

**PROJECT OCEAN,
ALTON TOWERS RESORT,
FARLEY LANE, ALTON,
STOKE-ON-TRENT,
ST10 4DB**

NOISE IMPACT ASSESSMENT

CLIENT: MERLIN ENTERTAINMENTS OPERATIONS
LIMITED – ALTON TOWERS RESORT

REVISION 1.2 – APR-24

NOTICE

This document and its contents have been prepared for Merlin Entertainments Operations Limited and are intended for their information only in relation to the proposed extension of use of Project Ocean at Alton Towers Resort, Farley Lane, Alton, Stoke-on-Trent ST10 4DB.

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1.0	DRAFT	NS	MS	MS	19/12/2023
1.1	Correction to Section 9.0 and Table A3 added to Appendix A	NS	BC	BC	12/04/2024
1.2	“Similar” Reference Ride wording	NS	BC	BC	12/04/2024

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1. EXECUTIVE SUMMARY

- 1.1 This report outlines the assessment and findings relating to a noise assessment for the proposed Project Ocean attraction, located in Alton Towers Resort, Farley Lane, Alton, Stoke-On-Trent, ST10 4DB.
- 1.2 A series of sound surveys have been undertaken at the nearest noise sensitive receivers around the perimeter of Alton Towers Resort, to establish representative background noise levels. Sound data will be compared to the data of previous sound surveys undertaken in 2021 to ensure the area's soundscape has not significantly changed.
- 1.3 An assessment has been completed in relation to potential construction impacts. This relates to both construction traffic and construction activities, throughout the construction duration.
- 1.4 Construction traffic is not expected to increase existing noise levels at defined noise sensitive receivers (NSRs).
- 1.5 Consideration of noise from construction activities is also outlined within this report, in accordance with BS5228. Based upon the results of the noise survey, maximum levels for construction noise to the most sensitive receivers are outlined.
- 1.6 An assessment has been undertaken with relation to noise from operational activities from the proposed development. This relates to both operational transportation and operational noise from the proposed attraction. Operational transportation is not expected to generate noise impacts.
- 1.7 Noise levels from operational activities to the nearest noise sensitive receivers are outlined within this report, based upon local authority requirements and the noise survey data.
- 1.8 Noise limits for the attraction are outlined. These are predicted to be achieved, based upon distances to the nearest receivers a shielding from the topography.
- 1.9 Based upon the assessment undertaken within this report, it is considered that the proposed development presents no constraints to achieving the requirements of planning with respect to noise.

2. INTRODUCTION AND OVERVIEW

- 2.1 Cahill Design Consultants has been commissioned by Merlin Entertainments Operations Limited – Alton Towers Resort, to assess the potential impact at noise-sensitive receivers around the perimeter of the site relating to construction and operation Project Ocean.
- 2.2 The Project Ocean attraction is expected to operate throughout the year during the normal opening times of the Alton Towers site.
- 2.3 The following figure illustrates central location of the proposed Project Ocean within the Alton Towers Resort.

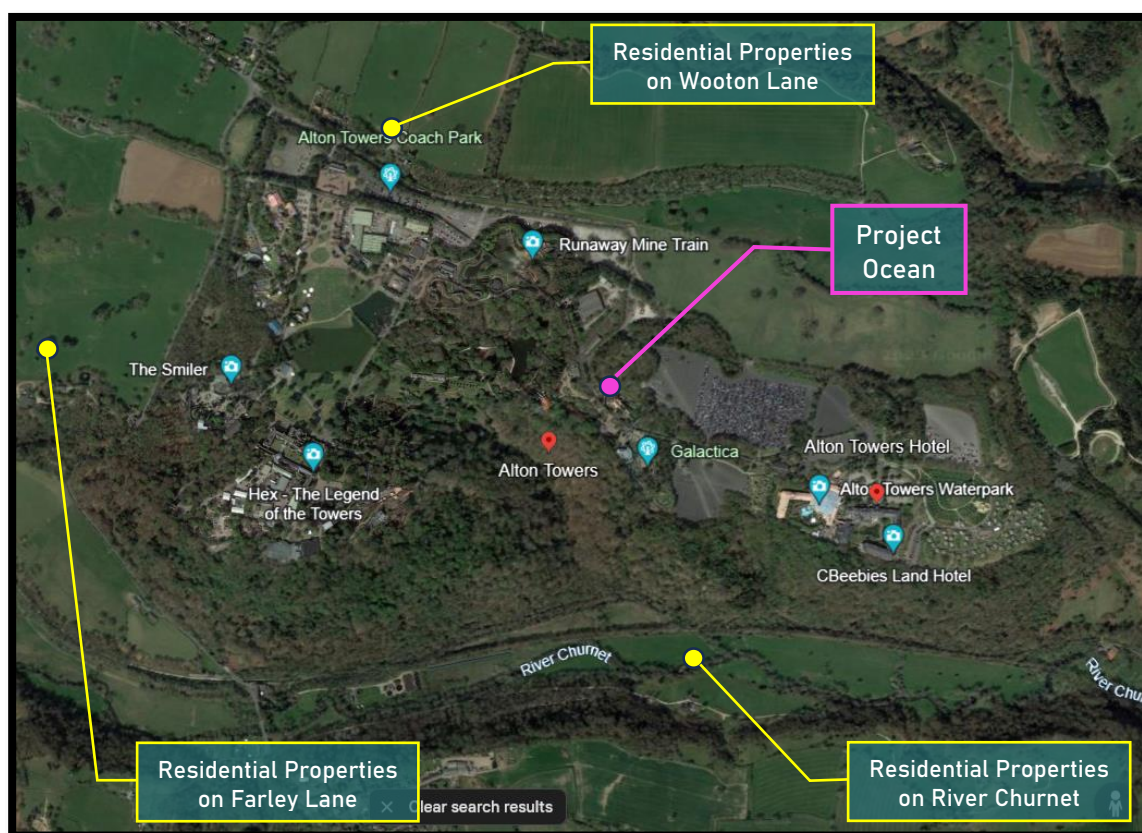


Figure 1: Project Ocean within Alton Towers Resort.

- 2.4 The assessment considers the potential noise impacts from Project Ocean to the nearest noise-sensitive receivers located externally of the Alton Towers boundary. Consideration has been given to receivers to the north, west and south of the attraction.
- 2.5 The nearest noise-sensitive receivers in relation to the attraction have been defined as follows:
 - Residential properties on Wootton Lane approximately 720 m northwest of Project Ocean.
 - Residential properties on Farley Lane approximately 1150 m west of Project Ocean.
 - Residential properties on River Churnet approximately 635 m southeast of Project Ocean

- 2.6 All other receivers are at a greater distance but with comparable ambient noise levels in relation to those above.
- 2.7 The nearest noise-sensitive receivers considered as part of the assessment are illustrated in Figure 1.
- 2.8 The criteria and calculation methodology have been developed based upon accepted code of practice for the assessment of environmental noise. Further information is provided in Section 4 of this report.

3. POLICY AND GUIDANCE DOCUMENTS

Policy and Guidance

- 3.1 The assessment methodology is based on the following policy and guidance documents:
 - [Staffordshire Moorlands Local Plan](#)
 - [Churnet Valley Masterplan – Supplementary Planning Guidance](#)
 - [National Planning Policy Framework \(NPPF\)](#);
 - [Noise Policy Statement for England \(NPSE\)](#);
 - [BS 4142:2014 + A1 2019 – “Methods for rating and assessing commercial and industrial sound”](#).
 - [The Environmental Protection Act 1990](#)
- 3.2 A review of the relevant planning policy and acoustics guidance is provided in Appendix A. National & Local Policy and Guidance

4. PROPOSED CRITERIA

- 4.1 For the purposes of this assessment, the following criteria has been used as a guideline. This is based upon the noise assessment and design of other similar attractions within UK theme parks including Alton Towers.
- 4.2 Impacts relating to transportation have been considered in accordance with guidance outlined within DMRB, based upon changes in noise levels. This relates to both construction and operational transportation.
- 4.3 Noise from construction activities have been assessed in accordance with guidance outlined within BS5228. Predicted construction noise impacts above the threshold would be deemed a ‘significant’ impact. Where levels are predicted to be below the threshold, impacts are deemed not to be ‘significant’.

4.4 Operational impacts have been considered in accordance with PPG-Noise 2014, and in line with assumed Local Authority requirements. The adverse effect levels have been defined as follows in this instance:

- NOEL – No Observed Effect Level
Minimum 5 dB below measured background dB L_{A90} noise measurements.
- LOAEL – Lowest Observed Adverse Effect Level
Between 5 dB below and 5 dB above the measured background dB L_{A90} noise measurements.
- SOAEL – Significant Observed Adverse Effect Level
In excess of 5 dB above measured background dB L_{A90} noise measurements.

4.5 The target threshold descriptor for noise impacts from the attraction to the nearest off-site receivers is to achieve LOAEL, that is between 5 dB below and 5 dB above the measured background dB L_{A90} noise measurements.

5. CONSULTATION

5.1 Consultation has not been undertaken with the Local Authority for this project regarding appropriate criteria and methodology to be referenced for the assessment of operational noise from the Project Ocean scheme.

5.2 However, the receiver locations assessed have been previously accepted by the Local Authority for noise assessments for other Alton Towers attractions.

5.3 The assessment is based on the methodology used for other attractions located within the Alton Tower Site.

5.4 For the purposes of this assessment the nearest residential receivers to Project Ocean have been defined as follows:

- Residential properties on Wootton Lane approximately 720m northwest of Project Ocean.
- Residential properties on Farley Lane approximately 1150m west of Project Ocean.
- Residential properties on River Churnet approximately 635m southeast of Project Ocean.

6. BASELINE DATA COLLECTION

6.1 A combination of attended and unattended noise surveys were undertaken around Alton Towers Resort, over representative daytime hours. Noise monitoring was undertaken at the noise-sensitive residential receivers nearest to the resort to establish the background noise level in their vicinity.

6.2 Attended noise monitoring was undertaken at the Wootton Lane and Farley Lane noise-sensitive receptors in 2023. Measurements were completed during daytime hours whilst the resort was open.

6.3 Although the attended measurements cover a short period of time, the data aim to validate whether there was a significant change in the vicinity's soundscape since

2022, where long-term data were measured at both the Wootton Lane and Farley Lane receptors.

6.4 Unattended noise monitoring along River Churnet was undertaken in 2023 at a location representative of the noise-sensitive residential properties located south of the resort.

6.5 Further details on the noise monitoring locations are provided below:

Wootton Lane receptors:

- Attended measurements undertaken on Friday 27th October 2023 from 14:04 to 15:29.
Microphone located on Alton Towers' north boundary near the Wootton Lane residential properties, set up on a tripod approximately 1.8m above the ground for 1 hour. Measurements were undertaken in 5-minute logging intervals.
- Unattended measurements undertaken from Friday 24th June 2022 at 15:01 to Wednesday 29th June 2022 at 16:16.
Microphone located on Alton Towers' north boundary between Alton Towers Dr and Wootton Lane. The microphone was placed on a tripod approximately 1.8m above the ground for a total of 5 days, 1 hour, and 15 minutes. Measurements were undertaken in 15-minute logging intervals. The main noise sources at this location are road traffic on Wootton Ln and Alton Towers Dr, nature sounds and occasional noise from Alton Towers' attractions and guests.

