HOARE LEA

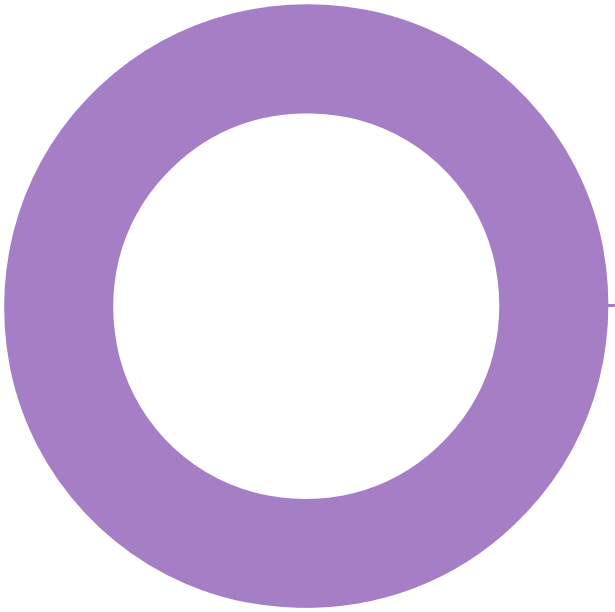
North Denbighshire Community Hospital. Rhyl.

Kier Construction.

ACOUSTICS

PLANNING ACOUSTIC REPORT

REVISION 00 – 08 APRIL 2020



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	08/04/2020	Initial issue	LR	PM	PM

This document has been prepared for Kier Construction only and solely for the purposes expressly defined herein. We owe no duty of care to any third parties in respect of its content. Therefore, unless expressly agreed by us in signed writing, we hereby exclude all liability to third parties, including liability for negligence, save only for liabilities that cannot be so excluded by operation of applicable law. The consequences of climate change and the effects of future changes in climatic conditions cannot be accurately predicted. This report has been based solely on the specific design assumptions and criteria stated herein.

Project number: 10-11993
Document reference: REP-1011993-5A-LR-20200408-Planning acoustic report-Rev00-F

Contents.

Audit sheet. **2**

Executive summary. **4**

1. Introduction. **5**

2. Site appraisal and local noise context. **5**
2.1 Site appraisal. 5
2.2 Surrounding area. 6
2.3 Local noise climate. 6

3. Planning policy and relevant guidance. **6**
3.1 National planning policy. 6
3.2 Local planning policy. 6
3.3 British Standard 4142:2014 Methods for rating and assessing industrial and commercial sound. 7

4. Environmental noise survey. **7**
4.1 Observations. 8

5. Plant noise control. **8**
5.1 External building services noise control. 8
5.2 Proposed emergency plant criteria. 8
5.3 Attenuation measures. 9

Appendix A: Survey details. **10**

Appendix B: Time history and statistical analysis graphs. **13**

Executive summary.

Hoare Lea Acoustics (HLA) has been appointed to provide acoustic input into the design of the proposed new-build facilities forming part of the North Denbighshire Community Hospital development, integrated within the existing Royal Alexandra Hospital site in Rhyl.

An environmental noise survey has been carried out and a noise egress assessment undertaken in accordance with the requirements of Denbighshire County Council (DCC) and BS4142:2014 guidance. The survey was carried out out between 12 March 2020 and 19 March 2020.

The representative background sound levels applicable at the nearest noise sensitive receivers were identified during the daytime (07:00 to 23:00 hrs) and night-time (23:00 to 07:00 hrs).

Based on the survey results, DCC requirements and BS4142:2014 guidance, noise limits have been set for the cumulative noise egress from plant, equipment and machinery associated with the development at 1 m from the façade of the nearest noise sensitive premises. If the plant contains any tonal characteristics a further correction will be required.

Limits have also been proposed for the operation of emergency services plant in accordance with the guidance provided in HTM 08-01 Wales and typical best practice for this type of equipment.

1. Introduction.

Hoare Lea Acoustics (HLA) has been appointed to assess the predicted noise impact from the proposed North Denbighshire Community Hospital development, integrated within the existing Royal Alexandra Hospital site in Rhyl.

This includes deriving noise limits to protect nearby residences against adverse effects associated with noise.

The following are contained in this report:

- A site description.
- A review of the relevant policy and guidance documents.
- A summary of the acoustic survey carried out.
- Noise limits for fixed plant associated with the proposed development.

