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 Stantec

20 St Anns Square, Manchester

Noise Impact Assessment

For Cushman & Wakefield

Date 18 November 2024

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1. Introduction

1.1 Overview

Hydrock have been appointed by Cushman & Wakefield to provide a noise impact assessment for the installation of 4 no. new condenser units at 20 St Anns Square, Manchester, M2 7HG. The units will replace 4 no. existing condenser units, associated with the refurbishment of two office suites at the property, and are to be located externally at rooftop level.

This report has been prepared to accompany a full planning application for the proposals. However, as the final plant specification has not been confirmed at this stage, it provides noise rating level limits for the proposed plant in accordance with current policy and guidance.

This report is technical in nature; therefore, a glossary is provided in **Appendix A** to assist in understanding this report.

1.2 Site Context

The 'Site' is located on the rooftop of a commercial and retail use building, 20 St Anns Square, with offices on the first through third floors, and a 'Holland and Barrett' store on the ground floor. To the north, the site is bordered by rooftop space of existing commercial buildings, with Barton Square beyond. To the east, the site is bordered by rooftop space of existing commercial buildings, with St Anns Square beyond. To the south, the Site is bordered by rooftop space of existing commercial buildings with St Anns Street beyond. To the West, the site is bordered by rooftop space of existing commercial buildings, followed by Barton Square, with additional commercial buildings beyond.

The existing noise environment at the Site, and for the nearest Existing Sensitive Receptors (ESRs), is dominated by existing plant from surrounding plant on neighbouring buildings.

2. Methodology

2.1 Overview

A noise impact assessment is required in support of the planning application. However, as the plant specification has not been determined at this stage, a survey has been carried out in order to establish noise rating level limits for proposed plant at the nearest ESR so that suitable noise levels can be achieved in accordance with current policy and guidance. This assessment considers the following noise impacts associated with the scheme:

- » Noise impacts from the proposed ancillary equipment associated with the development at nearby ESRs, including the proposed offices at the Site.

2.2 Consultation with Manchester City Council

The proposed scope of works and assessment methodology were sent to Environmental Health at Manchester City Council (MCC), on 2nd October 2024.

A response from Graeme Souter of Environmental Protection at MCC was received on 3rd October 2024, who agreed with the noise survey and assessment methodology in principle. It was also highlighted that proposed ancillary plant will need to achieve a noise rating level of 5 dB below the typical background level, in accordance with BS4142 in order to satisfy MCC guidance.

2.3 Policy, Standards and Guidance

The assessment carried out considers the following policy, standards and guidance documents:

- » National Planning Policy Framework, 2023 (NPPF);
- » Noise Policy Statement for England, 2010 (NPSE).
- » Planning Practice Guidance – Noise, 2019 (PPG);
- » World Health Organisation 1999: Guidelines for Community Noise (WHO);
- » BS 4142:2014 + A1 2019 - Methods for rating and assessing commercial and industrial sound (BS4142);
- » Manchester City Council - Planning and Noise: Technical Guidance, 2022 (MCC guidance).

A review of the relevant planning policy, standards and guidance is found in **Appendix B**.

2.4 Existing Sensitive Receptors

The following ESRs have been identified as those most likely to be affected by the proposals and are presented in **Table 1**. ESR1 represents the third-floor open plan office space across from the Proposed Development Site.