This location provides data that represent the properties on Wootton Ln, north of the resort.

Farley Lane receptors:

- Attended measurements undertaken on Friday 27th October 2023 from 15:45 to 16:10.
Microphone located on Alton Towers' west boundary on Farley Lane opposite the Chained Oak Lodge, set up on a tripod approximately 1.8m above the ground for 25 minutes. Measurements were undertaken in 5-minute logging intervals.
- Unattended measurements undertaken from Friday 24th June 2022 at 14:53 to Wednesday 29th June 2022 at 13:08.
Microphone located on Alton Towers' west boundary on Farley Ln opposite the Chained Oak Lodge. The microphone was placed on a tripod approximately 1.8m above the ground for a total of 4 days, 22 hours, and 15 minutes. Measurements were undertaken in 15-minute logging intervals. The main noise sources at this location are road traffic on Farley Ln, nature sounds and noise from Alton Towers' attractions and guests.

This location provides data that represent the properties on Farley Ln, west of the resort.

River Churnet receptors:

- Unattended measurements undertaken from Friday 27th October 2023 at 18:16 to Wednesday 01st November 2023 at 23:00.
Microphone located on Alton Towers' south boundary by River Churnet. The microphone was placed on a tripod approximately 2m above the ground for a total of 5 days, 4 hours, and 44 minutes. Measurements were undertaken in 15-minute logging intervals. The main noise sources at this location are predominantly nature sounds and occasional noise from Alton Tower's attractions and guests.

This location provides data that represent the properties south of River Churnet

6.6 The noise monitoring locations are illustrated in Figure 2.

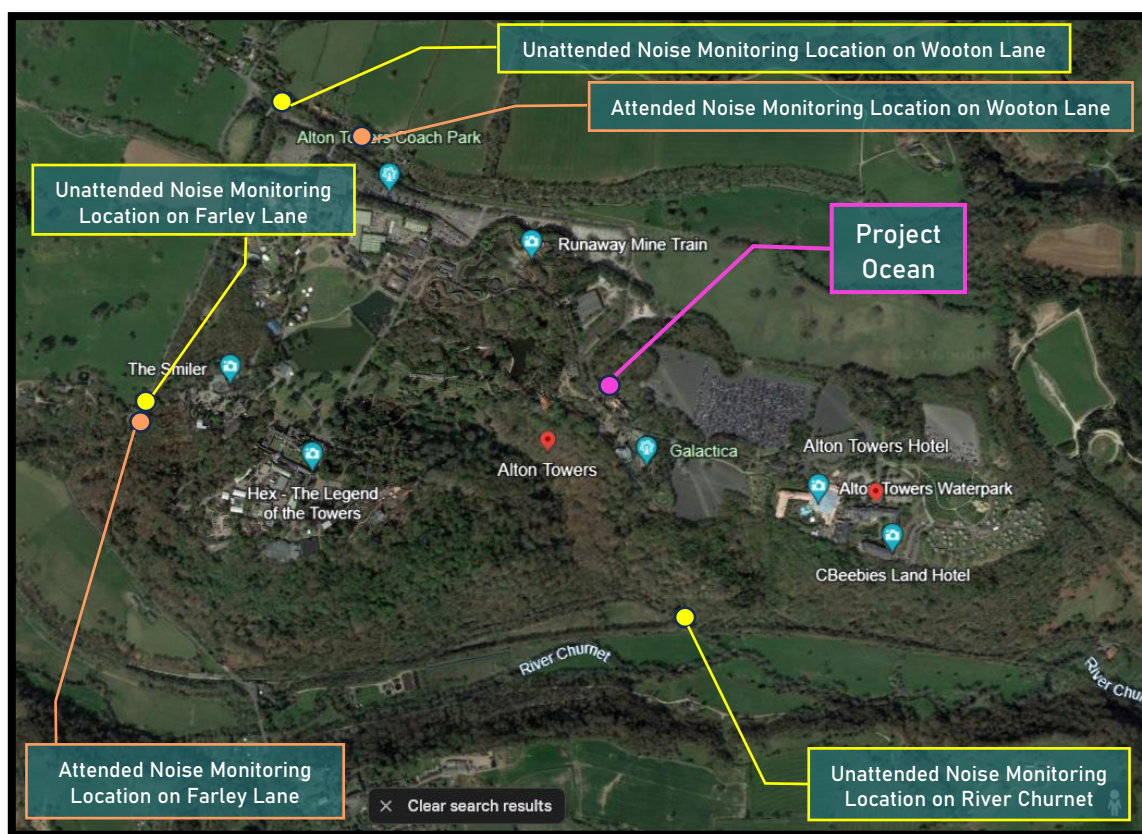


Figure 2: Noise monitoring locations in the vicinity of the nearest NSR.

- 6.7 Weather conditions were stable throughout all noise surveys. The temperature fluctuated between 11°C and 20°C during the 2022 surveys and between 7°C and 13°C during the 2023 surveys.
- 6.8 During the 2022 noise surveys, the wind speed fluctuated between 1 m/s and 7 m/s, exceeding the suitable weather conditions (≤ 5 m/s) for surveys at times. However, the data was assessed, and it was concluded that the events of wind speeds above 5 m/s did not affect the sound data collected. The wind speed during the 2023 noise surveys fluctuated below 5 m/s at all times, complying with the requirement for environmental surveys. Complete details of the weather during the environmental surveys are included in Appendix B.
- 6.9 Accredited laboratory-calibrated equipment was used for the surveys per BS EN 61672 and BS EN 60942. Equipment details are outlined in Appendix C.
- 6.10 The measurement equipment was calibrated before and after measurements were taken and no drift was observed.
- 6.11 All environmental survey data was measured per BS7445-1:2003 'Description and measurement of environmental noise'.
- 6.12 The following table outlines the results of the short-term noise measurements undertaken near the Wootton Lane and Farley Lane residents in 2023. The L_{Aeq} values are the logarithmic averages and L_{A90} values are the average value.

Table 1: Attended (short-term) noise survey results.

Location	Period	dB L _{Aeq,T}	dB L _{A90,5mins}
Wootton Lane 2023 (Attended Noise Monitoring)	Daytime (14:04 – 15:29 27/10/2023)	61	49
Farley Lane 2023 (Attended Noise Monitoring)	Daytime (14:04 – 15:29 27/10/2023)	69	52

6.13 Table 2 below outlines the results acquired from the long-term noise measurements undertaken near the Wootton Lane and Farley Lane residents in 2022 and near the River Churnet residents in 2023. The L_{Aeq} values are the logarithmic averages and L_{A90} values are the mode value.

6.14 The results are calculated for the daytime period during which Project Ocean is proposed to be operating throughout the year. The longest operational period of the attraction is from 10:00am until 09:00pm.

Table 2: Unattended (long-term) noise survey results.

Location	Daytime (11:00am – 09:00pm)	
	dB L _{Aeq,T}	dB L _{A90,15mins}
Wootton Lane 2022 (Unattended Noise Monitoring)	61	52
Farley Lane 2022 (Unattended Noise Monitoring)	60	53
River Churnet 2023 (Unattended Noise Monitoring)	50	33

6.15 A comparison between the short-term and long-term measurements near the noise-sensitive residential properties on Wootton Lane and Farley Lane reveals that no significant change occurred in the area's soundscape between 2022 and 2023. Therefore, the assessment is based on the background noise levels (expressed as L_{A90,15mins}) shown in Table 2, as they account for a longer period of time which is considered more representative of the noise character around the properties during the operation of Alton Tower's site.

7. CONSTRUCTION NOISE ASSESSMENT

Construction Overview

- 7.1 It is understood that the construction works for the development of the proposed attraction will commence in Spring 2023, lasting for approximately 15 weeks.
- 7.2 It is understood that the development will be a new build construction involving the installation of the proposed attraction and surrounding structure, as well as the installation of associated landscaping works.
- 7.3 As part of the works, some existing buildings and structures will be removed from the area, to make way for the attraction.
- 7.4 It is understood that the proposed attraction will mainly be constructed off-site with final assembly of components on site. The surrounding structure will be constructed

on-site. This off-site works will assist in controlling noise levels generated from on-site construction activities.

- 7.5 Ground works and site preparation will be undertaken on the site before main surrounding structure works commence.

Construction Traffic

- 7.6 It is currently anticipated that construction equipment and materials will mostly be stored on site, where possible, with some deliveries being scheduled during the assembly phase. This will assist with reducing the number of trips from construction vehicles to and from the site.
- 7.7 At the time of writing, there is no formal schedule for the number of construction vehicles that will arrive at the site daily. However, an estimation on vehicle movement has been carried out based on similar developments completed on site.
- 7.8 These daily construction traffic numbers are estimated to be low in comparison to the overall traffic flows in the area, particularly on Farley Lane, where the Alton Tower's staff / contractors' entrance and car park is located.
- 7.9 It is recommended that all construction traffic avoids residential roads with low traffic volume. It would be the appointed manager's role to provide the most suitable routes and times for deliveries from and to the site to the delivery drivers.
- 7.10 Additionally, all traffic related to the project should comply with local traffic conditions and rules.
- 7.11 All deliveries are expected to take place from 0800 – 1800 hours on Monday to Friday.
- 7.12 No night-time deliveries will be made, and no deliveries or construction transportation is anticipated to arrive or leave the site during Sundays and Bank Holidays. Deliveries from and to the site between 0800 – 0930 hours and 1630 – 1800 hours will be avoided if possible.
- 7.13 Furthermore, if possible, materials, equipment and plant will be chosen from local suppliers to ensure reduced impact on the highway network.
- 7.14 Construction workers will arrive by public, personal or shared transportation. Similarly, the number of vehicles will be small in comparison to the overall vehicles in the area on any given day.
- 7.15 In terms of noise impacts from transportation, anything less than a 25% increase in total traffic flow equates to a change of less than 1 dB which is not considered an impact. In this case the predicted flows from construction traffic will be significantly less than 25% and so the impact is considered as 'negligible'.
- 7.16 Therefore, there is negligible noise impact from construction traffic is expected during the construction of the attraction.

Construction Activities

- 7.17 All construction activities will be undertaken during daytime hours, as defined in BS5228, between 07:00 – 19:00 Monday to Friday, and Saturdays, between 07:00 – 13:00.
- 7.18 Based upon measured ambient levels at the defined noise sensitive receivers, the threshold value for 'significance' has been defined as outlined within Table 5 below, in accordance with BS5228. Predicted construction noise impacts above this threshold would be deemed as 'significant' impact. For levels predicted to be below the threshold, impacts are deemed not to be 'significant'.
- 7.19 These levels relate to 1m from the nearest defined receivers on the referenced roads.

