

Several items of mechanical plant will be associated with the proposed commercial premises (Gastropub and Retail unit) related to ventilation of public rooms, the kitchen and heating/cooling of retail/commercial spaces. In addition, refrigeration facilities will be in use for the temperature control of food. Such mechanical plant will potentially emit noise to the external air when in use, and their strategic placement has been considered in this Report.

Guidance on rating noise emissions from mechanical plant items can be assessed using several standards, including British Standard BS8233:2014 and consideration of advice in the 1999 World Health Organisations Guidelines on Community Noise.

5.2 Premises Access

Patrons will access the premises from the front entrance on the western side of the development through the existing building be retained. This will serve as the premises access and egress point for the public.

5.3 Noise from Music

It is understood that the premises will be a Gastropub and will not host any Entertainers or Disk Jockeys as part of the commercial offering at the premises. In discussion with the projects Architects and the Developer, we understand that the Gastropub offering will be a dominant part of the business and that live music from bands/entertainers or Diskjockeys is not something that the premises will host.

6 Rooftop Plant Design

In discussions with the project Architects and the Developer, we have considered a specifically intended mode of operation for the premises as part of our acoustic review. It is understood that the premises will be a Gastropub and will not host any Entertainers or Disk Jockeys as part of the offering. In addition, it is not envisaged that the premises will host bingo nights/table quizzes, nor will it run karaoke nights that might require additional audio amplification to be installed. While the premises will likely have TV sets, it is not envisaged that the premises will focus on sports. In addition, it is understood that patrons may host birthdays, retirements and special occasions, but these will not be formal events where entertainment will be provided.

The business will primarily run as a Gastropub over seven days from midday to 23:30 pm. It is proposed that the pub will be serviced on the northern side of the premises during daytime business hours. The Gastropub public areas, kitchen, and toilets will be mechanically ventilated and will not rely on natural ventilation by openable windows. The music system will be distributed throughout the premises and will be electronically limited so that management and staff cannot increase its level above a pre-defined threshold.

Mechanical plant considered in the proposed development

The following items of mechanical plant have been identified as requirements for the proposed development, which include consideration of the bar/restaurant requirements and commercial and retail spaces as shown in Table 1 below.

Reference	Area	Plant Type	Outlet location	Noise emissions
A	Male toilet extract fan	Internal in-line fan	Outlet on the building rooftop.	65dB(A) at 1m
B	Female toilet extract fan	Internal in-line fan	Outlet on the building rooftop.	65dB(A) at 1m
C	Kitchen Extract Fan 1 associated with the Gastropub.	Internal in-line low noise duct fan.	Radius bend outlet at roof level within the designed rooftop enclosure.	65dB(A) at 1m
D	Kitchen Supply Fan 2 associated with the Gastropub.	Internal in-line low noise duct fan.	Radius bend outlet at roof level within the designed rooftop enclosure.	65dB(A) at 1m
E	Ground floor of the Gastropub.	AHU	AHU with Heat Recovery	70dB(A) at 1m

F	Cold Room 1 of the Gastropub.	Refrigeration Unit	To be located in the basement of the premises and used for heat recovery purposes whereby the compressor unit will heat basement areas.	62dB(A) at 1m
G	Cold Room 2 of the Gastropub.	Refrigeration Unit	To be located in the basement of the premises and used for heat recovery purposes whereby the compressor unit will heat basement areas.	62dB(A) at 1m
H	Front Area of the Gastropub.	Ceiling mounted cassette	1No. Refrigeration condenser at roof level.	59dB(A) at 1m on heating mode.
I	The rear area of the Gastropub.	2no. ceiling mounted cassettes	1No. Refrigeration condenser at roof level	59dB(A) at 1m on heating mode.
J	Retail Area	2no. ceiling mounted cassettes	1No. Refrigeration condenser at roof level.	59dB(A) at 1m on heating mode.

