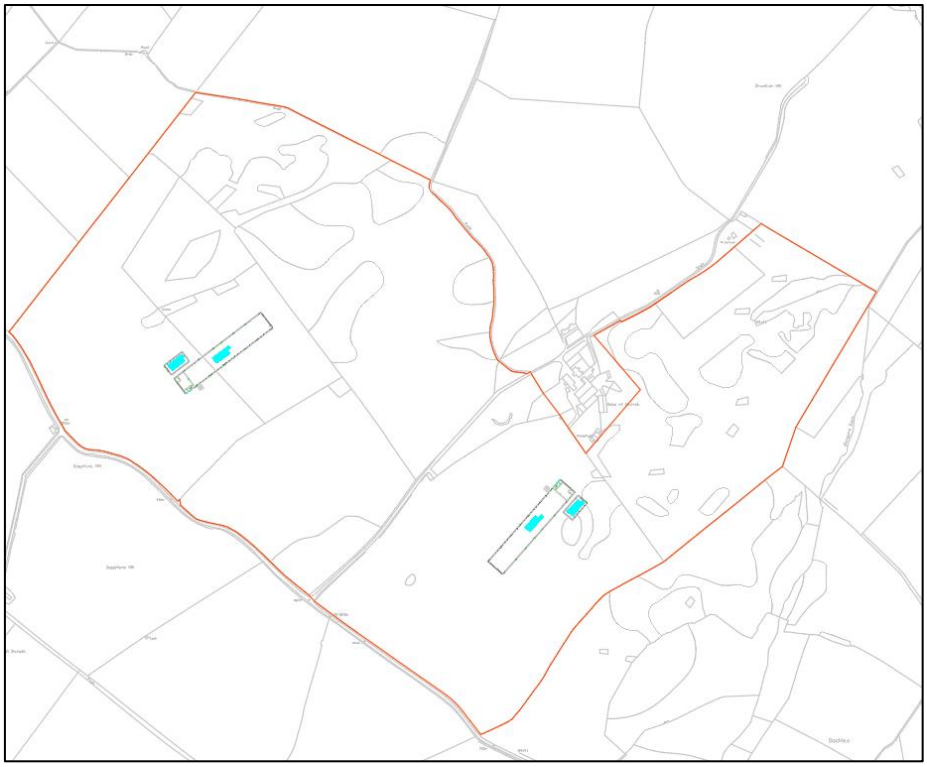
Mains of Dhuloch – Proposed Egg Production Plant, Kirkcolm, Stranraer

784-B067657



Noise Assessment

Graham Group

14th November 2024

TETRA TECH

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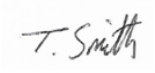
Revision:	N/A	**Prepared by:**	Travis Smith Environmental Assistant	
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Table of Contents

Executive Summary **6**

1.0 Introduction **7**

1.1 Purpose of this Report 7

1.2 Planning Advice Note (PAN 1/2011) Planning and Noise 7

1.3 Local & Regional Policy Context 7

1.4 Acoustic Consultants' Qualifications and Professional Memberships 8

2.0 Assessment Criteria **9**

3.0 Assessment Methodology **12**

3.1 Noise Modelling Methodology 12

3.2 Model Input Data 13

3.3 Modelling Inputs & Rating Corrections 14

3.4 Sensitive Receptors 15

4.0 Noise Survey **17**

4.1 Noise Survey Details 17

4.2 Noise Survey Results 18

4.3 Representative Background Noise Levels 20

5.0 Assessment of Effects **21**

5.1 Assessment of Noise: Technical Advice Note Assessment 21

6.0 Conclusion **29**

Appendices **30**

List of Tables

Table 1.1: Acoustic Consultants' Qualifications & Experience 8
Table 2.1: Sensitivity of Receptors 9
Table 2.2: World Health Organization (WHO) Target Noise Levels for Dwellings 10
Table 2.3: Magnitudes of Impact 10
Table 2.4: Significance of Effects 11
Table 2.5: Significance of Effects and Commentary on Significance 11
Table 3.1: Modelling Parameters Sources and Input Data 12
Table 3.2: Summary of Noise Input Data (Sound Pressure Levels) 13
Table 3.3: Summary of Noise Input Data (Sound Power Levels) 13
Table 3.4: Modelling Inputs & Rating Corrections 14
Table 3.5 Existing Sensitive Receptor Locations 15
Table 4.1: Noise Monitoring Locations 17
Table 4.2: Results of Baseline Noise Monitoring Survey (Average Levels) 18
Table 4.3: Representative Background Noise Levels (All Receptors) 20
Table 5.1: Noise Prediction Results 21
Table 5.2: BS 4142 and Determination of Receptor Sensitivity 24
Table 5.3: Magnitude of Change based on Change in Noise Level $L_{Aeq,T}$ 25
Table 5.4: Determining Significance of Effect 26
Table 5.5: Night-time Noise Intrusion Levels $L_{Aeq,15mins}$ 27

List of Figures

Figure 3.1: Sensitive Receptor Locations 16
Figure 4.1: Noise Monitoring Locations 18
Figure 5.1: Daytime Predicted Site Noise Contour Plot (dB $L_{Aeq,1Hour}$) at 1.5m 22
Figure 5.2: Night-time Predicted Site Noise Contour Plot (dB $L_{Aeq,15Mins}$) at 4.0m 23

Appendices

Appendix A – Acoustic Terminology
Appendix B – References

Acronyms/Abbreviations

Acronyms/Abbreviations	Definition
CADNA	Computer Aided Noise Abatement
DMRB	Design Manual for Roads and Bridges
HGV	Heavy Goods Vehicle
PPG	Planning Practice Guidance
UDP	Unitary Development Plan
UKAS	United Kingdom Accreditation Service

Executive Summary

A noise assessment has been undertaken in support of a planning application for an egg production facility at Stranraer, Scotland.

The operational noise assessment has been undertaken in accordance with the requirements stipulated within PAN 1/2011. The results show that noise from the proposed development would result in a Moderate impact during the night-time at R01. Further assessments have been undertaken to contextualise the potential noise impact.