Table 3: Maximum construction noise levels @ receivers (ref. BS5228)

Noise Sensitive Receivers	Measured Ambient Noise levels at NSR	Maximum Construction Activity Noise Level Threshold at Receivers
Wootton Lane Receivers	61 dB $L_{Aeq, 15 \text{ mins}}$	65 dB $L_{Aeq, T}$
Farley Lane Receivers	60 dB $L_{Aeq, 15 \text{ mins}}$	65 dB $L_{Aeq, T}$
River Chumet Receivers	50 dB $L_{Aeq, 15 \text{ mins}}$	65 dB $L_{Aeq, T}$

- 7.20 The above construction noise limits shall apply cumulatively, considering both the noise from construction activities and the existing ambient noise levels.
- 7.21 To check the viability of maintaining suitable levels of construction noise. it has been possible to complete a simple assessment of levels of construction noise at the project location that would The following table indicates the levels of construction noise that would be required exceed the.

Table 4: Maximum construction noise levels to receivers (ref. BS5228)

Noise Sensitive Receptors	Wootton Lane	Farley Lane	River Churnet
Distance and location relative to the potential construction activity	720m North West	1150m West	635m South
Ambient noise levels at receptors ($L_{Aeq, 15 \text{ mins}}$)	61 dB	60 dB	50 dB
Maximum Construction Noise $L_{Aeq, 15 \text{ mins}}$ at receptors	65 dB	65 dB	65 dB
Simple Distance Correction to a position 20m from Construction Site Boundary .	31 dB	35 dB	30 dB
Predicted Allowable Construction Noise at 20m from Construction compound to achieve maximum value at NSR ($L_{Aeq, 15 \text{ mins}}$)	96 dB	100 dB	95 dB

- 7.22 At the time of writing a detailed construction schedule has not been provided, however, CDC experience of similar construction operations on other sites indicates the allowable construction noise levels a position 20m from the construction compound is not expected to be exceeded.
- 7.23 Therefore, the construction noise threshold levels at the at the NSR are not expected to be exceeded given the distance to and the intervening topography and planting.

8. OPERATIONAL NOISE ASSESSMENT

Operational Transportation

- 8.1 It is anticipated that the proposed attraction will not generate any additional traffic numbers to and from the resort, on the basis that visitors will be travelling to Alton Towers anyway.
- 8.2 In terms of noise impacts from transportation, anything less than a 25% increase in flows equates to a change of less than 1 dB and so it is not considered an impact. In this case the predicted flows from operational traffic will be significantly less than 25% and so the impact is considered as 'Negligible'.
- 8.3 Therefore, the expected noise impact of sound relating directly to operational transportation for project Ocean would be 'Negligible'.

Operational Noise from the External Attraction

- 8.4 CDC has previously visited another Merlin Theme Park to measure noise from a very similar "Topspin" style attraction. The following table outlines the noise levels of similar attraction. The levels include noise from theming elements and people riding the attraction.

Table 5: Predicted operational noise levels from Project Ocean

Sound Pressure Level Measured @ Locations 10m from "Topspin" Style attraction		
Location Of Monitoring	L _{Aeq,15mins} dB	L _{A90,15mins} dB
Position 1	82	70
Position 2	78	70
Average Noise Level	80	70

- 8.5 The following table outlines predicted noise levels at the receiver locations based upon the source noise measurements shown in Table 5 above. The predicted levels are corrected for sound propagation over the distance between Project Ocean and the noise-sensitive receivers and compared to background noise levels measured within the receivers' vicinity during the normal operation of the Alton Towers Site.

Table 6: Predicted operational noise levels from Project Ocean at the nearest noise-sensitive receivers.

Noise Sensitive Receptors	Wootton Lane	Farley Lane	River Churnet
Distance and location relative to the resort	720m North	1150m West	635m South
Project Ocean Attraction $L_{Aeq,15mins}$ at 10m	80 dB	80 dB	80 dB
Background noise levels at receptors ($L_{A90,15mins}$)	52 dB	53 dB	33 dB
LOAEL Threshold $L_{Aeq,15mins}$ at receptors	47-57dB	48-58 dB	28-38 dB
Distance Reduction	-37 dB	-41	-36 dB
Shielding due to Topography	0 dB	-5 dB	-8 dB
Predicted $L_{Aeq,15mins}$ at receptors	43dB	34 dB	36 dB
Compliance (LOAEL)	Yes	Yes	Yes

- 8.6 The table above, indicates that the predicted noise levels from Project Ocean attraction are below the upper threshold LOAEL limit at each of the three nearest sensitive receptors to the Alton Towers site.
- 8.7 Noise Levels at Farley Lane & Wootton Lane are expected to be significantly lower than the prevailing background.
- 8.8 Noise Levels predicted at River Churnet receptor is below the upper LOAEL threshold at the nearest sensitive receptor. Noise from the Project Ocean ride will not cause a significant change in environment at this receptor and any audible noise would be similar in character to the other sources within the Alton Towers resort.

9. CONCLUSION & CLARIFICATION

- 9.1 The noise assessment for project Ocean attraction predicts that noise levels at all defined nearest noise-sensitive receivers will comply with the adopted criterion outlined in Section 4 of this report.
- 9.2 Noise from theming elements and any sound systems must be carefully controlled to make certain that the sound levels are NOT noise increased above the 80 dBA @ 10m sound pressure level used in this assessment.
- 9.3 Additionally, the speakers used for this project must be directional speakers and must face away from all nearest receivers. This will make certain that no residential properties are directly exposed to any theming music or sound effects that are used to create ambiance.

APPENDIX A

PLANNING POLICY, BS5228- 2009 & ENVIRONMENTAL PROTECTION ACT.

SUMMARIES

National & Local Policy and Guidance

Staffordshire Moorlands Local Plan

The Staffordshire Moorlands Local Plan provides policies which will form the basis of planning decisions. Noise is mentioned in Policy SD4 & Policy DC1:

Policy SD 4 Pollution and Water Quality

The Council will protect people and the environment from unsafe, unhealthy and polluted environments by ensuring proposals avoid potential adverse effects; and only permitting proposals that are deemed (individually or cumulatively) to result in pollution (including air/ water/ noise/ vibration/ light/ ground contamination) if after mitigation, potential adverse effects are deemed acceptable. This may be achieved by the imposition of planning conditions or through a planning obligation.

Policy DC 1 – Design Considerations

All development shall be well designed and reinforce local distinctiveness by positively contributing to and complementing the special character and heritage of the area in line with the Council's Design Guide SPD. In particular, new development should:

protect the amenity of the area, including creation of healthy active environments and residential amenity, in terms of satisfactory daylight, visual impact, sunlight, outlook, privacy, soft landscaping as well as noise, odour and light pollution.

However, the Local Authority do not appear to have any numerical noise limits within policy. Therefore, it is assumed that limits set in accordance with the standard method used in the UK will be considered acceptable to comply with the requirements of Policy EP3.

Churnet Valley Masterplan – Supplementary Planning Guidance

The Churnet Valley is part of the Staffordshire Moorlands which is rich in history and natural beauty. It is also a living landscape which provides jobs, services and homes for local communities and offers much for visitors to enjoy. This brings many pressures and demands on the area, as well as providing tremendous opportunities to enhance the overall contribution which the area makes to the district and region.

The Council has led in the preparation of this Masterplan for the Churnet Valley. This Masterplan provides a comprehensive framework for future development in the area. It identifies opportunities and measures to help regenerate and manage this important rural area based around sustainable tourism in a manner which is sensitive to and enhances its important heritage, landscape and ecology.

The document recognises that the impact of potential future development on local residents and existing visitors. Additional visitors may result in increased noise and increased number of vehicles on the roads. This could threaten quiet enjoyment of the countryside.

In section 7.7.6 the document recognises the development opportunities within the Alton Towers site. The document identifies that one of the constraints affecting the development at the park is “Noise and visual intrusion from rides”.

The development strategy for the Alton Towers site indicates *all major development proposals will need to consider impact on views, transport, trees and heritage assets. In some proposals the potential noise effects of proposals will also be an important consideration.*

The document provides advice on future development principles and gives the following advice relating to amenity and noise:

All future development should consider the amenity of residents living near to the resort and on the main access routes to the resort. Ensure that any new major development proposals for the site are accompanied by a Noise Impact Assessment where necessary.

National Planning Policy Framework, 2023 (NPPF)

The National Planning Policy Framework 2023 (NPPF) sets out the government planning requirements and supersedes previous versions and guidance notes such as PPG24. No specific noise criteria are set out in the NPPF, or in the Noise Policy Statement for England (NPSE) to which it refers. The NPPF includes the following statements relating to noise and the requirement to take it into account in the planning process.

Paragraph 180 advises that:

- *180 – 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. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*

Paragraph 191 advises that:

- *191. 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 tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*

Paragraph 193 of NPPF further elaborates on the consideration of existing businesses in all planning applications, as follows:

- *193. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable*

restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

The NPPF sets out the “need to ensure that developments do not give rise to significant adverse impacts on health and the quality of life”. In addition, the operations of existing businesses are also protected, with reference to ensuring new developments do not have an adverse effect on their operations.

Noise Policy Statement for England, 2010 (NPSE)

The Noise Policy Statement for England (NPSE) applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise but does not apply to noise in the workplace. The Government recognises that the effective management of noise requires a co-ordinated and long-term approach that encompasses many aspects of modern society.

The NPSE explains that the WHO defines health as “a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity” (NPSE paragraph 2.12)

The long-term vision of Government noise policy is set out to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

This long-term vision is supported by three main “Noise Policy 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 makes a distinction between “quality of life”, which is a subjective measure, and “health”, which refers to physical and mental well-being.

Impacts that may result from noise such as “annoyance” and “sleep disturbance” are both quality of life and health effects in this sense.

The NPSE introduces the concept of NOEL, LOAEL and SOAELs, which are described below:

- *No Observed Effect Level – NOEL*
This is the level below which no observable effect can be detected.
- *Lowest Observed Adverse Effect Level – LOAEL*
This is the level above which adverse effects on health and quality of life can be detected.
- *Significant Observed Adverse Effect Level – SOAEL –*
This is the level above which significant effects on health and quality of life can be detected.

It is the last of these criteria – the SOAEL – that is the level above which significant adverse effects on health and quality of life occur that equates to the “first aim of the NPSE” (paragraph 3.9 above) and the principal objective of the NPPF (paragraph 3.2 above).

The “second aim of the NPSE” is to mitigate and minimise adverse impacts between LOAEL and SOAEL.

The NPSE does not provide noise levels or limits above which SOAEL occurs. Indeed, the document advises that it is not possible to have a single objective noise-based measure that defines SOAEL. Therefore, it is necessary to refer to other advisory documents in order to seek to define such levels.

Planning Practice Guidance-Noise (PPG-N)

The PPG-N is an internet-based document that was last updated in July 2019.

This document reinforces the concept of NOEL, LOAEL and SOAEL and defines a person's perception at these different effect levels.

It is notable that the PPG-N describes the NOEL as “noise can be heard, but does not cause any change in behaviour or attitude”, whereas at a LOAEL “noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television, speaking more loudly”

The former is described as “noticeable and not intrusive” whereas the latter is described as “noticeable and intrusive”.

A “significant” effect is described as “noticeable and disruptive” resulting in “a material change in behaviour and/or attitude...”

The PPF, NPSE and PPG-N do not ascribe noise levels to any of the effects discussed, including a “significant effect”. Therefore, it is necessary to consider other guidance which attributes noise levels to health effects such as annoyance during the day or sleep disturbance at night.