Table 1: Showing the schedule of the mechanical plant to be used to service the Gastropub and Retail Space.

It is proposed that all fixed mechanical plant and fixed plant outlets be installed at roof level in a designated location screened from the residential properties. In addition, it is proposed that services will rise through a masonry core, separate and independent (and sufficiently decoupled) from the residential properties within the building. It is suggested that these details be developed during the detailed design phases of the project. In the proposed arrangement, no line of sight should exist between plant outlets and residential properties to protect residential receptors effectively.

7 Assessment of Noise Impact

Several guidance documents contain recommended absolute guideline noise values and relative noise limiting levels which are discussed below. It is possible to apply objective standards to assessing noise and the effect produced by introducing a particular noise source, and several methods can determine its impact. The methods considered in this Report are:

- British Standard (BS) 8233:2014
- The 1999 World Health Organisation (WHO) "Guidelines for Community Noise" contain such guidelines.

The British Standard 8233:2014 is principally intended to assist in the design of new dwellings; however, the Standard states that it may be used to assess noise from new sources being brought to existing dwellings.

The World Health Organisation Guidelines for Community Noise 1999 proposes absolute levels that should not be exceeded to avoid what is termed "critical health effects". This means that the limits are at the lowest noise level, which would result in any psychological or physiological effect.

7.1 BS8233:2014

For each space within a property, the Standard sets out a range of noise levels as being an appropriate level for design purposes. The designer should select a level suitable for particular circumstances. For example, in noise-making workshops, etc., the activity noise is dominant, so the internal ambient noise level is not critical. However, internal ambient noise is important in most other situations, such as residential locations, and appropriate levels have been extracted from the Standard and reproduced below.

Normally, only the maximum desirable noise level needs to be decided. Generally, for steady external noise sources, the internal ambient noise level shouldn't exceed the guideline values in Figure 25 below (extract from BS8233:2014).

Indoor ambient noise levels for dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	—
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	—
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Figure 25: Extract from BS8233:2014, defining suitable daytime and nighttime indoor levels for dwellings.

7.2 World Health Organisation Guidelines for Community Noise (1999)

The World Health Organisation Guidelines for Community noise (1999) suggests similar criteria to that proposed in BS: 8233. Table 2 below summarises the requirements referred to in the guidance document, setting out noise levels that should not be exceeded.

Noise Level	Guidance	Location
LAeqT = 55 dB	Seriously annoyed, daytime and evening.	Continuous noise, outdoor living areas.
LAeqT = 50 dB	Moderately annoyed, daytime and evening	Continuous noise, outdoor living areas.
LAeqT = 35 dB	Acceptable level to avoid speech interference, daytime and evening.	Continuous noise, dwellings, indoors.
LAeqT = 45 dB	To avoid sleep disturbance, window open at night.	Continuous noise, outside bedrooms, outdoor values.
LAeqT = 30 dB	To avoid sleep disturbance at night.	Continuous noise, bedrooms, indoors.
LAMAX = 60 dB	To avoid sleep disturbance, window open at night.	Noise peaks, outside bedrooms, outdoor values
LAMAX = 45 dB	To avoid sleep disturbance at night.	Noise peaks, bedrooms, indoor.

Table 2: 1999 World Health Organisation Guidelines for Community Noise.

7.3 Impact of noise on surrounding residential properties

The closest residential properties to the proposed development are the apartments in Temple Court, about 15 metres from the closest part of the new development on the Southern side of the development. Slightly further away, residential houses at Temple Woods, about 30 m away at the closest part of the proposed building. These properties would be unlikely to be affected by noise inside the Gastropub but could be impacted by noise from the proposed mechanical plant, depending on the sound power output of plant items and the attenuating effect of distance and intervening structures.