Based on internal ambient noise level criteria established within WHO guidelines, impacts in relation to night-time noise levels will be low and within limits considered to represent a neutral impact. As such, no further mitigation has been proposed.

1.0 Introduction

1.1 Purpose of this Report

This report presents the findings of a noise assessment to support a full planning application for a proposed poultry farm to the north-west of Leswalt, Stranraer. A description of the existing noise environment in and around the site is provided. Noise surveys have been undertaken and the results used to verify predictions of the short-term and long-term effects of noise.

A list of acoustic terminology used in this report is provided in Appendix A. Report Conditions are available upon request.

1.2 Planning Advice Note (PAN 1/2011) Planning and Noise

The following guidance has been taken from the introduction of the Planning Advice Note (PAN 1/2011). Whilst it promotes the selection of reasonable criteria to assess noise impact, it does not suggest specific target levels, allowing for consideration of contextual and non-acoustic factors.

> "1. This Planning Advice Note (PAN) provides advice on the role of the planning system in helping to prevent and limit the adverse effects of noise. It supersedes Circular 10/1999 Planning and Noise and PAN 56 Planning and Noise. Information and advice on noise impact assessment (NIA) methods is provided in the associated Technical Advice Note. It includes details of the legislation, technical standards and codes of practice for specific noise issues."

1.3 Local & Regional Policy Context

The Dumfries and Galloway Local Development Plan 2 contains reference to noise but does not include specific noise criteria. The following policy has bene taken from the Local Development Plan 2 and has been reproduced below.

> "Development will be assessed against the following considerations where relevant to the scale, nature and location of the proposal:
>
> a) General Amenity
>
> Development proposals should be compatible with the character and amenity of the area and should not conflict with nearby land uses. The following issues

which may result from the development will be a material consideration in the assessment of proposals:

• noise and vibration;

… ".

1.4 Acoustic Consultants' Qualifications and Professional Memberships

The lead project Acoustic Consultant is Travis Smith. The report has been checked by Joe Nott and verified by Dawit Abraham. Relevant qualifications, membership and experience are summarised in Table 1.1.

Table 1.1: Acoustic Consultants' Qualifications & Experience

Name	Education	Experience in Undertaking Noise Assessments (Start date of working in noise & acoustics)	Attained Associate Membership of the Institute of Acoustics (date)	Attained Membership of the Institute of Acoustics (date)
Travis Smith	BSc 2022	Jul 2022	-	-
Suzy Everett	BEng 2018	Aug 2016	Aug 2018	Sep 2022
Dawit Abraham	BSc 2008 MSc 2010	Oct 2010	Jan 2011	Jan 2015

2.0 Assessment Criteria

Assessment of Noise: Technical Advice Note (TAN) is supplementary guidance to PAN 1/2011 published by the Scottish Government. TAN recommends a five-stage process to the assessment of noise, as detailed below, and which has been used in this assessment to determine the level of impact from the proposed extension to the delivery hours.

Stage 1: Initial Process

The initial process requires the identification of all noise sensitive receptors (NSR) that may potentially be affected by the development and to prioritise each NSR according to their level of sensitivity.

For a noise generating development (NGD), receptor sensitivity can be determined based on the likelihood of complaints as indicated by the results of a BS 4142:1997[1] assessment. Table 2.1 below presents the criteria for determining High, Medium, and Low receptor sensitivity.

Table 2.1: Sensitivity of Receptors

Sensitivity	Difference Between the Rating Level ($L_{Ar,Tr}$) and Background Level ($L_{A90,T}$)
Low	<5 dB
Medium	5 dB to 10 dB
High	>10 dB (complaints are likely)

Stage 2: Quantitative Assessment

The quantitative assessment method depends on the type of development proposed i.e., Noise Sensitive Development (NSD) or Noise Generating Development (NGD). In the case of an NGD, a quantitative assessment will be based on the change in noise climate before and after the new noise is introduced with accordance to the approach contained within the Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment November (2014). For an NSD, a quantitative assessment will be based on comparing an absolute noise level with an appropriate noise target. The final procedure in this stage is to determine the magnitude of the impact.

[1] BS4142:1997 is now superseded by BS 4142:2014+A1:2019. The 1997 version is specifically referenced in the Assessment of Noise Technical Advice Note (TAN) 2011.

The magnitude of noise impacts could also be derived on the basis of the ambient noise level, when the development is operational, exceeding a target noise level that is based on World Health Organization (WHO) precautionary guideline levels published in Guidelines for Community Noise (1999) and Night Noise Guidelines for Europe (2009). Table 2.2 below presents the target noise levels.

Table 2.2: World Health Organization (WHO) Target Noise Levels for Dwellings

Time Period	Location	Target Noise Level
Daytime (07:00 – 23:00)	Outdoor living area	50 – 55 dB $L_{Aeq,16hours}$
	Dwelling, indoors	35 dB $L_{Aeq,16hours}$
Night-time (23:00 – 07:00)	Inside bedrooms	30 dB $L_{Aeq,8hours}$
	Outside bedrooms	40 dB L_{night}
	Inside bedrooms	45 dB L_{AFmax}* no more than 10-15 times per night

*This criterion has been derived from BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings.

Table 2.3 below presents the magnitudes of impact and the associated criteria.

Table 2.3: Magnitudes of Impact

Magnitude of Impact	Change in Ambient Noise Level, $L_{Aeq,T}$ dB (After – Before)[1]	WHO/BS8233 Exceedance Levels (Ambient After Development – Target)		
		Daytime $L_{Aeq,16hours}$	Night-time $L_{Aeq,8hours}$	Night-time L_{AFmax}
Major Adverse	≥5.0 dB	>10 dB	>15 dB	>15 dB
Moderate Adverse	3.0 – 4.9 dB	5 – 10 dB	10 – 15 dB	>10 dB
Minor Adverse	1.0 – 2.9 dB	3 – 5 dB	5 – 10 dB	0 – 10 dB
Negligible	0.1 – 0.9 dB	0 – 3 dB	0 – 5 dB	<0 dB
No Adverse Impact	≤0.0 dB	<0 dB	<0 dB	<0 dB

[1] When evaluating change in noise levels for magnitude of impact purposes, all levels should be rounded to 1 decimal point i.e. when the 2nd decimal is 5 or more, round up.

