



Craig Y Perthi Solar Farm Resubmission

Environmental Statement

Appendix 3.2 Noise Assessment

Prepared for

RWE

RWE Renewables UK

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NOISE ASSESSMENT

CRAIG Y PERTHI SOLAR FARM

RWE RENEWABLES UK SOLAR AND STORAGE LIMITED

JUNE 2026

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1. Introduction

LF Acoustics Ltd have been appointed by RWE Renewables UK Solar and Storage Limited to undertake an operational noise assessment for the proposed Craig Y Perthi Solar Farm.

RWE Renewables UK ('the Applicant'), a part of the RWE Group, is proposing to develop a solar farm and associated development ('the Proposed Development') on land to the east of Newport near the Craig Y Perthi Wood and the village of Bishton. The site is west of the Magor Brewery, south of the M4 motorway, northwest of the Tesco Distribution centre, and north of Llanwnern steelworks, separated by the South Wales Main Line.

The Proposed Development would be classed as a Development of National Significance ('DNS'), as it relates to an electricity generating station that has an installed generating capacity of between 10 and 350 MW. Any application for the Proposed Development would be determined by Planning and Environment Decisions Wales ('PEDW'), with a decision being made by the Welsh Ministers.

The Applicant is part of the largest power producer in Wales and the country's number one renewable energy producer, with over 1 GW of renewable energy generation, responsible for around a quarter of Wales' renewable energy production. The Applicant is a major Welsh employer, with around 300 people working out of their dedicated offices in Baglan, Port of Mostyn and Dolgarrog

Section 2 of this report presents an overview of the relevant standards and guidelines applicable when assessing noise from this type of facility. Section 3 provides a description of the site, its surroundings and proposed operation, with an assessment of the existing noise environment provided in Section 4. The calculation and assessment of noise levels associated with the operation of the solar farm is provided in Section 5. Finally, Section 6 provides a summary of the assessment.

2. Standards and Guidelines

A description of the noise units referred to in this report is provided in Appendix A.

2.1. Planning Policy Wales

Planning Policy Wales (PPW) revised in February 2024 [1], sets out the Government's planning policies for Wales and how these should be applied. The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales.

With regards renewable and low carbon developments, PPW advises:

Planning authorities should also identify and require suitable ways to avoid, mitigate or compensate adverse impacts of renewable and low carbon energy development. The construction, operation, decommissioning, remediation and aftercare of proposals should take into account:

- *the need to minimise impacts on local communities, such as from noise and air pollution, to safeguard quality of life for existing and future generations.*

A number of Technical Advice Notes (TAN) accompany PPW. TAN 11 [2] relates to noise. For noise generating development, TAN 11 advises:

Local planning authorities must ensure that noise generating development does not cause an unacceptable degree of disturbance. They should also bear in mind that if subsequent intensification or change of use results in greater intrusion, consideration should be given to the use of appropriate conditions.

For industrial and commercial developments, TAN 11 advises that BS 4142 should be adopted to assess potential impacts. The 1990 revision of the Standard is indicated within the document, has been withdrawn and consideration has therefore been given to the current revision of the Standard within this assessment.

2.2. British Standard BS 4142:2014+A1:2019

BS 4142 [3] is the British Standard for rating and assessing noise of a commercial or industrial nature and is relevant to the noise associated with the operation of the proposed plant.

BS 4142 is a comparative standard in which the estimated noise levels from the proposed development are compared to the representative / typical background noise level from existing uses.

BS 4142 relates the likelihood of adverse impact to the difference between the Rating Level of the noise being assessed and the background noise level.

The background noise level is the L_{A90} noise level, usually measured in the absence of noise from the source being assessed, but may include other existing industrial or commercial sounds. The background noise levels should generally be obtained from a series of measurements each of not less than 15-minute duration.

The Rating Level of the noise being assessed is defined as its L_{Aeq} noise level (the 'specific noise level'), with the addition of appropriate corrections should the noise exhibit a marked impulsive and/or tonal component or should the noise be irregular enough in character to attract attention. The extent of the correction is dependent upon the degree of tonality or character in the noise

and is determined either by professional judgement, where the plant is not operational at present, or by measurement.

Where the noise is tonal in nature, the standard imposes the following penalties when assessing the rating level:

- 2 dB for a tone which is just perceptible;
- 4 dB where the tone is clearly perceptible; and
- 6 dB where the tone is highly perceptible.

Methods for identifying whether noise is tonal in nature are provided within BS 4142.

Where noise exhibits other sound characteristics, the Standard advises a penalty of 3 dB should be applied.

During the daytime, the specified noise levels are determined over a reference time interval of 1 hour, with a 15 minute reference period adopted when assessing night-time noise.

If the Rating Level of the noise being assessed exceeds the background level by 10 dB or more BS 4142 advises that there is likely to be an indication of a significant adverse impact, depending upon context. A difference between background level and Rating Level of around 5 dB is likely to be an indication of an adverse impact, depending upon context. The lower the Rating Level is, relative to the background noise level, the less likely the specific source will have an adverse or significant adverse impact. Where the Rating Level does not exceed the background noise level is an indication of a low impact, depending upon context.

The assessment method outlined above is intended for the assessment of external noise levels and is not intended to assess the extent of impact at internal locations.

Where the initial assessment of impact, based upon an assessment of the external noise levels, needs to be modified due to the context, all pertinent factors should be taken into account, including:

- The absolute level of sound;
- Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night; and
- The sensitivity of the receptor and whether the premises will already incorporate measures to ensure good internal and/or external acoustic conditions.

The current revision of BS 4142 does not define low background or rating levels. The previous revisions of the Standard described very low background sounds as being less than 30 dB L_{A90} and low rating levels as being less than 35 dB $L_{Aeq,T}$. The Association of Noise Consultants have prepared a technical note to accompany the current revision of BS 4142 [4]. The document advises that it would not be unreasonable to adopt similar lower limits when assessing noise levels against the current revision of the Standard

2.3. British Standard BS 8233

British Standard BS 8233 [5] principally provides design guidance for new buildings. For residential premises, the guidance advises for steady external noise sources, levels of noise internally not exceeding 30 dB $L_{Aeq, 8 \text{ hour}}$ within bedrooms at night are desirable, with a level of 35 dB $L_{Aeq, 16 \text{ hour}}$ representing a desirable standard of noise within living rooms and bedrooms for resting purposes during daytime periods.

Externally within gardens and amenity spaces, the guidance recommends a general limit of 50 dB $L_{Aeq, T}$.

2.4. World Health Organisation Guidelines

The World Health Organisation guidance [6] provides additional guidance upon potential effects in relation to noise.

The guidance advises:

- few people are moderately annoyed by noise levels of below 50 dB L_{Aeq} during the daytime;
- for a good night's sleep, noise levels within bedrooms should not exceed 30 dB L_{Aeq} , with individual noise events not exceeding 45 dB L_{Amax} ; and
- special attention should be given to noise sources in an environment with low background noise levels and to noise sources with low frequency components.

Assuming an open window provides a reduction in noise levels of between 10 – 15 dB(A), during the night-time the WHO guidance indicates that external noise levels should remain below 40 – 45 dB L_{Aeq} to maintain the restorative processes of sleep.

The WHO produced additional noise guidance in relation specifically to night-time noise in 2009 [5], which is generally considered to be the most noise sensitive period. This report provides a description of the no observed adverse effect level (which is equivalent to a No Observed Effects Level, NOEL) and advises for night-time noise (which is considered to be the most sensitive period of the day) that this concept is less useful, as the adversity of effects are less clear. Instead, it advises the use of the observed effects thresholds, above which an effect starts to occur or shows itself to be dependent upon the exposure level.

The guidance is presented in terms of external and internal recommendations to minimise any potential adverse effects. Externally, the guidance advises that an average night-time noise level L_{night} (the $L_{Aeq, 8 \text{ hour}}$) of 40 dB is equivalent to the Lowest Observed Adverse Effect Level (LOAEL) and advises this guideline value is recommended for the protection of public health from night-noise. However, below this level there was no change in the small number of awakenings identified and hence a reason for considering that the NOEL was not an appropriate descriptor in noise terms for identifying adverse effects and hence recommend the use of the observed effects threshold as an appropriate descriptor to identify the potential for the onset of adverse effects.

The guidance, however, advises that an external night-time noise level of 30 $L_{Aeq, 8 \text{ hour}}$ would be equivalent to the NOEL, as their research indicated that there were no detectable effects on sleep observed below this level.

The potential for Significant Observed Adverse Effects (SOAEL) were identified to occur at levels considerably above 40 dB $L_{Aeq, 8 \text{ hour}}$.

3. Site Description and Identification of Potentially Affected Dwellings

The location of the proposed solar farm is as indicated on Figure 1, with the proposed layout indicated on Figure 2.

As indicated on Figure 2, the site would be split across two main areas either side of the village of Bishton, with a smaller separate area to the west.

The solar panels would be connected to string inverters that would be distributed around the site and positioned beneath the solar panels.

The inverters would be operational during daylight periods when the solar panels were generating electricity. The inverters would be actively cooled, with the operation of the fans being temperature controlled, and would only operate at full speed (i.e. generating the highest levels of noise) when the temperatures were high, which would occur during the middle of the day when solar generation was at a peak. Typically, the individual solar inverters would switch in and out during the day, thus generally not all of the inverters would be operating concurrently. During the early morning and late evening periods, when solar energy was lower, the fans would generally not be operating or only running at very low speeds, thus generating lower levels of noise.

The inverters would be connected to a number of Transformer Stations distributed around the site. This plant would also be fan cooled, with the fans temperature controlled.

A substation would be constructed within the southern area of the site, to enable the generated electricity to be supplied to the grid. The main source of noise within the substation would be associated with the operation of a 132kV / 45MW power transformer. Whilst the transformer would typically generate low levels of noise, particularly overnight, it would be fan cooled, with the fans potentially operating during periods of high temperatures.

There are a number of noise sensitive properties surrounding the proposed solar farm that have the potential to be affected by noise attributable to the operation. Those identified and considered within this assessment are indicated on Figure 1.

4. Baseline Noise Assessment

4.1. Unattended Noise Surveys

Unattended noise surveys have been undertaken at six positions representative of the surrounding noise sensitive properties to establish the prevailing background noise levels over the periods the solar farm would be operational.

The survey was carried out between Thursday 29 September and Monday 10 October 2022.

Given that there have been no major changes in the surrounding area since the surveys were undertaken, noise levels monitored at the time are considered to be representative of the current baseline noise climate at the neighbouring noise sensitive properties.

Rion NL-52 Class 1 Sound Level Meters were used for the exercise, which were calibrated before and after the exercise using a Rion NC-74 Class 1 Acoustic Calibrator, with the instruments reading 94.0 dB on each occasion. All the instrumentation used had been laboratory calibrated within the past 12/24 months in accordance with national standards; copies of the calibration certificates can be provided upon request.

Measurements were made at the positions indicated on Figure 1.

At each position, the microphone was set free-field and at a height of 1.3 metres from the ground. The microphones were fitted with Rion WS-15 outdoor microphone protection to ensure Class 1 performance was maintained under a wide range of weather conditions.

The instruments were configured to monitor over 15-minute periods throughout the duration of the survey, in accordance with the requirements of BS 4142.

Each instrument had an audio recording option card installed, which enabled periodic audio snapshots of the noise environment to be captured, along with any particular activities giving rise to high noise levels, thus enabling particular sources to be identified.

The survey period was selected to ensure weather conditions remained favourable for undertaking environmental surveys. Conditions during the majority of the survey period remained generally dry, with light winds.

A summary of the weather conditions during the survey is provided below.

Date		Conditions	Wind Strength	Wind Direction
Thursday	29/9/22	Dry	Light	NNE / NNW
Friday	30/9/22	Period of rain during afternoon	Light - moderate	SSW
Saturday	1/10/22	Dry	Very Light	Variable
Sunday	2/10/22	Dry	Very Light	Variable
Monday	3/10/22	Dry	Very Light	Variable
Tuesday	4/10/22	Light rain shower pm	Light	SSW
Wednesday	5/10/22	Mainly dry	Light	WSW
Thursday	6/10/22	Dry	Very Light	SW
Friday	7/10/22	Mainly dry	Very Light	SW
Saturday	8/10/22	Dry	Very Light	Variable
Sunday	9/10/22	Dry	Very Light	Variable
Monday	10/10/22	Dry	Very Light	Variable

Table 4.1 Summary of Weather Conditions

The results of the noise monitoring exercise carried out at each location are summarised and discussed in the following sub-sections.

4.2. Results of Noise Monitoring Carried Out at Position 1 – St Mary’s Church (West)

The noise monitoring equipment at this location was positioned within the application site, located within the field directly to the east of St Mary’s Church. This position was considered representative of the noise environment at the church and within Llanwern to the west.

Noise levels monitored at this location were principally influenced by road traffic associated with vehicles travelling along the M4 to the north, livestock, and train movements on the railway line to the south.

The results of the noise monitoring at this location are provided within Appendix B.

To establish the typical background noise levels, a statistical analysis of the measured noise levels has been undertaken for the early morning, daytime and evening periods, when the solar panels would be operational.

The statistical analysis is presented in Appendix B, with the typical levels determined from the analysis provided below:

- Early Morning (05:30 – 07:00 hours) – 40 dB $L_{A90,15 \text{ min}}$;
- Daytime (07:00 – 19:00 hours) – 39 dB $L_{A90,15 \text{ min}}$;
- Evening (19:00 – 23:00 hours) – 38 dB $L_{A90,15 \text{ min}}$.

4.3. Results of Noise Monitoring Carried Out at Position 2 – Bishton Village Hall

The noise monitoring equipment at this location was positioned within the field to the north of Bishton Village Hall.

Noise levels monitored at this location were influenced by traffic on the M4 motorway, and movements on the railway line to the south.

The results of the noise monitoring at this location are provided within Appendix C.

To establish the typical background noise levels, a statistical analysis of the measured noise levels has been undertaken for the early morning, daytime and evening periods, when the solar panels would be operational.

The statistical analysis is presented in Appendix C, with the typical levels determined from the analysis provided below:

- Early Morning (05:30 – 07:00 hours) – 43 dB $L_{A90,15 \text{ min}}$;
- Daytime (07:00 – 19:00 hours) – 44 dB $L_{A90,15 \text{ min}}$;
- Evening (19:00 – 23:00 hours) – 38 dB $L_{A90,15 \text{ min}}$.

4.4. Results of Noise Monitoring Carried Out at Position 3 – Castle Farm

The noise monitoring equipment at this location was positioned within the fields to the south of Castle Farm.

Noise levels at this location were observed to be higher, with noise from the M4 more audible at this location.

The results of the noise monitoring at this location are provided within Appendix D.

To establish the typical background noise levels, a statistical analysis of the measured noise levels has been undertaken for the early morning, daytime and evening periods, when the solar panels would be operational.

The statistical analysis is presented in Appendix D, with the typical levels determined from the analysis provided below:

- Early Morning (05:30 – 07:00 hours) – 39 dB $L_{A90,15 \text{ min}}$;
- Daytime (07:00 – 19:00 hours) – 41 dB $L_{A90,15 \text{ min}}$;
- Evening (19:00 – 23:00 hours) – 37 dB $L_{A90,15 \text{ min}}$.

4.5. Results of Noise Monitoring Carried Out at Position 4 – Underwood

The noise monitoring equipment at this location was positioned along the northern site boundary at a position representative of the properties within Underwood to the north.

Noise levels at this location were observed to be mainly influenced by the M4 traffic.

The results of the noise monitoring at this location are provided within Appendix E.

The statistical analysis of the background (L_{A90}) noise levels is presented in Appendix E, with the typical levels determined from the analysis provided below:

- Early Morning (05:30 – 07:00 hours) – 43 dB $L_{A90,15 \text{ min}}$;
- Daytime (07:00 – 19:00 hours) – 44 dB $L_{A90,15 \text{ min}}$;
- Evening (19:00 – 23:00 hours) – 41 dB $L_{A90,15 \text{ min}}$.

4.6. Results of Noise Monitoring Carried Out at Position 5 – Village Reen, Bishton

The noise monitoring equipment at this location was to the east of the properties along Village Reen, Bishton. The monitoring location was within the field adjacent to the properties.

Noise levels at this location were noted to be influenced by M4 traffic and train movements along the railway line. There was also activity within the neighbouring fields during the survey period, including hedge trimming and excavation of the ditches, that generated higher noise levels for short durations during the survey period.

The results of the noise monitoring at this location are provided within Appendix F.

The statistical analysis of the background (L_{A90}) noise levels is presented in Appendix F, with the typical levels determined from the analysis provided below:

- Early Morning (05:30 – 07:00 hours) – 42 dB $L_{A90,15 \text{ min}}$;
- Daytime (07:00 – 19:00 hours) – 43 dB $L_{A90,15 \text{ min}}$;
- Evening (19:00 – 23:00 hours) – 37 dB $L_{A90,15 \text{ min}}$.

4.7. Results of Noise Monitoring Carried Out at Position 6 – Ty Newydd

The noise monitoring equipment at this location was positioned along the eastern site boundary, at a position representative of the properties to the east, Ty Newydd

Noise levels at this location were noted to be influenced by a mix of M4 traffic and train movements along the railway line.

The results of the noise monitoring at this location are provided within Appendix G.

The statistical analysis of the background (L_{A90}) noise levels is presented in Appendix G, with the typical levels determined from the analysis provided below:

- Early Morning (05:30 – 07:00 hours) – 44 dB $L_{A90,15 \text{ min}}$;
- Daytime (07:00 – 19:00 hours) – 45 dB $L_{A90,15 \text{ min}}$;
- Evening (19:00 – 23:00 hours) – 40 dB $L_{A90,15 \text{ min}}$.

5. Calculation and Assessment of Noise from the Operation of the Solar Farm

5.1. Proposed Plant and Equipment

The solar panels would be connected to a number of string inverters that would be distributed across the site at positions where appropriate connections could be made to the solar arrays. The string inverters would be mounted at the end of the rows of solar panels and positioned beneath the panels. The inverters would be connected to a number of Transformer stations that would be distributed around the site.

For the purposes of this assessment, the string inverters have been distributed around the site, with the Transformer stations positioned as indicated on Figure 2. The positions for the string inverters would be finalised during the detailed design stage.

During peak daytime periods, the string inverter fans would operate up to their highest speed, with the operation of the fans during the early morning and evening periods lower, as the solar generation and ambient temperatures would be lower.

In addition, there would be a substation, located within the southern area of the site. The substation would house the main DNO transformer.

Unmitigated source term noise levels for the proposed plant have been obtained from manufacturers' specifications and are provided in Table 5.1 below.

Plant	Sound Power Level SWL [dB(A)]	Octave Band Sound Power Level SWL [dB]						
		63	125	250	500	1k	2k	4k
String Inverter Daytime	82	87	77	79	84	73	70	69
String Inverter Early / Evening	75	80	70	72	77	66	63	62
Transformer Station	70	67	80	76	66	56	42	39
DNO Transformer	90	83	101	95	85	74	61	58

Table 5.1 Source Term Noise Levels

5.2. Calculation of Noise Levels

As indicated above, the main noise generating elements of the proposed development would be attributable to the operation of the string inverters, transformer stations and substation.

Calculations of the noise levels attributable to the operation of the site have been made using the SoundPlan computer modelling package, which implements the calculation methodology from ISO 9613-2:2024.

The modelling has assumed the following parameters:

- ground absorption across the surrounding fields assumed to be soft ($G=1$);
- temperature 20°C
- pressure 1013 mbar;
- relative humidity 50%;

- meteorological conditions (Cmet) = 0;
- inclusion of the solar panels as reflective noise barriers, placed 1 metre off the ground and 2m in height.

Calculations have been prepared on the basis of all plant fully operational for early morning, day and evening periods, which represents the likely worst-case conditions during the peak daytime periods.

The operation of the cooling fans within the plant and equipment are temperature controlled. During the early morning periods, when temperatures are lower and solar energy low, it is less likely that the fans would need to operate and if so, they would only operate at very low speed, thus generating lower levels of noise. The fans would be most likely to operate at full speed during the mid-part of the day when the sun is at its highest level and thus generating the maximum energy. During the evening periods, the output from the solar panels would reduce as the sun sets and thus the requirement for the cooling fans to operate would gradually reduce later into the evening. As indicated previously, there would be no requirement for the fans on the solar inverters to operate overnight, during hours of darkness.

Noise levels have been calculated on the basis of the site layout indicated on Figure 2.

Figures 3 and 4 present the calculated worst case operational noise levels for the early morning / evening periods and the daytime periods. The results are presented in graphical format and additionally provide the calculated façade noise levels in numerical form at the properties potentially most likely to be affected by the operation of the solar farm. The calculated noise levels at the potentially most affected properties are additionally summarised in Table 5.2 below.

Location	Calculated Façade Noise Level at First Floor Level [dB L _{Aeq,T}]	
	Early Morning / Evening	Daytime
St Mary's Church	17	24
Llanwern Village	17	22
Bishton (South)	28	35
Bishton (Central)	31	38
Bishton (Castle Farm)	30	37
Underwood	13	18
Village Reen, Bishton	29	35
Ty Newydd	24	31

Table 5.2 Noise Levels Generated by Operation of Proposed Solar Farm

5.3. Assessment Criteria

As indicated previously, background noise levels in the vicinity are mainly influenced by the traffic using the M4 motorway to the north of the site, with traffic noise audible throughout the day and night-time periods.

The solar panels and inverters would only be operational during daylight hours, potentially between 05:30 – 22:00 hours during summer months.

To provide a worst-case assessment therefore, the noise levels attributable to the full daytime operation have been assessed for daytime, early morning (05:30 – 07:00 hours) and evening (19:00 – 22:00 hours) periods.

BS 4142 advises that the significance of sound of an industrial / commercial nature depends upon both the margin by which the rating level of noise exceeds the background noise levels and the context in which the sound occurs.

An initial estimate of the potential impacts associated with the operation of the proposed solar farm has been made in accordance with the guidance within BS 4142 by subtracting the measured background noise levels from the calculated rating level of noise.

BS 4142 advises where the initial assessment needs to be modified due to the context, all pertinent factors should be taken into consideration. This includes the absolute levels of noise and in situations where background and rating levels are low, as at this site, the absolute noise levels might be as, or more, appropriate, rather than by the amount the rating level exceeds the background noise levels, which is especially true at night.

For night-time noise, which is relevant to the early morning periods, consideration has therefore also been given to absolute noise level criteria contained within BS 8233 and by the WHO, which provides guidance on absolute noise levels to ensure potential adverse impacts are minimised.

BS 8233 advises for steady state external noise sources, such as those associated with the operation of the solar farm, it is desirable that the internal ambient noise level does not exceed a level of 35 dB $L_{Aeq,16\text{ hour}}$ during the daytime period within living rooms and bedrooms and 30 dB $L_{Aeq,8\text{ hour}}$ within bedrooms at night. On the basis of an open window typically providing a sound reduction of between 10 – 15 dB(A), equivalent external levels below 45 dB $L_{Aeq,16\text{ hour}}$ daytime and 40 dB $L_{Aeq,8\text{ hour}}$ night-time, would ensure an acceptable noise environment was maintained within the surrounding properties.

Additionally, for steady state noise, the WHO night-noise guidance advises that an external level of 40 dB $L_{Aeq,8\text{ hour}}$ represents the Lowest Observed Adverse Effect Level (LOAEL) overnight, which is equivalent to the BS 8233 guidance for night noise, assuming an open window. The guidance advises a level of 30 dB $L_{Aeq,8\text{ hour}}$ externally would represent the No Observed Effects Level (NOEL).

5.4. Assessment

As indicated previously, noise would only be generated from the operation of the inverters associated with the solar panels during daylight hours, when the panels are producing electricity.

As discussed, the highest noise levels that have been calculated would only occur during the mid-daytime periods whilst the solar panels were operating at full capacity, thus an assessment based upon the peak operating conditions for the plant represents worst-case conditions, particularly during the early morning and evening periods.

With the exception of areas very close to the inverters (typically, within 25 metres), where high frequency noise from the operation of the inverters is likely to be clearly audible, the noise generated by the inverters would be principally associated with the operation of the cooling fans, which generate broadband noise. At the large distances between the inverters and neighbouring properties, any high frequency components of the noise would be effectively mitigated, as the higher frequencies attenuate at a higher rate over distance compared to lower frequencies.

The operation of the fans has a potential to generate noise that is characteristic in nature, compared to the existing noise environment. On this basis, a 3 dB other character correction has been applied when assessing the noise levels against the BS 4142 methodology to determine the rating level of noise.

Uncertainties in the calculations have been considered. Given that the assessment has been based upon all plant and equipment fully operational, which is considered unlikely, particularly during the most sensitive early morning periods, the calculations are likely to have overestimated the noise levels at the dwellings and thus cover any uncertainty in the noise levels attributable to the operation of the plant or within the calculation methodology. It is additionally noted that the source data used represents the maximum design level for the plant.

The calculated noise levels have been assessed against the guidance within BS 4142, BS 8233 and the WHO guidance to evaluate the likelihood of potential adverse effects.

The assessments of the noise levels at the potentially most affected dwellings are provided below. Noise levels at other surrounding properties would be lower and thus any potential for adverse impact at those properties would also be reduced.

St Mary's Church

St Mary's Church is only considered to be noise sensitive during the daytime periods, particularly when there is a service. Whilst an initial BS 4142 assessment has been prepared for the whole 24-hour period, consideration to the use has therefore been given when identifying potential adverse impacts.

The initial assessment is provided below.

	Assessment Period		
	Early Morning	Daytime	Evening
Specific Noise Level	17	24	17
Acoustic Feature Correction	3	3	3
Rating Level	20	27	20
Background Noise Level [dB L _{A90}]	40	39	38
Excess of Rating Over Background Level	-20	-12	-18
Likelihood of Impact	Indication of Low Impact	Indication of Low Impact	Indication of Low Impact

Table 5.3 BS 4142 Assessment – St Mary’s Church

The initial BS 4142 assessment above indicates that the noise levels attributable to the operation of the solar farm would be very low at the church. The operational noise levels would be at least 10 dB(A) below the prevailing background noise levels and thus the operation of the plant would be unlikely to be audible at the church.

On this basis the operation would not result in any adverse impact on the use of the church.

Llanwern Village

The initial BS 4142 assessment for this location is provided in the table below.

	Assessment Period		
	Early Morning	Daytime	Evening
Specific Noise Level	17	22	17
Acoustic Feature Correction	3	3	3
Rating Level	20	25	20
Background Noise Level [dB L _{A90}]	40	39	38
Excess of Rating Over Background Level	-20	-14	-18
Likelihood of Impact	Indication of Low Impact	Indication of Low Impact	Indication of Low Impact

Table 5.4 BS 4142 Assessment – Llanwern Village

Noise levels associated with the operation of the solar farm within this village would be very low, with the initial assessment indicating operational noise levels remaining at least 10 dB(A) below the prevailing background noise levels.

The operation of the solar farm would be highly unlikely to be audible within the village and therefore would not result in any adverse impacts.

Dwellings Within the Southern Part of Bishton Village

The initial BS 4142 assessment for this location is provided in the table below.

	Assessment Period		
	Early Morning	Daytime	Evening
Specific Noise Level	28	35	28
Acoustic Feature Correction	3	3	3
Rating Level	31	38	31
Background Noise Level [dB L _{A90}]	43	44	38
Excess of Rating Over Background Level	-12	-6	-6
Likelihood of Impact	Indication of Low Impact	Indication of Low Impact	Indication of Low Impact

Table 5.5 BS 4142 Assessment – Bishton (South)

Noise levels attributable to the operation of the solar farm at this location would remain very low, with the assessment above indicating operational noise levels at least 6 dB(A) below the prevailing background noise levels and thus below a level which would result in adverse noise effects.

Noise levels at the properties within this part of the village would therefore remain acceptable and ensure any potential adverse noise impacts were minimised.

Dwellings Within the Central Part of Bishton Village

The initial BS 4142 assessment for this location is provided in the table below.

	Assessment Period		
	Early Morning	Daytime	Evening
Specific Noise Level	31	38	31
Acoustic Feature Correction	3	3	3
Rating Level	34	41	34
Background Noise Level [dB L _{A90}]	39	41	37
Excess of Rating Over Background Level	-5	0	-3
Likelihood of Impact	Indication of Low Impact	Indication of Low Impact	Indication of Low Impact

Table 5.6 BS 4142 Assessment – Bishton (Central)

Noise levels attributable to the operation of the solar farm at this location are not anticipated to exceed the prevailing background noise levels during the peak daytime period and would remain below the background noise levels during the early morning and evening periods.

Consideration would be given during the detailed design stage to ensure that the string inverters are placed as far from the neighbouring properties as possible. This would seek to ensure noise levels are reduced further, compared to those assessed on the basis of the illustrative layout at this stage.

Noise levels at the properties within this part of the village would therefore remain acceptable and ensure any potential adverse noise impacts were minimised.

Dwellings Within the Northern Part of Bishton Village (Castle Farm)

The initial BS 4142 assessment for these properties, based upon the highest noise levels calculated is provided in the table below.

	Assessment Period		
	Early Morning	Daytime	Evening
Specific Noise Level	30	37	30
Acoustic Feature Correction	3	3	3
Rating Level	33	40	33
Background Noise Level [dB L _{A90}]	39	41	37
Excess of Rating Over Background Level	-6	-1	-4
Likelihood of Impact	Indication of Low Impact	Indication of Low Impact	Indication of Low Impact

Table 5.7 BS 4142 Assessment – Bishton Village (North)

Noise levels attributable to the operation of the solar farm are not anticipated to exceed the prevailing background noise levels at this location throughout the day, indicating a low potential for adverse noise impacts.

The noise modelling indicates that the string inverters would be the main source of noise at this location and consideration would be given during the detailed design stage to ensure that the string inverters are placed as far from the neighbouring properties as possible. This would seek to ensure noise levels are reduced further, compared to those assessed on the basis of the illustrative layout at this stage.

Noise levels at these properties would therefore remain acceptable and ensure any potential adverse noise impacts were minimised.

Dwellings Within Underwood

These properties are some distance from the solar farm and are close to the M4 motorway. Consequently, the background noise levels at this location are relatively high both throughout the day and night-time periods. The initial BS 4142 assessment for this location is provided in the table below.

	Assessment Period		
	Early Morning	Daytime	Evening
Specific Noise Level	13	18	13
Acoustic Feature Correction	3	3	3
Rating Level	16	21	16
Background Noise Level [dB L _{A90}]	43	44	41
Excess of Rating Over Background Level	-27	-23	-25
Likelihood of Impact	Indication of Low Impact	Indication of Low Impact	Indication of Low Impact

Table 5.8 BS 4142 Assessment – Underwood

Noise levels attributable to the operation of the solar farm at this location would be very low, with the assessment above indicating the operational noise levels remaining at least 23 dB(A) below the prevailing background noise levels.

The operation of the solar farm would not be audible within Underwood and would therefore not result in any adverse impacts.

Dwellings Along Village Reen, Bishton

The initial BS 4142 assessment for these properties, based upon the highest noise levels calculated is provided in the table below.

	Assessment Period		
	Early Morning	Daytime	Evening
Specific Noise Level	29	36	29
Acoustic Feature Correction	3	3	3
Rating Level	32	39	32
Background Noise Level [dB L _{A90}]	42	43	37
Excess of Rating Over Background Level	-10	-4	-5
Likelihood of Impact	Indication of Low Impact	Indication of Low Impact	Indication of Low Impact

Table 5.9 BS 4142 Assessment – Village Reen, Bishton

The assessment of noise levels attributable to the operation of the solar farm above indicates operational noise levels remaining at least 4 dB(A) below the prevailing background noise levels, with the assessment indicating a low potential for adverse impacts.

Noise levels at these properties would therefore remain acceptable and ensure any potential adverse noise impacts were minimised.

Ty Newydd

These properties are located to the east of the solar farm. The initial BS 4142 assessment for these properties is provided in the table below.

	Assessment Period		
	Early Morning	Daytime	Evening
Specific Noise Level	24	31	24
Acoustic Feature Correction	3	3	3
Rating Level	24	34	27
Background Noise Level [dB L _{A90}]	44	45	40
Excess of Rating Over Background Level	-20	-11	-13
Likelihood of Impact	Indication of Low Impact	Indication of Low Impact	Indication of Low Impact

Table 5.10 BS 4142 Assessment – Ty Newydd

Noise levels attributable to the solar farm at these properties would remain low, with operational noise levels remaining at least 10 dB(A) below the prevailing background noise levels. On this basis, noise attributable to the operation of the solar farm would be inaudible at these properties.