Table 1 above indicates the type and number of plant items likely to be installed at the bar/restaurant and the typical noise emission levels of such mechanical plant. We have calculated that in a 'worst-case' situation with all mechanical plant operating simultaneously and no allowance made for barrier effects of intervening structures. When considering the impact on the closest apartments at Temple Court, the expected noise level at the nearest part of the façade would be approximately 50 dB(A). As noted in 6.1 above, there will be no line of sight between plant outlets and residential properties, providing a 'barrier' attenuation of 5 – 10 dB. In addition, not all mechanical plant will operate continuously; however, even in a 'worst-case' situation, the level of plant noise at the nearest façade will 45 dB(A) or less. The equivalent noise level inside any apartment, with windows open for ventilation, would be 30 dB(A) or less. Such levels would be lower **than** those specified in BS8233:2014 and the 1999 WHO Noise Guidelines for Community Noise.

It should be noted that the ambient noise level, due primarily to traffic noise, outside the apartments at Temple Court has been measured as up to 64 dB LAeq during evening periods, appreciably higher than the noise of plant items.

The noise of bar/restaurant's associated mechanical plant outside the nearest houses in Temple Woods will be approximately 3 dB(A) lower than at Temple Court due to the extra distance from the building, more than 20 dB(A) lower than the ambient noise level.

7.4 Impact of noise in residential apartments above the bar/restaurant

The occupants of apartments above the bar/restaurant will not be directly exposed to the noise from the operating mechanical plant. However, there would be the potential to be impacted by noise from activities within the bar/restaurant, depending on the nature of activities and mitigating measures to minimise airborne and structural sound transmission within the building.

It is noted that entertainment will not be provided in the bar/restaurant; however, there would be a level of noise within the bar from patrons depending on the level of custom at any particular time.

The Irish Building Regulations, TGD-E, 2014 recognises that '*A higher standard of sound insulation may be required between spaces used for normal domestic purposes and communal or non-domestic purposes. In these situations, the appropriate level of sound insulation will depend on the noise generated in the communal or non-domestic space.*' Therefore, it will be necessary to ensure that an adequate level of airborne sound insulation is provided between the bar/restaurant and the apartments directly above and that the floors in the bar/restaurant are acoustically separated from walls in order to minimise structure-borne noise to the upper part of the building.

At the detailed design stage of the building, it would be possible to provide adequate airborne and structure-borne sound insulation to minimise sound transmission from the bar and restaurant to the apartments above.

8 Design Strategies

8.1 The strategic location of the designated smoking area

Site noise measurements show that the area's background noise levels are notably elevated in the general area. The primary source of noise at the site emanates from both local roads (Greenhills Road and M50). Due to high traffic noise levels on the western boundary, the smoking area has been strategically placed on the west side of the two-story building to be retained. Measurements on the western side of the development show the daytime traffic noise level at this location to be 65dB, LAeq, the evening traffic noise level to be 64dB,LAeq and the night traffic noise level to be 55dB,LAeq.

8.2 Designated Smoking Area

Since road traffic noise levels are at their highest on the western and north-western facades of the existing building, it is considered appropriate to locate designated smoking areas (Zone A, B and C) on those sides of the premises. The designated smoking areas are shown in Figure 26 below. In addition, residential properties currently located on the Eastern and Southern sides of the development site are already exposed to elevated levels of traffic noise. This assists in that the potential noise impact from the proposed external smoking areas will be notably reduced, combined with the screening offered by building barrier effects.

