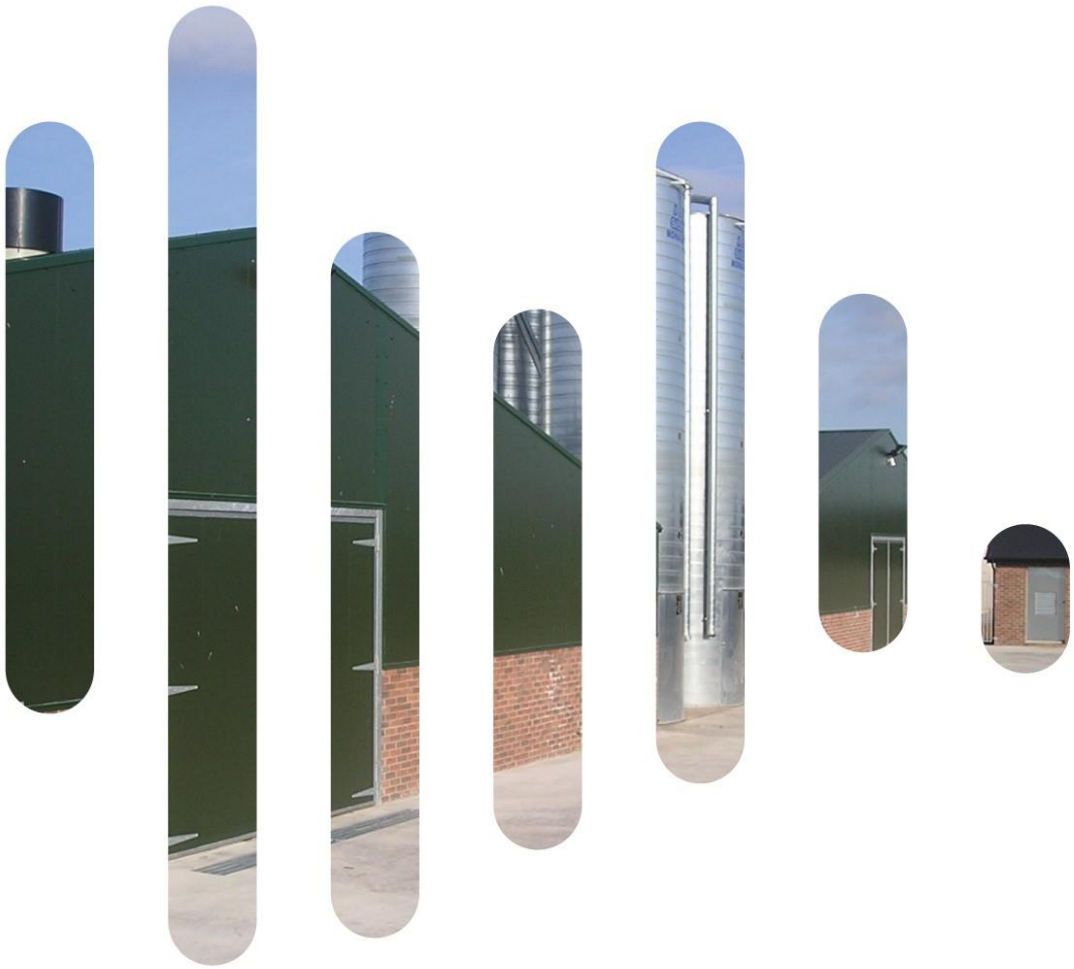
IRWIN CARR
CONSULTING



NOISE IMPACT ASSESSMENT
BLAKISTON HOUSTON DIGESTATE MANAGEMENT BUILDING

Report No. RP001N 2024199 (Blakiston Houston Digestate Management Building)
9 April 2025

PROJECT: BLAKISTON HOUSTON DIGESTATE MANAGEMENT BUILDING

PREPARED FOR: CLARE MCPARLAND
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REPORT NO.: RP001N 2024199

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Document Control

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1.0 INTRODUCTION

Irwin Carr Consulting have been commissioned to undertake a noise assessment for a proposed industrial building to be used for anaerobic digestate management on lands approximately 120m southwest of No.28 Carrowreagh Road, Dundonald, BT16 1TS.

It is understood that this assessment will be submitted to the Planning Section of Lisburn and Castlereagh City Council (LCCC) in support of a future planning application and will be assessed by the Environmental Health Service (EHS) of the Council.

The application seeks full planning permission.

2.0 DEVELOPMENT DESCRIPTION

The proposal seeks permission for a building that facilitates the management of anaerobic digestate by way of blending with mineral fertiliser and additives to produce a pelletised product.

The proposed development site is situated on existing agricultural land, adjacent to the boundary of the Carrowreagh Business Park and Dundonald Enterprise Park. The noise climate in the vicinity of the proposed development site and nearby noise sensitive properties is dominated by road traffic noise from the Upper Newtownards Road.

There are a number of residential properties in the vicinity of the proposed site. The closest third-party receptor property (i.e. 40 Millreagh Grove) is located approximately 180m to the east of the proposed building.

From an acoustics perspective, the primary noise associated with the proposed development will involve:

- Noise breakout from the proposed building
- Noise from the external stack
- Noise from vehicles accessing the site.

For the purposes of the assessment, it is assumed that the development will operate 24 hours a day, 7 days a week.

The location of the site and nearby residential properties is shown in Appendix A.

3.0 ASSESSMENT CRITERIA

There are two types of assessment criteria in relation to the predicted noise levels from this type of site. BS4142:2014 is an assessment methodology that can be described as using noise change criteria, where the predicted noise levels are compared to the existing background noise levels.

Another method of assessment compares the predicted noise levels to absolute noise levels such as the World Health Organisation Guidelines, which outline absolute noise levels.

For completeness, we have assessed the predicted noise levels from this site in line with both criteria.

3.1 BS4142:2014

BS 4142:2014, *Methods for rating and assessing industrial and commercial sound*, describes methods for assessing whether noise levels are likely to give rise to an adverse impact by comparison of the background noise level with the noise emissions from the facility under assessment.

The Standard introduces the concept of a Rating Level (L_{Ar}) to account for the fact that certain characteristics of the noise source can increase the likelihood of an adverse impact. These characteristics include noise sources of an irregular nature or that contain distinguishable, discrete tonal noise.

