

**Assessment of the Internal Noise
Climate within the New Apartments contained within the
Townhead Building, 150 Yorkshire Street, Rochdale.**

Report Prepared for:

Raj Property Investments Ltd (Townhead)
26 Taylor Street
Rochdale
OL12 0HX

Report Prepared By:

Mr. Robert Smith

Report Reference: DRUK/ACC/RS/RPILTJSR/3235 v 2

Date: 12th September 2023

Contents

- 1.0 Summary**
- 2.0 Introduction**
- 3.0 Site Description**
- 4.0 Assessment Criteria**
 - 4.1 Perceived Change
- 5.0 Construction Specification**
 - 5.1 External Walls
 - 5.2 Glazing
- 6.0 Noise Climate Assessment Details**
 - 6.1 Survey Times and Personnel
 - 6.2 Weather
 - 6.3 Equipment
 - 6.4 Measurement Procedure
- 7.0 Noise Survey Results**
- 8.0 Discussion**
- 9.0 Conclusion**

Appendix 1. Emails

Appendix 2. Standardised Internal Noise Levels

1.0 Summary

The former Rochdale Borough Council offices located within the existing building at 150 Yorkshire Street in Rochdale, is in the process of being converted to provide 13 new residential apartments. Subsequent to the commencement of the conversion works, the Local Planning Authority (LPA) has raised concerns relating to the potential ingress of noise from the external environment and in particular the issue of road traffic noise from the nearby John Street was specifically raised.

In order to assess the level of external noise break-in within the proposed residential apartments, Druk Limited was commissioned to undertake an assessment of the internal noise climate within a completed apartment within the development. In this case measurements have been made within apartment 2 to assess compliance with the internal noise guidance contained within BS 8233:2014.

The results of the measurements within the living room of apartment 2 highlighted that the daytime mean (log) internal noise levels was 36dB L_{eq} , which exceed the design guide value of 35dB by 1 dB. Despite this note 7 to table 4 of BS 8233:2014 states *"Where development is considered as necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5dB and reasonable internal conditions still achieve"*. In this case the indicated exceedance of 1dB would still comply with the additional guidance contained within BS8233:2014. It is also suggested that a change in level of 1dB, assuming the character of the noise remains the same, would generally be imperceptible and would potentially have no impact on the person experiencing the change.

Turning to the situation within the bedroom of apartment 2, it can be seen that the standardised mean values for the daytime and night time periods were 39 and 38dB L_{Aeq} respectively. Additionally, and with reference to the night time bedroom L_{Amax} levels, the measurements highlighted that the 45dB L_{Amax} criterion was exceeded on a number of occasions throughout the night time period. Consequently, the standardised sound levels within the bedroom may be regarded as having exceeded the design guide values, expressed in terms of the L_{Aeq} and L_{Amax} parameters, contained within BS 8233:2014. It is therefore suggested that additional sound insulation measures would be beneficial within the bedroom space and that these measures should be targeted at improving the sound insulation of the existing glazing.

Improving the internal noise climate would require the current sound insulation of the existing glazing to be increased to around 39dB R_w in order to further limit the ingress of external noise. With this in mind two main options to enhance the sound insulation of the glazing exists, and these would be the substitution of the existing sealed units for a more robust sealed unit or the provision of a secondary glazing system. Despite this, the fact that the building benefits from Grade II listing may be a limiting factor with respect to the type and extent of the sound insulation enhancement measures that may be applied to the glazing.

With reference to a substitute sealed unit, in order to achieve the indicated 39dB sound insulation the new unit would need to be of the following general specification: 6mm pane - 16mm cavity - 6.8mm pane. As the existing windows are of the sliding timber sash type, accommodating this type of sealed unit within the existing frames could be challenging. The second option of a secondary glazing system would need to comprise

a 6mm pane that is contained within a separate frame that is separated from the existing window frame by a gap of at least 50 - 75mm.

Bearing in mind the fact that the bedrooms to apartments 1, 2, 13 and 14 are on the John Street elevation of the existing building, it is recommended that consideration is given to enhancing the glazing in all those bedrooms that are exclusively and wholly on the John Street elevation of the Townhead building apartments.

Report Prepared by:

A handwritten signature in black ink, appearing to read 'R. Smith'.

