



36 Salisbury Square, Hatfield

Noise Intrusion Assessment

Report 20/0025/R1



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20/0025/SP1

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20/0025/TH1- 20/0025/TH3

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1 Introduction

- 1.1 It is proposed to refurbish an existing office building at 36 Salisbury Square, Hatfield, AL9 5AF. The development is to include the addition of a residential floor at current roof level and an extension of the existing ground floor undercroft for use as residential also.
- 1.2 There are three separate planning consents for the various parts of the scheme, each of which includes a planning condition requiring a noise assessment be undertaken.
- 1.3 This report sets out details of a noise survey undertaken at the site in order to quantify the existing noise climate, along with an assessment of noise intrusion for the dwellings within the proposed development.

2 Local Authority Criteria

- 2.1 There are three planning conditions pertaining to Acoustics. The first of which to be listed here is in relation to application 6/2018/2442/PN11, and states the following:

“Development must not commence until a sound insulation scheme (including ventilation) has been submitted to and approved in writing by the Local Planning Authority. This scheme must include details to protect the occupiers of the development from noise associated with commercial properties in the area and must take place on a day/evening/night when an event is taking place at The Great Northern Pub, 54 Great North Road, Hatfield, AL9 5AE. The approved scheme must be implemented before any part of the accommodation is occupied and permanently retained thereafter. Any associated mechanical ventilation will need to meet the ventilation requirements found within The Noise Insulation Regulations 1975 (or a similar alternative to be agreed with the Local Planning Authority).”

- 2.2 The following condition (REF: 6/2017/1903/FULL), in relation to the roof works to be undertaken, has been outlined by the Local Authority, Welwyn Hatfield Borough Council:

“Prior to the commencement of the development the applicant must submit to, for approval by the Local Planning Authority details of the glazing scheme and ventilation systems required to be installed to meet the internal noise levels within BS8233:2014. The mechanical Ventilation system must provide adequate ventilation rate to maintain thermal comfort. The applicant must either install a cooling/air conditioning system to undertake a SAP 2012 Appendix P assessment of the internal temperature in summer demonstrating that the windows can be kept shut and that the ventilation alone is capable of keeping the room at a temperature which provides thermal comfort (standards described in SAP). The development must not be carried out other than in accordance with the approved details.”

- 2.3 An application for the ground floor conversion (REF: APP/C1950/W/18/3203353) outlays the following condition:



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“Development shall not begin until details of the glazing scheme and ventilation system, necessary to meet the internal noise requirements of BS8233:2014 and to provide an adequate ventilation rate to maintain thermal comfort, have been submitted to and approved in writing by the local planning authority. The applicant shall either install a cooling/air conditioning system or undertake a SAP 2012 Appendix P assessment of the internal temperature in summer, demonstrating that the windows can be kept shut and that the ventilation alone is capable of keeping the room at a temperature which provides thermal comfort, in line with SAP standards. The development shall not be occupied until the glazing scheme and ventilation system have been constructed in accordance with approved details and retained thereafter.”

3 Site Description

- 3.1 The site address is 36 Salisbury Square, Hatfield, AL9 5AF, it is a three storey office building that fronts over a retail/residential square to the east, Salisbury Square.
- 3.2 To the north of the site is an existing car park and The Great Northern Pub, 54 Great North Road, Hatfield, AL9 5AE with external beer garden.
- 3.3 To the south are further offices and retail stores, beyond which is a residential area. To the west runs the Great North Road and a train line that passes through Hatfield train station to the north west.
- 3.4 The site and surrounding area are shown on the attached site plan 20/0025/SP1.

