BROADWAY POULTRY FARM EXTENSION

NOISE ASSESSMENT

Acoustics Report A1860 R01

29th June 2023

Report for:	Broadway Poultry Ltd Holly Cottage Ford Heath Shrewsbury ST5 9NN
Issued to:	Berrys Beech House Anchorage Avenue Shrewsbury Business Park Shropshire SY2 6FG Attention: Nick Williams
Prepared by: Janec Lillis-James BSc, MSc, MIOA Acoustic Consultant	Checked by: Gavin Irvine BSc (Hons) MIOA Director
Issue/Revision number A1860 R01	Date 29/06/2023

Ion Acoustics Ltd
Georges House
9 – 10 Bath Street
BRISTOL
BS1 6HL

www.ionacoustics.co.uk

0117 911 3765
mail@ionacoustics.co.uk

Contents

1 Introduction

Ion Acoustics is appointed by Berrys on behalf of Broadway Poultry Ltd to provide advice on external noise associated with a proposed extension to an existing poultry farm at Broadway Farm, Ford Heath, Shrewsbury. The site already accommodates four poultry sheds with capacity for 200,000 birds per crop. This application is seeking permission for two further sheds to be constructed at the site, raising the capacity to 288,000 birds per crop.

This assessment has been informed by a baseline noise survey, undertaken between the 18th and 21st January 2022. Calculations and computer modelling software have been used to predict the noise levels from the proposed extension to the nearest noise-sensitive receptors (dwellings) in the vicinity of the site.

This report considers the potential noise impact effect of the two proposed sheds along with a consideration of the noise levels produced by the existing poultry sheds. An assessment of the HGV movements associated with the proposed extension has also been undertaken. The predictions have been compared to noise limits set to protect amenity derived from the baseline survey and guidance on acceptable noise standards.

2 Site and Development

2.1 Site Location

The proposed poultry farm is to be located at Broadway Farm, off Yockleton road, Ford Heath near Shrewsbury. The site is in a predominately rural area, with agricultural land in all directions. The site is approximately 350m to the north of Ford Heath. Figure 1 below presents the site location, red line boundary, noise monitoring locations and the nearest receptor locations.

Figure 1: Site, Monitoring Location and Receptor Plan © Google Earth

2.2 Noise Sensitive Receptors

There are a number of residential receptors in the vicinity at various distances from the site boundary. Three properties are known to be owned by the land owner; others have no known connection with the landowner or proposed development. The nearest receptors are identified in Table 1 below and in Figure 1 above.

Table 1: Assessment Locations

Assessment Position	Description	OS Grid Reference	Approximate Distance from Application Boundary (m)
AP01	Olderscott*	340207, 311537	60
AP02	Far Broadway Farm*	340426, 311687	40
AP03	Holly Cottage*	340255, 311452	100
AP04	Oaklands	339994, 311620	210
AP05	Orchard House	339918, 311657	270
AP06	2 Orchard Farms	339695, 312136	670
*Owned by landowner			

2.3 Existing Planning Consent

Planning consent for the existing poultry sheds was granted under application reference 10/02963/FUL dated July 2010. The consent permits four poultry sheds at the site with a total capacity of up to 200000 birds per crop. The application was supported by a noise assessment undertaken by Alan Saunders Associates in report reference AS6249.101025.R1 dated October 2010.

The decision note includes a number of conditions, including a small number which are intended to address potential noise impacts. These conditions are detailed below for reference:

10. The removal of poultry manure shall not take place outside the following times: Monday to Friday 07:00hrs to 18:00hrs; Saturday 08:00hrs to 13:00hrs; and at no time during a Sundays, bank or public holidays.

Reason: To minimise noise disturbance to neighbouring properties.

11. There shall be a maximum of 30 bird removal days in any 12-month period

Reason: To minimise noise disturbance to neighbouring properties

12. On days 38, 39, 44 and 45 of a cycle, there shall be a maximum of 14 vehicle movements which shall only take place between the hours of 00.00 and 12.00 for the purpose of bird depletion. For the purpose of this condition a vehicle movement is defined as a single movement either in or out of the site.

Reason: To minimise noise disturbance to neighbouring properties

13. Feed lorry deliveries shall not take place outside the following times: Monday to Friday 07:00hrs to 18:00hrs; Saturday 08:00hrs to 13:00hrs; and at no time during a Sundays, bank or public holidays.

Reason: To minimise noise disturbance to neighbouring properties

2.4 Proposed Poultry Farm Extension

This application seeks consent for two additional sheds at the poultry farm increasing the overall capacity of the site to 288,000 birds per crop. The additional sheds are to be built to the north of the existing sheds; the new poultry sheds will include provisions for new plant and will also result in an increase in the amount of HGV movements associated with the site.

The location and layout of the existing and proposed sheds are presented in Figure 2 for reference.

Figure 2: Poultry farm layout plan

Table 2 below details the plant items and number of HGV movements associated with the proposed extenuation that are to be assessed in this report.

Table 2: Noise Sources Associated with Proposed Extension

Noise Source	Total Number of Noise Sources
Ridge Fans	12 (6 on each proposed shed)
Air Scrubbers	3 (1 on each proposed shed and 1 on an existing shed)
Total HGV Movements	148 per cycle (6 – 7) Per day

Access to the site is by the existing access route for the existing sheds.

3 Planning Policy and Relevant Guidance on Noise

3.1 National Planning Policy Framework (NPPF)

In 2012 the National Planning Policy Framework (NPPF) replaced a number of Planning Policy Statements with a single document which is intended to promote sustainable development. The NPPF was revised in July 2021[1] and certain aspects of the guidance changed.

The NPPF sets out the Government's planning policies for England. The document is generally not prescriptive and does not provide noise criteria. Instead, it places the onus on local authorities to develop their own local plans and policies. Sections of the NPPF relating to noise are stated below:

174. Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.

185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.

b) identify and protect areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

3.2 Noise Policy Statement for England (NPSE)

The Noise Policy Statement for England (NPSE)[2] sets out the Government's policy on environmental, neighbourhood and neighbour noise for England. The policy has three aims:

- *"avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.*

The NPSE introduces the following terms which are also used in the NPPF:

"NOEL – No Observed Effect Level
This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level
This is the level above which adverse effects on health and quality of life can be detected.

[1] https://www.gov.uk/government/publications/national-planning-policy-framework--2
[2] Noise Policy Statement for England (DEFRA) available at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf

SOAEL – Significant Observed Adverse Effect Level
This is the level above which significant adverse effects on health and quality of life occur."

However, neither the NPSE nor the NPPF Planning Practice Guidance defines numeric bounds for NOEL, LOAEL or SOAEL. The boundary of each effect level should be defined for each situation and location.

Further Government planning advice is available online[3]. The online guidance refers to the NPPF and NPSE and presents a noise assessment hierarchy table to provide further information on the boundaries between NOEL, LOAEL and SOAEL. This is shown below in Table 3.

Table 3: Noise Assessment Hierarchy Table

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not noticeable	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

[3] See https://www.gov.uk/guidance/noise--2

3.3 BS 4142: 2014 +A1: 2019 – Assessment Principles

The standard method for assessing noise of a commercial or industrial nature affecting housing, is British Standard BS 4142 "Method for rating and assessing industrial and commercial sound". A BS 4142 assessment is typically made by determining the difference between the industrial noise under consideration and the background sound level as represented by the L_{A90} parameter, determined in the absence of the industrial noise. The L_{A90} parameter is defined as the level exceeded for 90% of the measurement time, representing the underlying noise in the absence of short duration noise events such as dog barks or individual cars passing.

The industrial noise under consideration is assessed in terms of the ambient noise level, L_{Aeq}, but a character correction penalty can be applied where the noise exhibits certain characteristics such as distinguishable tones, impulsiveness or, if the noise is distinctively intermittent. The ambient noise level, L_{Aeq} is defined as the steady-state noise level with the same energy as the actual fluctuating sound over the same time period. It is effectively the average noise level during the period. The industrial noise level (L_{Aeq}) with the character correction (if necessary) is known as rating level, L_{Ar}, and the difference between the background noise and the rating level is determined to make the BS 4142 assessment. The standard then states:

- *"Typically, the greater the difference, the greater the magnitude of the impact.*
- *A difference of around +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 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."*

The standard outlines a number of methods for defining appropriate 'character corrections' to determine the rating levels to account for tonal qualities, impulsive qualities, other sound characteristics and/or intermittency.

3.4 BS 8233: 2014 and WHO criteria

British Standard BS 8233: 2014[4] and the World Health Organisation (WHO) also provide external noise criteria to protect residential amenity. These are detailed in Table 4 below.

Table 4: WHO / BS 8233: 2014 Guideline Noise Levels

Location	Critical Health Effect	07:00 to 23:00	23:00 to 07:00
Outside Bedroom Windows	Sleep Disturbance (Windows Open)	--	45dB $L_{Aeq, 8hours}$ (1)
Amenity Spaces (Gardens / Patios)	Moderate Annoyance Serious Annoyance	50dB $L_{Aeq, 16\ hours}$ (2) 55dB $L_{Aeq, 16\ hours}$ (2)	--
Notes: (1) From WHO Community Noise Guidelines (1999) (2) BS 8233: 2014 and WHO Community Noise Guidelines			

[4] British Standards Institution (2014) BS 8233:2014: Guidance on sound insulation and noise reduction for buildings

The WHO guideline of 45 dB $L_{Aeq, 8hr}$ represents an 8-hour L_{Aeq} outside noise-sensitive rooms to prevent sleep disturbance. The WHO limit is a level at 1m from the façade. Therefore, equivalent free field level would be approximately 3dB lower, that is 42 dB L_{Aeq}.

The limits apply to relatively anonymous noises without character such as traffic noise.

3.5 Absolute Noise Level Assessment Criteria

In instances of low background and rating noise levels, BS4142 indicates that assessment in line with absolute noise limits might be as, or more, appropriate than an assessment relative to the background noise.

In these instances, to ensure the proposed development is not a significant or prohibiting factor in achieving the relevant WHO guideline values at sensitive receptors, noise generated by the development should aim to be approximately 10dB below the guidance levels in section 3.4 and in the table above.

Therefore, a target of 32 dB L_{Aeq} (free field) can be adopted for the night-time period, and this will ensure that sleep is protected. In achieving this criterion, the facility is considered to be consistent with a rating of a low impact in accordance with BS 4142 and no observed adverse effect (NOEL) according to the NPPF.

3.6 Linked Property / Receptor

The properties identified as AP01, AP02 and AP03 (Olderscott, Far Broadway Farm and Holly Cottage) on Figure 1 above is known to be in the ownership the land owner. As such, it is considered to be linked to the proposed development. In this instance, the response to noise from the facility would not conform to the impact criteria detailed in BS4142:2014. Given this, the noise impact at the landowner properties have been assessed in line with the noise limits determined to protect sleep and amenity in line with the guidance from the World Health Organisation (WHO) and BS 8233: 2014, detailed in Table 4 above.

3.7 Shropshire Council Environmental Health Officer Consultation

The Local Planning Authority, Shropshire Council have indicated, on similar projects in the past, that they would look for noise limits to be set at 5dB below the typical background sound level for each assessment period. The Council further indicated that if the background sound levels measured are very low (typically taken as below L_{A90} 30dB) then an assessment against absolute noise limits would be acceptable.

4 Baseline Noise Survey

A baseline noise survey was carried out from 18th to 21st January 2022 at two locations in the vicinity of the site. It is noted that all the existing sheds were empty at the start of the survey and were being cleaned down between crops. The new crop was added on the Wednesday / Thursday though at the early crop stages, ventilation requirements are relatively low.

The survey was undertaken using two Rion NL52 sound level meters fitted with a WS-15 wind shield. At each location, the microphone and windshield were mounted on a tripod at a height of 1.5m above soft ground, well clear of any vertical reflecting facades. The meters were set up to log various noise parameters in 15-minute periods, including L_{Aeq} and L_{A90} values. Both were calibrated before and after the survey using a Brüel & Kjær 4231 calibrator. No significant drift in calibration was noted. The noise monitoring station was unattended apart from the set up and

collection periods. The audio signal was recorded (as .wav files) at intervals to enable sound sources to be identified during post-processing.

4.1 Location M01

Location M01 was sited to the south of the application site, adjacent to Yockleton Road, at a distance of approximately 125m from the existing poultry sheds. The proximity of the monitoring location to Yockleton Road is comparable to that of Oaklands (AL03) and Orchard House (AL04) which are approximately 5m and 18m (resp.) from the roads.

Photographs of the noise measurement location are shown in Figure 3, below.

	
Monitoring location looking towards Yockleton Road	Location looking towards Receptor AL03

Figure 3 - Photograph of noise measurement location

The noise climate at this location was relatively tranquil considering its proximity to Yockleton Road. Traffic was sporadic during the attended portion of the survey, with only a couple of vehicles using the road while on site.

Occasional bird song and other general environmental noise was noted however, no other significant noise sources were noted during the attended portions of the survey.

The monitoring equipment was accompanied at this location by a small, Davis Instruments Vantage Vue weather station, which measured the prevailing meteorological conditions during the survey. This includes the temperature, wind speed, wind direction and rainfall.

4.2 Location M02

Location M02 was located to the east of the existing poultry sheds, in the vicinity of Far Broadway Farm (AL02). The meter was 250m from Yockleton Road with no clear line of sight to the carriageway. Photographs of the noise measurement location are shown in Figure 3, below.