.....
Robert Smith

2.0 Introduction

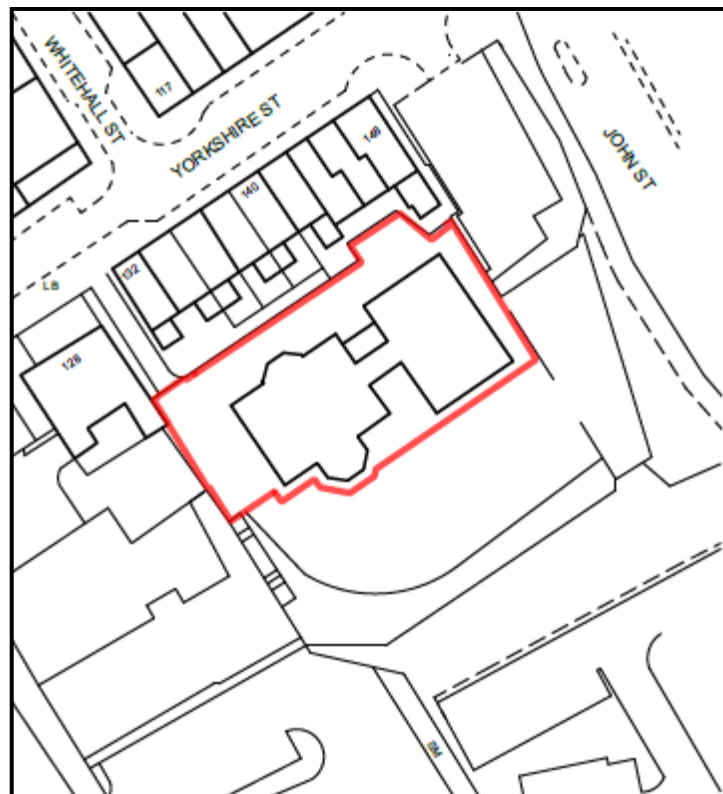
The former Rochdale Borough Council offices located within the existing building at 150 Yorkshire Street in Rochdale is in the process of being converted to provide 13 new residential apartments. Subsequent to the commencement of the conversion works, the Local Planning Authority (LPA) has raised concerns relating to the potential ingress of noise from the external environment and in particular the issue of road traffic noise from the nearby John Street was specifically raised.

In order to assess the level of external noise break-in within the proposed residential apartments, Druk Limited was commissioned to undertake an assessment of the internal noise climate within a completed apartment within the development.

3.0 Site Description

The existing building is located at 150 Yorkshire Street in Rochdale and is believed to date from the late nineteenth century (figure 1 below and photograph 1 overleaf). To the North of the existing building is Yorkshire Street itself which hosts a range of retail shops (photograph 2 overleaf), to the South of the existing building is a car park with the extensive Upperbanks residential development beyond (photograph 3 overleaf). To the East of the existing building is John Street (photograph 4 overleaf) and to the West of the existing building are further retail buildings on Yorkshire Street with the Wheatsheaf shopping centre beyond (photograph 5 overleaf).

Figure 1. Location of the new residential apartments, (edged in red), 150 Yorkshire Street



Photograph 1. Former council offices, 150 Yorkshire Street



Photograph 2. Retail shops on Yorkshire Street



Photograph 3. Car park and Upperbanks development to the South of the former council offices



Photograph 4. John Street to the East of the former council offices



Photograph 5. Wheatsheaf shopping centre to the south of the former council offices



4.0 Assessment Criteria

As previously detailed, the Rochdale Borough Council acting as the LPA raised concerns relating to the potential for break-in noise from the external environment to adversely affect the internal noise environment within the proposed residential apartments. This concern was expressed in an email received from Rochdale Borough Council's Planning Department and the relevant text from this email is reproduced below.

The site is set against John Street which is a busy main road facilitating large volumes of traffic both through the day and night, with the associated traffic dominating the acoustic environment around this site. After discussing with the Environmental Health Officer they have requested that a Noise Impact Assessment is provided in order to demonstrate that the rooms are either currently suitable for habitation, or a scheme of works necessary to ensure suitable internal conditions.

It is noted that the adjacent Upperbanks development did carry out a NIA which concluded that uprated glazing was required for the windows in the elevations facing east.

With respect to the comments received from Rochdale Borough Council, as a number of the apartments were essentially complete the opportunity to directly measure the acoustic conditions within the apartments presented itself. In order to ascertain whether this approach would be acceptable to the Local Planning Authority, a conversation was held with Mr. Ryan Killeen within Rochdale Borough Council's Planning Department. Subsequent to this conversation an email summarising the assessment proposals was

sent to Mr. Killeen, whom confirmed their acceptability in his emailed response. Copies of these emails are reproduced in Appendix 1.