On this basis, the operation of the plant and equipment within the solar farm would not result in any adverse noise impacts at these properties.

6. Summary

LF Acoustics Ltd have been appointed by RWE Renewables UK Solar and Storage Limited to undertake an operational noise assessment for the proposed Craig Y Perthi Solar Farm.

RWE Renewables UK ('the Applicant'), a part of the RWE Group, is proposing to develop a solar farm and associated development ('the Proposed Development') on land to the east of Newport near the Craig Y Perthi Wood and the village of Bishton. The site is west of the Magor Brewery, south of the M4 motorway, northwest of the Tesco Distribution centre, and north of Llanwnern steelworks, separated by the South Wales Main Line.

Baseline noise monitoring has been carried out at several locations around the site at positions representative of the neighbouring noise sensitive properties to establish the prevailing background noise levels for the daylight periods upon which the assessment has been based.

This report has presented calculations and an assessment of the likely worst-case noise levels to be generated by the operation of the plant and equipment to be located around the site.

The calculated noise levels have been assessed against relevant standards and guidance, to ensure that the operation of the plant does not result in occupants of nearby properties being unacceptably affected by levels of noise.

The assessment concluded that the operation of the solar farm would generate low noise levels at surrounding properties throughout the day. An assessment of the noise levels against the requirements of BS 4142 concluded that the operation would result in a low potential for adverse impact, with noise levels remaining below the prevailing background noise levels at neighbouring properties. The operation of the solar farm would therefore not result in a potential for any adverse noise impacts at the neighbouring properties.

References

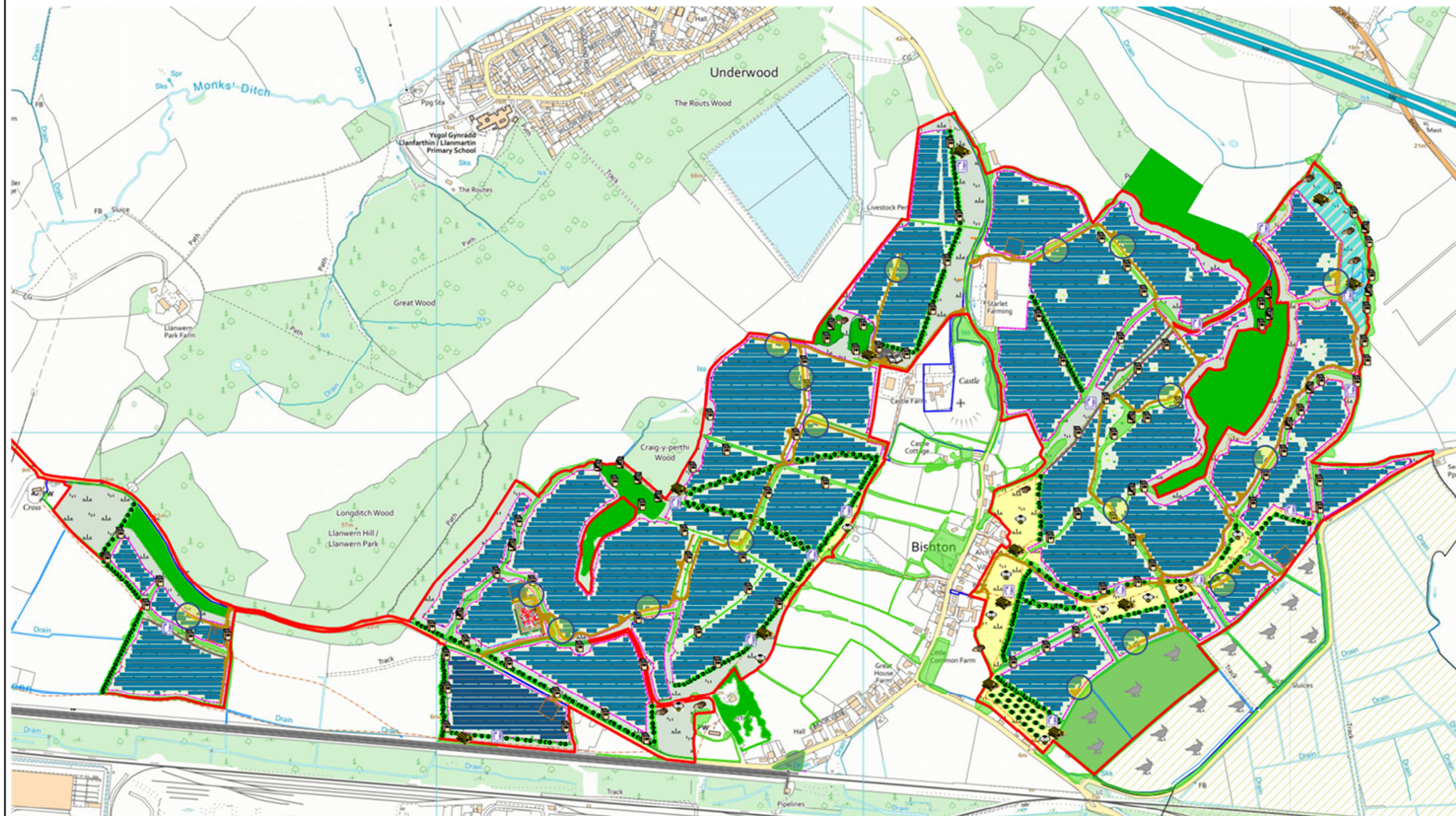
1. Welsh Government. Planning Policy Wales. Edition 12. February 2024.
2. Welsh Government. Planning Guidance (Wales). Technical Advice Note (Wales) 11, Noise – October 1997.
3. British Standards Institute. Methods for Rating and Assessing Industrial and Commercial Sound. BS 4142:2014 +A1:2019.
4. British Standards Institute. Guidance on Sound Insulation and Noise Reduction in Buildings. BS 8233: 2014.
5. World Health Organisation. Guidelines for Community Noise. 1999. WHO Geneva.
6. World Health Organisation. Night Noise Guidelines for Europe. 2009.

Figures



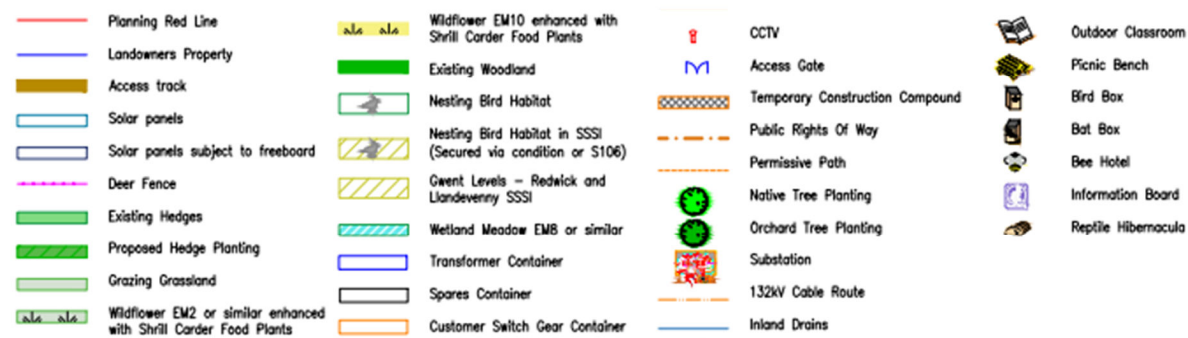
-  Noise Sensitive Receptors
-  Unattended Noise Survey Position

Figure 1:
Site Location and Noise
Monitoring Positions



Position of Transformer Stations

Figure 2:
Layout Plan





Noise Level $L_{Aeq,T}$
in dB(A)

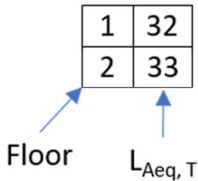
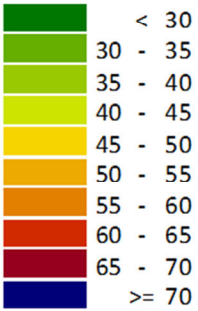
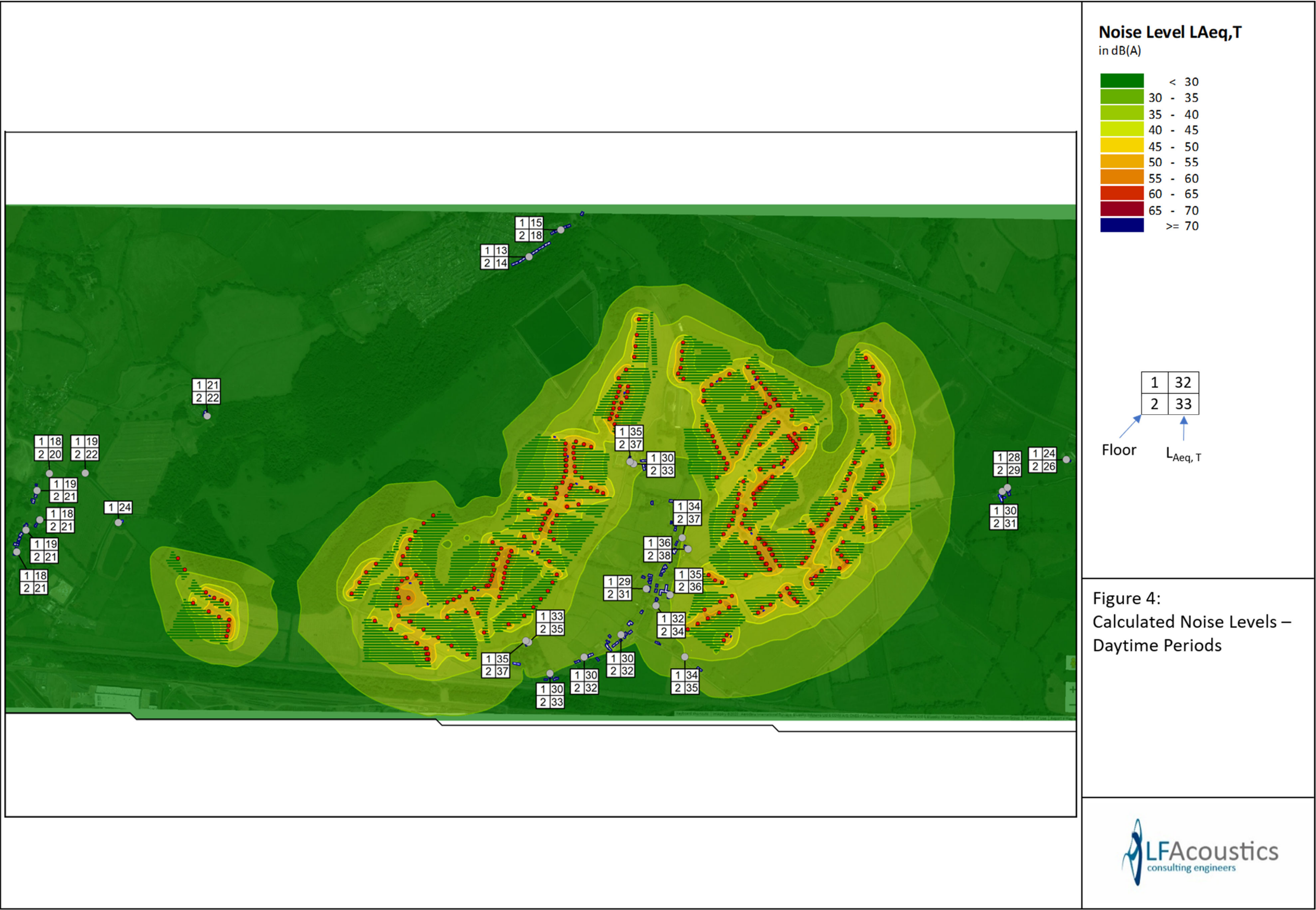


Figure 3:
Calculated Noise Levels –
Early Morning / Evening
Periods



Appendix A

Noise Units

Decibels (dB)

Noise can be defined as unwanted sound. Sound in air can be considered as the propagation of energy through the air in the form of oscillatory changes in pressure. The size of the pressure changes in acoustic waves is quantified on a logarithmic decibel (dB) scale firstly because the range of audible sound pressures is very great, and secondly because the loudness function of the human auditory system is approximately logarithmic.

The dynamic range of the auditory system is generally taken to be 0 dB to 140 dB. Generally, the addition of noise from two sources producing the same sound pressure level, will lead to an increase in sound pressure level of 3 dB. A 3 dB noise change is generally considered to be just noticeable and a 10 dB change is generally accepted as leading to the subjective impression of a doubling or halving of loudness. A 5 dB change is generally considered to be clearly discernible.

A-weighting

The bandwidth of the frequency response of the ear is usually taken to be from about 18 Hz to 18,000 Hz. The auditory system is not equally sensitive throughout this frequency range. This is taken into account when making acoustic measurements by the use of A-weighting, a filter circuit which has a frequency response similar to the human auditory system.

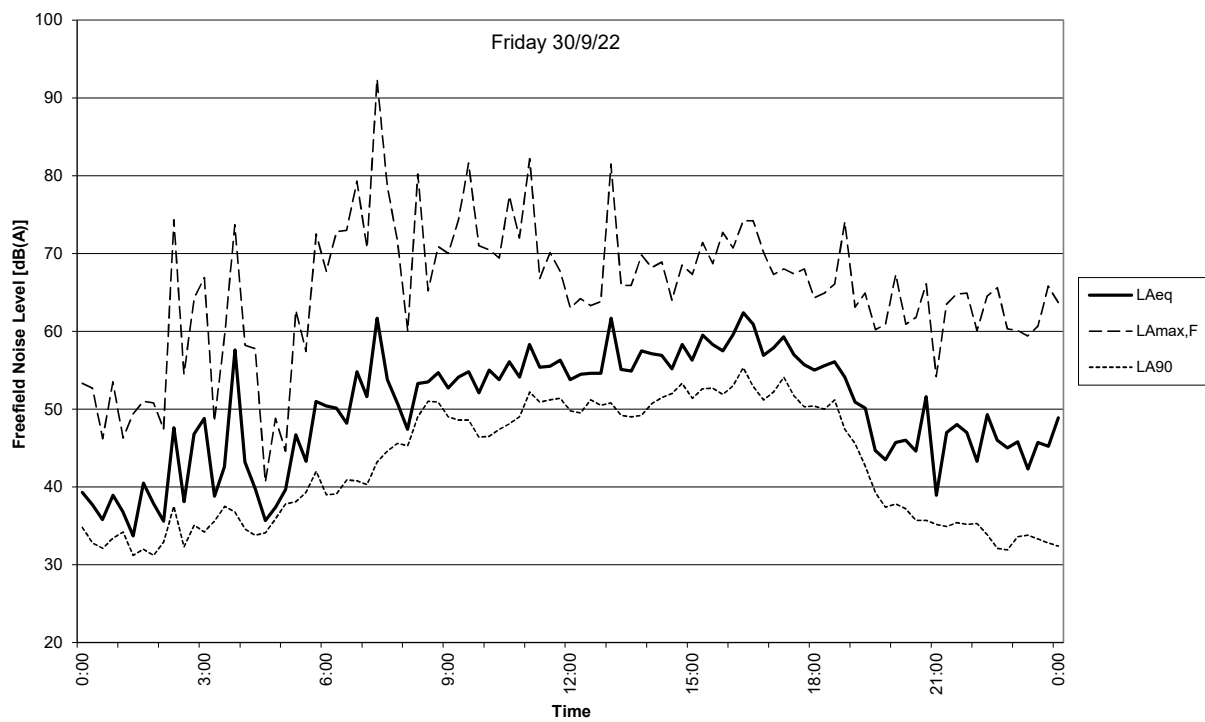
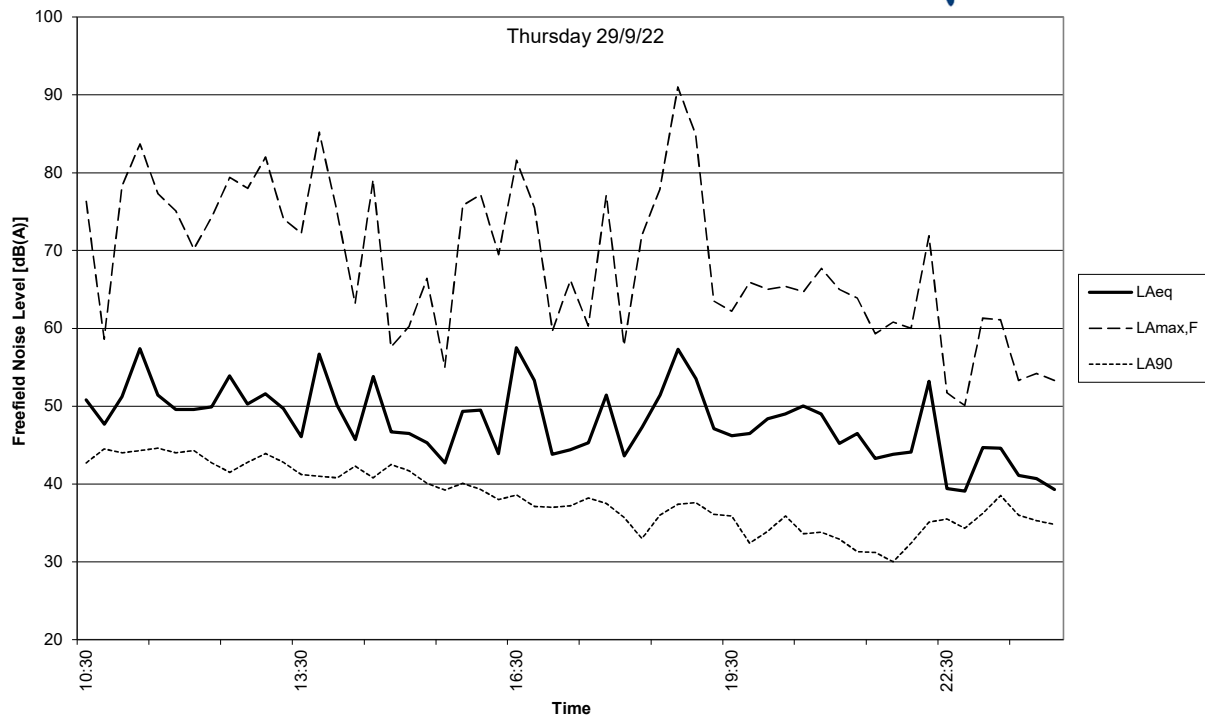
Units Used to Describe Noises Which Change Their Level with Time

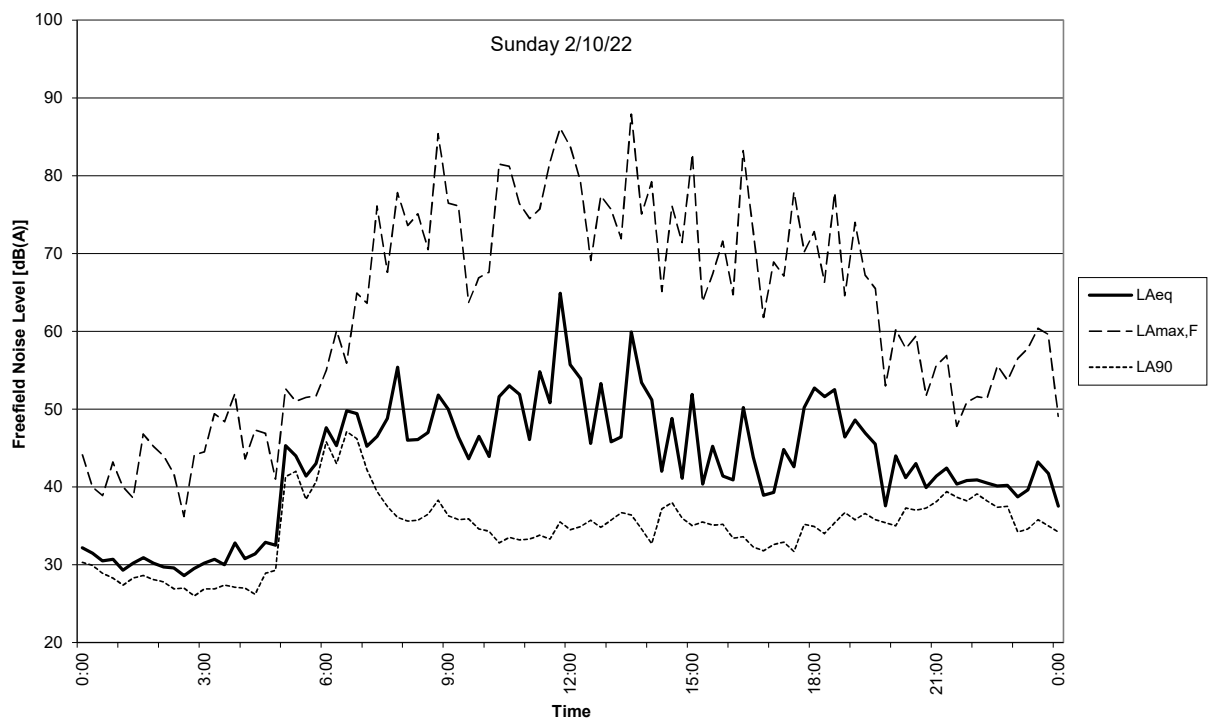
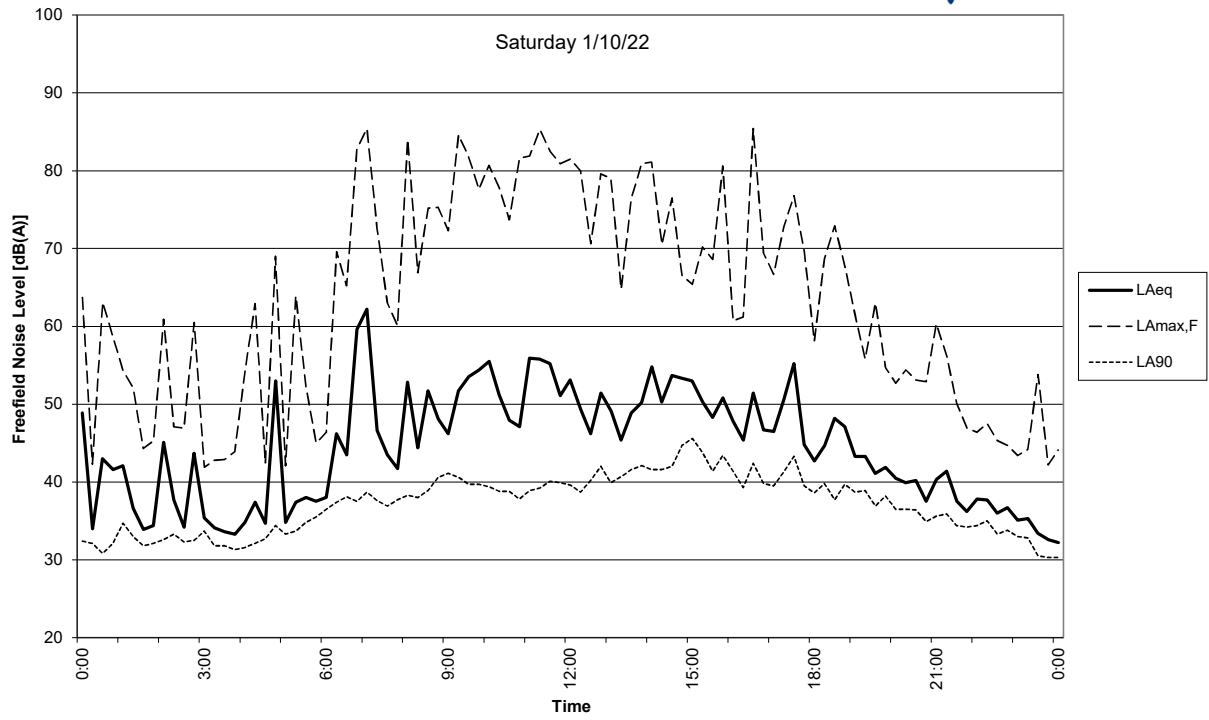
The Equivalent Continuous A-Weighted Sound Pressure Level ($L_{Aeq,T}$) is the principal measurement index for environmental noise. The $L_{Aeq,T}$ is defined as the A-weighted sound pressure level of the steady sound which contains the same acoustic energy as the noise being assessed over a specific time period, T.

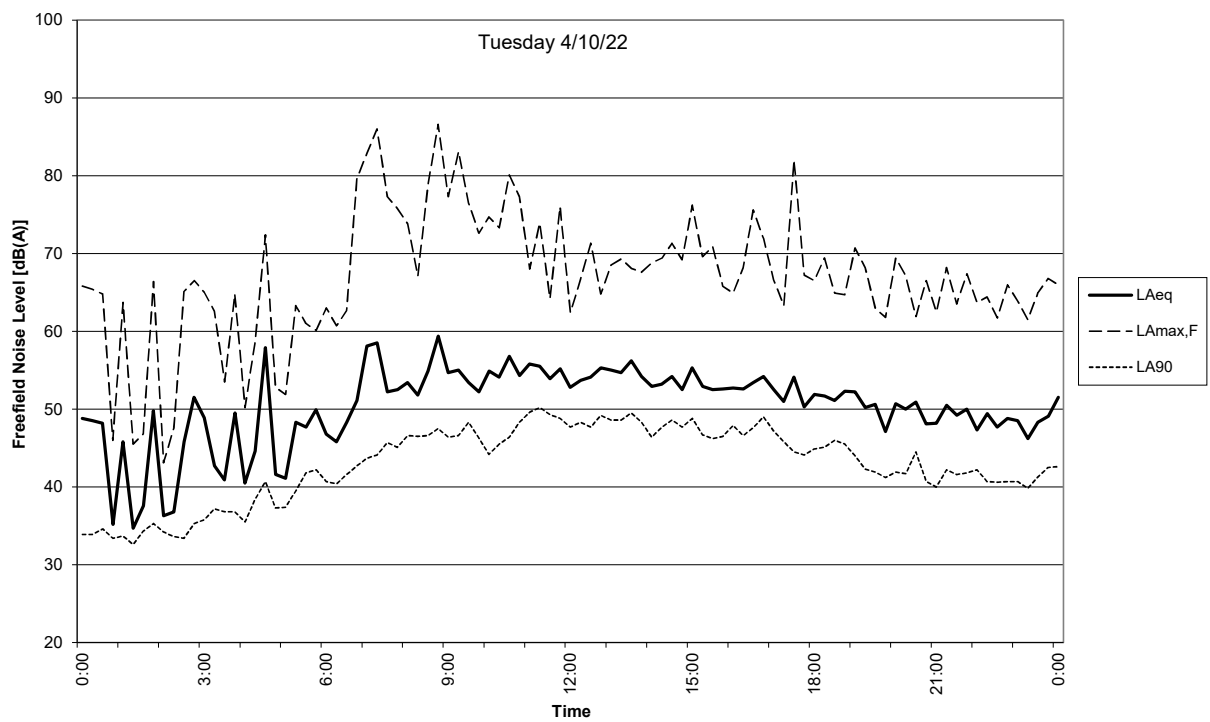
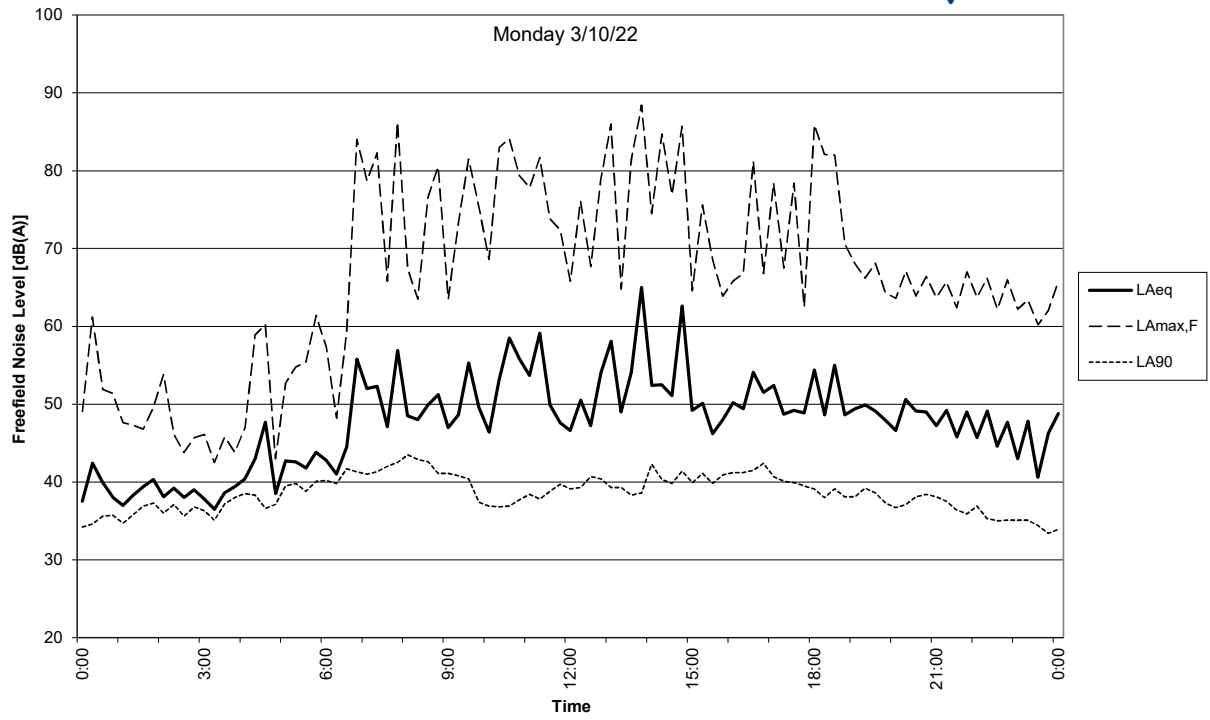
The L_{A90} is the noise level exceeded for 90% of the measurement period. It is generally used to quantify the background noise level, the underlying level of noise which is present even during the quieter parts of the measurement period.