This report serves to accompany the planning application submission for the proposed development to the Local Planning Authority.

2. Site appraisal and local noise context.

2.1 Site appraisal.

The proposed works consist of a comprehensive redevelopment within the existing Royal Alexandra Hospital (RAH) site, to provide new care facilities to existing departments and refurbish the existing RAH main building.

New car park provisions are to be created following demolition works of the existing facilities across Alexandra Road, with all premises consolidated onto the existing main hospital site.

The site is bonded by Russell Drive along the south boundary and East Parade/Marine Drive, both major thoroughfares serving Rhyl city centre. Other roads include Alexandra Road along the west boundary, a quieter road mainly providing access to the RAH site, and Grosvenor Road, a quiet local road bonding the site to the East. The wider site outline, as well as the two main aspects of the proposed works are indicated in Figure 1.

Figure 1 Annotated aerial photograph denoting site location and nearest identified noise sensitive premises

2.2 Surrounding area.

The Royal Alexandra Hospital (RAH) site is located within a predominantly residential area of Rhyl city centre. The nearest noise sensitive receivers have been identified as the residences along Grosvenor Road, Russell Drive, as well as the rear elevations of residences along Beechwood Road.

These are indicated by the areas shaded in blue in Figure 1 and have been considered to be the nearest noise sensitive receivers for the purposes of demonstrating planning compliance with regards to plant noise egress from the proposed scheme.

2.3 Local noise climate.

The existing local noise climate is currently dominated by road traffic noise along the surrounding road network, as well as seagull activity and occasional aircraft fly-bys overhead.

3. Planning policy and relevant guidance.

3.1 National planning policy.

3.1.1 Environmental noise regulations - Wales.

The Environmental Noise (Wales) Regulations 2006 as amended by the Environmental Noise (Wales) (Amendment) Regulations 2009 aim to define a common approach intended to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to environmental noise. In this assessment these Regulations are collectively referred to as the 'Environmental Noise Regulations'.

3.1.2 Planning Policy Wales.

Current government planning advice to Local Authorities in Wales concerning noise takes two forms. General guidance is provided by 'Planning Policy Wales' (PPW). Section 6.7 of PPW details guidance on Air Quality and Soundscape, recognising the association between exposure to air pollution, which includes noise, and health risks. PPW advises that certain sounds associated with nature, such as those created by trees, wildlife or water can contribute to a sense of tranquillity and that problematic forms of sound are generally experienced as noise pollution and can affect amenity and be prejudicial to health.

PPW advises that in proposing new development, planning authorities and developers must address any implication arising because of its location within noise action planning policy areas; not create areas of inappropriate soundscape; and seek to incorporate measures which reduce overall exposure to noise pollution and create appropriate soundscapes.

3.1.3 Technical Advice Note (Wales) 11: Noise.

PPW is supplemented by 'Technical Advice Note (Wales) 11: Noise' (TAN11). The introduction to TAN11 sets out the importance of appropriately considering noise in planning applications and states how the planning system can be used to:

'minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business.'

3.2 Local planning policy.

From experience on other projects located within the jurisdiction of DCC it is understood that standard planning guidance with regards to noise egress is based upon the guidance of BS 4142:2014.

3.3 British Standard 4142:2014 Methods for rating and assessing industrial and commercial sound.

The general principle of the BS 4142 assessment criteria is that noise nuisance can be avoided provided there is no significant change in the prevailing background noise conditions at any surrounding noise sensitive premises once the new equipment is operational.

Where the assessment indicates that the noise rating level of new plant would be 10 dB or greater above the background noise level, the standard judges that sound to be of significant adverse impact. A difference of 5dB is considered to result in adverse impact. Where the rating noise level of the plant is equal to or below background noise, there is likely to be low impact.

As such, noise egress from any plant, machinery and operational noise associated with the development should not cause disturbance at the nearby houses, and the rating level of noise shall not exceed the existing background noise level at the nearest noise sensitive receivers.

Further corrections should be applied if the plant noise contains tonal, intermittent and/or impulsive characteristics. The magnitude of these corrections is dependent upon the subjective perceptibility of the tones/impulses present.