With respect to the assessment of the desirable internal noise levels within the proposed new houses, the guidance contained within British Standard (BS) 8233:2014 "Guidance on sound insulation and noise reduction for buildings" will be employed. BS 8233:2014 draws together research and best practice relating to building design, providing guidance to facilitate the development of buildings that have internal noise environments that are consistent with and appropriate for their intended use. The British Standard highlights methods for the control of noise from a number of sources including external noise and building services etc., as well as evaluating the effect that noise from these sources may have on the acoustics of the internal spaces.

With reference to the design guidance relating to the internal noise climate of residential dwellings, BS 8233:2014 summarises this guidance within table 4 of section 7.7.2. The main elements of this guidance are reproduced in table 1 below.

Table 1. Indoor ambient noise levels for dwellings (reproduced from table 4 of BS8233:2014)

Activity	Location	0700 to 2300	2300 to 0700
Resting	Living room	35dB $L_{Aeq, 16 \text{ hour}}$	-
Dining	Dining room/area	40dB $L_{Aeq, 16 \text{ hour}}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq, 16 \text{ hour}}$	30dB $L_{Aeq, 8 \text{ hour}}$

In addition to the internal noise design guidance detailed above, supplementary notes 4, 5 and 7 to table 4 of section 7.7.2 are deemed appropriate to this assessment and state the following:

Note 4. *Regular individual noise events (for example scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values.*

Note 5. *If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting sound level.*

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

With reference to note 4, the design guidance detailed within the previous 1999 version of BS 8233 relating to individual noise events, expressed as L_{Amax} levels, will be adopted for this assessment. This guidance stated: "for a reasonable standard for bedrooms at night, individual noise events (measured with the fast time-weighting) should not normally exceed 45 dB L_{Amax} ", and this guidance complies with the provisions contained within the WHO document.

It must however be stated that many regard the 45dB L_{Amax} criterion as stringent. Additionally, it must be remembered that all of the above criteria are design guidance,

they do not represent a set of rigid criteria, below which a development 'passes' and above which a development 'fails'.

Remaining with the issue of internal noise level guidance and the proposed levels for individual noise events, expressed as an $L_{\max}$, the guidance contained within Appendix A of the Planning and Noise: Professional Guidance on Planning and Noise (ProPG) document, published in May 2017 contains a short summary of research into the effects of individual noise events and the effect that these can have on sleep. In the light of this summary the document, at paragraph A.20, states the following, "...therefore, it is considered that if, in bedrooms at night, the $L_{A\max,F}$ from individual noise events (from all sources) would not normally exceed 45dB more than 10 times a night, then this represents a reasonable threshold below which the events on sleep can be regarded as negligible".

4.1 Perceived Change

The level of change in an existing noise climate that may be brought about by the introduction of another noise source, will cause a variety of responses within the individuals experiencing the change. These responses are frequently regarded as being subjective, based on a variety of perceptions and based on the context within which the change is framed. With the subjectivity of potential responses to changes in noise levels in mind, guidelines have been formulated to try and quantify the effects of any changes in noise on the perception of the overall level. Quoting from the Guidelines for Noise Impact Assessment (draft 10/04/02) by the Institute of Environmental Management and Assessment and the Institute of Acoustics, table 2 below shows the effects of changes in noise.

Table 2. Perceived change in noise levels and subjective effects

Change in level (no other changes in character)	Subjective effect	Likely impact
0dB	No change in level	None
Up to 3dB	Imperceptible	Slight
+3 to +5dB	Perceptible	Moderate
+5 to +10dB	Up to a doubling	Substantial
+10dB or more	At least a doubling	Severe

Note, however, that 'Subjective Effects' assume that the nature of the noise is unchanged. Also, many acousticians feel that the wording under the 'Likely Impact' column can be unhelpful.

5.0 Construction Specification

The newly formed residential flats are in the process of being formed within the existing building located at 150 Yorkshire Street. The existing building is believed to date from the late nineteenth century and the principal construction details of the existing building are as summarised.

5.1 External Walls

The walls of the existing building are believed to be of solid masonry and are in the region of 550 - 600mm hick (photograph 6 below).

Photograph 6. External walls to the existing building



Sound insulation data for a similar construction suggests that external walls of this type should provide an overall sound insulation of at least 66dB R_w , with the octave band sound insulation values being as detailed in table 3 below.

Table 3. Existing building external wall construction, Octave Band Sound Insulation Values

OBCF, Hz*	125	250	500	1k	2k	4k	Overall, R_w dB
Sound Insulation, dB	52	59	65	70	74	74	66

* Octave Band Centre Frequency

5.2 Glazing

The glazing within the new apartments is contained within timber sash frames and the glazed elements themselves are of the sealed unit type with the following typical specification:

- 4mm pane - 16mm cavity - 4mm pane (all other glazing)

Laboratory test data obtained from Pilkington Glass indicate that this configuration should provide a sound insulation value of around 31dB R_w . The octave band sound insulation values are as detailed in table 4 below.