Where applicable, a correction is added to the measured or predicted Specific Noise Level (L_{Aeq}) to determine the Rating Level. Note that all noise levels are assessed at an amenity area of the property under consideration.

BS 4142:2014 requires that the measured Rating Level (L_{Ar}) is compared to the Background Level (L_{A90}), measured in the absence of the noise under assessment, to determine the likelihood of an adverse impact.

3.2 World Health Organisation (WHO)

Example noise limits can be found in World Health Organisation (WHO) publication *Guidelines for Community Noise,* 1999 which states the following:

> *"To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq} for a steady, continuous noise."*

and

> *"For a good night's sleep, the equivalent sound level should not exceed 30dB(A) for continuous background noise, and individual noise events exceeding 45dB(A) should be avoided."*

3.3 BS 8233:2014 – Guidance on sound insulation and noise reduction for buildings

Example absolute noise limits can be found in British Standard 8233:2014 – Guidance on sound insulation and noise reduction for buildings. Table 8.7 of BS8233:2014 is replicated in Table 1 below:

Table 1: Indoor noise criteria

Activity	Location	07:00 to 23:00	23:00 to 07:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,16hour}$		
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$		
Sleeping	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$	45 dB L_{Amax}

4.0 ENVIRONMENTAL NOISE SURVEY

Noise levels were measured between 13 and 18 November 2024 at a location deemed representative of the background level in the vicinity of the nearest residential properties in proximity to the site. The measurement location is described in Table 2 below and depicted in Appendix A.

The survey was set up by Liam McAleavey using the following equipment:

- 01 dB DUO Sound Level Meter
- 01 dB CAL21 Acoustic Calibrator
- Davis Vantage Pro Weather Station

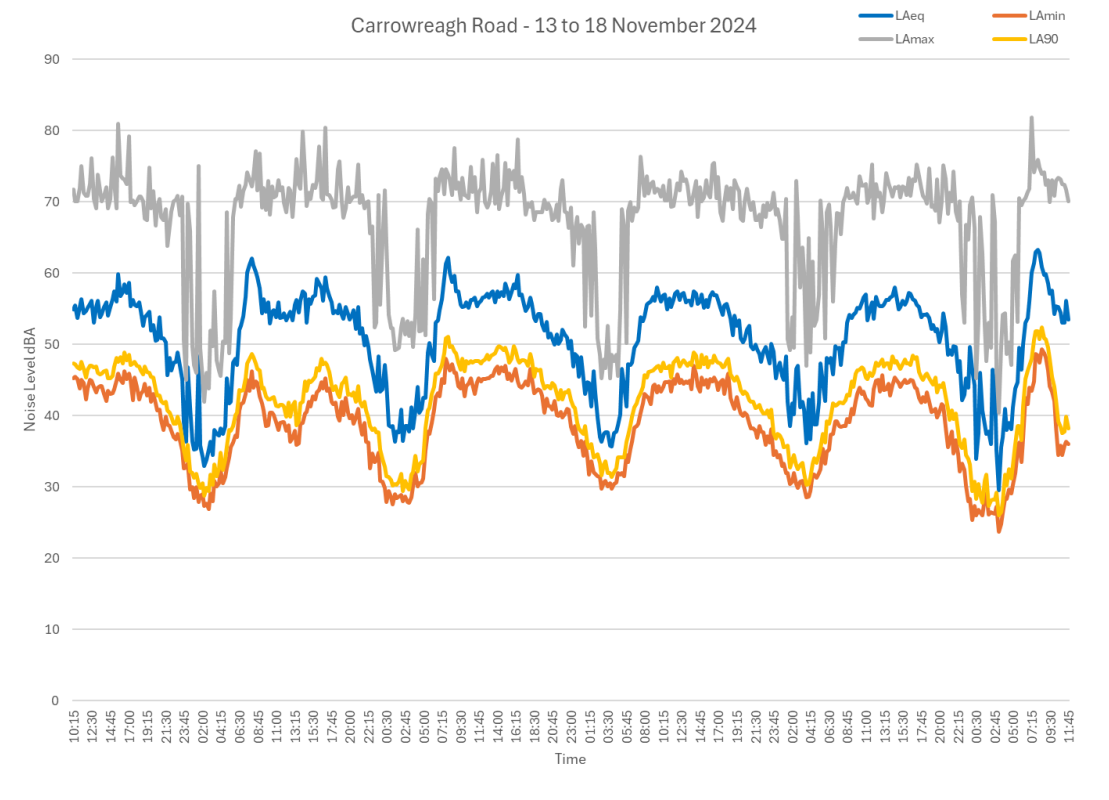
Table 2: Noise Monitoring Location

	Location (Irish Co-ordinate System)
Noise Monitoring Location	343553 374539

The acoustic parameters measured included L_{Aeq}, L_{A90}, L_{Amin} and L_{AMax}. Instrumentation was check calibrated before and after the survey period with no derivations noted. Weather during the surveys was dry and calm with wind speeds less than 5 m/s. Any periods of rainfall were removed from the data pool.