Table 1: Existing Sensitive Receptor

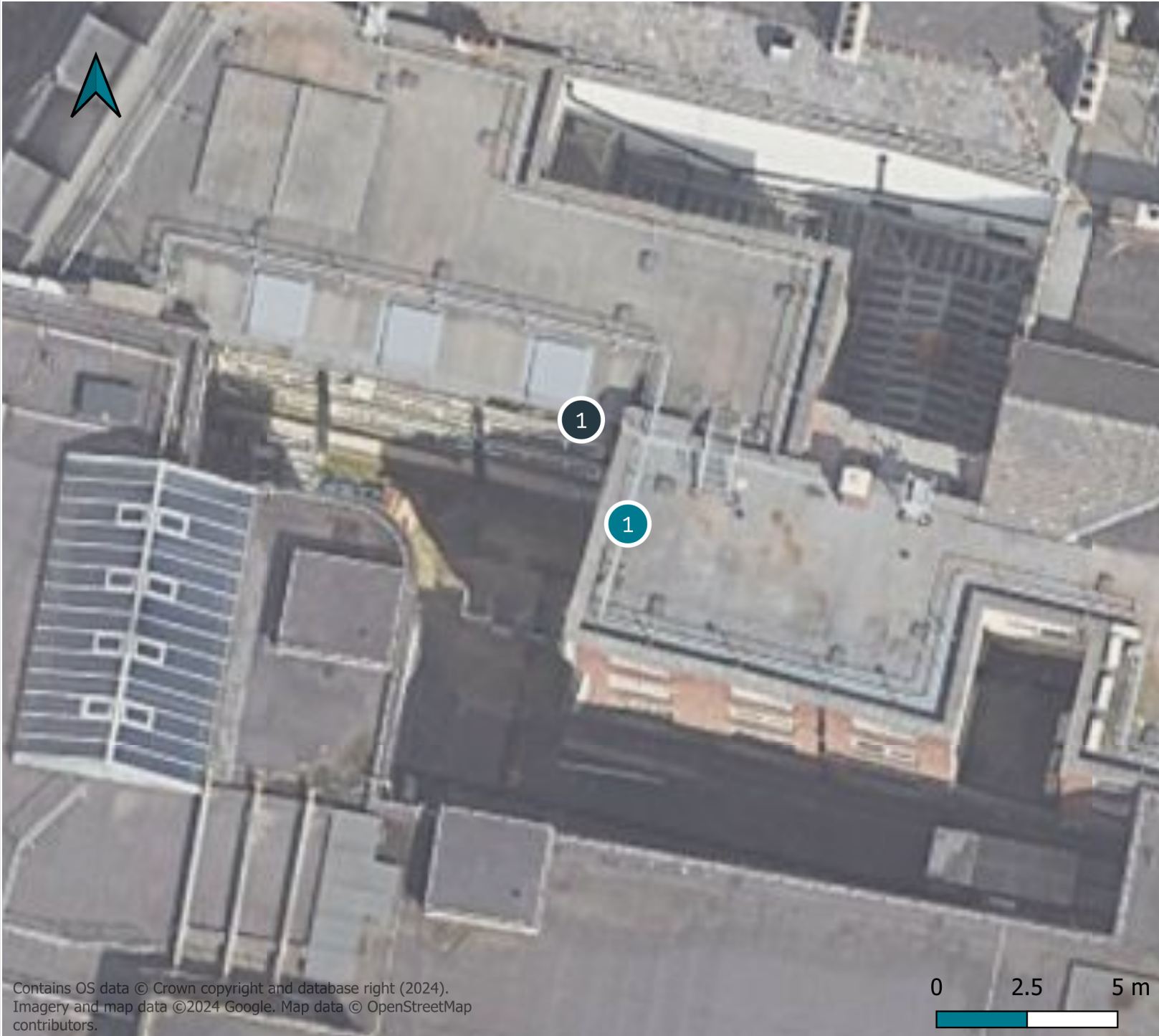
Existing Receptor	Address	Coordinates		Bearing from Site
		X (Easting)	Y (Northing)	
ESR1	Third-floor Open Plan Office, 20 St Anns Square, Civic Quarter, City Centre, Manchester, M2 7HG	383756	398413	North-West

ESR1 is also illustrated on **Figure 1**. Despite the fact that the third-floor offices spaces are currently vacant, the spaces are in the refurbishment process and will be occupied when the proposed plant is in operation. As these offices will be the closest sensitive receptors to the Site, any impacts associated with the proposed plant at other nearby ESRs will be less than those considered at the selected ESR location.

2.5 Noise Survey

An unattended noise survey has been carried out in order to characterise the existing noise environment at the ESRs. A combination of site observations and a review of audio recordings have been carried out the Monitoring Location (ML) to facilitate the analysis of baseline conditions.

The ML is shown in **Figure 1** and full details of the survey are set out in **Section 3** of this report. Calibration information is also included in **Appendix C**.



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Key

Monitoring Location

Existing Sensitive Receptor

Notes

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Figure

Figure 1

P01

3. Noise Survey

3.1 Survey Overview

A noise survey was undertaken at the Site between 10th and 14th October 2024.

Monitoring equipment was set up to continuously measure A-weighted, time-equivalent, one-third octave band sound pressure levels for the duration of the survey. Noise measurements were carried out using Class 1, integrating sound level meter. The microphone was positioned vertically on a tripod at least 1.5m above the ground and at least 3.5m from any other reflecting surfaces.

The sound level meter was calibrated to a reference level of 94 dB at 1kHz both prior to, and on completion of, the noise survey. No significant drift in calibration was noted during the survey (≤ 0.5 dB).

All noise monitoring was carried out in accordance with British Standard 7445-2 - *Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use*, where appropriate.

3.2 Weather Conditions

Weather conditions varied throughout the survey. Periods with dry and calm conditions, with wind speeds less than 5ms⁻¹ and no precipitation have been selected for the assessment. Weather forecasts were reviewed prior to the survey, observations were made during setup and decommissioning of monitoring equipment, and a review of the audio data from the survey allowed the following information to be gathered:

- » Temperatures ranging between 3°C and 13°C;
- » Occasional precipitation;
- » Wind speed varying between 1 and 5ms⁻¹; and,
- » Dry ground at points throughout monitoring period.

Precipitation during the survey affected the measured data between approximately 1715 and 2045hrs on Saturday 12th October 2024. Noise data which has been adversely affected has been eliminated from this assessment.