Alternative glazing configurations would be acceptable providing the sound insulation performances are at least equivalent to the specifications detailed in table 4 below.

Table 4. Glazing, octave band sound insulation values

OBCF, Hz*	125	250	500	1k	2k	4k	Overall, R_w (C_{tr}) dB
4mm, 12 - 20mm, 4mm	24	20	25	35	38	35	31 (-6)

* Octave Band Centre Frequency

6.0 Noise Climate Assessment Details

Noise surveys to evaluate the existing noise climate both within the apartments were undertaken in accordance with the assessment proposals agreed in principle with Mr. Killeen. Measurements were made within a bedroom and the living room of apartment 2 (figure 2 overleaf) on the ground floor of the former office building. Apartment 2 was selected as the bedrooms were on the Eastern elevation facing the busy John Street. In addition apartments 13 and 14 on the first floor lacked doors and as such measurements within these spaces were not possible.

Figure 2. Location of the noise measurement positions, apartment 2



6.1 Survey Times and Personnel

Assessment of the noise levels within the bedroom and living room apartment 2 were conducted between: 13:00 – 13:00 hours on the 9th - 10th August.

6.2 Weather

At the commencement of the internal noise measurements, the external weather conditions were as follows:

All surfaces were dry, cloud cover was approximately 60%, the external temperature was approximately 18°C, the barometric pressure was approximately 998mb and the wind speed was approximately 1.2m/s.

6.3 Equipment

The noise assessments were conducted using the equipment detailed in the table 5 below.

The sound level meters were field calibrated before, after and during the surveys as necessary, during which time no significant deviation in the calibrated level was observed.

All the equipment used is calibrated by a UKAS accredited calibration laboratory and the calibration certificates are available on request.

Table 5. Equipment used during the noise surveys

Equipment description	Manufacturer	Model number	Serial number
Sound level meter	Norsonic AS	Nor 140	1402738
Microphone pre-amplifier	Norsonic AS	Nor 1209	12075
Microphone	Norsonic AS	Nor 1225	72843
Sound level meter	NTI Audio	XL2-TA	A2A-10232-E
Microphone pre-amplifier	NTI Audio	MA220	5537
Microphone	NTI Audio	M2230	8636
Acoustic calibrator	Norsonic AS	Nor 1251	31522

6.4 Measurement Procedure

With respect to these internal measurements due regard, where appropriate, was paid to the guidance provided within the Association of Noise Consultants (ANC) – Measurement of Sound Levels in Buildings, Version 1.0, June 2020.

Throughout the internal noise assessments the measurement time interval was 5 minutes, the windows were closed but any ventilation openings were in their open positions and all measurements were made with the fast time weighting engaged.

During the course of the assessments, the sound level meters were placed in positions that approximated the likely positions of the beds within the bedrooms and a sofa within the living room area. The sound level meters were tripod mounted, such that they were approximately 1.2 metres above floor level and approximately 1.0 metre from the internal walls. The microphones were connected to the sound level meters via 5 metre extension cables, so permitting the operator to remain outside the assessment spaces. The measurements were unmanned or their duration.

7.0 Noise Survey Results

At the time of the internal noise measurements within apartment 2, the plot was complete, unfurnished, unoccupied and uncarpeted. As a consequence it was likely that the sound absorption of the bedroom and living room would be different from that which would prevail when the dwelling was occupied and fully furnished. In order to permit the obtained sound levels to be 'standardised', sample reverberation time measurements were made within the bedrooms and living rooms of apartment 2. The mean reverberation times for the bedrooms and living rooms within apartment 2 are presented in table 6 below.

Table 6. Mean reverberation time measurements, apartment 2

Room	Mean Reverberation Time, T_{20} , seconds
Living room	1.44
Front bedroom	1.25

For the purposes of the subsequent assessments the measured internal ambient noise levels will be 'standardised' to a reverberation time of 0.5 seconds, which would be typical of a furnished and occupied dwelling.

By virtue of the significant amounts of measured noise data collected during the noise surveys, tables 7 and 8 and graphs 1 and 2 below and overleaf contain summaries of the noise data from the measurement surveys. Full measured noise data are presented in tabular form in Appendix 2.