Stage 3: Qualitative Assessment

A qualitative assessment allows additional factors to be included in the assessment procedure to augment the quantitative evaluation. The outcome from this process allows the magnitude of impacts determined from the quantitative assessment to be adjusted accordingly.

Stage 4: Level of Significance

The level of significance of the noise impact at the NSR is obtained through the relationship of the receptor's sensitivity to noise and the magnitude of the noise impact. The result of this process is entered into the Summary Table of Significance of Noise Impacts. Table 2.4 provides a framework in determining the level of significance relating the magnitude of impact with the sensitivity of the receptor.

Table 2.4: Significance of Effects

Magnitude of Impact	Sensitivity of Receptor		
	Low Sensitivity	Medium Sensitivity	High Sensitivity
Major Adverse	Slight/Moderate	Moderate/Large	Large/Very Large
Moderate Adverse	Slight	Moderate	Moderate/Large
Minor Adverse	Neutral/Slight	Slight	Slight/Moderate
Negligible	Neutral/Slight	Neutral/Slight	Slight
No Adverse Impact	Neutral	Neutral	Neutral

The level of significance is used to determine whether or not noise is a key decision-making issue for the NSR in question. The level of significance and its relevance to the decision-making process is explained in Table 2.5 below.

Table 2.5: Significance of Effects and Commentary on Significance

Significance of Effect	Commentary of Significance of Effect
Very Large	These effects represent key factors in the decision-making process. They are generally, but not exclusively associated with impacts where mitigation is not practical or would be ineffective.
Large	These effects are likely to be important considerations but where mitigation may be effectively employed such that resultant adverse effects are likely to have a Moderate or Slight significance.
Moderate	These effects, if adverse, while important, are not likely to be key decision-making issues.
Slight	These effects may be raised but are unlikely to be of importance in the decision-making process.
Neutral	No effect, not significant, noise need not be considered as a determining factor in the decision-making process.

Stage 5: The Decision Process

The number of noise sensitive receptors within each level of significance is totalled to complete the Summary Table of Significance which provides an overview of the level of significance of the noise impact on all NSRs.

3.0 Assessment Methodology

3.1 Noise Modelling Methodology

Three-dimensional noise modelling has been undertaken based on the monitoring data to predict noise levels at a number of locations both horizontally and vertically. CADNA noise modelling software has been used. This model is based on ISO 9613-2 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data and model settings as given in Table 3.1 below have been used.

Table 3.1: Modelling Parameters Sources and Input Data

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	DEFRA	LiDAR 1m DTM
Building heights – around site	Tetra Tech Observations	• 4.0m height for one-storey properties • 8.0 m height for two storey properties
Receptor positions*	Tetra Tech	• 1.5 m for ground floor properties • 4.0m height for first-floor properties
Modelling Parameters	Tetra Tech	• Ground Absorption: 0.5 • Order of Reflections: 2 • Noise Contour Plot Grid Receiver Spacing: 10.0
Proposed Plans	Aitken Turnbull Architects	Drawing Title: Block Plan as Proposed Drawing No: AT3887 - 002
*All receptors modelled 1.0m from building façade unless otherwise stated.		

It is acknowledged that a number of the values of parameters chosen will affect the overall noise levels presented in this report. However, it should be noted that the values used, as identified above, are worst-case.

3.2 Model Input Data

Information regarding noise emissions from operational noise sources have been determined using the Tetra Tech Library as well as supplied manufacturer data.

Data contained within Tables 3.2 & 3.3 presents noise information for exhaust fans, HGVs and forklifts.

Table 3.2: Summary of Noise Input Data (Sound Pressure Levels)

Noise Source	Type	Sound Pressure Level (dB(A))	Distance (m)	Source
Exhaust Fan Noise	Average	79.0	2.0	Manufacturer Data
HGV Unloading	Average	73.8	3.0	Tetra Tech Library
HGV Movement	Maximum	73.0	3.0	Tetra Tech Library

*Maximum noise level applied to moving point source to simulate HGV movements.

Table 3.3: Summary of Noise Input Data (Sound Power Levels)

Noise Source	Type	Octave Band Sound Power Level (L_w(A))								Sound Power Level (L_w(A))	Source
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz		
Forklift	Average	81	78	80	83	80	85	87	65	91.5	Tetra Tech Library

3.3 Modelling Inputs & Rating Corrections

Table 3.4 below presents the model input information and BS4142 rating penalty corrections applied to noise data presented within Tables 3.2 & 3.3. Rating corrections have been applied as +3dB for sources considered to be otherwise readily distinctive, as per guidance within BS4142 Section 9.2.

Table 3.4: Modelling Inputs & Rating Corrections

Noise Source	Height (m)	Source Type	Speed (km/h)	Movements per Hour		BS4142 Rating Penalty
				Daytime	Night-Time	
HGV Movement	1.0	Line (Moving Point)	10	2	-	-
Exhaust Fans	0.5 from roof	Point	-	-	-	+3