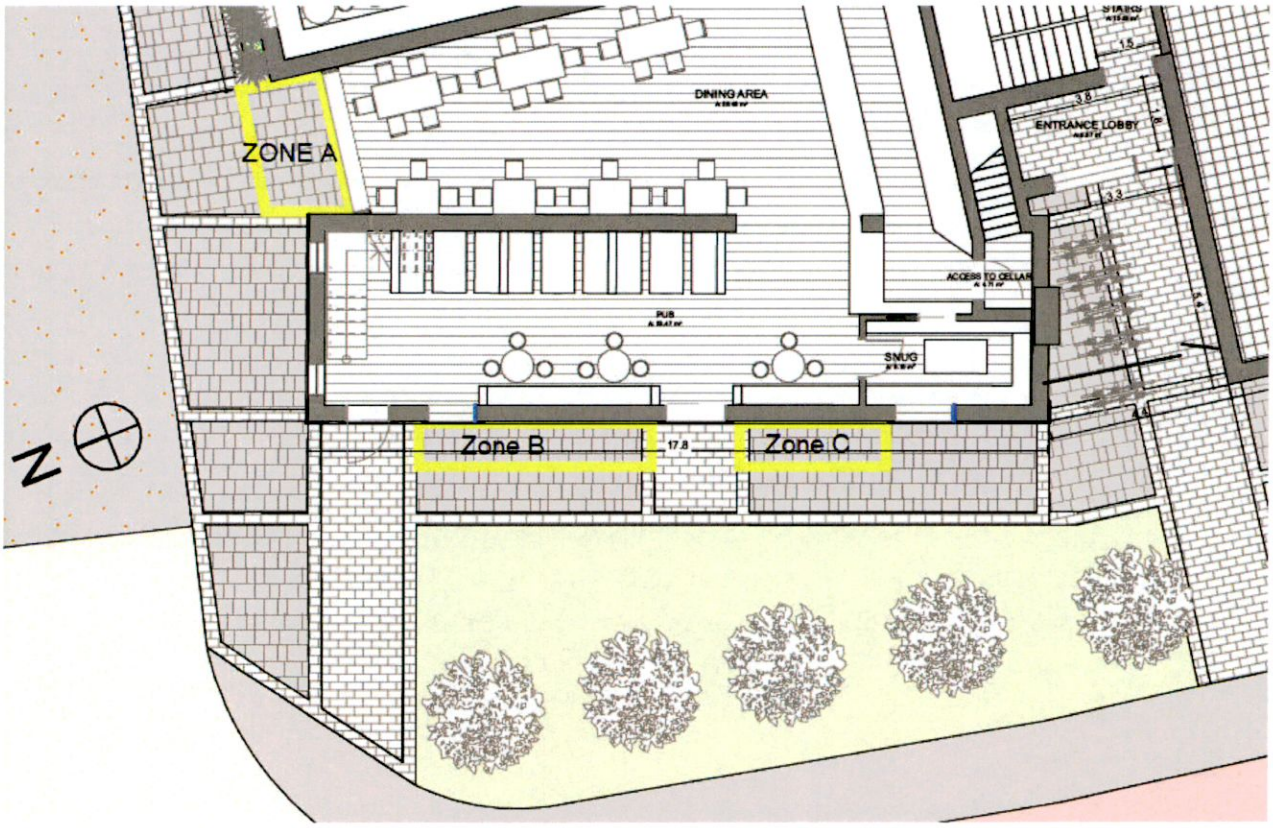

Figure 26: Designated smoking area on the Western side of the Cuckoo's Nest Bar and Restaurant.

We are satisfied that the proposed designated smoking area presents a very suitable location for the congregation of smokers outside the premises. Furthermore, it can be seen that the noise level from smokers is likely to be noticeably less than that of road traffic in the locality at all times of day and night. The design arrangement will be greatly assisted by the location of the patron smoking area, distance to the nearest residential properties, traffic noise levels and screening from the proposed building. Therefore, the proposed arrangement will result in careful noise control concerning the congregation of smokers outside the premises and will consequently protect the residential amenity within the vicinity.

8.3 Roof Plant Location

Noise predictions show that the cumulative plant noise, which includes all the development's fixed mechanical plant and outlets, shall be comfortably lower than ambient noise levels during the daytime and evening periods when the plant is in use. Measurements show that the kitchen extract fan is likely to be the most significant contributor. While its impact on the residential properties will be insignificant due to the roof design and rooftop barrier effects, it will not be used after 23:00 hours at night. Our prediction assumes a worst-case scenario where all mechanical plant is running simultaneously. In practice, however, this is unlikely to be the case except for high-demand periods, which have been accounted for in the predictions. In addition, the location of mechanical plant outlets on the roof would be significantly better than typical arrangements where the fixed plant can often be mounted directly to the facades surrounding the premises.