4 Noise Survey

4.1 Methodology

- 4.1.1 In order to establish the existing noise climate on site, an unattended noise survey was undertaken at the site between 16h00 hours on Thursday 12 March and 11h00 hours on Monday 16 March 2020.
- 4.1.2 The survey was timed to include an event at the Great Northern Pub on the evening of Saturday 14 March, ‘St Patricks Party’ which included amplified live music.
- 4.1.3 Measurements of noise levels were taken at second floor level from three positions, 1m from the exterior of the building’s façades. These have been illustrated in attached site plan 20/0025/SP1 and are described below:
 - MP1: Façade-incident position, 1m from the site’s eastern façade;
 - MP2: Façade-incident position, 1m from the site’s northern façade;
 - MP3: Façade-incident position, 1m from the site’s western façade.



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- 4.1.4 These positions were selected to quantify existing noise levels representative of those incident on each side of the building.
- 4.1.5 Measurements of the L_{Aeq} , L_{Amax} and L_{A90} indices were recorded over consecutive 15-minute periods for the duration of the survey using the equipment listed within table T1 (see attached Glossary of Acoustic Terms for an explanation of the noise units used).

Item	Manufacturer	Type
Sound Level Analyser (x3)	Rion	NL-52
Acoustic Calibrator (x3)	Rion	NC-74
Weatherproof windshield (x3)	Rion	WS-15

T1 Equipment used during noise survey.

- 4.1.6 The microphones were fitted within weatherproof enclosures, and the sound level meters calibrated before and after the survey in order to confirm an acceptable level of accuracy. No significant drift was noted to have occurred.
- 4.1.7 The weather conditions when setting up the noise monitoring equipment were cool with a mild wind and no noted precipitation. When collecting the equipment, the weather was cool and clear with a slight breeze. Locally available weather data¹ has shown that during the late night of Saturday 14th March there had been light rainfall with further light rainfall on Sunday 15th during the afternoon. Wind speeds stayed acceptable throughout. Noise data over the rainy periods had not been used during this assessment.

4.2 Results

- 4.2.1 The results of the unattended noise measurements are presented in attached time history figures 20/0025/TH1- 20/0025/TH3.
- 4.2.2 The noise climate onsite was generally governed by road traffic noise from Great North Road to the west of the site and the rail line that runs parallel to this.
- 4.2.3 It had been important to undertake our noise monitoring during a period in which the neighbouring public house, The Great Northern, had been undertaking an event. Our measurements were undertaken during a St. Patricks Day celebration concert on the evening of Saturday 14th March. From analysis of triggered audio recordings from measurement position MP2 and MP1, there had been a live band playing through the evening beyond 23h00.
- 4.2.4 The resultant average day and night time period noise levels recorded at the measurement positions are presented in table T2.

¹ Weather data sourced from: <https://www.timeanddate.com>



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Position	Daytime	Night Time	
	$L_{Aeq, 16h}$	$L_{Aeq, 8h}$	Typical L_{AFmax} ²
MP1: Site's eastern façade	56	48	70
MP2: Site's northern façade	62	53 ³	75
MP3: Site's western façade	69	61	80

T2 Average period noise levels.

4.2.5 The minimum background noise levels recorded during the day and night time measurement hours during the survey duration are set out in table T3 below.

Location	Minimum Background Noise Level, dB(A)	
	Daytime (07h00-23h00)	Night time (23h00-07h00)
MP1: Site's eastern façade	40	33
MP2: Site's northern façade	40	36
MP3: Site's western façade	44	35

T3 Lowest measured background noise levels, L_{A90} .

² Worst-case 10th highest L_{Amax} event level over a given night time period.

³ Worst case period during event at Great Northern Pub 58dB $L_{Aeq,15min}$



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5 Noise Assessment

5.1 Planning Guidance and Criteria

5.1.1 The planning conditions set out within section 2 refer to noise standards as defined by BS8233. Table 4 of the current 2014 version of the standard⁴ sets out recommended criteria for internal noise levels in dwellings as replicated below:

Activity	Location	07h00 to 23h00	23h00 to 07h00
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Note 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

T4 Table 4 of BS 8233:2014.

