

Victoria Riverside Manchester

Condition Discharge Report 23(b) Tower B & Tower C

28499/RP2

27 September 2024

For:
CR Construction (U.K) Company Limited
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Condition Discharge Report 23b – Internal Ambient Noise Levels 28499/RP2

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Internal Noise Level Test Report 28499/RP2

Document Control

Rev	Date	Comment	Prepared by	Checked by	Authorised by
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1.0 Introduction

Hann Tucker Associates Limited (Hann Tucker) has been commissioned by CR Construction (U.K.) Company Limited to undertake validation measurements and prepare supplementary evidence to assist with the discharge of planning condition 21(b) on Tower Block's B & C for the development referred to as Victoria Riverside, Manchester.

It should be noted that this Report relates to "Tower B & C" only as the practical completion date for Tower A means it is not yet ready to undertake measurements (ie phased construction). As such a supplementary Report will be provided to capture Tower A to follow this Report.

The tests were carried out across the development on a number of elevations within Towers B and C to capture noise data for each façade specification installed across the development.

A combination of unattended and attended noise loggers have been utilised in critical areas around the development to establish the as built operation internal noise levels across readings against the worst-case noise incident in relation to road and rail traffic noise.

Our findings are presented herein.

2.0 Planning Condition 23 (b)

Planning Condition 23, part (b), requests that evidence of the noise mitigation measures installed are capable of achieving internal ambient noise levels in apartments satisfy agreed limits be submitted to the local planning authority. The condition is as below with relevant text highlighted in bold.

23. Notwithstanding the Chapter 12 Noise and Vibration, prepared by ARUP of the ES stamped as received by the City Council, as Local Planning Authority, on 19 May 2020,

(b). Prior to the first occupation of each phase of the development, a verification report for that phase of development will be required to validate that the work undertaken conforms to the recommendations and requirements approved as part of part (a) of this planning condition. The verification report shall include post completion testing to confirm the noise criteria has been met. In instances of non-conformity, these shall be detailed along with mitigation measures required to ensure compliance with the noise criteria. Any mitigation measures shall be implemented in accordance with a timescale to be agreed with the City Council, as Local Planning Authority, and thereafter retained and maintained in situ.



As such, internal ambient noise levels must adhere to the criteria stipulated in BS 8233:2014, as shown in the table overleaf.

Activity	Location	Desirable Ambient Criteria	
		07:00 – 23:00	23:00 – 07:00
Resting	Living Rooms	35 dB $L_{Aeq,16hour}$	-
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$ 45 dB $L_{Amax,2min}$ (not normally exceeded, 10-15 times per night)

3.0 Commissioning Details

3.1 Overview

At the time of the surveys all of the apartments were unfurnished, though carpeted where carpet is adopted in the design (ie bedrooms). Consequently, corrections have been made to the measured internal noise levels to account for reverberation time in a finished apartment (ie as the scheme has been designed to), which would be 0.5 seconds as defined in BS 8233:2014.

The results both unattended and the attended surveys are outlined in the following Sections.

3.2 Unattended Measurement Locations

Unattended sound level loggers were installed within 6No apartments, as described below. These rooms were selected for the unattended surveys as they can be considered to be representative of highest and lowest façade specifications of the development as a whole.

Test Ref.	Apartment	Tower	Room	Test Dates
MP1	1704	Block B	Living/Kitchen/Dining (LKD)	25/09/2024-26/09/2024
MP2	1201		Living/Kitchen/Dining (LKD)	25/09/2024-26/09/2024
MP3	504		Living/Kitchen/Dining (LKD)	25/09/2024-26/09/2024
MP4	2407	Block C	Living/Kitchen/Dining (LKD)	25/09/2024-26/09/2024
MP5	901		Living/Kitchen/Dining (LKD)	25/09/2024-26/09/2024
MP6	305		Bedroom (BED)	25/09/2024-26/09/2024

Each sound level meter was set up to continuously record L_{Aeq} and L_{Amax} noise levels over 15-minute and 2-minute periods.



3.3 Attended Measurement Locations

Internal ambient noise level measurements were taken in 23No different apartments across the development in the following locations. The noise levels were typically measured for 15-minute durations.