4. Environmental noise survey.

An environmental noise survey was carried out on site over a period of 7 days between 12 March 2020 and 19 March 2020. During this time, long-term noise monitoring and sample attended noise measurements were carried out. Details of the method and equipment used as well as weather information are presented in Appendix A. Graphs showing the timeline results from the noise monitoring survey are provided in Appendix B.

The survey measurement position and prevalent noise levels around the site are summarised in the annotated aerial photograph presented in Figure 2. Position L1 indicates the unattended measurement position and positions P1 to P3 shows the attended sample positions.

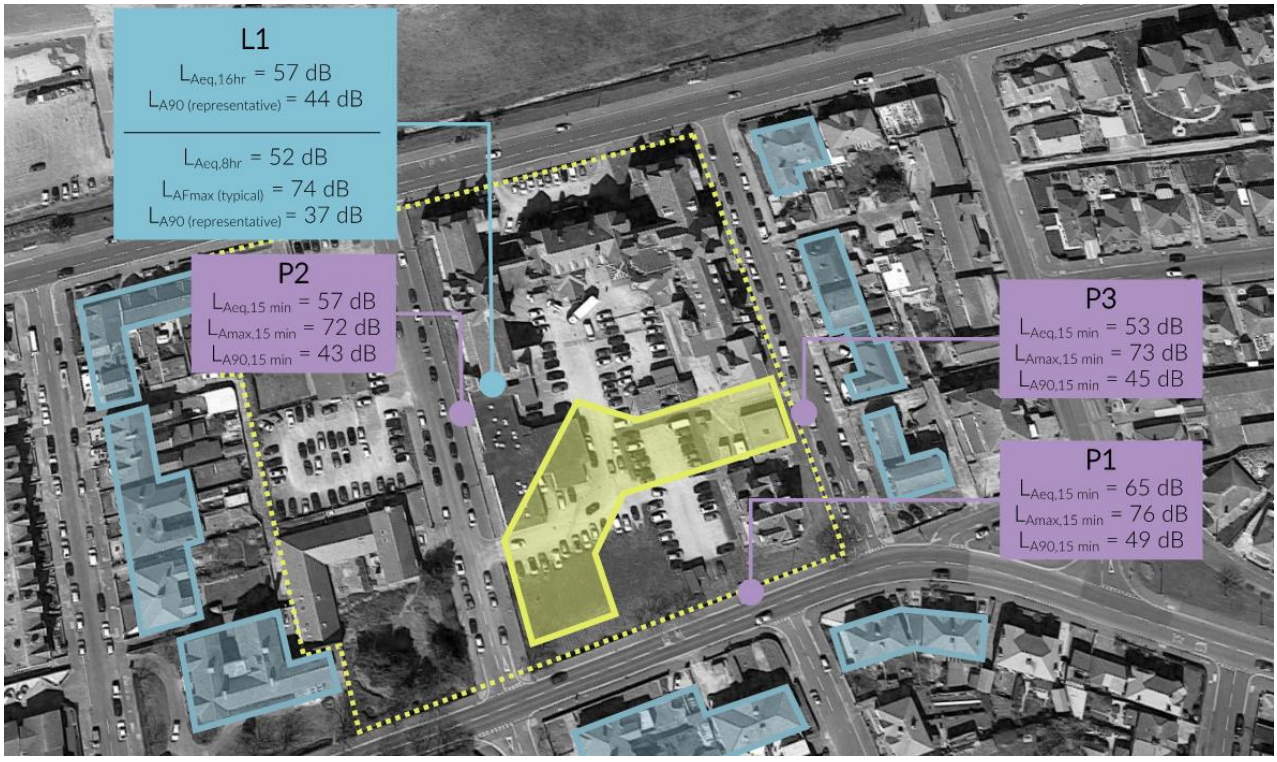


Figure 2 Annotated aerial photograph indicating measurement positions and prevalent noise levels (courtesy of Google Maps)

A statistical analysis of the survey results has been carried out in accordance with BS 4142:2014 guidance, and is presented in Appendix B. From this the representative background noise levels in the vicinity of the proposed development were determined to be:

- L_{A90} 46 dB during the day (07:00 – 23:00) along Russell Drive noise sensitive elevations
- L_{A90} 44 dB during the day (07:00 – 23:00) at all other noise sensitive elevations
- L_{A90} 37 dB during the night (23:00 - 07:00) at all noise sensitive elevations

The typical maximum noise level not usually exceeded during the night period, as determined by the 90% percentile of the total night period maximum noise levels measured during the survey, was L_{AFmax} 74 dB. A statistical analysis of maximum noise levels is provided in Appendix B for reference.