4.1 Survey Results

Figure 1: Acoustic survey time history

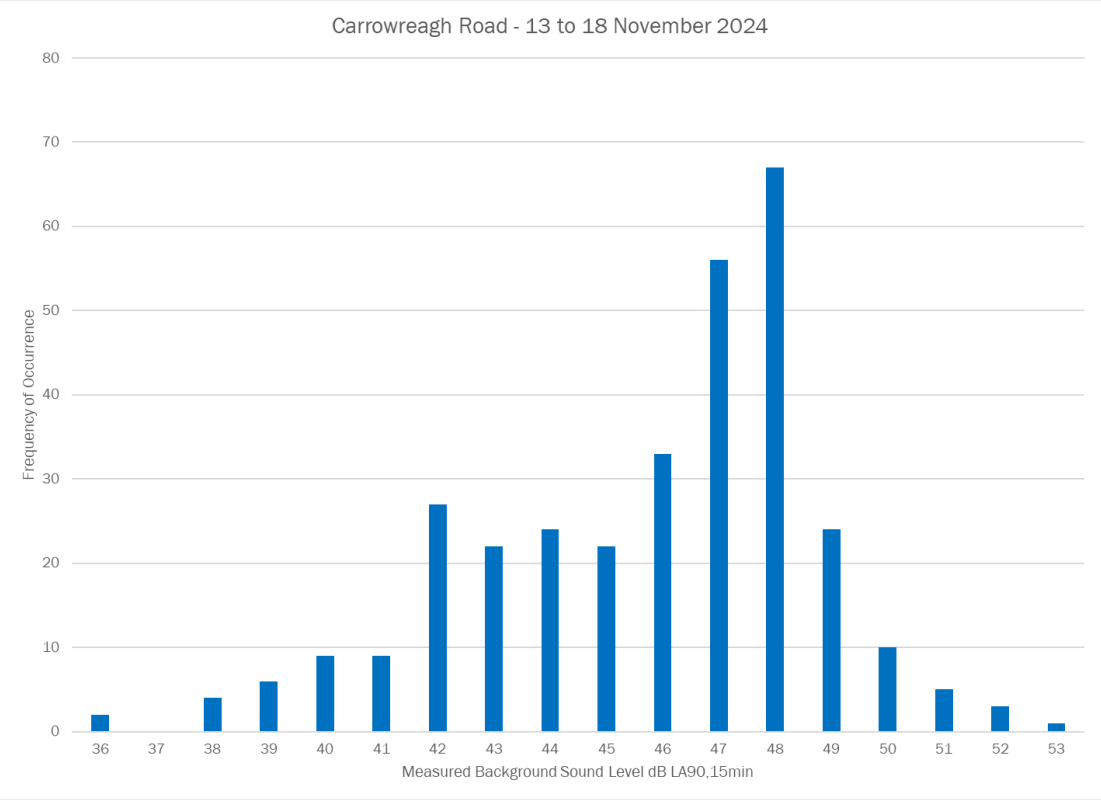


4.2 Background Sound Level

Background sound pressure levels were determined for the purposes of the BS4142 assessment of noise of a commercial or industrial nature associated with the proposed site. The standard uses a typical background level (LA90, T) in the absence of the specific sound under consideration.

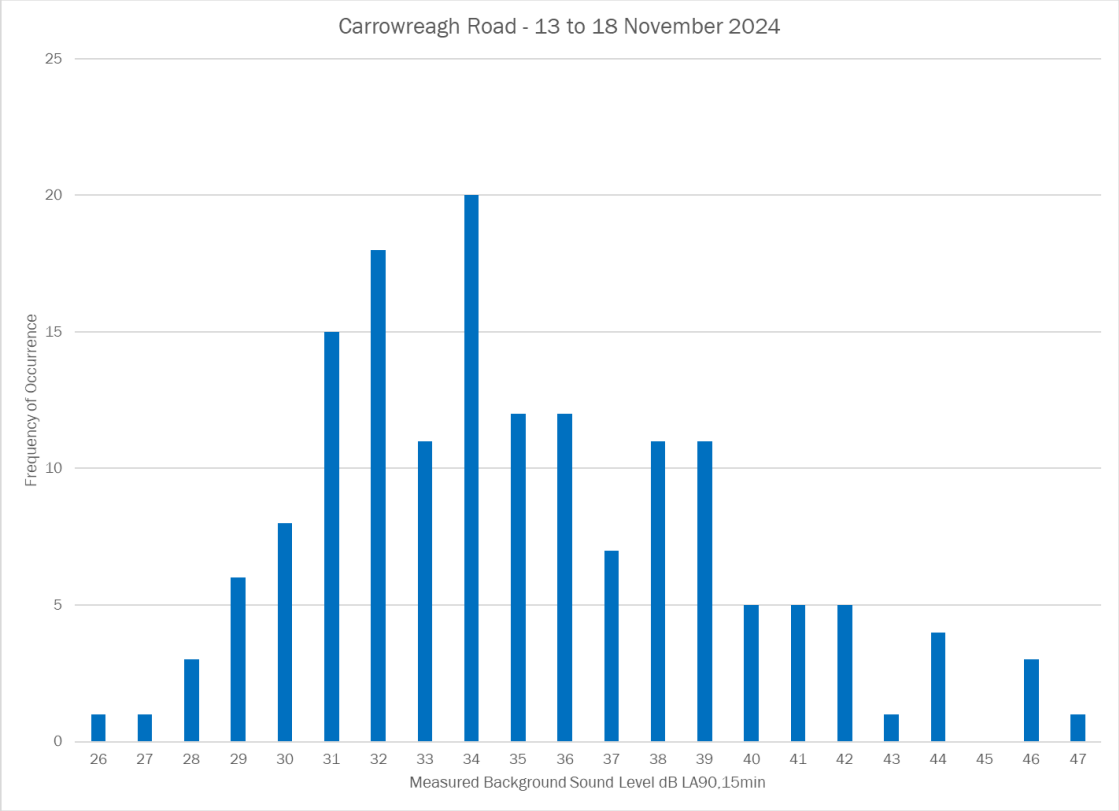
The results are shown below, where the measured background levels are shown as per the frequency of each occurrence. The results are presented for daytime and night-time in Figures 2 and 3 respectively.

Figure 2: Histogram showing frequency distribution of daytime background sound levels at the monitoring location



The daytime mean was 45 dB, the mode 48 dB and median 46 dB. Based on analysis of the data presented in Figure 2 and guidance from BS 4142:2014, **47 dB L_{A90}** has been chosen as appropriate and representative background noise levels for the daytime period as it lies centrally within the main data range, is very similar to the mean and median values and is conservatively below the modal value.

Figure 3: Histogram showing frequency distribution of night-time background sound levels at the monitoring location