	
Monitoring location looking towards the existing sheds	Location looking towards Receptor AL02

Figure 4 - Photograph of noise measurement location

The noise climate at this location was very tranquil, being removed from virtually all noise sources in the area. Note the existing sheds were empty and the fans were not operating during the set-up period.

Analysis of the audio recordings indicates occasional, sporadic vehicles on Yockleton Road and occasional aircraft overhead. Bird song is very prevalent from 06:30 onwards (dawn chorus).

4.3 Weather Data

The weather during the set-up period was noted to be cold, with a ground frost evident even at midday. Wind speeds were low with no prevailing directional component. Cloud cover was light, estimated to be approximately 30%.

The weather monitoring station located at M01 recorded the prevailing weather conditions throughout the unattended portion of the survey. During this time the weather was fairly stable, with cold, frosty conditions prevailing. The ambient air temperature only reached 5°C or 6°C during the daytime period and dropped to freezing overnight. Wind speeds were low, with the average speed rarely exceeding 2m/s and gusts of up to 4m/s. The wind direction was from the south-west during the early part of the survey, changing to a more northerly direction on Wednesday / Thursday.

The rain gauge tipped once during the survey (09:45 on 19th Jan) though this is not likely to be an actual rain event. More likely melting frost on the weather station. To that end, no precipitation is considered to have fallen during the survey period.

5 Measured Noise Data

5.1 Results of the Unattended Logging

The noise levels measured at the monitoring locations are summarised in the tables below. The data is presented over the typical daytime (07:00 to 23:00) and night-time (23:00 to 07:00) periods for each day. The data is presented as the logarithmic average of the ambient, L_{Aeq} values and both the arithmetic mean and mode (most common) values for the background noise (L_{A90}). Time history charts and tabulated data are included in Appendix A.

Table 5: Noise Monitoring Data Summary – M01

Period		Duration hh:mm	L_{Aeq}, dB	Mean L_{A90}, dB	Mode L_{A90}, dB
18th January 2022	Daytime	12:45	52.4	36	36
	Night	08:00	44.1	31	30
19th January 2022	Daytime	16:00	53.6	41	42
	Night	08:00	46.9	35	33
20th January 20222	Daytime	16:00	53.5	41	42
	Night	08:00	42.2	32	30
21st January 2022	Daytime	05:00	54.5	42	42

Table 6: Noise Monitoring Data Summary – M02

Period		Duration hh:mm	L_{Aeq}, dB	Mean L_{A90}, dB	Mode L_{A90}, dB
18th January 2022	Daytime	12:45	45.6	35	35
	Night	08:00	37.0	31	30
19th January 2022	Daytime	16:00	46.5	41	42
	Night	08:00	38.5	33	31
20th January 20222	Daytime	16:00	46.9	39	37
	Night	08:00	38.4	33	32
21st January 2022	Daytime	05:00	45.6	41	42

5.2 Analysis of Measured Sound Levels

BS 4142 requires the use of the 'typical' background sound level though does not stipulate how the typical level is derived. The analysis presented below identifies appropriate 'typical' noise levels for both the daytime and night-time periods at each location.

Typical Background Sound Level - Daytime

The daytime period covers the hours 07:00 to 23:00 and is expressed as the arithmetic average of the 15min periods over each one-hour period.

Table 7: Background Sound Level Analysis – Daytime

Location	Measured Background Sound Level, $L_{A90, 15mins}$		
	Minimum	Mean	Mode
M01	31	40	42
M02	31	39	42

The analysis above indicates that the background sound level is consistent at both monitoring locations, with a minimum of L_{A90} 31dB and a mode of L_{A90} 42dB. The distribution of values is similar too, with a primary peak at L_{A90} 42dB and a secondary peak at L_{A90} 35dB / 36dB. Given the overall distribution of background sound levels, and the consistency between locations, L_{A90} 42dB is considered to be typical for the daytime period.

Typical Background Sound Level - Night

The night-time period covers the hours 23:00 to 07:00 and is expressed in 15-minute periods during these hours.

Table 8: Background Sound Level Analysis – Night

Location	Measured Background Sound Level, $L_{A90, 15mins}$		
	Minimum	Mean	Mode
M01	28	33	30
M02	28	32	31

The distribution of $L_{A90, 15min}$ night-time values is similarly consistent during the night-time period, showing little variation between locations. The distribution of values is again consistent at both locations. Given this and the values above, L_{A90} 31dB is considered typical for both locations for the night-time period.

5.3 Noise Targets

Noise limits have been determined in accordance with the LPA's criteria discussed in section 3.7; L_{A90} -5dB. Where the background sound levels are low, absolute noise limits derived in section 3.5 have been applied in line with BS 4142 guidance which indicates absolute limits might be appropriate under such circumstances.

Table 9: Proposed Noise Limits

Monitoring Location	Relevant Assessment Location	Period	Typical Background Sound Level, L_{A90} dB	Rating Level Noise Limit, dB
Location M01	AL04, AL05 & AL06	Daytime	42	37
		Night-time	31	32*
Financially Linked Properties	AL01, AL02, AL03	Daytime	--	42#
		Night-time	--	42#
* Absolute noise limit derived in Section 3.5 above # Absolute noise limit for financially linked properties set at the sleep disturbance threshold				

The rating level is defined as the specific noise level generated by the facility plus any specific character corrections which need to be applied in line with BS4142:2014.

The rating level will apply to the plant noise level plus any specific character corrections which need to be applied in line with BS4142:2014.

6 Noise Modelling Assessment and Predictions

As part of this assessment a noise model was constructed using IMMI noise mapping software to predict noise levels to the nearest noise sensitive receptor locations in accordance with ISO 9613-2. The input parameters have been assumed:

- Downwind propagation (noise levels in crosswind & upwind conditions will be less);
- Soft ground (G = 1) between the noise source and receiver locations;
- Ambient air temperature of 10°C and 70% Relative Humidity; and,
- Barriers and screening influence in calculated in accordance with ISO 9613-2.

The noise model was constructed utilising the following information:

- Ordnance Survey Open Data topographical data;
- Site layout information provided by Berry's as per Figure 2 of this report; and,
- Noise information sourced from manufacturers' data sheets.

The noise sources associated with the computer model are identified below.

6.1 Noise Source Information

The proposed sheds are to be ventilated via six roof mounted ridge fans on each shed located on top of sheds, operating as required by the flock, with more demand placed on the fans as external conditions require i.e. higher external ambient temperatures require greater ventilation. The air scrubbers associated with each unit wash the air to remove dust, odour and ammonia.

Noise source data for each component of the process is detailed below.

6.1.1 Roof-Mounted Ridge Fans

Noise information for the roof fans is provided by Fancom. The Fancom model 3692 has been chosen for this assessment. The data provided by Fancom gives a sound pressure level of 68 dB (L_{pa}) at 2m which equates to a sound power of 82 dB L_{WA} assuming hemispherical radiation. The choice of fan model is currently not fixed however it should be noted that alternative fans must be selected to achieve the same noise limits.

No spectral information has been provided. Instead a spectrum shape for similar type of fans has been used. Octave band spectrum data for the unit gives the following sound power spectrum.

Table 10: Roof-Mounted Ventilation Fans

Noise Source	Sound Power Level (dB) in Octave Bands, Hz							Overall, dB(A)
	63	125	250	500	1000	2000	4000	
Fancom Fan – Model 3692	79.2	83.1	78.6	79.2	77.0	74.8	70.0	82.0

6.1.2 Air Scrubber Unit.

Based on available product information, a sound pressure level of 70 dB @ 1 m is reported by the manufacturer from each side of the unit. This equates to a sound power level of 78 dB L_{WA}.

6.2 Assessment Scenarios

To adequately assess the potential impact of the proposed development a number of assessment scenarios will be presented.

Considerations must also be given to the noise levels produced by the existing poultry sheds. A noise report was submitted with the planning application of the original scheme (10/02963/FUL dated July 2010). The noise impact report 'AS6249.101025.R1 dated 25th October 2010' undertook an assessment of the potential noise impact at the receptors the report has identified as AP01, AP02 and AP03. A cumulative noise impact assessment will be undertaken considering the potential noise levels reported in the report for the original planning application and the noise levels from this proposed development.

Table 11 details the proposed assessment scenarios.

Table 11: Assessment Scenarios

Assessment Scenario	Assessment Period (hh:mm)	Description
Daytime	07:00 – 23:00	Maximum ventilation requirements assuming 100% ventilation requirements are provided by both the air scrubbers and ridge fans. All 12 proposed ridge fans and 3 air scrubbers.
Night-time	23:00 – 07:00	50% ventilation requirements. 6 proposed ridge fans and 2 air scrubbers.
Cumulative Assessment Daytime	07:00 – 23:00	Noise levels of the existing poultry shed* + the noise levels reported in the Daytime Assessment Scenario.
Cumulative Assessment Night-time	23:00 – 07:00	Noise levels of the existing poultry shed* + the noise levels reported in the Night-time Assessment Scenario.
*As reported in the Noise Impact Assessment Report AS6249.101025.R1 dated 25th October 2010, submitted for the planning application 10/02963/FUL dated July 2010		

7 Operational Assessment

The assessments summarised within this section of the report have been undertaken to the locations detailed within Figure 1 and Table 1 presented above. It is reiterated that the receptors identified as AP01, AP02 and AP03 are linked to the land owner.

The calculations undertaken within this section of the report consider the noise generated by the ventilation requirements and noise generated by vehicle movements separately. In both instances, the assessments have been undertaken for both the daytime and night-time periods where appropriate.

7.1 Daytime Scenario

The specific noise levels have been calculated and are presented as the noise contours in Figure 5 below. The contours present the worst-case assessment of the daytime scenario, with all 12 ridge fans and three air scrubbers active during the assessment period.

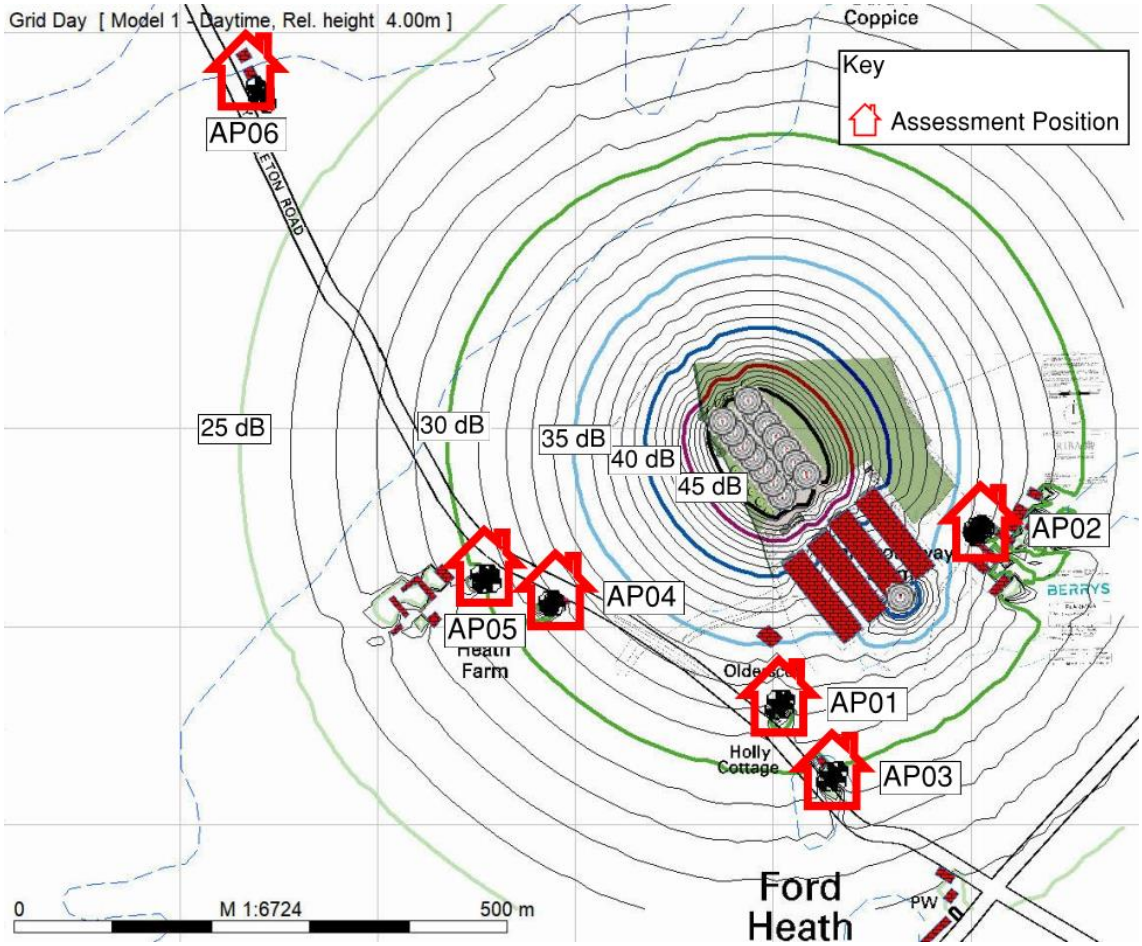


Figure 5: Predicted Noise Contours – Daytime Scenario

Levels have been calculated to the receptor locations detailed above. These predicted levels have been used to evaluate the noise impact in accordance with the methodology detailed in BS 4142: 2014.