Test Ref.	Tower	Apt No.	Room Type	Test Date	Test Time
IANL1	B	1608	LKD	25/09/2024	17:30-17:45
IANL2	B	1503	LKD	25/09/2024	17:36-17:52
IANL3	B	1408	BED	25/09/2024	17:56-18:10
IANL4	B	908	BED	25/09/2024	18:15-18:30
IANL5	B	904	BED	25/09/2024	18:20-18:40
IANL6	B	701	BED	25/09/2024	18:40-18:50
IANL7	B	704	BED	25/09/2024	18:48-19:00
IANL8	B	508	BED	25/09/2024	18:56-19:10
IANL9	B	301	BED	25/09/2024	19:00-19:15
IANL10	B	305	LKD	25/09/2024	19:10-19:22
IANL11	B	208	LKD	25/09/2024	19:18-19:28
IANL12	B	204	LKD	25/09/2024	19:45-20:00
IANL13	C	2301	LKD	26/09/2024	16:00-16:10
IANL14	C	1505	LKD	26/09/2024	16:30-16:45
IANL15	C	1403	LKD	26/09/2024	16:34-16:52
IANL16	C	1301	LKD	26/09/2024	16:30-16:45
IANL17	C	1107	BED	26/09/2024	16:54-17:08
IANL18	C	905	BED	26/09/2024	17:00-17:15
IANL19	C	702	LKD	26/09/2024	17:06-17:20
IANL 20	C	705	BED	26/09/2024	17:15-17:30
IANL 21	C	501	LKD	26/09/2024	17:22-17:34
IANL 22	C	505	LKD	26/09/2024	17:28-17:40
IANL 23	C	308	BED	26/09/2024	17:36-17:50
IANL 24	C	201	BED	26/09/2024	17:42-17:56
IANL 25	C	205	LKD	26/09/2024	17:50-18:02



3.4 Equipment

The equipment used, as detailed below, was calibrated prior to and on completion of the survey. No significant calibration drift occurred (not more than 0.3 dB).

Location	Description	Manufacturer	Type	Serial Number	Calibration
MP1, IANL15, IANL18, IANL21, IANL24	Type 1 Precision Sound Level Meter	Larson Davis	LxT	4086	Calibrated on 28/08/2024
MP2, IANL2, IANL4, IANL7, IANL10, IANL13, IANL16, IANL17, IANL20, IANL23	Type 1 Precision Sound Level Meter	Larson Davis	LxT	4568	Calibrated on 30/05/2024
MP3, IANL1, IANL3, IANL5, IANL11, IANL12, IANL14, IANL19, IANL22, IANL25	Type 1 Precision Sound Level Meter	Larson Davis	LxT	5111	Calibrated on 30/05/2024
MP4	Type 1 Precision Sound Level Meter	Larson Davis	LxT	5104	Calibrated on 30/05/2024
MP5	Type 1 Precision Sound Level Meter	Larson Davis	LxT	5103	Calibrated on 29/05/2024
MP6	Type 1 Precision Sound Level Meter	Larson Davis	LxT	6409	Calibrated on 12/09/2024
IANL 6, IANL9	Type 1 Precision Sound Level Meter	Larson Davis	LxT	4569	Calibrated on 30/05/2024
All	Calibrator	Larson Davis	Cal 200	3083	Calibrated on 27/03/2024

3.5 Site Conditions

The following pre-requisites were requests given to the site in order to obtain representative measurements results:-

- Rooms were to be finished, unfurnished and unoccupied
- Test rooms to be locked for the duration of the measurement (no access for trades).
- Windows to be closed, as ventilation provided by mechanical ventilations systems.
- Mechanical ventilation systems to be balanced and operating at design duty for the duration of the noise surveys.
- Extraneous noises from site construction works were excluded as far as reasonably possible.

All attended measurements were carried out during daytime and evening hours (typically between 16:00-20:00 hrs), as to include road/rail traffic noise during peak hours.



4.0 Survey Results

4.1 Unattended Measurements

The table below summarises the highest $L_{Aeq,8hr}$ (night-time) measurements and the 10th highest $L_{AFmax,2min}$ (night-time) noise levels at each measurement position. The Manchester City Council (MCC) noise level limit is also presented to judge compliance.

Due to extraneous noise as a result of the active construction site, the unattended data is presented below for night-time periods only as the daytime levels are not considered representative. The time history graphs for each position are however provided in Appendix A for completeness.

Test Ref	Measurement Location	Parameter	Measured Noise Level (dB)	MCC Limit (dB)	Compliance?
MP1	Tower Block: B Plot Reference: 1704 Room: LKD	Night-time $L_{Aeq, 8hour}$	26	30	✓
		Night-time L_{Amax}	43	45	✓
MP2	Tower Block: B Plot Reference: 1201 Room: LKD	Night-time $L_{Aeq, 8hour}$	30	30	✓
		Night-time L_{Amax}	42	45	✓
MP3	Tower Block: B Plot Reference: 504 Room: LKD	Night-time $L_{Aeq, 8hour}$	28	30	✓
		Night-time L_{Amax}	41	45	✓
MP4	Tower Block: C Plot Reference: 2407 Room: LKD	Night-time $L_{Aeq, 8hour}$	25	30	✓
		Night-time L_{Amax}	43	45	✓
MP5	Tower Block: C Plot Reference: 901 Room: LKD	Night-time $L_{Aeq, 8hour}$	28	30	✓
		Night-time L_{Amax}	32	45	✓
MP6	Tower Block: C Plot Reference: 305 Room: Bed	Night-time $L_{Aeq, 8hour}$	29	30	✓
		Night-time L_{Amax}	36	45	✓



4.2 Attended Measurements

The table below summarises the $L_{Aeq,T}$ measurements at each measurement position. The Manchester City Council (MCC) noise level limit is also presented to judge compliance.

