
**742-744 Wilmslow Road, Didsbury
Noise Verification Report**

Project: No.742-744 Wilmslow Road, Didsbury (Noise Verification)

Client: HUS Property Developments Ltd

Project Reference: RSA419/2023

Report Date: 22 March 2023

Document History

Version	Date	Comments	Initials
1	22 March 2023	Issue for planning	RS / LT

Authorised by	Ryan Swales, BSc, MIOA Director & Principal Consultant
Signature	

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1. Introduction

- 1.1 RS Acoustic Engineering Ltd has been appointed by HUS Property Developments Ltd to undertake an internal noise survey and provide a verification report with regard to a new residential development at No.742-744 Wilmslow Road, Didsbury, Manchester, M20.
- 1.2 The detached property was formerly Didsbury Police Station and has recently been converted into six self-contained apartments. Planning permission was granted for the development in January 2021, subject to a number of conditions. There is a noise related planning condition which states that a noise validation survey and report needs to be submitted to the local authority prior to the dwellings being occupied.
- 1.3 This assessment is based on the results of a noise survey undertaken at the site by RS Acoustic Engineering. Continuous sound level monitoring was conducted over a number of days within a finished apartment on the second floor. The apartment was unoccupied and unfurnished at the time of the survey.
- 1.4 The survey and assessment was conducted by Mr Ryan Swales (BSc(Hons), MIOA), Principal Acoustic Consultant and Member of the Institute of Acoustics.
- 1.5 The results of the noise survey have been presented, along with a discussion of the results with respect to the appropriate planning condition and acoustic performance targets.

2. Acoustic Performance Criteria

Manchester City Council Planning Conditions

- 2.1 Manchester City Council granted full planning permission for the development subject to a number of conditions (ref:128136/FO/2020). With regard to noise, the following condition was stipulated:

4) Before the development commences a scheme for acoustically insulating the proposed residential accommodation against noise from Wilmslow Road shall be submitted to and approved in writing by the City Council as local planning authority. There may be other actual or potential sources of noise which require consideration on or near the site, including any local commercial/industrial premises. The approved noise insulation scheme shall be completed before any of the dwelling units are occupied.

Upon completion of the development and before first occupation of the residential units, a verification report will be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post completion testing to confirm that the internal noise criteria has been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the internal noise criteria.

Reason - To secure a reduction in noise from traffic or other sources in order to protect future residents from noise disturbance, pursuant to Policy DM1 in the Manchester Core Strategy.

British Standard 8233:2014: Guidance on sound insulation and noise reduction for buildings

- 2.2 BS 8233 provides guidance regarding acoustic criteria and noise levels appropriate for various types of space that have different functions. With regard to dwellings, appropriate internal ambient sound levels are given in Table 2.1 for bedrooms, living rooms and dining rooms. The guidelines take into consideration the effect of internal noise on sleep and also the effect of noise on resting, listening and communicating.

Table 2.1 - Indoor ambient noise levels for dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
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}

- 2.3 Note 7 of BS 8233 also suggests that in some circumstances, it is appropriate to relax the indoor ambient noise level targets by up to 5 dB:

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.

- 2.4 Note 5 also states...*If relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the facade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.*

World Health Organisation: Guidelines for community noise (1999)

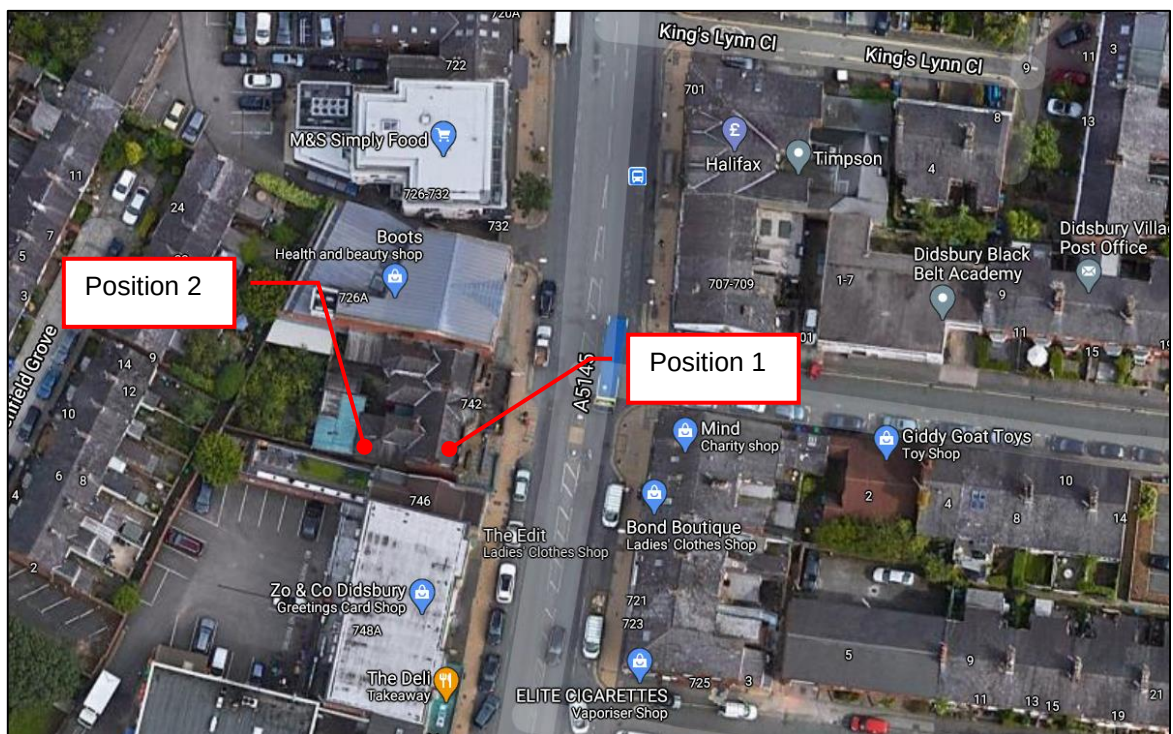
- 2.5 The guidelines and corresponding sound level targets within the recently superseded document corroborate those given within BS 8233. The guideline values are to help avoid speech interference, annoyance and sleep disturbance within dwellings.
- 2.6 The study undertaken by Vallet & Vernet suggests that for good sleep, indoor maximum sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10 to 15 times per night.

3. Internal Noise Survey

Survey methodology

- 3.1 Continuous sound level monitoring was conducted over a 45-hour period within the main bedroom of apartment five on the east facing elevation overlooking Wilmslow Road. Measurements were conducted from 13:45 hours on Wednesday 15th through to 10:45 hours on Friday 17th March 2023.
- 3.2 Continuous sound level monitoring was also conducted over a 40-hour period within the open-plan lounge on the west facing elevation. Measurements were conducted from 13:45 hours on Wednesday 15th through to 05:45 hours on Friday 17th March 2023.
- 3.3 A measurement interval of 5-minutes was used during the survey and the microphone was tripod mounted at a height of approximately 1.2 metres from the ground.
- 3.4 Intermittent construction works were on-going around the ground floor entrance to the building at the time of the survey (steelwork installation and brickwork). However, the noise generated did not adversely affect the measurements conducted.
- 3.5 The rooms within the apartment were plastered and decorated with floor finishes installed, but were unfurnished. All windows were closed during the survey and the frame mounted trickle vents were fully opened.
- 3.6 The site location and survey measurement positions are shown below.