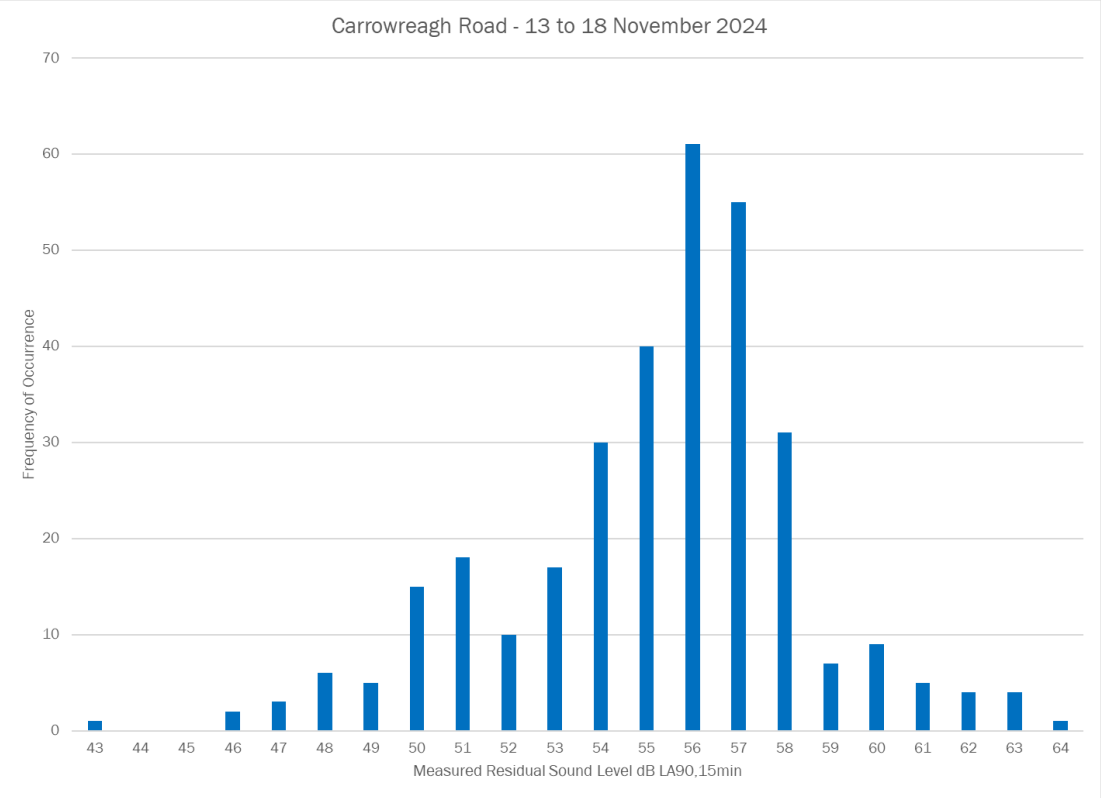
The night-time mean was 35 dB, the mode 34 dB and median 34 dB. Based on analysis of the data presented in Figure 3 and guidance from BS 4142:2014, **34 dB L_{A90}** has been chosen as appropriate and representative background noise levels for the night-time period as it lies centrally within the main data range, is very similar to the mean value and is equal to the median and modal values.

4.3 Residual Sound Level

Residual sound pressure levels were determined for the purposes of the BS4142 assessment of noise of a commercial or industrial nature associated with the proposed site. The standard uses a typical residual level (LAeq, T) in the absence of the specific sound under consideration.

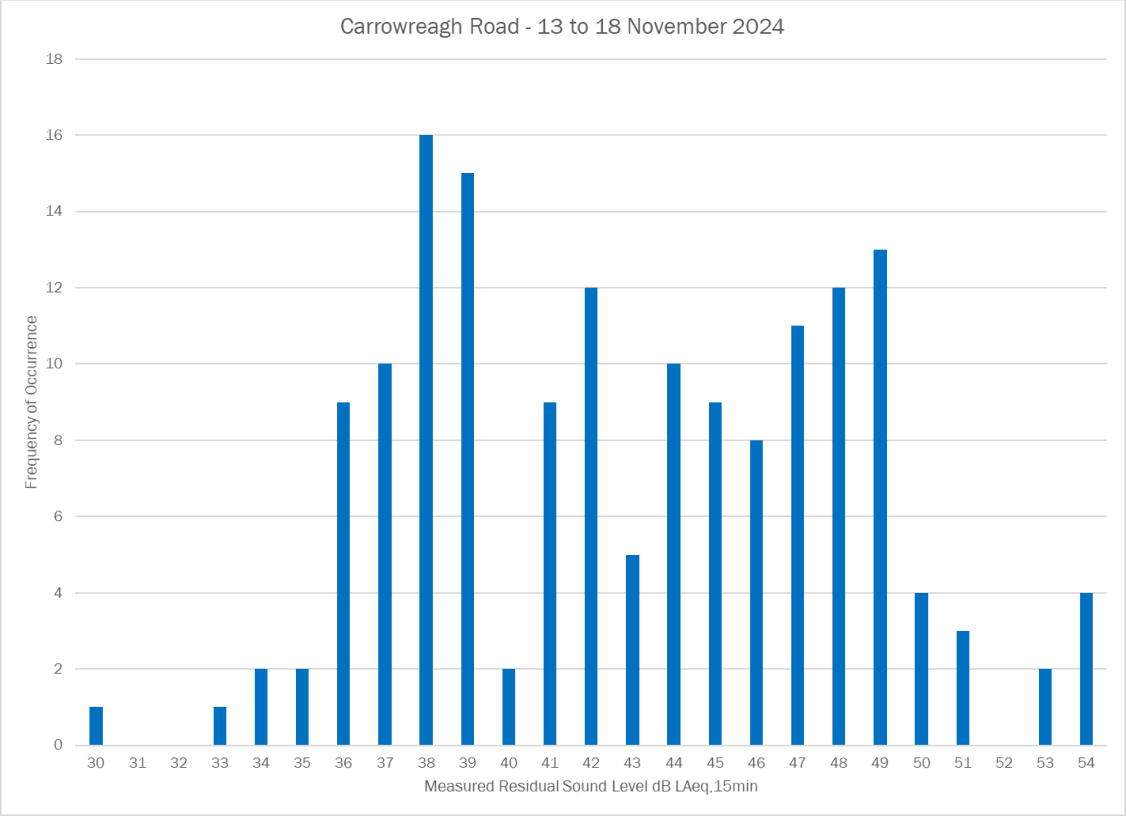
The results are shown below, where the measured residual levels are shown as per the frequency of each occurrence. The results are presented for daytime and night-time in Figures 4 and 5 respectively.

Figure 4: Histogram showing frequency distribution of daytime residual sound levels at the monitoring location



The daytime mean was 55 dB, the mode 56 dB and median 55 dB. Based on analysis of the data presented in Figure 4 and guidance from BS 4142:2014, **56 dB L_{Aeq}** has been chosen as appropriate and representative residual noise levels for the daytime period as it lies centrally within the main data range, is very similar to the mean and median values and is equivalent to the most frequently occurring value.