British Standards

BS5228-2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise

There are no statutory limits regarding construction noise. BS5228-1:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open site – Part 1: Noise’, provides guidance on assessing the potential significance of noise effects from construction activities in Annex E. Within the guidance there are two approaches described for threshold limits and noise level changes.

The following table has been reproduced from table E.1 in BS5228-1:2009+A1:2014 and shows the ‘ABC criteria’ thresholds for potential significant effect.

The ambient noise level is determined through baseline noise survey at, or within the vicinity of, the nearest residential properties and then rounded to the nearest 5dB to determine the appropriate category (A, B or C) and subsequent threshold value. This is compared with the noise level predicted from construction activity. A potential significant effect is indicated if the construction noise level exceeds the appropriate category threshold value.

If the existing ambient level exceeds the threshold category threshold values, then a potential significant impact is indicated if the total noise level, including both the ambient noise and the various contributions of construction noise, is greater than the ambient noise level by more than 3dB.

Construction activity noise levels

Example Threshold of Potential Significant Effect at Dwellings (BS5228-1:2009+A1:2014)

Assessment Category and Threshold Value Period	Threshold Value in decibels (dB) ($L_{Aeq,T}$)		
	Category A ^{A)}	Category B ^{B)}	Category C ^{C)}
Night-Time (23:00 – 07:00)	45	50	55
Evenings and Weekends ^{D)}	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
NOTE 1: A potential significant effect is indicated if the total $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the Category appropriate to the ambient noise level.			
NOTE 2: If the ambient noise level exceeds the threshold values given in the table (i.e., the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3dB due to site noise.			
NOTE 3: Applied to residential receptors only.			
A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.			
B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.			
C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.			
D) 19:00 – 23:00 Weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.			

For public open space, impact might be deemed to be significant if the total noise (pre-construction ambient plus construction noise) exceeds the pre-construction ambient noise ($L_{Aeq, Period}$) by 5 dB or more.

The Environmental Protection Act 1990

Under Part III of the Environmental Protection Act 1990 as amended by the Noise and Statutory Nuisance Act 1993, local authorities have a duty to investigate noise complaints relating to a variety of sources, excluding road traffic noise. If the local authority is satisfied that the noise amounts to a statutory nuisance it will serve an Abatement Notice which may require that the noise, be stopped altogether or limited to certain times.

Section 79 of the Act defines noise as being a Statutory Noise Nuisance where it is '*emitted from premises so as to be prejudicial to health or a nuisance*' and Sections 80 and 82 specify the action which can be taken. Unlike common law nuisance, which deals with harm to property, statutory nuisance interferes with personal comfort in a manner that affects wellbeing.

Definition of Noise Nuisance

Perhaps rather inconveniently, noise nuisance is not specifically defined in the 1990 Act. It is, however, generally regarded as something which could be construed as such by an 'average' person. However, it may be observed that what is normal and everyday for one person may not be for another because of the differing lifestyles of neighbours. A famous judgment given in 1879 declared that '*what would be a nuisance in Belgrave Square would not necessarily be so in Bermondsey*' and is often cited in nuisance cases where locality is an issue.

What is very clear, however, is that a statutory, or indeed common law, noise nuisance is not defined purely by measured noise level but by its likely effects on an average person. As well as locality (see above), and of course noise level, a number of other factors are taken into account including:

- time of day of disturbance ; sleep disturbance is important in this respect, as well as relaxation during the evenings, even outdoors, but special provision for shift-workers, or other people with specific needs, is usually not made because of the focus on the 'average' person.
- frequency – how often the noise occurs ; something which happens only rarely would normally be considered to be less of a nuisance than something which happens every night or day.
- duration – how long the noise goes on for ; a short-term effect would normally be considered less of a nuisance than one which extends for several hours or even days.
- convention – how 'normal' is the noise ; a neighbour mowing their lawn once a week would normally be considered acceptable but a neighbour regularly listening to music outside at the same level for the same time would not.
- avoid ability; a noise disturbance which is easily avoidable can easily be perceived as more of a nuisance simply because it can be avoided.

Noise Abatement

Noise abatement can therefore consist of reducing the noise level generated, changing the time of day it operates, reducing number of occurrences and/or the length of time it operates for and possibly even changing what is done and in what way. In the case of a Section 80 action, it can be advantageous to agree the measures to be taken with the local authority, such as permitted noise level and restrictions on times and durations of activities. Strictly, however, all that needs to be done to comply is to abate the nuisance; the way in which it is done is not the concern of the authority.

Best Practicable Means

Alternatively, a defence to a requirement to abate a noise nuisance is to prove that ‘best practicable means’ is already being used to prevent or to counteract the effects of the nuisance or will be used in the future.

Under this Act, the premises responsible for an alleged noise statutory may employ the following as Best Practicable Means (BPM) for defence against an abatement notice:

- ‘Practicable’ means reasonably practicable, having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications.
- The means to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery.
- The design, construction and maintenance of buildings and structures, the test is to apply only so far as compatible with any duty imposed by law.
- the test is to apply only so far as compatible with safety and safe working conditions, and with the exigencies of any emergency or unforeseeable circumstances. Description of Noise Sources

APPENDIX B

NOISE SURVEY RESULTS

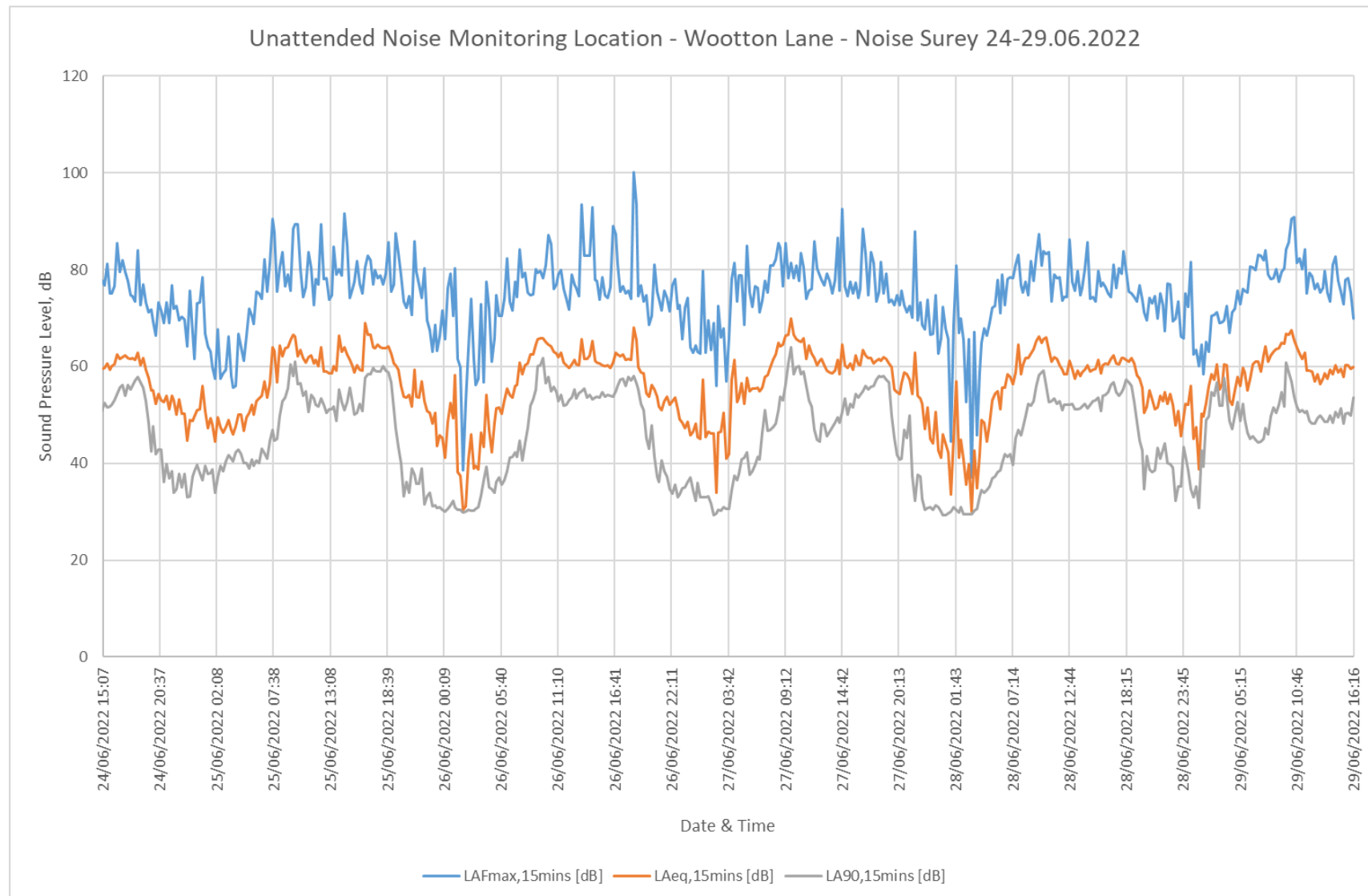


Figure A1: Complete survey data of the unattended noise monitoring location on Wootton Lane in 2022.

Table A1: Complete survey data of the attended noise monitoring location on Wootton Lane in 2023.

Date & time	L _{AFmax,15mins} [dB]	L _{Aeq,15mins} [dB]	L _{A90,15mins} [dB]
27/10/2023 14:09:50	79.9	63.7	52.0
27/10/2023 14:14:50	78.0	61.8	48.3
27/10/2023 14:19:50	71.1	60.9	48.2
27/10/2023 14:24:50	71.5	61.0	46.4
27/10/2023 14:29:50	72.4	62.3	49.6
27/10/2023 14:34:50	75.8	63.2	51.6
27/10/2023 14:39:50	77.0	62.1	48.8
27/10/2023 15:09:04	70.6	57.5	43.1
27/10/2023 15:14:04	73.6	59.1	51.4
27/10/2023 15:19:04	68.7	57.7	51.1
27/10/2023 15:24:04	76.4	57.2	50.5
27/10/2023 15:29:04	68.9	57.8	48.8