Figure 3.1 - Site location and survey measurement positions

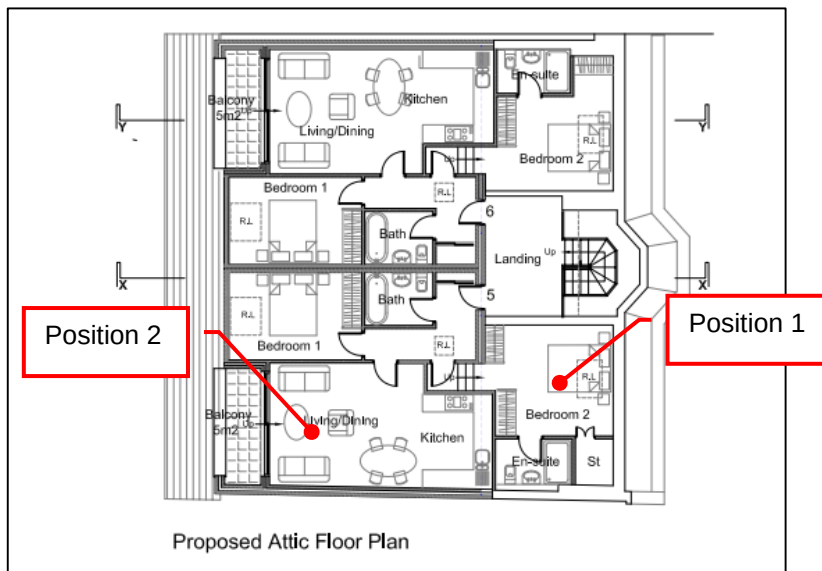


- 3.7 The measurement rooms and survey equipment are shown in the photographs overleaf.

Figure 3.2 - Photographs showing measurement rooms and survey equipment



Figure 3.3 - Floor layout showing measurement positions



Survey equipment

3.8 The survey was conducted using the following Class-1 specification equipment:

- Brüel & Kjaer 2260 sound level meter, microphone type 4189 and pre-amplifier type ZC0026.
- Casella CEL-63X sound level meter, microphone type CEL-251 and pre-amplifier type CEL-495.
- CEL-120/1 Acoustic calibrator.

3.9 Calibration of the sound level meter and microphone used for the measurements are traceable to UKAS accredited laboratories (calibration certificates are available on request).

3.10 The calibration of both sound level meter and microphone was checked using a 1 kHz tone at 94 dB prior to and following the measurements performed. Calibration drift was less than 0.1 dB.

Measured indices

3.11 Although a wide range of statistical sound level data was recorded during the survey, the L_{Aeq} and L_{AFmax} indices are of most interest in this instance:

- $L_{Aeq,T}$ - The A-weighted equivalent continuous sound pressure level over a period of time, T. Representative of the 'average' sound pressure level over a given period (commonly used to describe the 'ambient' sound level).
- $L_{AFmax,T}$ - The A-weighted 'maximum' sound pressure level that occurred during a given period, T (commonly used for the assessment of occasional loud noises).

3.12 Sound pressure level measurements are taken with an A-weighting (denoted by a subscript 'A', e.g. L_{Aeq}) to approximate the frequency response of the human ear.

Results summary

3.13 Table 3.1 presents the measurement results for the main bedroom and Table 3.2 presents the measurement results for the open-plan lounge/kitchen. Measured values have been rounded to the nearest whole number.

Table 3.1 - Summary of continuously measured ambient sound pressure levels (main bedroom)

Date	Period	Duration, T (hours)	$L_{Aeq,T}$ dB	10 th highest ¹ $L_{AFmax,T}$ dB	15 th highest ² $L_{AFmax,T}$ dB
Wednesday 15/03/2023	Daytime (13:45-23:00)	9.25	27	---	---
	Night-time (23:00-07:00)	8	24	40	37
Thursday 16/03/2023	Daytime (07:00-23:00)	16	30	---	---
	Night-time (23:00-07:00)	8	22	37	35
Friday 17/03/2023	Daytime (07:00-10:45)	3.75	32	---	---

¹The 10th highest value from 96 measurement periods ²The 15th highest value from 96 measurement periods (indoor sound pressure levels should ideally not exceed 45 dB L_{Amax} more than 10-15 times per night).

Table 3.2 - Summary of continuously measured ambient sound pressure levels (lounge)

Date	Period	Duration, T (hours)	$L_{Aeq,T}$ dB	10 th highest ¹ $L_{AFmax,T}$ dB	15 th highest ² $L_{AFmax,T}$ dB
Wednesday 15/03/2023	Daytime (13:45-23:00)	9.25	32	---	---
	Night-time (23:00-07:00)	8	30	37	35
Thursday 16/03/2023	Daytime (07:00-23:00)	16	34	---	---
	Night-time (23:00-05:45)	6.75	25	36	33

¹The 10th highest value from 96 measurement periods ²The 15th highest value from 96 measurement periods (indoor sound pressure levels should ideally not exceed 45 dB L_{Amax} more than 10-15 times per night).

- 3.14 The survey results indicate daytime ambient sound pressure levels ranging between 27 to 34 dB $L_{Aeq,T}$ and night-time ambient sound pressure levels ranging between 22 to 30 dB $L_{Aeq,T}$.
- 3.15 The measured ambient sound pressure levels are presented graphically in Figure 3.4 and 3.5. Additional tabulated survey data is presented in Appendix A.

Figure 3.4 - Graph showing results of continuous sound level monitoring (main bedroom)