3.3 Monitoring Locations

Monitoring Locations (MLs) are summarised in **Table 2** and illustrated on **Figure 1**.

Table 2: Noise Monitoring Location

ML	Description	Approximate Measurement Period
ML1	Located in the position of the proposed plant, 1.5m above the roof level. The nearest office spaces are situated below, on the second and third floor of the same building. This location was selected to establish typical ambient and background noise levels in the vicinity of ESR1 and ESR2.	1030, 10/10/24 to 1000, 14/10/24

3.4 Summary of Baseline Acoustic Environment

Observations made during the survey and a review of audio recordings identified the following noise sources contributing to the noise climate at the Site:

Commercial/Industrial Noise: Noise from various plant items on the surrounding roof spaces was dominant at ML1. No industrial type noise was identified to be audible at ML1.

Maintenance Noise: Noise from machinery and tools for maintenance was occasionally audible during the survey. Periods where maintenance noise was audible have been excluded from the assessment.

Road Traffic: Road traffic noise from Deansgate and Cross Street were audible throughout the survey, occasional cars passing on St Anns Street were also audible, at ML1.

Tram Noise: Distant tram horns were audible at ML1 at points throughout the survey period.

Entertainment Noise: Music/busking from St Anns Square could be heard at points throughout the survey period

Other Sources: Bird noise, distant aircraft noise, pedestrian noise from St Anns Square, and church bells from St Anns Church were audible at ML1 at points throughout the survey period.

3.5 Summary of Baseline Noise Levels

Measured noise levels have been separated in to daytime (0700 to 2300) and night-time (2300 to 0700) periods, in accordance with current guidance, where appropriate. A summary of average measured noise levels has been provided in **Table 3** and set out in full in **Appendix D**.

In order to determine a representative background sound level, an analysis of the measured L_{A90} levels has been carried out. The analysis comprises a comparison of the measured $L_{A90,15min}$ time history to the arithmetic average. The arithmetic average level is then adjusted to establish a typical background level, so that an appropriate proportion of the measured background level exceeds the selected background level. This establishes a background level that will typically not be exceeded for the majority of the time. This analysis is shown in **Appendix E**.

Table 3: Summary of Daytime and Night Time Noise Levels

Monitoring Location	Time Period	Measured Noise Level	
		$L_{Aeq, T}$, dB	$L_{A90, T}$, dB
ML1	0700 – 2300	55	52
	2300 – 0700	51	50

4. Noise Impact Assessment

The existing condenser units associated with the third-floor office suites are no longer in use, these are located in a different position on the roof space as the Site where the 4 no. new replacement condenser units will be located. The calculations used in this assessment considers the location of the new condenser units.

The proposed condenser units are required to be assessed in accordance with BS4142. However, at this stage of the design, final plant selections have not been made. Therefore, in lieu of this information, plant rating level limits have been established based on BS4142, and MCC's requirement for plant noise to be 5 dB below a representative background sound level. A summary is provided in **Table 4**.

Table 4: Proposed Plant Noise Rating Level Limits

Time Period	Representative Background Sound Level, dB L _{A90}	Plant Noise Rating Level Limit, dB L _{A,r}
Daytime (0700 – 2300)	52	47
Night-time (2300 – 0700)	50	45

The above plant level limits would ensure that the noise rating level is 5 dB below the existing typical background level at ESRs. This is a good indication of low impact in accordance with BS4142, depending on context.

The responsibility to achieve the above would fall to the principal contractor. The contractor will also need to take care to ensure that, when installed, any tones, rattles or noises from the units that are incongruous to the existing ambient sound, are appropriately mitigated and/or remediated.

Since the external fixed plant's location has been finalised, it is predicted that the maximum sound power level of the units, while still meeting the rating level limit at the closest Existing Sensitive Receptor (ESR), are estimated to be 70 dB(A) (each unit) during the daytime period, and 68 dB(A) (each unit) during the night-time period. Higher sound power levels might also be acceptable, but this would require confirmation from a suitably qualified acoustician through further assessment.

It should be noted that these sound power levels have been provided as advice for the contractor only, so that they may be informed when finalising the plant selections. **The sound power levels should not form part of the wording of any planning condition.**

If the contractor is not able to achieve the rating level limit in the proposed location, then additional mitigation measures will be required. These measures will likely take form of an acoustic screen or enclosure. Alternatively, it may be possible to have the units operate on a reduced duty. These measures will need to be discussed with the relevant MEP subcontractor.

The contractor should also ensure that the plant is fitted with vibration isolators to control the transmission of vibration to the building structure. General guidance on adequate anti-vibration mount selection for various items of equipment is included in CIBSE Guide B4 "Noise and vibration control for building services systems".