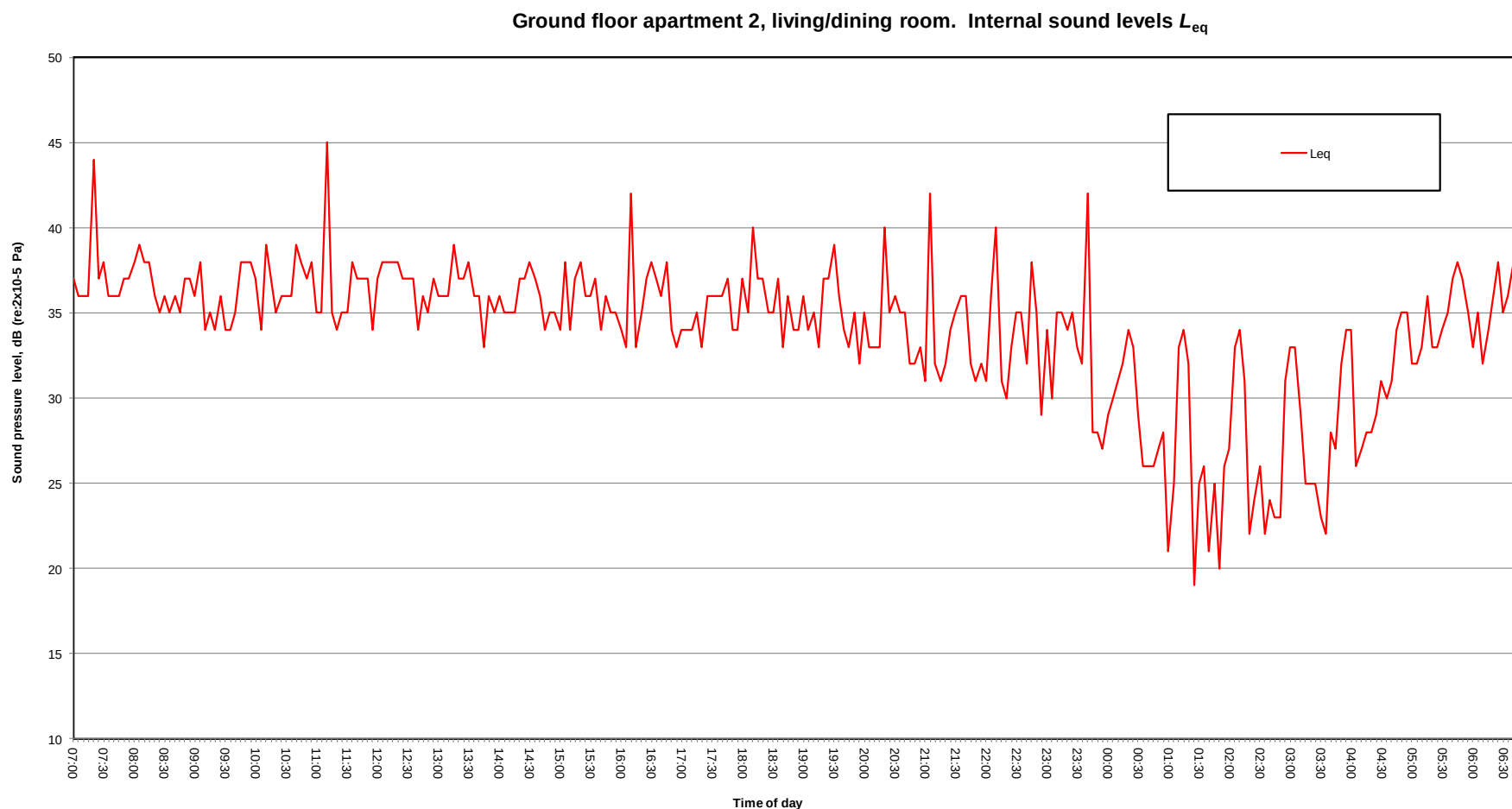
Table 7. Measured sound level summary, living room

	$L_{Aeq,T}$	$L_{Amax,T}$
Standard deviation, daytime	2.29	5.02
Standard deviation, night time	4.95	5.59
Daytime mean (log)	36	53
Night time mean (log)	33	50
Daytime modal value	36	48
Night time modal value	34	42