Test Ref.	Measurement Location	Time Period (mins)	Measured L_{eq} (dB)	MCC Criterion $L_{Aeq,16hr}$ (dB)	Compliance
IANL1	Tower: B Plot Reference: 1608 Room: LKD	15	32	35	✓
IANL2	Tower: B Plot Reference: 1503 Room: LKD	18	34	35	✓
IANL3	Tower: B Plot Reference: 1408 Room: BED	16	37 $L_{Aeq,t}$ 35 $L_{A90,T}$	35	✓ See Note 1
IANL4	Tower: B Plot Reference: 908 Room: BED	15	34	35	✓
IANL5	Tower: B Plot Reference: 1904 Room: BED	20	31	35	✓
IANL6	Tower: B Plot Reference: 701 Room: BED	10	35	35	✓
IANL7	Tower: B Plot Reference: 704 Room: BED	12	35	35	✓
IANL8	Tower: B Plot Reference: 508 Room: BED	14	27	35	✓
IANL9	Tower: B Plot Reference: 301 Room: BED	15	29	35	✓
IANL10	Tower: B Plot Reference: 305 Room: LKD	12	30	35	✓
IANL11	Tower: B Plot Reference: 208 Room: LKD	10	28	35	✓



Test Ref.	Measurement Location	Time Period (mins)	Measured L_{eq} (dB)	MCC Criterion $L_{Aeq,16hr}$ (dB)	Compliance
IANL12	Tower: B Plot Reference: 204 Room: LKD	15	34	35	✓
IANL13	Tower: C Plot Reference: 2301 Room: LKD	10	31	35	✓
IANL14	Tower: C Plot Reference: 1505 Room: LKD	15	35	35	✓
IANL15	Tower: C Plot Reference: 1403 Room: LKD	20	33	35	✓
IANL16	Tower: C Plot Reference: 1301 Room: LKD	15	33	35	✓
IANL17	Tower: C Plot Reference: 1107 Room: BED	16	28	35	✓
IANL18	Tower: C Plot Reference: 905 Room: BED	15	33	35	✓
IANL19	Tower: C Plot Reference: 702 Room: LKD	16	35	35	✓
IANL20	Tower: C Plot Reference: 705 Room: BED	15	29	35	✓
IANL21	Tower: C Plot Reference: 501 Room: LKD	14	33	35	✓
IANL22	Tower: C Plot Reference: 505 Room: LKD	14	35	35	✓
IANL23	Tower: C Plot Reference: 308 Room: BED	16	31	35	✓



Test Ref.	Measurement Location	Time Period (mins)	Measured L_{eq} (dB)	MCC Criterion $L_{Aeq,16hr}$ (dB)	Compliance
IANL24	Tower: C Plot Reference: 201 Room: BED	14	23 See Note 2	35	✓
IANL25	Tower: C Plot Reference: 205 Room: LKD	12	22 See Note 2	35	✓

[1] Measurement undertaken during peak rush hour period and when comparing the $L_{A90,T}$ to the $L_{Aeq,T}$, it is clear that road traffic is influencing the measured levels during the period. It is considered that during quieter periods of the day, the noise levels would be reduced. Given the criteria is a full 16-hour daytime average, this apartment is considered to be compliant with the intent of the planning condition.

[2] Considering the low levels measured in apartments 201 and 205 on Tower C it is assumed MVHR was not running. However, it is considered that compliance with all other apartments demonstrates that these areas would be expected to meet the requirements of MCC daytime criteria when MVHRs running.

5.0 Conclusion

In conclusion, it stands to reason that the installed façade system is suitable to control external noise intrusion, and the operational mechanical ventilation systems commensurate with suitable internal noise levels, on all façades of “Towers B & C” of the Manchester Victoria development.