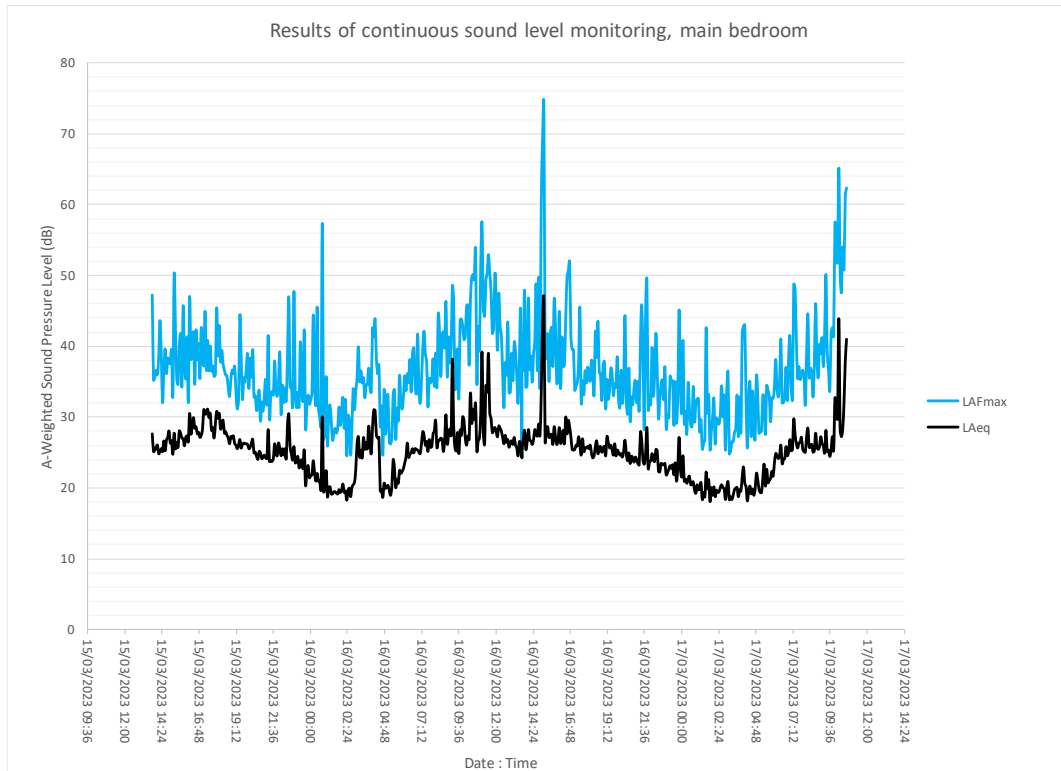
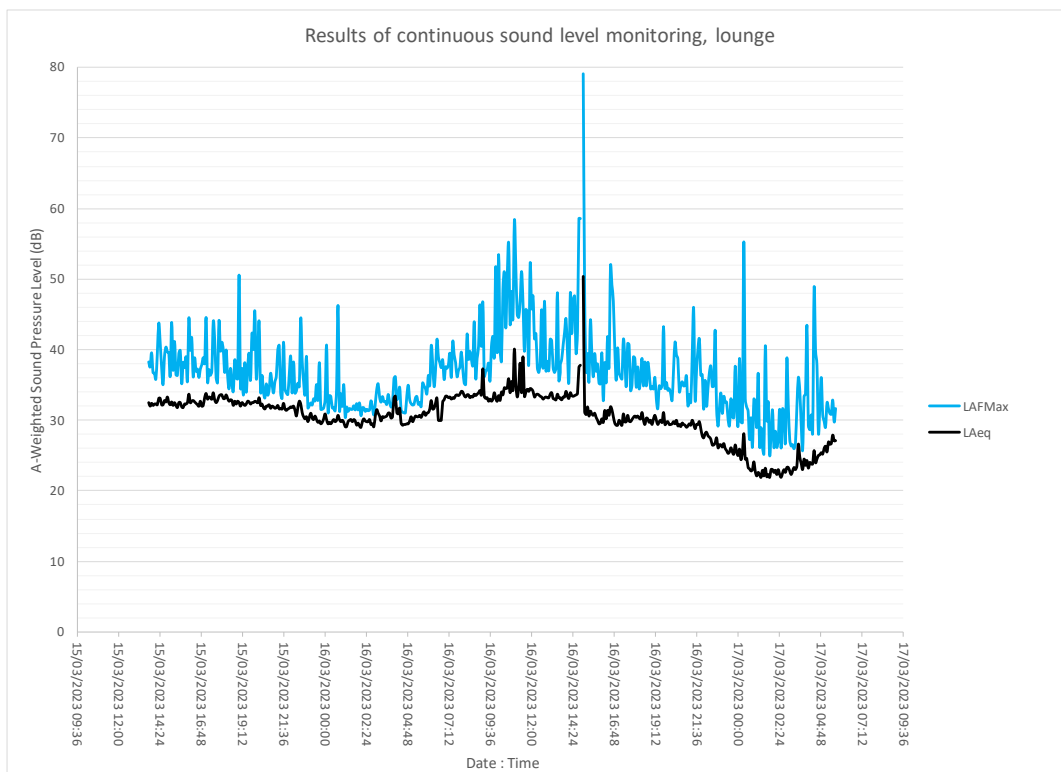


Figure 3.5 - Graph showing results of continuous sound level monitoring (lounge)



4. Building Envelope Construction

- 4.1 The external walls are of a traditional double-leaf brickwork construction and the roof construction consists of a traditional pitched slate roof at the front of the property and a new flat roof at the rear.
- 4.2 The original windows were single glazed, approximately 3 to 4 mm thick with timber frames. Ventilation was previously provided via the opening sash windows alone.
- 4.3 With regard to the front elevation, the original timber frames have been completely refurbished with new double glazed cassette units installed (replacing the single panes of glass). The glazing configuration is understood to be 4 mm glass / 10 mm cavity / 6.8 mm acoustic laminate.
- 4.4 The previous noise assessment report assumed a sound insulation performance of approximately 37 dB R_w for the new laminated double glazed units. Manufacturer's prediction software indicates that the glazing provides a performance of approximately 38 dB R_w .
- 4.5 Standard thermal double glazing consisting of 4 mm glass / 20 mm cavity / 4 mm glass has been installed on the rear elevation and is in line with the recommendations of the previous noise assessment report dated March 2021.
- 4.6 On the front elevation, acoustic ventilator units (Simon 5000EA) have been retrofitted to the original timber frames and the new roof windows have integrated manually operated trickle vents.
- 4.7 Figure 4.1 shows the roof window and trickle vent and also the refurbished sash window and retro-fitted acoustic trickle vent.

Figure 4.1 - Photographs showing new window trickle vents



- 4.8 The previous noise assessment report stated that the ventilator unit should provide an acoustic performance of at least 32 dB $D_{n,e,w}$ in the open position. The manufacturer's claimed performance is 33 dB $D_{n,e,w}$ and therefore the installed units are expected to provide a sufficient performance.

Performance		
BS EN 1026: 2000 Air Permeability		
Window vent	@ 50Pa (m^3/hr)	@ 50Pa (l/s)
5000EA	0.61	0.17
BS EN 1027: 2000 Watertightness		
Window vent	Pressure at no leakage (Pa)	Classification
5000EA	900	E900
BS EN ISO 717-1: 1997 Airborne Sound Insulation (dB)		
Window vent	$D_{n,e,w}$ (dB) Open	
5000EA	33	

5. Summary

- 5.1 Continuous sound level monitoring has been conducted over a number of days within habitable rooms on opposite elevations.
- 5.2 Within the front bedroom, the survey results indicate a daytime ambient sound pressure level of approximately 27 to 32 dB $L_{Aeq,16hour}$ and a night-time sound pressure level of approximately 22 to 24 dB $L_{Aeq,8hour}$.
- 5.3 Within the open-plan lounge, the survey results indicate a daytime ambient sound pressure level of approximately 32 to 34 dB $L_{Aeq,16hour}$ and a night-time sound pressure level of approximately 25 to 30 dB $L_{Aeq,8hour}$.
- 5.4 The daytime sound level target of 35 dB $L_{Aeq,16hour}$ and the night-time target of 30 dB $L_{Aeq,8hour}$ are therefore being achieved within habitable rooms.
- 5.5 The recommended night-time maximum sound level target of 45 dB $L_{AFmax,T}$ within bedrooms is also being achieved.
- 5.6 The building envelope construction, new glazing and trickle vents provide sufficient airborne sound insulation and therefore the noise related planning condition can be fully discharged.