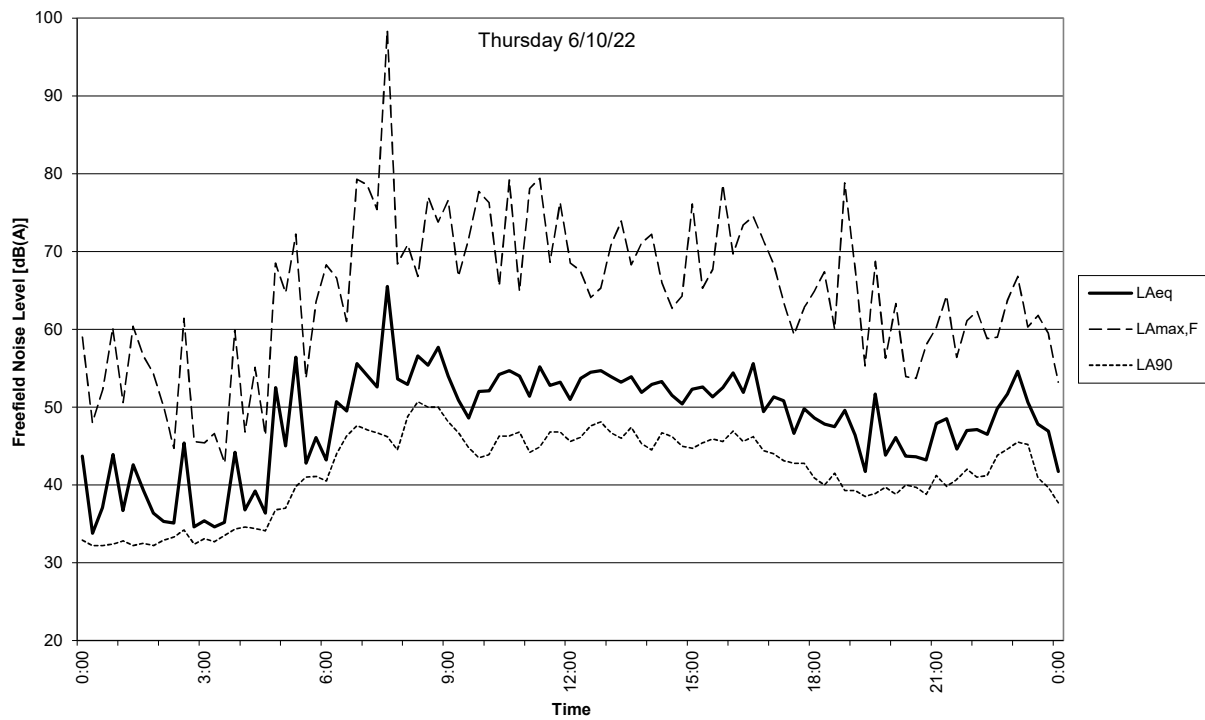
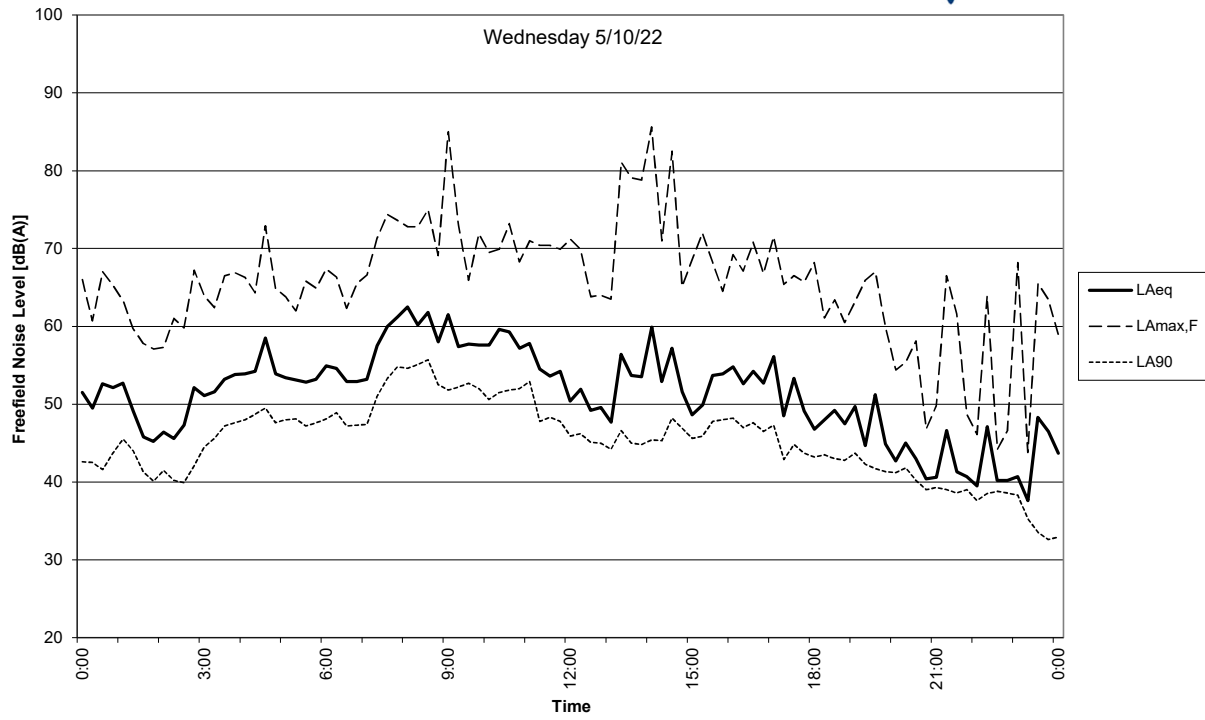
The L_{Amax} is the single maximum value that the A-weighted sound pressure level reaches during a measurement period. $L_{Amax F}$, or Fast, is averaged over 0.125 of a second and $L_{Amax S}$, or Slow, is averaged over 1 second. The measured L_{Amax} noise levels in this assessment are Fast.

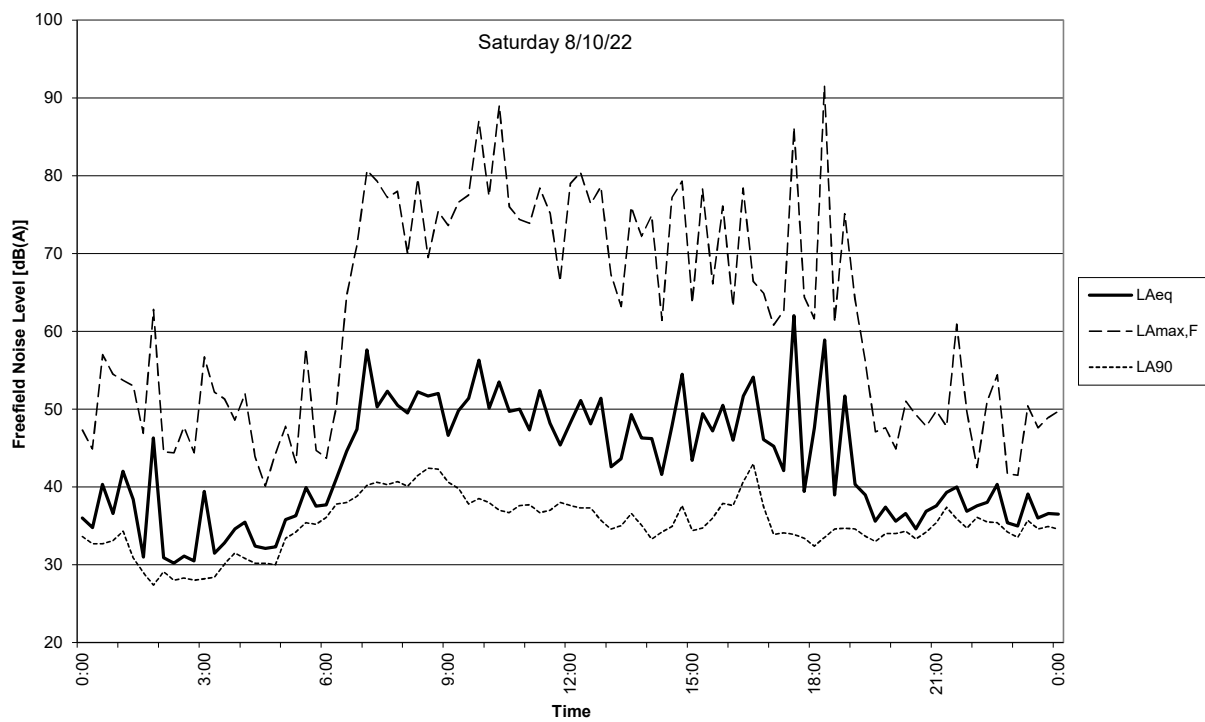
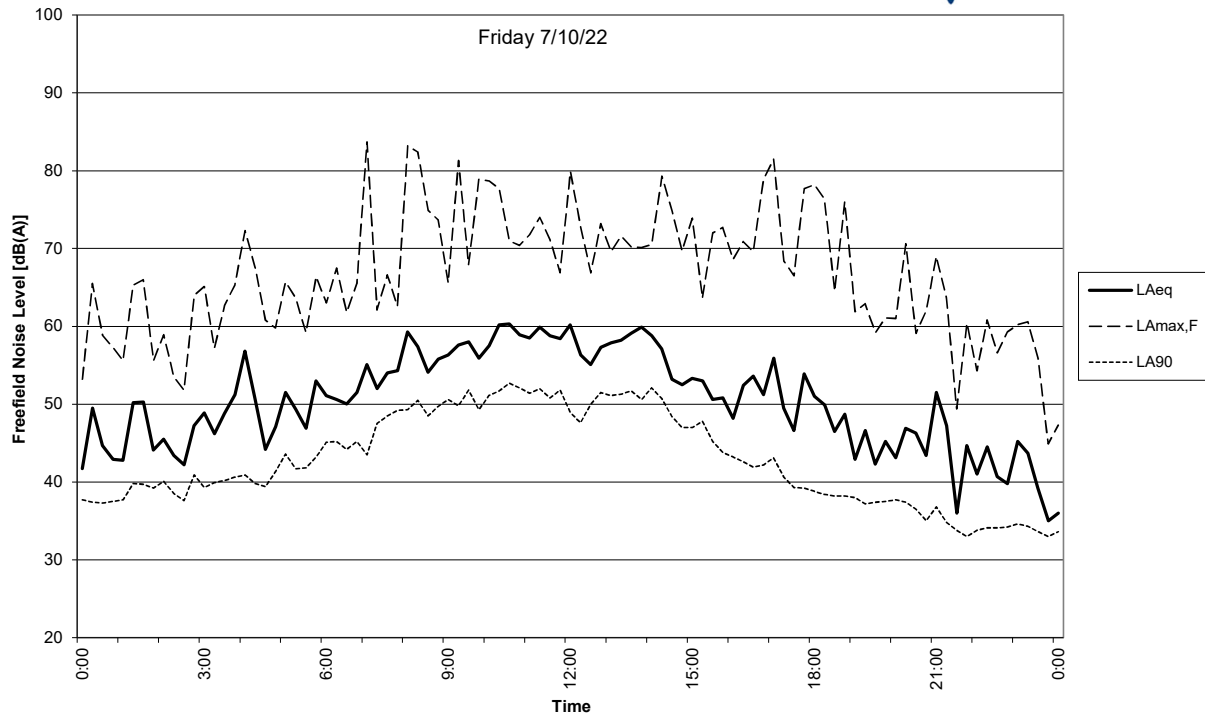
Appendix B
Results and Analysis of Noise Monitoring
at Position U1 – St Mary’s Church

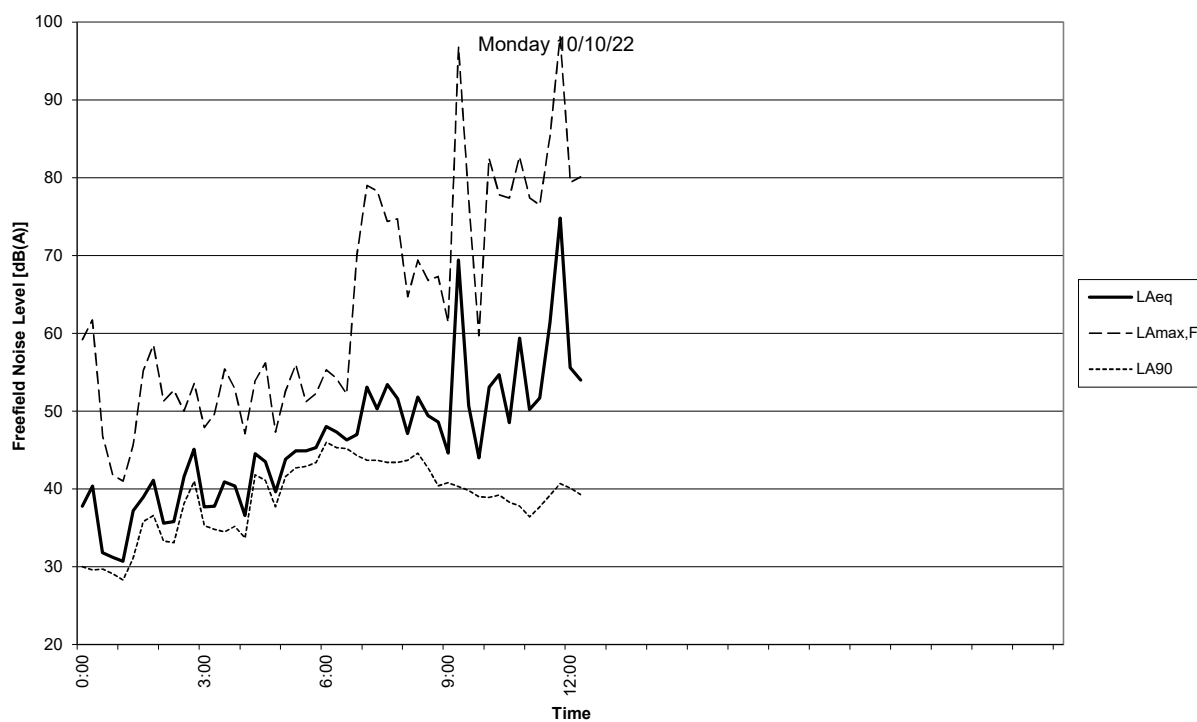
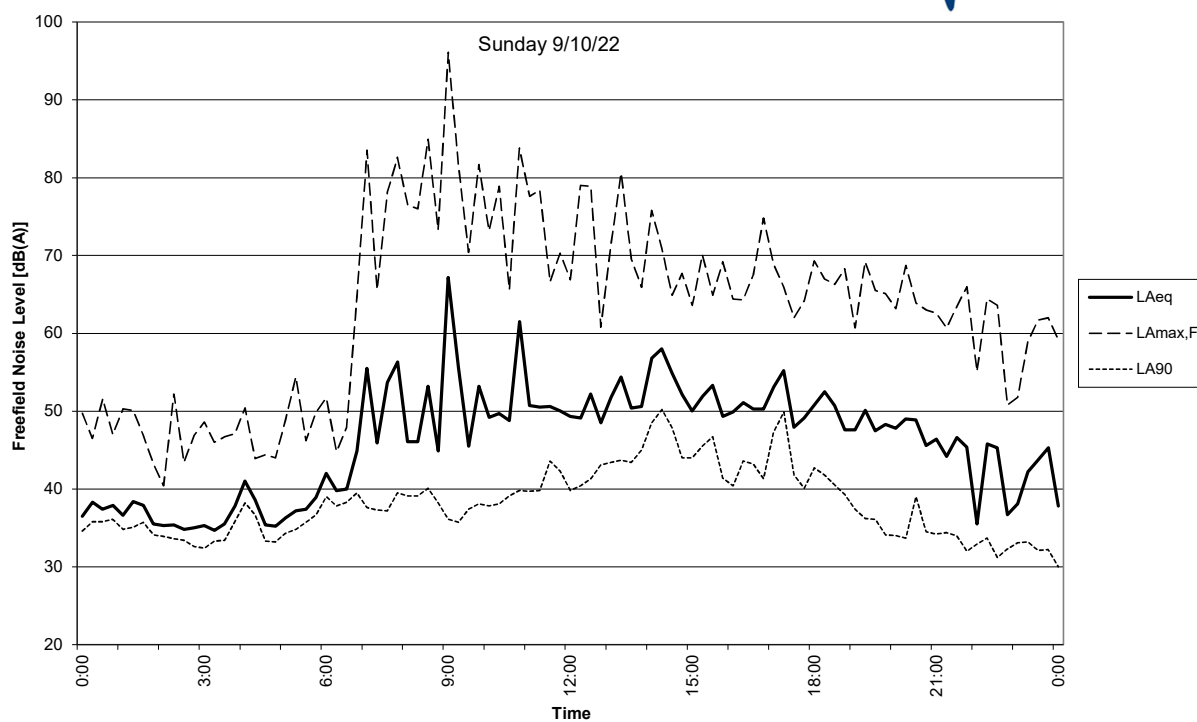


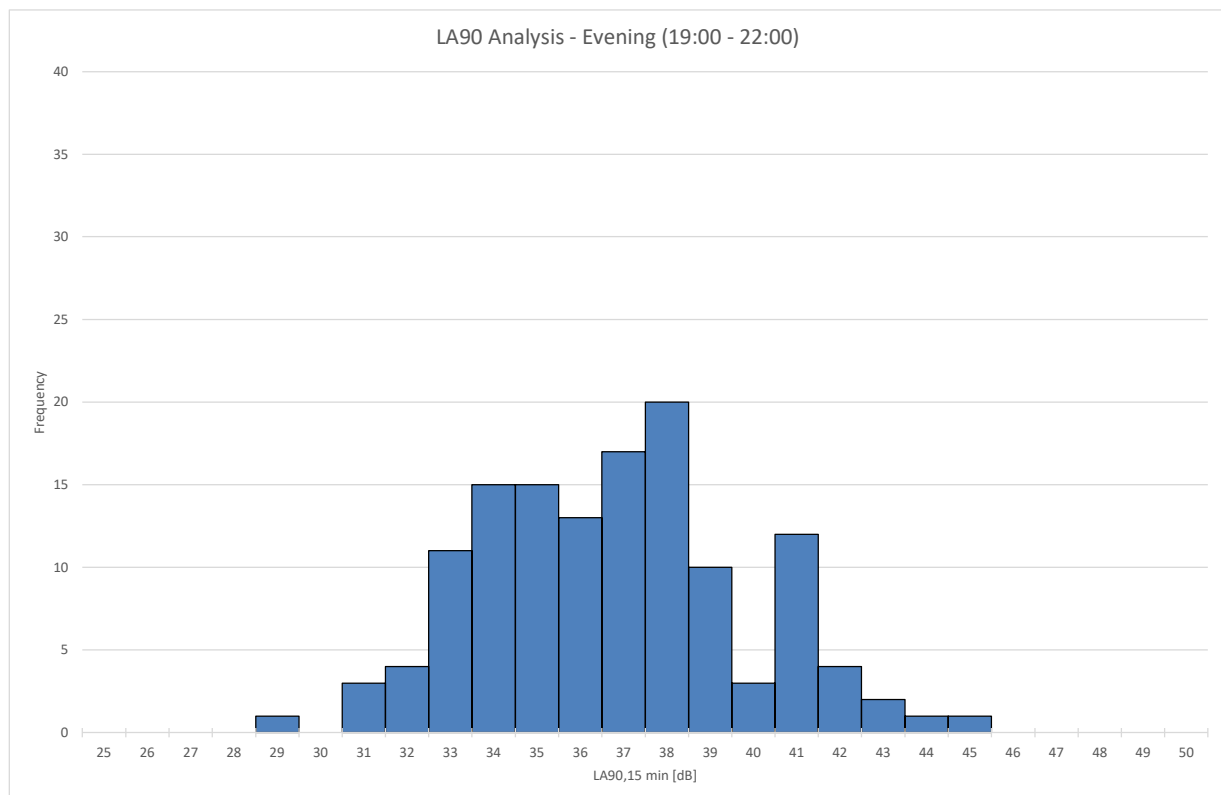
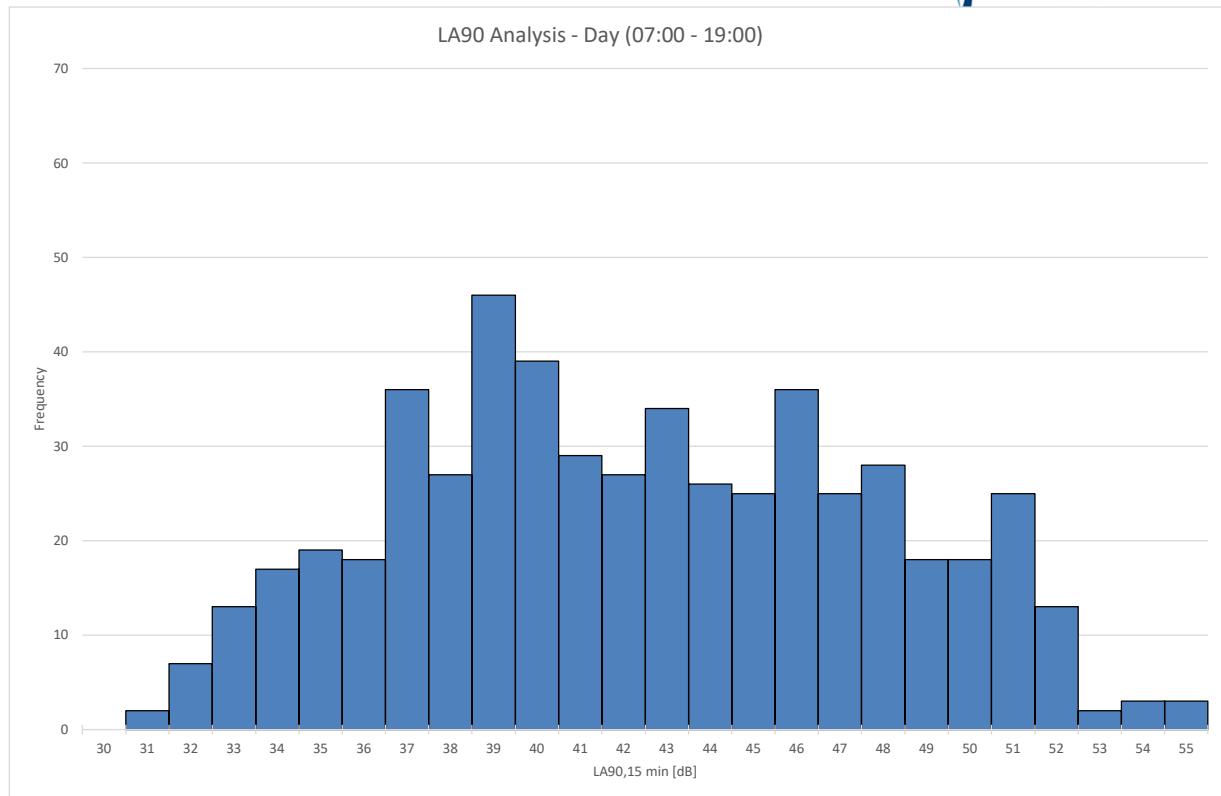


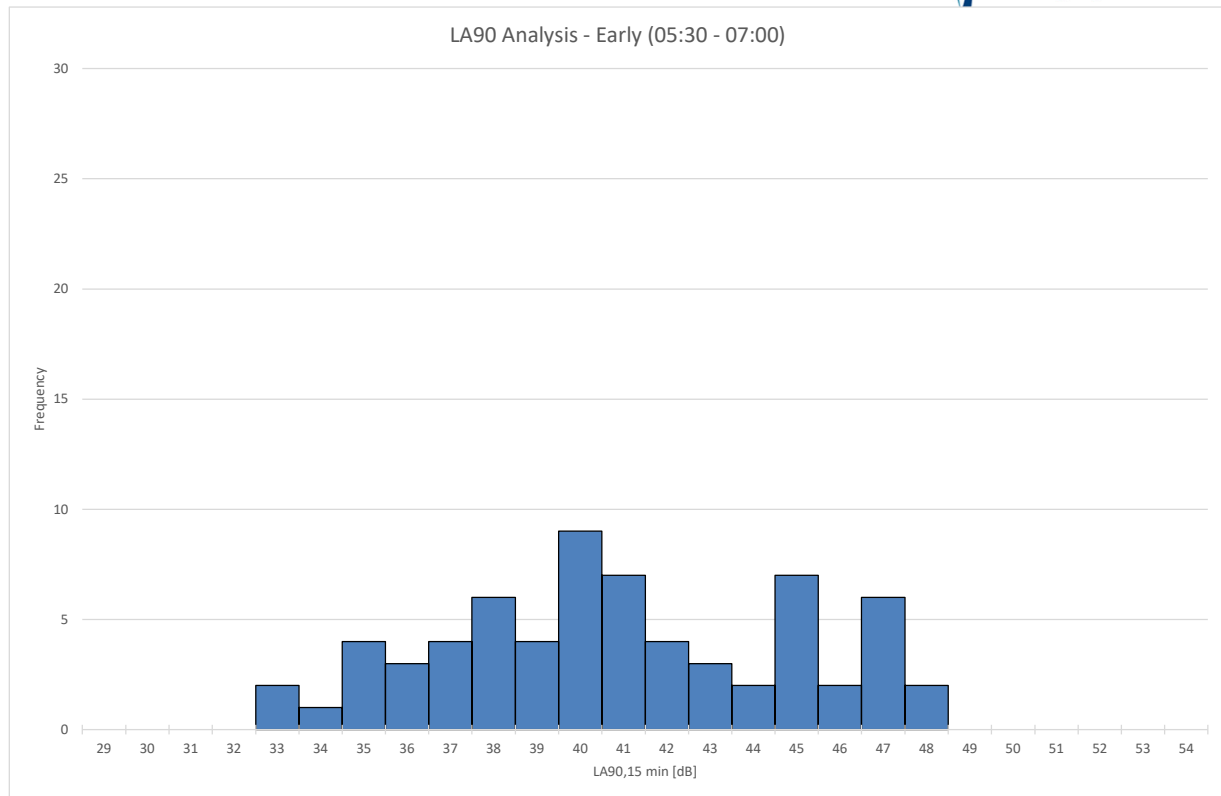




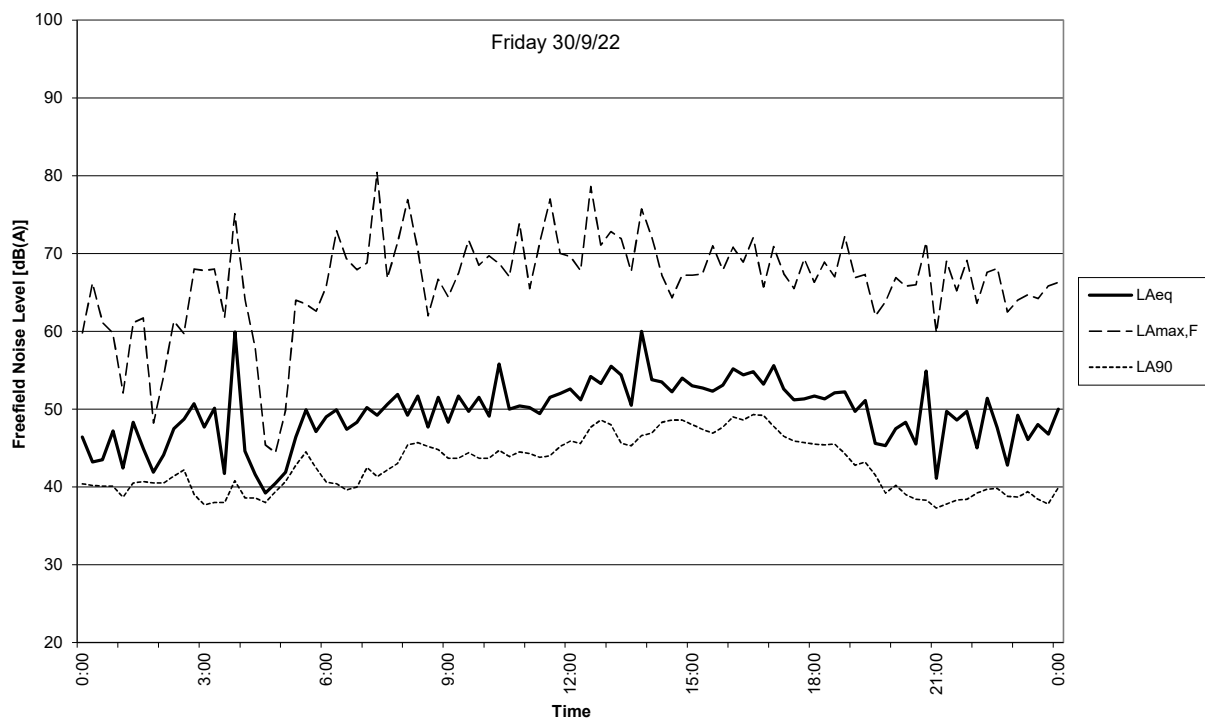
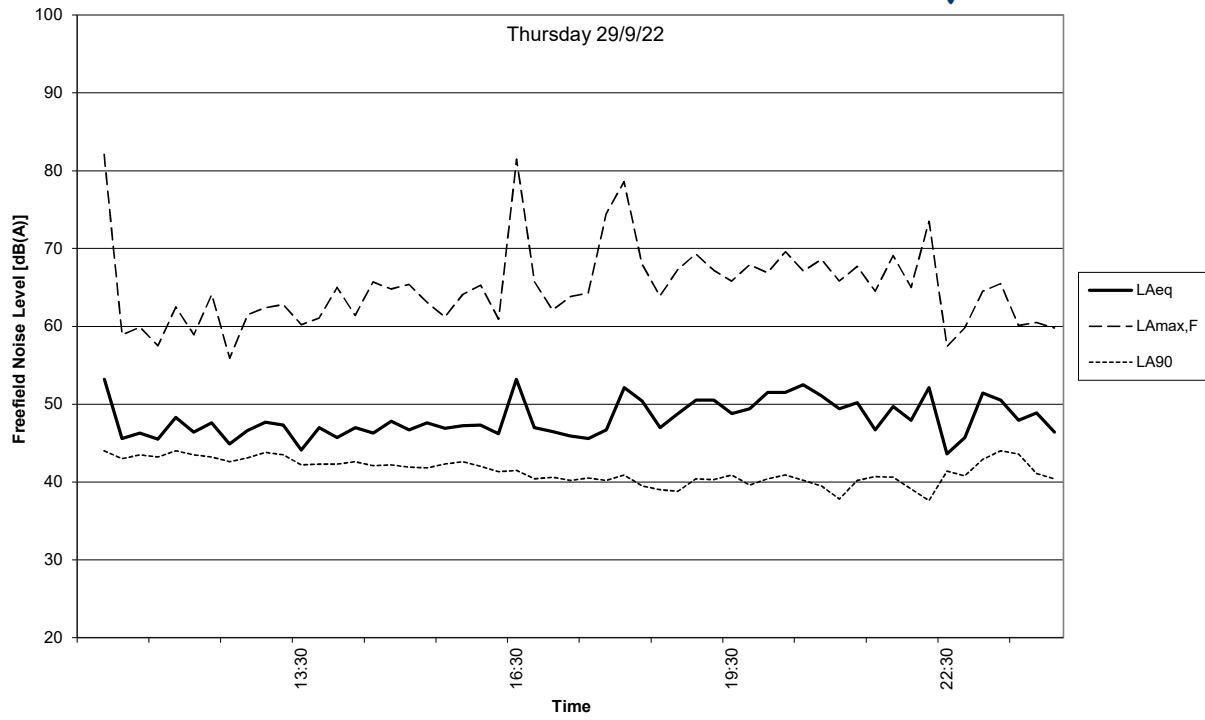


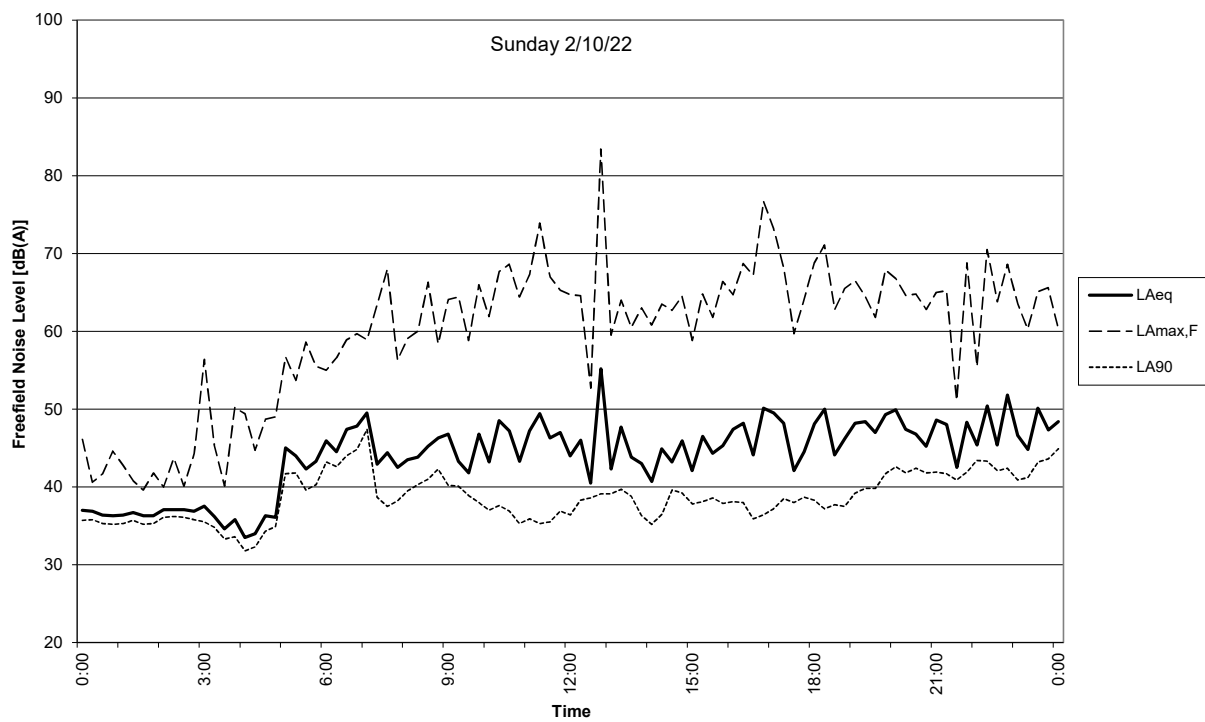
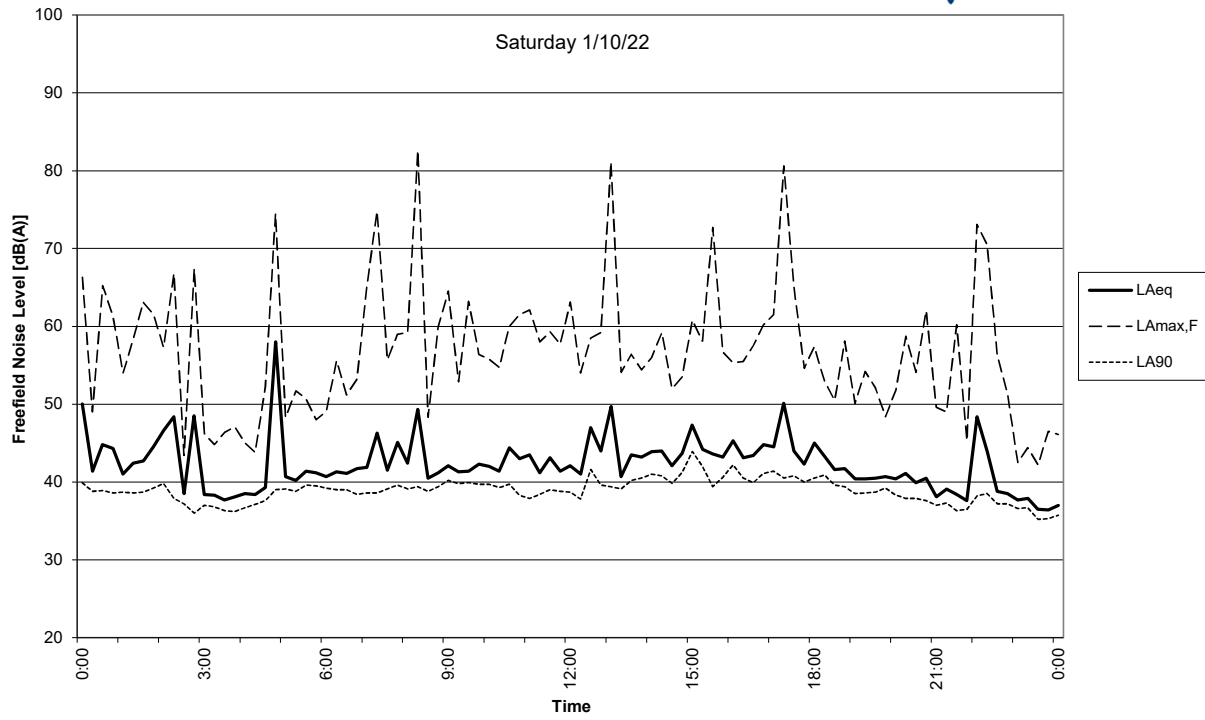