Appendix A

Time History Graphs

Manchester Victoria

Position 1

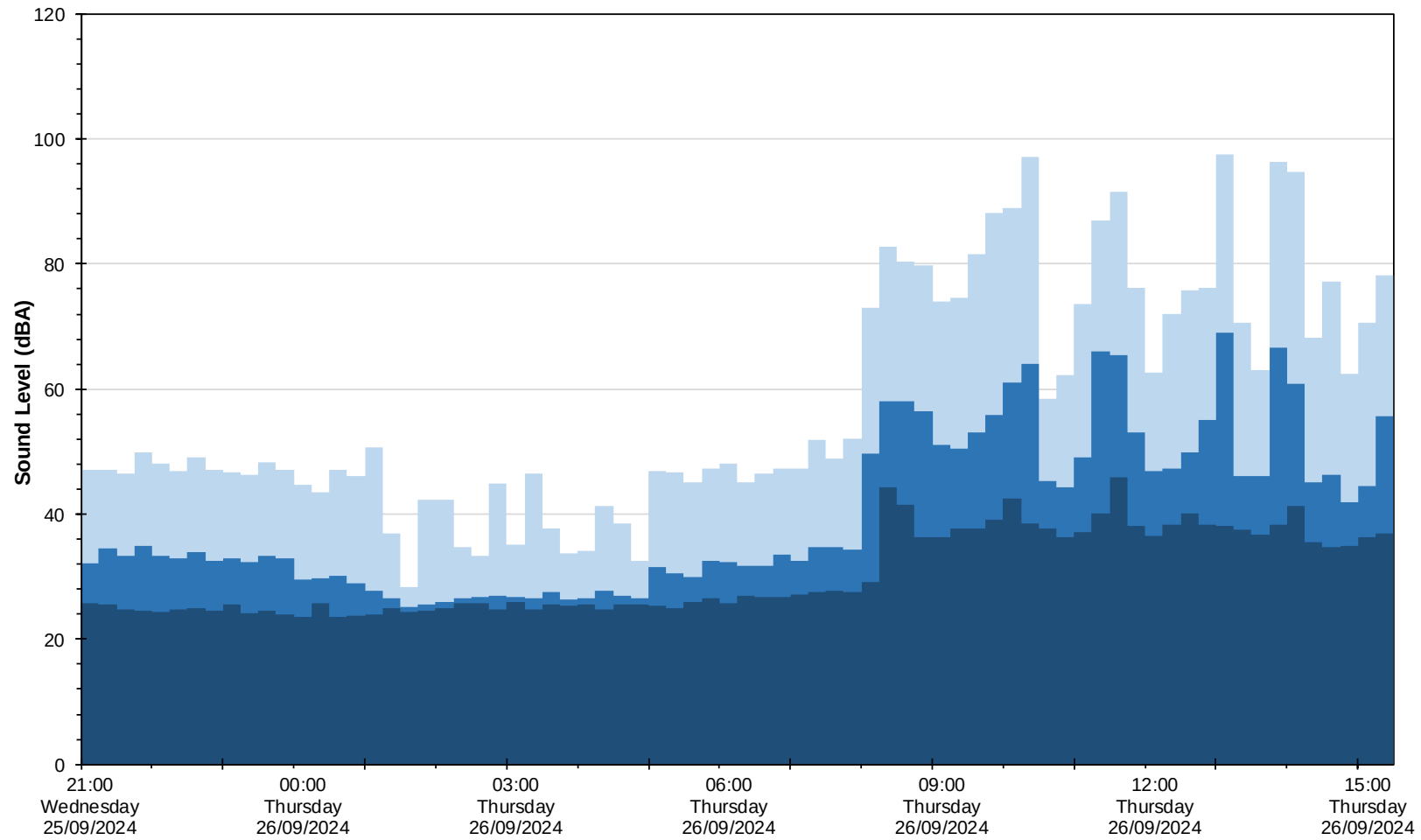
L_{eq} , L_{max} and L_{90} Noise Levels