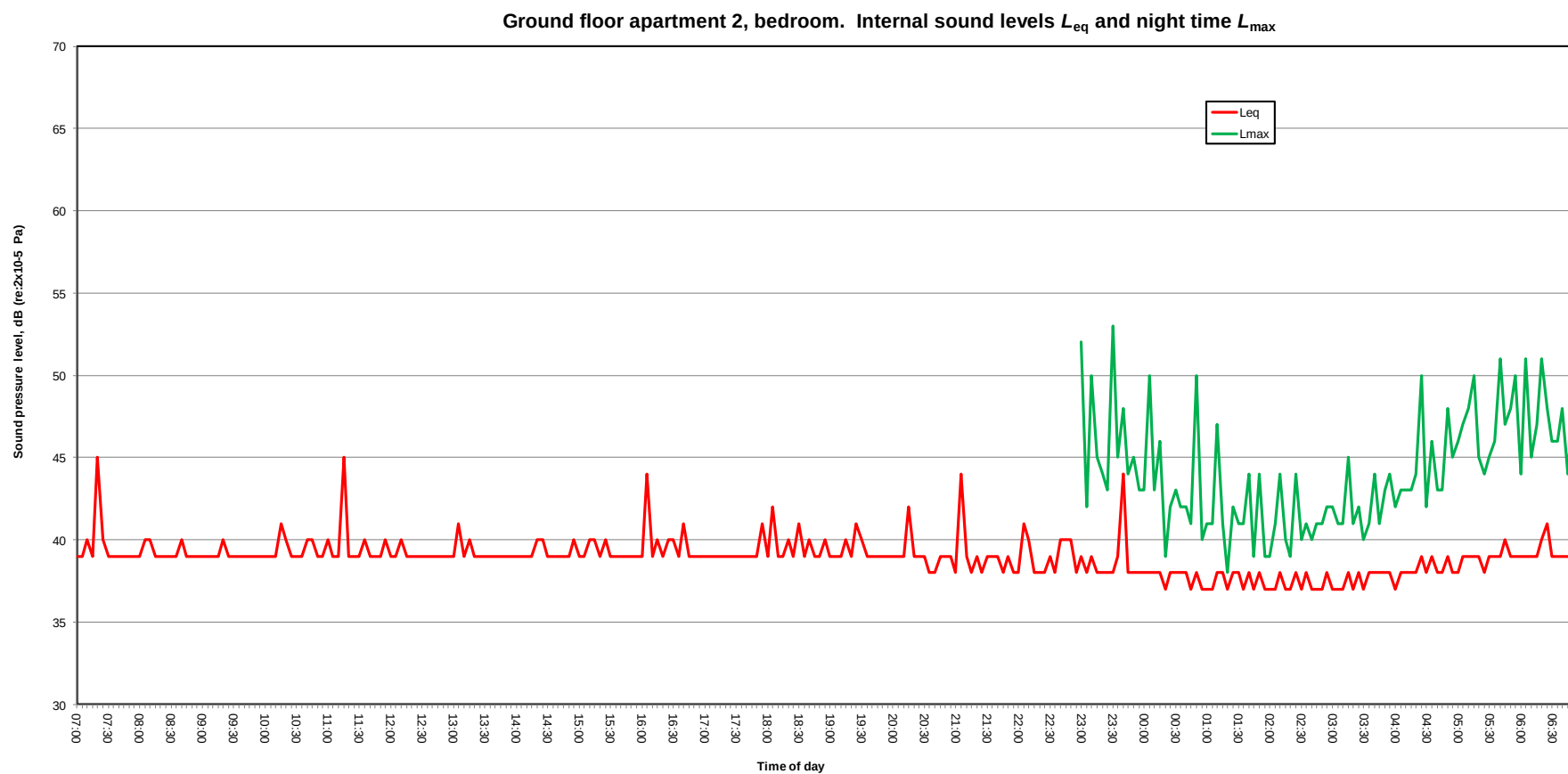
Table 8. Measured sound level summary, bedroom

	$L_{Aeq,T}$	$L_{Amax,T}$
Standard deviation, daytime	1.01	5.06
Standard deviation, night time	1.02	3.46
Daytime mean (log)	39	54
Night time mean (log)	38	46
Daytime modal value	39	49
Night time modal value	38	41

Graph 1. Standardised sound level summary, living room, apartment 2



Graph 2. Standardised sound level summary, bedroom apartment 2



8.0 Discussion

With reference to the design guide values presented within table 1 above, the living room guidance relates to the daytime period only and suggests that the $L_{Aeq, 16 \text{ hour}}$ should ideally not exceed 35dB. The results of the measurements made within the living room and presented within table 7 above highlight that the daytime L_{eq} noise climate was relatively steady. Table 7 also reveals that the mean (log) sound level and the modal value for the daytime period were both 36dB. As can be seen for the results it would, at first sight, appear that the design guide value had been exceeded. Despite this a number of factors must be considered.