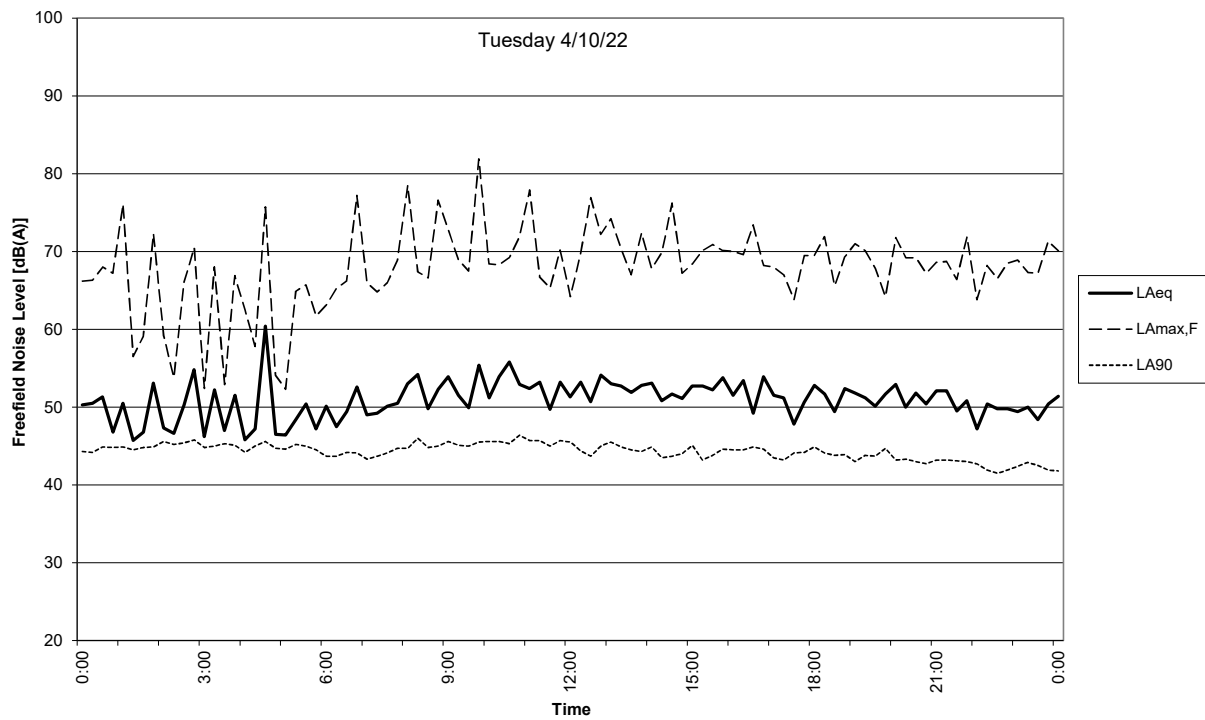
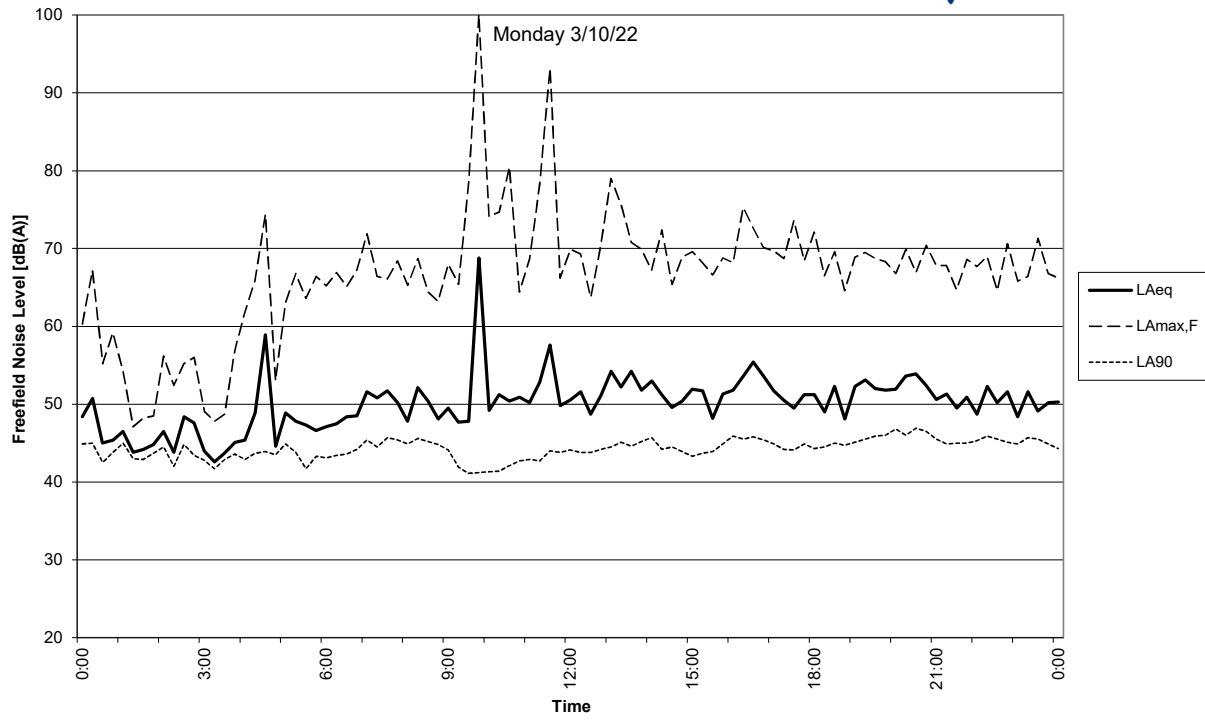


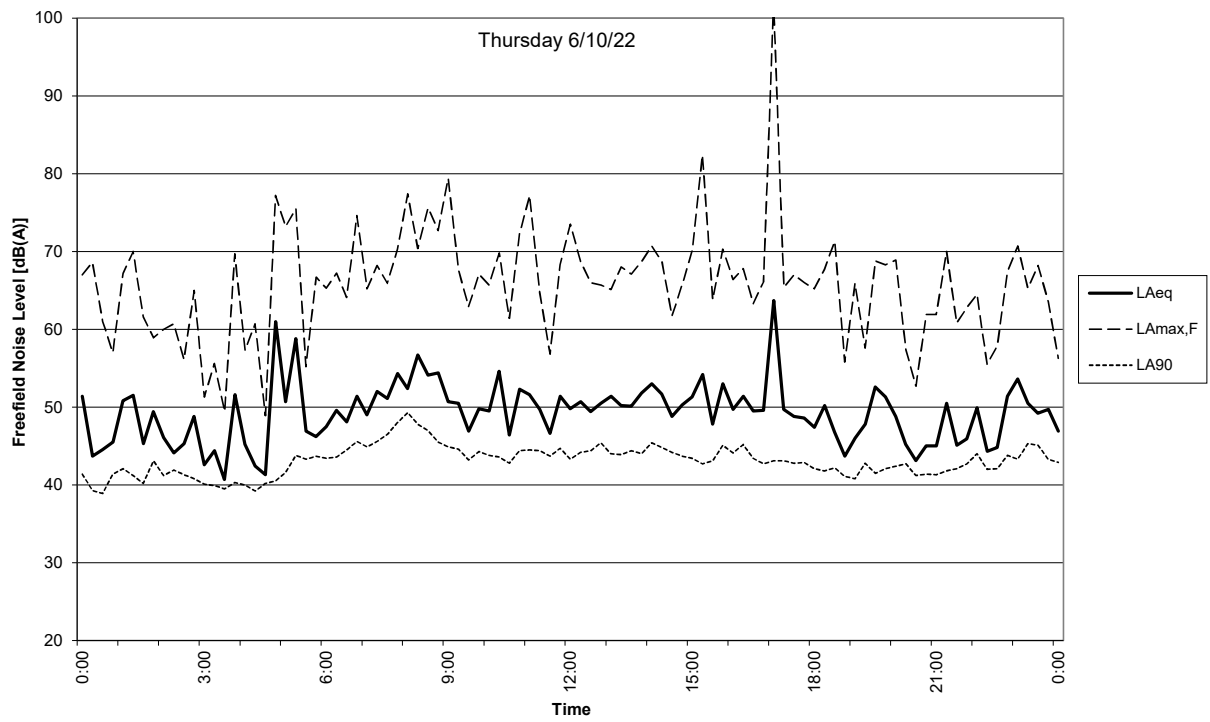
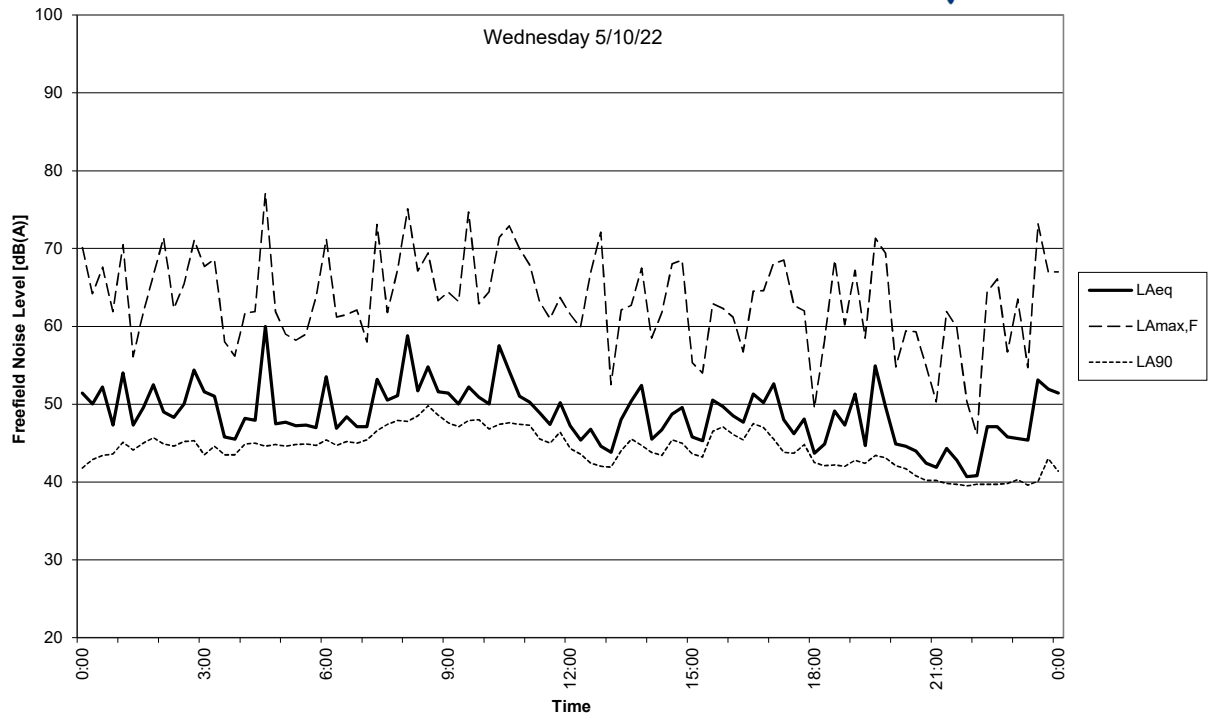


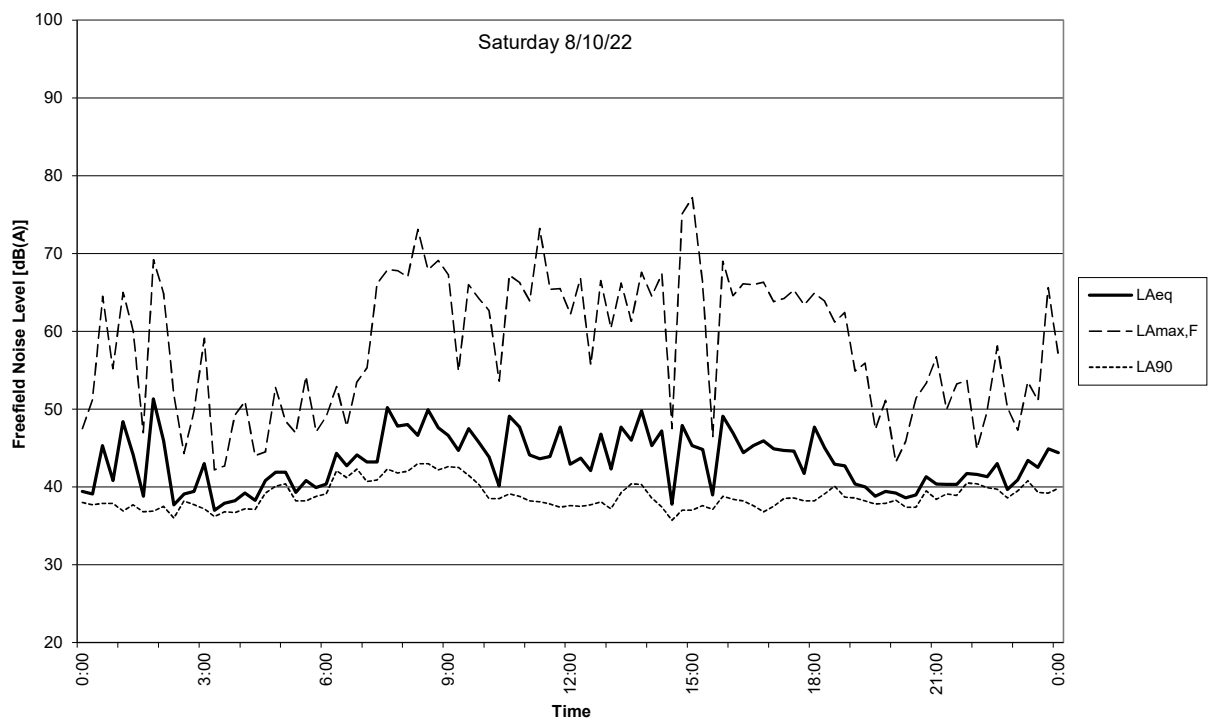
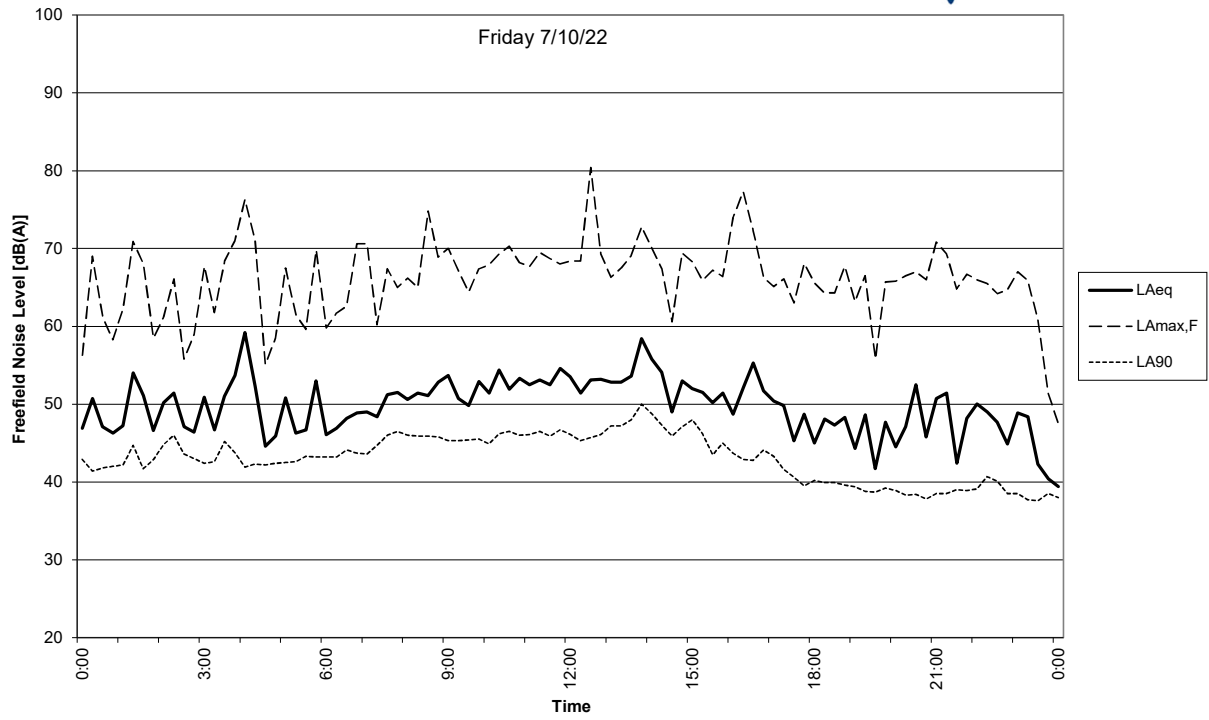
Appendix C
Results and Analysis of Noise Monitoring
at Position U2 – Bishton Village Hall

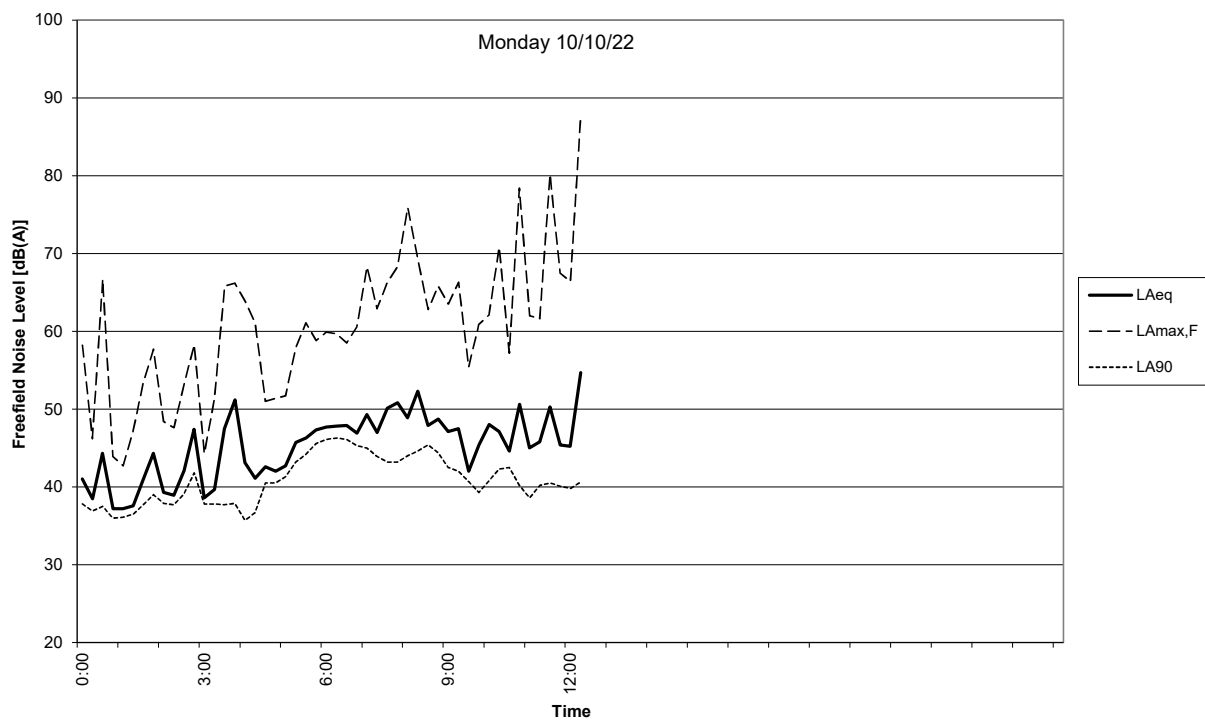
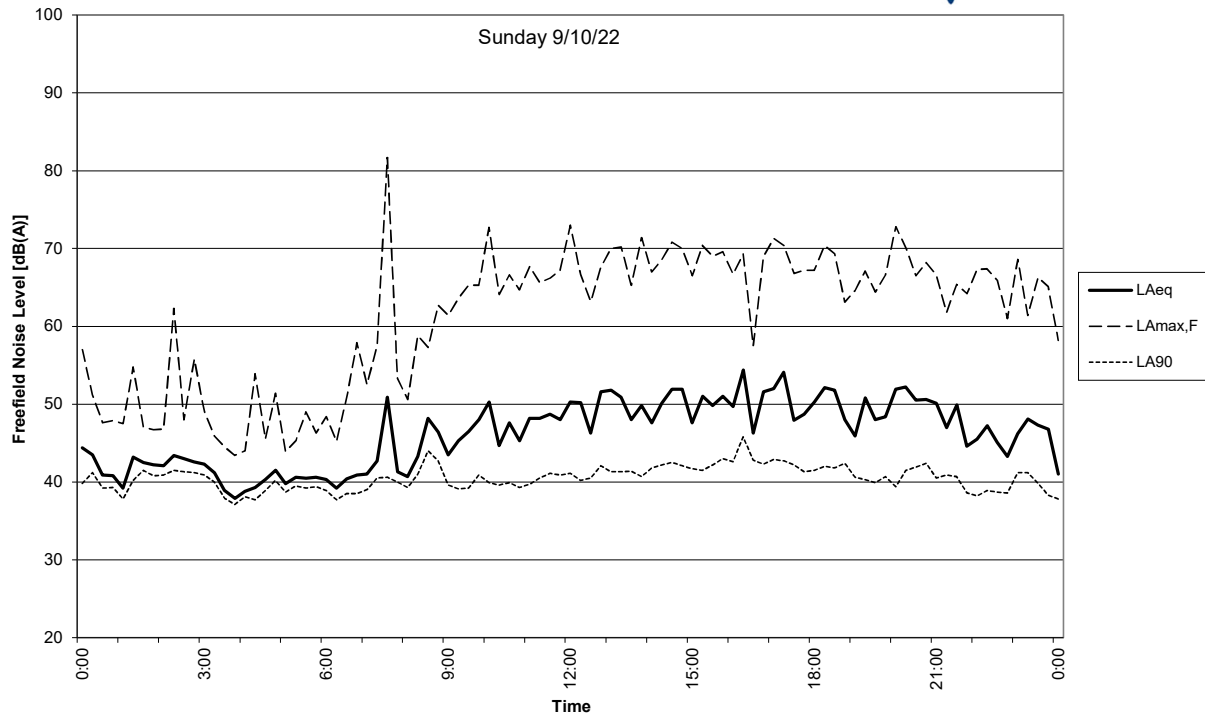


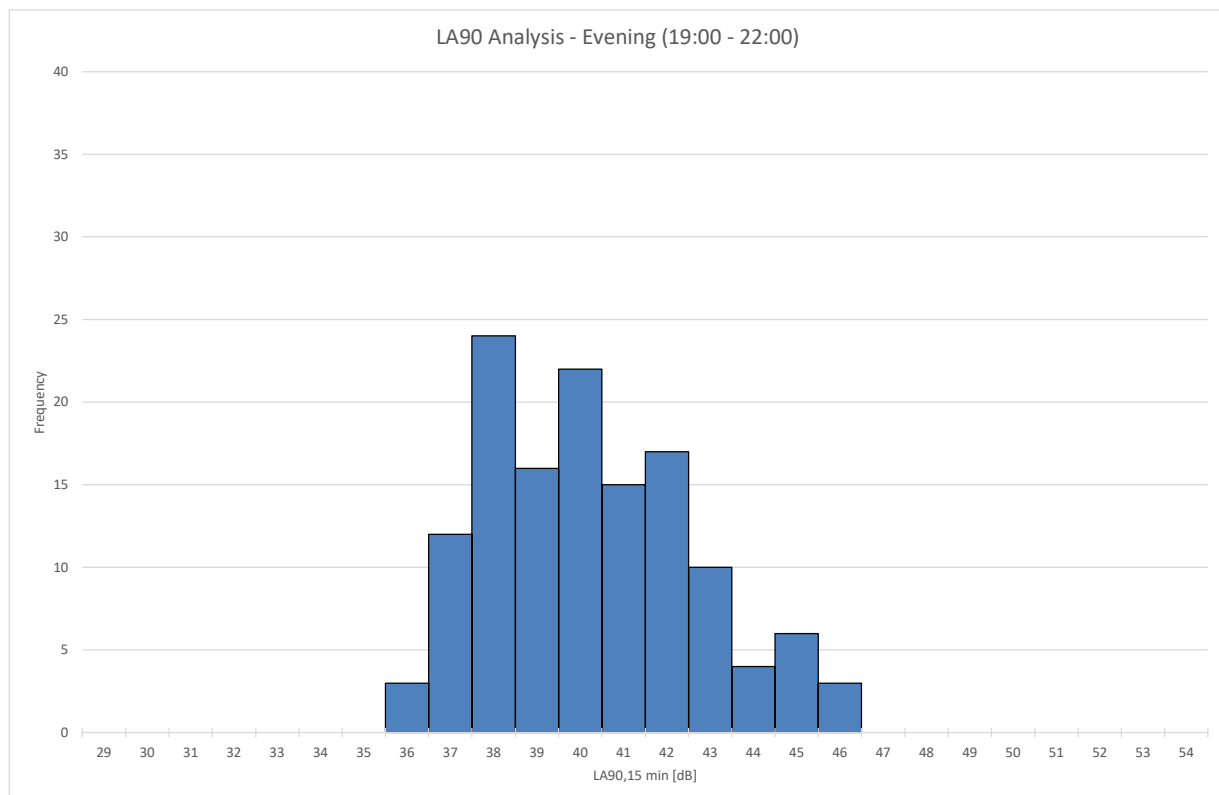
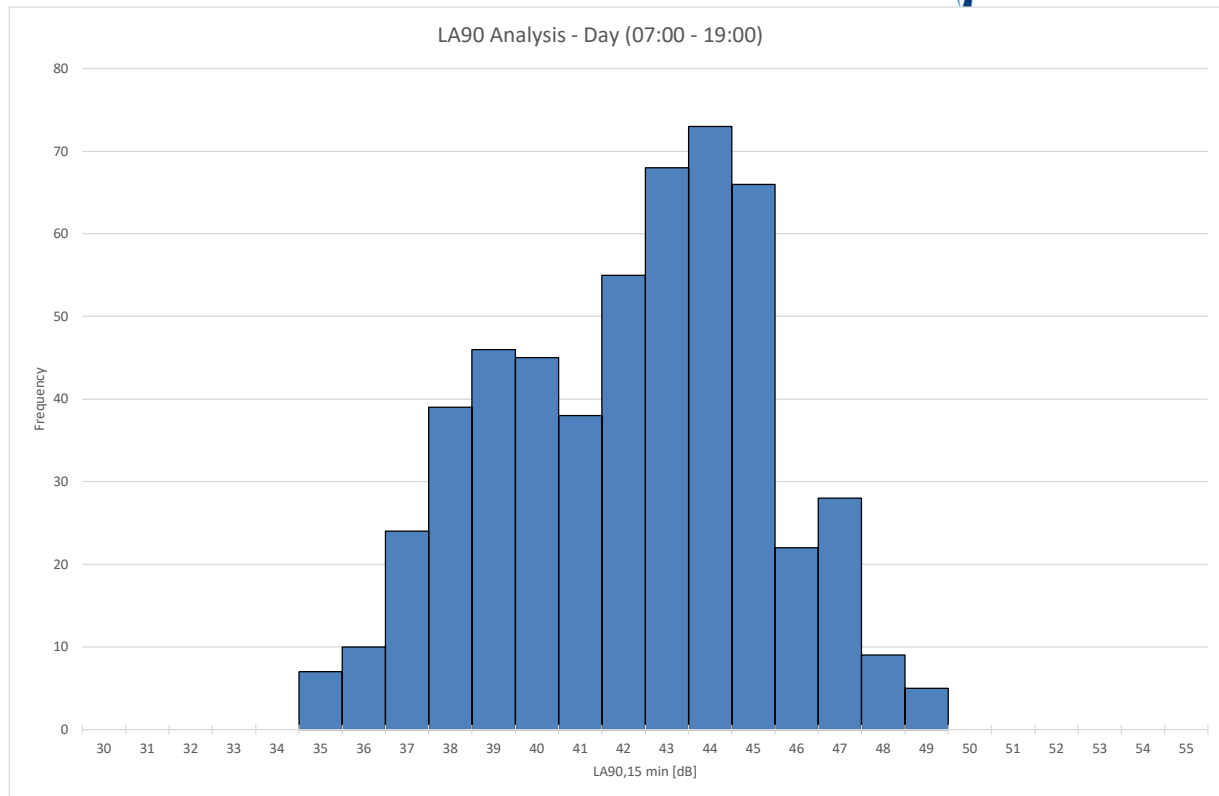