Figure 5: Histogram showing frequency distribution of night-time residual sound levels at the monitoring location



The night-time mean was 43 dB, the mode 38 dB and median 42 dB. Based on analysis of the data presented in Figure 5 and guidance from BS 4142:2014, **42 dB L_{Aeq}** has been chosen as appropriate and representative residual noise levels for the night-time period as it lies centrally within the main data range and is very similar to the mean and median values.

5.0 NOISE PREDICTIONS

5.1 SoundPLAN Noise Modelling

For the purposes of this assessment, computer modelling has been undertaken to accurately predict noise emissions at the nearest residential properties due to the proposed development.

The model was implemented in *SoundPLAN* version 9.1, which is produced by Braunstein & Berndt GmbH. The *SoundPLAN* implementation of ISO9613 has been tested in-house by *SoundPLAN* developers to ensure calculated results are within 0.2dB of the standard.

The model is integrated, allowing noise from all sources, with prediction methodologies to be undertaken simultaneously. The noise model takes into consideration the following parameters:

- Topographical effects
- Atmospheric absorption
- Ground absorption
- Screening effects
- Reflections
- Focusing effects
- Metrological conditions

The model predicts the propagation of noise in each octave-band for source-receiver pair and produces a noise level contour map. The noise level contours are colour coded for ease of interpretation.

5.2 Source Noise Levels and Noise Model Inputs

5.2.1 Proposed Shed Construction

The proposed building will be constructed of profiled metal cladding from ground to ridge height. For the purposes of the assessment, the model assumes that the shed is constructed from 0.8mm profiled metal sheeting, which provides a sound reduction of 22 dB (Acoustics in the built environment – Advice for the design team 2nd Edition 1997).

The daytime model assumes that all roller shutter doors are in the open position, providing 0 dB attenuation to the internal noise level.

The night-time model assumes that the roller shutter doors are only open for access and egress. The roller shutter doors are assumed to be constructed of at least 0.8mm metal, which provides a sound reduction of 22 dB.

5.2.2 Internal Noise Level

The primary noise sources within the proposed building includes a compressor, a front loader for unloading material, stabiliser bin, magnetic separator, rotary drum mixer, pellet line and activities associated with bag storage.

Based on data provided by the applicant, a sound pressure level of 80 dB(A) has been applied to the internal facades of the proposed building with no on-time correction. The internal noise level is based on measurements carried out of the proposed internal equipment at similar sites. A sound pressure level of 80 dB(A) applied to the internal facades would equate to a higher noise level centrally within the building – approximately 85-90 dB(A).

5.2.3 External Noise

External noise will involve HGVs accessing the site associated with delivery and export of products, as well as noise from the external stack.

HGV movements are represented in the model as a line source, travelling from the site entrance to the roller shutter doors at the northern façade. The applicant has advised that 13 HGV loads will enter the site each day, equating to a total of 26 movements to and from the site.

The daytime model assumes that there will be six HGV movements on the site each hour (three HGVs entering and three exiting the site). The night-time model assumes that there will be four HGV movements on the site each hour (two HGVs entering and two exiting the site). HGVs have a

sound power level of 98 dB(A) (BS5228:2014) and are assumed to travel at a speed of 20km/h. Furthermore, a point source has been included in both the daytime and night-time models with a sound power level of 98 dB(A), representing the HGV starting its engine. The model assumes that the three HGVs during the daytime hours and two HGVs during night-time hours will idle for 1-minute.

The proposed stack on the western side of the proposed building has been included in the model as a point source with a sound power level of 88 dB(A), which would be equivalent to a sound pressure level of 80 dB(A) at 1m distance. No on-time correction has been applied.

Digital mapping was used to present the site layout and the closest residential properties in the vicinity of the site, included in Appendix B.

5.3 Receptors

Six receptors were identified representing the amenity areas of the nearest residential properties in the vicinity of the proposed development site. The location of these receptors is presented in Table 3 and Appendix A.

Table 3: Noise Sensitive Receptors

Location	Co-ordinates
R1 – 30/32 Carrowreagh Road	343504 374676
R2 – 28/28a Carrowreagh Road	343522 374622
R3 – 27 Carrowreagh Road	343591 374578
R4 – 40 Millreagh Grove	343569 374479
R5 – 21/23 Millreagh Grove	343566 374440
R6 – 34 Lambert Avenue	342892 374651

**Where the address was not available, exact coordinates have been provided*

5.4 Predicted Noise Levels

The predicted noise levels (L_{Aeq} to the nearest dB) at each receptor location are presented in Table 4.

Table 4: Predicted Noise Levels

Location	Predicted noise impact	
	Daytime $L_{Aeq,1hr}$	Night-time $L_{Aeq,15min}$
R1 – 30/32 Carrowreagh Road	46	36
R2 – 28/28a Carrowreagh Road	46	37
R3 – 27 Carrowreagh Road	44	35
R4 – 40 Millreagh Grove	42	37
R5 – 21/23 Millreagh Grove	39	35
R6 – 34 Lambert Avenue	32	26

6.0 NOISE ASSESSMENT

6.1 BS 4142:2014 Noise Assessment

The predicted operations of the site at the amenity areas associated with the nearest residential properties have been assessed in accordance with BS 4142:2014.

- The highest predicted level at a third-party residential receptor is taken from Table 4 above
- The acoustic feature correction was assessed this takes account of:
    - Tonality – The noise sources associated with the proposed development are not expected to be tonal. The noise impact from the site is below the existing background and residual noise levels during the day at the receptor locations. At night, residents are likely to be indoors. Therefore, any potential tonal noise from the site is anticipated to be inaudible at receptor locations.
    - Impulsivity – Noise from the proposed development is not expected to be impulsive.
    - Other sound characteristics – Noise from the proposed development would be consistent with the existing noise environment, considering the agricultural and industrial nature of the wider area.
    - Intermittency – When referring to the application of a character correction for intermittency, Section 9.2 of BS4142 states:

      "If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."

      The predicted impact of the site is significantly below the residual sound level, and any potential intermittency element is not anticipated to be readily distinctive as it is effectively masked by the residual sound climate. Therefore, no character correction for intermittency has been applied.

The predicted noise impact during daytime and night-time hours are significantly below the representative residual sound levels. Therefore, any potential characteristics to the noise from the site is unlikely to be audible.