3.4 Sensitive Receptors

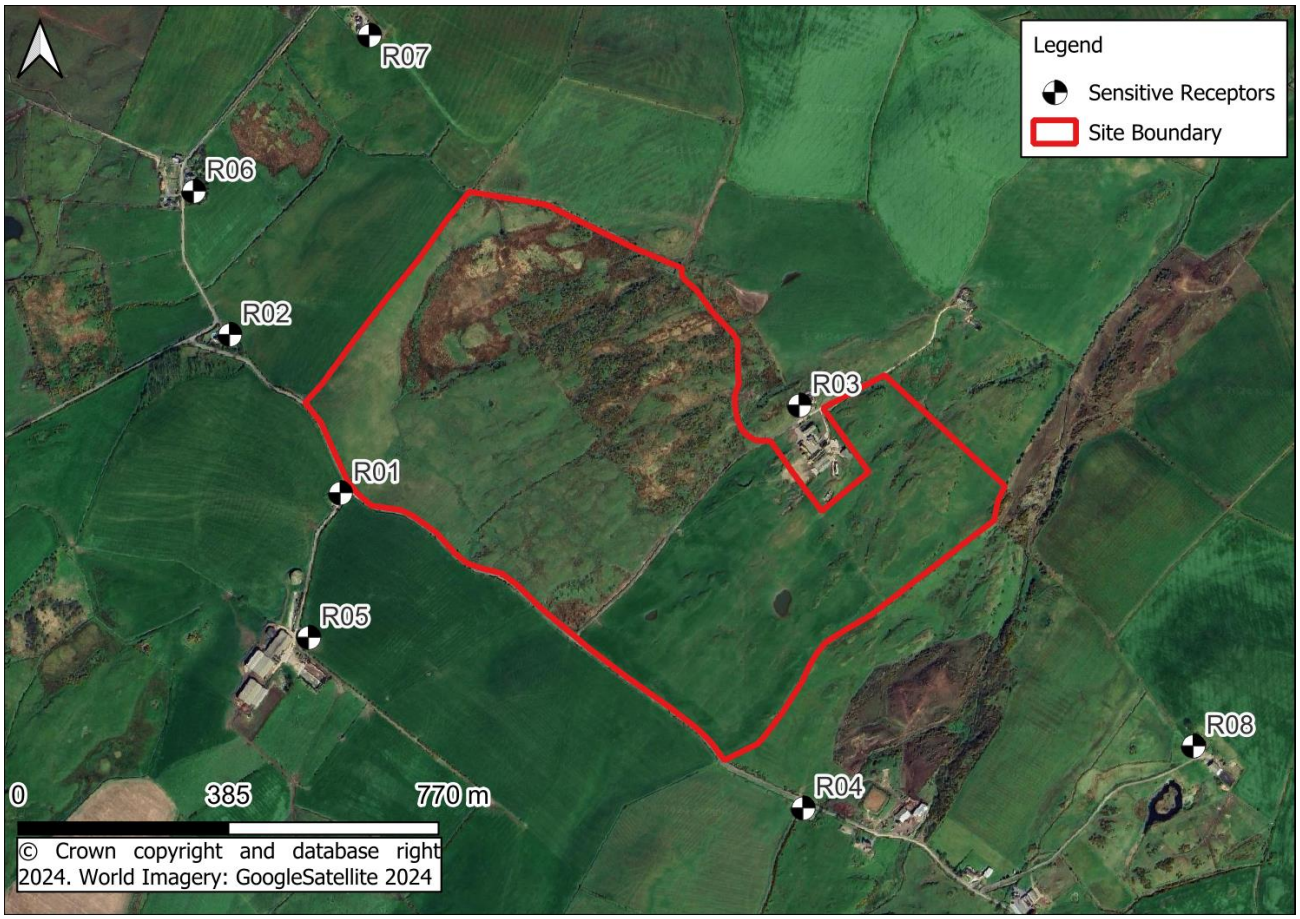
3.4.1 Existing Sensitive Receptor Locations

Table 3.5 below summarises receptor locations that have been selected to represent worst-case sensitive receptors with respect to direct noise from the site. Façades of the nearest noise sensitive properties to the development site have been represented. The locations of the receptors are presented within Figure 3.1 below.

Table 3.5 Existing Sensitive Receptor Locations

Ref.	Description	Type of Use	Height (m) Daytime / Night-time
R01	West Dhuloch Farm, Kirkcolm, Stranraer	Residential	1.5 / 4.0
R02	Knockbennan House	Residential	1.5 / 4.0
R03	2 Mains of Dhuloch Cottages	Residential	1.5 / 1.5
R04	Meikle Glengyre Cottage	Residential	1.5 / 4.0
R05	Dhuloch House	Residential	1.5 / 4.0
R06	Dhuloch Schoolhouse	Residential	1.5 / 4.0
R07	Drumleight	Residential	1.5 / 1.5
R08	Little Glengyre	Residential	1.5 / 4.0

Figure 3.1: Sensitive Receptor Locations



4.0 Noise Survey

4.1 Noise Survey Details

A monitoring survey was undertaken to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background and traffic noise levels. Equipment used during the survey included:

Rion NL52	Environmental Noise Analyser	s/n	710448
Rion NL52	Environmental Noise Analyser	s/n	810559
Rion NL52	Environmental Noise Analyser	s/n	253701
Rion NC75	Sound Calibrator	s/n	34145521

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice, a drift of +0.1 dB was observed on meter s/n 810559, +0.2 dB on meter s/n 253701, and 0.0 dB on meter s/n 710448. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