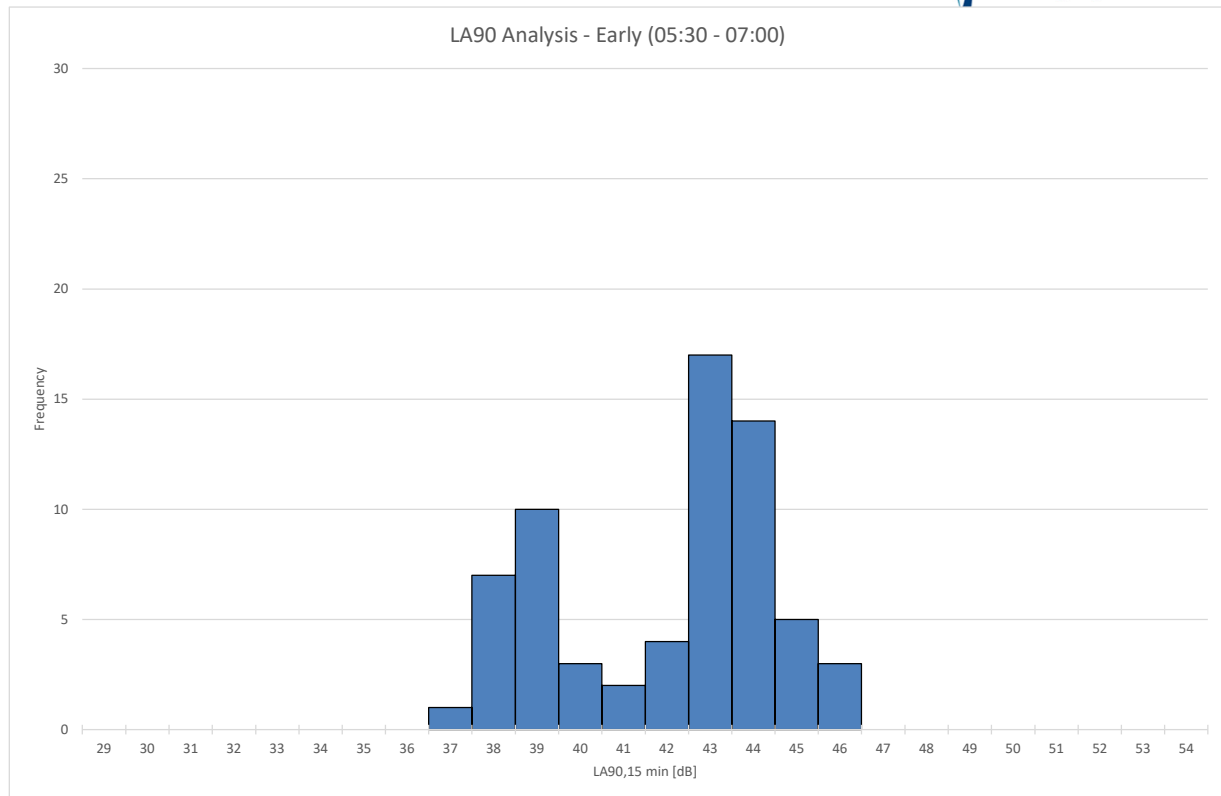




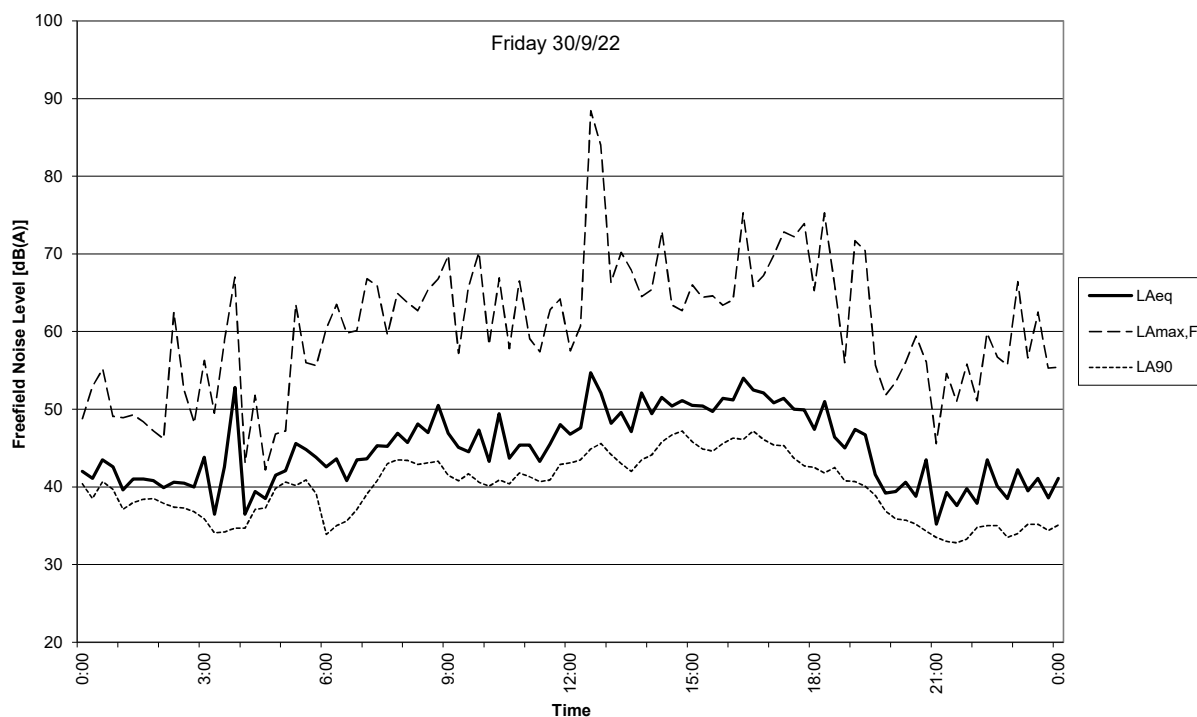
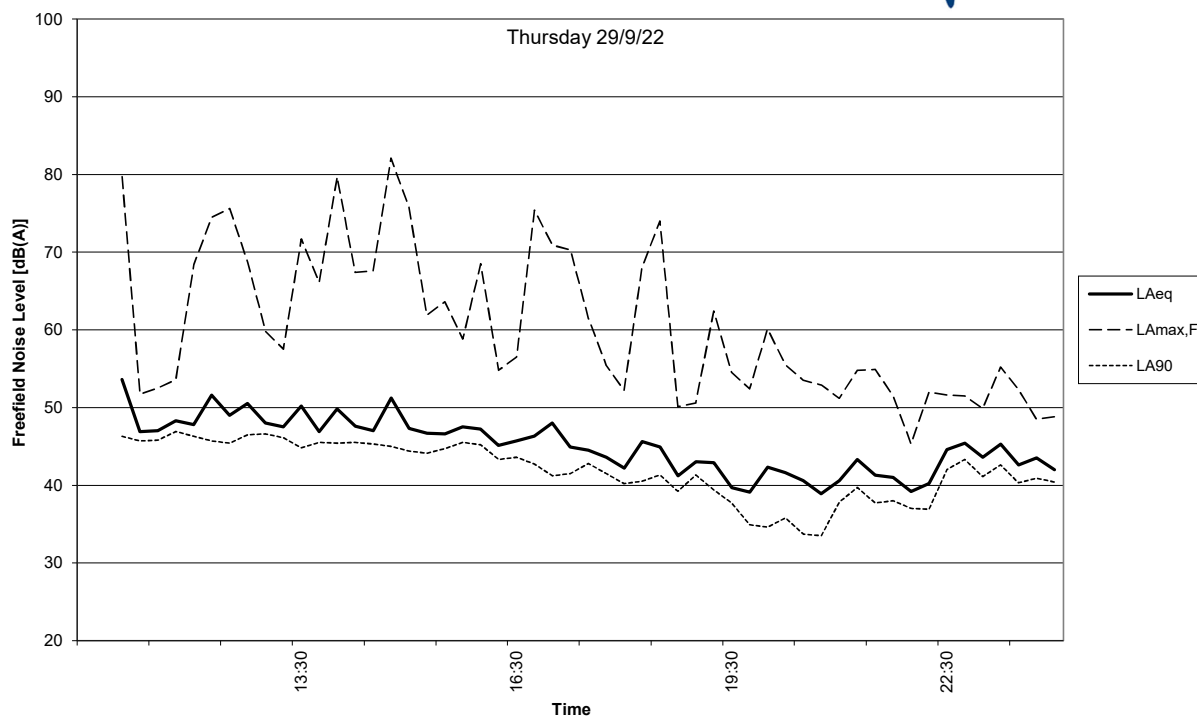


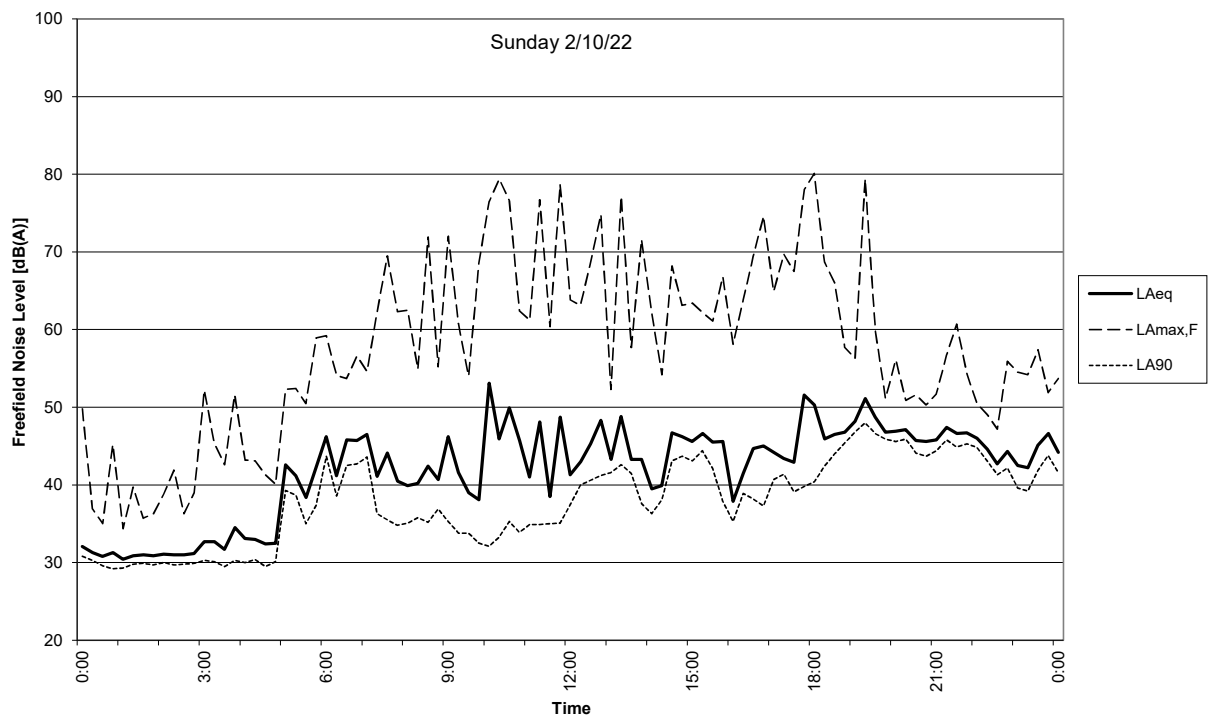
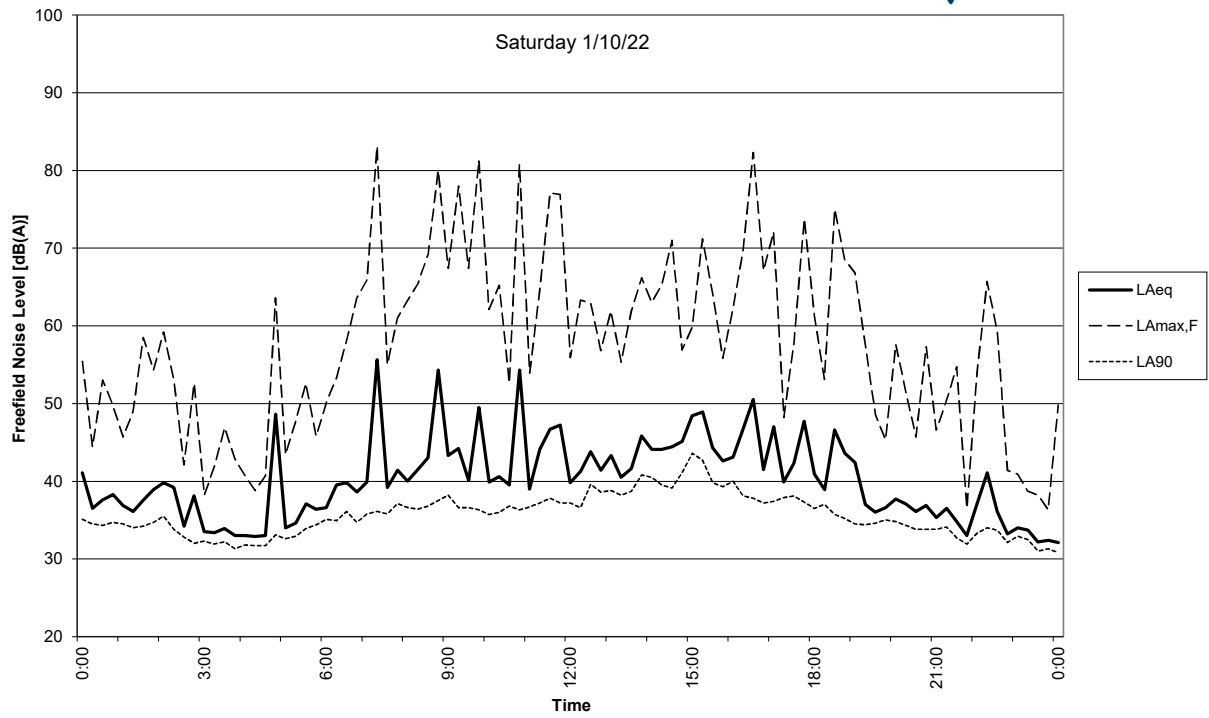


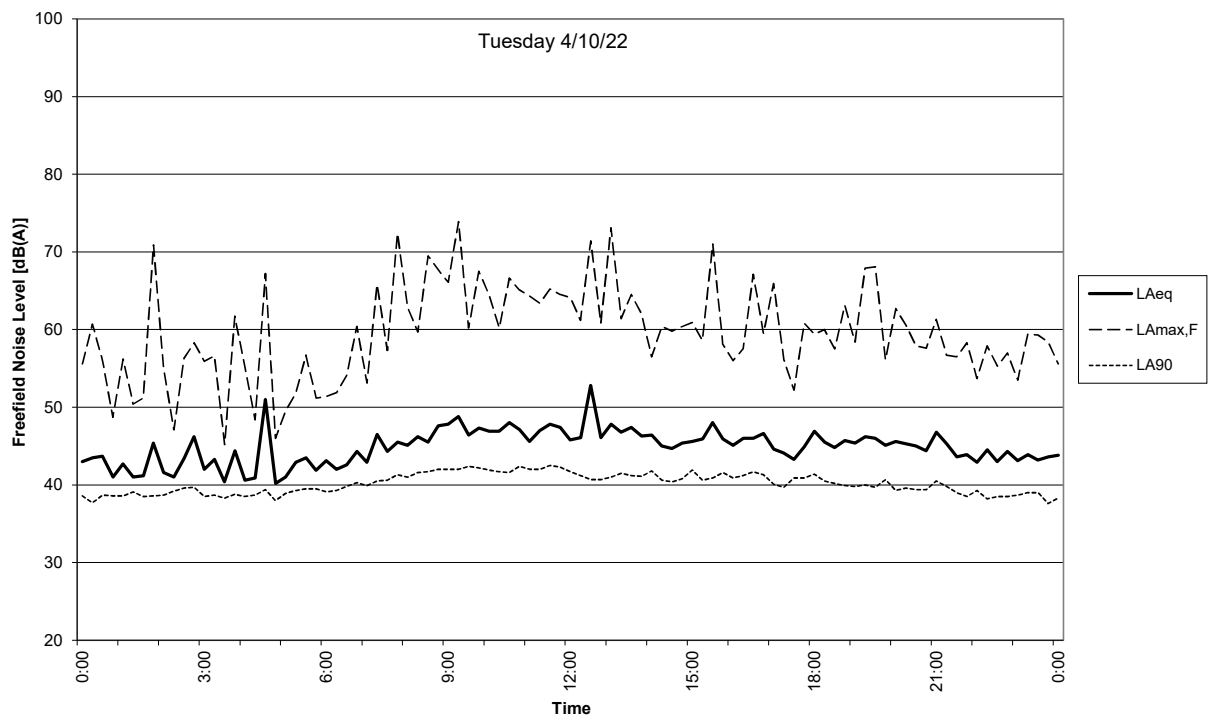
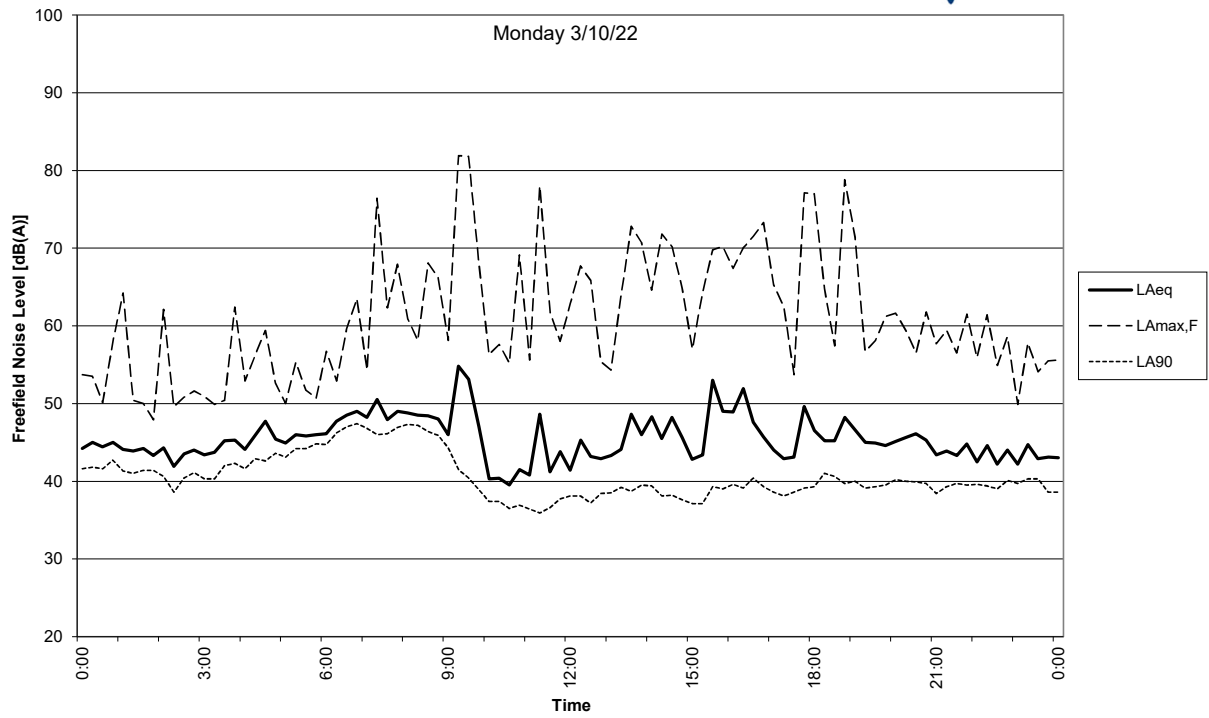


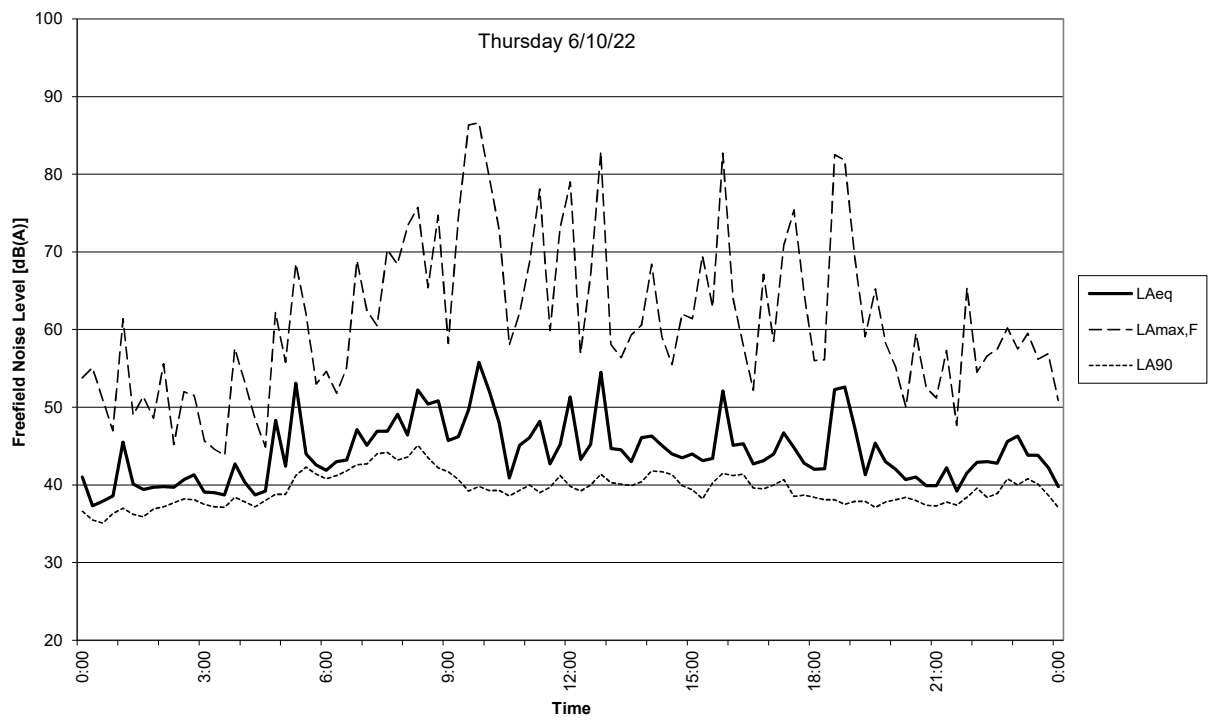
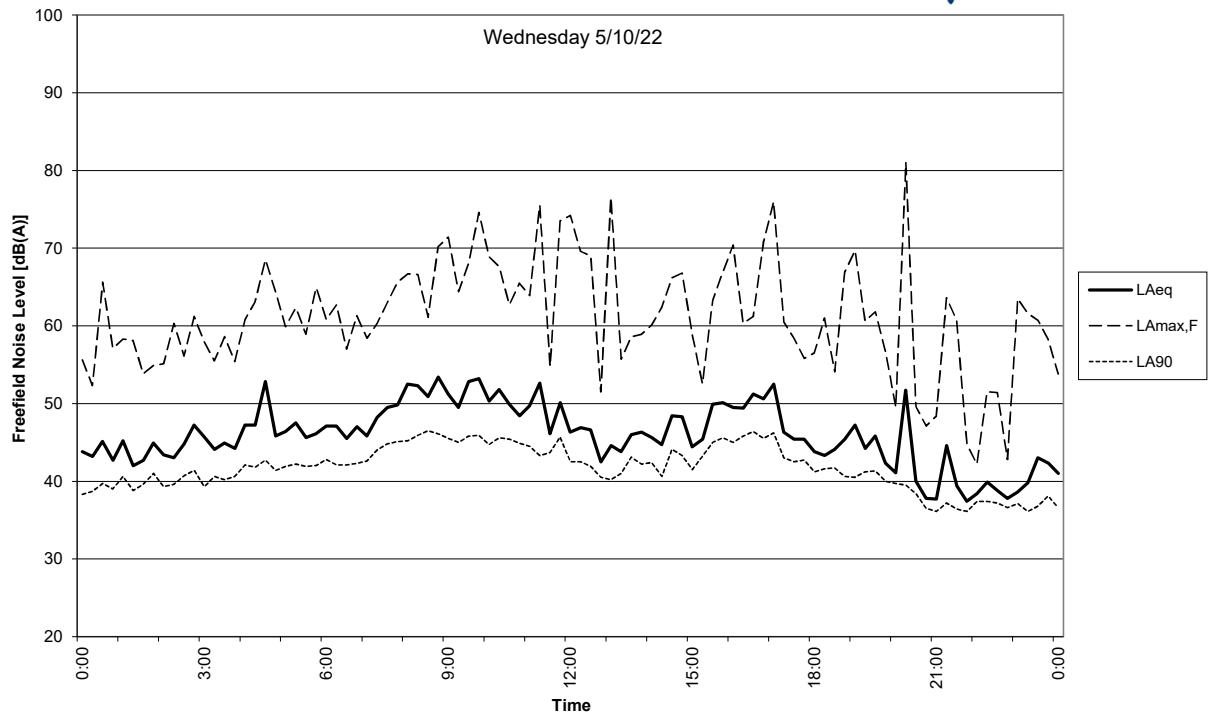


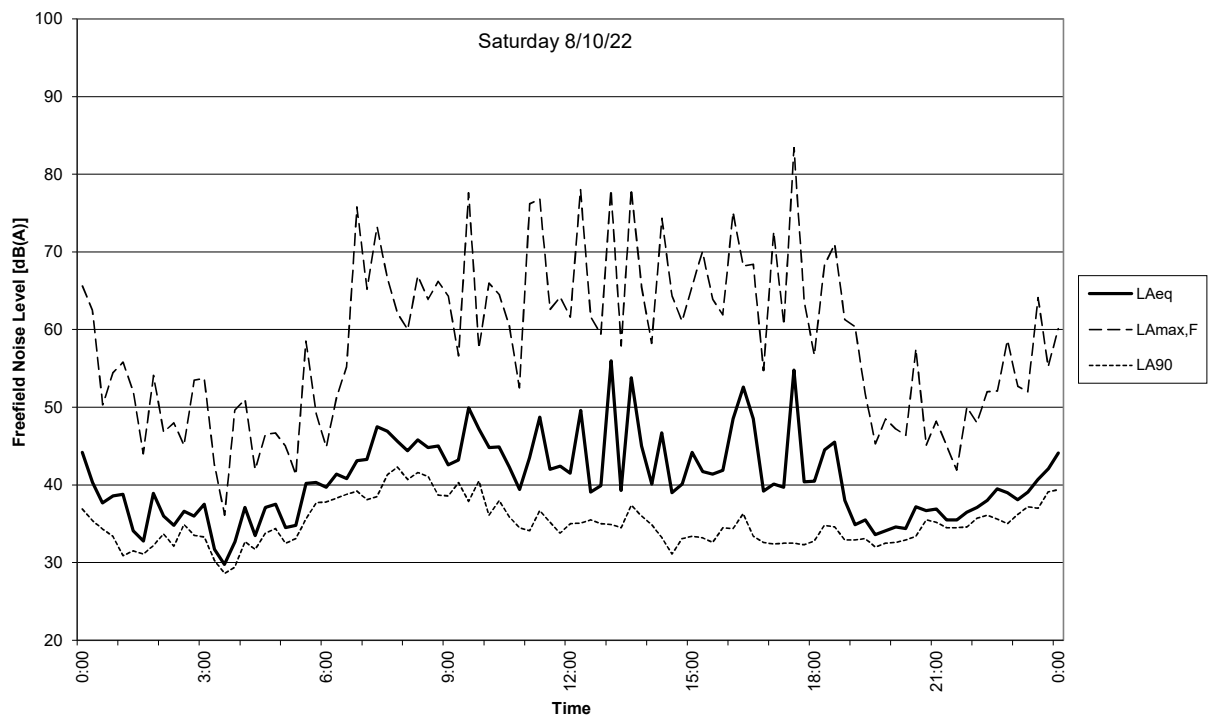
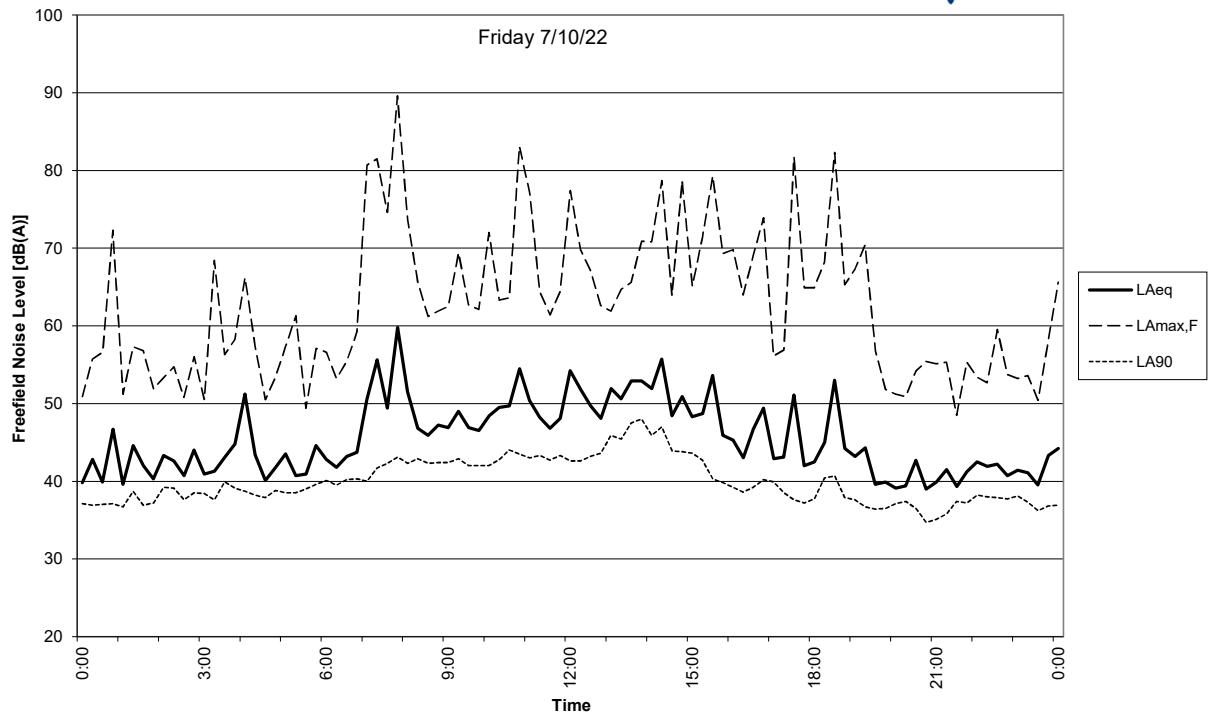
Appendix D
Results and Analysis of Noise Monitoring
at Position U3 – Castle Farm

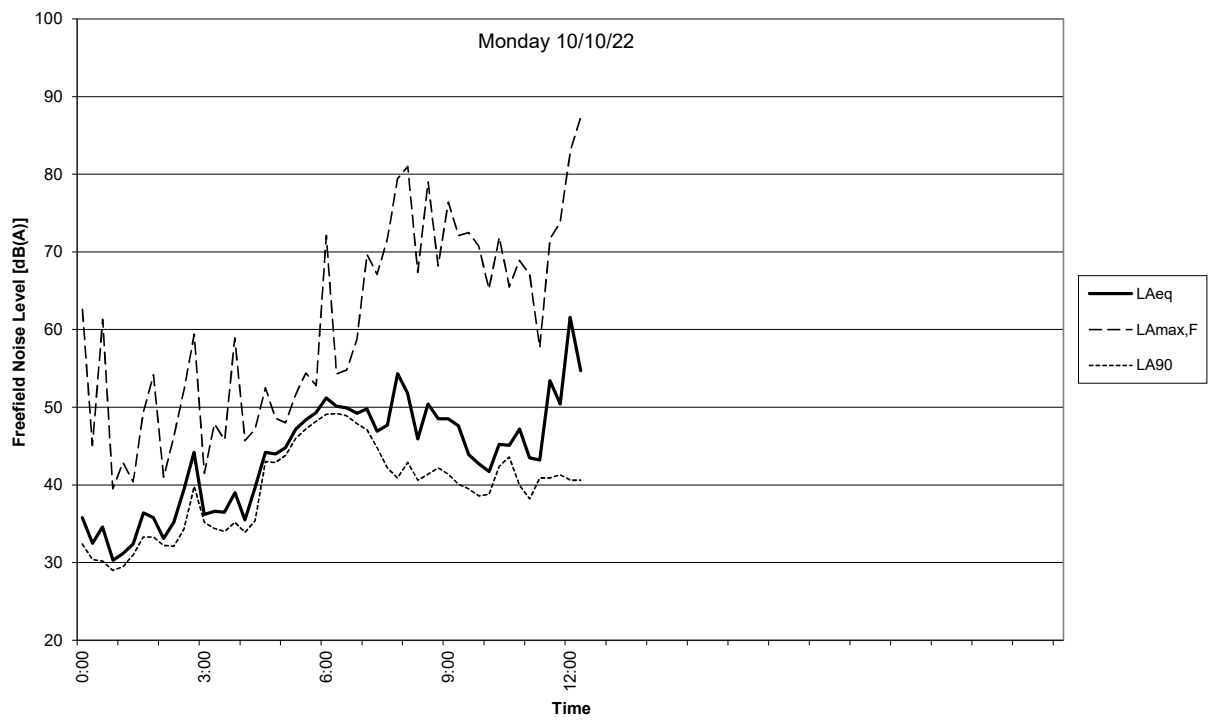
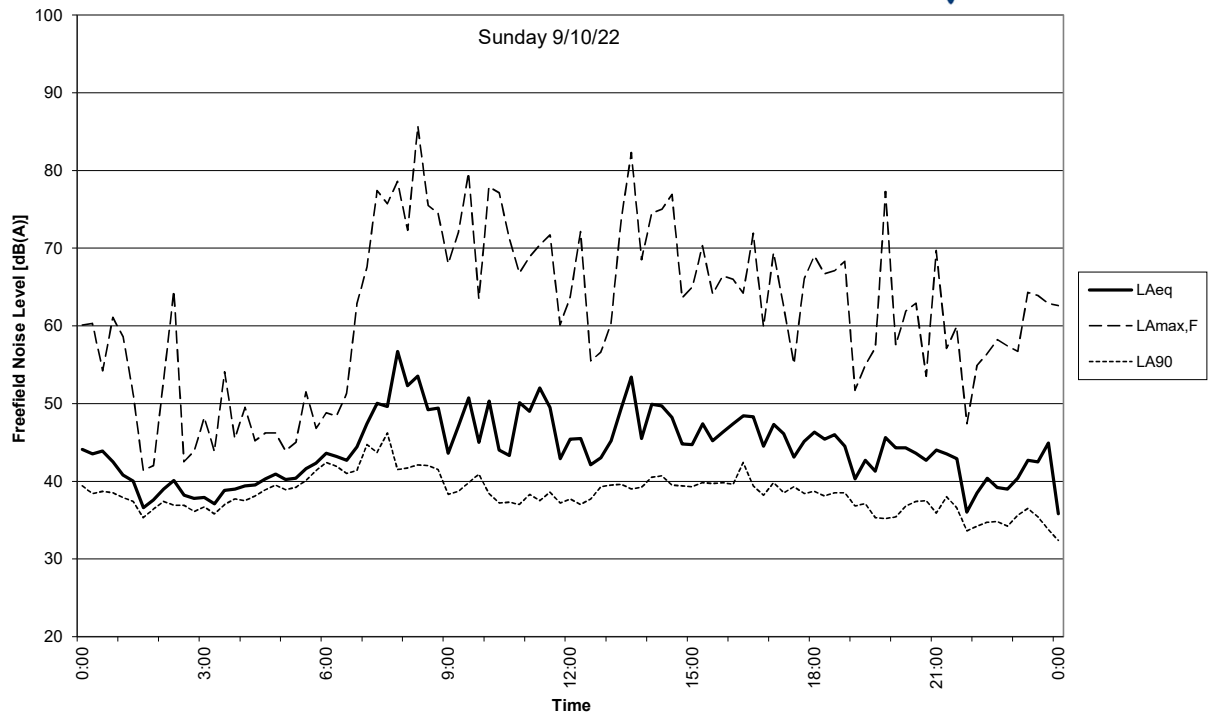