Appendix A

Full tabulated survey results

Table A.1 - Survey results, front bedroom lounge

Start Date & Time	L _{Aeq,5min} dB	L _{AFmax,5min} dB	L _{Aeq,5min} dB	L _{AFmax,5min} dB
15/03/2023 13:45	27.6	47.2	32.5	38.3
15/03/2023 13:50	25.1	35.2	32	37.6
15/03/2023 13:55	25.3	35.5	32.4	39.6
15/03/2023 14:00	25.7	36.6	32.1	36.8
15/03/2023 14:05	26.0	36.0	32.3	36.7
15/03/2023 14:10	24.8	38.6	32.3	35.9
15/03/2023 14:15	25.1	43.6	32.2	39.5
15/03/2023 14:20	25.5	38.8	33.1	43.8
15/03/2023 14:25	25.1	32.0	33.1	41
15/03/2023 14:30	26.6	36.5	32.2	37.5
15/03/2023 14:35	25.2	39.6	32.2	35.1
15/03/2023 14:40	26.7	36.1	32.8	39.1
15/03/2023 14:45	27.1	38.3	32.6	40.4
15/03/2023 14:50	28.0	37.5	33.3	39.7
15/03/2023 14:55	26.3	37.6	32.5	39.6
15/03/2023 15:00	26.6	39.4	32.2	36.3
15/03/2023 15:05	24.7	33.0	32.6	43.9
15/03/2023 15:10	27.7	50.1	32.1	37.1
15/03/2023 15:15	25.5	42.6	32.5	41.2
15/03/2023 15:20	26.4	35.4	32.1	36.5
15/03/2023 15:25	25.7	34.6	31.8	36.4
15/03/2023 15:30	28.0	40.0	32.5	39.5
15/03/2023 15:35	27.7	41.6	32.5	39.9
15/03/2023 15:40	27.0	34.2	31.9	35.2
15/03/2023 15:45	26.9	45.7	31.8	38.2
15/03/2023 15:50	25.9	38.1	32.3	37.5
15/03/2023 15:55	27.1	35.4	32.3	39
15/03/2023 16:00	27.3	41.3	32.5	35.6
15/03/2023 16:05	26.5	32.0	33.7	44.5
15/03/2023 16:10	30.5	47.0	32.5	40
15/03/2023 16:15	27.6	38.2	32.7	41.7
15/03/2023 16:20	28.7	39.2	32.8	36.2
15/03/2023 16:25	29.9	41.9	32.6	38.9
15/03/2023 16:30	28.4	34.6	32.4	37
15/03/2023 16:35	28.6	42.3	32.2	37.3
15/03/2023 16:40	27.6	38.1	32	36.1
15/03/2023 16:45	27.8	40.3	32.7	37.3
15/03/2023 16:50	27.1	35.4	32	37.9
15/03/2023 16:55	27.4	42.6	32.1	38.9
15/03/2023 17:00	28.2	38.3	33.2	38.1
15/03/2023 17:05	31.0	37.3	33.8	44.6
15/03/2023 17:10	30.4	44.9	33	35.5
15/03/2023 17:15	30.5	36.6	33.3	37.2
15/03/2023 17:20	31.1	40.8	33.2	36.4

15/03/2023 17:25	29.9	36.5	33	37
15/03/2023 17:30	30.5	40.0	33.9	44
15/03/2023 17:35	28.1	36.5	32.9	41.4
15/03/2023 17:40	28.5	37.2	32.5	36.1
15/03/2023 17:45	27.0	35.7	32.8	35.4
15/03/2023 17:50	29.0	36.0	33.4	44.1
15/03/2023 17:55	30.8	45.4	33.6	39.9
15/03/2023 18:00	29.8	38.6	33.6	41.1
15/03/2023 18:05	30.5	42.9	33.1	40
15/03/2023 18:10	28.3	37.8	33.1	36.8
15/03/2023 18:15	29.0	39.4	33.6	40
15/03/2023 18:20	29.5	37.4	33.1	36.4
15/03/2023 18:25	27.7	36.6	32.7	34.5
15/03/2023 18:30	27.9	35.9	32.9	37.4
15/03/2023 18:35	27.4	35.8	32.8	35.3
15/03/2023 18:40	27.0	34.1	32.1	34.2
15/03/2023 18:45	26.2	32.9	32.7	38.6
15/03/2023 18:50	27.2	35.2	32.3	36
15/03/2023 18:55	27.0	36.6	32.7	35.9
15/03/2023 19:00	27.3	36.1	32.5	50.6
15/03/2023 19:05	26.2	37.1	32	34.7
15/03/2023 19:10	26.0	33.3	32.5	37.4
15/03/2023 19:15	25.5	31.1	32.3	33.6
15/03/2023 19:20	26.0	32.4	32.1	38.2
15/03/2023 19:25	26.8	44.3	32.3	34
15/03/2023 19:30	25.6	38.7	32.7	37.5
15/03/2023 19:35	26.1	32.5	32.6	39.5
15/03/2023 19:40	26.3	35.5	32.3	35.7
15/03/2023 19:45	26.2	34.9	32.5	42.3
15/03/2023 19:50	26.2	36.9	32.5	40.1
15/03/2023 19:55	26.1	38.9	32.7	45.5
15/03/2023 20:00	25.5	34.0	32.6	36
15/03/2023 20:05	25.7	38.3	32.5	39.6
15/03/2023 20:10	26.3	35.6	33.2	44
15/03/2023 20:15	26.8	39.5	32.1	34.1
15/03/2023 20:20	24.9	32.8	32.3	36.4
15/03/2023 20:25	25.0	33.0	31.8	34.1
15/03/2023 20:30	24.4	30.9	31.6	33.2
15/03/2023 20:35	24.0	32.2	32	35.2
15/03/2023 20:40	25.1	33.7	32	33.6
15/03/2023 20:45	24.9	29.4	32.2	34.4
15/03/2023 20:50	24.1	32.1	31.7	36.7
15/03/2023 20:55	24.3	30.8	32	35.2
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15/03/2023 21:05	24.2	35.3	31.7	35.5
15/03/2023 21:10	24.1	31.8	31.8	36.3