Table 5: BS4142 assessment

Description	Daytime	Night-time
Predicted source L_{Aeq} noise level	46 dB	37 dB
Acoustic feature correction	+0 dB	+0 dB
Rating Level, L_{Ar}	46 dB	37 dB
Typical background level (measured L_{A90})	47 dB	34 dB
Difference	Rating Level = Background – 1 dB	Rating Level = Background + 3 dB

BS4142:2014 requires that the background noise level is subtracted from the Rating Level to identify the presence or otherwise of an adverse impact. The greater this difference, the greater the likelihood of an adverse impact as follows:

- A difference of +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

Under the definitions of BS4142:2014, we conclude the following:

- As the Rating Level is **1 dB lower** than the daytime background level at the nearest residential property, this is an indication of the specific sound source having a low impact, however an assessment of absolute noise levels will also be carried out in order to establish the significance of these results.
- As the Rating Level is **3 dB higher** than the night-time background level at the nearest residential property, this is an indication of the specific sound source having a low impact, however an assessment of absolute noise levels will also be carried out in order to establish the significance of these results.

6.2 Context

However, it should be recognised that these ratings are deemed an 'initial estimate of the impact' which may need to be modified due to context. BS4142:2014 presents a number of pertinent factors that also need to be taken into consideration:

1. The absolute level of sound – *"where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background."*

   Typically, an open window provides 15 dB attenuation (World Health Organisation Guidelines for Community Noise 1999).

   The specific daytime noise level of 46 dB(A) outside the nearest third-party receptors window equates to 31 dB(A) internally. Therefore, taking this into consideration, internal noise levels within the third-party receptors would be deemed compliant with BS8233 – Rest/ Sleeping – during daytime hours.

   Furthermore, the maximum predicted absolute sound pressure levels predicted at the closest third-party receptor window are a minimum of 4 dB below the WHO recommended lower external daytime noise level of 50dB $L_{Aeq.}$

   With regards to the night-time impact on the noise sensitive properties as a result of operation of the development, the document *'BS 4142:2014+A1:2019 – Technical Note'* by The ANC Working Group dated March 2020 states:

   > *"Garden amenity value was considered to be much reduced in the night-time period (suggested in BS 4142 as 23:00 to 07:00 hours) and the focus of protection should be on amenity at the residential accommodation itself during this period. It is suggested that this view would hold relevance to the contextual stage of an assessment.".*

   This extract suggests that the impact from the development should be assessed at the dwelling, rather than the external amenity area. In consideration of this, the specific night-time noise level of 37 dB(A) outside the nearest third-party receptors window equates to 22 dB(A) internally. Therefore, internal noise levels within the third-party receptors would be deemed compliant with BS8233 – Rest/ Sleeping – during night-time hours.

2. The character and level of noise – *'...assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound'.*

   Noise from the proposed development would be consistent with the industrial/agricultural character of the immediate area. Furthermore, the worst-case predicted impact from the site is below the daytime background level and only 3 dB above the night-time background level at the worst-affected receptor locations. It is assumed that at night-time residents are indoors and noise from the development will not be audible. Therefore, noise from the proposed development would not be considered incongruous to the locality.

3. The sensitivity of the receptor and whether dwellings already incorporate design measures that secure good internal acoustic condition.

It is unknown if any acoustic measures have been incorporated into the existing dwellings and hence it is considered within this assessment that there have not.

Taking the above into consideration, it is determined that the context of this particular scenario is such that the daytime and night-time noise impact would be deemed 'low'.

6.3 Uncertainty

BS4142:2014 requires a qualitative consideration of the level of uncertainty in relied upon data, measurements and calculations. Where the level of uncertainty could affect the conclusion, reasonably practicable steps to reduce the level uncertainty should be taken.

Background noise level measurements –

- Background noise level measurements were undertaken for 6 days, reducing uncertainty over the derived 'typical' day background noise levels
- Background noise level measurements were reviewed for suspected abnormal events and these were excluded, increasing conservatism
- Background noise level measurements were reviewed against prevailing weather conditions, where weather effects were noted (i.e. high winds or rainfall) these were excluded, reducing uncertainty
- Background noise level measurements were undertaken using Type 1 calibrated sound level meters, reducing uncertainty
- Background noise level measurements presented a typical diurnal pattern which was repeated daily, this demonstrates limited variability in the daily background noise level pattern, reducing uncertainty

Residual and ambient sound level measurements –

- Residual and ambient sound level measurements were undertaken for 6 days, reducing uncertainty over the derived 'typical' residual and ambient sound levels
- Residual and ambient sound level measurements were reviewed against prevailing weather conditions, where weather effects were noted (i.e. high winds) these were excluded, reducing uncertainty
- Residual and ambient sound level measurements were undertaken using Type 1 calibrated sound level meters fitted with wind shields, reducing uncertainty
- Residual and ambient sound level measurements presented a typical diurnal pattern which was repeated daily, this demonstrates limited variability in the daily noise level pattern, reducing uncertainty

Sound Power Level Data –

- Where available, manufacturer's sound power level data was relied upon, reducing uncertainty
- Were manufacturer's sound power level data was not available, conservative assumptions were relied upon, whilst not reducing uncertainty, conservative assumptions ensure that any uncertainty would only have a positive impact on conclusions (i.e. impacts only lower than presented).

Calculations –

- Calculations were undertaken using SoundPlan noise modelling software which has been independently validated and assumes a slight downwind propagation from source to receiver, reducing uncertainty

Taking into consideration all of the above, were reasonably practicable, uncertainty has been reduced. Were uncertainty remains, conservative assumptions have been applied to ensure that such uncertainty would only have a positive impact on conclusions.

7.0 CONCLUSION

Irwin Carr Consulting have been commissioned to undertake a noise assessment for a proposed industrial building to be used for anaerobic digestate management on lands approximately 120m southwest of No.28 Carrowreagh Road, Dundonald, BT16 1TS.