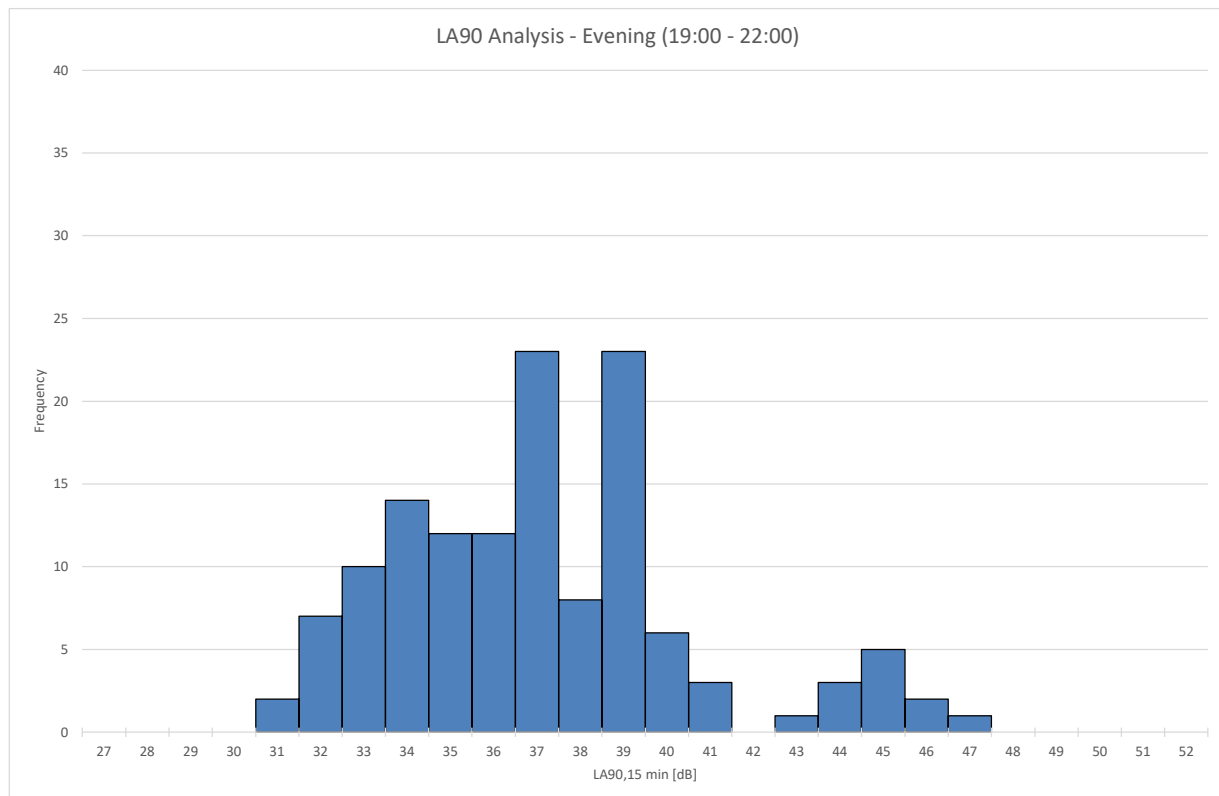
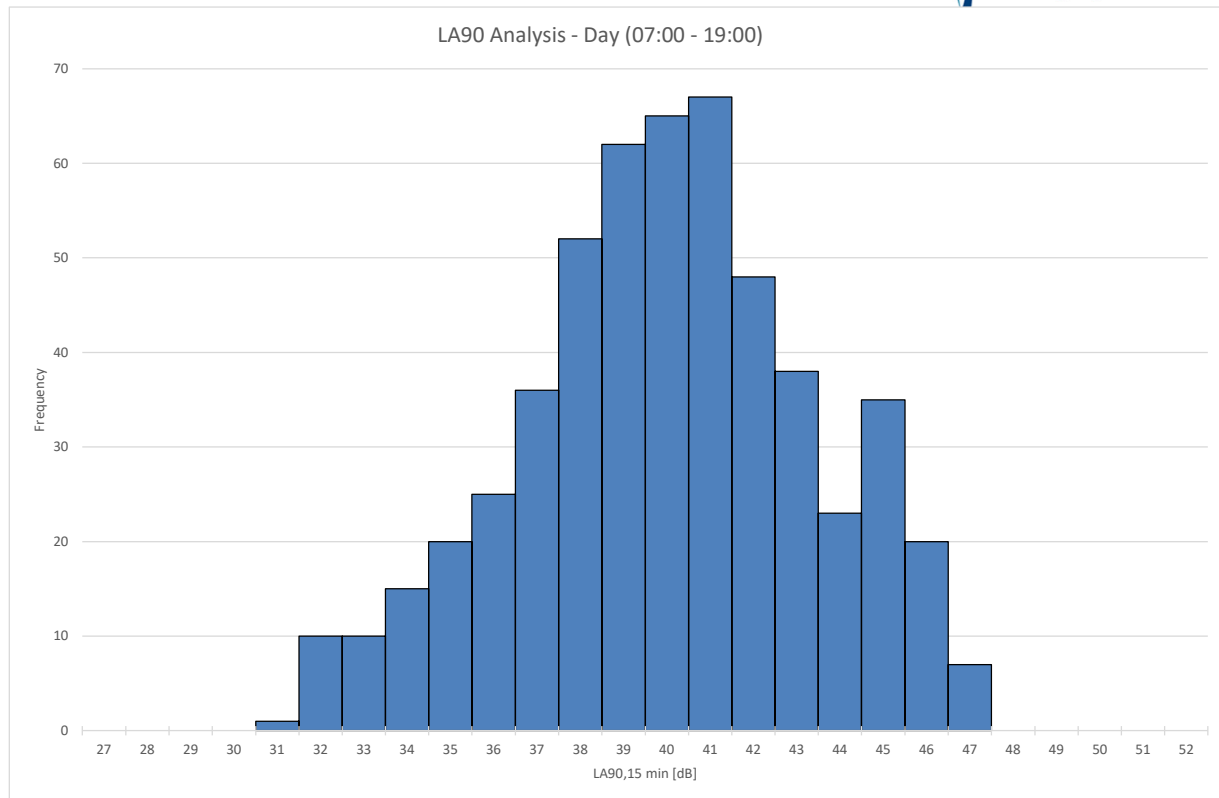


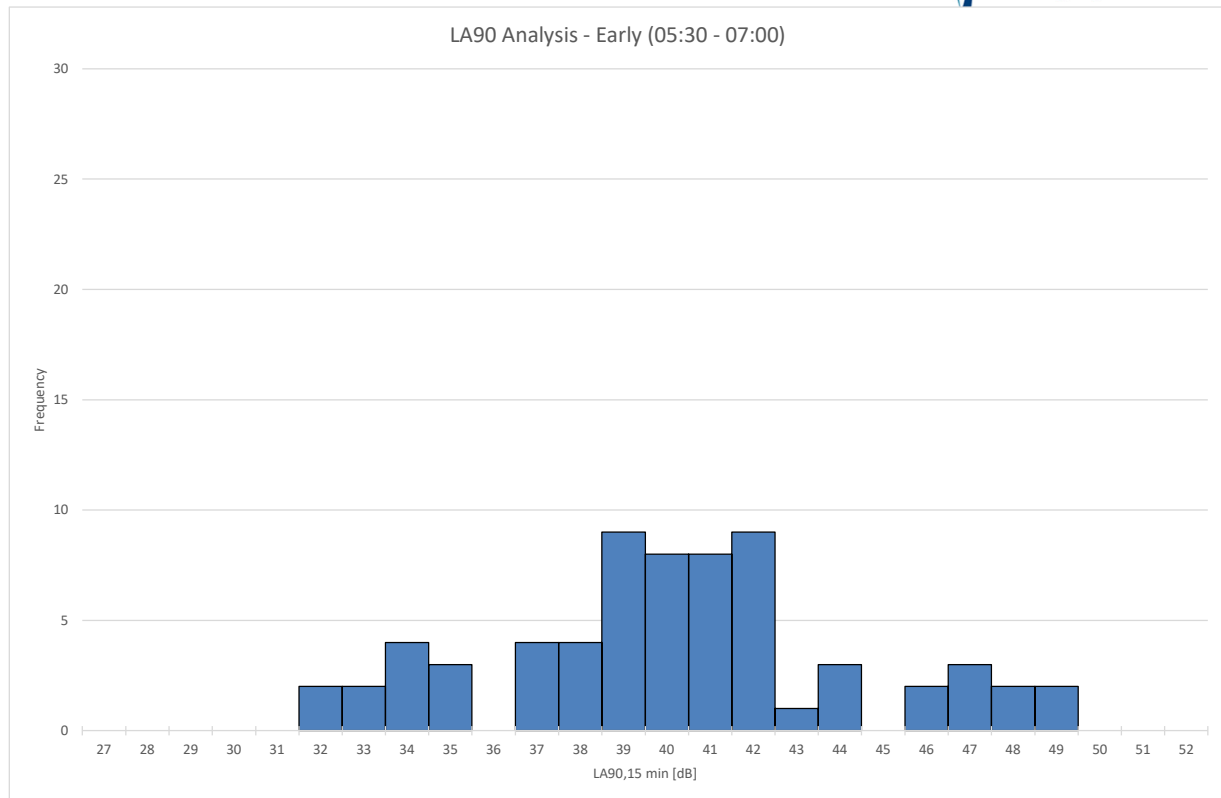




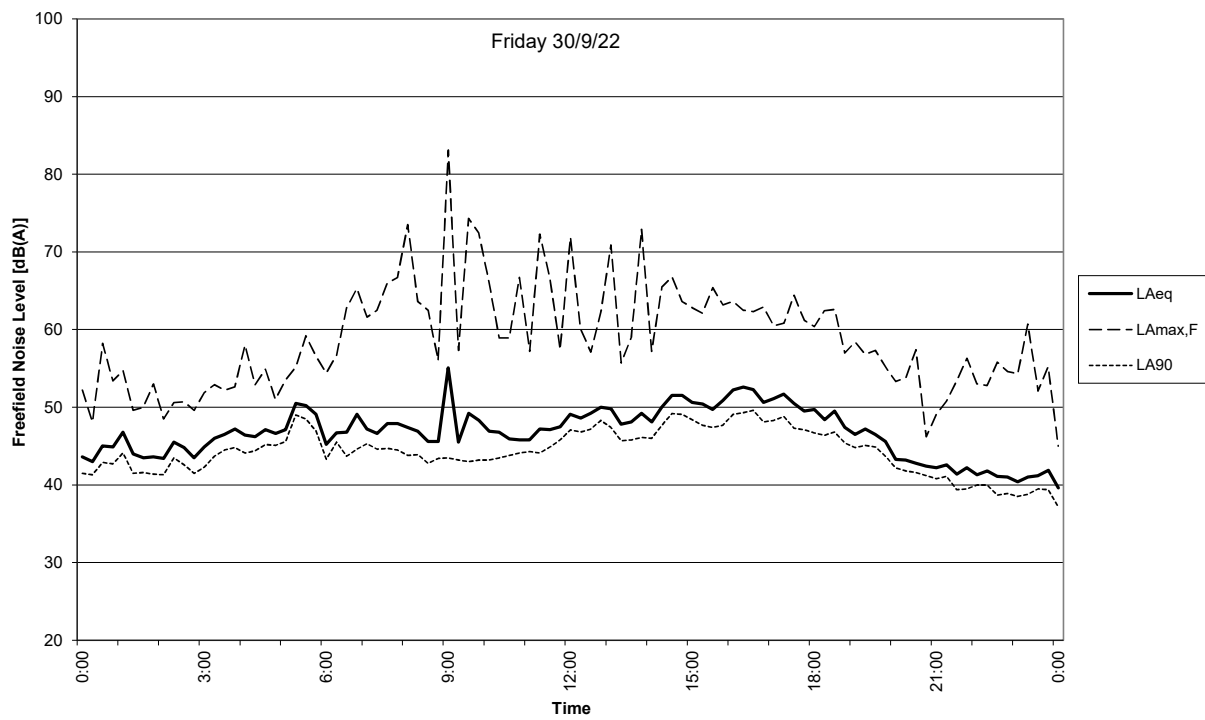
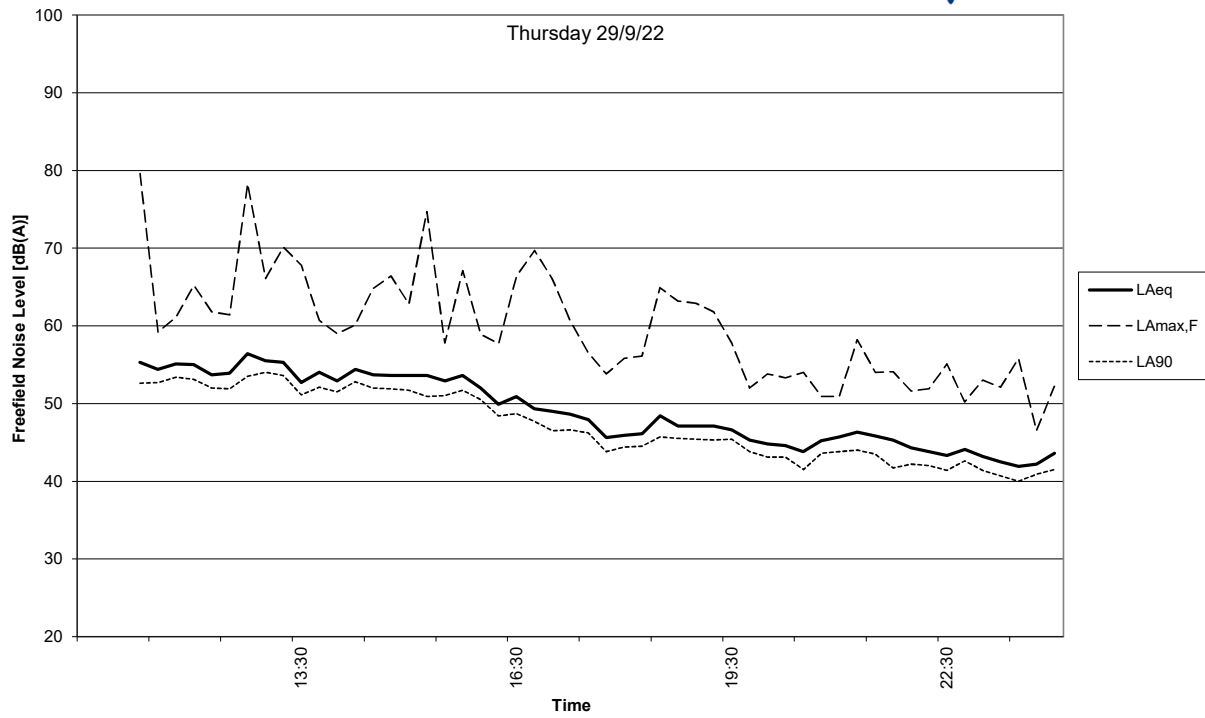


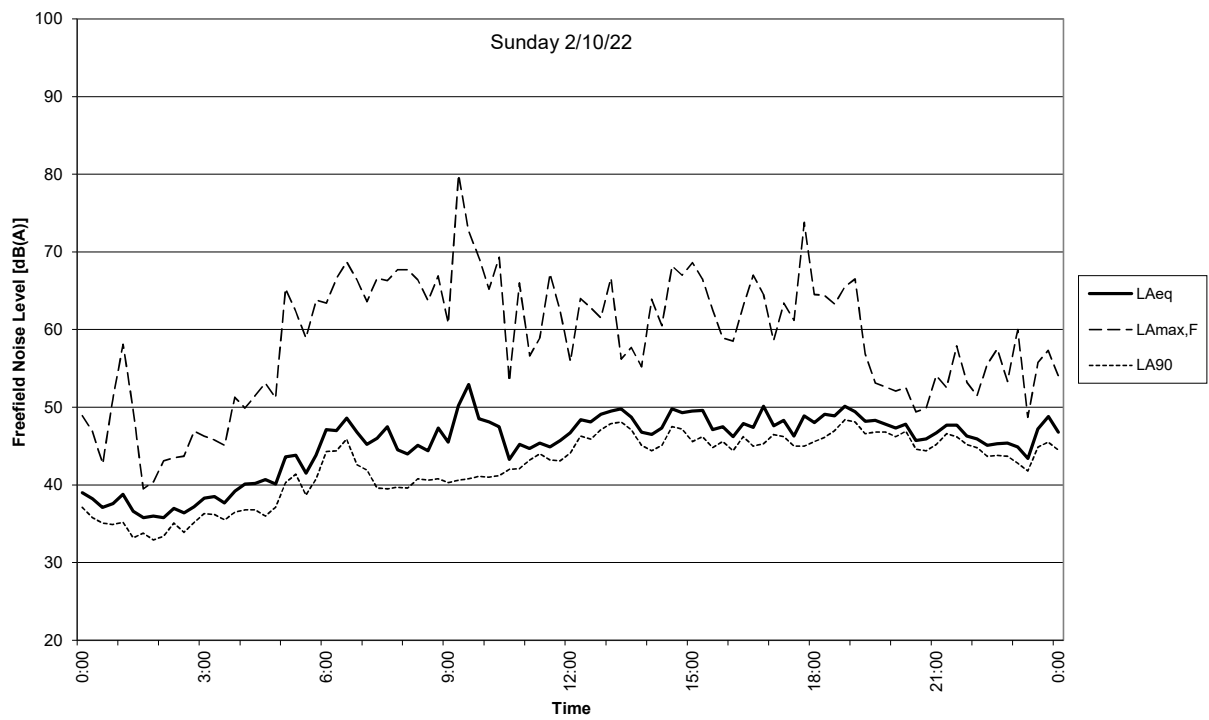
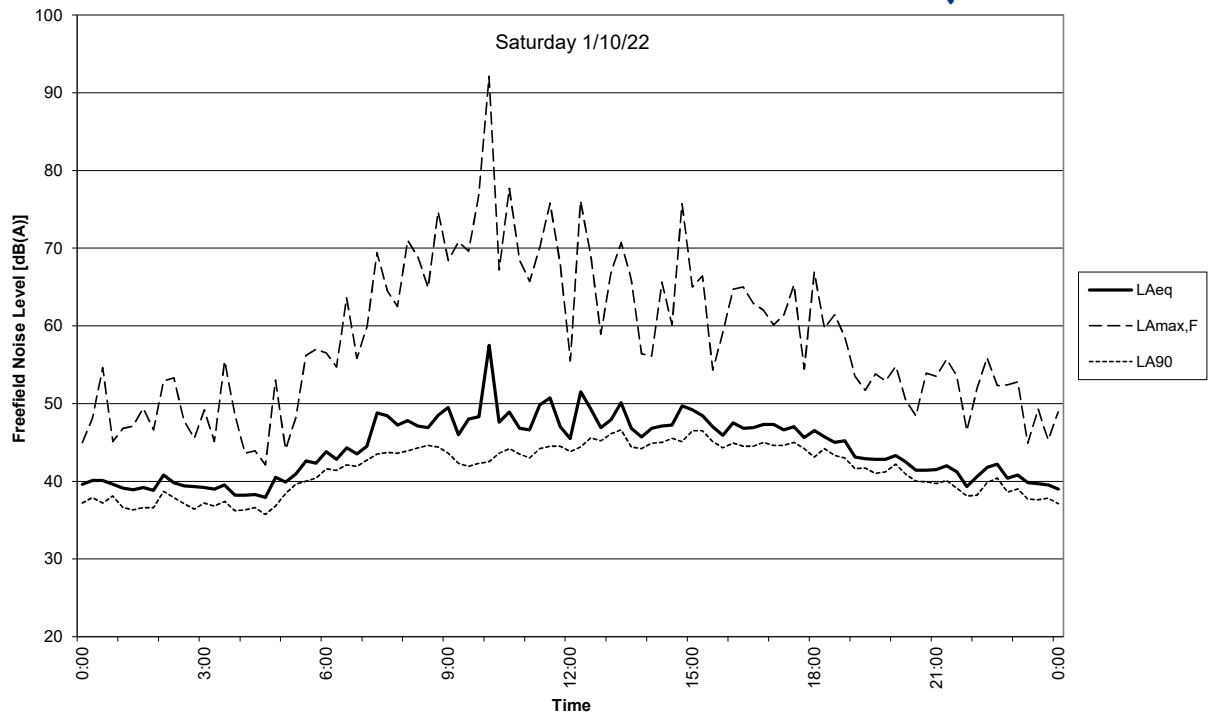


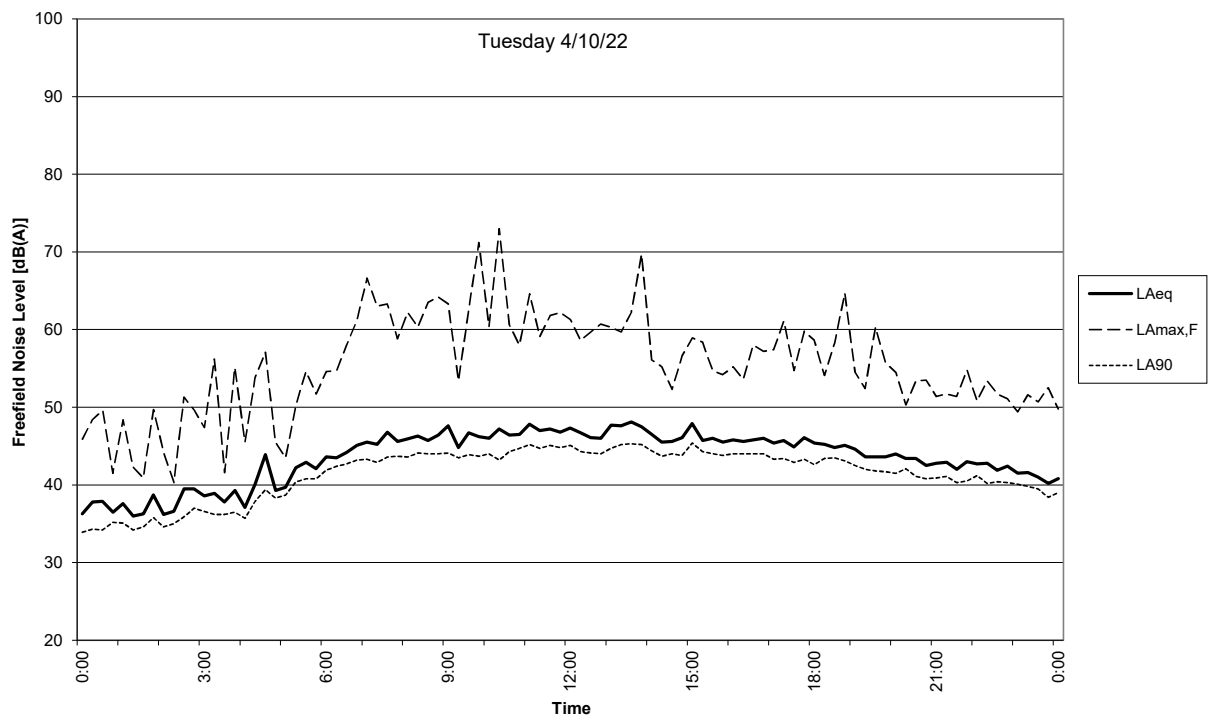
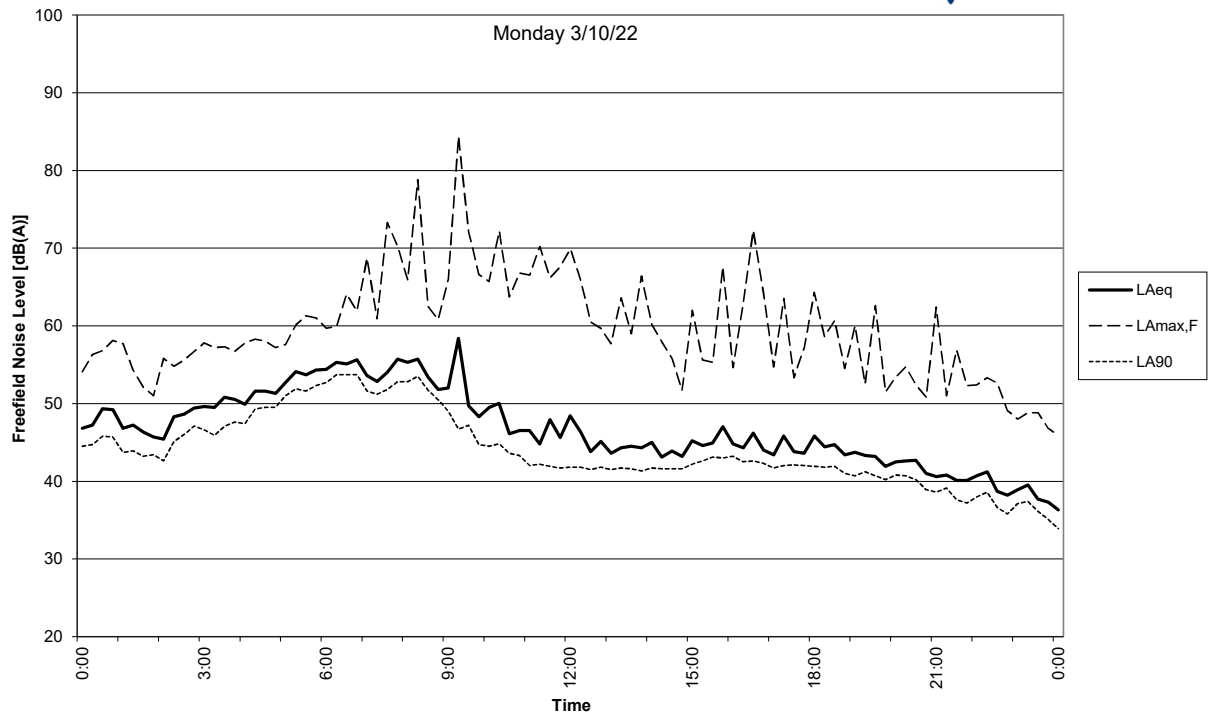


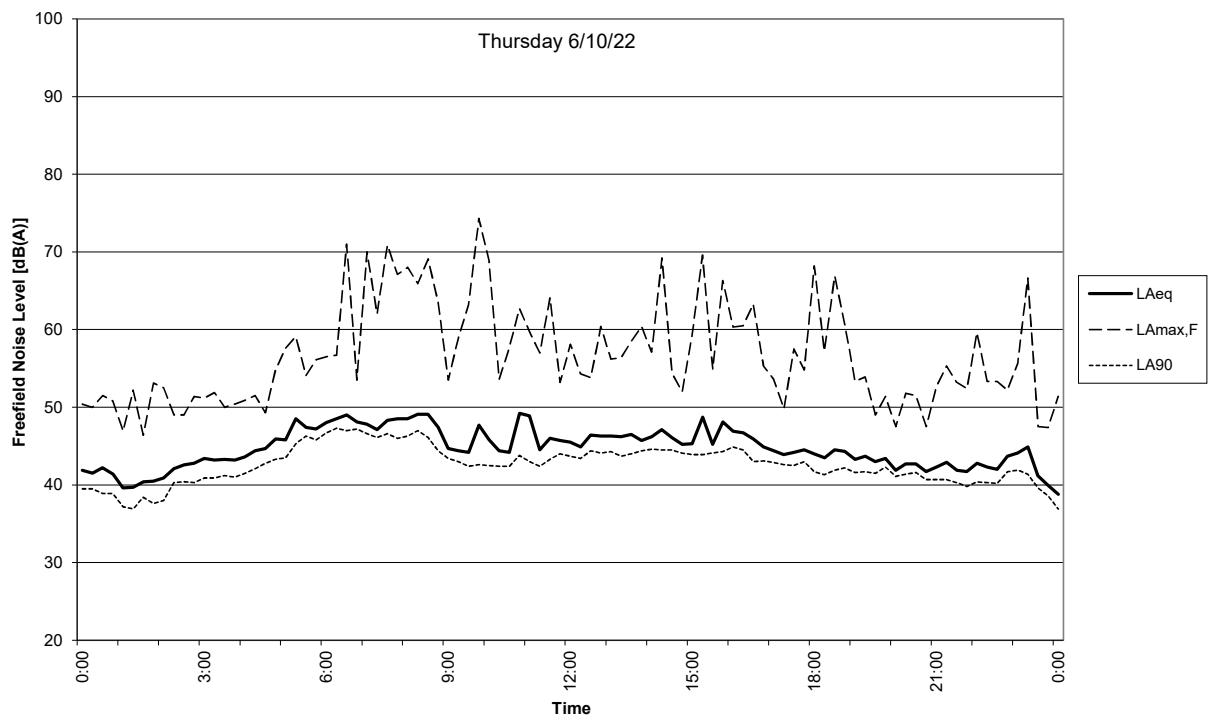
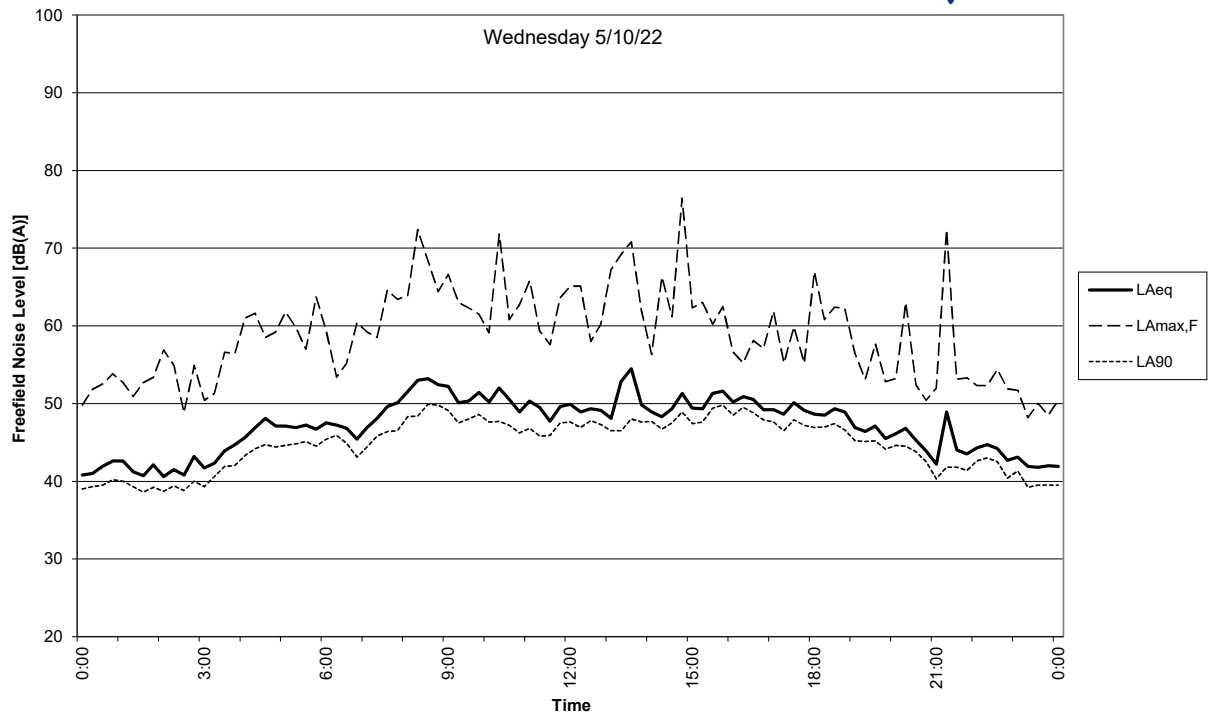