15/03/2023 21:15	28.2	41.5	32.1	40
15/03/2023 21:20	23.7	29.8	31.6	40.6
15/03/2023 21:25	23.8	33.3	31.7	33.9
15/03/2023 21:30	23.7	33.6	31.6	33.2
15/03/2023 21:35	24.1	33.1	32.4	41.1
15/03/2023 21:40	26.2	37.9	31.6	34.5
15/03/2023 21:45	24.9	33.8	31.4	33.9
15/03/2023 21:50	24.5	32.9	31.6	33.7
15/03/2023 21:55	26.3	34.8	31.7	36.5
15/03/2023 22:00	25.5	39.1	31.9	39.1
15/03/2023 22:05	24.5	30.4	31.8	33.9
15/03/2023 22:10	25.5	34.5	32	38.3
15/03/2023 22:15	24.6	32.0	31.4	33.9
15/03/2023 22:20	25.5	34.1	30.6	34.2
15/03/2023 22:25	24.1	32.3	31.8	35.3
15/03/2023 22:30	28.9	38.8	32.7	34.8
15/03/2023 22:35	30.4	46.9	32.3	44.5
15/03/2023 22:40	25.8	34.2	31.1	38.5
15/03/2023 22:45	24.8	34.8	30.5	35.5
15/03/2023 22:50	23.9	31.6	30.2	33.7
15/03/2023 22:55	25.8	47.7	30.5	39.1
15/03/2023 23:00	23.5	33.4	29.8	31.8
15/03/2023 23:05	23.7	31.3	30.4	32.1
15/03/2023 23:10	24.4	33.5	31	32.5
15/03/2023 23:15	22.8	31.5	30.3	32.2
15/03/2023 23:20	23.6	40.6	30.1	33.1
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16/03/2023 00:30	20.9	31.4	30.1	31.8
16/03/2023 00:35	21.0	29.9	29.8	31.4
16/03/2023 00:40	19.7	28.6	30	34.5
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16/03/2023 00:55	19.8	27.6	29.8	33.8
16/03/2023 01:00	22.4	35.7	30	32

16/03/2023 01:05	18.7	26.0	29.7	35.1
16/03/2023 01:10	20.0	30.3	29.1	30.5
16/03/2023 01:15	20.1	31.7	29.1	31.9
16/03/2023 01:20	19.1	29.3	29.8	31.3
16/03/2023 01:25	19.1	26.7	30	31.7
16/03/2023 01:30	19.4	27.7	30.1	31.6
16/03/2023 01:35	19.4	28.4	29.8	31.6
16/03/2023 01:40	19.2	27.7	30.1	32.1
16/03/2023 01:45	19.1	28.5	29.9	31.5
16/03/2023 01:50	19.7	31.4	29.3	32.4
16/03/2023 01:55	19.3	28.8	29.6	31.5
16/03/2023 02:00	19.6	30.9	29.2	32.5
16/03/2023 02:05	20.5	32.7	29	30.7
16/03/2023 02:10	19.3	28.4	29.8	31.8
16/03/2023 02:15	19.5	32.4	30.2	31.8
16/03/2023 02:20	18.2	24.5	29.9	31.3
16/03/2023 02:25	19.6	30.2	29.8	31.6
16/03/2023 02:30	19.9	29.6	29.8	31.4
16/03/2023 02:35	18.7	24.6	30.1	31.5
16/03/2023 02:40	20.0	28.5	29.4	32.8
16/03/2023 02:45	20.4	34.0	29.5	31.8
16/03/2023 02:50	20.7	31.0	29.1	30.8
16/03/2023 02:55	22.6	33.7	30.6	32.4
16/03/2023 03:00	26.2	35.5	31.5	34.4
16/03/2023 03:05	27.2	39.9	31	35.2
16/03/2023 03:10	24.3	35.0	30.6	33.3
16/03/2023 03:15	25.3	36.5	29.9	32.6
16/03/2023 03:20	24.2	34.8	30.5	33.4
16/03/2023 03:25	27.1	35.5	30.4	32.7
16/03/2023 03:30	25.4	32.7	30.5	32.7
16/03/2023 03:35	26.4	34.5	30.6	32.3
16/03/2023 03:40	25.5	34.6	31	33.7
16/03/2023 03:45	28.7	36.9	31	32.6
16/03/2023 03:50	26.6	34.2	30.3	31.9
16/03/2023 03:55	24.8	33.5	30.5	32.3
16/03/2023 04:00	28.5	42.5	33.1	35.9
16/03/2023 04:05	31.0	41.3	33.4	36.2
16/03/2023 04:10	30.9	43.8	31.1	33
16/03/2023 04:15	27.4	38.2	30.9	33.3
16/03/2023 04:20	27.0	36.1	31.7	34.7
16/03/2023 04:25	27.1	37.3	29.6	31.5
16/03/2023 04:30	19.5	28.7	29.3	31.2
16/03/2023 04:35	19.7	31.5	29.4	31.1
16/03/2023 04:40	18.6	24.6	29.4	31.1
16/03/2023 04:45	20.6	33.9	29.5	33.5
16/03/2023 04:50	19.9	27.6	29.5	35

16/03/2023 04:55	20.1	31.2	29.9	32.9
16/03/2023 05:00	20.3	33.0	30.5	32.4
16/03/2023 05:05	19.6	26.4	29.8	32.2
16/03/2023 05:10	18.9	26.2	30.2	32.3
16/03/2023 05:15	20.1	26.9	30.6	33.2
16/03/2023 05:20	23.9	33.1	30.5	33.4
16/03/2023 05:25	22.8	33.8	30.5	32.3
16/03/2023 05:30	20.0	26.8	30.7	32.6
16/03/2023 05:35	21.2	31.2	30.4	32
16/03/2023 05:40	20.6	29.5	30.9	35.3
16/03/2023 05:45	22.4	35.9	31.2	34.9
16/03/2023 05:50	22.0	31.9	30.7	34.5
16/03/2023 05:55	22.3	31.1	31	33.8
16/03/2023 06:00	22.7	32.9	31.1	36.4
16/03/2023 06:05	23.5	35.8	31.6	35
16/03/2023 06:10	24.3	33.7	32.8	40.6
16/03/2023 06:15	26.3	36.1	31.6	38.1
16/03/2023 06:20	24.3	34.9	31.7	34.8
16/03/2023 06:25	24.7	38.1	32.4	37.1
16/03/2023 06:30	24.9	33.5	33.1	41.5
16/03/2023 06:35	25.5	38.9	30	39
16/03/2023 06:40	24.9	39.7	30.1	38.2
16/03/2023 06:45	25.5	34.7	30	37.5
16/03/2023 06:50	25.4	33.4	32.6	38.6
16/03/2023 06:55	25.3	41.7	32.9	35.8
16/03/2023 07:00	25.0	34.0	33.4	37.6
16/03/2023 07:05	24.8	31.9	33.4	37.4
16/03/2023 07:10	26.2	35.1	33.2	37.9
16/03/2023 07:15	27.9	39.5	33.3	39.5
16/03/2023 07:20	27.4	42.1	33	36.1
16/03/2023 07:25	26.0	38.9	33.2	41.2
16/03/2023 07:30	26.5	37.7	33.1	39.3
16/03/2023 07:35	25.1	31.4	33.5	38.2
16/03/2023 07:40	26.8	35.4	33.6	36.2
16/03/2023 07:45	25.7	34.8	33.5	37.1
16/03/2023 07:50	25.8	35.3	33.7	37.6
16/03/2023 07:55	27.6	38.2	34.1	39.7
16/03/2023 08:00	28.0	34.3	34	37.3
16/03/2023 08:05	29.5	39.0	33.5	35.3
16/03/2023 08:10	25.7	34.2	33.3	35.1
16/03/2023 08:15	26.6	44.4	33.6	42.2
16/03/2023 08:20	26.7	42.1	33.6	38.7
16/03/2023 08:25	27.0	35.7	33.2	39.8
16/03/2023 08:30	26.8	41.6	33.4	38.7
16/03/2023 08:35	25.1	42.0	33.3	37.8
16/03/2023 08:40	26.7	39.8	33.7	44