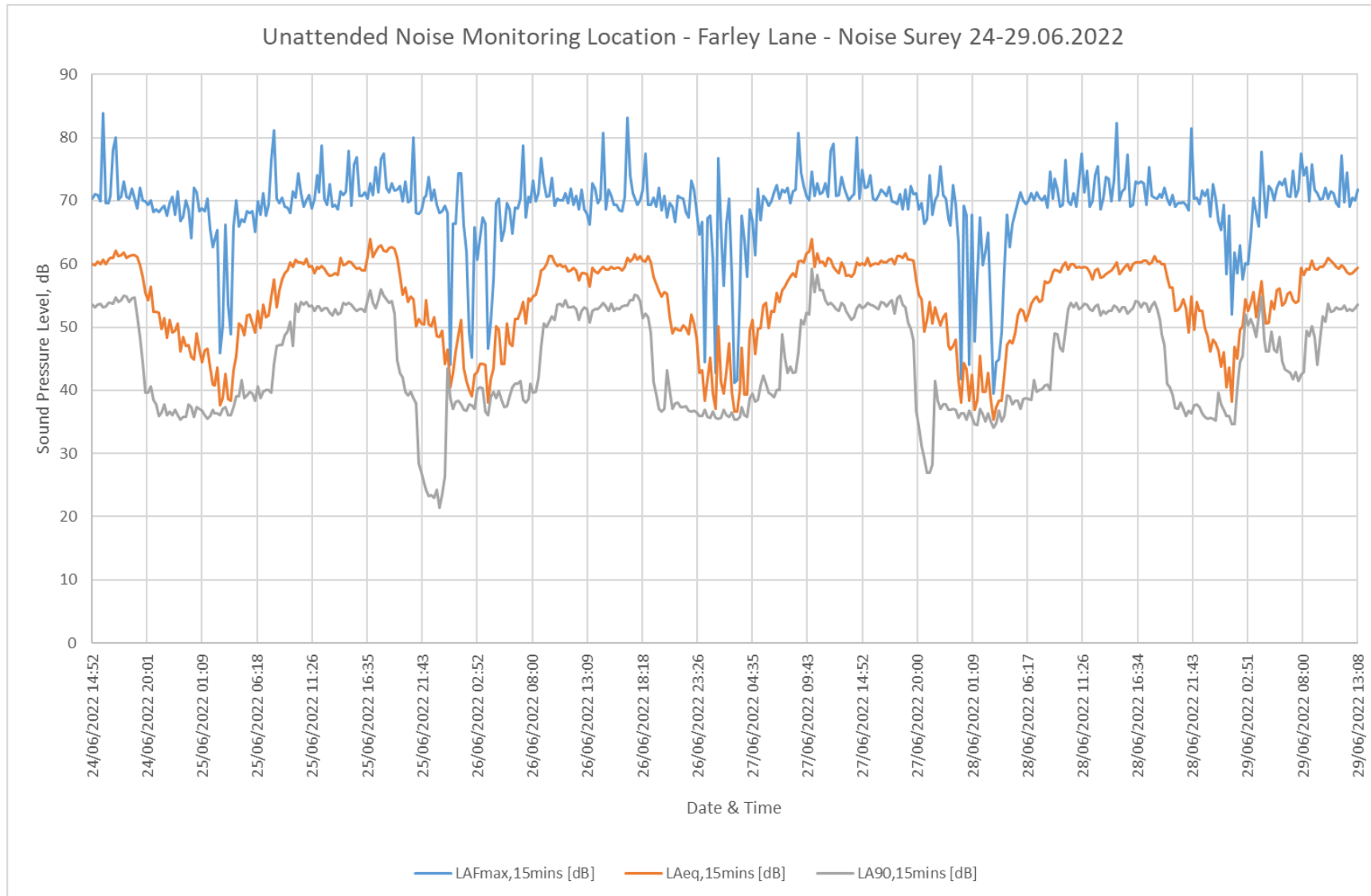


Figure A2: Complete survey data of the unattended noise monitoring location on Farley Lane in 2022.

Table A2: Complete survey data of the attended noise monitoring location on Farley Lane in 2023

Date & time	L _{AFmax,15mins} [dB]	L _{Aeq,15mins} [dB]	L _{A90,15mins} [dB]
27/10/2023 15:50:05	80.9	67.3	50.3
27/10/2023 15:55:05	81.6	68.4	51
27/10/2023 16:00:05	80.6	70.1	53.5
27/10/2023 16:05:05	80.7	68.5	51.7
27/10/2023 16:10:05	81.4	70.2	52.4

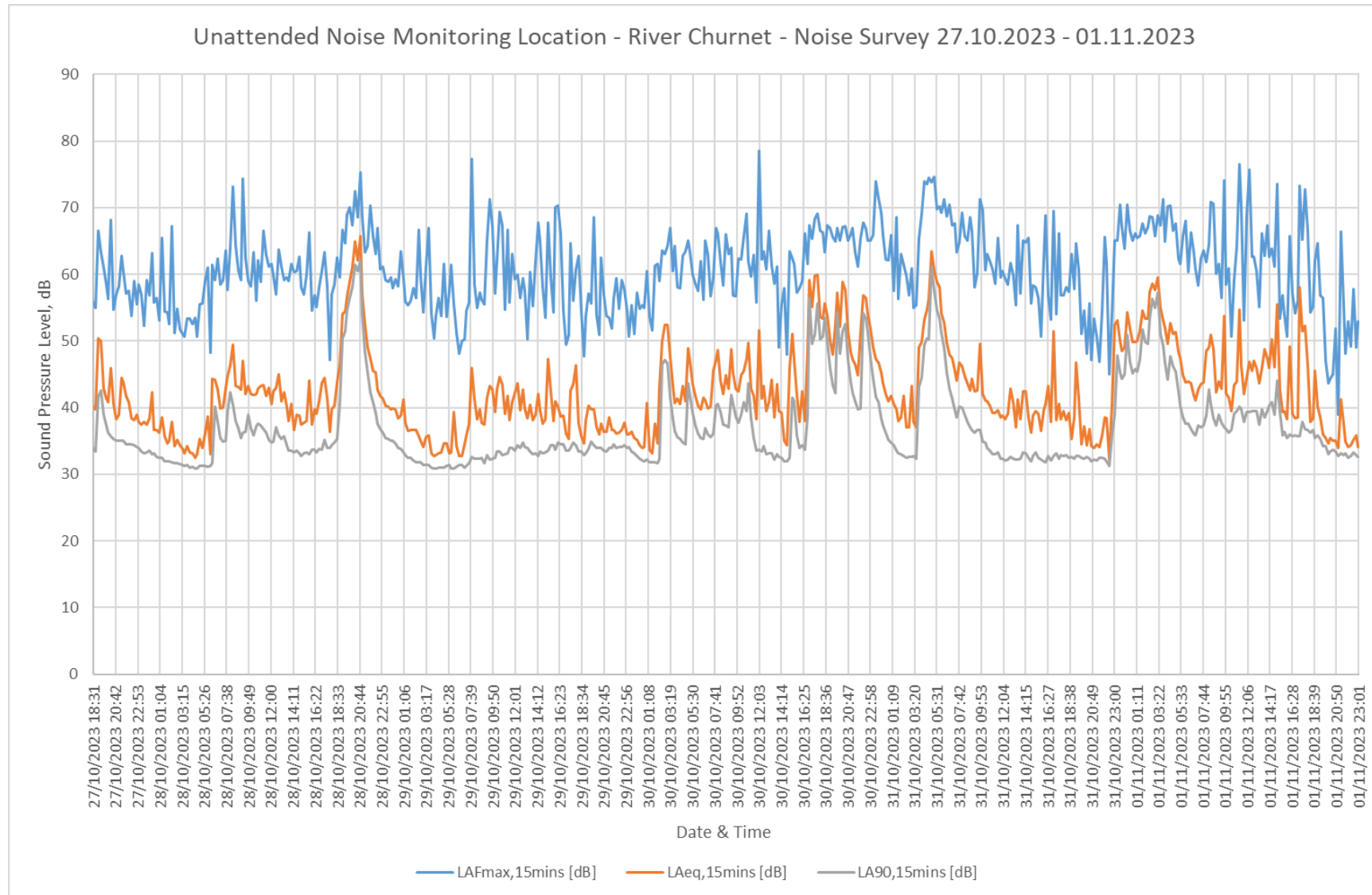


Figure A3: Complete survey data of the unattended noise monitoring location by the River Churnet in 2023.

Table A3: Hourly survey data of the unattended noise monitoring location by the River Churnet in 2023

Start date & time	L _{Aeq} 1 Hour (dB)	L _{Amax} (dB)	L _{A90} (dB)	Start date & time	L _{Aeq} 1 Hour (dB)	L _{Amax} (dB)	L _{A90} (dB)	Start date & time	L _{Aeq} 1 Hour (dB)	L _{Amax} (dB)	L _{A90} (dB)
28/10/2023 00:00	39	63	33	29/10/2023 00:00	40	63	35	30/10/2023 00:00	37	61	32
28/10/2023 01:00	36	66	32	29/10/2023 01:00	37	58	33	30/10/2023 01:00	35	62	32
28/10/2023 02:00	36	67	32	29/10/2023 02:00	36	67	32	30/10/2023 02:00	51	64	34
28/10/2023 03:00	34	53	31	29/10/2023 03:00	35	67	31	30/10/2023 03:00	45	67	38
28/10/2023 04:00	34	56	31	29/10/2023 04:00	34	62	31	30/10/2023 04:00	45	65	36
28/10/2023 05:00	36	61	31	29/10/2023 05:00	35	61	31	30/10/2023 05:00	44	63	39
28/10/2023 06:00	43	62	36	29/10/2023 06:00	35	55	31	30/10/2023 06:00	41	65	37
28/10/2023 07:00	44	64	37	29/10/2023 07:00	42	77	32	30/10/2023 07:00	46	67	37
28/10/2023 08:00	46	73	38	29/10/2023 08:00	39	57	33	30/10/2023 08:00	44	66	38
28/10/2023 09:00	44	74	38	29/10/2023 09:00	42	71	33	30/10/2023 09:00	46	64	40
28/10/2023 10:00	43	63	38	29/10/2023 10:00	43	69	34	30/10/2023 10:00	47	69	41
28/10/2023 11:00	42	67	36	29/10/2023 11:00	41	67	34	30/10/2023 11:00	47	79	35
28/10/2023 12:00	43	64	36	29/10/2023 12:00	42	60	35	30/10/2023 12:00	42	67	34
28/10/2023 13:00	41	62	34	29/10/2023 13:00	39	62	34	30/10/2023 13:00	42	61	33
28/10/2023 14:00	38	63	34	29/10/2023 14:00	40	68	33	30/10/2023 14:00	40	63	32
28/10/2023 15:00	40	66	33	29/10/2023 15:00	44	70	34	30/10/2023 15:00	47	64	36
28/10/2023 16:00	41	61	34	29/10/2023 16:00	39	70	34	30/10/2023 16:00	53	67	35
28/10/2023 17:00	41	63	34	29/10/2023 17:00	43	65	34	30/10/2023 17:00	58	69	52
28/10/2023 18:00	49	67	36	29/10/2023 18:00	37	63	33	30/10/2023 18:00	54	67	49
28/10/2023 19:00	58	70	53	29/10/2023 19:00	39	69	34	30/10/2023 19:00	54	67	46
28/10/2023 20:00	64	75	56	29/10/2023 20:00	37	63	34	30/10/2023 20:00	56	67	48
28/10/2023 21:00	50	70	44	29/10/2023 21:00	37	59	34	30/10/2023 21:00	48	67	42
28/10/2023 22:00	43	67	39	29/10/2023 22:00	37	59	34	30/10/2023 22:00	55	68	51
28/10/2023 23:00	40	60	37	29/10/2023 23:00	36	57	33	30/10/2023 23:00	47	74	42