The noise emitted by the ventilation fans is generally considered to be broadband in nature with no distinguishable tones or impulsive characteristics. it is likely that fan noise is present in the local noise climate however it is still considered 'readily distinctive' against the prevailing noise climate in the vicinity of the site. As such, a +3dB rating level correction has been applied in accordance with the BS4142 assessment methodology for 'other sound characteristics.

It is reiterated that the noise impacts summarised above relate to the new, proposed shed, operating in isolation.

Table 12: Noise Impact – Daytime Scenario

Receptor	Description	Predicted Specific Level, dB L_{Aeq}	Rating Level, L_{Ar} dB*	Noise Target, dB	Difference, dB
AP01	Olderscott	33	36	42	-6
AP02	Far Broadway Farm	34	37		-5
AP03	Holly Cottage	30	33		-9
AP04	Oaklands	32	35	37	-2
AP05	Orchard House	30	33		-4
AP06	2 Orchard Farms	24	27		-10

The assessment presented above shows that during the daytime scenario, where all fans and air scrubbers are running at full capacity, the calculated rating level at the noise sensitive receptors do not exceed the proposed noise criteria.

7.2 Night-time Scenario

The specific noise levels have been calculated and are presented as the noise contours in Figure 6 below. The contours present the typical assessment of the night-time scenario, with six ridge fans and two air scrubbers active during the assessment period. the air scrubbers operating for the appropriate on time during the assessment period.

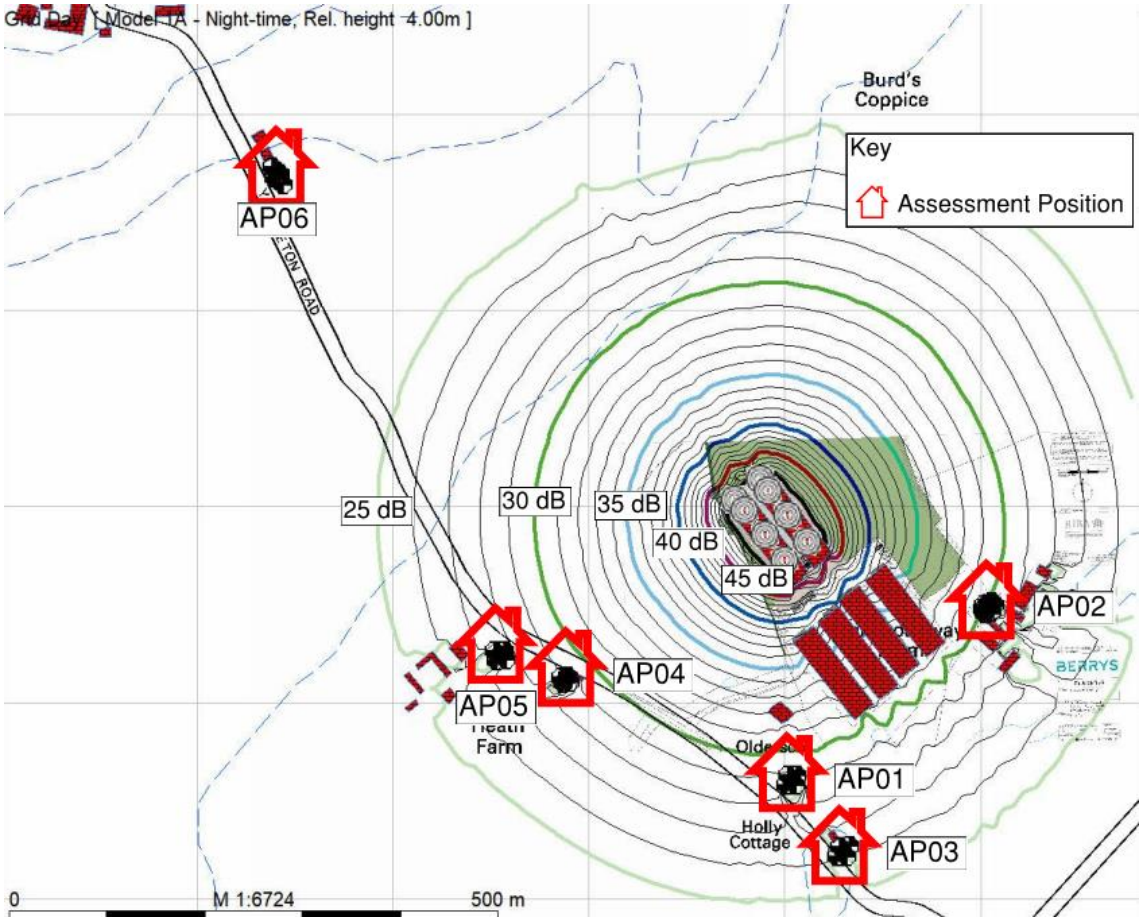


Figure 6: Predicted Noise Contours – Night-time Scenario

Using the noise model, levels have been calculated to the receptor locations detailed above. These predicted levels have been used to evaluate the noise impact in accordance with the methodology detailed in BS 4142: 2014.

As discussed above, a +3dB rating level correction has been applied in accordance with the BS4142 assessment methodology for 'other sound characteristics.

Table 13: Noise Impact Assessment – Night-time Scenario

Receptor	Description	Predicted Specific Level, dB L_{Aeq}	Rating Level, L_{Ar} dB*	Noise Target, dB	Difference, dB
AP01	Olderscott	29	32	42	-10
AP02	Far Broadway Farm	30	33		-9
AP03	Holly Cottage	26	29		-13
AP04	Oaklands	29	32	32	0
AP05	Orchard House	28	31		-1
AP06	2 Orchard Farms	21	24		-8

The results in table show that the calculated rating levels do not exceed the proposed noise targets.

7.3 Cumulative Daytime Assessment

Table 14 below presented the cumulative daytime assessment which considered the calculated noise levels as presented in section 7.1 and the daytime predicted noise levels of the existing sheds.

As discussed above, a +3dB rating level correction has been applied to the combined specific noise levels in accordance with the BS4142 assessment methodology for 'other sound characteristics.

Table 14: Cumulative Daytime Assessment

Receptor	Description	Predicted Specific Level of Existing Sheds, dB L_{Aeq}	Predicted Specific Level of Proposed Sheds, dB L_{Aeq}	Combined Rating Level, L_{Ar} dB*	Noise Target, dB	Difference, dB
AP01	Olderscott	33	33	39	42	-3
AP02	Far Broadway Farm	35	34	41	42	-1
AP04	Oaklands	26	32	36	37	-1

The results show in Table 14 show that noise levels meet the proposed noise targets.

7.4 Cumulative Night-time Assessment

Table 15 below presented the cumulative night-time assessment which considered the calculated noise levels as presented in section 7.2 and the night predicted noise levels of the existing sheds.

As discussed above, a +3dB rating level correction has been applied to the combined specific noise levels in accordance with the BS4142 assessment methodology for 'other sound characteristics'.

Table 15: Cumulative Night-time Assessment

Receptor	Description	Predicted Specific Level of Existing Sheds, dB L_{Aeq}	Predicted Specific Level of Proposed Sheds, dB L_{Aeq}	Combined Rating Level, L_{Ar} dB*	Noise Target, dB	Difference, dB
AP01	Olderscott	32	29	37	42	-5
AP02	Far Broadway Farm	33	30	38	42	-4
AP04	Oaklands	25	29	34	32	2

The results show a small exceedance in respect of cumulative noise levels at the nearest third-party receptor location. The exceedance at AP04 is 2 dB. However the predicted levels in absolute terms are still low and below the background noise (31 dB L_{A90}) at this location and this would still be regarded as a low impact in respect of BS 4142: 2014.

7.5 Context and Uncertainty

BS 4142 requires an assessment of context and uncertainty.

The context in this instance is that the site already experiences activity associated with poultry management and has been operating in a manner which has not led to any complaints or concerns from nearby residents. To that end, noise associated with poultry management is consistent with the current use and part of the character of the area.

It is acknowledged that the rating levels at AP04 during the night-time exceed the proposed noise limit on the basis of a simplistic calculation of the cumulative scenario. However the assessment is based the specified equipment operational 100% of the time during the assessment period. In likelihood this will not be the case and in practise not all noise generating components will be generating noise at the same time, therefore the likely noise levels due to the operation of the proposed development will be below the proposed noise limit.

There is uncertainty in all measurements and assessments. The uncertainty in the survey has been minimised by measuring over an extended period. Weather data measured during the survey period to ensure that the data used in the assessment was collected during periods of appropriate meteorological conditions. The background sound level was relatively stable during the survey therefore derivation of the 'typical' background sound level was relatively straightforward and is considered a good representation of the prevailing background sound level.

Conservative practices adopted to minimise uncertainty over all include:

- Conservative noise limits derived from survey data including a daytime noise limit 5dB below the 'typical' background sound level;
- Simplified assumptions relating to the source / receiver propagation path; and,
- Assumptions relating to operating plant i.e. plant operates for 100% of the assessment period.

Given the above, uncertainty is not considered to have a significant impact on the overall assessment outcome and based on the context of the assessment, the proposed development is unlikely to result in an adverse noise impact at the noise sensitive receptors.

8 Vehicle Movements

The poultry sheds are accessed via the exiting gravel private access with the C5132 Yockleton Road. The entrance to the access road is positioned approximately 120m from the nearest third-party receptor (AP04).

The access road is already consented as part of the extant planning consent for the existing sheds. The transport assessment prepared for this application (Berrys' Transport Statement ref SA43370_TS1 dated April 2022), indicates that the proposed development represents an increase of around 50% therefore a growth rate of 1.5 as been applied to all existing HGV movements and a rate of 1.25 applied to maintenance and inspection light vehicle movements.

General vehicle movements to and from the development, including feed and bedding deliveries etc, would only occur during the daytime period, as currently consented between the hours of 07:00 to 20:00. The exception to this would occur during the thinning and de-population process which happens at night, from 02:00, at the end of each flock cycle as per the existing consent. Vehicle movements to the poultry farm, including those consented and the additional vehicles proposed for the new shed are detailed in Table 16 below.

Table 16: Vehicle Movement Numbers

Phase	Vehicle Type	2 Way Movements	When in the cycle
Bedding Delivery	HGV	3	Day 48
Chick Delivery	HGV	6	Day 1
Feed Delivery	HGV	30	Ongoing throughout the crop cycle
Fuel Delivery	HGV	3	Days 1 and 18
Mortality Collection	LGV	5	Ongoing throughout the crop cycle
Bird thinning	HGV	20	Day 30 - 31
Bird depopulation	HGV	20	Day 37 – 38
Manure removal	Tractor and Trailer	46	Day 39 - 42
Ongoing maintenance	Light vehicles	15	Ongoing
Total		**148**	

The transport assessment indicates that the litter and manure would be removed from site to an existing anaerobic digestion facility at Cardeston.

Movements of this nature are not uncommon in an agricultural setting and, as such, have been omitted from the assessment below.

The proposed increase in broiler capacity at the site would not result in an increase in the number of daily peak movements to the site associated with thinning and depopulation, with this staying the same at 6-7 movements per day, no more than 1 per hour.

The thinning and depopulation activities occur during the night-time period. Of the remaining vehicle movements, the information indicates that over a single crop cycle, 40, two-way vehicle movements occur during the daytime period. This would average to around one vehicle delivery per day between the hours detailed above.

The thinning and depopulation processes starts during the night-time hours: commencing from 02:00 and continuing until the task is completed. Typically, this may run in to portions of the daytime period i.e. beyond 07:00. During the depopulation scenario, the site would expect one vehicle to arrive at the site, be loaded and leave within an hour.

Given the specifics of the site and the route of the access road, it is considered appropriate to assess the noise generated by HGV movements to and from the site in line with the Haul road methodology detailed in BS5228-1. The following attributes have been used in the calculations:

- The source noise of an HGV under acceleration is a sound power level of 105.5dB(A)[5]; and,
- Vehicle speeds are limited to 10mph (16kph or 4.4m/s).

It is noted that the calculations below centre on the receptors AL01 and AL04, being the most significantly affected by vehicle movements on the site access road. Note that BS 4142 would only require consideration of vehicles on the private access road not on the public highway.

8.1 Daytime Vehicle Movements

The daytime scenario assumes one HGV visits the site during a one-hour assessment period as a typical assessment. This would equate to two vehicle movements on the access road in a 1-hour assessment period i.e. one vehicle in and one vehicle out.

Table 17: Vehicle Noise Assessment - Daytime

Receptor	Description	Distance from Source[1], m	Resultant $L_{pA,\ 1hr}$, dB	Noise Target, dB	Difference, dB
AL01	Olderscott	100	37	42	-5
AL04	Oaklands	120	37	37	0
1 Distance taken from the centre of the access road to the receptor location at the closest approach					

The assessment above indicates that, when averaged over a one-hour assessment period, noise from vehicle movements on the access road would not exceed the noise target. This would indicate that noise associated with vehicle movements would be of low impact during the daytime period.

[5] Maximum permissible noise level for a vehicle under acceleration as defined by EC directive 92/97/EC.

8.2 Night-time Vehicle Movements - Depopulation

Information from the transport consultant indicates that, during the depopulation scenario, the site would expect one HGV per hour. The transport assessment further states that the vehicles are timed so as one empty vehicle arrives at site as a full vehicle is ready to leave, minimising any transitional period in between.