5.1.2 The above design standards apply to the time period appropriate for the activity involved. The WHO document⁵ on which the standards are based, identifies that the daytime noise standard applies to a 16 hour day while the night time noise standard applies to an 8 hour night. In BS8233 this is classified as 23h00 to 07h00.

5.1.3 The WHO study derived the 45dB $L_{Amax,F}$ night time noise standard on the basis of 10 to 15 occurrences per night. On this basis the aim shall be to ensure that $L_{Amax,F}$ values for **typical** intermittent noise events, rather than occasional or one-off noise events, shall not exceed 45dB in bedrooms.

5.1.4 Based on the above, the following noise level criteria are sought for external noise intrusion within the proposed development:

- Daytime internal $L_{Aeq,16hour}$ levels to all habitable rooms no greater than 35dB;
- Night time internal $L_{Aeq,8hour}$ levels to all bedrooms no greater than 30dB;
- Individual L_{Amax} event noise levels to all bedrooms no greater than 45dB (excluding 10-15 events per night).

⁴ British Standard 8233: 2014 - *Sound insulation and noise reduction for buildings – code of practice.*

⁵ World Health Organisation: *Guidelines for Community Noise*, Berglund et. al. 1999



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5.2 Assessment and Mitigation

Façade and Roof Elements

- 5.2.1 It is understood that the existing external building fabric of masonry construction and a tiled roof will stay the same with 10 dormer windows and 10 roof lights added.
- 5.2.2 In order to adequately control external noise intrusion, the underside of the roof joists should be lined with two layers of plasterboard (minimum 10 kg/m² each layer) mounted on resilient bars, with minimum 100mm deep unfaced mineral wool slabs (density $\geq 100\text{kg/m}^3$) between the joists. The non-glazed parts of new dormer windows should have the same construction.
- 5.2.3 At ground floor level some new sections of external wall will be formed. A cavity masonry construction would be suitable to adequately control external noise intrusion, or a masonry outer leaf with internal independent timber/metal studwork frames lined with two layers of plasterboard (minimum 10 kg/m² each layer) with 100mm mineral wool/fibreglass insulation (density $\geq 10\text{kg/m}^3$) between the studs.

Glazing

- 5.2.4 The glazing requirements are set out below in table T5. These requirements are the minimum necessary to achieve the internal criteria, as set out above.

Façade Group	Sound Reduction Index, Octave Band Centre Frequency (Hz)					
	125	250	500	1k	2k	4k
Glazing Type G1	20	18	26	33	33	33
Glazing Type G2	20	25	22	32	41	45
Glazing Type G3	27	28	35	45	50	50

T5 Minimum octave band sound reduction index of each glazing type.

- 5.2.5 The Glazing Type performance can typically be achieved using the following glazing configurations.



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Performance Reference	Typical Configuration
Glazing Type G1	4mm glass – 12mm gap – 4mm glass
Glazing Type G2	4mm glass – 16mm gap – 8mm glass
Glazing Type G3	6.4mm laminated glass – 9mm gap – 10.4mm laminated glass

T6 Typical glazing configurations expected to be capable of achieving the required sound reduction index performance

- 5.2.6 The sound reduction performance for all glazing types as quoted in table T5 above must be achieved by the glazing system taken as a whole and in its installed condition. The specification therefore applies to the glazing and all seals on any openable parts of the system and any required ventilation or condensation control mechanisms.
- 5.2.7 This list is not exhaustive and no part of the windows shall cause the above figures not to be achieved. The typical configurations to achieve the required performance are provided in table T6 above for guidance only. It is the sound reduction figures in table T5 above that must be achieved by the complete window system in each case. The position of the glazing is to be as follows:
- Glazing Type G1 is to be used across the whole of the East Façade of the development including rooflights and dormer windows;
 - Glazing Type G2 is to be used across the whole of the North Façade of the development including rooflights and dormer windows;
 - Glazing Type G3 is to be used across the whole of the West Façade of the development including rooflights and dormer windows.