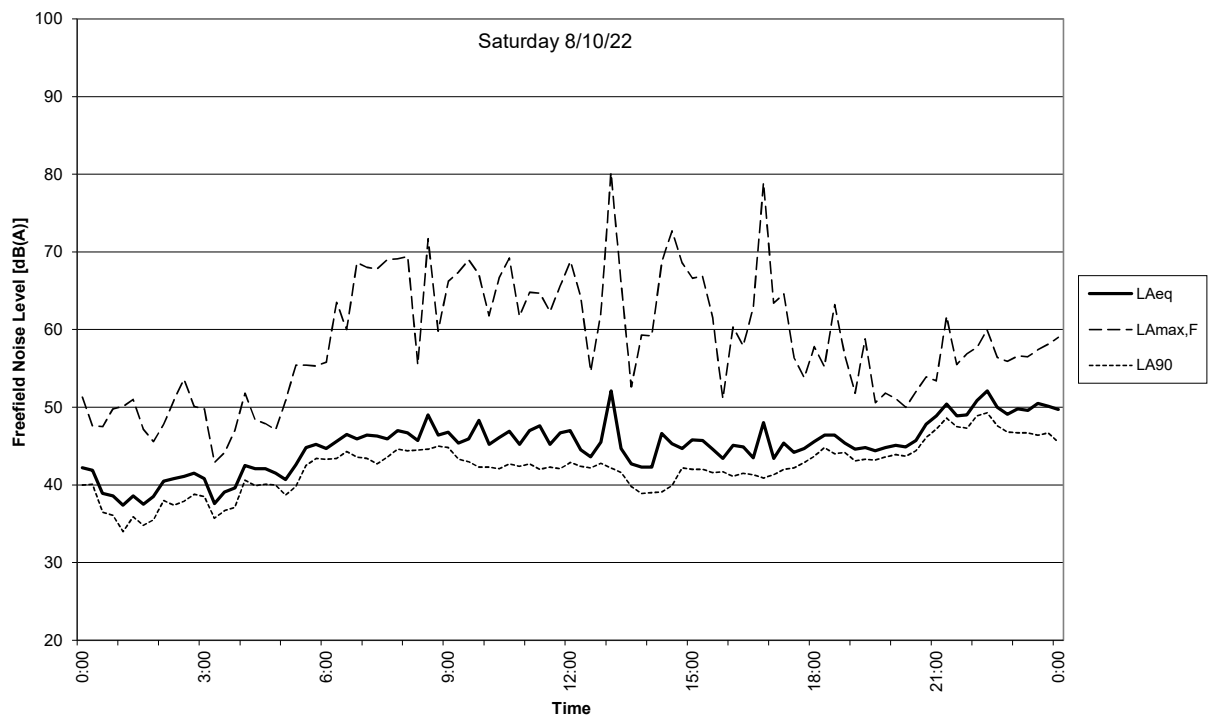
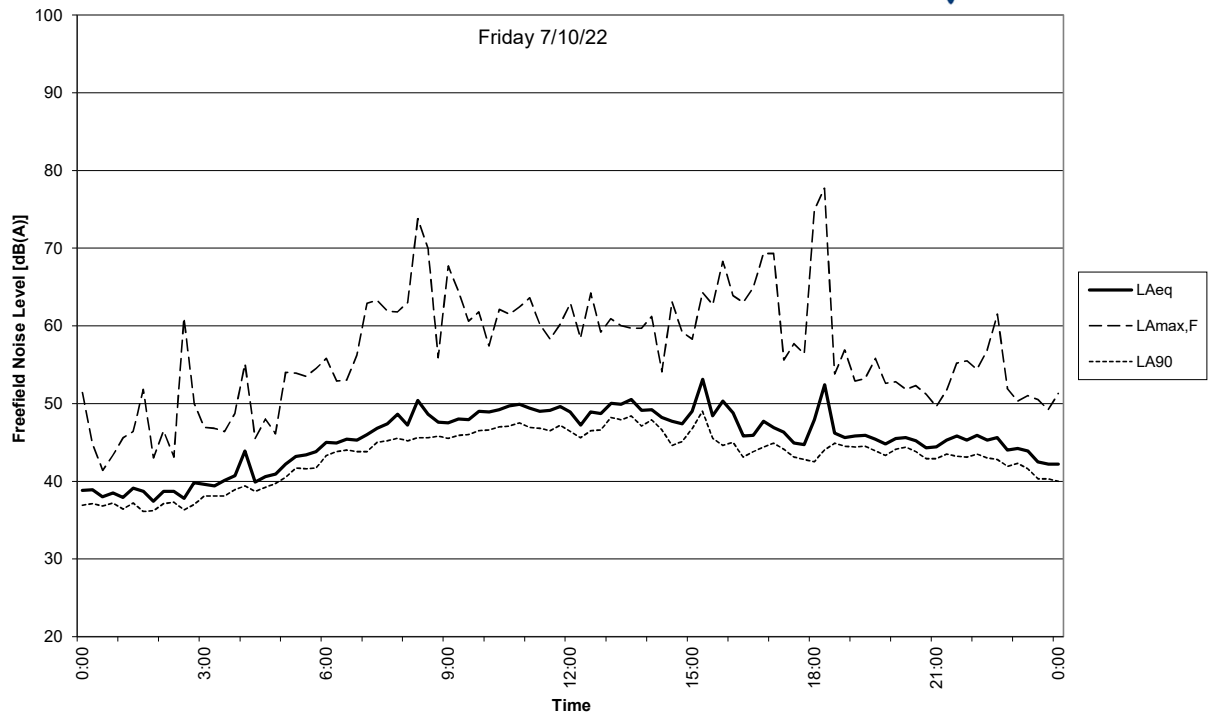
Appendix E
Results and Analysis of Noise Monitoring
at Position U4 – Underwood

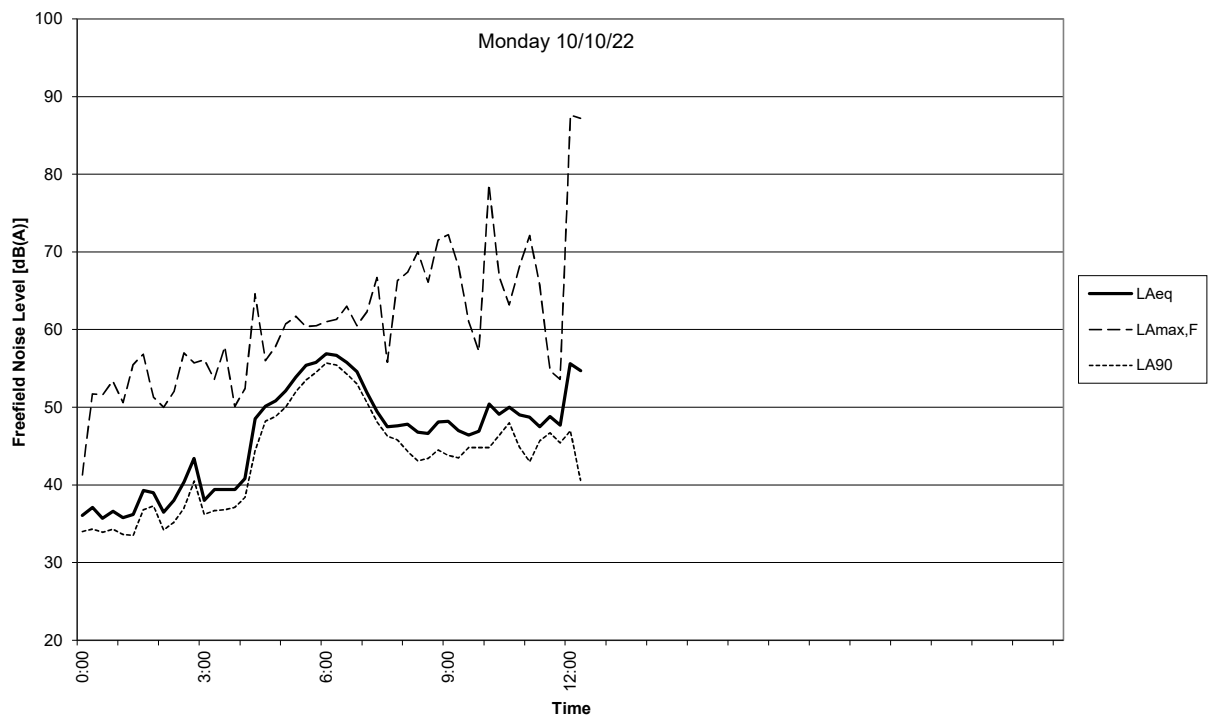
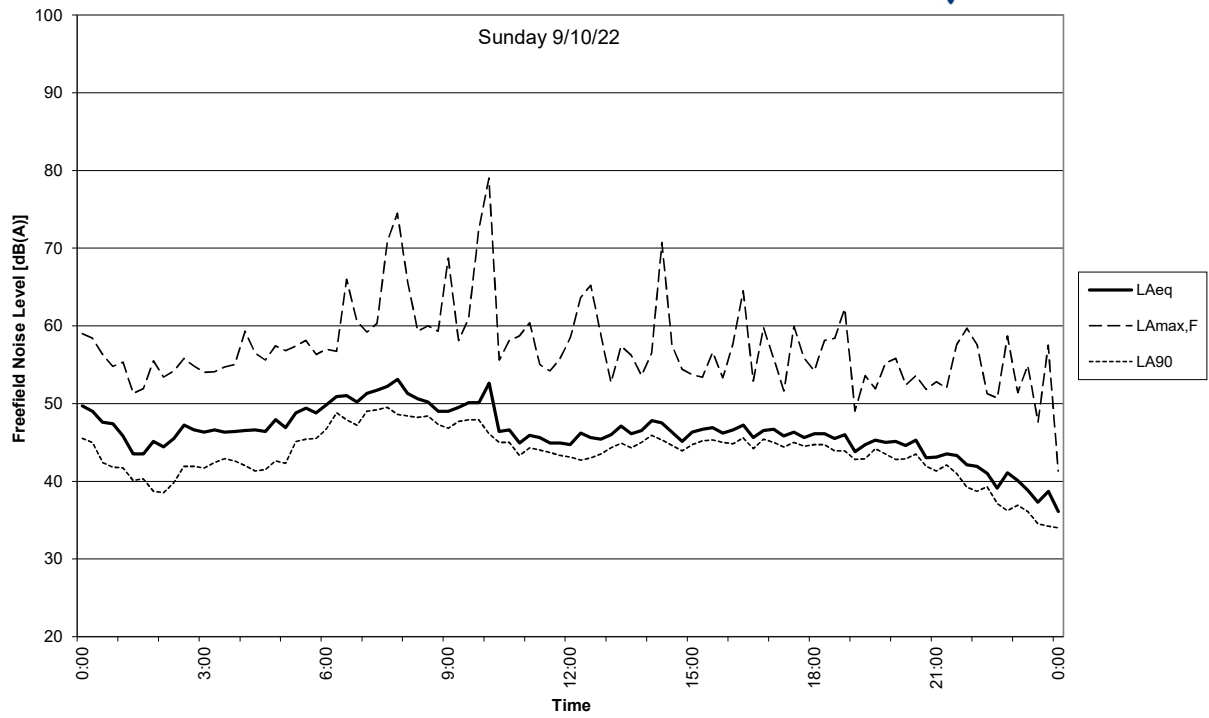


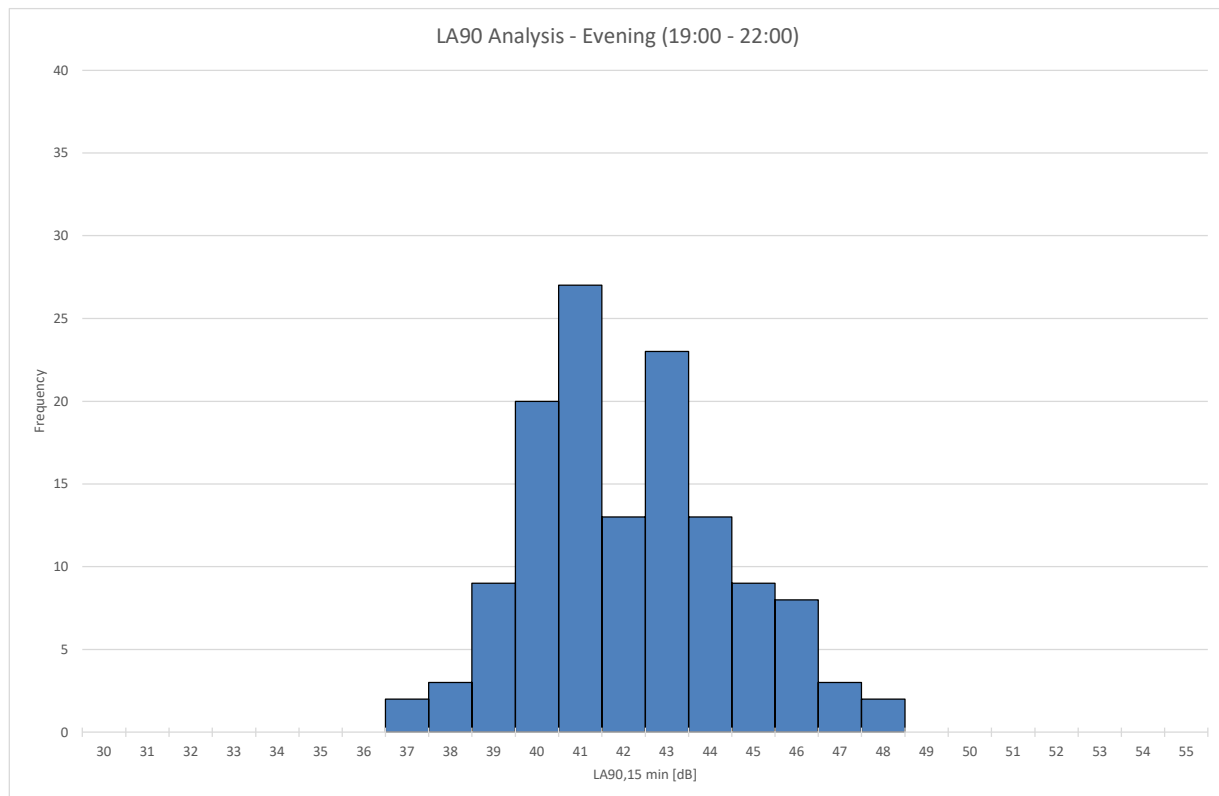
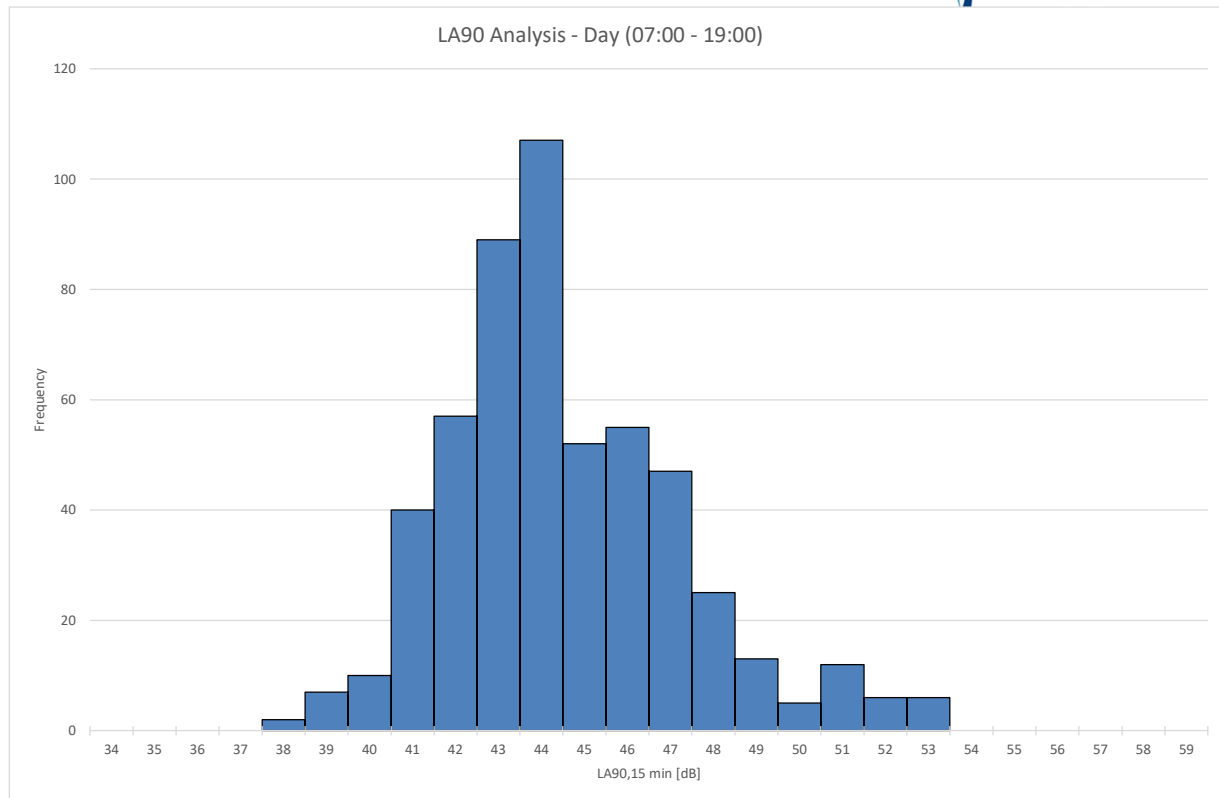


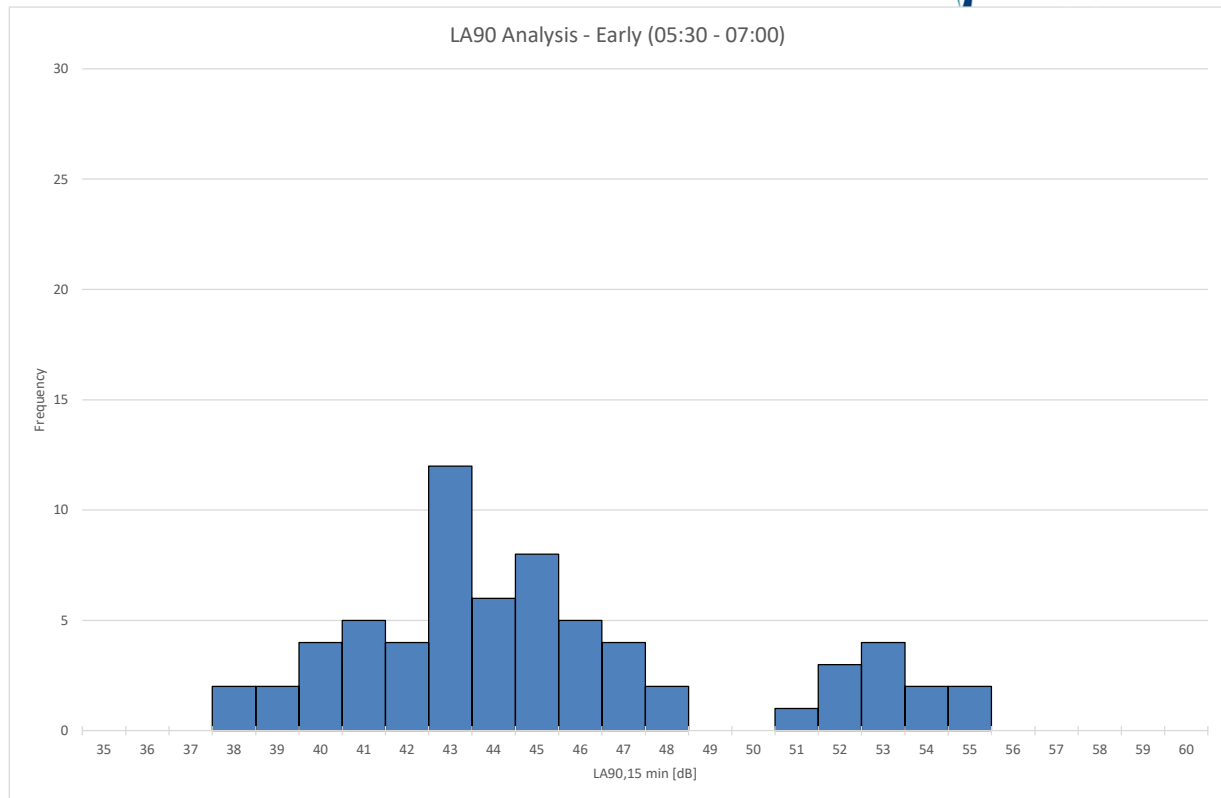




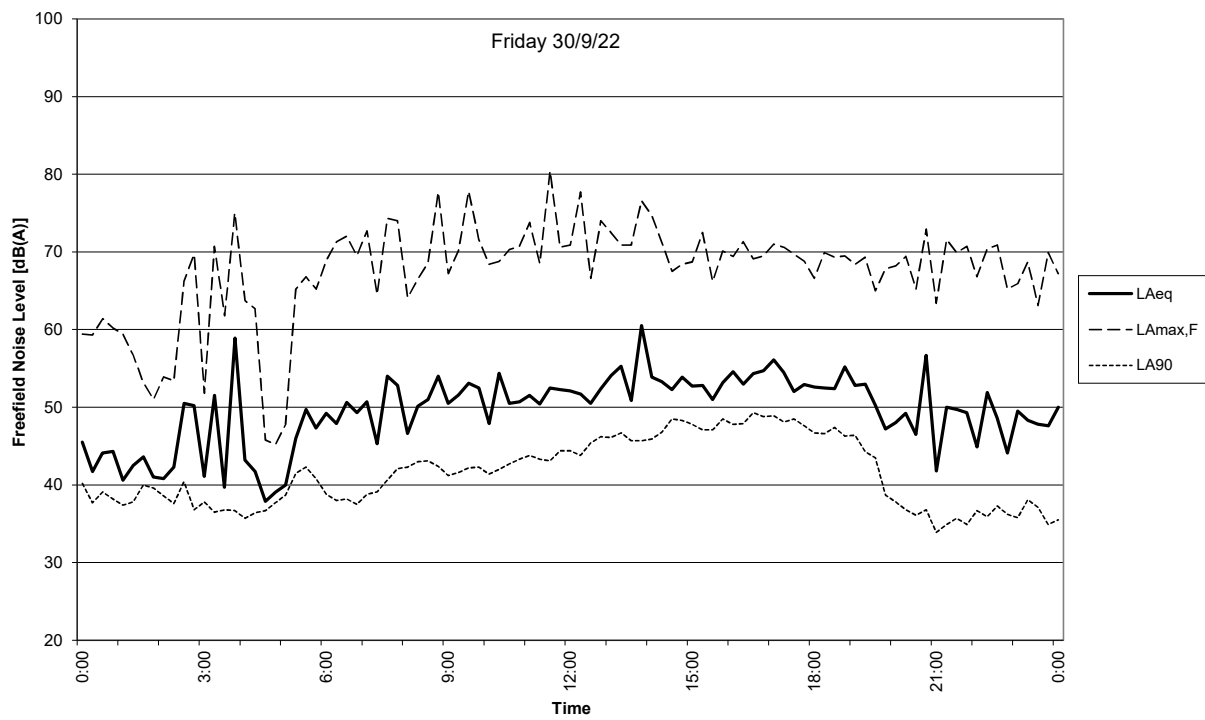
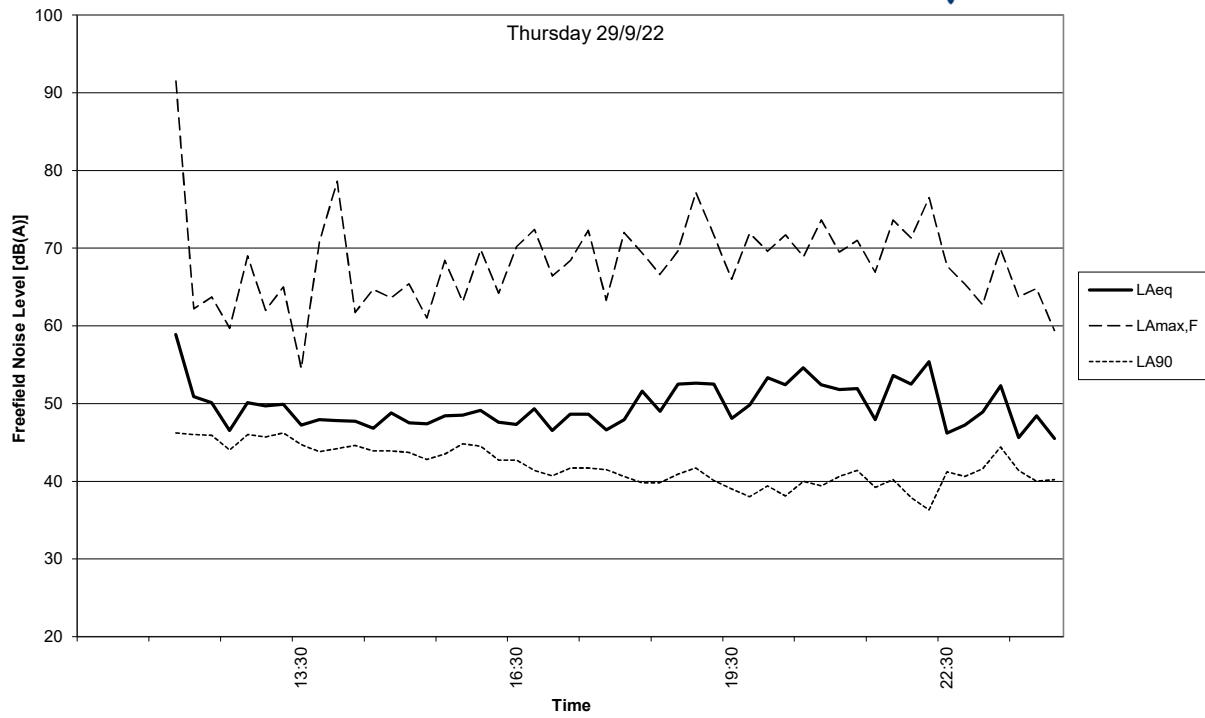


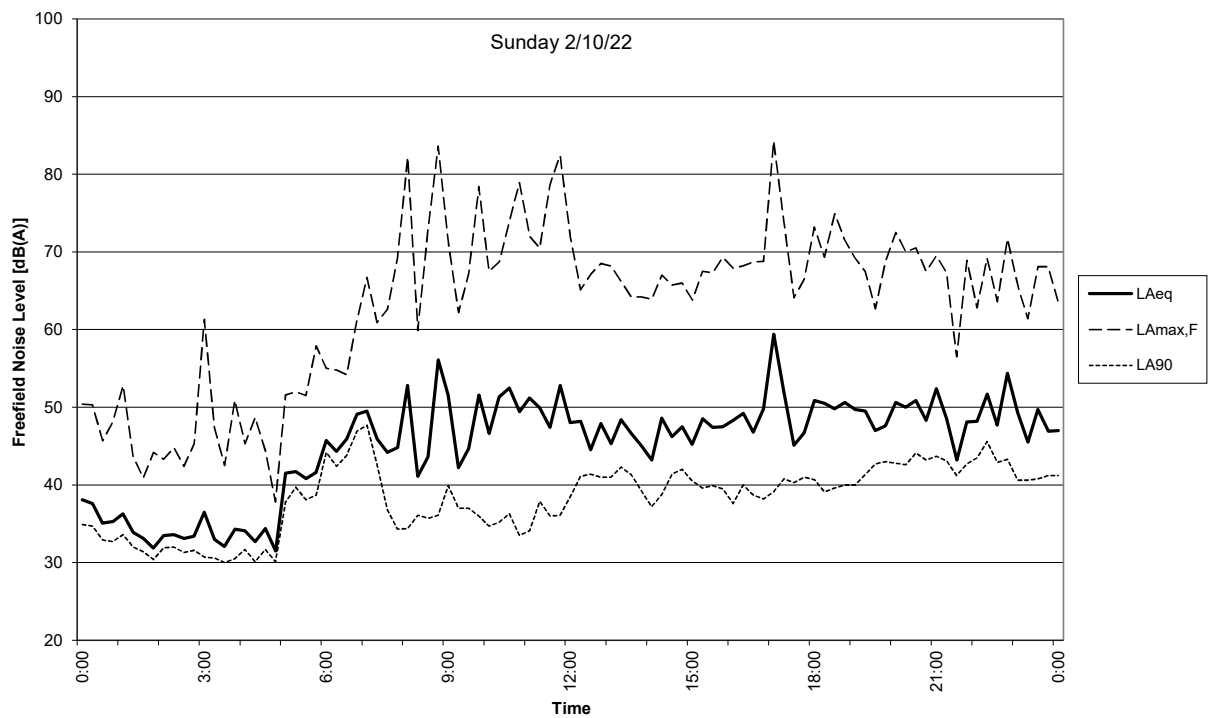
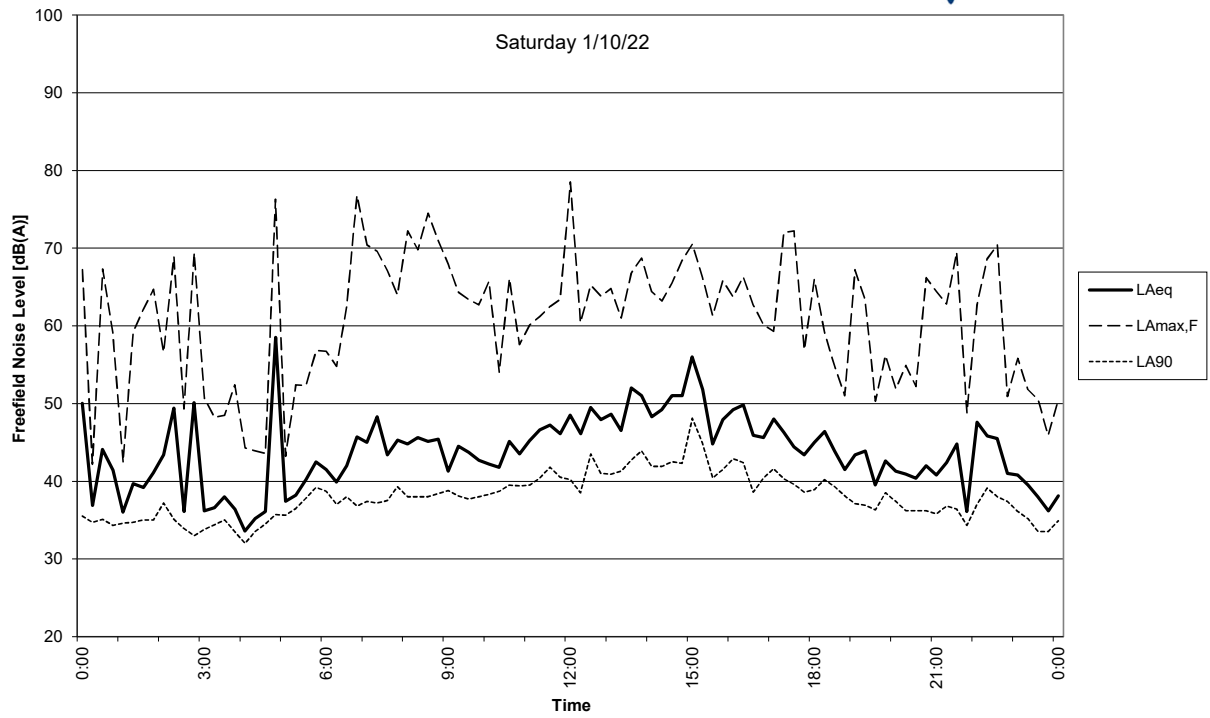