Wednesday 25 September 2024 to Thursday 26 September 2024

LA_{max}

LA_{eq}

LA₉₀



Date and Time

28499/TH1

Manchester Victoria

Position 2

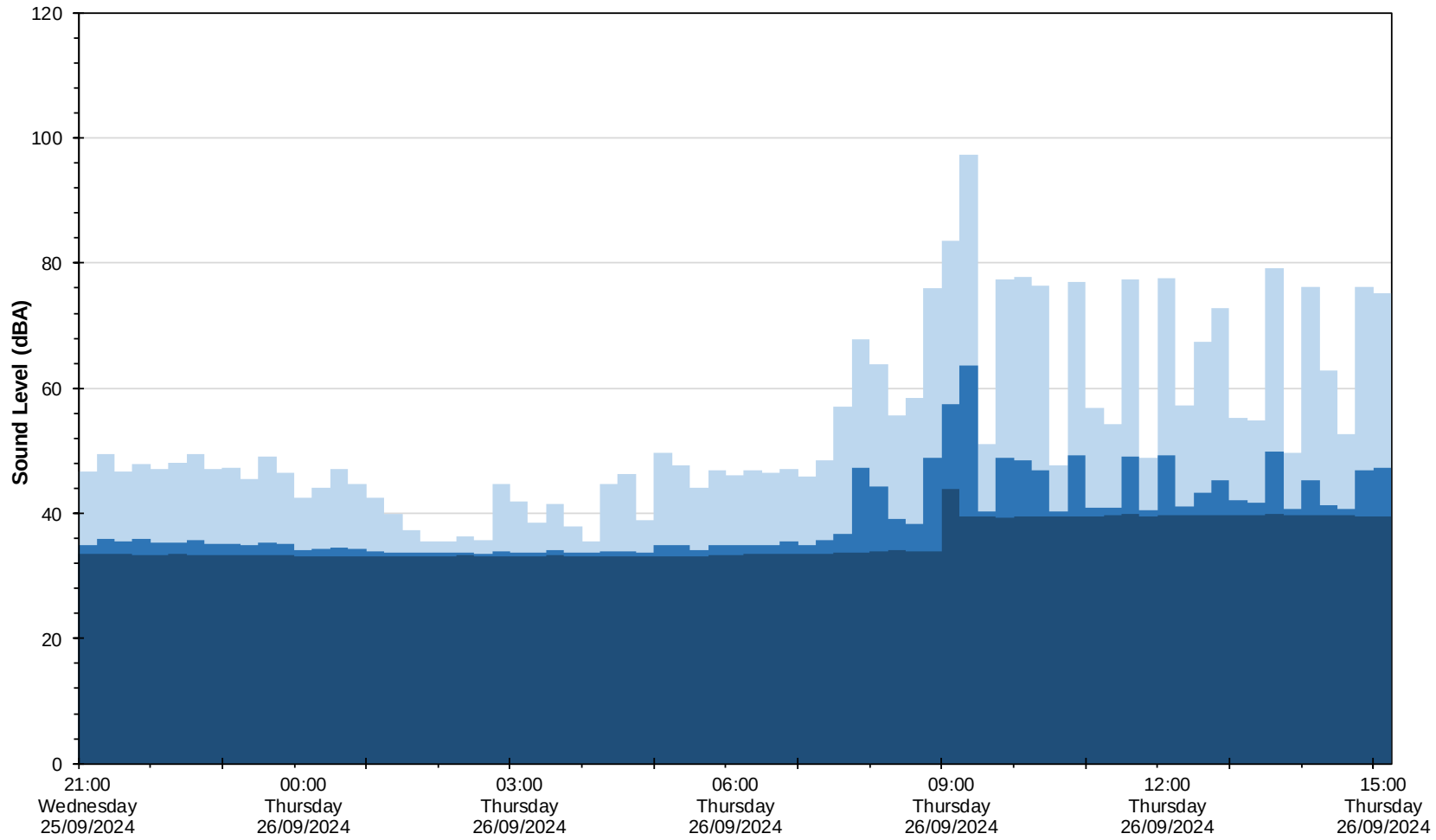
L_{eq} , L_{max} and L_{90} Noise Levels

Wednesday 25 September 2024 to Thursday 26 September 2024

LA_{max}

LA_{eq}

LA₉₀



Date and Time

28499/TH2

Manchester Victoria

Position 3

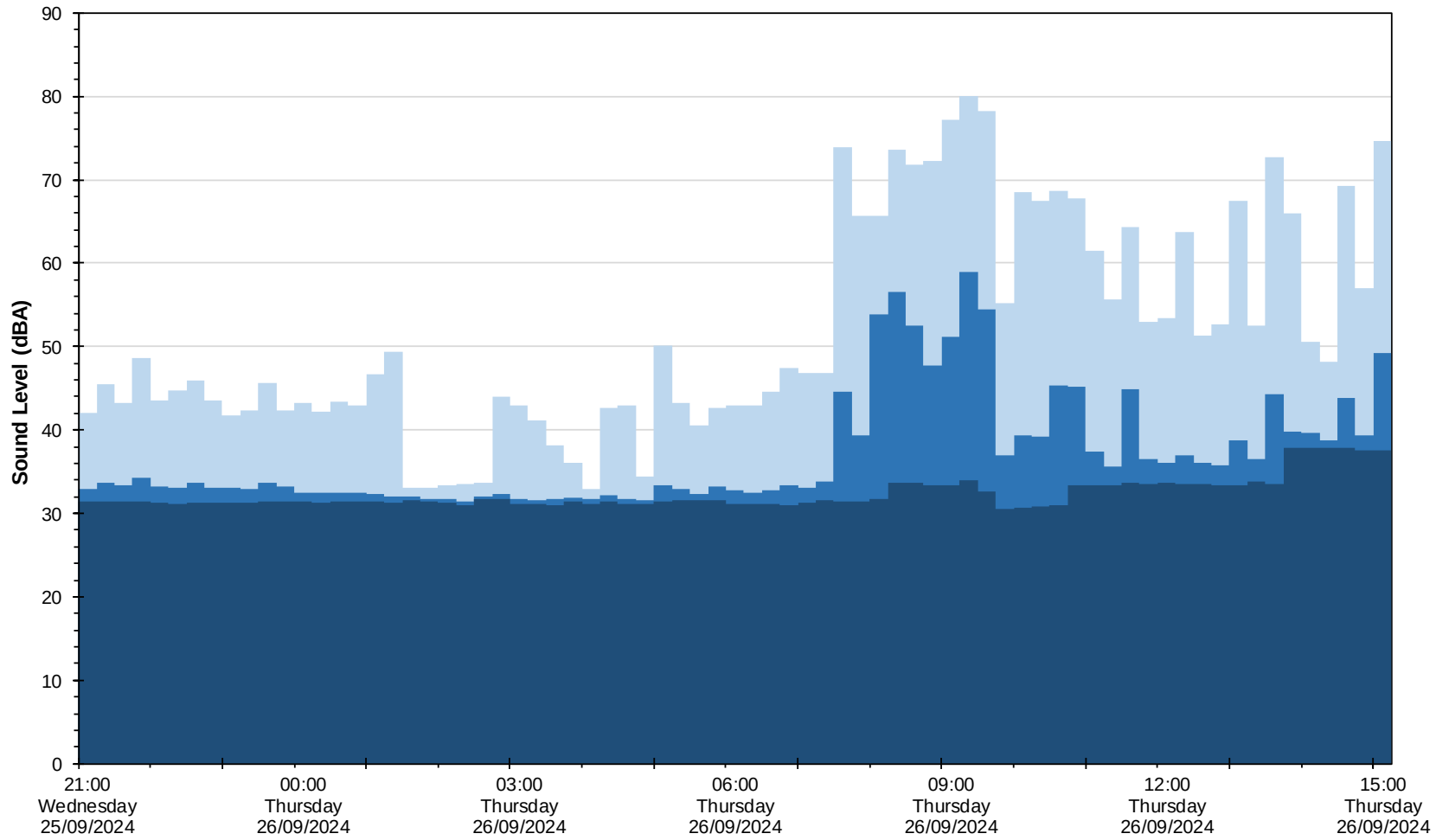
L_{eq} , L_{max} and L_{90} Noise Levels