Ventilation

- 5.2.8 The SAP 2012 Appendix P assessment referred to in the planning conditions has been undertaken by the project building services engineer. Mechanical extract ventilation (MEV) systems have been specified as necessary to maintain thermal comfort with windows closed as required by planning condition. Windows should still be openable for purge ventilation (examples in Building Regulations Approved Document F include to remove high concentrations of pollutants from occasional activity such as painting and decorating or accidental releases such as smoke from burnt food).
- 5.2.9 All mechanical ventilation systems are to be designed to achieve noise levels inside of no more than NR25 in bedrooms and NR30 in all other habitable rooms.
- 5.2.10 The ventilation systems will incorporate passive air intakes (trickle vents) in the façades, the vents should have an installed element-normalized level difference ($D_{n,e}$) when tested in



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accordance with BS EN 10140 2010 Parts 1 to 5 of not less than that indicated in the following table:

Location	Trickle Vent Installed Element Normalized Level Difference (dB $D_{n,e}$) @ Octave Band Centre Frequency (Hz)						
	125	250	500	1k	2k	4k	Indicative $D_{n,e,w}$
All façades <i>Indicative vent type:</i> <i>Greenwood AAB</i>	33	38	43	48	52	52	47

T7 Passive ventilator sound reduction performance requirements

- 5.2.11 Typical vents which would achieve the performance requirements are also identified within table T7.
- 5.2.12 The indicative $D_{n,e,w}$ values and indicative vent types quoted above are for guidance only, alternatives may be utilised provided the **octave band** sound reduction performance quoted are achieved.

Resultant Noise Levels

- 5.2.13 Table sets out the resultant internal noise levels taking account of the recommendations set out above.

Façade	Daytime $L_{Aeq,16hr}$ dB <i>(criterion)</i>	Night time $L_{Aeq,8hr}$ dB <i>(criterion)</i>	Night time L_{Amax} dB <i>(criterion)</i>
East	26 (35)	17 (30)	42 (45)
North	27 (35)	19 ⁶ (30)	43 (45)
West	29 (35)	21 (30)	45 (45)

T8 Resultant Internal Noise Levels (worst case rooms)

⁶ 25dB $L_{Aeq,15min}$ during live music



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6 Conclusions

- 6.1 Planning permission has been granted across three separate consents for the refurbishment an existing office building at 36 Salisbury Square, Hatfield, AL9 5AF. The development is to include the addition of a residential floor at current roof level and an extension of the existing ground floor undercroft for use as residential also.
- 6.2 Each of the three planning consents includes a condition requiring a noise assessment be undertaken. Guidance provided within the decision notices, discussed within this report, has been used to determine the internal noise criteria for this development.
- 6.3 The report has shown that suitable internal noise levels can be achieved in all of the proposed residential dwellings using double glazing with suitable sound insulating performance, with acoustically rated façade trickle ventilators.
- 6.4 With the specified glazing and proposed ventilation installed, noise levels within the proposed residences will be controlled to within suitable levels on all parts of the proposed development area on the site.

■ End of Section



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Glossary of Acoustic Terms

L_{Aeq} :

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq} .

L_{Amax} :

The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, L_{Amax} is measured using the “fast” sound level meter response.

L_{A10} & L_{A90} :

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly L_{A90} gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

L_{A10} is commonly used to describe traffic noise. Values of dB L_{An} are sometimes written using the alternative expression dB(A) L_n .

L_{AX} , L_{AE} or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. L_{AX} values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of L_{Aeq} for the total noise. The L_{AX} term can sometimes be referred to as Exposure Level (L_{AE}) or Single Event Level (SEL).