For the purposes of this assessment it is assumed that this would result in two vehicle movements on the access road in a 15-minute assessment period i.e. one HGV coming in as a full vehicle departs.

Table 18: Vehicle Noise Assessment – Night-time

Receptor	Description	Distance from Source[1], m	Resultant $L_{pA,\ 15\ min}$ dB	Noise Target, dB	Difference, dB
AL01	Olderscott	100	40	42	-2
AL04	Oaklands	120	39	32	+7
1 Distance taken from the centre of the access road to the receptor location at the closest approach					

During the night-time period noise from vehicles exceed the measured background sound level but would fall well below the existing ambient noise climate. In absolute terms, the predicted noise from vehicle movements within the site area is low at the nearest receptor locations falling well below the level at which the WHO[6] would consider sleep disturbance a factor during the night-time period. It is reiterated that the de-population process only occurs for two consecutive days in one 14-month period and is a scenario that already occurs at the site.

The depopulation scenario only occurs once per crop cycle that is between days 37-38 of the crop.

9 Summary

A noise assessment has been carried out for the proposed extension to an existing poultry farm at Broadway Farm, Ford Heath, Shrewsbury

Appropriate noise targets have been derived in line with Shropshire Council standard criteria, the guidance of BS 4142: 2014 and absolute noise levels. Based on this information, the calculations indicate that operational noise during the daytime period would not exceed the proposed noise limits, indicating that noise from the facility would fall a minimum of 5dB below the typical background sound level.

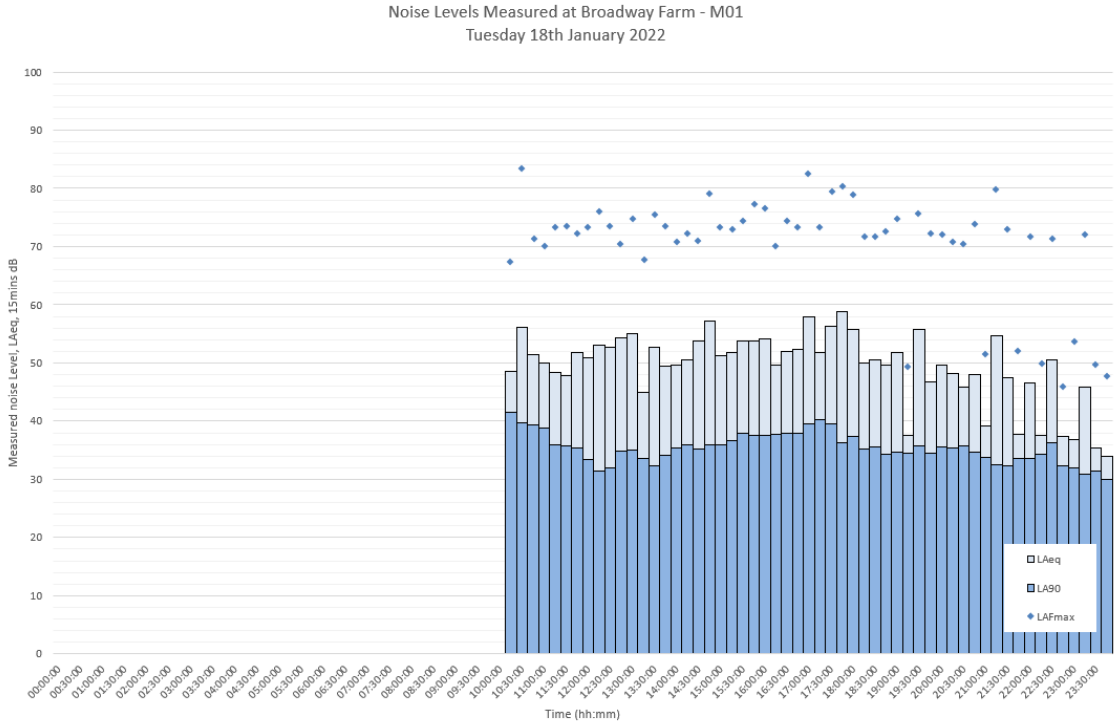
The assessment indicates that, under the various operational scenarios considered within this report, operational noise generated by the proposed extension would fall below the noise targets. This is considered to demonstrate a low noise impact in accordance with BS4142.

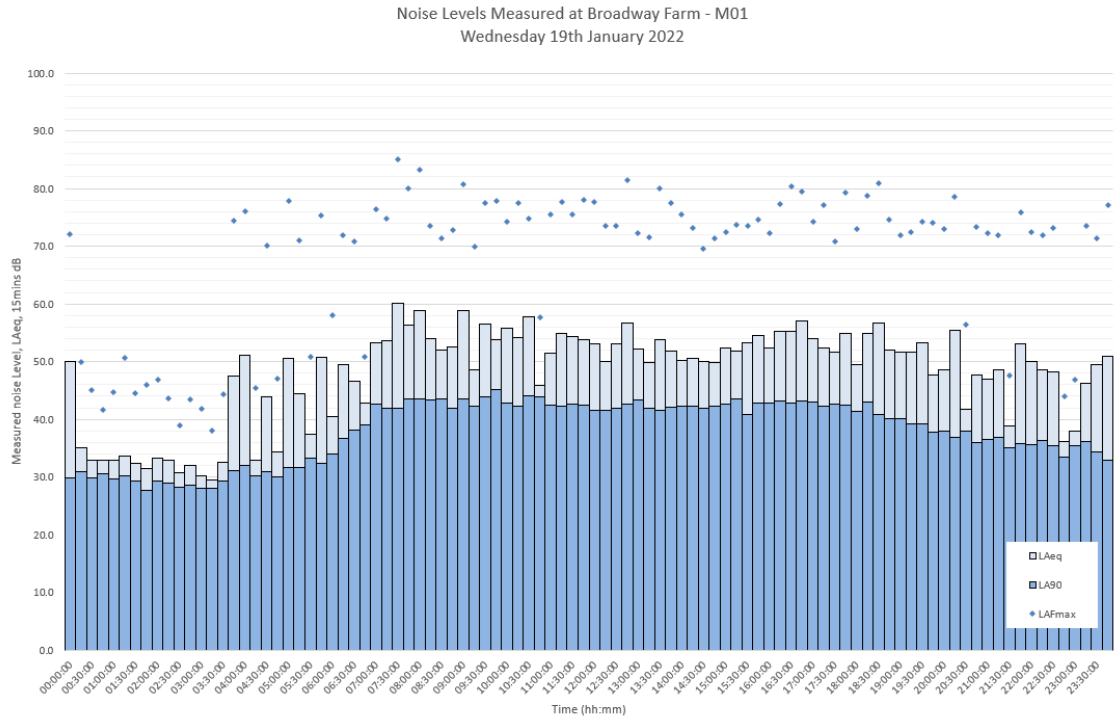
During the night-time period, noise from vehicles during the de-population process may be audible however it would fall well below the level at which the WHO would consider sleep disturbance to occur and would only take place for two nights, every 14 months.

Given the above, it is considered that there are no noise-related issues associated with the proposed poultry farm extension which would prevent the granting of full planning permission.

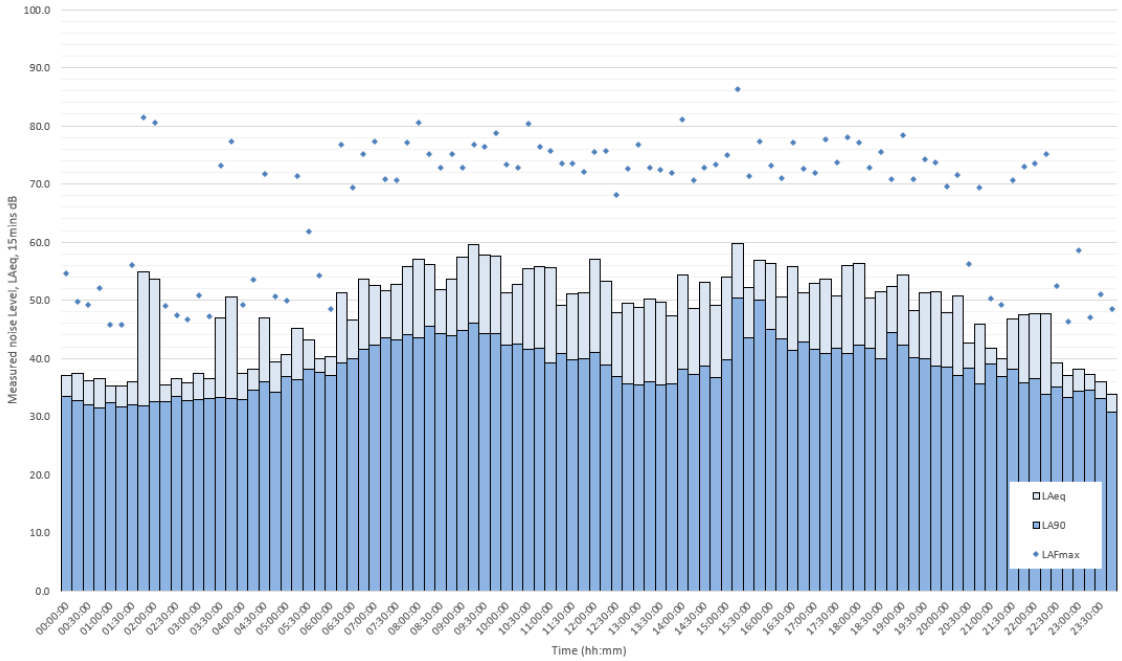
[6] World Health Organisation. Guidelines for Community Noise. 1999.