4.1 Observations.

The dominant noise source prevalent on the site comprised of road traffic along Russell Drive and Alexandria Road, with minor contributions from road traffic along the East Parade to the north of the site which was audible during lulls in local road activity.

Other noted noise sources included intermittent but regular seagull activity and occasional car park activity from use of the existing Royal Alexandra Hospital car park. Infrequent aircraft movement was also noted overhead.

5. Plant noise control.

5.1 External building services noise control.

Based on the results of the noise survey, typical Denbighshire County Council (DCC) requirements, the limits stated in Table 1 shall inform the external design of the building services scheme. The limits apply to the cumulative maximum sound pressure levels for fixed plant, equipment and machinery associated with the development at 1 m from the nearest residential elevations, as well as external occupiable areas.

Table 1 Maximum permissible sound pressure levels at 1m from the nearest noise sensitive premises

Noise sensitive receptor	Maximum permissible sound pressure level at nearest noise sensitive receivers (L_{Aeq}, dB)*	
	Daytime (07:00 – 23:00)	Night (23:00 – 07:00)
Residences along Russell Drive	46	37
Residences along Grosvenor Road and Beechwood Road	44	37

*If plant noise contains any tonal or impulsive characteristics, a further correction shall be applied to the levels set out above according to BS 4142:2014 guidance.

5.2 Proposed emergency plant criteria.

With regards to noise contributions from emergency plant operation during maintenance, HTM08-01 guidance states that an exceedance of up to 10 dB is normally considered acceptable internally and externally. This is predicated on periodic maintenance testing being limited to daytime hours (07:00 to 23:00) during weekdays, to minimise the risk of adverse impact on hospital users and the nearest noise sensitive premises.

The above guidance is in line with typically agreed relaxations for emergency plant noise to permit regular maintenance testing of standby life safety power generator equipment, and is proposed to form the basis of emergency plant design, subject to DCC approval.

5.3 Attenuation measures.

At this stage, the design is not sufficiently advanced to specify specific plant attenuation measures and will need to be assessed in detail as the design progresses.

All noise generating plant and equipment associated with the development will be designed to ensure that the noise egress limits specified above are achieved. The specific attenuation measures will depend on the type and location of the plant items but typical measures to be considered include in-duct attenuation, acoustic screening or enclosures, low noise equipment, acoustic lagging, and acoustically rated louvres.

Appendix A: Survey details.

Long-term noise monitoring.

Long-term noise measurements were carried out between 11:00 on 12 March 2020 and 12:30 on 19 March 2020. The noise monitoring was carried out continuously in 5 minute intervals.

Prior to commencement of the unattended survey, a subjective assessment of the noise climate was undertaken and compared to that of the immediate vicinity of the houses to the south east of the site. The chosen logger position was deemed to be representative of the noise levels at the nearest noise sensitive premises.

The microphone was fitted with a windshield. The meter was calibrated before and after the survey and no significant drift was noted. A photograph showing the unattended monitoring position is presented in Figure A1 and the measurement location is indicated as position L1 in Figure 2.

Figure 3 Photo of unattended measurement position L1

Attended sample measurements.

Attended sample noise measurements were carried out around the site on 19 March 2020 between 10:40 and 12:10; the measurement locations are indicated as Positions P1-P3 in Figure 2.

Measurements were conducted over 5 minute periods with a Brue & Kjaer 2250 Sound Level Meter (SLM) and synchronised with the noise monitoring position L1. The SLM was mounted on a tripod approximately 1.2m above ground level and at least 1 m from any other reflective surface.

The microphone of the SLM was fitted with a windshield. The meter was calibrated before and after the survey and no significant drift was noted.

Equipment details.

Table A1 summarises the details of the equipment used during the environmental noise survey. All equipment used was within dates of calibration and calibration certificates are available on request.