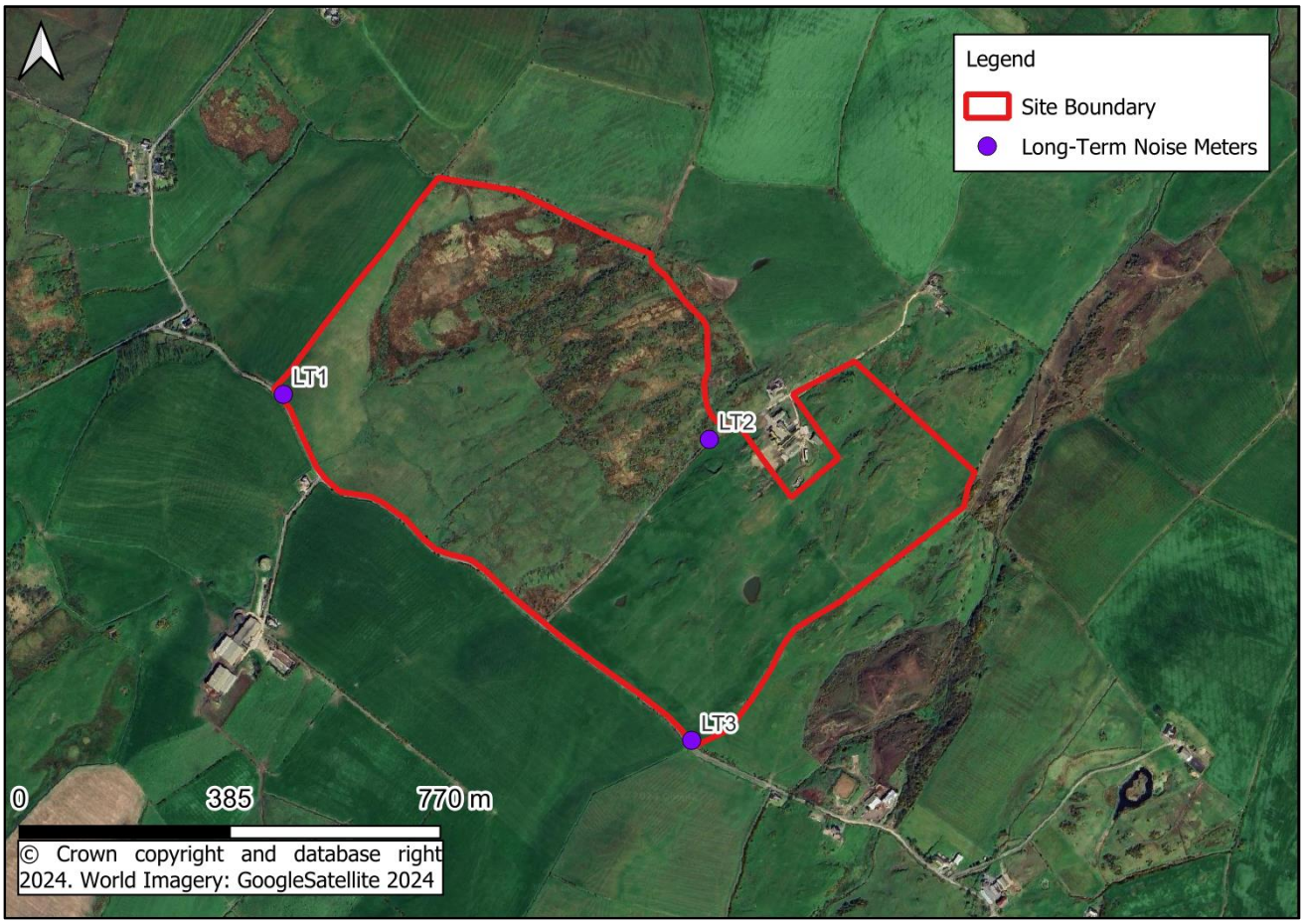
A baseline monitoring survey was undertaken at three locations (as specified in Table 4.1 and shown in Figure 4.1 below) from Thursday 22nd August 2024 to Tuesday 27th August 2024.

Measurements were taken in general accordance with BS 7445-1:2003 The Description and Measurement of Environmental Noise: Guide to quantities and procedures. Weather conditions during the survey period were observed as being dry. Anemometer readings confirmed that wind speeds were less than 5 ms-1 at all times during the survey, with a predominant north-eastern wind direction during the survey.

Table 4.1: Noise Monitoring Locations

Ref	Description
LT1	Edge of field near the road to the South of the site. (54.9496865, -5.1539897)
LT2	Within the site boundary near the landowners empty property. (54.9493241, -5.1418755)
LT3	Edge of field near the road to the South of the site. (54.9443402, -5.1419952)

Figure 4.1: Noise Monitoring Locations



4.2 Noise Survey Results

The dominant noise sources found in the area include road traffic noise, farm activities and noises from animals.

The results of the statistical and frequency measurements conducted during the baseline noise survey are summarised below in Table 4.2. All values are sound pressure levels in dB (re: 2 x 10^{-5} Pa).

Table 4.2: Results of Baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekday Daytime 07:00 - 23:00	42hrs	23/08/2024 26/08/2024-27/08/2024	LT1	53.4	92.3	23.0	44.5	34.0
Weekday Night-time	16hrs	23/08/2024 26/08/2024		38.0	76.9	22.7	32.3	28.0

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
23:00 – 07:00								
Weekend Daytime 07:00 - 23:00	32hrs	24/08/2024-25/08/2024		50.1	87.0	20.9	46.4	37.0
Weekend Night-time 23:00 – 07:00	16hrs	24/08/2024-25/08/2024		37.0	65.3	22.0	36.4	32.0
Weekday Daytime 07:00 - 23:00	50hrs	22/08/2024-23/08/2024 26/08/2024-27/08/2024	LT2	45.3	83.7	19.5	43.4	30.0
Weekday Night-time 23:00 – 07:00	24hrs	22/08/2024-23/08/2024 26/08/2024		40.3	75.6	17.9	36.2	24.0
Weekend Daytime 07:00 - 23:00	32hrs	24/08/2024-25/08/2024		45.2	77.1	19.8	44.0	31.0
Weekend Night-time 23:00 – 07:00	16hrs	24/08/2024-25/08/2024		36.0	63.2	18.9	36.5	30.0
Weekday Daytime 07:00 - 23:00	42hrs	23/08/2024 26/08/2024-27/08/2024	LT3	46.5	80.1	20.6	42.3	32.0
Weekday Night-time 23:00 – 07:00	16hrs	23/08/2024 26/08/2024		36.5	73.0	21.1	31.1	24.0
Weekend Daytime 07:00 - 23:00	32hrs	24/08/2024-25/08/2024		47.6	82.7	20.0	44.1	32.0
Weekend Night-time 23:00 – 07:00	16hrs	24/08/2024-25/08/2024		37.7	73.2	20.7	36.0	29.0

All values are sound pressure levels in dB re: 2x 10^{-5} Pa

4.3 Representative Background Noise Levels

Using the data collected during the baseline survey, representative background noise levels have been derived for all receptor locations presented in Figure 3.1. Table 4.3 presents the representative background noise levels considered appropriate for the existing sensitive receptors within the area (the lower of the respective daytime and evening measurements have been used to represent daytime noise levels, where appropriate).

Table 4.3: Representative Background Noise Levels (All Receptors)

Receptors	Monitoring Location	Time Period	Representative Background Noise Level ($L_{A90,T}$ dB)*
R01, R02, R06, R07	LT1	Daytime (07:00 – 23:00)	34.0
		Night-time (23:00 – 07:00)	28.0**
R03, R05, R08	LT2	Daytime (07:00 – 23:00)	31.0
		Night-time (23:00 – 07:00)	24.0**
R04	LT3	Daytime (07:00 – 23:00)	32.0
		Night-time (23:00 – 07:00)	24.0**

*Lowest $L_{A90,T}$ value selected from either Weekday or Weekend.
** ** A limiting plant noise limit of 35 dB $L_{Aeq,T}$ is set where the prevailing background noise levels minus 5 dB(A) are below this value. Such a limiting criterion falls below credited absolute health-based guideline values to prevent harmful effects of noise (e.g. on rest/sleep with windows open), whilst ensuring standard abatement measures remain physically and economically viable.