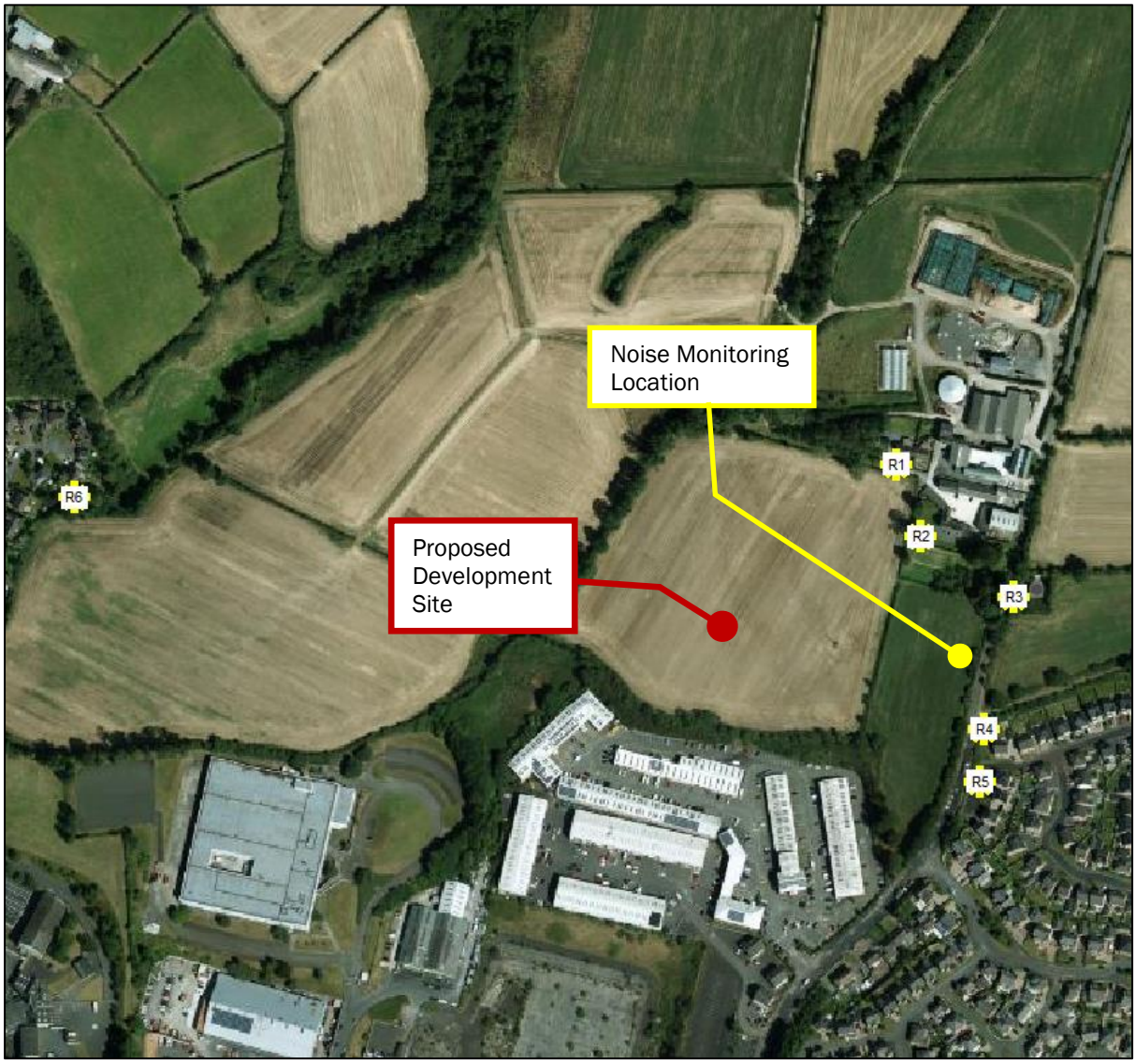
For this assessment, background noise levels were measured close to the nearest noise sensitive properties between 13 and 18 November 2024. The background noise level measured at this location was deemed representative of the background noise levels in the vicinity of the site.

The predicted noise levels at each of the nearest sensitive receptors were assessed against BS 4142:2014 limits and WHO recommended noise levels.

It was found that operational noise from the proposed development is likely to have a low impact during the daytime and night-time periods.

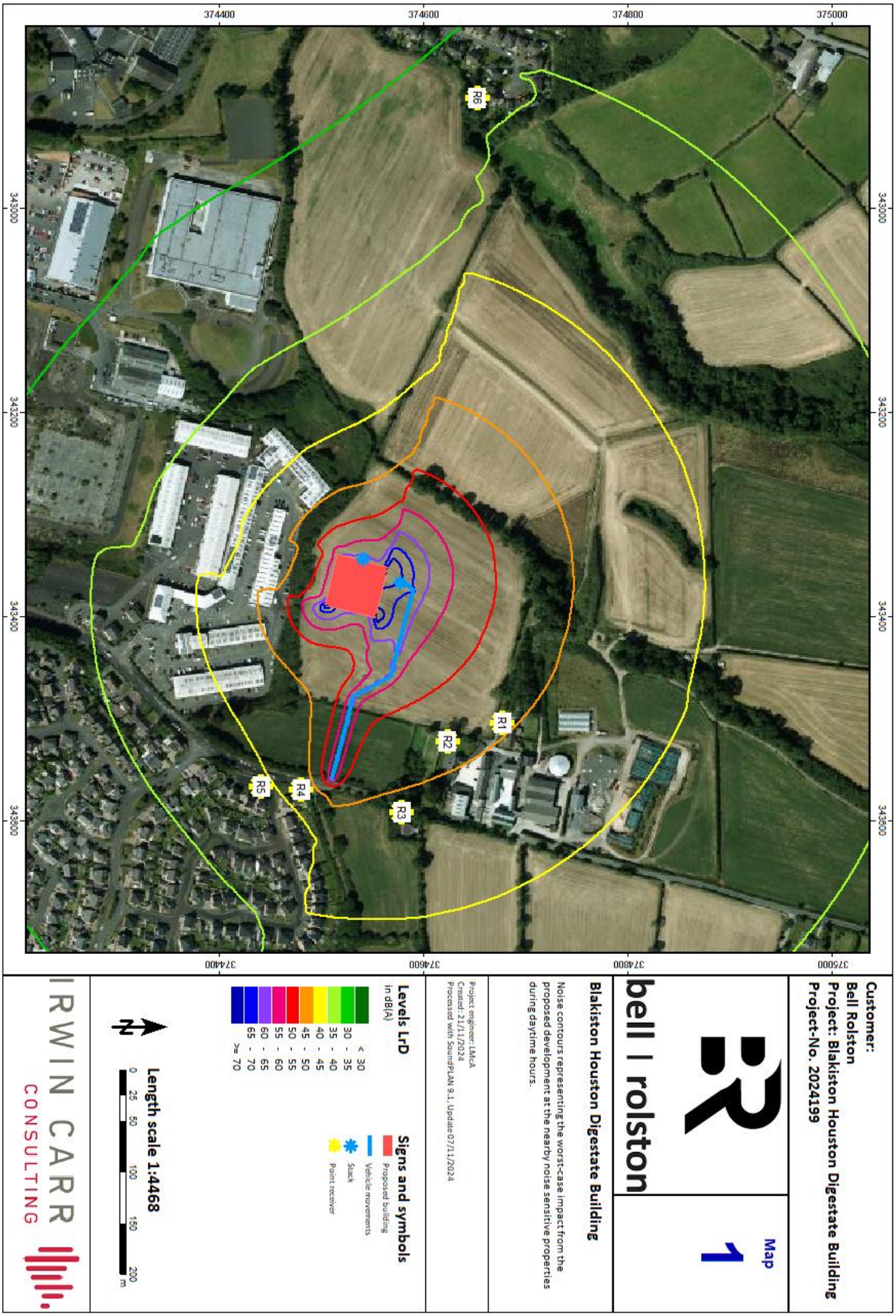
For the reasons outlined within this report, Irwin Carr Consulting is of the opinion that noise generated by the proposed development should not adversely impact neighbouring properties and therefore should not be considered a negative determining factor when assessing this application.