5. Conclusions

Hydrock has been appointed by Cushman & Wakefield to provide a noise impact assessment for the installation of 4 no. new condenser units, which will replace 4 no. existing, obsolete units on the rooftop of 20 St Ann's Square, Manchester, M2 7HG.

The Site is situated on the rooftop of a commercial and retail building, 20 St Anns Square. The closest Existing Sensitive Receptor (ESR), ESR1, is an open-plan office on the third floor.

A noise survey has been carried out at the Site; the results of the survey have been used to establish daytime and night-time typical background sound levels at ESR1 so that noise rating level limits from the proposed condenser units remain 5 dB below the background sound level at ESR1, in line with the guidance set out in BS4142 and by MCC.

An additional noise impact assessment should be carried out by a suitably qualified acoustician once final plant specifications have been selected.

Appendix A Glossary

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2×10^{-5} Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{AFmax}	L_{AFmax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{AFmax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} and L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time, and the L_{90} is the level exceeded for 90% of the time.
R_w	R_w is the single-number quantity which characterizes the sound insulating properties of a given material over a range of frequencies. This is typically measured in a laboratory in accordance with BS EN ISO 717-1.
$D_{n,e,w}$	$D_{n,e,w}$ is the single number quantity which characterizes the airborne sound insulation performance across a given 'element' and is typically used to describe the acoustic performance of trickle ventilators etc.
C_{tr}	C_{tr} is a correction term applied to single-number sound insulation values (R_w , $D_{n,e,w}$ etc.) to afford additional weighting against low frequency performance.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and at least 3 m from buildings.

Appendix B Policy, Standards & Guidance

National Planning Policy Framework (NPPF)

Published in December 2023, this document sets out the Government's planning policies for England and supersedes the previous version of the NPPF published in 2021. It makes the following reference to noise in the section entitled Conserving and enhancing the natural environment:

"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."

It also makes the following references to noise in the Section entitled Ground conditions and pollution:

"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 life⁶⁹;

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.

69 See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010)."

And

"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."

Noise Policy Statement for England (NPSE)

Published in March 2010, the Noise Policy Statement for England (NPSE) sets out the long-term vision of Government noise policy as follows:

"Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development."

The NPSE identifies three observed effect levels, names "No Observed Effect Level" (NOEL), "Lowest Observed Adverse Effect Level" (LOAEL) and "Significant Observed Adverse Effect Level" (SOAEL).

The NPSE contains little detail on assessment methodologies and specific parameters at which the varying observed effect levels would occur in the context of a residential development.

World Health Organisation (WHO) 1999: Guidelines for Community Noise

As with the 'good' and 'reasonable' criteria in BS 8233, the L_{AFmax} criterion in BS8233 is largely concordant with the World Health Organisation (WHO) guidance 1999: Guidelines for community noise. This document draws upon guidance from Vallet and Vernay, which states:

"For good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10-15 times per night"

BS 4142:2014 - Methods for rating and assessing commercial and industrial sound

BS 4142 describes methods for rating and assessing sound from industrial and manufacturing processes, fixed installations which comprise mechanical and electrical plant and equipment, the loading and unloading of goods and materials at industrial and/or commercial premises and mobile plant and vehicles that are an intrinsic part of the overall sound emanating from premises or processes.

The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

If appropriate, the specific sound level of the source ($L_{Aeq,T}$) is corrected, by the application of one or more corrections for acoustic features to give a 'rating' level ($L_{Ar,Tr}$). The Standard effectively compares and rates the difference between the rating level of the sound and the prevailing background sound level ($L_{A90,T}$). Comparing the rating level with the background sound level, BS 4142 states:

"Typically, the greater this difference, the greater the magnitude of impact. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

Manchester City Council - Planning and Noise: Technical Guidance, 2022 (MCC guidance).

MCC requires noise assessments based on BS 4142, addressing both overall noise levels and any distinct characteristics. Applications for such installations must show that external plant achieves a rating level at least 5 dB below the typical background noise ($L_{A90,T}$) at the nearest noise-sensitive location to ensure negligible impact.