The representative noise levels presented in Table 4.3 have been used to inform the assessment presented in Section 5.0.

5.0 Assessment of Effects

5.1 Assessment of Noise: Technical Advice Note Assessment

The significance of the impact is determined by an assessment following the methodology in TAN document detailed in Section 2.0. The sensitivity of the receptor is determined by the difference between the Rating Level and the Background Sound Level. Table 5.1 presents the results of the daytime and night-time noise predictions and Table 5.2 presents the determination of the receptor sensitive based on the typical representative Background Sound Level in Section 4.0 above.

Figure 5.1 and Figure 5.2 present the noise contour plots (inclusive of all potential noise sources) for the daytime and night-time periods.

Table 5.1: Noise Prediction Results

Receptor	Daytime Predicted Specific Sound Level $L_{Aeq,1hour}$	Night-time Predicted Specific Sound Level $L_{Aeq,15min}$
R01	39	40
R02	32	32
R03	38	38
R04	36	36
R05	35	35
R06	29	29
R07	30	30
R08	30	30

Figure 5.1: Daytime Predicted Site Noise Contour Plot (dB $L_{Aeq,1Hour}$) at 1.5m

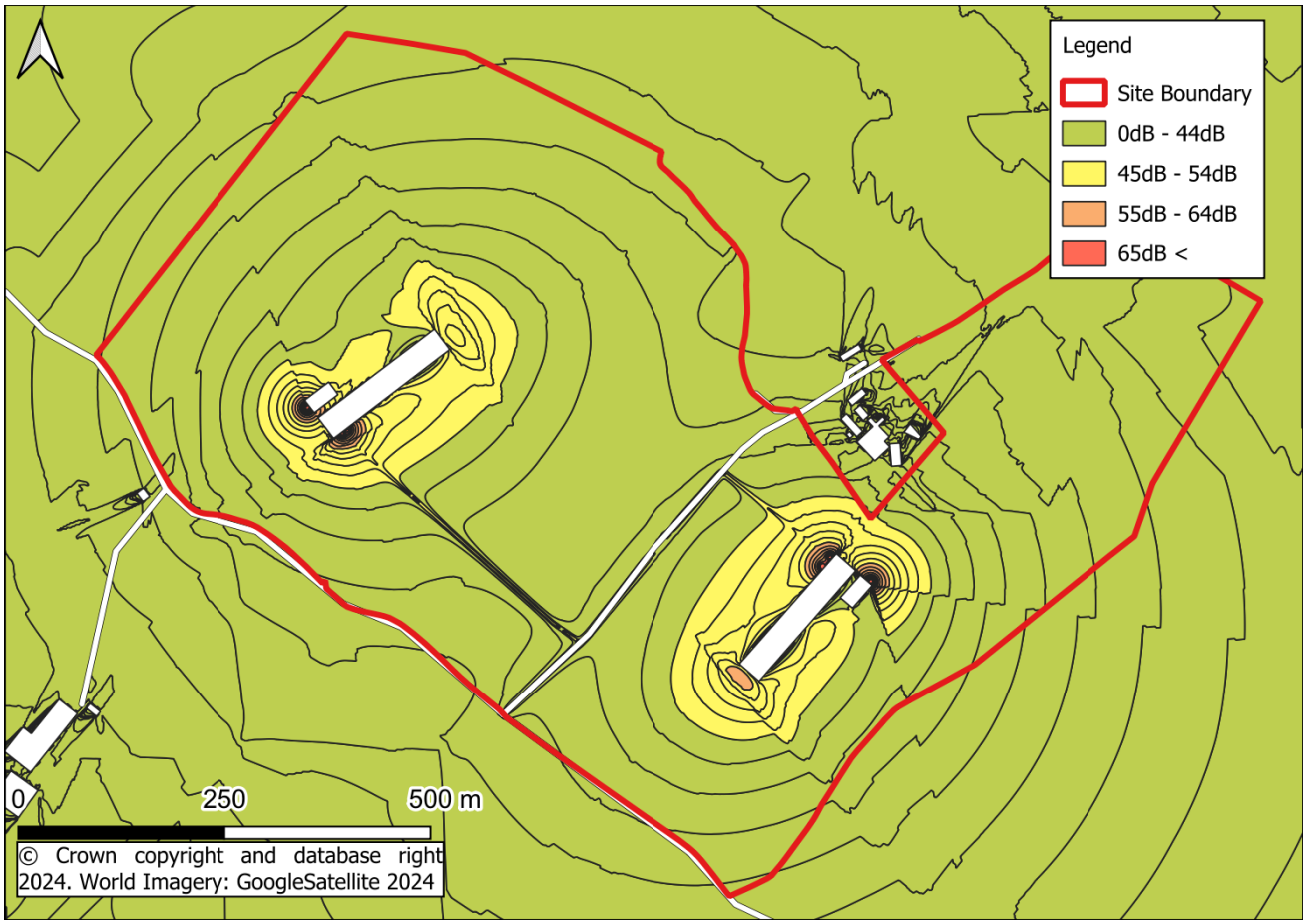
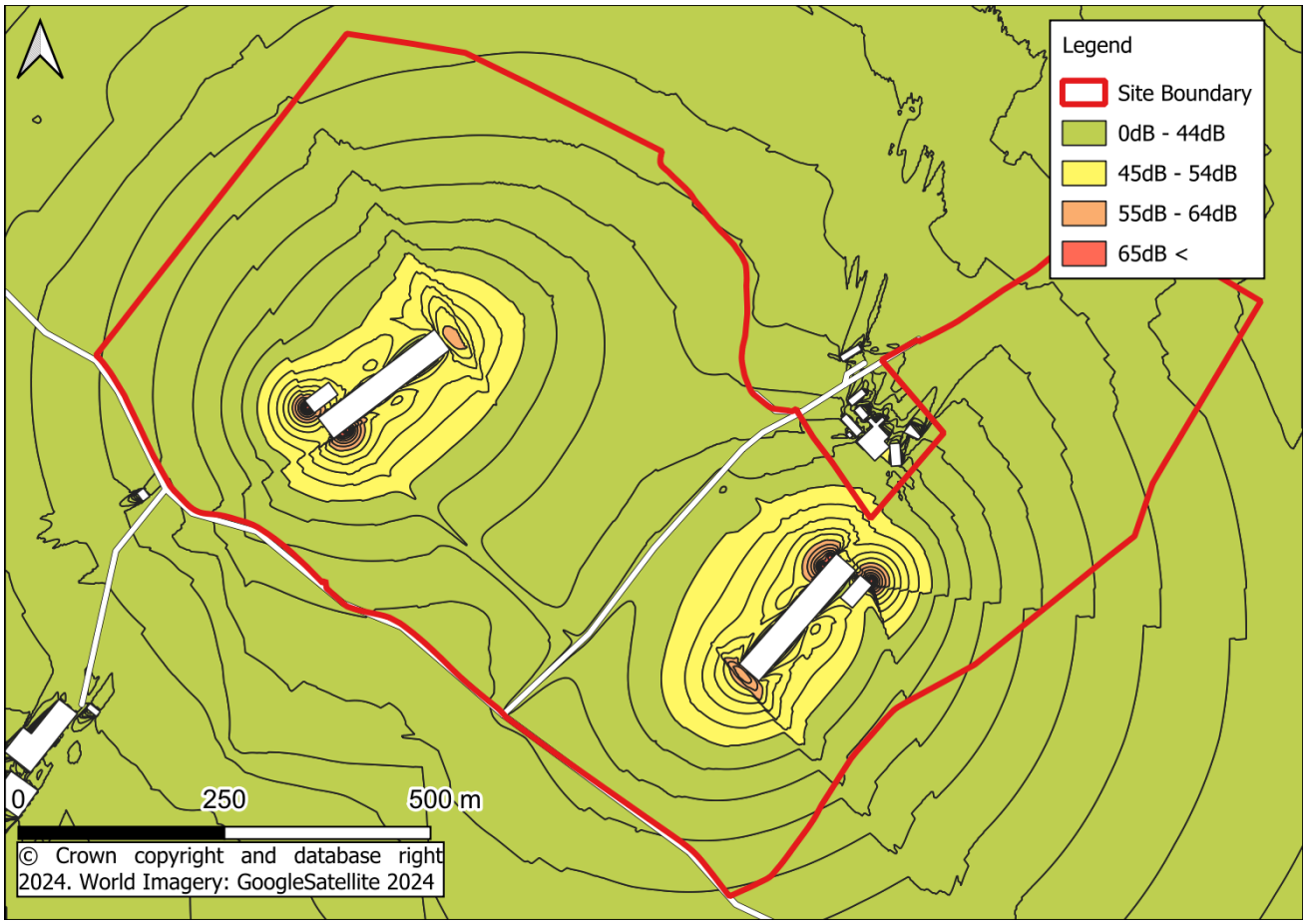