8.4 Indoor Bottle Sorting/Recycling

It is proposed that all empty bottle sorting and processing will be conducted indoors in the basement area of the premises. This measure will ensure that noise from this activity will be carefully managed and controlled and remain an indoor activity. Recycled bottles will then be removed via the stock elevator on the western side of the development.

8.5 Deliveries to Bar/Restaurant

It is proposed that deliveries will occur on the northern side of the proposed building exclusively between 08:00hrs and 12:00hrs. The proposed facility will allow suppliers to deliver stock and fresh produce to the bar and restaurant. The proposed usage will be strictly adhered to, and delivery times will be signposted at the site.

9 Conclusion

A comprehensive baseline noise study and prediction of noise emissions have been prepared concerning the proposed Gastropub on the ground floor level of the Cuckoos Nest Pub and apartment Development. Through the use of typical mechanical plant noise emission data, it has been possible to determine the likely noise impact of the proposed development of residential properties within the vicinity of the Gastropub and Retail space. Furthermore, using predicted noise levels and contrasting them against relevant guidance and baseline noise measurement data, it has been possible to assess the likely noise impact of the proposed development on the nearest residential receptors.

- The baseline noise study shows that residential locations within the vicinity of the proposed development are dominated by road traffic noise from the R819 and M50.

- Deliveries to the bar/restaurant will occur directly from the R819 on the northern side of the site, not directly affecting residential properties at Temple woods and Temple court.

- Using the guidance provided in British Standard 8233:2014 and 'The World Health Organisation Guidelines for Community Noise 1999', we have been able to assess the impact of noise. Predictions would indicate that the noise levels for the fixed mechanical plant will be highly unlikely to give rise to unacceptable levels for daytime or evening hours, either outside or inside residential properties in the vicinity of the site.

- Provided adequate measures are taken at the detailed design stage to minimise airborne and structure-borne noise transmission, the noise impact on the apartments above the bar/restaurant would not be significant.

In summary, the noise impact associated with the new development is considered to be within acceptable levels and predicted levels clearly show that the Gastropub and Retail space will not have an appreciable impact on the surrounding environment. The arrangement boasts design features that will assist with effectively controlling and managing noise. Additionally, the proposed smoking area will be located on the western façade of the building, away from existing and proposed dwellings, where the building will act as a noise barrier. With the project's design strategies to be employed and careful consideration during the detailed design phase, we have determined that the development is unlikely to have an adverse impact on the existing and future residential amenities within the area.

10 Terminology.

Decibel (dB): The decibel is a unit of level, which denotes the ratio between two quantities that are proportional to the power; the number of decibels corresponding to the ratio of two powers is ten times the logarithm to the base 10 of this ratio.

dB(A): A weighted sound pressure level (SPL) approximately equivalent to the human ear frequency response to noise.
The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear frequency response of human hearing. All sound levels in this Report are expressed in terms of decibels (dB) relative to $2x10^{-5}$ Pa.

Equivalent Continuous (A) Weighted Sound Level [L_{AeqT}]:
This can be regarded as a notional level, which would, in the course of the measuring period (T), cause the same (A) weighted sound energy to be received as that due to the actual sound over the actual measuring period.

LAFMax
The maximum of the sound pressure levels recorded of a measurement period with 'A' frequency weighting. The 'F' denotes a fast sampling rate relating to the speed at which the instrument samples the noise being measured.

LA10
The percentile sound pressure level exceeded 10% of the measurement period, with 'A' frequency weighting calculated by statistical analysis.