■ End of Section



Figure 20/0025/SP1

Title:

Site plan showing the measurement positions on site

 Measurement Position



Project:

36 Salisbury Square, Hatfield

Date:

March 2020

Revision:

-

Scale:

Not to scale



Figure 20/0025/TH01

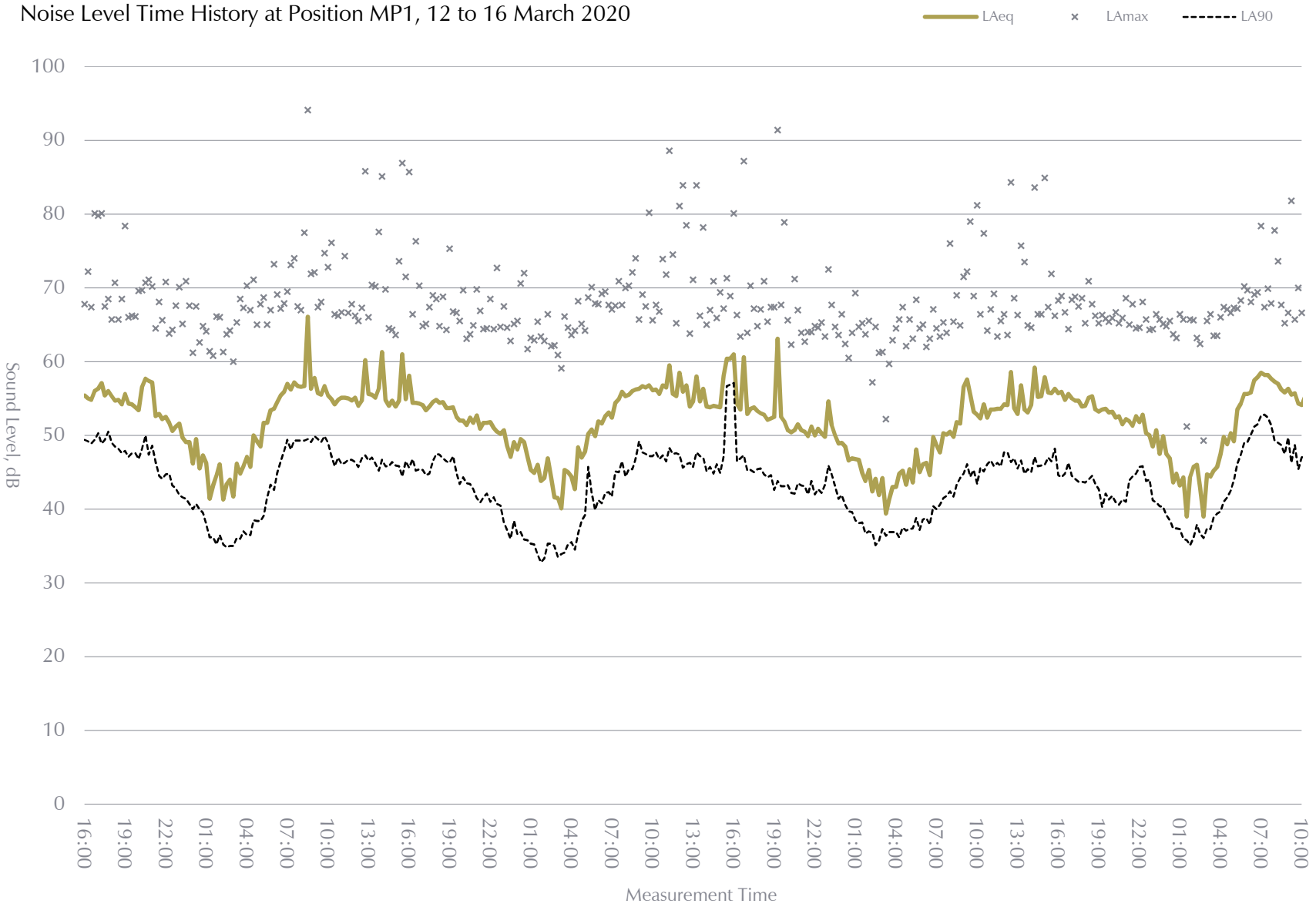
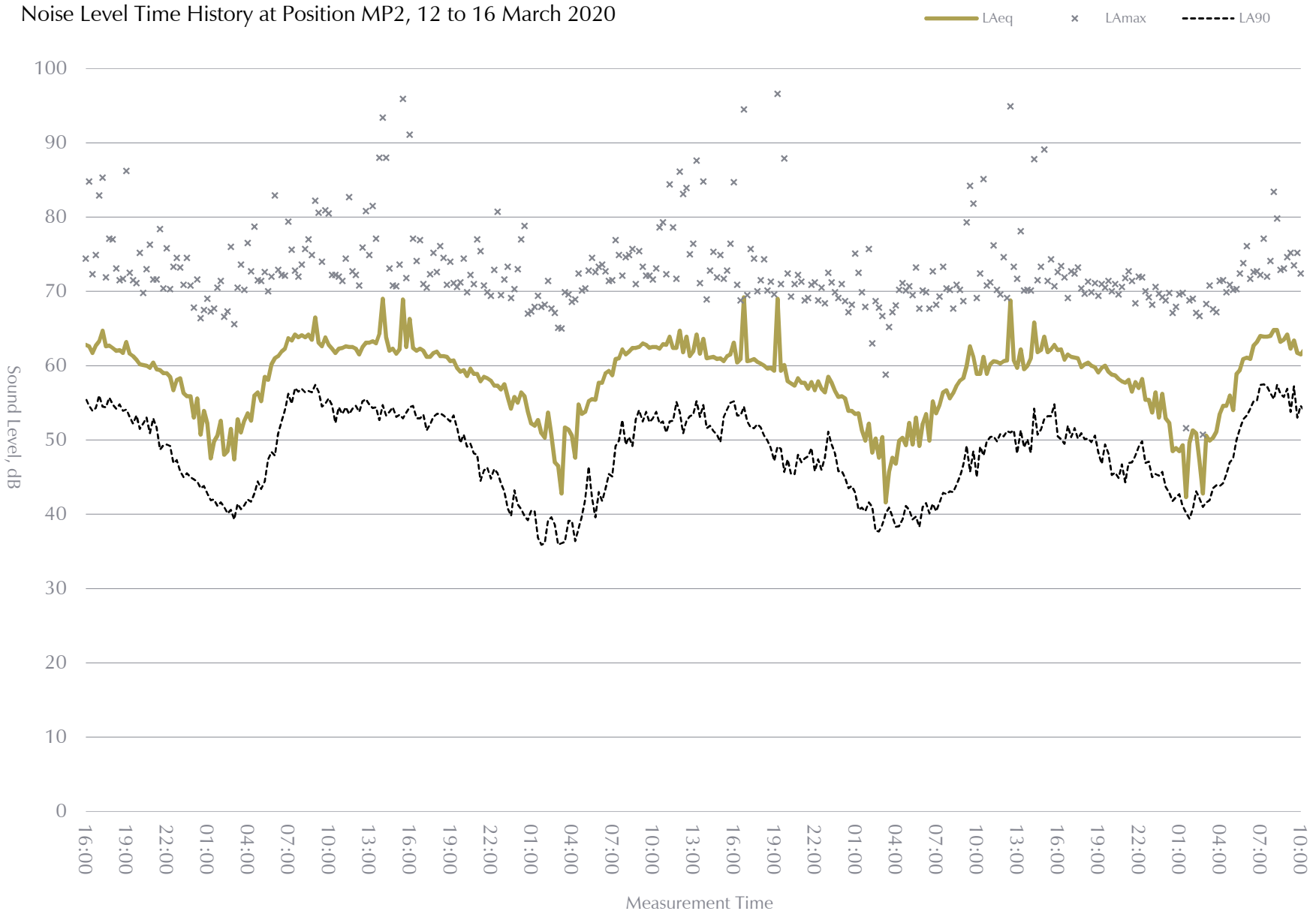