Table A1 Equipment used during environmental noise survey

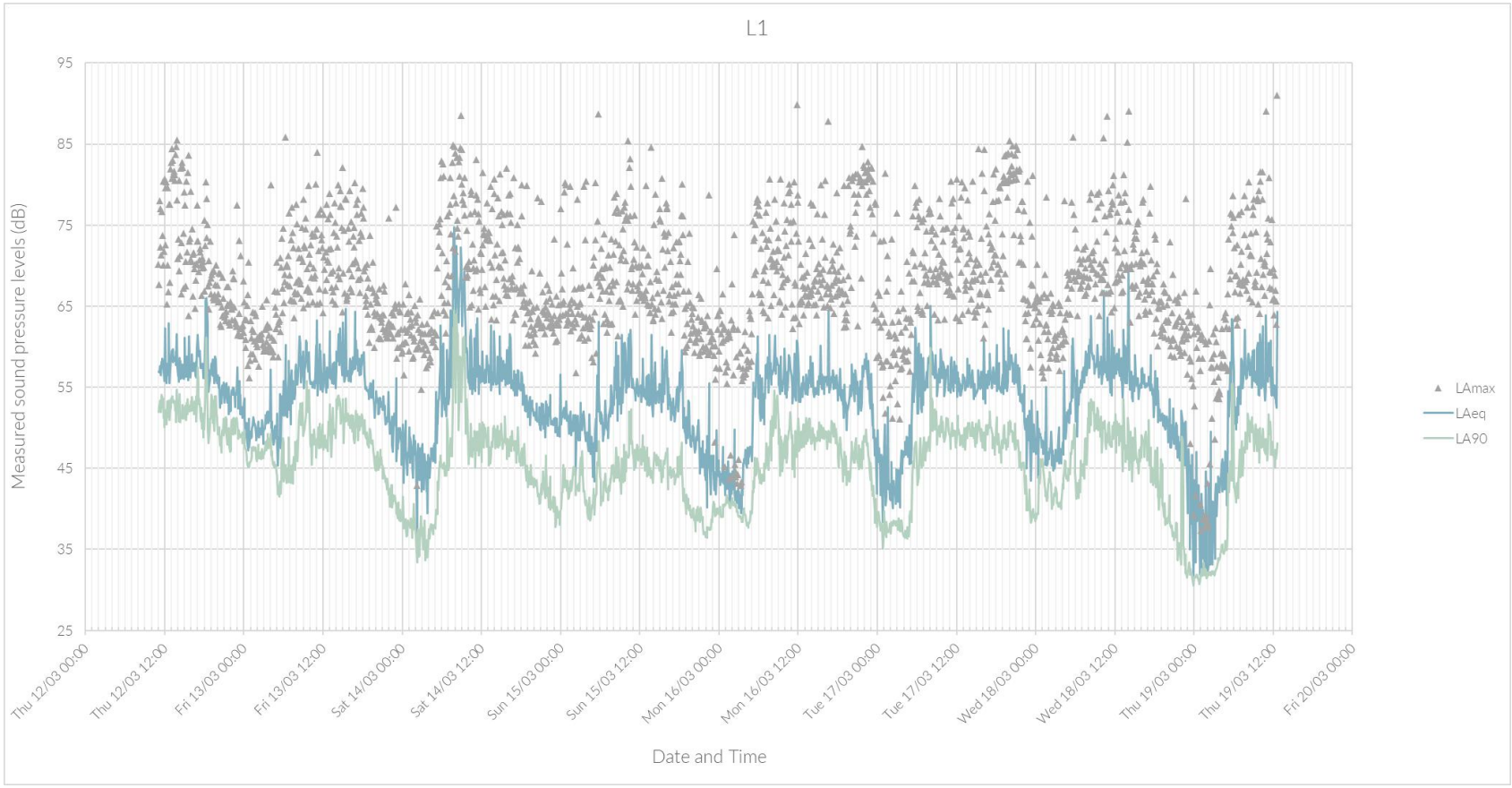
Item	Description	Serial Number	Calibration Date
Unattended Monitoring SLM	Rion - Noise Level Meter: NL-52 Rion - Microphone: UC-59 Rion - Pre-amplifier: NH-25	00732162 05354 32190	15/05/2019
Attended samples SLM	Rion - Noise Level Meter: NL-52 Rion - Microphone: UC-59 Rion - Pre-amplifier: NH-25	00732162 05354 32190	15/05/2019

Weather information.