Wednesday 25 September 2024 to Thursday 26 September 2024

LA_{max}

LA_{eq}

LA₉₀



Date and Time

28499/TH3

Manchester Victoria

Position 4

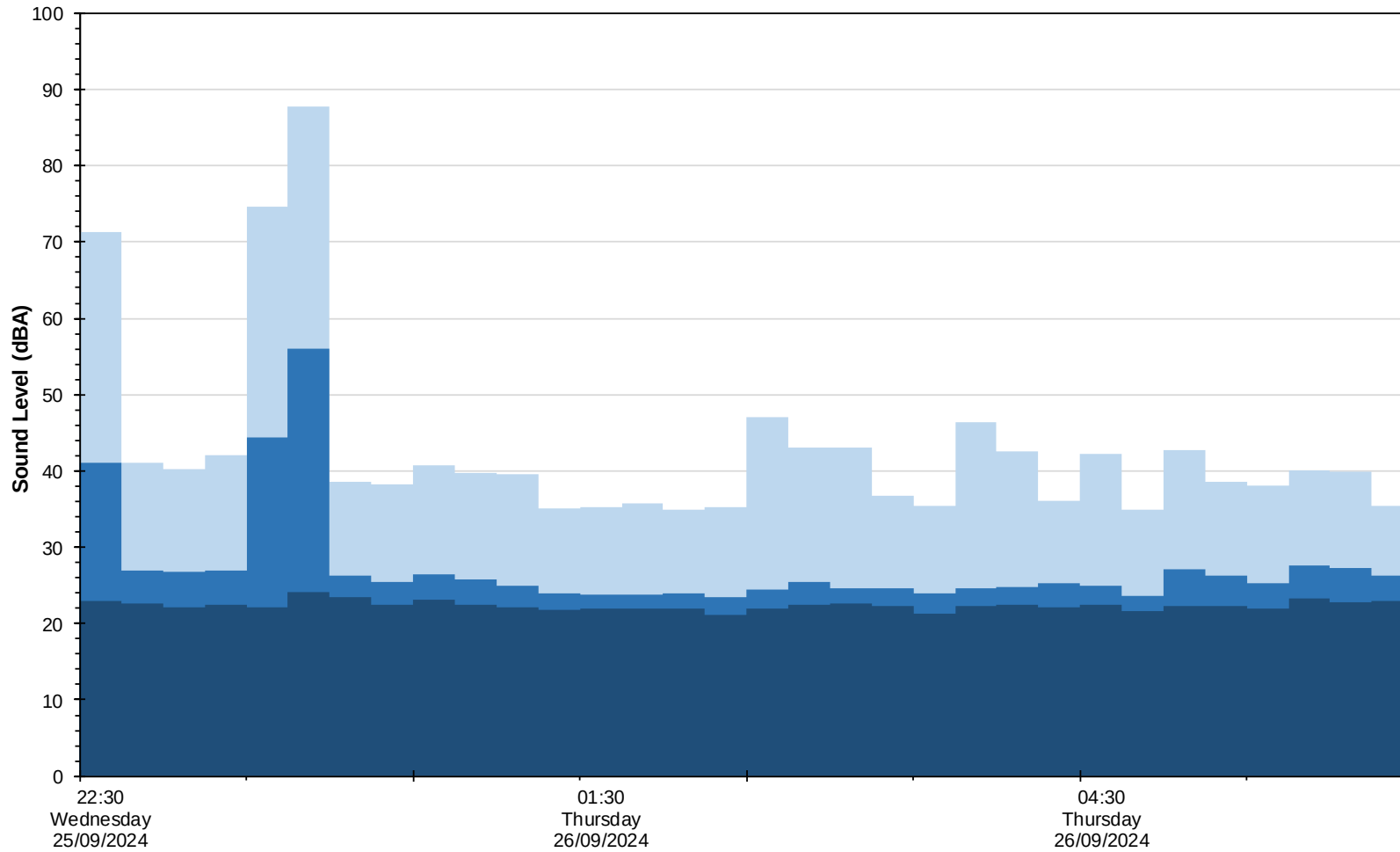
L_{eq} , L_{max} and L_{90} Noise Levels