16/03/2023 08:45	30.3	46.3	33.5	36
16/03/2023 08:50	26.2	35.7	33.7	38.8
16/03/2023 08:55	27.4	41.3	33.9	40.5
16/03/2023 09:00	28.3	37.6	34.2	46.4
16/03/2023 09:05	27.4	39.8	33.6	40.5
16/03/2023 09:10	38.2	48.5	37.3	46.8
16/03/2023 09:15	28.7	46.3	33.4	36.3
16/03/2023 09:20	25.6	34.0	33.1	37
16/03/2023 09:25	25.2	38.7	33.2	37.2
16/03/2023 09:30	27.8	39.5	32.7	38.1
16/03/2023 09:35	24.8	32.5	33	35.6
16/03/2023 09:40	28.1	43.7	32.7	40.5
16/03/2023 09:45	27.4	43.8	33	41.9
16/03/2023 09:50	30.0	42.8	33.9	39.1
16/03/2023 09:55	29.5	40.9	33.1	51.8
16/03/2023 10:00	27.0	41.3	32.7	39.6
16/03/2023 10:05	26.0	45.7	33.5	53.5
16/03/2023 10:10	27.3	45.8	32.8	40.2
16/03/2023 10:15	26.8	37.3	34	38.4
16/03/2023 10:20	33.4	46.4	33.6	48.5
16/03/2023 10:25	29.1	49.6	34.6	51
16/03/2023 10:30	31.1	50.1	34.5	43.1
16/03/2023 10:35	29.6	49.4	34.6	50.3
16/03/2023 10:40	31.9	53.5	35.9	55.1
16/03/2023 10:45	25.2	34.8	33.9	43.7
16/03/2023 10:50	26.6	42.7	35.5	48.3
16/03/2023 10:55	27.0	39.5	34.3	44.5
16/03/2023 11:00	30.5	51.5	40.1	58.3
16/03/2023 11:05	39.2	57.4	35	51.7
16/03/2023 11:10	27.9	45.4	33.3	45
16/03/2023 11:15	26.1	44.2	34.6	44.6
16/03/2023 11:20	34.4	49.2	38.1	46.9
16/03/2023 11:25	33.5	50.3	33.9	51.1
16/03/2023 11:30	39.0	52.9	39	46.7
16/03/2023 11:35	30.6	50.2	33.4	39.8
16/03/2023 11:40	29.8	47.7	34	45.7
16/03/2023 11:45	27.8	41.8	34.4	45.3
16/03/2023 11:50	28.2	42.5	34.1	37.9
16/03/2023 11:55	28.5	50.2	34.5	52.2
16/03/2023 12:00	27.9	46.5	34.4	45.9
16/03/2023 12:05	27.2	39.4	34.1	47.6
16/03/2023 12:10	28.7	47.4	33.3	41.6
16/03/2023 12:15	28.4	42.9	33.6	42.3
16/03/2023 12:20	28.0	41.5	33.7	37.5
16/03/2023 12:25	27.1	36.3	33.6	36.8
16/03/2023 12:30	26.2	31.3	33.4	38.3

16/03/2023 12:35	27.4	37.6	33.3	45.7
16/03/2023 12:40	26.4	36.0	33	37.4
16/03/2023 12:45	26.8	43.4	33.2	46.9
16/03/2023 12:50	25.7	33.4	33.3	37.1
16/03/2023 12:55	26.4	33.5	33.2	38.4
16/03/2023 13:00	26.6	39.0	33.2	37.1
16/03/2023 13:05	26.1	35.1	33.7	41.5
16/03/2023 13:10	27.1	40.5	33.9	41.3
16/03/2023 13:15	26.0	39.2	33.1	37.5
16/03/2023 13:20	25.6	35.7	33	36.8
16/03/2023 13:25	24.5	31.9	32.9	37.5
16/03/2023 13:30	26.5	37.8	33.7	48.1
16/03/2023 13:35	25.7	45.0	33.2	35.7
16/03/2023 13:39	24.2	24.4	33.2	36.8
16/03/2023 13:40	25.2	36.7	33.1	37.9
16/03/2023 13:45	26.8	36.5	32.9	38.7
16/03/2023 13:50	28.1	47.9	33.3	40.7
16/03/2023 13:55	25.4	34.2	33.3	42.5
16/03/2023 14:00	26.4	34.4	34.1	44.4
16/03/2023 14:05	28.2	46.8	33.4	39.7
16/03/2023 14:10	26.7	36.8	33.1	35.5
16/03/2023 14:15	26.6	38.6	33.9	48
16/03/2023 14:20	26.1	34.9	33.5	42.3
16/03/2023 14:25	26.8	38.9	33.4	47.1
16/03/2023 14:30	28.2	40.8	33.5	47.6
16/03/2023 14:35	27.5	48.8	33.6	39.5
16/03/2023 14:40	27.3	36.5	33.8	42.6
16/03/2023 14:45	29.0	49.7	37.5	58.6
16/03/2023 14:50	27.4	34.0	37.8	58.6
16/03/2023 14:55	33.4	60.4	Meter paused for power pack check	
16/03/2023 15:00	43.2	69.0	50.4	79.1
16/03/2023 15:05	46.7	74.2	31.2	47.6
16/03/2023 15:10	26.5	38.6	30.8	37
16/03/2023 15:15	28.4	38.2	31.9	39.5
16/03/2023 15:20	28.6	41.7	30.6	35.5
16/03/2023 15:25	27.1	35.0	31.3	44.2
16/03/2023 15:30	27.5	41.6	30.9	39.6
16/03/2023 15:35	27.5	42.6	30.7	36.2
16/03/2023 15:40	26.1	37.1	31	39.5
16/03/2023 15:45	28.6	46.6	30.4	37
16/03/2023 15:50	27.3	43.1	30	38
16/03/2023 15:55	26.1	34.7	29.5	35.3
16/03/2023 16:00	26.5	35.0	29.6	35.2
16/03/2023 16:05	28.5	44.9	30.2	39.6
16/03/2023 16:10	26.3	34.0	29.7	32.8
16/03/2023 16:15	26.7	41.3	31.4	38.2