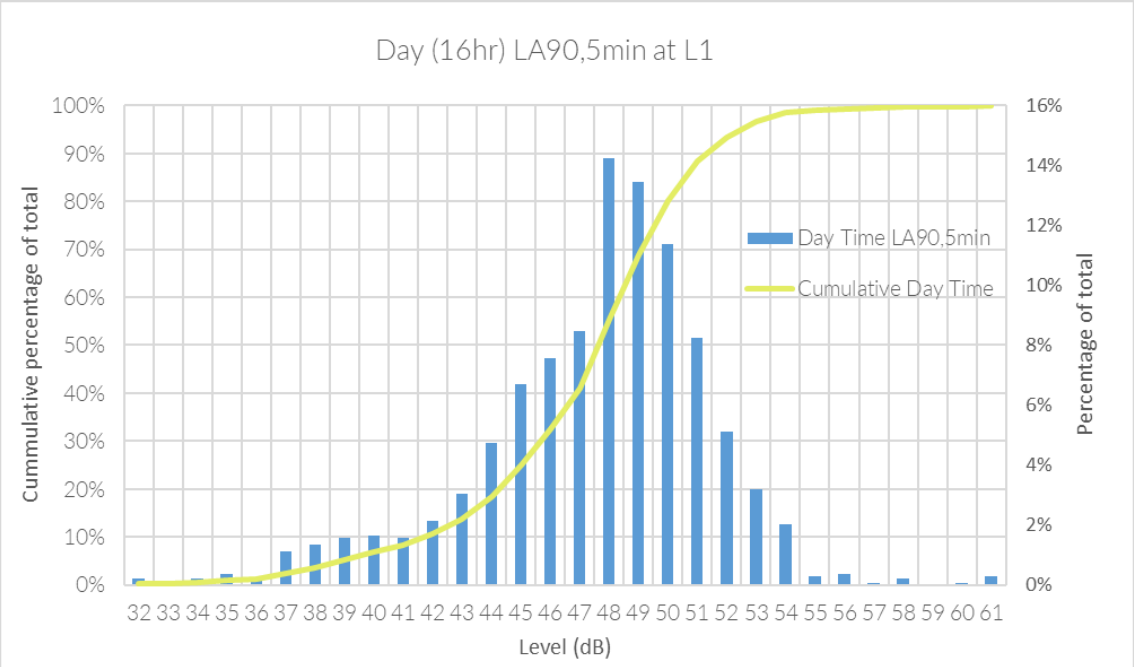
Weather conditions were noted to be clear and dry for the majority of the survey period. No significant showers occurred during the survey period and wind speeds were noted to be generally below 5 m/s, with the exception of strong wind speeds above this on 12/03/2020. The measured data is therefore considered suitable as being representative of typical conditions.

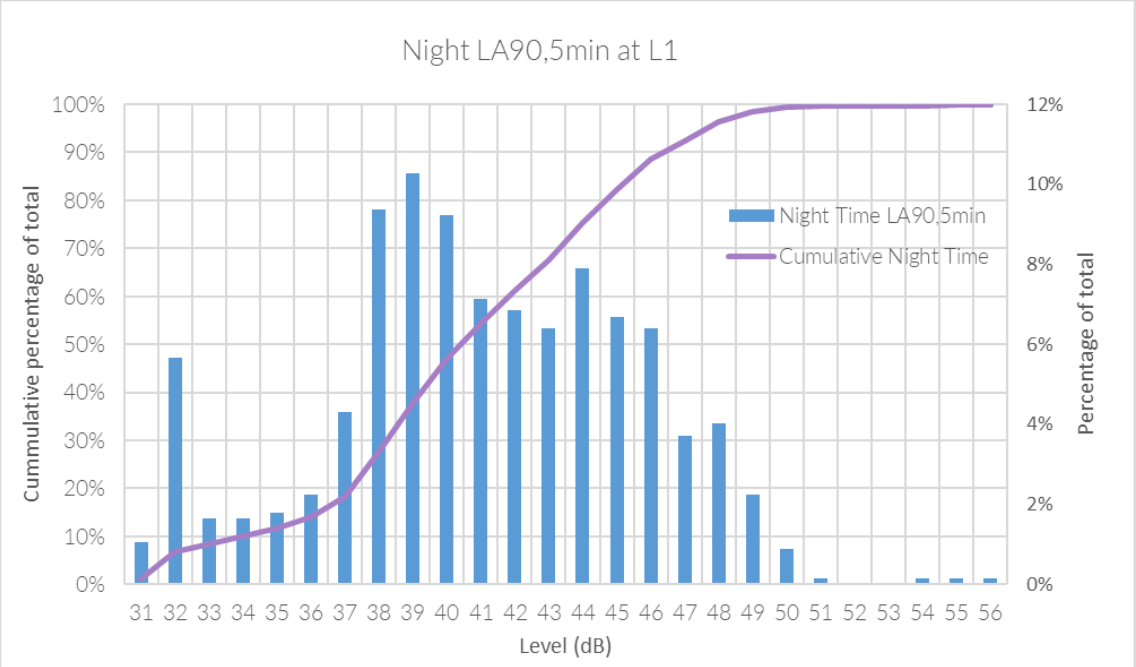
Appendix B: Time history and statistical analysis graphs.