Location M01

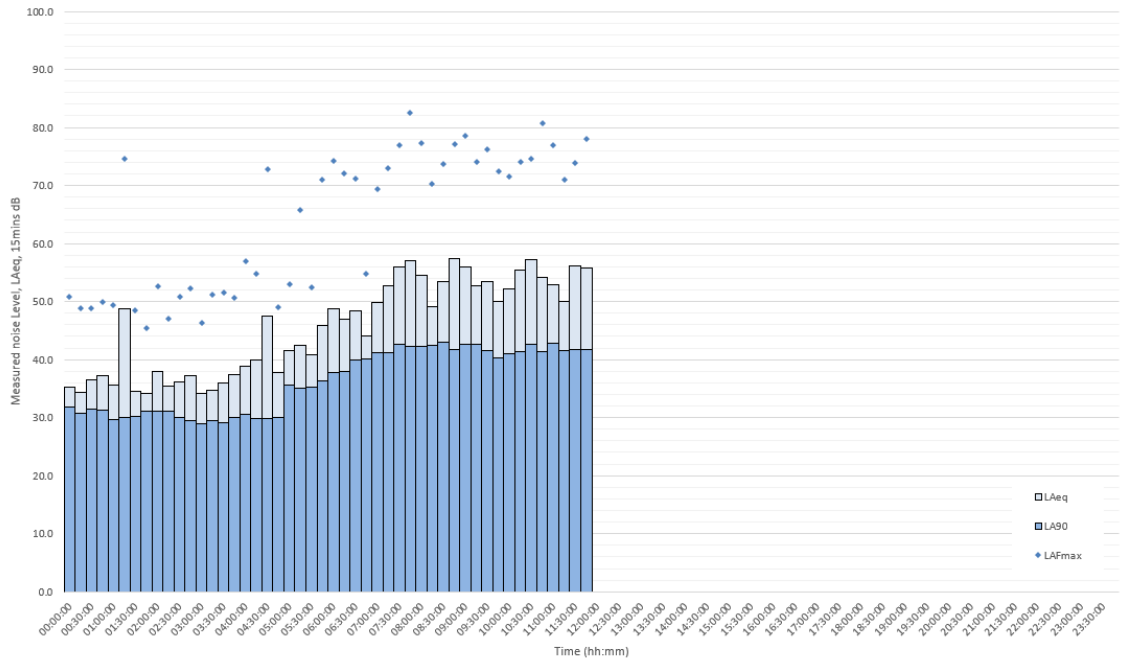


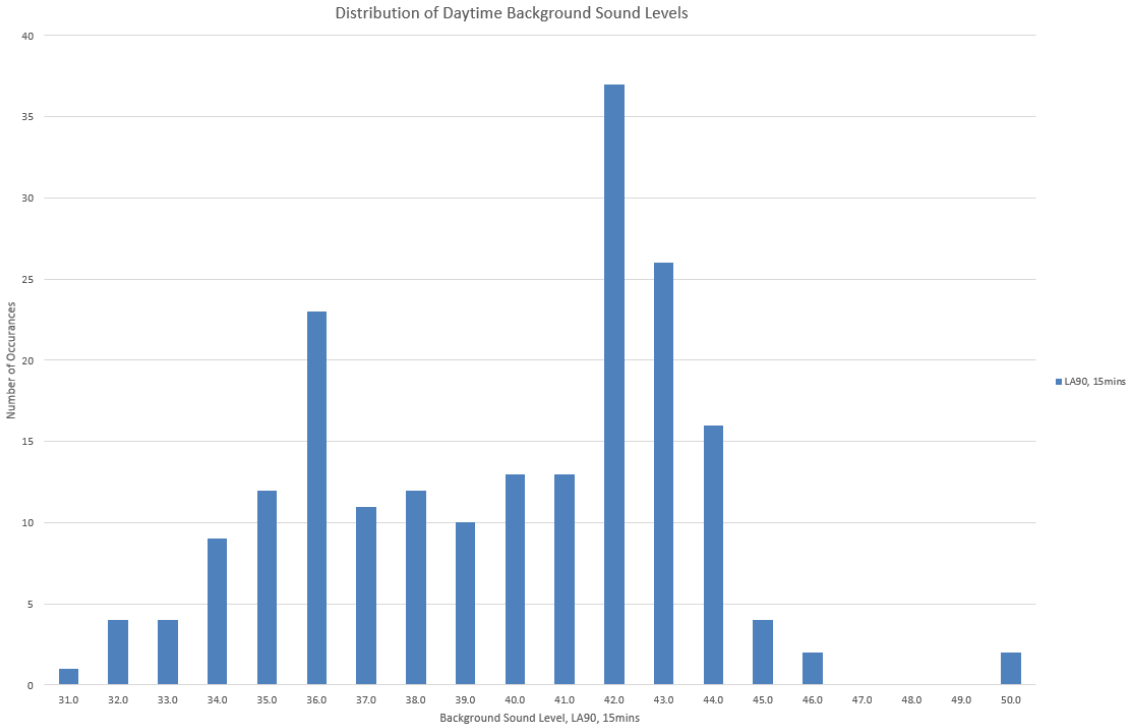


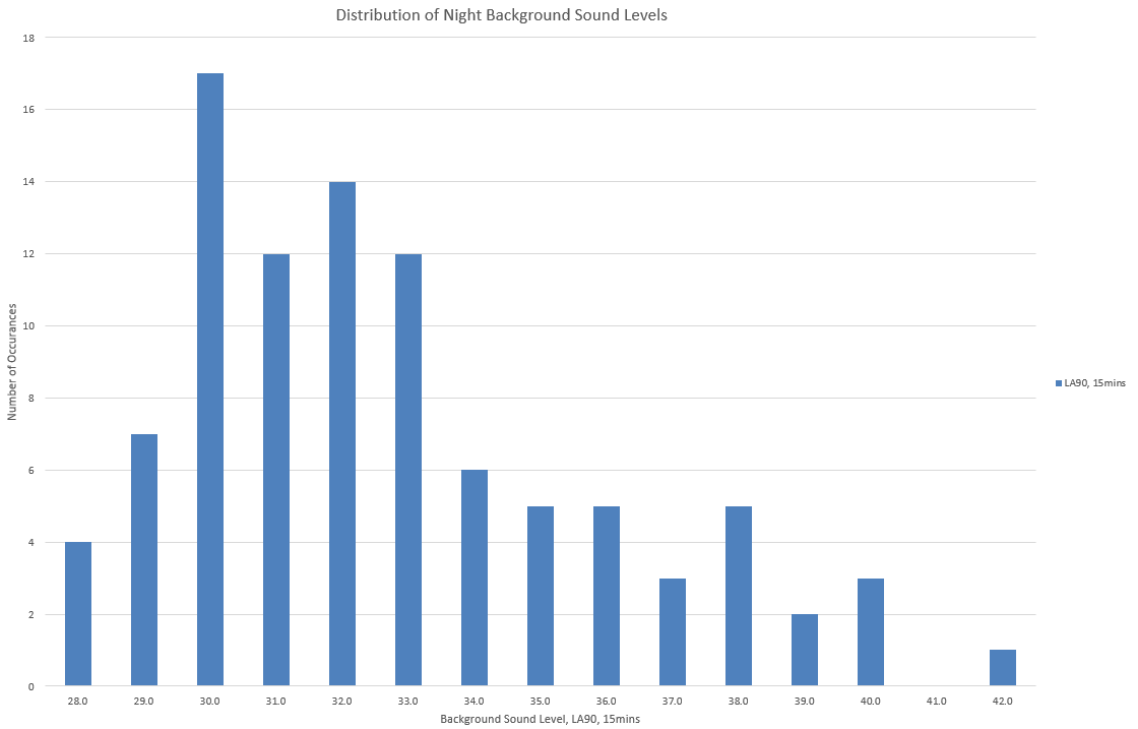
Noise Levels Measured at Broadway Farm - M01
Thursday 20th January 2022



Noise Levels Measured at Broadway Farm - M01
Friday 21st January 2022



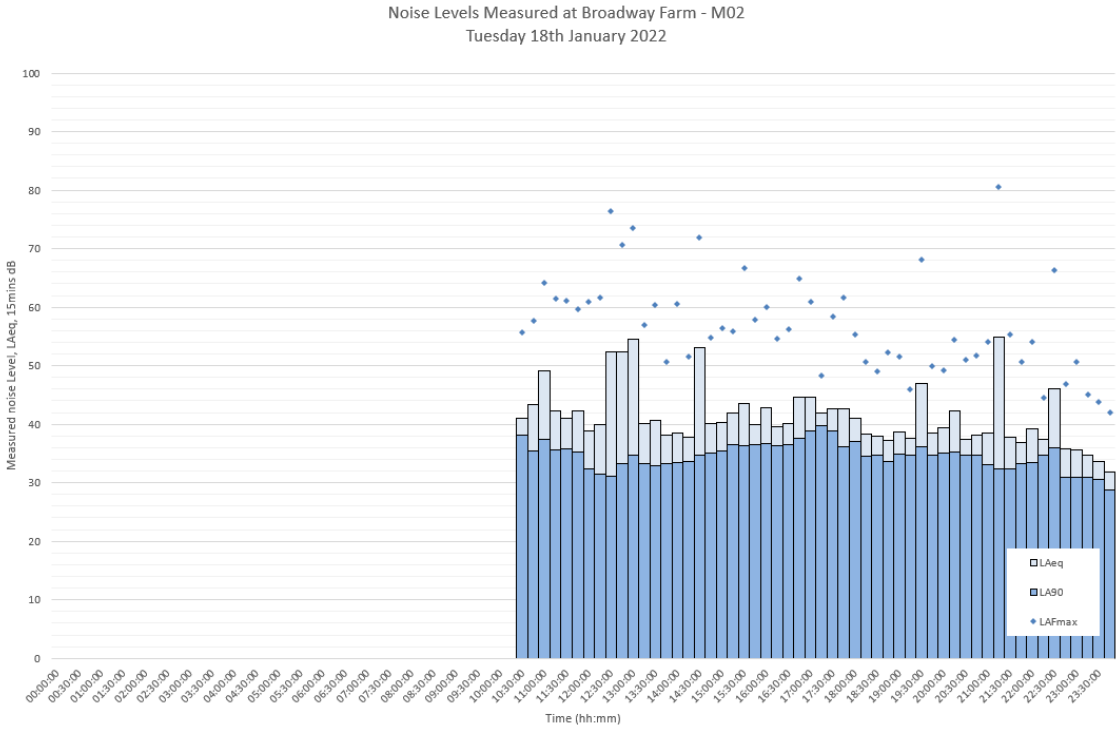

Distribution of Daytime Background Sound Levels
Number of Occurances
Background Sound Level, LA90, 15mins
LA90, 15mins
0
5
10
15
20
25
30
35
40
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
45.0
46.0
47.0
48.0
49.0
50.0

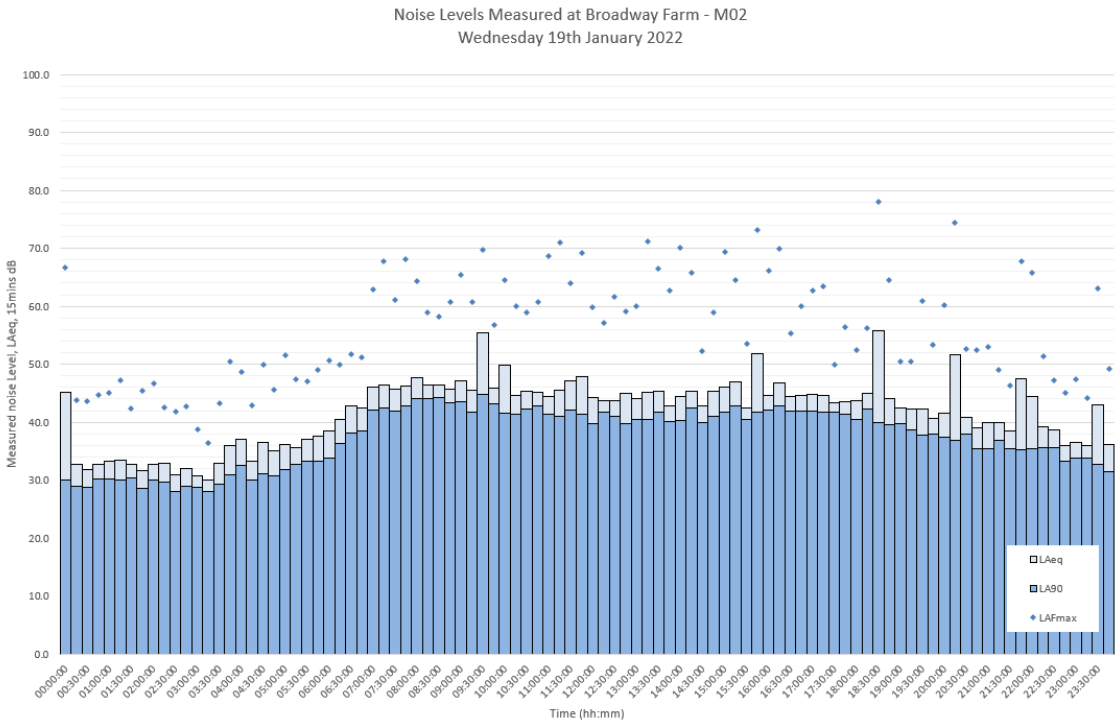

Distribution of Night Background Sound Levels
Number of Occurances
Background Sound Level, LA90, 15mins
LA90, 15mins
0
2
4
6
8
10
12
14
16
18
28.0
29.0
30.0
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0