16/03/2023 16:20	28.1	37.1	30.2	35.4
16/03/2023 16:25	26.2	37.3	31.4	41.9
16/03/2023 16:30	30.0	44.0	30.7	37.6
16/03/2023 16:35	27.6	49.8	31.9	51.8
16/03/2023 16:40	29.5	50.6	31.5	49.2
16/03/2023 16:45	28.6	51.9	30.5	46.9
16/03/2023 16:50	27.2	41.3	29.6	40.2
16/03/2023 16:55	25.4	39.5	29.3	35.7
16/03/2023 17:00	25.3	39.5	29.3	40.3
16/03/2023 17:05	25.4	33.8	30	36.8
16/03/2023 17:10	26.0	34.4	29.6	36.2
16/03/2023 17:15	25.9	34.9	29.3	35.9
16/03/2023 17:20	27.2	37.7	30.9	41.5
16/03/2023 17:25	26.0	45.4	29.8	38.9
16/03/2023 17:30	24.6	32.1	29.8	34.8
16/03/2023 17:35	26.9	35.1	30.7	40.9
16/03/2023 17:40	25.1	33.1	29.9	40.7
16/03/2023 17:45	25.6	36.5	29.8	34.3
16/03/2023 17:50	25.6	34.8	30.1	35
16/03/2023 17:55	25.8	37.0	30.4	39
16/03/2023 18:00	25.5	35.8	30.6	38.8
16/03/2023 18:05	26.0	35.1	30.4	34.7
16/03/2023 18:10	24.8	38.0	30.6	37.6
16/03/2023 18:15	24.2	36.3	30.3	34.5
16/03/2023 18:20	24.5	33.1	30.2	36
16/03/2023 18:25	25.8	42.0	31.1	38.8
16/03/2023 18:30	26.6	38.4	30	34.9
16/03/2023 18:35	24.8	43.5	29.4	38.3
16/03/2023 18:40	25.7	36.5	30.3	34.9
16/03/2023 18:45	25.8	35.9	30.2	38.2
16/03/2023 18:50	25.0	32.3	29.7	36.8
16/03/2023 18:55	25.5	37.3	30	34.5
16/03/2023 19:00	25.8	37.8	29.4	34.8
16/03/2023 19:05	24.5	31.1	30.2	34.5
16/03/2023 19:10	27.2	35.3	30.7	36.1
16/03/2023 19:15	26.4	32.5	30	33
16/03/2023 19:20	25.6	33.8	29.4	31.7
16/03/2023 19:25	26.0	36.9	29.8	34.9
16/03/2023 19:30	25.3	36.0	30	34.5
16/03/2023 19:35	24.6	33.0	29.7	35
16/03/2023 19:40	26.2	34.7	31.1	43.3
16/03/2023 19:45	24.5	34.2	29.4	34.6
16/03/2023 19:50	25.3	38.5	29.7	35.4
16/03/2023 19:55	25.0	32.4	29.8	34.3
16/03/2023 20:00	24.6	31.3	29.4	34.5
16/03/2023 20:05	24.8	36.6	29.4	33.8

16/03/2023 20:10	24.3	31.9	29.5	32.9
16/03/2023 20:15	25.2	35.3	29.8	37.3
16/03/2023 20:20	26.7	44.3	29.5	41.1
16/03/2023 20:25	24.8	32.4	30	39.3
16/03/2023 20:30	23.8	30.4	29.2	38.7
16/03/2023 20:35	24.9	36.9	29.4	34.1
16/03/2023 20:40	23.4	29.4	29.1	34.9
16/03/2023 20:45	24.4	32.8	29.6	35.5
16/03/2023 20:50	24.2	31.7	29.4	34.9
16/03/2023 20:55	23.6	34.1	29.3	35
16/03/2023 21:00	24.3	35.1	29	36.3
16/03/2023 21:05	24.0	32.0	29.2	32.1
16/03/2023 21:10	23.4	35.0	29.5	33.7
16/03/2023 21:15	23.2	30.9	29.3	32.6
16/03/2023 21:20	27.8	40.7	30	39.2
16/03/2023 21:25	26.6	45.8	29.5	45.9
16/03/2023 21:30	23.8	38.3	28.8	33
16/03/2023 21:35	23.3	28.3	29.4	37
16/03/2023 21:40	24.8	44.9	29.4	40.1
16/03/2023 21:45	28.5	49.3	29.8	41.5
16/03/2023 21:50	22.7	31.1	28.8	36.4
16/03/2023 21:55	23.6	33.2	27.8	36.5
16/03/2023 22:00	23.8	31.8	27.5	31.6
16/03/2023 22:05	24.8	39.8	28.1	35.7
16/03/2023 22:10	23.9	33.0	28.3	32
16/03/2023 22:15	23.7	35.9	27.8	34.6
16/03/2023 22:20	25.4	41.8	27.6	36.8
16/03/2023 22:25	25.2	36.7	27.3	37.7
16/03/2023 22:30	22.3	29.8	26.5	34.8
16/03/2023 22:35	22.2	32.4	26.5	34.9
16/03/2023 22:40	23.4	34.7	26.8	42.8
16/03/2023 22:45	23.3	35.2	27.5	31.7
16/03/2023 22:50	23.2	32.4	26.1	29.2
16/03/2023 22:55	23.4	37.1	26.5	31.8
16/03/2023 23:00	21.8	28.4	26.5	33.9
16/03/2023 23:05	22.1	30.2	26.2	31
16/03/2023 23:10	22.6	29.9	26.7	33.4
16/03/2023 23:15	23.1	35.7	26	32.6
16/03/2023 23:20	22.7	34.9	25.7	32.6
16/03/2023 23:25	23.2	35.1	25.3	30.2
16/03/2023 23:30	21.8	28.8	25.5	29.3
16/03/2023 23:35	23.5	35.0	26.1	33.1
16/03/2023 23:40	20.9	29.1	25.5	30.5
16/03/2023 23:45	22.9	33.3	25.2	30.4
16/03/2023 23:50	27.1	45.1	26.5	37.7
16/03/2023 23:55	22.7	34.9	25.5	31.9

17/03/2023 00:00	21.5	30.6	25	29.4
17/03/2023 00:05	24.5	40.8	25.9	38.8
17/03/2023 00:10	20.9	29.1	24.4	29.8
17/03/2023 00:15	21.2	30.8	25.5	29.7
17/03/2023 00:20	20.6	27.6	28.1	55.3
17/03/2023 00:25	21.2	34.8	24.5	33.1
17/03/2023 00:30	21.6	31.4	24.6	31.9
17/03/2023 00:35	20.4	28.9	23.3	31.3
17/03/2023 00:40	20.5	28.6	23.1	27.3
17/03/2023 00:45	20.8	34.3	22.8	30.4
17/03/2023 00:50	19.6	29.3	23	26.2
17/03/2023 00:55	19.2	31.9	24.1	33
17/03/2023 01:00	20.4	32.5	22.7	32.4
17/03/2023 01:05	19.7	32.6	22.1	29.1
17/03/2023 01:10	19.8	27.9	22.6	36.7
17/03/2023 01:15	20.7	29.6	22.3	26.4
17/03/2023 01:20	18.3	25.5	21.9	29
17/03/2023 01:25	19.3	26.3	22.9	26.2
17/03/2023 01:30	18.7	26.8	22.1	25.3
17/03/2023 01:35	22.2	42.6	23.2	40.6
17/03/2023 01:40	19.8	30.7	22	30.1
17/03/2023 01:45	21.1	33.2	22.3	32.6
17/03/2023 01:50	18.0	25.5	21.9	25.1
17/03/2023 01:55	20.0	27.8	23	28.2
17/03/2023 02:00	18.9	29.9	23	31.5
17/03/2023 02:05	20.1	32.6	22.6	26.2
17/03/2023 02:10	18.7	26.2	22.9	28.5
17/03/2023 02:15	19.6	29.8	22.3	26.2
17/03/2023 02:20	19.3	29.3	23	27.4
17/03/2023 02:25	19.4	29.0	22.3	31.6
17/03/2023 02:30	20.0	30.3	21.9	26.1
17/03/2023 02:35	20.4	34.4	22.5	31.6
17/03/2023 02:40	20.0	30.0	23	30.8
17/03/2023 02:45	19.8	33.0	22.6	26.9
17/03/2023 02:50	18.3	25.3	23.3	38.8
17/03/2023 02:55	20.1	33.7	23.3	32.2
17/03/2023 03:00	20.8	36.2	22.8	27.3
17/03/2023 03:05	18.3	24.8	22.3	26.4
17/03/2023 03:10	18.7	25.2	22.8	26.6
17/03/2023 03:15	18.3	26.5	23.3	26
17/03/2023 03:20	18.9	26.5	23	26.8
17/03/2023 03:25	19.7	27.8	23.5	31.9
17/03/2023 03:30	19.9	28.4	26.6	36.1
17/03/2023 03:35	20.0	33.1	24.8	34.3
17/03/2023 03:40	18.7	27.2	23.9	29.5
17/03/2023 03:45	19.7	32.8	23	25.8