In expressing the guide values for internal living areas, paragraph 7.7.2 of BS8233:2014 states "*In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values in table 4*". It is suggested that the important caveat in this statement is "desirable", this does not suggest that the guide values are mandatory or represent rigid criteria. This interpretation also supports the additional guidance with note 7 to table 4 which states "*Where development is considered as necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5dB and reasonable internal conditions still achieve*". In this case the indicated exceedance of 1dB would still comply with the additional guidance contained within BS8233:2014. Reference to table 2 above also suggests that a change in level of 1dB, assuming the character of the noise remains the same, would generally be imperceptible and would potentially have no impact on the person experiencing the change.

This being the case it is suggested that any additional sound insulation measures would not be appropriate and a requirement to install such measures may be considered as disproportional to the benefit that would be derived from their implementation.

Turning to the situation within the bedroom, it can be seen from table 8 above that the standardised mean values for the daytime and night time periods were 39 and 38dB L_{Aeq} respectively. It is suggested that the higher internal sound levels within this space were a consequence of the bedroom being closer and directly exposed to the traffic on John Street. In both cases the standardised sound levels exceed the design guide values, expressed as the L_{Aeq} parameter, contained within BS 8233:2014, although in the case of the daytime level this is still within the 5dB 'tolerance' contained within note 7 to table 4. Despite this the night time L_{Aeq} level exceeds the design guide value by 8dB and as such it is suggested that additional sound insulation measures may be appropriate for the bedroom.

With reference to the night time bedroom L_{Amax} levels, graph 2 highlights that the 45dB L_{Amax} criterion was exceeded on many occasions throughout the night time period and more than the 10 occurrences detailed as being acceptable in the additional guidance contained within the ProPG document. Bearing in mind the exceedances of both the L_{Aeq} and L_{Amax} design guide values within the bedroom, it is suggested that additional sound insulation measures would be beneficial within the bedroom space.

As is often the case, it is the glazed elements that may be considered as the 'weaker' links with respect to sound insulation, when compared with the external masonry elements. This would most definitely be the case in this situation as the external

masonry wall is of very robust construction. Accepting this would suggest that the sound insulation of the glazing to the bedroom would require to be improved in order to reduce the level of external noise break-in to the internal space.

The standardised mean values for the daytime and night time periods were 39 and 38dB L_{Aeq} respectively and as such an initial assessment would suggest that the sound insulation provided by the glazing would need to be improved by around 8dB in order to comply with the design guide value for a bedroom during the more sensitive night time period. This statement does not however consider the 5dB 'tolerance' contained within note 7 to table 4 of BS 8233:2014.

The existing glazing is detailed within section 5.2 above and would be expected to provide a sound insulation value of around 31dB R_w . This being the case it is suggested that the sound insulation of the glazing would need to be increased to around 39dB R_w in order to further limit the ingress of external noise and ensure compliance with the design guide values. With this in mind two main options to enhance the sound insulation of the glazing exists, and these would be the substitution of the existing sealed units for a more robust sealed unit or the provision of a secondary glazing system. Despite this, the fact that the building benefits from Grade II listing may be a limiting factor with respect to the type and extent of the sound insulation enhancement measures that may be applied to the glazing.

With reference to a substitute sealed unit, in order to achieve the indicated 39dB sound insulation the new unit would need to be of the following general specification: 6mm pane - 16mm cavity - 6.8mm pane. As the existing windows are of the sliding timber sash type, accommodating this type of sealed unit within the existing frames could be challenging.

The second option would be to install a secondary glazing system, which can not only offer significant sound insulation advantages but has also previously proved acceptable for retro-fitment within listed buildings. Assuming the acceptability of a secondary pane installation within a listed building, it is recommended that this comprises a 6mm pane that is contained within a separate frame that is separated from the existing window frame by a gap of at least 50 - 75mm. Laboratory test data supplied by Selectaglaze indicates that this type of secondary glazing system should provide a sound insulation value of at least 39 dB R_w , which would improve the glazing sound insulation by the suggested 8dB.

Bearing in mind the fact that the bedrooms to apartments 1, 2, 13 and 14 are on the John Street elevation of the existing building, it is recommended that consideration is given to enhancing the glazing in all those bedrooms that are exclusively and wholly on the John Street elevation of the apartments.

9.0 Conclusion

Measurements have been made within apartment 2 to assess compliance with the internal noise guidance contained within BS 8233:2014. Starting with the living room of apartment 2, the results highlighted that the daytime mean (log) internal noise levels was 36dB L_{eq} , which exceed the design guide value of 35dB by 1 dB. At first sight it would appear that the design guide value has been exceeded however a number of factors must be considered. Chief amongst these is the fact that note 7 to table 4 of BS 8233:2014 states "*Where development is considered as necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5dB and reasonable internal conditions still achieve*". In this case the indicated exceedance of 1dB would still comply with the additional guidance contained within BS8233:2014. It is also suggested that a change in level of 1dB, assuming the character of the noise remains the same, would generally be imperceptible and would potentially have no impact on the person experiencing the change.