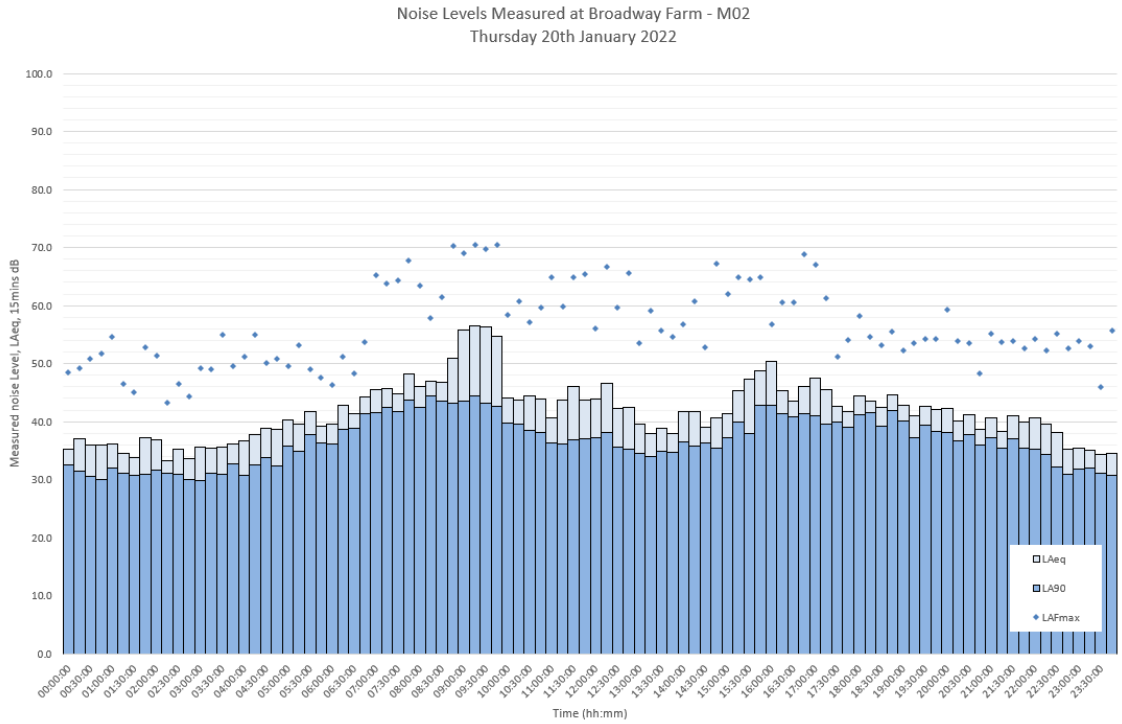
Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB
18/01/2022 10:15	48.5	67.2	41.5	18/01/2022 22:15	37.5	50.0	34.3	19/01/2022 10:15	54.1	77.5	42.2
18/01/2022 10:30	56.2	83.4	39.8	18/01/2022 22:30	50.5	71.4	36.3	19/01/2022 10:30	57.7	74.8	44.1
18/01/2022 10:45	51.4	71.5	39.4	18/01/2022 22:45	37.3	46.0	32.3	19/01/2022 10:45	45.9	57.7	43.9
18/01/2022 11:00	50.0	70.2	38.8	18/01/2022 23:00	36.8	53.8	32.0	19/01/2022 11:00	51.4	75.6	42.4
18/01/2022 11:15	48.4	73.1	36.0	18/01/2022 23:15	45.9	72.1	30.8	19/01/2022 11:15	54.9	77.7	42.3
18/01/2022 11:30	47.8	73.4	35.7	18/01/2022 23:30	35.3	49.6	31.5	19/01/2022 11:30	54.3	75.6	42.7
18/01/2022 11:45	51.8	72.2	35.3	18/01/2022 23:45	33.9	47.7	29.9	19/01/2022 11:45	53.8	78.0	42.5
18/01/2022 12:00	50.8	73.2	33.4	19/01/2022 00:00	50.1	72.1	29.8	19/01/2022 12:00	53.0	77.6	41.5
18/01/2022 12:15	53.0	76.0	31.4	19/01/2022 00:15	35.1	49.9	30.9	19/01/2022 12:15	50.0	73.6	41.6
18/01/2022 12:30	52.7	73.6	31.9	19/01/2022 00:30	32.9	45.1	29.8	19/01/2022 12:30	53.0	73.6	42.0
18/01/2022 12:45	54.3	70.5	34.8	19/01/2022 00:45	32.9	41.6	30.6	19/01/2022 12:45	56.7	81.4	42.6
18/01/2022 13:00	55.1	74.7	35.0	19/01/2022 01:00	33.0	44.8	29.7	19/01/2022 13:00	52.2	72.3	43.4
18/01/2022 13:15	44.9	67.8	33.5	19/01/2022 01:15	33.6	50.7	30.2	19/01/2022 13:15	49.9	71.6	41.9
18/01/2022 13:30	52.6	75.3	32.3	19/01/2022 01:30	32.3	44.5	29.4	19/01/2022 13:30	53.8	80.0	41.6
18/01/2022 13:45	49.4	73.4	34.2	19/01/2022 01:45	31.5	45.9	27.7	19/01/2022 13:45	51.8	77.5	42.1
18/01/2022 14:00	49.7	70.6	35.3	19/01/2022 02:00	33.3	46.9	29.3	19/01/2022 14:00	50.2	75.5	42.2
18/01/2022 14:15	50.5	72.2	35.9	19/01/2022 02:15	32.9	43.6	28.9	19/01/2022 14:15	50.6	73.2	42.2
18/01/2022 14:30	53.8	71.2	35.2	19/01/2022 02:30	30.8	39.0	28.3	19/01/2022 14:30	50.0	69.5	41.9
18/01/2022 14:45	57.2	79.2	36.0	19/01/2022 02:45	32.0	43.5	28.5	19/01/2022 14:45	49.8	71.4	42.2
18/01/2022 15:00	51.2	73.3	36.0	19/01/2022 03:00	30.2	41.8	28.1	19/01/2022 15:00	52.4	72.4	42.7
18/01/2022 15:15	51.8	73.0	36.7	19/01/2022 03:15	29.5	38.1	28.0	19/01/2022 15:15	51.8	73.7	43.5
18/01/2022 15:30	53.7	74.6	38.0	19/01/2022 03:30	32.5	44.4	29.4	19/01/2022 15:30	53.3	73.6	40.9
18/01/2022 15:45	53.7	77.4	37.6	19/01/2022 03:45	47.5	74.4	31.2	19/01/2022 15:45	54.6	74.6	42.9
18/01/2022 16:00	54.1	76.8	37.6	19/01/2022 04:00	51.1	76.1	32.0	19/01/2022 16:00	52.4	72.2	42.9
18/01/2022 16:15	49.6	70.2	37.7	19/01/2022 04:15	33.0	45.4	30.2	19/01/2022 16:15	55.3	77.4	43.1
18/01/2022 16:30	52.0	74.6	37.9	19/01/2022 04:30	43.9	70.1	30.9	19/01/2022 16:30	55.3	80.4	42.9
18/01/2022 16:45	52.4	73.1	38.0	19/01/2022 04:45	34.4	47.1	30.1	19/01/2022 16:45	57.0	79.5	43.1
18/01/2022 17:00	58.0	82.7	39.5	19/01/2022 05:00	50.5	77.9	31.7	19/01/2022 17:00	53.9	74.3	43.0
18/01/2022 17:15	51.8	73.3	40.2	19/01/2022 05:15	44.5	71.0	31.6	19/01/2022 17:15	52.3	77.1	42.2
18/01/2022 17:30	56.3	79.5	39.5	19/01/2022 05:30	37.5	50.9	33.2	19/01/2022 17:30	51.6	70.8	42.6
18/01/2022 17:45	58.8	80.4	36.2	19/01/2022 05:45	50.7	75.3	32.4	19/01/2022 17:45	54.9	79.3	42.4
18/01/2022 18:00	55.7	78.9	37.3	19/01/2022 06:00	40.5	58.1	34.0	19/01/2022 18:00	49.4	73.0	41.4
18/01/2022 18:15	50.0	71.6	35.2	19/01/2022 06:15	49.4	72.0	36.7	19/01/2022 18:15	54.9	78.8	43.0
18/01/2022 18:30	50.6	71.8	35.6	19/01/2022 06:30	46.6	70.8	38.2	19/01/2022 18:30	56.6	80.9	40.8
18/01/2022 18:45	49.7	72.7	34.3	19/01/2022 06:45	42.8	50.9	39.1	19/01/2022 18:45	52.0	74.7	40.1
18/01/2022 19:00	51.7	74.8	34.7	19/01/2022 07:00	53.3	76.4	42.7	19/01/2022 19:00	51.7	71.9	40.1
18/01/2022 19:15	37.6	49.2	34.4	19/01/2022 07:15	53.7	74.8	42.0	19/01/2022 19:15	51.7	72.4	39.2
18/01/2022 19:30	55.7	75.8	35.7	19/01/2022 07:30	60.2	85.0	42.0	19/01/2022 19:30	53.3	74.2	39.3
18/01/2022 19:45	46.7	72.3	34.5	19/01/2022 07:45	56.4	80.1	43.5	19/01/2022 19:45	47.6	74.0	37.8
18/01/2022 20:00	49.7	72.1	35.5	19/01/2022 08:00	58.9	83.3	43.6	19/01/2022 20:00	48.6	73.0	38.0
18/01/2022 20:15	48.1	70.9	35.3	19/01/2022 08:15	54.0	73.6	43.3	19/01/2022 20:15	55.5	78.5	36.8
18/01/2022 20:30	45.8	70.5	35.8	19/01/2022 08:30	52.0	71.4	43.5	19/01/2022 20:30	41.8	56.5	38.0
18/01/2022 20:45	48.0	74.0	34.6	19/01/2022 08:45	52.6	72.9	42.0	19/01/2022 20:45	47.6	73.3	36.0
18/01/2022 21:00	39.1	51.4	33.7	19/01/2022 09:00	58.9	80.7	43.5	19/01/2022 21:00	46.9	72.2	36.6
18/01/2022 21:15	54.6	79.7	32.5	19/01/2022 09:15	48.6	69.9	42.2	19/01/2022 21:15	48.6	72.0	36.9
18/01/2022 21:30	47.4	72.8	32.4	19/01/2022 09:30	56.5	77.5	43.9	19/01/2022 21:30	38.9	47.6	35.1
18/01/2022 21:45	37.7	52.1	33.6	19/01/2022 09:45	53.8	77.8	45.1	19/01/2022 21:45	53.0	75.9	35.8
18/01/2022 22:00	46.6	71.8	33.6	19/01/2022 10:00	55.7	74.3	42.9	19/01/2022 22:00	50.1	72.4	35.6

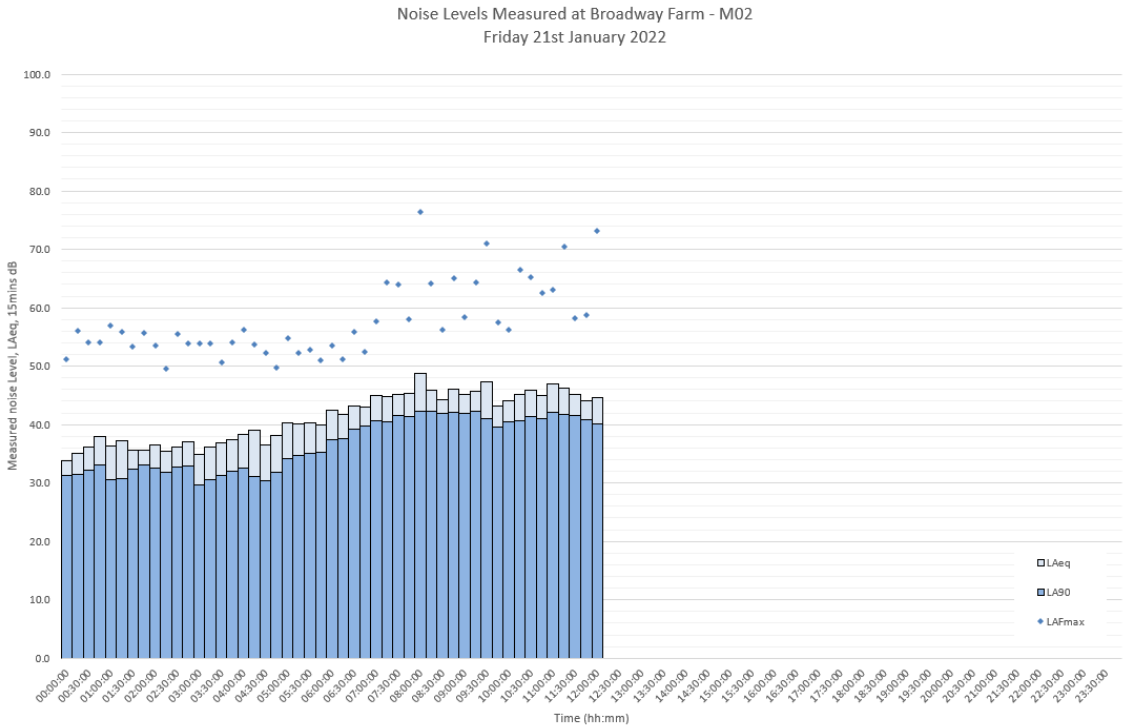
Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB
19/01/2022 22:15	48.6	71.9	36.4	20/01/2022 10:15	52.7	72.9	42.5	20/01/2022 22:15	47.7	75.1	33.9
19/01/2022 22:30	48.3	73.1	35.5	20/01/2022 10:30	55.5	80.4	41.5	20/01/2022 22:30	39.3	52.4	35.1
19/01/2022 22:45	36.2	44.0	33.4	20/01/2022 10:45	55.7	76.5	41.8	20/01/2022 22:45	37.1	46.3	33.2
19/01/2022 23:00	37.9	46.9	35.4	20/01/2022 11:00	55.6	75.7	39.2	20/01/2022 23:00	38.2	58.5	34.3
19/01/2022 23:15	46.3	73.6	36.1	20/01/2022 11:15	49.2	73.5	40.8	20/01/2022 23:15	37.3	47.1	34.6
19/01/2022 23:30	49.4	71.4	34.3	20/01/2022 11:30	51.1	73.5	39.8	20/01/2022 23:30	36.0	51.1	33.1
19/01/2022 23:45	50.9	77.1	32.9	20/01/2022 11:45	51.2	72.1	40.0	20/01/2022 23:45	33.9	48.5	30.8
20/01/2022 00:00	37.0	54.7	33.5	20/01/2022 12:00	57.1	75.6	41.1	21/01/2022 00:00	35.3	50.9	31.8
20/01/2022 00:15	37.5	49.8	32.8	20/01/2022 12:15	53.2	75.7	38.9	21/01/2022 00:15	34.4	48.8	30.8
20/01/2022 00:30	36.1	49.2	32.0	20/01/2022 12:30	47.9	68.1	36.8	21/01/2022 00:30	36.6	48.8	31.5
20/01/2022 00:45	36.5	52.1	31.5	20/01/2022 12:45	49.4	72.6	35.6	21/01/2022 00:45	37.2	49.9	31.3
20/01/2022 01:00	35.2	45.8	32.3	20/01/2022 13:00	48.8	76.7	35.5	21/01/2022 01:00	35.7	49.4	29.6
20/01/2022 01:15	35.3	45.8	31.7	20/01/2022 13:15	50.2	72.9	36.0	21/01/2022 01:15	48.7	74.6	30.1
20/01/2022 01:30	35.9	56.1	32.1	20/01/2022 13:30	49.7	72.4	35.5	21/01/2022 01:30	34.5	48.5	30.3
20/01/2022 01:45	54.8	81.5	31.8	20/01/2022 13:45	47.4	71.9	35.6	21/01/2022 01:45	34.2	45.5	31.1
20/01/2022 02:00	53.7	80.6	32.6	20/01/2022 14:00	54.3	81.1	38.1	21/01/2022 02:00	37.9	52.6	31.2
20/01/2022 02:15	35.4	49.0	32.5	20/01/2022 14:15	48.5	70.7	37.2	21/01/2022 02:15	35.4	47.1	31.2
20/01/2022 02:30	36.5	47.5	33.5	20/01/2022 14:30	53.1	72.9	38.6	21/01/2022 02:30	36.1	50.9	30.1
20/01/2022 02:45	35.8	46.7	32.7	20/01/2022 14:45	49.2	73.4	36.7	21/01/2022 02:45	37.2	52.2	29.5
20/01/2022 03:00	37.5	50.8	33.0	20/01/2022 15:00	54.0	74.9	39.7	21/01/2022 03:00	34.2	46.4	28.9
20/01/2022 03:15	36.6	47.3	33.1	20/01/2022 15:15	59.8	86.4	50.3	21/01/2022 03:15	34.8	51.2	29.5
20/01/2022 03:30	46.9	73.2	33.2	20/01/2022 15:30	52.1	71.3	43.6	21/01/2022 03:30	35.9	51.6	29.1
20/01/2022 03:45	50.6	77.4	33.1	20/01/2022 15:45	56.8	77.4	50.1	21/01/2022 03:45	37.4	50.7	30.1
20/01/2022 04:00	37.5	49.3	32.9	20/01/2022 16:00	56.3	73.1	44.9	21/01/2022 04:00	38.9	56.9	30.6
20/01/2022 04:15	38.1	53.6	34.6	20/01/2022 16:15	50.6	71.1	43.3	21/01/2022 04:15	39.9	54.8	29.8
20/01/2022 04:30	46.9	71.8	35.9	20/01/2022 16:30	55.7	77.2	41.4	21/01/2022 04:30	47.5	72.9	29.8
20/01/2022 04:45	39.4	50.7	34.1	20/01/2022 16:45	51.3	72.7	42.8	21/01/2022 04:45	37.7	49.1	30.0
20/01/2022 05:00	40.7	50.0	36.8	20/01/2022 17:00	52.9	72.0	41.6	21/01/2022 05:00	41.6	53.0	35.6
20/01/2022 05:15	45.2	71.4	36.3	20/01/2022 17:15	53.7	77.6	40.8	21/01/2022 05:15	42.4	65.7	35.1
20/01/2022 05:30	43.2	61.9	38.2	20/01/2022 17:30	50.8	73.7	41.7	21/01/2022 05:30	40.8	52.4	35.2
20/01/2022 05:45	40.0	54.2	37.6	20/01/2022 17:45	55.9	78.0	40.9	21/01/2022 05:45	45.9	71.0	36.4
20/01/2022 06:00	40.3	48.5	37.1	20/01/2022 18:00	56.3	77.2	42.2	21/01/2022 06:00	48.8	74.3	37.8
20/01/2022 06:15	51.2	76.8	39.2	20/01/2022 18:15	50.3	72.9	41.8	21/01/2022 06:15	47.0	72.1	37.9
20/01/2022 06:30	46.6	69.3	40.0	20/01/2022 18:30	51.4	75.5	40.0	21/01/2022 06:30	48.4	71.2	40.0
20/01/2022 06:45	53.6	75.2	41.6	20/01/2022 18:45	52.4	70.9	44.5	21/01/2022 06:45	44.1	54.8	40.2
20/01/2022 07:00	52.5	77.3	42.2	20/01/2022 19:00	54.4	78.4	42.3	21/01/2022 07:00	49.9	69.4	41.2
20/01/2022 07:15	51.6	70.9	43.5	20/01/2022 19:15	48.3	70.9	40.1	21/01/2022 07:15	52.7	73.0	41.2
20/01/2022 07:30	52.8	70.7	43.2	20/01/2022 19:30	51.3	74.3	40.0	21/01/2022 07:30	55.9	76.9	42.6
20/01/2022 07:45	55.8	77.2	44.0	20/01/2022 19:45	51.5	73.7	38.7	21/01/2022 07:45	57.1	82.6	42.3
20/01/2022 08:00	57.0	80.5	43.5	20/01/2022 20:00	47.8	69.5	38.5	21/01/2022 08:00	54.6	77.4	42.2
20/01/2022 08:15	56.1	75.2	45.5	20/01/2022 20:15	50.8	71.5	37.1	21/01/2022 08:15	49.1	70.3	42.4
20/01/2022 08:30	51.9	72.9	44.2	20/01/2022 20:30	42.6	56.2	38.3	21/01/2022 08:30	53.5	73.7	43.0
20/01/2022 08:45	53.6	75.2	43.9	20/01/2022 20:45	45.8	69.4	35.6	21/01/2022 08:45	57.5	77.1	41.8
20/01/2022 09:00	57.4	72.8	44.8	20/01/2022 21:00	41.8	50.3	39.0	21/01/2022 09:00	56.0	78.5	42.7
20/01/2022 09:15	59.5	76.8	46.0	20/01/2022 21:15	40.0	49.3	36.8	21/01/2022 09:15	52.7	74.1	42.7
20/01/2022 09:30	57.8	76.5	44.2	20/01/2022 21:30	46.8	70.7	38.1	21/01/2022 09:30	53.5	76.3	41.5
20/01/2022 09:45	57.6	78.7	44.3	20/01/2022 21:45	47.5	73.0	35.8	21/01/2022 09:45	50.0	72.4	40.3
20/01/2022 10:00	51.2	73.3	42.3	20/01/2022 22:00	47.6	73.5	36.5	21/01/2022 10:00	52.1	71.5	41.1