Start date & time	L _{Aeq} 1 Hour (dB)	L _{Amax} (dB)	L _{A90} (dB)	Start date & time	L _{Aeq} 1 Hour (dB)	L _{Amax} (dB)	L _{A90} (dB)
31/10/2023 00:00	42	66	38	01/11/2023 00:00	52	70	48
31/10/2023 01:00	39	69	35	01/11/2023 01:00	53	68	48
31/10/2023 02:00	41	61	34	01/11/2023 02:00	57	69	52
31/10/2023 03:00	46	69	34	01/11/2023 03:00	56	71	50
31/10/2023 04:00	59	75	51	01/11/2023 04:00	51	70	47
31/10/2023 05:00	59	75	54	01/11/2023 05:00	47	68	41
31/10/2023 06:00	50	71	45	01/11/2023 06:00	43	66	38
31/10/2023 07:00	46	69	42	01/11/2023 07:00	45	64	38
31/10/2023 08:00	44	69	39	01/11/2023 08:00	49	71	40
31/10/2023 09:00	46	71	38	01/11/2023 09:00	49	74	38
31/10/2023 10:00	41	63	35	01/11/2023 10:00	42	64	37
31/10/2023 11:00	39	66	34	01/11/2023 11:00	50	77	39
31/10/2023 12:00	41	62	33	01/11/2023 12:00	46	76	40
31/10/2023 13:00	40	67	33	01/11/2023 13:00	47	67	39
31/10/2023 14:00	40	66	33	01/11/2023 14:00	51	74	40
31/10/2023 15:00	39	62	33	01/11/2023 15:00	40	57	36
31/10/2023 16:00	46	70	32	01/11/2023 16:00	44	66	36
31/10/2023 17:00	39	66	33	01/11/2023 17:00	54	73	37
31/10/2023 18:00	38	63	33	01/11/2023 18:00	42	65	36
31/10/2023 19:00	42	65	32	01/11/2023 19:00	37	60	34
31/10/2023 20:00	35	56	32	01/11/2023 20:00	35	52	33
31/10/2023 21:00	36	66	32	01/11/2023 21:00	38	66	33
31/10/2023 22:00	46	65	32	01/11/2023 22:00	35	58	33
31/10/2023 23:00	51	70	47	01/11/2023 23:00	37	62	33

Please Note CDC understands that the Alton Stages were active during RED marked period. Measurement periods marked in GREY have been influenced by sources local to the noise monitor. These effects were probably caused by weather or local sources and are not applicable in assessment of noise from the Alton Towers resort.

APPENDIX B

WEATHER DATA

**OBTAINED FROM THE NEAREST WEATHER STATION.
THIS IS SOME DISTANCE FROM THE NOISE MONITORING LOCATIONS**

Table B1: Weather Data during the 2022 noise surveys.

Date & Time	Temperature	Weather Description	Wind Speed	Wind Direction
Friday, 24 June 2022				
14:50	19 °C	Partly sunny.	2 m/s	N
15:20	18 °C	Sprinkles. Broken clouds.	4 m/s	N
15:50	19 °C	Scattered clouds.	3 m/s	N
16:20	19 °C	Broken clouds.	3 m/s	N
16:50	19 °C	Sprinkles. Partly sunny.	4 m/s	NNE
17:20	19 °C	Partly sunny.	4 m/s	N
17:50	18 °C	Broken clouds.	4 m/s	N
18:20	18 °C	Scattered clouds.	3 m/s	N
18:50	19 °C	Scattered clouds.	3 m/s	N
19:50	18 °C	Passing clouds.	2 m/s	NNW
20:20	18 °C	Scattered clouds.	2 m/s	NNW
20:50	18 °C	Broken clouds.	5 m/s	N
21:20	17 °C	Mild.	3 m/s	S
21:50	17 °C	Partly cloudy.	3 m/s	NNW
22:20	17 °C	Overcast.	4 m/s	N
22:50	16 °C	Mostly cloudy.	3 m/s	NNW
23:20	16 °C	Light rain. Mostly cloudy.	3 m/s	S
23:50	15 °C	Rain. Partly cloudy.	4 m/s	N
Saturday, 25 June 2022				
00:20	15 °C	Passing clouds.	3 m/s	N
01:50	13 °C	Passing clouds.	4 m/s	N
02:20	13 °C	Passing clouds.	3 m/s	N
02:50	13 °C	Passing clouds.	3 m/s	N
03:20	12 °C	Cool.	4 m/s	N
03:50	12 °C	Cool.	4 m/s	N
04:20	12 °C	Passing clouds.	3 m/s	N
04:50	11 °C	Cool.	3 m/s	N
05:20	12 °C	Cool.	3 m/s	N
05:50	12 °C	Cool.	3 m/s	N
06:20	12 °C	Cool.	3 m/s	N
06:50	13 °C	Cool.	3 m/s	N
07:20	13 °C	Cool.	4 m/s	N
07:50	14 °C	Passing clouds.	5 m/s	N
08:20	14 °C	Partly sunny.	4 m/s	N
08:50	15 °C	Partly sunny.	4 m/s	N
09:20	15 °C	Broken clouds.	4 m/s	NNE
09:50	15 °C	Broken clouds.	3 m/s	NNE
10:20	17 °C	Partly sunny.	5 m/s	N

10:50	16 °C	Partly sunny.	3 m/s	NNE
11:20	18 °C	Partly sunny.	4 m/s	NNE
11:50	18 °C	Scattered clouds.	5 m/s	N
12:20	18 °C	Scattered clouds.	5 m/s	N
12:50	19 °C	Scattered clouds.	5 m/s	N
13:20	19 °C	Partly sunny.	5 m/s	N
14:20	19 °C	Mild.	5 m/s	NNW
14:50	20 °C	Mild.	5 m/s	N
15:20	15 °C	Scattered showers. Partly sunny.	5 m/s	NNE
16:20	19 °C	Scattered clouds.	4 m/s	N
16:50	19 °C	Scattered showers. Scattered clouds.	6 m/s	NE
17:20	17 °C	Passing clouds.	6 m/s	NNE
17:50	17 °C	Passing clouds.	4 m/s	N
18:20	17 °C	Passing clouds.	4 m/s	N
19:20	16 °C	Scattered showers. Scattered clouds.	5 m/s	NE
19:50	13 °C	Scattered showers. Scattered clouds.	4 m/s	N
20:20	14 °C	Partly sunny.	2 m/s	NNW
20:50	14 °C	Cool.	2 m/s	NNW
21:50	13 °C	Cool.	2 m/s	N
22:20	12 °C	Cool.	1 m/s	S
22:50	12 °C	Cool.	2 m/s	S
23:20	12 °C	Cool.	2 m/s	N
23:50	11 °C	Cool.	2 m/s	NW
Sunday, 26 June 2022				
00:20	12 °C	Cool.	2 m/s	S
01:50	11 °C	Cool.	2 m/s	NNW
02:20	11 °C	Cool.	2 m/s	S
02:50	11 °C	Cool.	2 m/s	S
03:20	11 °C	Cool.	2 m/s	NNW
03:50	11 °C	Cool.	2 m/s	NNW
04:20	11 °C	Cool.	3 m/s	NNW
05:20	11 °C	Cool.	3 m/s	S
05:50	11 °C	Cool.	3 m/s	S
06:20	11 °C	Cool.	3 m/s	NNW
06:50	12 °C	Cool.	3 m/s	NNW
07:20	13 °C	Cool.	4 m/s	N
07:50	14 °C	Partly sunny.	5 m/s	N
08:20	14 °C	Scattered clouds.	5 m/s	N
08:50	15 °C	Scattered clouds.	5 m/s	N
09:20	15 °C	Partly sunny.	6 m/s	N

10:20	16 °C	Partly sunny.	5 m/s	N
10:50	17 °C	Scattered clouds.	5 m/s	N
11:20	17 °C	Partly sunny.	5 m/s	N
11:50	18 °C	Partly sunny.	6 m/s	NNE
12:20	18 °C	Partly sunny.	5 m/s	NNE
13:20	18 °C	Partly sunny.	6 m/s	NNE
13:50	19 °C	Mild.	6 m/s	N
14:20	19 °C	Mild.	6 m/s	N
14:50	19 °C	Partly sunny.	5 m/s	NNE
15:20	19 °C	Partly sunny.	6 m/s	NNE
15:50	19 °C	Mild.	6 m/s	NE
16:20	19 °C	Mild.	5 m/s	NNE
16:50	19 °C	Mild.	5 m/s	NNE
17:20	19 °C	Mild.	5 m/s	NNE
17:50	19 °C	Scattered clouds.	5 m/s	NNE
18:20	18 °C	Scattered showers. Scattered clouds.	5 m/s	NE
18:50	18 °C	Scattered clouds.	4 m/s	NNE
19:50	17 °C	Mild.	6 m/s	NE
20:20	17 °C	Passing clouds.	5 m/s	NE
20:50	16 °C	Refreshingly cool.	4 m/s	NNE
21:20	15 °C	Cool.	4 m/s	NNE
21:50	15 °C	Cool.	5 m/s	NNE
22:20	14 °C	Cool.	3 m/s	NNE
22:50	14 °C	Cool.	2 m/s	N
23:20	14 °C	Cool.	4 m/s	N
23:50	14 °C	Cool.	3 m/s	N
Monday, 27 June 2022				
00:20	14 °C	Passing clouds.	4 m/s	N
01:50	13 °C	Cool.	3 m/s	N
02:20	13 °C	Cool.	3 m/s	N
02:50	13 °C	Passing clouds.	4 m/s	N
03:20	13 °C	Light rain. Overcast.	3 m/s	N
03:50	13 °C	Cool.	3 m/s	N
04:20	13 °C	Light rain. Passing clouds.	3 m/s	N
04:50	13 °C	Scattered clouds.	3 m/s	N
05:20	13 °C	Light rain. Scattered clouds.	3 m/s	N
05:50	13 °C	Scattered clouds.	3 m/s	N
06:20	12 °C	Light rain. Passing clouds.	3 m/s	N
06:50	12 °C	Scattered showers. Passing clouds.	3 m/s	N
07:20	14 °C	Scattered showers. Passing clouds.	3 m/s	N

07:50	13 °C	Scattered showers. Scattered clouds.	4 m/s	NNE
08:20	13 °C	Light rain. Scattered clouds.	4 m/s	NNE
09:20	13 °C	Scattered showers. Scattered clouds.	5 m/s	ENE
10:20	13 °C	Sprinkles. Scattered clouds.	4 m/s	ENE
10:50	13 °C	Scattered showers. Scattered clouds.	4 m/s	ENE
11:20	15 °C	Scattered clouds.	4 m/s	ENE
11:50	14 °C	Scattered showers. Scattered clouds.	5 m/s	ENE
12:20	13 °C	Sprinkles. Scattered clouds.	4 m/s	ESE
12:50	13 °C	Overcast.	2 m/s	E
13:20	14 °C	Scattered clouds.	1 m/s	S
13:50	15 °C	Broken clouds.	2 m/s	E
14:20	15 °C	Scattered clouds.	4 m/s	ENE
17:20	16 °C	Refreshingly cool.	5 m/s	E
17:50	16 °C	Refreshingly cool.	4 m/s	E
18:20	17 °C	Mild.	4 m/s	ESE
18:50	16 °C	Refreshingly cool.	4 m/s	ENE
19:20	16 °C	Refreshingly cool.	6 m/s	ENE
20:20	15 °C	Refreshingly cool.	3 m/s	ENE
20:50	14 °C	Refreshingly cool.	3 m/s	NE
21:50	12 °C	Cool.	2 m/s	NE
22:20	11 °C	Cool.	2 m/s	N
23:20	12 °C	Passing clouds.	2 m/s	N
23:50	12 °C	Cool.	2 m/s	N
Tuesday, 28 June 2022				
00:20	13 °C	Passing clouds.	2 m/s	N
01:50	12 °C	Cool.	2 m/s	N
02:20	12 °C	Cool.	2 m/s	N
02:50	12 °C	Cool.	2 m/s	N
03:20	12 °C	Cool.	2 m/s	N
03:50	12 °C	Cool.	2 m/s	N
04:20	12 °C	Cool.	1 m/s	S
04:50	12 °C	Cool.	3 m/s	S
05:20	12 °C	Cool.	3 m/s	N
05:50	12 °C	Cool.	3 m/s	N
06:20	12 °C	Cool.	2 m/s	N
06:50	13 °C	Rain. Passing clouds.	2 m/s	N
07:20	14 °C	Passing clouds.	3 m/s	N
08:20	15 °C	Cool.	5 m/s	N
09:50	15 °C	Scattered clouds.	4 m/s	N