Wednesday 25 September 2024 to Thursday 26 September 2024

LA_{max}

LA_{eq}

LA₉₀



Date and Time

28499/TH4

Manchester Victoria

Position 5

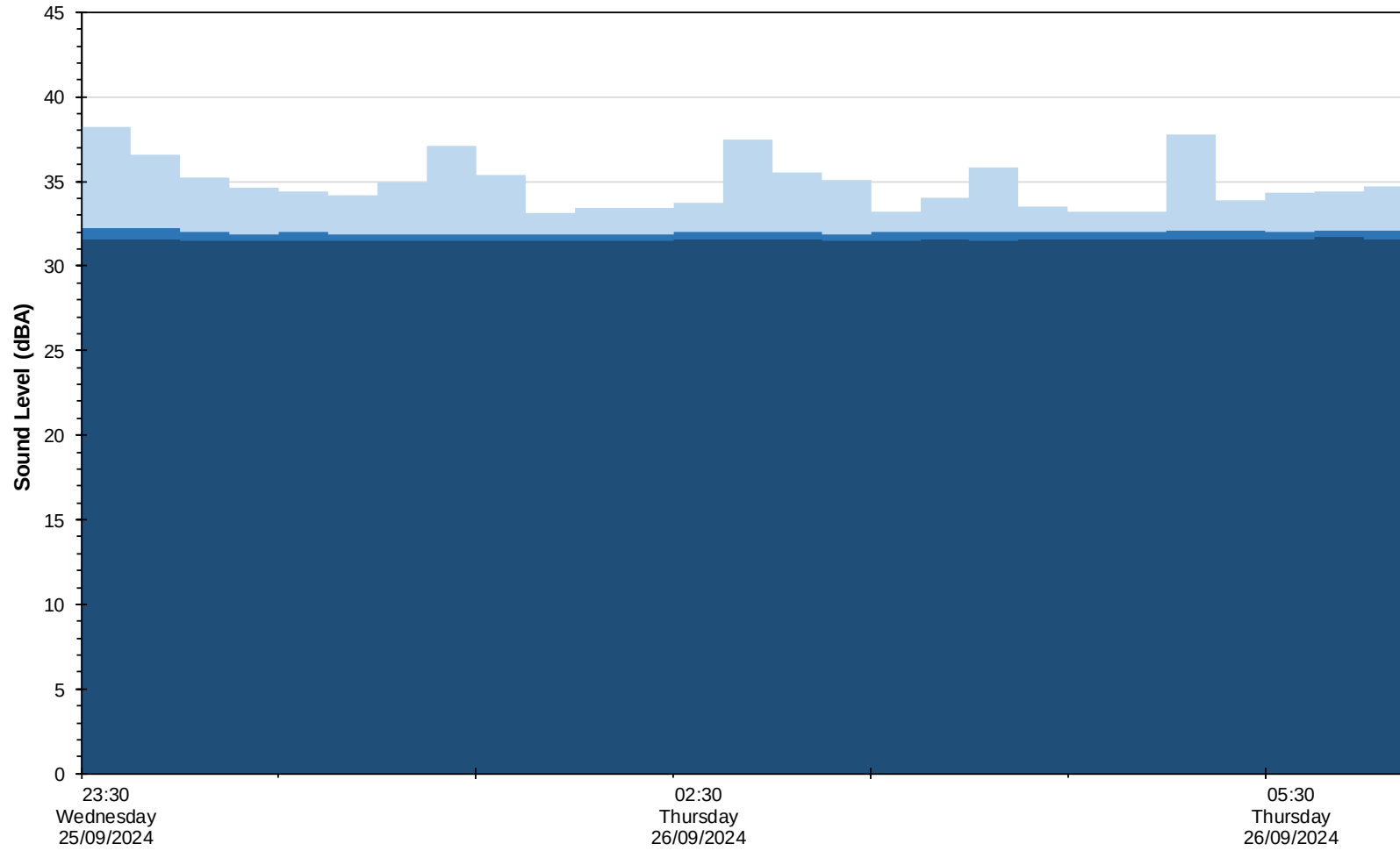
L_{eq} , L_{max} and L_{90} Noise Levels