Time-history graph of monitoring at position L1.

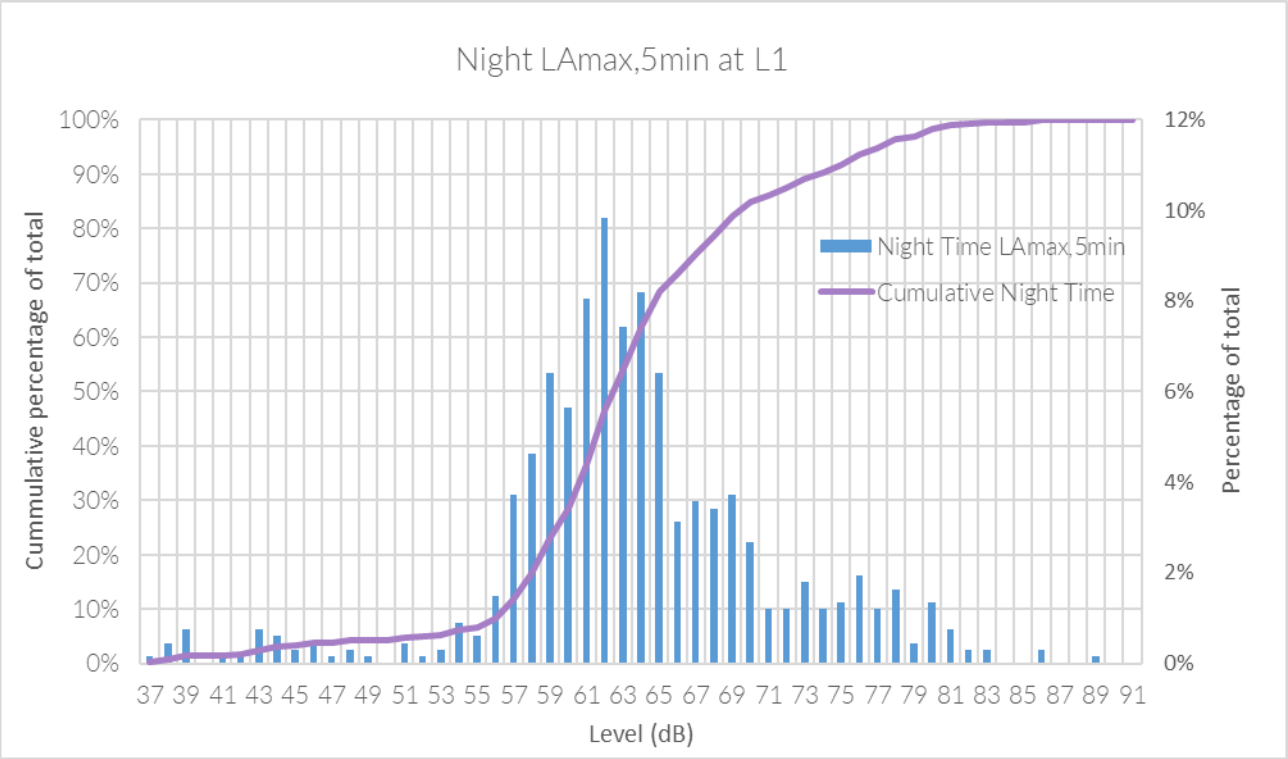


Statistical analysis of background noise levels at position L1.





Statistical analysis of maximum noise levels at position L1.



HOARE LEA

LUIS RUIVO
SENIOR ACOUSTICS ENGINEER

+44 161 672 7217
luisruivo@hoarelea.com

HOARELEA.COM

Royal Exchange
Manchester
M2 7FL
England