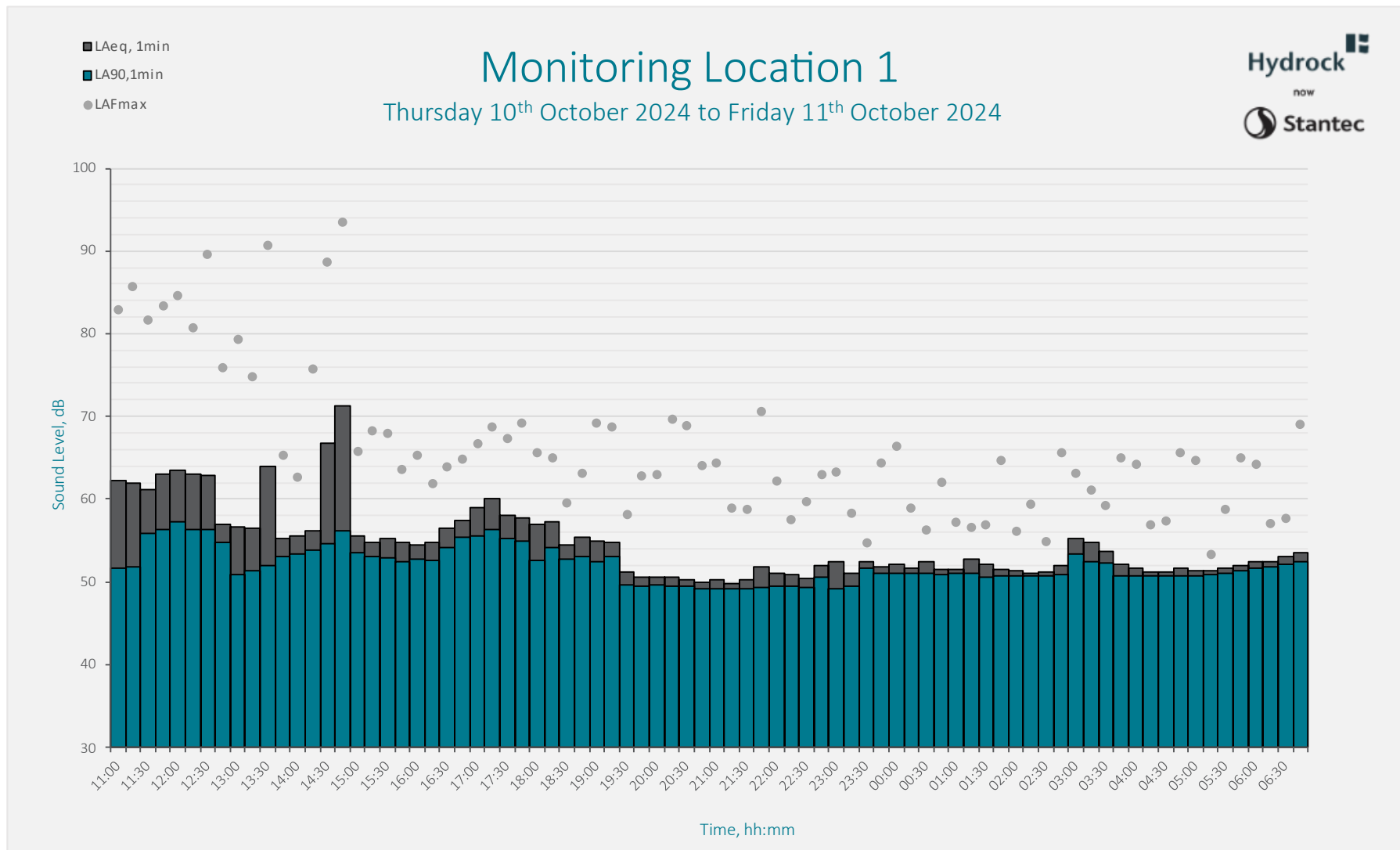
Achieving this standard typically prevents noise complaints. Specifications for proposed equipment should be included with acoustic reports, allowing consultants to assess potential impact and propose mitigation if levels exceed the 5 dB criterion.