17/03/2023 03:50	19.5	27.9	24.5	33.4
17/03/2023 03:55	21.5	41.8	23.6	33.8
17/03/2023 04:00	22.9	42.8	24.3	43.5
17/03/2023 04:05	20.6	43.0	23.2	29.3
17/03/2023 04:10	20.1	32.2	24	28.7
17/03/2023 04:15	18.1	25.6	23.8	30.8
17/03/2023 04:20	19.5	32.5	23.8	28.3
17/03/2023 04:25	20.2	34.9	25.7	48.7
17/03/2023 04:30	19.1	27.2	24	40
17/03/2023 04:35	19.8	33.6	24.5	37.8
17/03/2023 04:40	18.9	29.8	25	28.2
17/03/2023 04:45	19.7	26.9	25.1	31.9
17/03/2023 04:50	22.0	35.7	25.4	36.1
17/03/2023 04:55	21.2	33.3	25.2	30.8
17/03/2023 05:00	19.8	27.7	26	29.9
17/03/2023 05:05	19.3	27.9	26.3	29.1
17/03/2023 05:10	19.3	28.0	25.5	32.5
17/03/2023 05:15	21.3	33.1	26.9	31.7
17/03/2023 05:20	23.3	32.8	26.6	31
17/03/2023 05:25	20.2	27.5	26.7	30.9
17/03/2023 05:30	22.6	34.4	27.9	32.9
17/03/2023 05:35	20.7	33.7	27.1	29.8
17/03/2023 05:40	21.0	33.0	27.1	31.7
17/03/2023 05:45	21.3	29.3	---	---
17/03/2023 05:50	22.3	32.7	---	---
17/03/2023 05:55	21.6	32.6	---	---
17/03/2023 06:00	23.5	34.2	---	---
17/03/2023 06:05	24.8	38.1	---	---
17/03/2023 06:10	24.5	34.1	---	---
17/03/2023 06:15	24.1	32.8	---	---
17/03/2023 06:20	24.5	34.8	---	---
17/03/2023 06:25	26.0	41.0	---	---
17/03/2023 06:30	23.4	32.0	---	---
17/03/2023 06:35	24.0	32.0	---	---
17/03/2023 06:40	24.1	32.8	---	---
17/03/2023 06:45	25.8	37.0	---	---
17/03/2023 06:50	24.5	32.3	---	---
17/03/2023 06:55	25.0	38.2	---	---
17/03/2023 07:00	26.8	41.4	---	---
17/03/2023 07:05	25.2	34.1	---	---
17/03/2023 07:10	25.4	32.5	---	---
17/03/2023 07:15	29.7	48.7	---	---
17/03/2023 07:20	27.6	48.2	---	---
17/03/2023 07:25	26.3	41.2	---	---
17/03/2023 07:30	25.6	35.5	---	---
17/03/2023 07:35	26.3	37.1	---	---

17/03/2023 07:40	26.4	35.3	---	---
17/03/2023 07:45	27.1	36.0	---	---
17/03/2023 07:50	25.4	36.6	---	---
17/03/2023 07:55	25.1	35.6	---	---
17/03/2023 08:00	25.0	31.7	---	---
17/03/2023 08:05	27.2	39.2	---	---
17/03/2023 08:10	28.4	44.5	---	---
17/03/2023 08:15	25.7	35.6	---	---
17/03/2023 08:20	25.7	36.9	---	---
17/03/2023 08:25	26.1	36.2	---	---
17/03/2023 08:30	25.0	32.8	---	---
17/03/2023 08:35	25.2	37.5	---	---
17/03/2023 08:40	27.7	46.0	---	---
17/03/2023 08:45	25.7	38.1	---	---
17/03/2023 08:50	25.4	35.5	---	---
17/03/2023 08:55	25.8	40.2	---	---
17/03/2023 09:00	27.2	38.9	---	---
17/03/2023 09:05	26.2	41.2	---	---
17/03/2023 09:10	25.9	37.1	---	---
17/03/2023 09:15	24.9	42.0	---	---
17/03/2023 09:20	28.1	50.1	---	---
17/03/2023 09:25	25.1	39.1	---	---
17/03/2023 09:30	25.3	36.7	---	---
17/03/2023 09:35	24.4	33.7	---	---
17/03/2023 09:40	25.3	41.8	---	---
17/03/2023 09:45	27.2	42.6	---	---
17/03/2023 09:50	25.3	41.4	---	---
17/03/2023 09:55	32.6	57.4	---	---
17/03/2023 10:00	30.3	56.5	---	---
17/03/2023 10:05	29.7	51.9	---	---
17/03/2023 10:10	43.9	65.1	---	---
17/03/2023 10:15	28.2	50.3	---	---
17/03/2023 10:20	27.2	47.5	---	---
17/03/2023 10:25	28.2	54.0	---	---
17/03/2023 10:30	31.9	50.9	---	---
17/03/2023 10:35	37.8	61.1	---	---
17/03/2023 10:40	41.0	62.3	---	---

Appendix B

Assessment terminology

Assessment terminology

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2 \times 10^{-5} \text{Pa}$).
dB(A)	The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc, according to the parameter being measured.
Acoustic environment	Sound from all sources as modified by the environment.
Ambient sound level	The totally encompassing sound in a given situation at a given time; it is usually composed of sound from many sources, near and far.
Equivalent continuous sound level - $L_{Aeq,T}$	The A-weighted equivalent continuous sound pressure level over a period of time, T. Representative of the 'average' sound pressure level over a given period (commonly used to describe the 'ambient' sound level).
Maximum sound level - $L_{AFmax,T}$	The A-weighted 'maximum' sound pressure level that occurred during a given period, T (commonly used for the assessment of intermittent loud noises).
Background sound level - $L_{A90,T}$	The sound pressure level that is exceeded for 90% of the measurement time interval, T. $L_{A90,T}$ is often used to describe the 'background' sound level.
Habitable room	Any room used or intended to be used for sleeping, cooking, living or eating purposes (enclosed spaces such as bath or toilet facilities, service rooms, corridors, laundries, hallways, utility rooms or similar spaces are excluded from this definition).
R_w	The weighted sound reduction index expressed in dB. A single number quantity for airborne sound insulation rating.
$R_w + C_{tr}$	The ' C_{tr} ' term is added to the single number rating R_w to take account of the characteristics of particular sound spectra (e.g. road traffic).