Figure 20/0025/TH02



Noise Level Time History at Position MP3, 12 to 16 March 2020

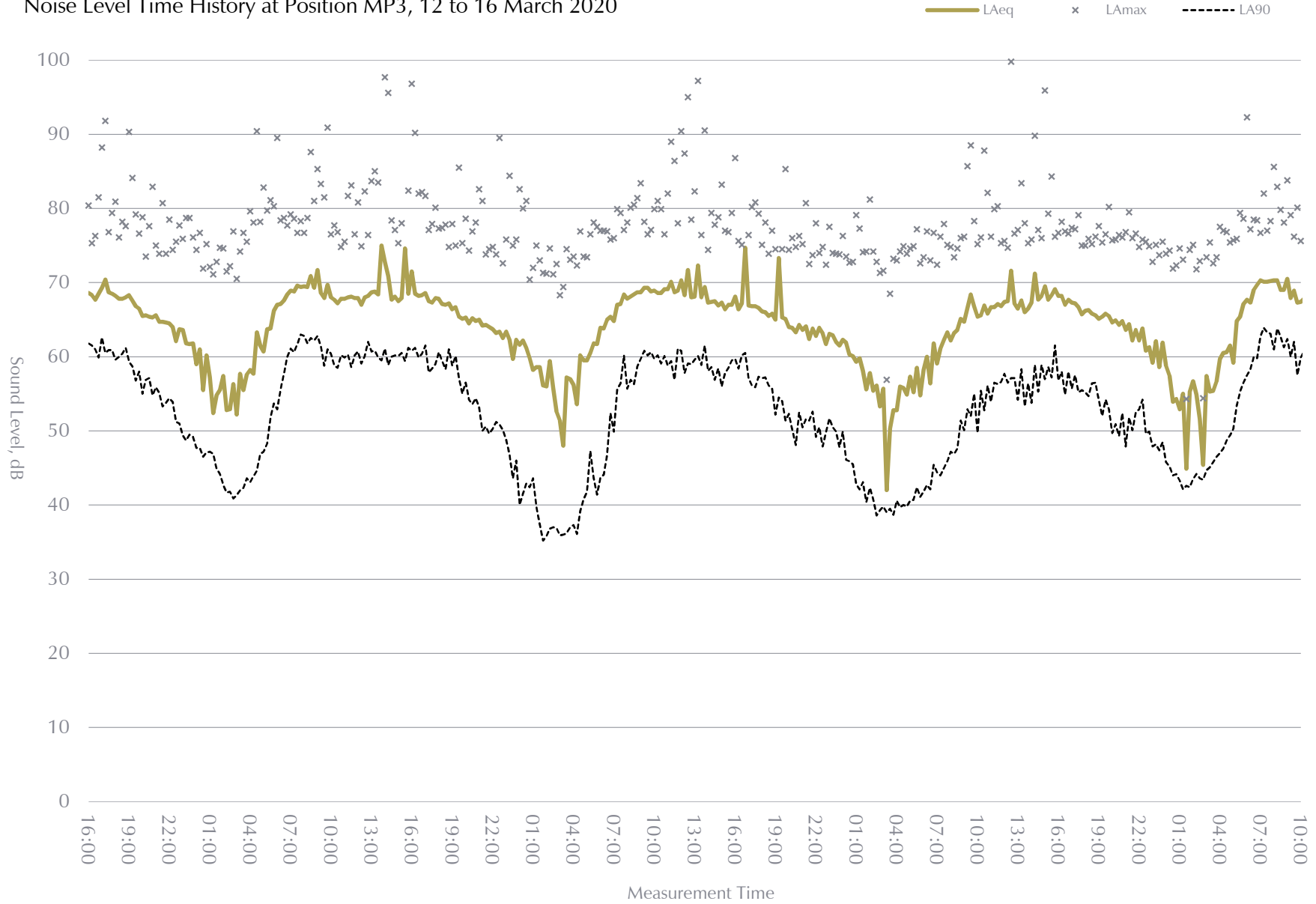


Figure 20/0025/TH03



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