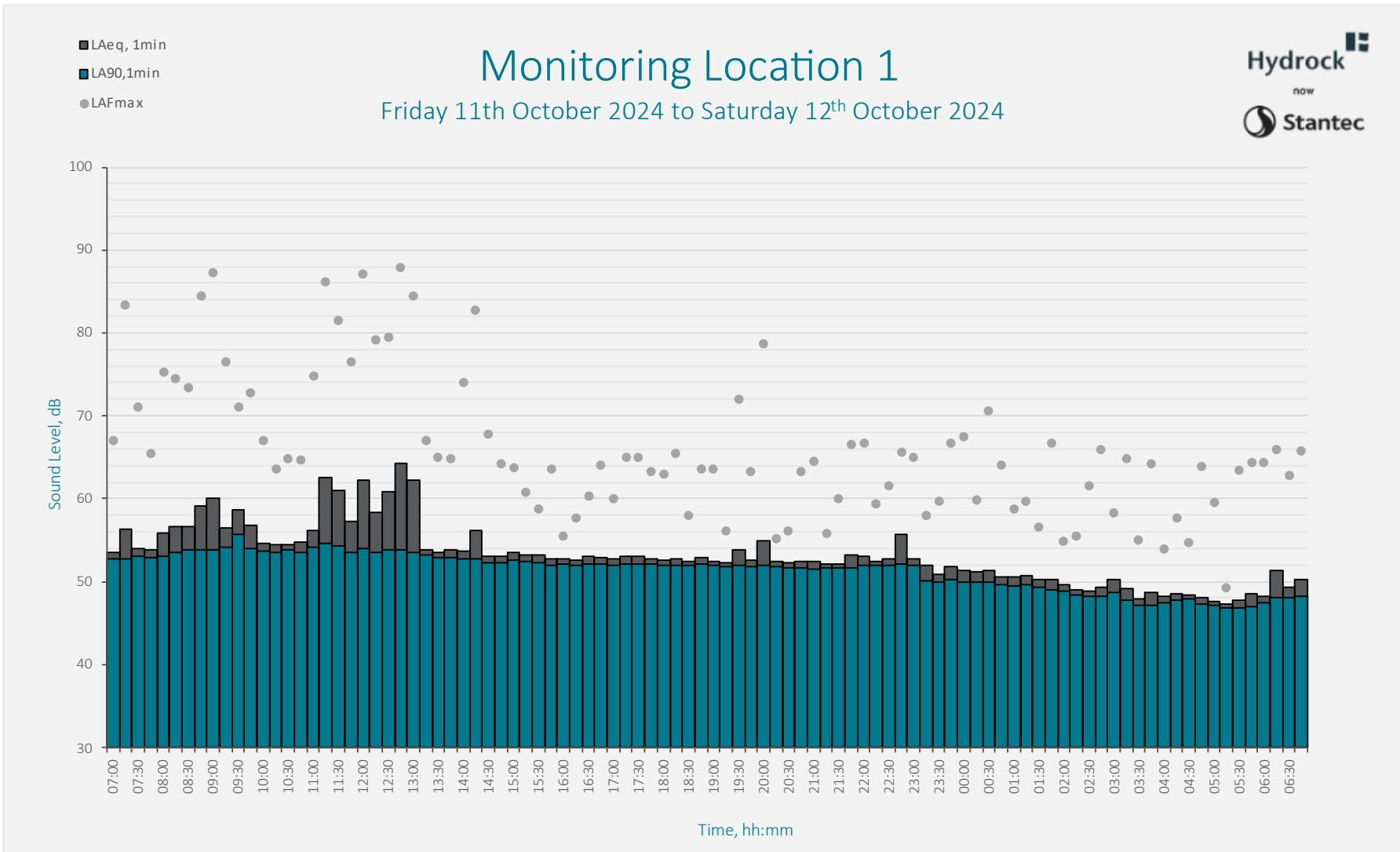
Appendix C Equipment Calibration Information