Wednesday 25 September 2024 to Thursday 26 September 2024

LA_{max}

LA_{eq}

LA₉₀



Date and Time

28499/TH5

Manchester Victoria

Position 6

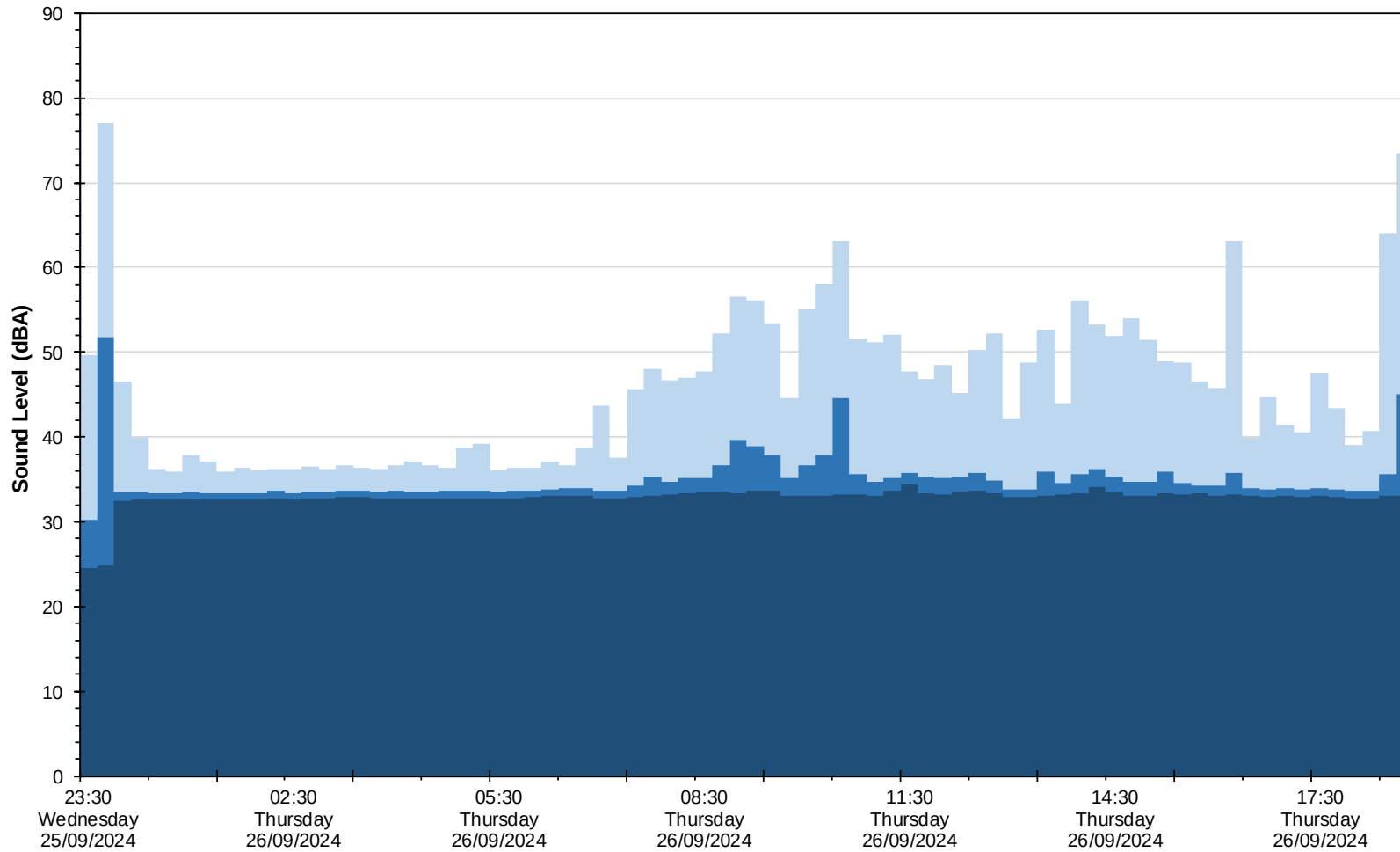
L_{eq} , L_{max} and L_{90} Noise Levels

Wednesday 25 September 2024 to Thursday 26 September 2024

LAmax

LAeq

LA90



Date and Time

28499/TH6