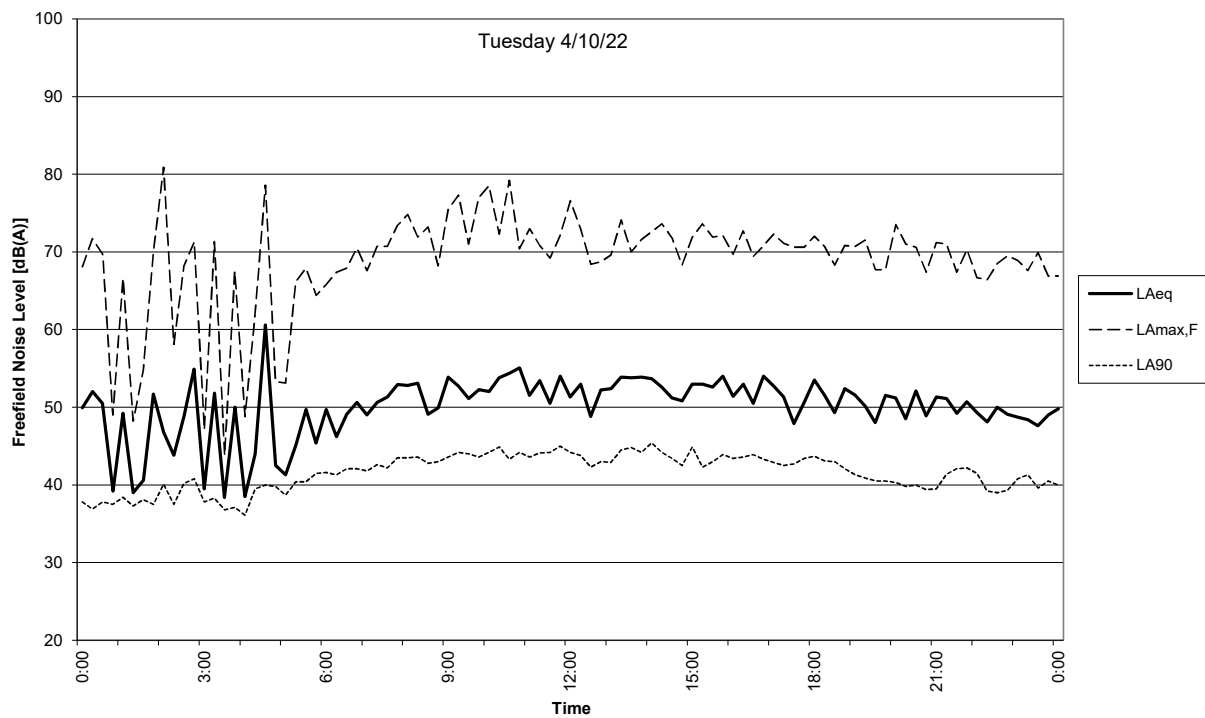
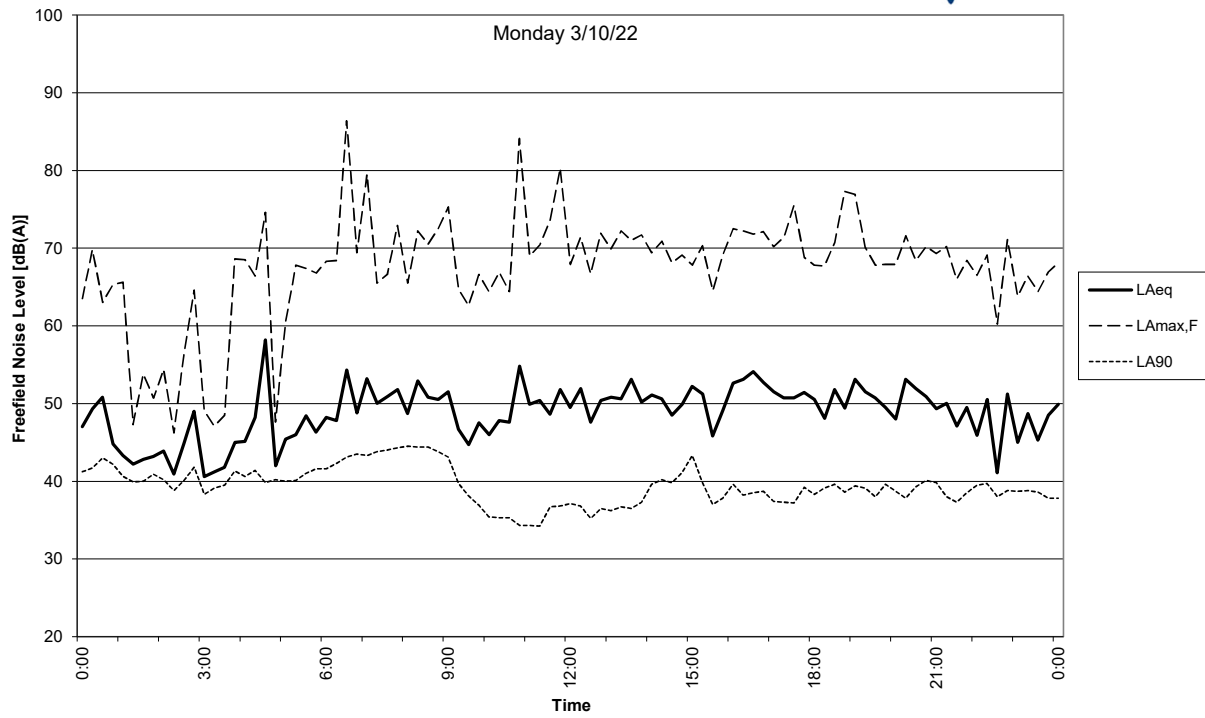


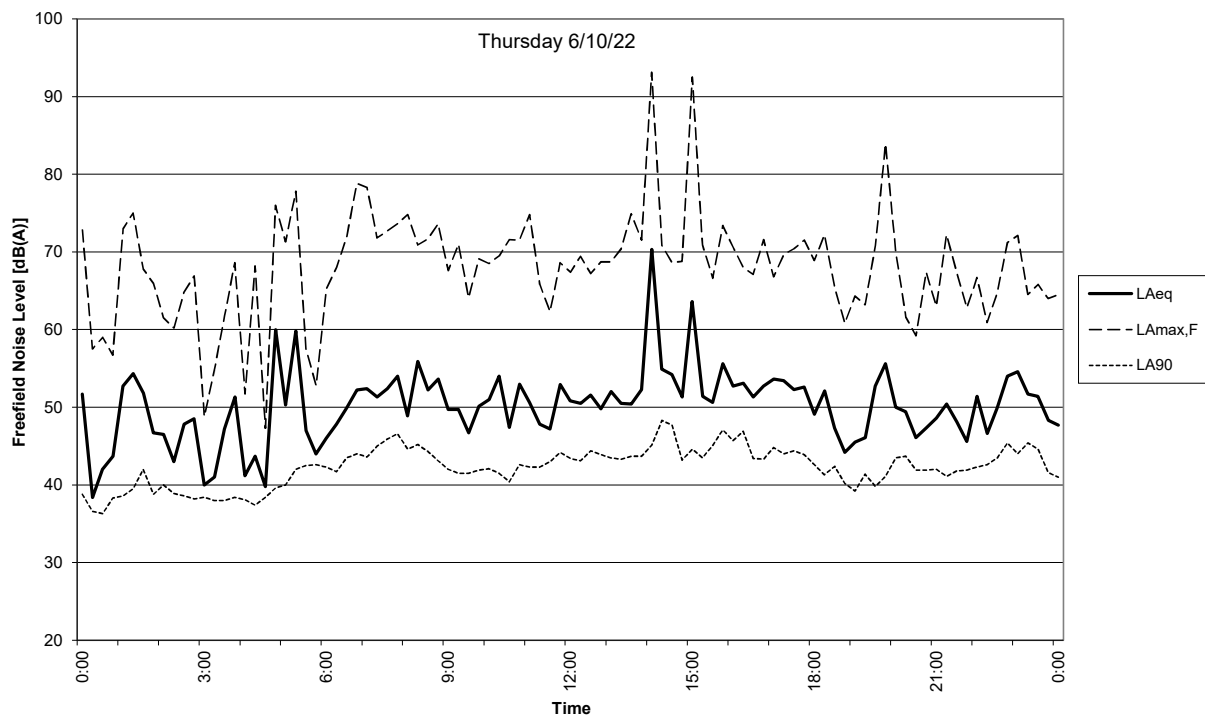
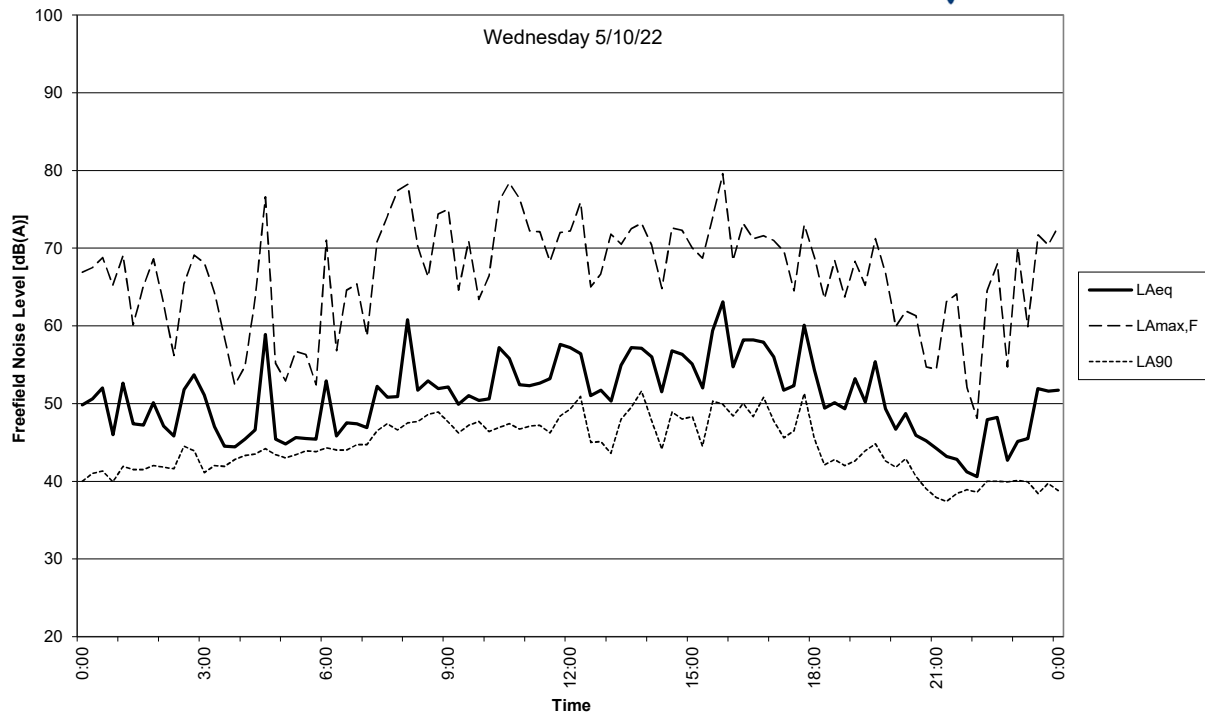


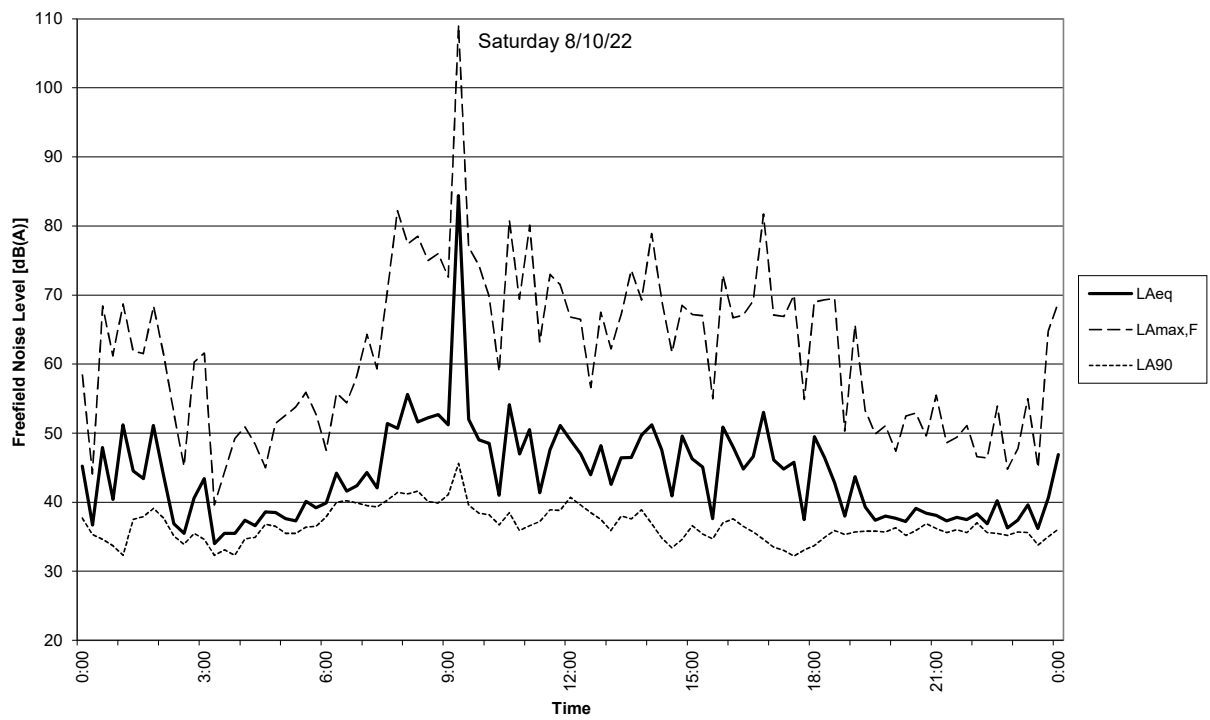
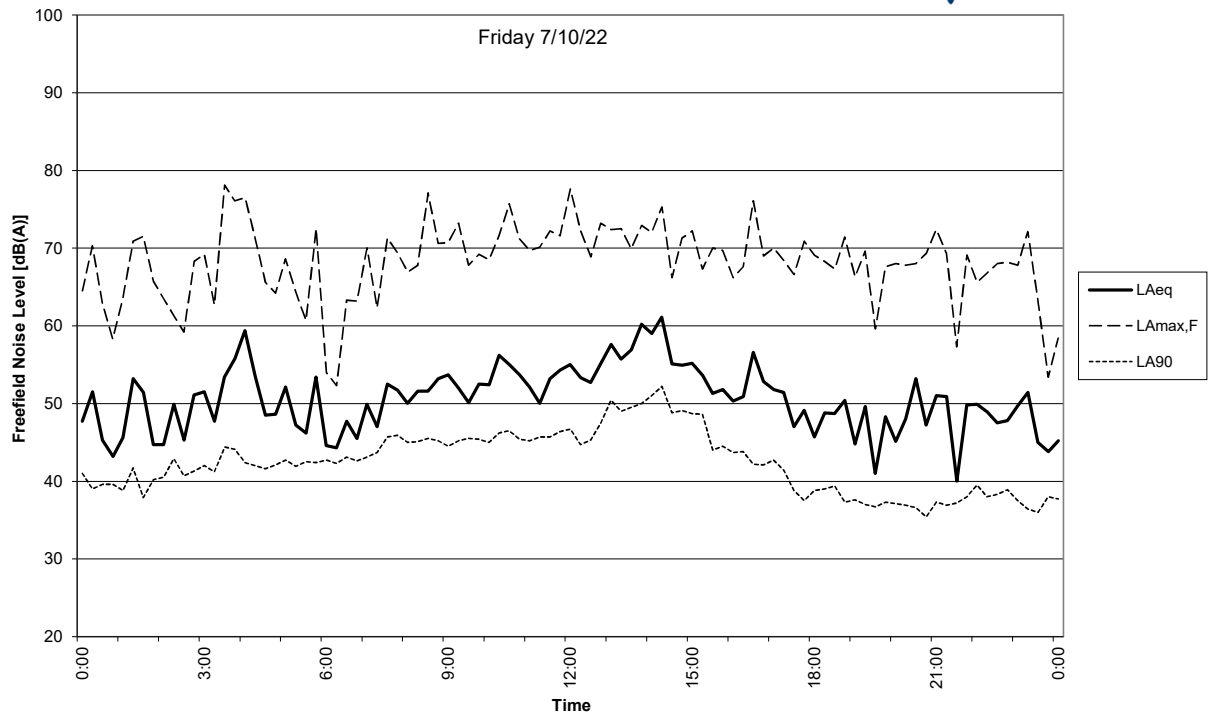
Appendix F
Results and Analysis of Noise Monitoring
at Position U5 – Village Reen, Bishton

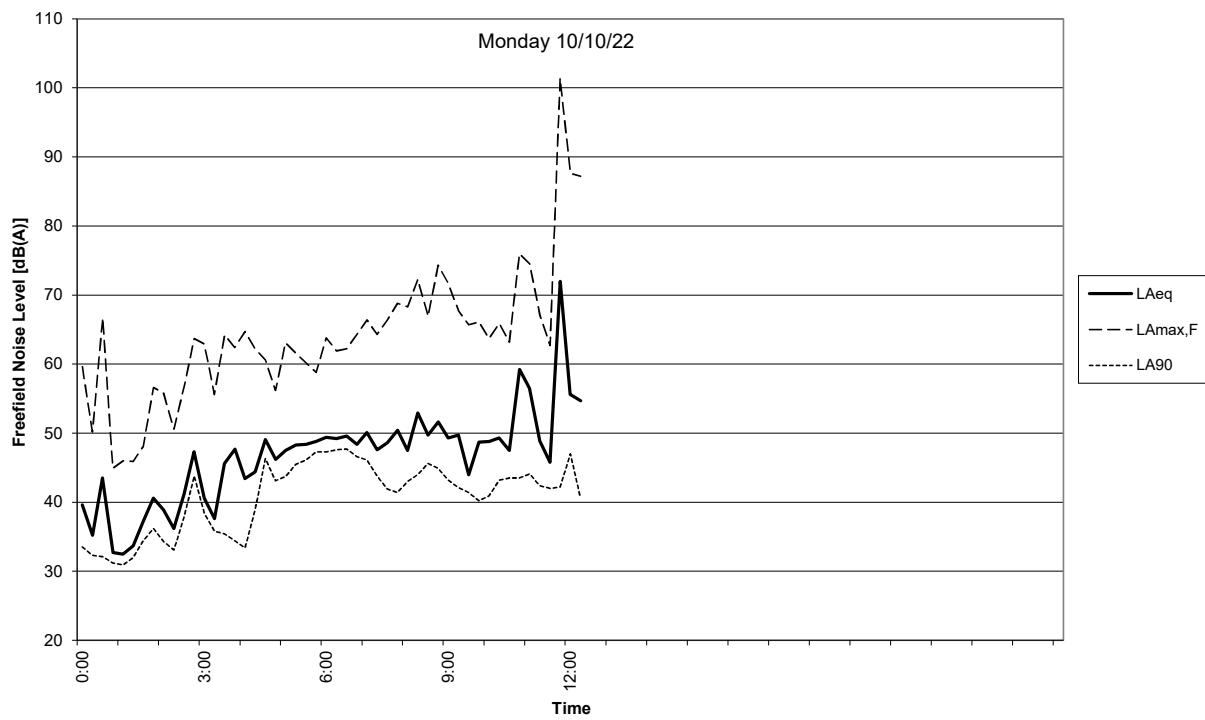
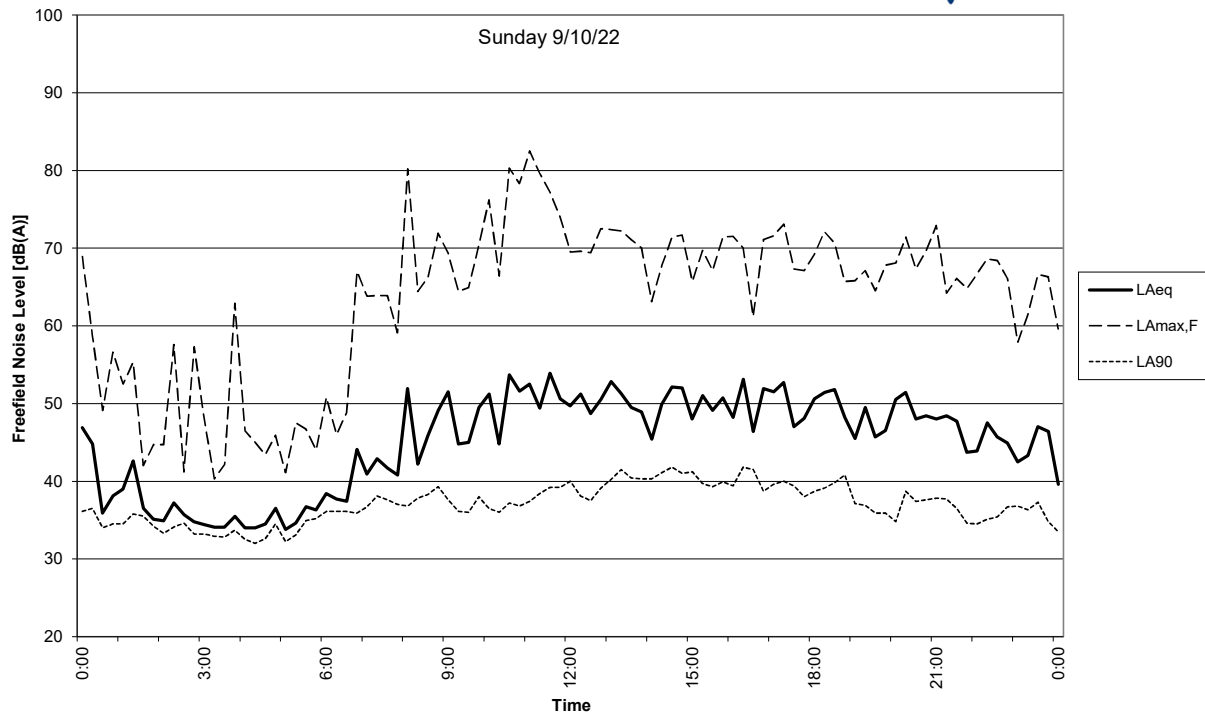


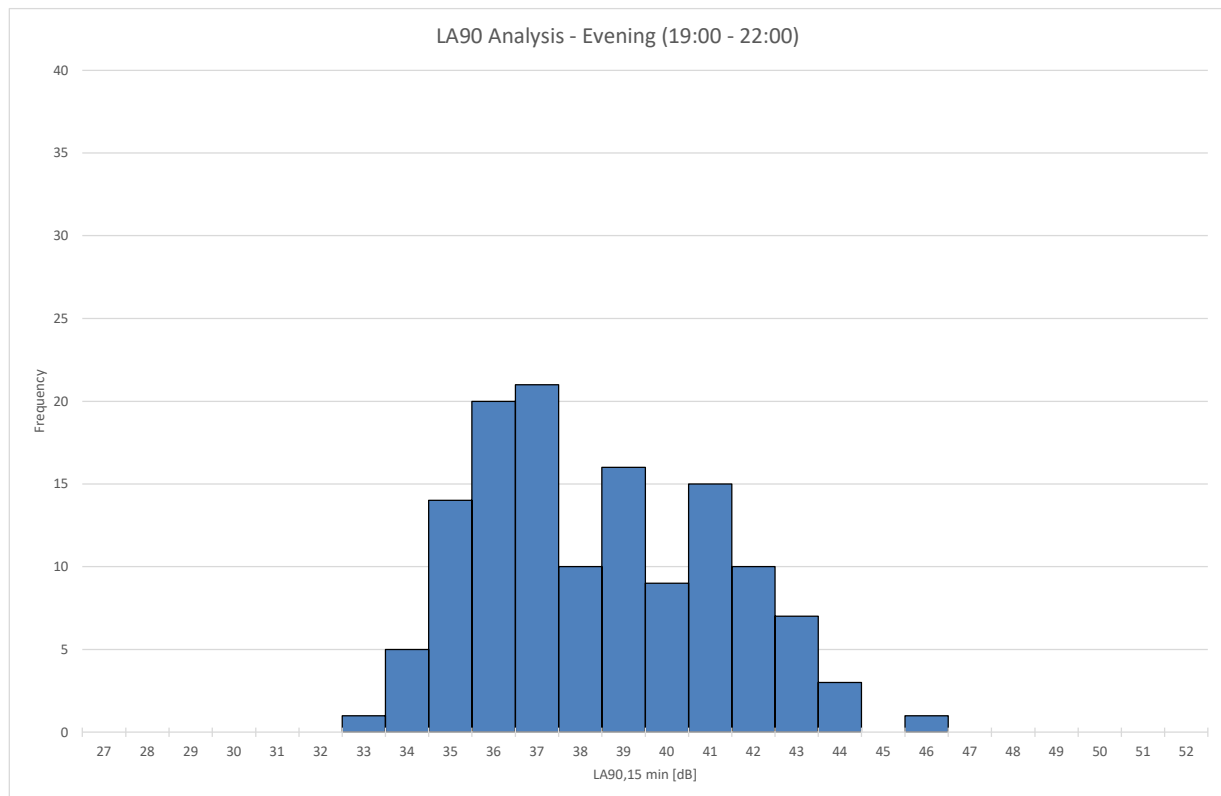
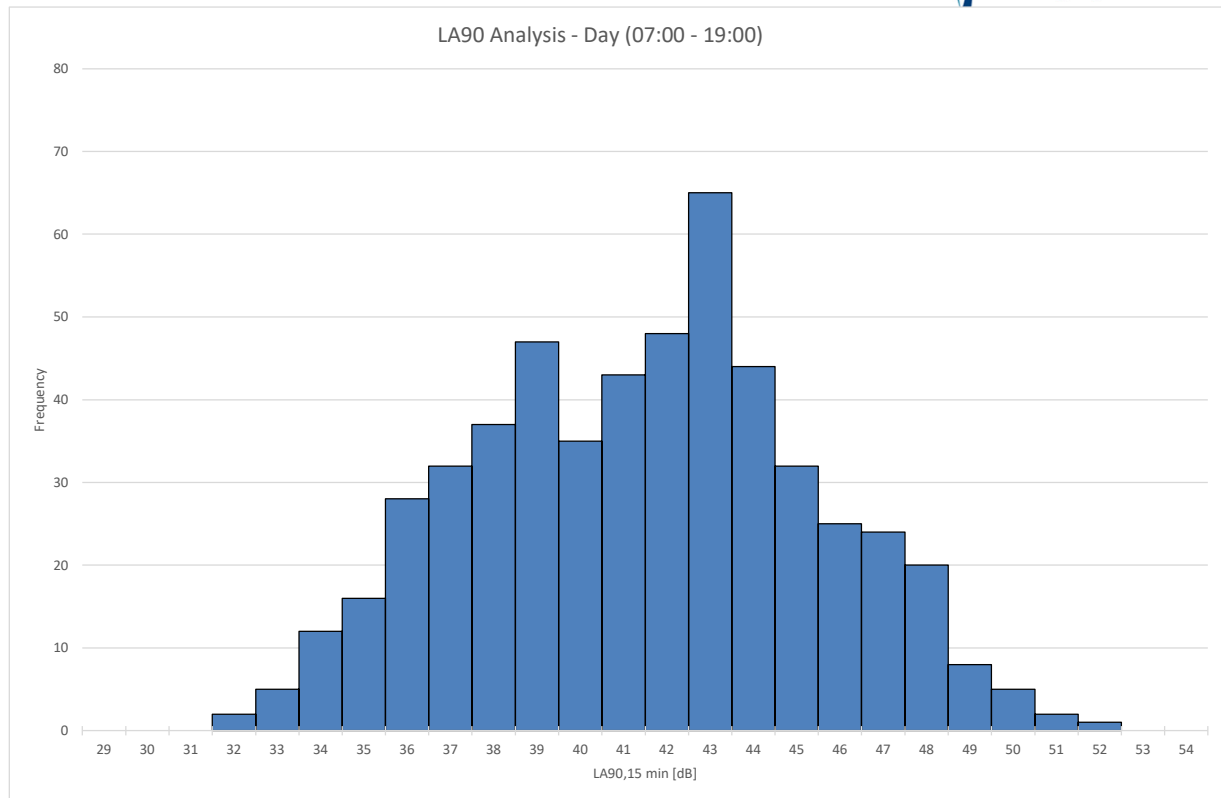


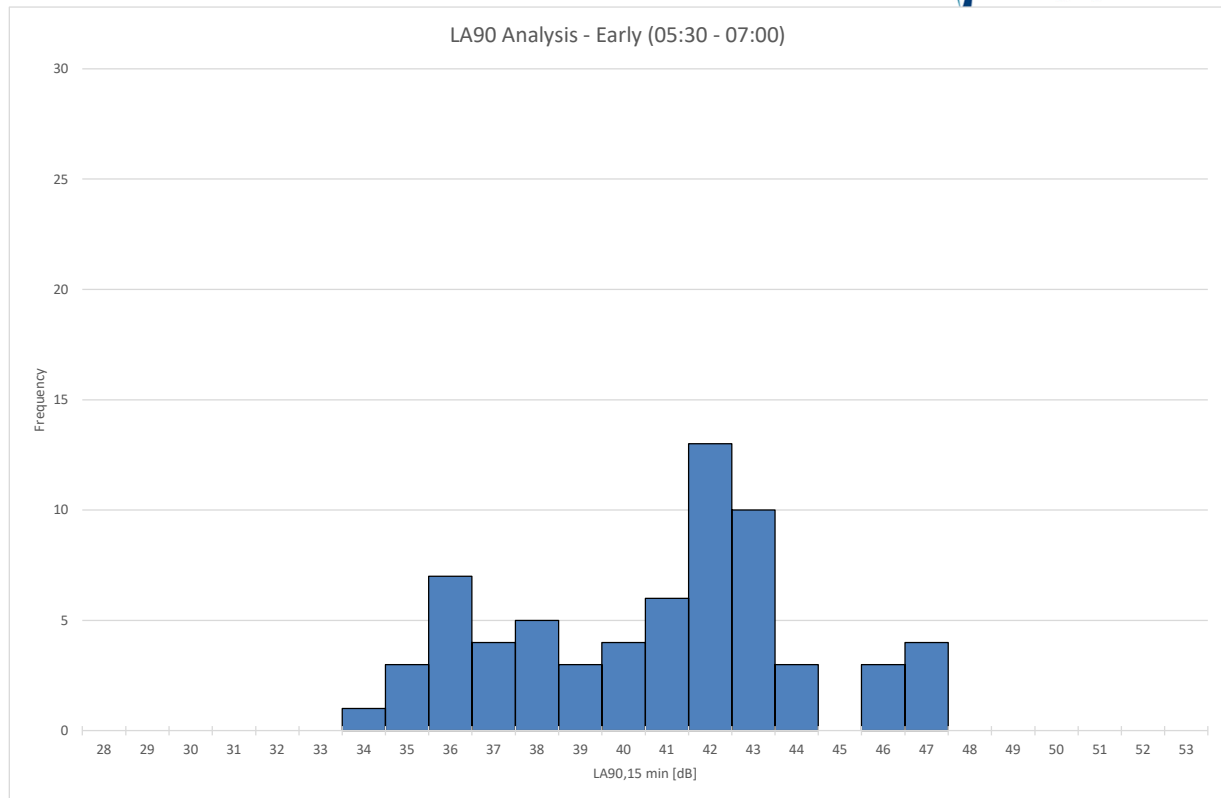












Appendix G
Results and Analysis of Noise Monitoring
at Position U6 – Ty Newydd