10:20	15 °C	Mostly cloudy.	3 m/s	N
10:50	16 °C	More clouds than sun.	4 m/s	N
11:20	16 °C	Scattered clouds.	4 m/s	N
11:50	17 °C	Scattered clouds.	5 m/s	N
12:20	17 °C	Scattered clouds.	4 m/s	N
12:50	17 °C	Partly sunny.	6 m/s	N
13:50	17 °C	Partly sunny.	4 m/s	N
14:20	17 °C	Partly sunny.	6 m/s	N
15:20	18 °C	Partly sunny.	5 m/s	N
15:50	17 °C	Partly sunny.	4 m/s	N
16:50	17 °C	Partly sunny.	5 m/s	N
17:20	17 °C	Broken clouds.	4 m/s	N
18:20	15 °C	Light rain. Partly sunny.	4 m/s	N
18:50	16 °C	Passing clouds.	3 m/s	N
19:20	16 °C	Passing clouds.	5 m/s	N
19:50	16 °C	Passing clouds.	4 m/s	N
20:20	16 °C	Cool.	3 m/s	NNW
20:50	15 °C	Light rain. Cloudy.	3 m/s	NNW
21:20	15 °C	Light rain. Cloudy.	2 m/s	N
22:20	15 °C	Light rain. Passing clouds.	2 m/s	S
22:50	15 °C	Light rain. Overcast.	3 m/s	S
23:20	14 °C	Light rain. Passing clouds.	3 m/s	N
23:50	14 °C	Mostly cloudy.	3 m/s	NNW
Wednesday, 29 June 2022				
00:20	15 °C	Overcast.	2 m/s	NNW
01:50	15 °C	Mostly cloudy.	3 m/s	N
02:20	14 °C	Light rain. Passing clouds.	2 m/s	S
02:50	14 °C	Light rain. Passing clouds.	3 m/s	NNW
03:20	14 °C	Light rain. Passing clouds.	2 m/s	NNW
03:50	13 °C	Light rain. Passing clouds.	2 m/s	NNW
04:20	13 °C	Passing clouds.	2 m/s	S
04:50	14 °C	Light rain. Overcast.	3 m/s	NW
05:20	13 °C	Drizzle. Low clouds.	3 m/s	NNW
05:50	12 °C	Light rain. More clouds than sun.	2 m/s	N
06:50	14 °C	Scattered clouds.	2 m/s	NNW
07:20	14 °C	Passing clouds.	2 m/s	N
07:50	15 °C	Scattered clouds.	3 m/s	N
08:20	15 °C	Partly sunny.	3 m/s	N
09:20	16 °C	Scattered clouds.	4 m/s	N
09:50	16 °C	Partly sunny.	3 m/s	NNE
10:20	17 °C	Mostly cloudy.	4 m/s	N
10:50	17 °C	Broken clouds.	3 m/s	N

11:20	18 °C	Scattered clouds.	3 m/s	N
11:50	18 °C	Scattered clouds.	3 m/s	N
12:20	18 °C	Mild.	3 m/s	N
12:50	18 °C	Scattered showers. Broken clouds.	3 m/s	NNE
13:20	19 °C	Passing clouds.	4 m/s	N
13:50	19 °C	Scattered showers. Passing clouds.	3 m/s	S
14:20	20 °C	Scattered showers. Scattered clouds.	5 m/s	N
14:50	17 °C	Scattered showers. Scattered clouds.	7 m/s	ENE
15:20	16 °C	Light rain. Scattered clouds.	2 m/s	NNE
15:50	17 °C	Scattered showers. Passing clouds.	2 m/s	N
16:20	18 °C	Scattered showers. Passing clouds.	2 m/s	NNW

Table B2: Weather Data during the 2023 noise surveys.

Date & Time	Temperature	Weather Description	Wind Speed	Wind Direction
Friday, 27 October 2023				
12:20	11 °C	Partly sunny.	3 m/s	N
12:50	10 °C	Partly sunny.	2 m/s	NNW
13:20	10 °C	Partly sunny.	3 m/s	N
13:50	11 °C	Partly sunny.	2 m/s	NW
14:20	11 °C	Scattered clouds.	2 m/s	NW
15:20	11 °C	Partly sunny.	2 m/s	NW
15:50	12 °C	Scattered clouds.	2 m/s	S
16:20	12 °C	Partly sunny.	2 m/s	WNW
16:50	12 °C	Partly sunny.	2 m/s	S
17:20	11 °C	Passing clouds.	1 m/s	S
17:50	10 °C	Cool.	1 m/s	S
18:20	10 °C	Cool.	1 m/s	S
18:50	10 °C	Cool.	1 m/s	S
19:20	10 °C	Cool.	1 m/s	S
19:50	10 °C	Passing clouds.	2 m/s	S
20:20	10 °C	Passing clouds.	1 m/s	S
21:20	10 °C	Cool.	2 m/s	NW
21:50	10 °C	Cool.	2 m/s	S
22:20	9 °C	Passing clouds.	1 m/s	S
23:20	8 °C	Cool.	1 m/s	S
23:50	8 °C	Cool.	1 m/s	S
Saturday, 28 October 2023				

00:20	7 °C	Quite cool.	2 m/s	WNW
01:50	8 °C	Cool.	1 m/s	S
02:20	7 °C	Quite cool.	1 m/s	S
02:50	8 °C	Cool.	1 m/s	S
03:20	8 °C	Cool.	1 m/s	S
03:50	8 °C	Cool.	1 m/s	S
04:20	8 °C	Passing clouds.	2 m/s	WNW
04:50	9 °C	Low clouds.	2 m/s	NW
05:20	9 °C	Low clouds.	2 m/s	NW
05:50	9 °C	Low clouds.	3 m/s	NW
06:20	9 °C	Passing clouds.	3 m/s	NW
06:50	9 °C	Passing clouds.	2 m/s	NW
07:20	9 °C	Passing clouds.	1 m/s	S
07:50	9 °C	Passing clouds.	2 m/s	W
08:20	9 °C	Mostly cloudy.	2 m/s	W
08:50	9 °C	Overcast.	1 m/s	S
09:20	10 °C	Mostly cloudy.	1 m/s	S
09:50	10 °C	Overcast.	2 m/s	NW
10:20	11 °C	More clouds than sun.	2 m/s	WNW
11:20	12 °C	Partly sunny.	3 m/s	NNW
11:50	12 °C	Mostly cloudy.	2 m/s	S
12:20	12 °C	Overcast.	3 m/s	N
12:50	12 °C	Partly sunny.	2 m/s	NNW
13:20	13 °C	Partly sunny.	3 m/s	NW
13:50	12 °C	Broken clouds.	3 m/s	S
14:20	12 °C	Cool.	3 m/s	NNW
14:50	13 °C	Cool.	3 m/s	NW
15:20	13 °C	Passing clouds.	3 m/s	NW
15:50	13 °C	Cool.	2 m/s	NW
16:20	13 °C	Passing clouds.	2 m/s	NW
16:50	13 °C	Cool.	2 m/s	WNW
17:20	12 °C	Cool.	2 m/s	S
17:50	12 °C	Cool.	2 m/s	S
18:20	11 °C	Cool.	2 m/s	W
18:50	12 °C	Cool.	2 m/s	W
19:20	12 °C	Light rain. Overcast.	2 m/s	W
19:50	11 °C	Light rain. Passing clouds.	2 m/s	W
20:20	11 °C	Light rain. Passing clouds.	3 m/s	W
20:50	11 °C	Light rain. Passing clouds.	2 m/s	S
21:20	10 °C	Light rain. Mostly cloudy.	3 m/s	SW
21:50	10 °C	Light rain. Passing clouds.	2 m/s	SSW
22:20	10 °C	Light rain. Passing clouds.	4 m/s	SSW

22:50	10 °C	Partly cloudy.	1 m/s	S
23:20	10 °C	Mostly cloudy.	2 m/s	W
23:50	10 °C	Passing clouds.	2 m/s	WSW
Sunday, 29 October 2023				
00:20	10 °C	Passing clouds.	2 m/s	W
01:20	10 °C	Passing clouds.	2 m/s	NNW
01:50	10 °C	Partly cloudy.	1 m/s	S
01:50	10 °C	Partly cloudy.	1 m/s	S
02:20	10 °C	Passing clouds.	2 m/s	NNW
02:50	10 °C	Cool.	2 m/s	NNW
03:20	9 °C	Cool.	3 m/s	NNW
03:50	9 °C	Cool.	2 m/s	NNW
04:20	9 °C	Cool.	2 m/s	NNW
04:50	9 °C	Cool.	3 m/s	NNE
05:20	9 °C	Cool.	3 m/s	N
05:50	9 °C	Cool.	2 m/s	N
06:20	9 °C	Cool.	1 m/s	S
06:50	8 °C	Cool.	2 m/s	S
07:20	9 °C	Cool.	1 m/s	S
08:20	9 °C	Cool.	2 m/s	N
08:50	10 °C	Cool.	2 m/s	N
09:20	10 °C	Cool.	2 m/s	N
10:20	11 °C	Cool.	2 m/s	NW
10:50	12 °C	Cool.	2 m/s	N
11:20	13 °C	Cool.	3 m/s	N
11:50	13 °C	Cool.	3 m/s	N
12:20	13 °C	Cool.	3 m/s	NNE
12:50	13 °C	Partly sunny.	3 m/s	NNE
13:20	13 °C	Scattered clouds.	3 m/s	N
13:50	13 °C	Passing clouds.	3 m/s	N
14:20	13 °C	Cool.	3 m/s	N
14:50	13 °C	Cool.	2 m/s	N
15:20	13 °C	Cool.	2 m/s	N
15:50	13 °C	Partly sunny.	1 m/s	S
16:20	12 °C	Passing clouds.	2 m/s	WNW
16:50	12 °C	Light rain. Passing clouds.	1 m/s	S
17:20	11 °C	Rain. Partly cloudy.	3 m/s	E
17:50	11 °C	Sprinkles. Partly cloudy.	1 m/s	S
18:20	11 °C	Sprinkles. Partly cloudy.	1 m/s	S
18:50	11 °C	Light rain. Passing clouds.	1 m/s	S
19:20	10 °C	Light rain. Overcast.	1 m/s	S
20:20	10 °C	Cool.	2 m/s	NW