Figure 5.2: Night-time Predicted Site Noise Contour Plot (dB $L_{Aeq,15Mins}$) at 4.0m



To provide a robust assessment and account for any uncertainty a +3 dB correction has been applied.

Table 5.2: BS 4142 and Determination of Receptor Sensitivity

Receptor	Time Period	Predicted Specific Sound Level $L_{Aeq,T}$	Rating Level $L_{Ar,T}$ dB	Background Sound Level $L_{A90,T}$	Difference Rating Level – (Background Sound Level)	Receptor Sensitivity
R01	Daytime	39	42	34	+8	Medium
	Night-time	40	43	35*	+8	Medium
R02	Daytime	32	35	34	+1	Low
	Night-time	32	35	35*	0	Low
R03	Daytime	38	41	31	+10	Medium/High
	Night-time	38	41	35*	+6	Medium
R04	Daytime	36	39	32	+6	Medium
	Night-time	36	39	35*	+4	Low
R05	Daytime	35	38	31	+7	Medium
	Night-time	35	38	35*	+3	Low
R06	Daytime	29	32	34	-2	Low
	Night-time	29	32	35*	-3	Low
R07	Daytime	30	33	34	-1	Low
	Night-time	30	33	35*	-2	Low
R08	Daytime	30	33	31	+2	Low
	Night-time	30	33	35*	-2	Low

* 35 $L_{A90,T}$ has been used as the representative backgrounds due to the measured backgrounds being low in accordance with BS4142:1997. See Section 4.3 for the contextual argument for using 35 $L_{A90,T}$.

The results indicate that the sensitivity of the worst case affected receptors is Medium/High, reaching a Difference Rating Level of +10 at the worst-case receptor during the daytime. To determine the significance of the effect the change in noise level has been undertaken to determine the magnitude of change. The magnitude of change is presented in Table 5.3.

Table 5.3: Magnitude of Change based on Change in Noise Level $L_{Aeq,T}$

Receptor	Time Period	Predicted Specific Sound Level $L_{Aeq,T}$	Existing Ambient Sound Level $L_{Aeq,T}$	Change in Sound Level (dB)	Magnitude of Change
R01	Daytime	39	50	-11	No Adverse Impact
	Night-time	40	37	+3	Moderate Adverse
R02	Daytime	32	50	-18	No Adverse Impact
	Night-time	32	37	-5	No Adverse Impact
R03	Daytime	38	45	-7	No Adverse Impact
	Night-time	38	36	+2	Minor Adverse
R04	Daytime	36	47	-11	No Adverse Impact
	Night-time	36	37	-1	No Adverse Impact
R05	Daytime	35	45	-10	No Adverse Impact
	Night-time	35	36	-1	No Adverse Impact
R06	Daytime	29	50	-21	No Adverse Impact
	Night-time	29	37	-8	No Adverse Impact
R07	Daytime	30	50	-20	No Adverse Impact
	Night-time	30	37	-7	No Adverse Impact
R08	Daytime	30	45	-15	No Adverse Impact
	Night-time	30	36	-6	No Adverse Impact

The table above indicates that there would be a moderate adverse change in noise levels at one of the sensitive receptors during the night-time and a minor adverse change at another sensitive receptor during the night-time based on predicted existing ambient sound level.