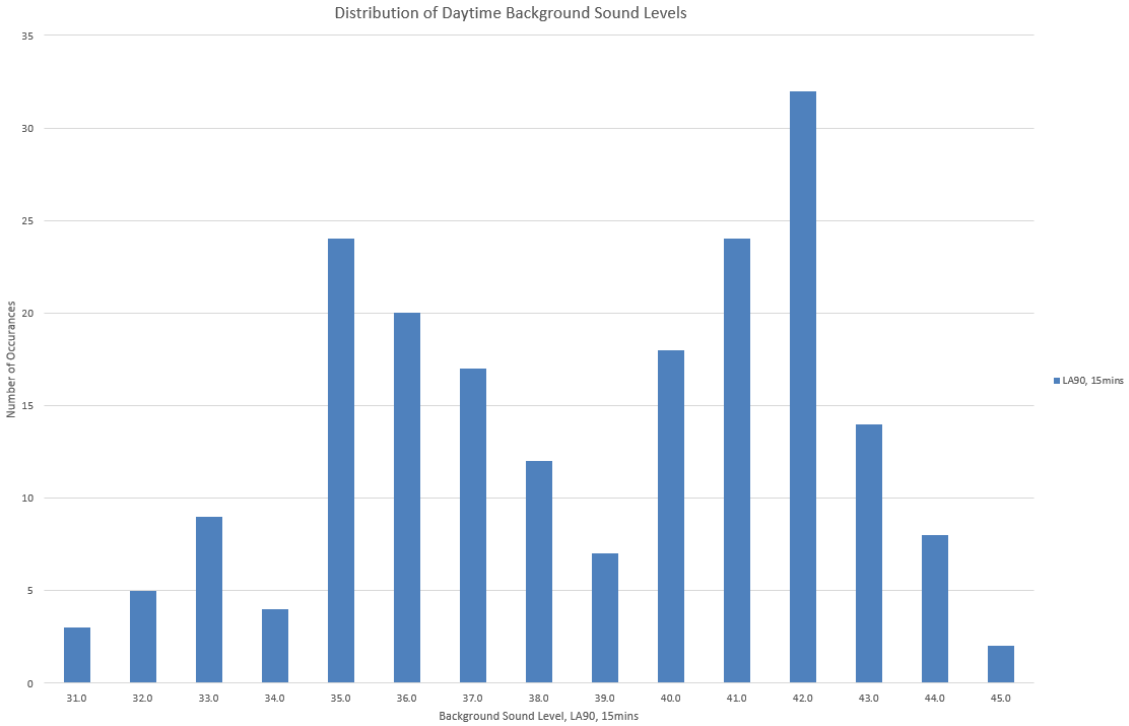
Location M02

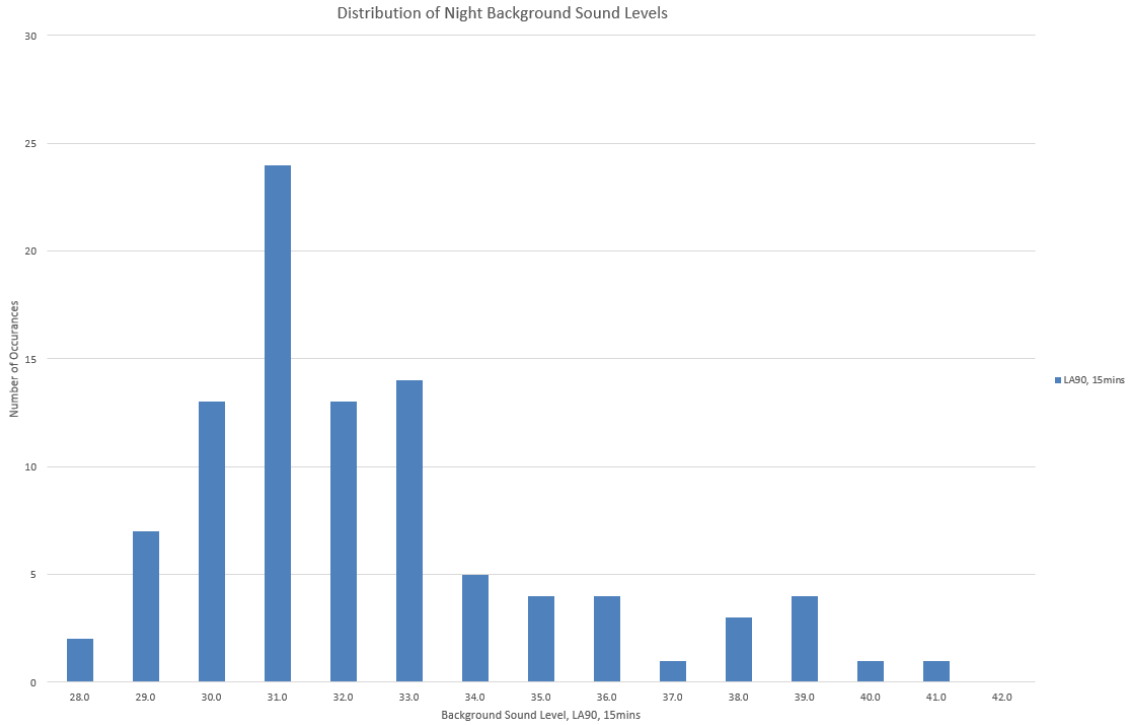





Noise Levels Measured at Broadway Farm - M02
Thursday 20th January 2022
Measured noise Level, LAeq, 15mins dB
Time (hh:mm)
LAeq
LA90
LAFmax


Noise Levels Measured at Broadway Farm - M02
Friday 21st January 2022
Measured noise Level, LAeq, 15mins dB
Time (hh:mm)
LAeq
LA90
LAFmax


Distribution of Daytime Background Sound Levels
Number of Occurances
0
5
10
15
20
25
30
35
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
45.0
Background Sound Level, LA90, 15mins
LA90, 15mins


Distribution of Night Background Sound Levels
Number of Occurances
0
5
10
15
20
25
30
28.0
29.0
30.0
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
Background Sound Level, LA90, 15mins
LA90, 15mins

Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB
18/01/2022 10:30	41.0	55.7	38.1	18/01/2022 22:30	46.1	66.3	35.9	19/01/2022 10:30	45.4	58.9	42.3
18/01/2022 10:45	43.3	57.6	35.5	18/01/2022 22:45	35.8	46.8	31.0	19/01/2022 10:45	45.2	60.7	42.9
18/01/2022 11:00	49.1	64.1	37.4	18/01/2022 23:00	35.7	50.6	30.9	19/01/2022 11:00	44.4	68.6	41.4
18/01/2022 11:15	42.2	61.5	35.6	18/01/2022 23:15	34.7	45.0	30.9	19/01/2022 11:15	45.6	71.1	41.0
18/01/2022 11:30	41.0	61.1	35.8	18/01/2022 23:30	33.6	43.9	30.6	19/01/2022 11:30	47.2	64.0	42.1
18/01/2022 11:45	42.2	59.6	35.2	18/01/2022 23:45	31.8	42.1	28.7	19/01/2022 11:45	47.8	69.2	41.3
18/01/2022 12:00	38.9	60.9	32.4	19/01/2022 00:00	45.2	66.6	30.1	19/01/2022 12:00	44.3	59.8	39.8
18/01/2022 12:15	39.9	61.7	31.5	19/01/2022 00:15	32.7	43.8	28.9	19/01/2022 12:15	43.7	57.2	41.7
18/01/2022 12:30	52.4	76.5	31.1	19/01/2022 00:30	31.8	43.7	28.7	19/01/2022 12:30	43.8	61.6	41.1
18/01/2022 12:45	52.3	70.6	33.3	19/01/2022 00:45	32.7	44.7	30.3	19/01/2022 12:45	44.9	59.2	39.8
18/01/2022 13:00	54.6	73.5	34.8	19/01/2022 01:00	33.2	45.0	30.3	19/01/2022 13:00	44.0	60.1	40.5
18/01/2022 13:15	40.2	56.9	33.2	19/01/2022 01:15	33.4	47.3	30.1	19/01/2022 13:15	45.2	71.2	40.4
18/01/2022 13:30	40.7	60.4	33.0	19/01/2022 01:30	32.7	42.3	30.4	19/01/2022 13:30	45.4	66.5	41.8
18/01/2022 13:45	38.1	50.6	33.2	19/01/2022 01:45	31.6	45.4	28.5	19/01/2022 13:45	42.8	62.7	40.1
18/01/2022 14:00	38.5	60.5	33.4	19/01/2022 02:00	32.8	46.7	30.1	19/01/2022 14:00	44.4	70.1	40.3
18/01/2022 14:15	37.7	51.5	33.6	19/01/2022 02:15	33.0	42.6	29.6	19/01/2022 14:15	45.3	65.8	42.5
18/01/2022 14:30	53.1	71.9	34.8	19/01/2022 02:30	31.0	41.9	28.1	19/01/2022 14:30	42.8	52.3	39.9
18/01/2022 14:45	40.1	54.8	35.0	19/01/2022 02:45	32.0	42.7	28.9	19/01/2022 14:45	45.4	59.0	41.1
18/01/2022 15:00	40.3	56.5	35.5	19/01/2022 03:00	30.7	38.7	28.8	19/01/2022 15:00	46.0	69.3	41.8
18/01/2022 15:15	42.0	55.9	36.5	19/01/2022 03:15	30.0	36.5	28.1	19/01/2022 15:15	46.9	64.5	42.9
18/01/2022 15:30	43.5	66.6	36.4	19/01/2022 03:30	32.9	43.2	29.4	19/01/2022 15:30	42.5	53.5	40.5
18/01/2022 15:45	40.0	57.8	36.5	19/01/2022 03:45	36.0	50.5	31.0	19/01/2022 15:45	51.9	73.1	41.8
18/01/2022 16:00	42.9	60.1	36.7	19/01/2022 04:00	37.0	48.7	32.6	19/01/2022 16:00	44.6	66.2	42.1
18/01/2022 16:15	39.5	54.6	36.3	19/01/2022 04:15	33.3	43.0	30.0	19/01/2022 16:15	46.8	70.0	42.9
18/01/2022 16:30	40.1	56.2	36.5	19/01/2022 04:30	36.5	49.9	31.2	19/01/2022 16:30	44.5	55.4	41.9
18/01/2022 16:45	44.7	64.9	37.6	19/01/2022 04:45	35.1	45.7	30.7	19/01/2022 16:45	44.6	60.1	41.9
18/01/2022 17:00	44.7	60.9	38.9	19/01/2022 05:00	36.2	51.5	31.8	19/01/2022 17:00	44.8	62.7	42.0
18/01/2022 17:15	42.0	48.3	39.7	19/01/2022 05:15	35.7	47.5	32.7	19/01/2022 17:15	44.7	63.5	41.8
18/01/2022 17:30	42.7	58.4	38.8	19/01/2022 05:30	37.1	47.1	33.3	19/01/2022 17:30	43.4	50.0	41.7
18/01/2022 17:45	42.6	61.7	36.1	19/01/2022 05:45	37.6	49.0	33.3	19/01/2022 17:45	43.6	56.4	41.4
18/01/2022 18:00	41.0	55.4	37.0	19/01/2022 06:00	38.5	50.6	33.8	19/01/2022 18:00	43.7	52.4	40.5
18/01/2022 18:15	38.4	50.7	34.6	19/01/2022 06:15	40.5	50.0	36.4	19/01/2022 18:15	44.9	56.2	42.3
18/01/2022 18:30	38.0	49.0	34.7	19/01/2022 06:30	42.8	51.8	38.1	19/01/2022 18:30	55.8	78.1	40.0
18/01/2022 18:45	37.3	52.2	33.6	19/01/2022 06:45	42.4	51.2	38.5	19/01/2022 18:45	44.1	64.6	39.5
18/01/2022 19:00	38.6	51.5	34.9	19/01/2022 07:00	46.0	62.9	42.1	19/01/2022 19:00	42.5	50.4	39.7
18/01/2022 19:15	37.6	46.0	34.8	19/01/2022 07:15	46.5	67.7	42.4	19/01/2022 19:15	42.3	50.4	38.6
18/01/2022 19:30	46.9	68.2	36.1	19/01/2022 07:30	45.7	61.1	41.9	19/01/2022 19:30	42.3	60.9	37.8
18/01/2022 19:45	38.5	49.9	34.7	19/01/2022 07:45	46.3	68.2	42.9	19/01/2022 19:45	40.7	53.3	37.9
18/01/2022 20:00	39.4	49.3	35.0	19/01/2022 08:00	47.6	64.4	44.1	19/01/2022 20:00	41.5	60.2	37.5
18/01/2022 20:15	42.3	54.5	35.2	19/01/2022 08:15	46.5	58.9	44.0	19/01/2022 20:15	51.6	74.4	36.8
18/01/2022 20:30	37.4	51.0	34.8	19/01/2022 08:30	46.4	58.2	44.3	19/01/2022 20:30	40.9	52.6	37.9
18/01/2022 20:45	38.1	51.8	34.7	19/01/2022 08:45	45.7	60.8	43.3	19/01/2022 20:45	39.1	52.4	35.4
18/01/2022 21:00	38.5	54.1	33.1	19/01/2022 09:00	47.2	65.5	43.6	19/01/2022 21:00	39.9	53.0	35.5
18/01/2022 21:15	54.9	80.6	32.3	19/01/2022 09:15	45.6	60.8	41.8	19/01/2022 21:15	40.0	49.1	36.8
18/01/2022 21:30	37.7	55.4	32.3	19/01/2022 09:30	55.4	69.8	44.8	19/01/2022 21:30	38.5	46.4	35.5
18/01/2022 21:45	36.8	50.6	33.2	19/01/2022 09:45	45.9	56.7	43.1	19/01/2022 21:45	47.5	67.8	35.3
18/01/2022 22:00	39.3	54.0	33.4	19/01/2022 10:00	49.9	64.6	41.5	19/01/2022 22:00	44.5	65.7	35.4
18/01/2022 22:15	37.4	44.5	34.7	19/01/2022 10:15	44.7	60.1	41.3	19/01/2022 22:15	39.3	51.4	35.6

Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB
19/01/2022 22:30	38.7	47.2	35.6	20/01/2022 10:30	44.5	57.2	38.5	20/01/2022 22:30	38.1	55.1	32.2
19/01/2022 22:45	35.9	45.1	33.2	20/01/2022 10:45	43.9	59.7	38.1	20/01/2022 22:45	35.2	52.6	30.9
19/01/2022 23:00	36.6	47.5	33.8	20/01/2022 11:00	40.6	64.9	36.3	20/01/2022 23:00	35.4	53.9	31.8
19/01/2022 23:15	35.9	44.2	33.9	20/01/2022 11:15	43.8	59.9	36.1	20/01/2022 23:15	35.1	53.0	32.1
19/01/2022 23:30	43.0	63.0	32.8	20/01/2022 11:30	46.0	64.8	36.8	20/01/2022 23:30	34.4	46.0	31.1
19/01/2022 23:45	36.2	49.2	31.4	20/01/2022 11:45	43.8	65.4	37.1	20/01/2022 23:45	34.6	55.7	30.7
20/01/2022 00:00	35.3	48.5	32.6	20/01/2022 12:00	43.9	56.0	37.3	21/01/2022 00:00	33.8	51.2	31.3
20/01/2022 00:15	37.0	49.3	31.5	20/01/2022 12:15	46.6	66.6	38.1	21/01/2022 00:15	35.0	56.1	31.5
20/01/2022 00:30	35.9	50.9	30.6	20/01/2022 12:30	42.2	59.7	35.7	21/01/2022 00:30	36.2	54.0	32.2
20/01/2022 00:45	36.0	51.8	30.1	20/01/2022 12:45	42.5	65.6	35.3	21/01/2022 00:45	38.0	54.0	33.1
20/01/2022 01:00	36.1	54.6	32.1	20/01/2022 13:00	39.6	53.6	34.6	21/01/2022 01:00	36.3	57.0	30.5
20/01/2022 01:15	34.6	46.5	31.2	20/01/2022 13:15	37.9	59.2	34.0	21/01/2022 01:15	37.2	55.9	30.7
20/01/2022 01:30	33.9	45.0	30.7	20/01/2022 13:30	38.9	55.7	34.9	21/01/2022 01:30	35.7	53.3	32.3
20/01/2022 01:45	37.3	52.8	30.9	20/01/2022 13:45	37.9	54.6	34.7	21/01/2022 01:45	35.6	55.7	33.1
20/01/2022 02:00	36.9	51.4	31.6	20/01/2022 14:00	41.7	56.7	36.6	21/01/2022 02:00	36.6	53.6	32.5
20/01/2022 02:15	33.3	43.3	31.1	20/01/2022 14:15	41.7	60.7	35.8	21/01/2022 02:15	35.5	49.6	31.8
20/01/2022 02:30	35.3	46.5	30.9	20/01/2022 14:30	39.1	52.8	36.4	21/01/2022 02:30	36.2	55.5	32.7
20/01/2022 02:45	33.7	44.3	30.1	20/01/2022 14:45	40.7	67.2	35.5	21/01/2022 02:45	37.0	53.9	32.9
20/01/2022 03:00	35.7	49.2	29.8	20/01/2022 15:00	41.3	62.0	37.2	21/01/2022 03:00	34.9	53.9	29.7
20/01/2022 03:15	35.5	49.1	31.1	20/01/2022 15:15	45.4	64.8	39.9	21/01/2022 03:15	36.1	53.9	30.6
20/01/2022 03:30	35.6	55.0	31.0	20/01/2022 15:30	47.4	64.6	38.0	21/01/2022 03:30	36.8	50.7	31.3
20/01/2022 03:45	36.1	49.6	32.8	20/01/2022 15:45	48.7	64.8	42.8	21/01/2022 03:45	37.5	54.1	32.1
20/01/2022 04:00	36.7	51.2	30.8	20/01/2022 16:00	50.3	56.8	42.9	21/01/2022 04:00	38.4	56.3	32.6
20/01/2022 04:15	37.8	55.0	32.6	20/01/2022 16:15	45.3	60.5	41.4	21/01/2022 04:15	39.1	53.8	31.2
20/01/2022 04:30	38.8	50.1	33.9	20/01/2022 16:30	43.6	60.6	40.8	21/01/2022 04:30	36.5	52.3	30.4
20/01/2022 04:45	38.7	50.8	32.3	20/01/2022 16:45	46.0	68.9	41.3	21/01/2022 04:45	38.1	49.7	31.8
20/01/2022 05:00	40.3	49.5	35.8	20/01/2022 17:00	47.5	67.0	41.0	21/01/2022 05:00	40.3	54.8	34.1
20/01/2022 05:15	39.6	53.2	34.9	20/01/2022 17:15	45.6	61.3	39.5	21/01/2022 05:15	40.2	52.3	34.8
20/01/2022 05:30	41.7	49.0	37.8	20/01/2022 17:30	42.6	51.2	40.0	21/01/2022 05:30	40.3	52.8	35.1
20/01/2022 05:45	39.3	47.6	36.4	20/01/2022 17:45	41.7	54.0	39.0	21/01/2022 05:45	40.0	51.1	35.3
20/01/2022 06:00	39.5	46.3	36.2	20/01/2022 18:00	44.5	58.3	41.2	21/01/2022 06:00	42.5	53.6	37.4
20/01/2022 06:15	42.9	51.2	38.6	20/01/2022 18:15	43.6	54.6	41.5	21/01/2022 06:15	41.7	51.2	37.6
20/01/2022 06:30	41.3	48.3	38.9	20/01/2022 18:30	42.5	53.1	39.2	21/01/2022 06:30	43.2	55.8	39.2
20/01/2022 06:45	44.2	53.8	41.3	20/01/2022 18:45	44.7	55.6	42.0	21/01/2022 06:45	43.0	52.4	39.7
20/01/2022 07:00	45.5	65.2	41.5	20/01/2022 19:00	42.8	52.2	40.1	21/01/2022 07:00	45.0	57.6	40.7
20/01/2022 07:15	45.7	63.8	42.5	20/01/2022 19:15	41.0	53.6	37.3	21/01/2022 07:15	44.8	64.4	40.5
20/01/2022 07:30	44.8	64.4	41.8	20/01/2022 19:30	42.6	54.2	39.4	21/01/2022 07:30	45.1	63.9	41.6
20/01/2022 07:45	48.3	67.8	43.8	20/01/2022 19:45	42.1	54.3	38.4	21/01/2022 07:45	45.4	58.1	41.3
20/01/2022 08:00	46.1	63.4	42.5	20/01/2022 20:00	42.3	59.3	38.2	21/01/2022 08:00	48.8	76.5	42.2
20/01/2022 08:15	46.9	57.9	44.4	20/01/2022 20:15	40.2	53.9	36.7	21/01/2022 08:15	45.8	64.2	42.3
20/01/2022 08:30	46.8	61.5	43.6	20/01/2022 20:30	41.2	53.6	37.7	21/01/2022 08:30	44.3	56.2	41.9
20/01/2022 08:45	51.0	70.2	43.1	20/01/2022 20:45	38.7	48.4	36.0	21/01/2022 08:45	46.0	65.1	42.1
20/01/2022 09:00	55.7	69.1	43.6	20/01/2022 21:00	40.7	55.2	37.3	21/01/2022 09:00	45.1	58.4	41.9
20/01/2022 09:15	56.5	70.5	44.5	20/01/2022 21:15	38.3	53.8	35.4	21/01/2022 09:15	45.7	64.4	42.2
20/01/2022 09:30	56.4	69.7	43.1	20/01/2022 21:30	41.1	53.9	37.0	21/01/2022 09:30	47.4	71.1	41.0
20/01/2022 09:45	54.7	70.5	42.6	20/01/2022 21:45	40.0	52.7	35.4	21/01/2022 09:45	43.1	57.5	39.6
20/01/2022 10:00	44.0	58.4	39.7	20/01/2022 22:00	40.6	54.3	35.3	21/01/2022 10:00	44.1	56.3	40.5
20/01/2022 10:15	43.8	60.8	39.6	20/01/2022 22:15	39.6	52.3	34.4	21/01/2022 10:15	45.2	66.5	40.7