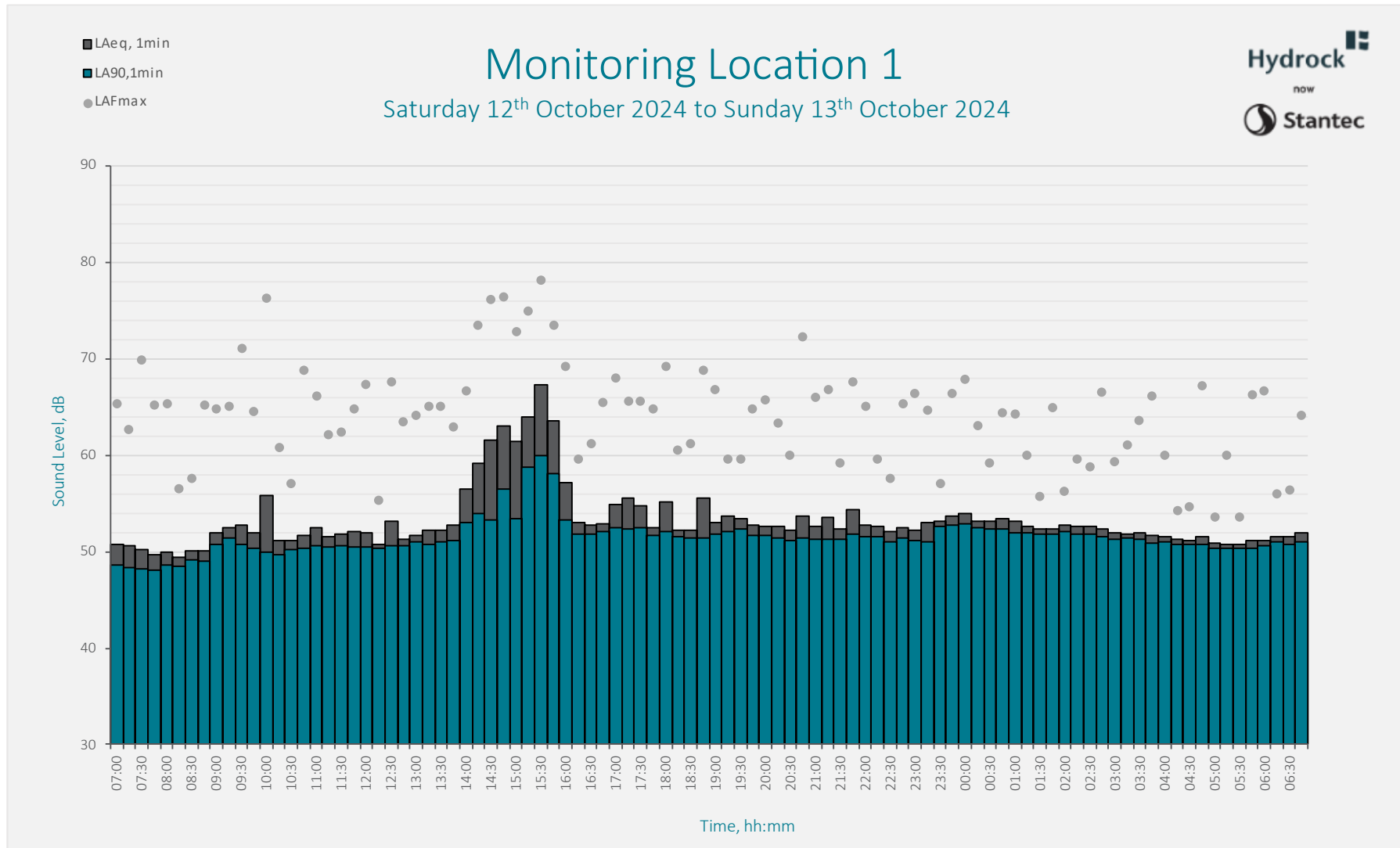
Equipment Calibration Information

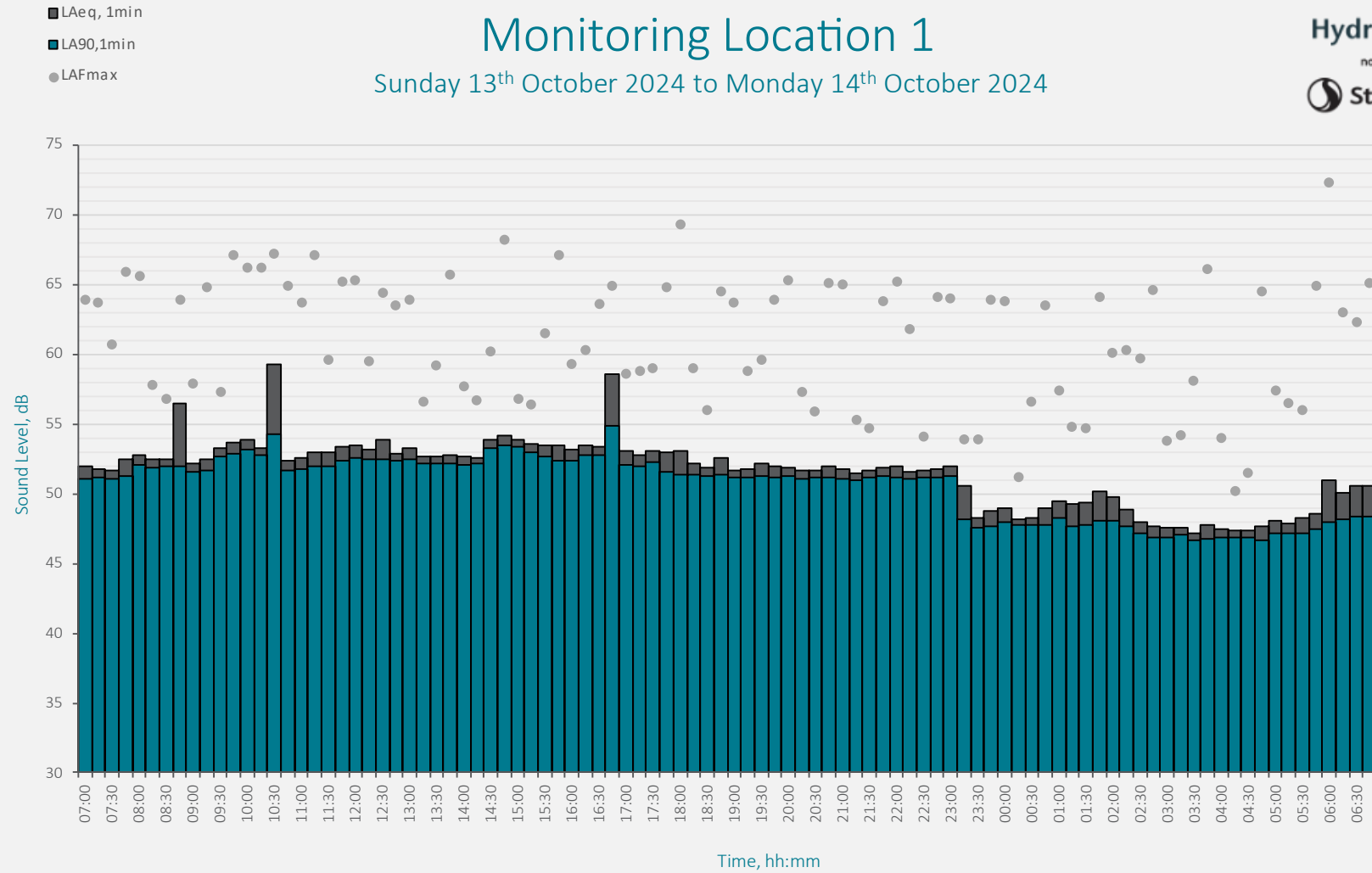
Kit Name	Equipment	Manufacturer	Model	Serial No.	Cal Cert No.	Cal Date.	Calibration Due
ML1	Sound Level Meter	01dB	Fusion	12243	05811/2	25-Jul-22	24-Jul-24
	Pre-amp		Pre22	1915115	05811/2	25-Jul-22	
	Microphone	G.R.A.S	40CD	367051	05811/2	25-Jul-22	
	Calibrator	Cirrus	CR:515	98104	06682/1	19-Mar-24	19-Mar-25