The level of significance for each receptor based on the receptor sensitivity and magnitude of change is presented in Table 5.4. The conclusions for the significance of effect are also stated.

Table 5.4: Determining Significance of Effect

Receptor	Time Period	Sensitivity of Receptor	Magnitude of Change	Significance of Effect	Conclusion
R01	Day	Medium	No Adverse Impact	Neutral	No effect, not significant, noise need not be considered as a determining factor in the decision-making process.
	Night	Medium	Moderate Adverse	Moderate	These effects, if adverse, while important, are not likely to be key decision-making issues.
R02	Day	Low	No Adverse Impact	Neutral	No effect, not significant, noise need not be considered as a determining factor in the decision-making process.
	Night	Low	No Adverse Impact	Neutral	No effect, not significant, noise need not be considered as a determining factor in the decision-making process.
R03	Day	Medium/High	No Adverse Impact	Neutral	No effect, not significant, noise need not be considered as a determining factor in the decision-making process.
	Night	Medium	Minor Adverse	Slight	These effects may be raised but are unlikely to be of importance in the decision-making process.
R04	Day	Medium	No Adverse Impact	Neutral	No effect, not significant, noise need not be considered as a determining factor in the decision-making process.
	Night	Low	No Adverse Impact	Neutral	No effect, not significant, noise need not be considered as a determining factor in the decision-making process.
R05	Day	Medium	No Adverse Impact	Neutral	No effect, not significant, noise need not be considered as a determining factor in the decision-making process.
	Night	Low	No Adverse Impact	Neutral	No effect, not significant, noise need not be considered as a determining factor in the decision-making process.
R06	Day	Low	No Adverse Impact	Neutral	No effect, not significant, noise need not be considered as a determining factor in the decision-making process.
	Night	Low	No Adverse Impact	Neutral	No effect, not significant, noise need not be considered as a determining factor in the decision-making process.
R07	Day	Low	No Adverse Impact	Neutral	No effect, not significant, noise need not be considered as a determining factor in the decision-making process.
	Night	Low	No Adverse Impact	Neutral	No effect, not significant, noise need not be considered as a determining factor in the decision-making process.
R08	Day	Low	No Adverse Impact	Neutral	No effect, not significant, noise need not be considered as a determining factor in the decision-making process.
	Night	Low	No Adverse Impact	Neutral	No effect, not significant, noise need not be considered as a determining factor in the decision-making process.

For the majority of receptors, a neutral significance of effect is predicted at this time based on existing background and ambient noise levels and worst-case operations related to the proposed development. There is one receptor (R01) which demonstrates a Moderate significance of effect during the night-time and another receptor (R03) which demonstrates a Slight significance of effect during the night-time.

As the assessment above determines the worst-case significance of effect as Moderate, it is considered that additional night-time assessment should be undertaken to further contextualise any predicted impact. The assessment in Table 5.5 utilise the WHO criteria as set out in Table 2.2 to determine the noise intrusion as a result of the proposed development.

5.1.1 Noise Intrusion Assessment

Internal noise levels at sensitive receptor locations from the proposed plant have been assessed both with windows open, where a reduction from a partially open window of 10 dB has been used, and with windows closed where an assumption of double glazing with a sound reduction of 30 dB R_{w+Ctr} has been used.

Results of the noise intrusion assessment for average night-time noise levels are presented below within Tables 5.5.

Table 5.5: Night-time Noise Intrusion Levels $L_{Aeq,15mins}$

Location	External L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria L_{Aeq}
R01	40	30	10	30
R02	32	22	2	30
R03	38	28	8	30
R04	36	26	6	30
R05	35	25	5	30
R06	29	19	0	30
R07	30	20	0	30
R08	30	20	0	30
All values are sound pressure levels in dBA re: $2x\ 10^{-5}$ Pa.				

Although it is noted that BS8233 is predominantly intended for the assessment of transport noise, it is considered that the assessment of noise levels against internal noise limits prescribed within the standard may provide additional context to the results of the TAN assessment undertaken above.

As demonstrated within Tables 5.5 above, predicted noise levels meet or are below night-time BS 8233 criteria at all receptors, including R01 which previously showed a moderate significance of effect in Table 5.4. Therefore, in relation to the WHO/BS8233 ambient noise level criteria, it is considered that the likelihood of impact is low.

6.0 Conclusion

A noise assessment has been undertaken in support of a planning application for an egg production facility at Stranraer, Scotland.

A noise survey was undertaken on site to determine the baseline noise climate on site. A 3D model was undertaken based on the monitoring data using CADNA noise modelling software.

Using the 3D model, an operational noise assessment has been undertaken in accordance with the requirements stipulated within PAN 1/2011. The results show that noise from the proposed development would result in a Moderate impact during the night-time at R01, and a neutral affect at all other identified noise sensitive receptors.

Further assessments have been undertaken to contextualise the potential noise impact in accordance with BS8233 to predict the noise levels at the façade and within the identified receptors.

Based upon ambient noise level criteria established within BS8233 and WHO guidelines, impacts in relation to night-time noise levels will be low and within limits. This is considered to represent a neutral impact, and, as such, no further mitigation has been proposed.

Appendices

Appendix A – Acoustic Terminology

Acoustic Terminology

dB Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.

dB(A) Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result the single dBA value provides a good representation of how loud a sound is.

L_{Aeq} Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The $L_{Aeq,\ 07:00\ –\ 23:00}$ for example, describes the equivalent continuous noise level over the 16-hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower that the $L_{Aeq,\ 07:00\ –\ 23:00}$.

L_{Amin} The L_{Amin} is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.

L_{Amax} The L_{Amax} is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.

L_n Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say. 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the $L_{A10,\ 1\ hr}$ = x dB.

The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90}, the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.

R_w The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.

Appendix B – References

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