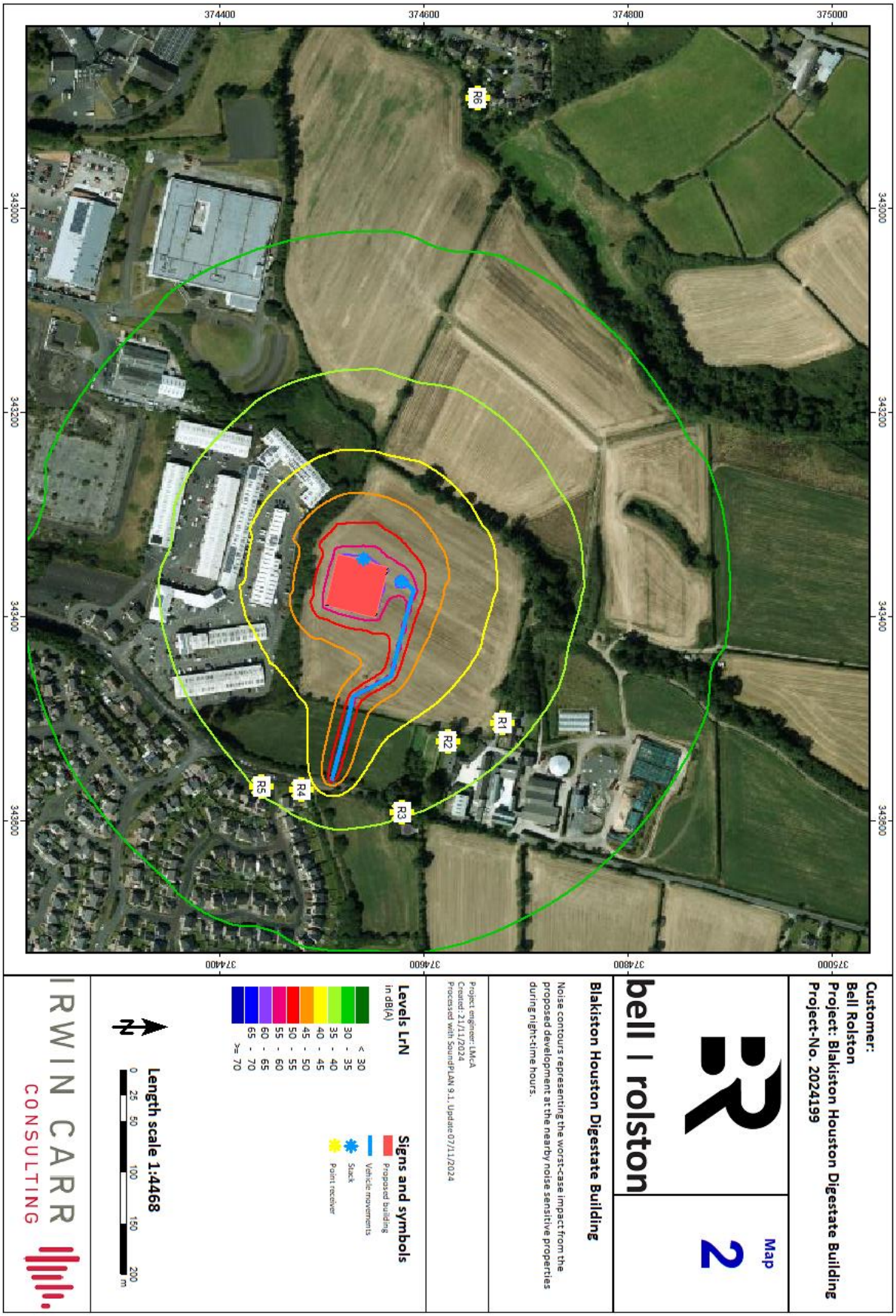
APPENDIX A SITE, RECEPTOR AND NOISE MONITORING LOCATION



***Note- The above diagram is not to scale and is for illustrative purposes only*

APPENDIX B SOUNDPLAN NOISE MODEL OUTPUT




Customer:
Bell Rolston
Project: Blakiston Houston Digestate Building
Project-No. 2024199
bell | rolston
Map 2
Blakiston Houston Digestate Building
Noise contours representing the worst-case impact from the proposed development at the nearby noise sensitive properties during night-time hours.
Project engineer: LMcA
Created: 21/11/2024
Processed with SoundPLAN 9.1. Update 07/11/2024
Levels LrN
in dB(A)
< 30
30 - 35
35 - 40
40 - 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
>= 70
Signs and symbols
Proposed building
Vehicle movements
Stack
Point receiver
Length scale 1:4468
0 25 50 100 150 200 m
N
IRWIN CARR CONSULTING
374400
374600
374800
375000
343000
343200
343400
343600
R1
R2
R3
R4
R5
R6