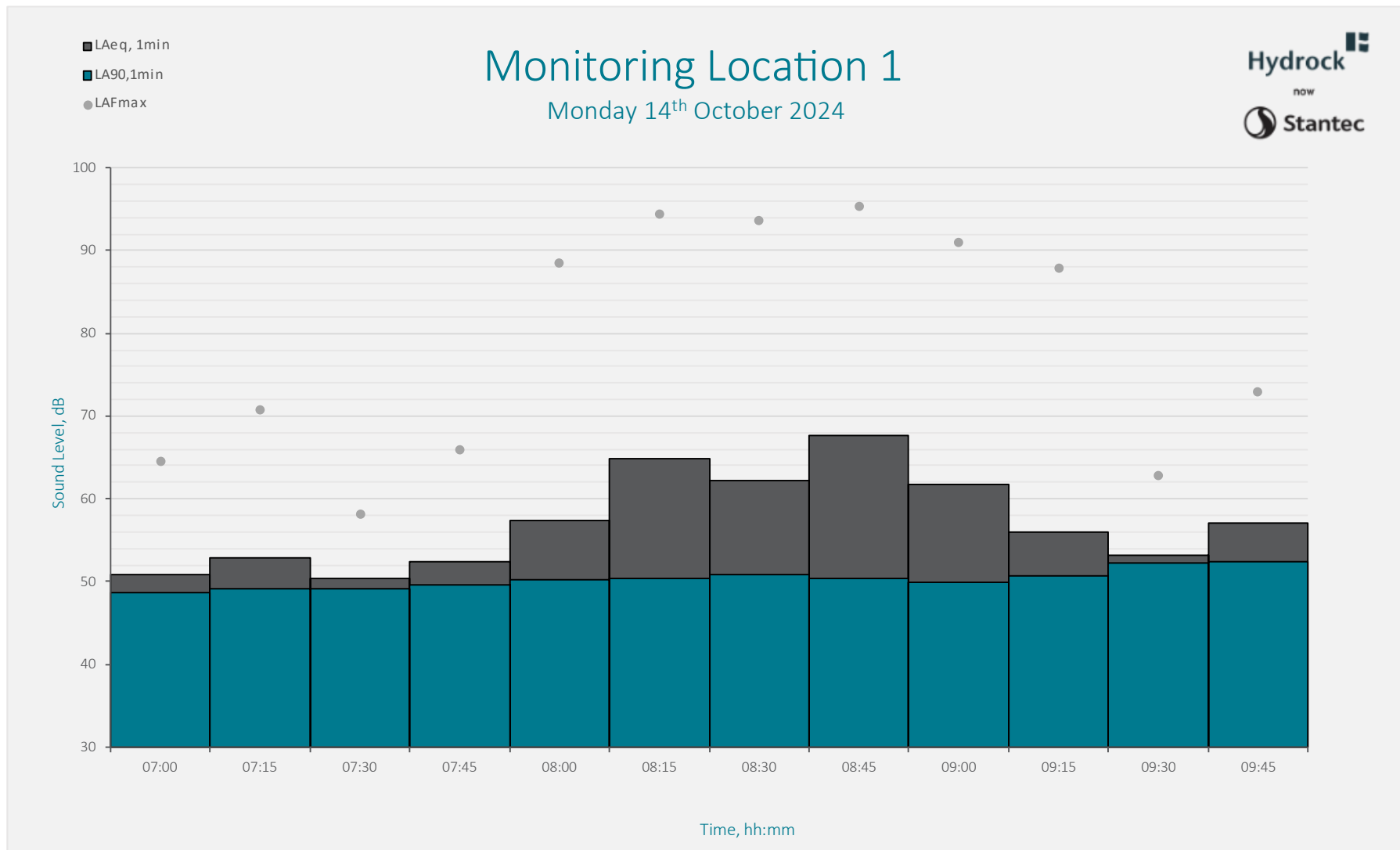
Appendix D Measured Noise Levels











Appendix E Identification of Background Sound Levels