20:50	10 °C	Cool.	1 m/s	S
21:20	10 °C	Passing clouds.	2 m/s	WNW
21:50	10 °C	Cool.	2 m/s	NW
22:20	10 °C	Cool.	2 m/s	NW
22:50	10 °C	Cool.	2 m/s	NW
23:20	10 °C	Passing clouds.	2 m/s	NW
Monday, 30 October 2023				
00:50	10 °C	Light rain. Passing clouds.	2 m/s	NNW
01:20	10 °C	Light rain. Mostly cloudy.	2 m/s	S
01:50	10 °C	Light rain. Mostly cloudy.	2 m/s	NW
02:20	9 °C	Light rain. Partly cloudy.	2 m/s	NW
02:50	9 °C	Passing clouds.	2 m/s	S
03:20	9 °C	Passing clouds.	1 m/s	S
03:50	9 °C	Passing clouds.	1 m/s	S
04:20	9 °C	Partly cloudy.	1 m/s	S
04:50	9 °C	Light rain. Passing clouds.	1 m/s	S
05:20	9 °C	Passing clouds.	3 m/s	SW
05:50	9 °C	Light rain. Passing clouds.	2 m/s	WSW
06:20	9 °C	Partly cloudy.	2 m/s	SW
06:50	9 °C	Heavy rain. Partly cloudy.	3 m/s	SW
07:20	10 °C	Light rain. Broken clouds.	3 m/s	WSW
07:50	10 °C	Scattered showers. Broken clouds.	3 m/s	SSW
08:20	10 °C	Scattered showers. Partly sunny.	3 m/s	SW
08:50	10 °C	Light rain. Partly sunny.	2 m/s	SW
09:20	10 °C	Drizzle. Partly sunny.	2 m/s	W
09:50	10 °C	Rain. Partly sunny.	3 m/s	WSW
10:20	10 °C	Light rain. Broken clouds.	3 m/s	WSW
10:50	10 °C	Light rain. Partly sunny.	3 m/s	WSW
11:20	10 °C	Partly sunny.	3 m/s	WSW
11:50	10 °C	Drizzle. Partly sunny.	3 m/s	WSW
12:20	11 °C	Scattered showers. Partly sunny.	3 m/s	WSW
12:50	11 °C	Light rain. Partly sunny.	3 m/s	WSW
13:20	11 °C	Scattered showers. Partly sunny.	4 m/s	W
13:50	11 °C	Scattered showers. Scattered clouds.	4 m/s	WSW
14:20	11 °C	Scattered showers. Scattered clouds.	3 m/s	WSW
14:50	11 °C	Scattered showers. Scattered clouds.	4 m/s	WSW
15:20	11 °C	Scattered showers. Scattered clouds.	3 m/s	W

15:50	10 °C	Scattered showers. Scattered clouds.	3 m/s	WSW
16:20	10 °C	Scattered showers. Scattered clouds.	3 m/s	W
16:50	10 °C	Scattered showers. Passing clouds.	2 m/s	W
17:20	10 °C	Light rain. Passing clouds.	3 m/s	WSW
17:50	9 °C	Light rain. Passing clouds.	3 m/s	WSW
18:20	9 °C	Passing clouds.	2 m/s	WSW
18:50	9 °C	Passing clouds.	2 m/s	WSW
19:20	9 °C	Overcast.	3 m/s	W
19:50	9 °C	Overcast.	2 m/s	W
20:20	9 °C	Mostly cloudy.	4 m/s	W
20:50	9 °C	Passing clouds.	3 m/s	W
21:20	9 °C	Passing clouds.	3 m/s	W
21:50	9 °C	Passing clouds.	3 m/s	W
22:20	9 °C	Passing clouds.	4 m/s	W
22:50	8 °C	Passing clouds.	4 m/s	WSW
23:20	8 °C	Passing clouds.	3 m/s	WSW
Tuesday, 31 October 2023				
00:50	9 °C	Heavy rain. Partly cloudy.	4 m/s	W
01:20	9 °C	Passing clouds.	4 m/s	W
01:50	9 °C	Passing clouds.	4 m/s	W
02:20	8 °C	Light rain. Passing clouds.	4 m/s	W
03:20	8 °C	Light rain. Passing clouds.	4 m/s	W
03:50	8 °C	Light rain. Passing clouds.	4 m/s	W
04:20	8 °C	Light rain. Overcast.	3 m/s	W
04:50	8 °C	Light rain. Partly cloudy.	3 m/s	W
05:20	8 °C	Passing clouds.	3 m/s	W
05:50	8 °C	Partly cloudy.	2 m/s	W
06:20	9 °C	Partly cloudy.	3 m/s	W
06:50	8 °C	Passing clouds.	2 m/s	W
07:20	8 °C	Scattered showers. Partly sunny.	1 m/s	WSW
07:50	8 °C	Scattered showers. Broken clouds.	1 m/s	S
08:20	9 °C	Partly sunny.	2 m/s	W
08:50	9 °C	Scattered showers. Scattered clouds.	2 m/s	W
09:20	9 °C	Broken clouds.	2 m/s	W
09:50	10 °C	Scattered showers. Broken clouds.	1 m/s	S
10:20	10 °C	Scattered showers. Broken clouds.	2 m/s	W

10:50	10 °C	Scattered showers. Broken clouds.	1 m/s	S
11:20	10 °C	Scattered showers. Broken clouds.	2 m/s	W
11:50	11 °C	Light rain. Broken clouds.	2 m/s	WSW
12:20	11 °C	Scattered showers. Broken clouds.	1 m/s	S
12:50	11 °C	Light rain. Partly sunny.	1 m/s	S
13:20	12 °C	Scattered showers. Scattered clouds.	1 m/s	S
14:20	11 °C	Scattered clouds.	2 m/s	WSW
14:50	11 °C	Scattered clouds.	3 m/s	SW
15:20	10 °C	Scattered clouds.	3 m/s	WSW
15:50	10 °C	Partly sunny.	3 m/s	SW
16:20	10 °C	Partly sunny.	3 m/s	WSW
16:50	9 °C	Partly cloudy.	3 m/s	WSW
17:20	9 °C	Partly cloudy.	3 m/s	WSW
17:50	9 °C	Passing clouds.	3 m/s	WSW
18:50	9 °C	Passing clouds.	2 m/s	W
19:20	9 °C	Passing clouds.	3 m/s	W
19:50	9 °C	Cool.	3 m/s	W
20:20	9 °C	Cool.	3 m/s	W
20:50	10 °C	Cool.	2 m/s	W
21:20	10 °C	Cool.	2 m/s	S
22:20	10 °C	Passing clouds.	2 m/s	S
22:50	10 °C	Partly cloudy.	1 m/s	S
23:20	10 °C	Light rain. Mostly cloudy.	2 m/s	W
Wednesday, 01 November 2023				
00:50	10 °C	Light rain. Passing clouds.	2 m/s	S
01:20	10 °C	Light rain. Passing clouds.	2 m/s	S
01:50	11 °C	Light rain. Passing clouds.	2 m/s	S
02:20	11 °C	Light rain. Overcast.	3 m/s	NW
02:50	11 °C	Light rain. Partly cloudy.	3 m/s	S
03:20	11 °C	Light rain. Partly cloudy.	3 m/s	NNW
03:50	11 °C	Light rain. Passing clouds.	3 m/s	S
04:20	12 °C	Mostly cloudy.	4 m/s	NNW
04:50	12 °C	Passing clouds.	4 m/s	NNW
05:20	12 °C	Partly cloudy.	4 m/s	NW
05:50	13 °C	Mostly cloudy.	3 m/s	NW
06:20	13 °C	Partly cloudy.	4 m/s	NW
06:50	13 °C	Light rain. Partly cloudy.	3 m/s	NNW
07:20	13 °C	Light rain. Broken clouds.	4 m/s	N
08:20	12 °C	Passing clouds.	3 m/s	N

08:50	12 °C	Cool.	4 m/s	N
09:20	12 °C	Passing clouds.	4 m/s	N
09:50	12 °C	Passing clouds.	4 m/s	N
10:20	13 °C	Passing clouds.	3 m/s	N
10:50	13 °C	Passing clouds.	4 m/s	N
11:20	13 °C	Partly sunny.	4 m/s	N
11:50	13 °C	Mostly cloudy.	6 m/s	NNE
12:50	13 °C	Broken clouds.	7 m/s	NNE
13:20	12 °C	Broken clouds.	9 m/s	NE
14:20	12 °C	Passing clouds.	4 m/s	NE
14:50	11 °C	Scattered clouds.	5 m/s	NNE
15:20	11 °C	Scattered clouds.	3 m/s	NNE
15:50	11 °C	Partly sunny.	3 m/s	NNE
16:20	11 °C	Light rain. Scattered clouds.	5 m/s	NNE
16:50	10 °C	Scattered showers. Passing clouds.	5 m/s	NNE
17:20	9 °C	Cool.	4 m/s	NNE
17:50	8 °C	Cool.	3 m/s	N
18:20	8 °C	Cool.	3 m/s	N
18:50	8 °C	Cool.	3 m/s	N
19:20	8 °C	Cool.	3 m/s	N
19:50	8 °C	Cool.	2 m/s	NNW
20:20	8 °C	Cool.	3 m/s	N
20:50	8 °C	Cool.	3 m/s	N
21:20	8 °C	Cool.	3 m/s	NW
21:50	8 °C	Cool.	3 m/s	NNW
22:20	8 °C	Cool.	3 m/s	NW
22:50	8 °C	Cool.	2 m/s	W
23:20	8 °C	Passing clouds.	3 m/s	W

APPENDIX C

INSTRUMENTATION DETAILS

Table C1: Details of noise measurement equipment used for the 2022 and 2023 surveys.

Type	Manufacturer	Model	Serial Number	Last Calibration Date	Calibration Certificate No.
2023 noise surveys instrumentation					
Sound Level Meter	Svantek	971A	113204	05/09/2023	1506129-1
Microphone	ACO PACIFC	7152	80678	05/09/2023	1506129-1
Preamplifier	Svantek	SV18A	113706	05/09/2023	1506129-1
Calibrator	Svantek	SV33B	116284	06/10/2023	Factory Cal.
2022 noise surveys instrumentation					
Sound Level Meter	RION	NL52	1043459	17/10/2023	45656
Microphone	RION	UC59	7235	17/10/2023	45655
Pre-amplifier	RION	NH25	43488	17/10/2023	45655
Calibrator	RION	NC74	35246905	17/10/2023	45654
Sound Level Meter	Norsonic	Nor-118	28254	01/02/2022	05650/2, 05650/3 & 05650/4
Microphone	Norsonic	Nor-1225	335374	01/02/2022	Inc. SLM
Preamplifier	Norsonic	Nor-1206	30228	01/02/2022	Inc. SLM
Calibrator	Norsonic	Nor-1251	35233	22/03/2023	U43768
Sound Level Meter	RION	NL52	00320635	16/10/2020	UCRT20/2017
Microphone	RION	UC59	03384	16/10/2020	Inc. SLM
Pre-amplifier	RION	NH25	10643	16/10/2020	Inc. SLM
Calibrator	RION	NC74	34536109	22/09/2020	UCRT20/1900