LA90
The percentile sound pressure level exceeded 90% of the measurement period, with 'A' frequency weighting calculated by statistical analysis. This is a term used to measure the background noise level in an area.

Hertz (Hz): The unit of frequency equivalent to one cycle per second.

11 Limitations

ICAN Acoustics, St Mary's Road, Galway City, have prepared this Report for the sole use of Armstrong Fenton Planning Consultants ("Client") in accordance with the Agreement under which our services were performed. No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by ICAN Acoustics.

The conclusions and recommendations in this Report are based upon information provided by others and on the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by ICAN Acoustics has not been independently verified by ICAN Acoustics unless otherwise stated in the Report.

The methodology adopted and the sources of information used by ICAN Acoustics in providing its services are outlined in this Report. The work described in this Report was undertaken in November/December 2022 and is based on the conditions encountered and the information available during the said period of time. At the time of writing of this Report, not all mechanical and electrical elements had been finalised, and a detailed design concerning the mechanical plant had not been finalised. It is proposed that the design makes adequate consideration of the potential of the mechanical plant and considers its proposed location and the buildings mitigating features.

These circumstances accordingly limit the scope of this Report and the services. It is anticipated that a detailed design review of noise control measures will occur once Planning Approval has been secured. Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and, where appropriate, are subject to further investigations or information which may become available.

ICAN Acoustic disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to ICAN Acoustics' attention after the date of the Report.

Certain statements made in the Report that are not historical facts may constitute estimates, projections or other forward-looking statements, and even though they are based on reasonable assumptions as of the date of the Report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. ICAN Acoustics expressly does not guarantee or warrant any estimate or projections contained in this Report.

Where field investigations are carried out, these have been restricted to a level of detail required to meet the stated objectives of the services. The results of any measurements taken may vary spatially or with time, and further confirmatory measurements should be made after any significant delay in issuing this Report.

12 Appendix A: Calibration Certification

12.1 Logging Type Approved Measurement Instrument SLM4 (S/N A2A-19921-E0)

NTi AUDIO

Manufacturer Calibration Certificate

The following instrument has been tested and calibrated to the manufacturer specifications.
The calibration is traceable in accordance with ISO/IEC 17025 covering all instrument functions.

- Device Type: **XL2 Audio and Acoustic Analyzer**
- Serial Number: **A2A-19921-E0**

- Certificate Issued: **29 October 2021**
- Certificate Number: **44498-A2A-19921-E0**
- Results: **PASSED**
  (for detailed report see next page)

Tested by: M. Frick

Signature:

Stamp: NTi Audio AG
Im alten Riet 102
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www.nti-audio.com

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12.2 Field Calibration Unit

NSAI

National Metrology Laboratory

Certificate of Calibration

Issued to

ICAN Acoustics
9 St. Mary's Road
Galway City
Co. Galway

Certificate Number	224633
Item Calibrated	Bruel & Kjaer Type 4231 Sound Level Calibrator
Serial Number	2499109
ID Number	None
Order Number	Diarmuid Keaney
Date Received	19 Oct 2022
NML Procedure Number	AP-NM-13
Method	The above calibrator was allowed to stabilize for a suitable period in laboratory conditions. It was then calibrated by measuring the sound pressure level generated in its measuring cavity (half-inch configuration). The calibrator's operating frequency was also measured.
Calibration Standards	Norsonic 1504A Calibration System incorporating: Agilent 34401A Digital Multimeter, File No. 0736 [Cal due: 16 Aug 2023] B & K 4134 Measuring Microphone, File No. 0744 [Cal due: 03 Jun 2023] B & K 4228 Pistonphone, File No. 0740 [Cal due: 04 Jun 2023]

Calibrated by: David Fleming — Approved by: Paul Hetherington

Date of Calibration: 03 Nov 2022 — Date of Issue: 03 Nov 2022

CIPM MRA

This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org)

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13 Appendix B: Local Weather