Turning to the situation within the bedroom, it can be seen that the standardised mean values for the daytime and night time periods were 39 and 38dB L_{Aeq} respectively. Additionally and with reference to the night time bedroom L_{Amax} levels, the measurements highlighted that the 45dB L_{Amax} criterion was exceeded on a number of occasions throughout the night time period. Consequently, the standardised sound levels within the bedroom exceeded the design guide values, expressed in terms of the L_{Aeq} and L_{Amax} parameters, contained with BS 8233:2014. It is therefore suggested that additional sound insulation measures would be beneficial within the bedroom space and that these measures should be targeted at improving the sound insulation of the existing glazing.

Improving the internal noise climate would require the current sound insulation of the existing glazing to be increased to around 39dB R_w in order to further limit the ingress of external noise. With this in mind two main options to enhance the sound insulation of the glazing exists, and these would be the substitution of the existing sealed units for a more robust sealed unit or the provision of a secondary glazing system. Despite this, the fact that the building benefits from Grade II listing may be a limiting factor with respect to the type and extent of the sound insulation enhancement measures that may be applied to the glazing.

With reference to a substitute sealed unit, in order to achieve the indicated 39dB sound insulation the new unit would need to be of the following general specification: 6mm pane - 16mm cavity - 6.8mm pane. As the existing windows are of the sliding timber sash type, accommodating this type of sealed unit within the existing frames could be challenging. The second option of a secondary glazing system would need to comprise a 6mm pane that is contained within a separate frame that is separated from the existing window frame by a gap of at least 50 - 75mm.

Appendix 1. Emails

From: Robert Smith [mailto:rsmith@druklimited.co.uk]

Sent: 26 July 2023 11:54

To: 'ryan.killeen@rochdale.gov.uk'

Cc: 'Richard Storah'

Subject: Townhead, Yorkshire/John Street, Rochdale

Dear Mr. Killeen.

Many thanks for taking the time to discuss the noise survey requirement, as it relates to the above development, with me this morning.

As discussed, as the apartments within the existing building are essentially complete this provides the opportunity to obtain direct measurements of the internal climate within one of the most complete apartments.

With this in mind we would propose to install noise monitoring equipment within one of the first floor apartments and measure the existing noise climate within the apartment over a full 24 hour period. The measurements would be made within a bedroom on the John Street elevation (covering a full 24 hour period) and within the combined living/dining kitchen (over a 16 hour period). The results of the assessments would then be compared with the design guidance contained within BS 8233:2014. Should the comparison of the obtained results and design guide prove unfavourable, we would look at possible sound insulation enhancement measures. I understand that such measures would however be subject to confirmation from the conservation officer as the building benefits from grade II listing.

I hope the foregoing accurately summarises the main elements of our discussion. If you are happy that it does, would it be possible to confirm this via return email? This would be most useful in order that I may progress it with our client?

Many thanks again for your co-operation.

Regards,

Rob Smith

Druk Limited, 87 St Albans Road, Halifax, HX3 0ND

Tel: 07917 727 901

rsmith@druklimited.co.uk

www.druklimited.co.uk

Registered in England: 06380955

From: Ryan Killeen (He/Him) [mailto:Ryan.Killeen@Rochdale.Gov.UK]
Sent: 26 July 2023 17:07
To: Robert Smith
Cc: 'Richard Storah'
Subject: RE: Townhead, Yorkshire/John Street, Rochdale

Hi Robert,

Thanks for getting in touch, great to speak with you earlier.

I would be content with the design of that noise survey.

Kind regards,

Ryan

Ryan Killeen (He/Him)
Principal Planning Officer (Growth)
Planning & Development



 01706 925964

 ryan.killeen@rochdale.gov.uk

Rochdale Borough Council
Floor 3, Number One Riverside
Smith Street, Rochdale, OL16 1XU

To access our services go to www.rochdale.gov.uk

For news, events and social media updates go to www.rochdale.gov.uk/newsandevents

Please consider the environment before printing this email.

Appendix 2. Standardised Internal Noise Levels

Bedroom, standardised internal noise levels

Time	L_{Aeq} 5 mins	L_{Amax} , 5 mins	L_{A10} , 5 mins	L_{A90} , 5 mins
07:00	37	49	39	32
07:05	36	47	38	30
07:10	36	45	39	31
07:15	36	49	39	31
07:20	44	64	41	29
07:25	37	56	39	29
07:30	38	57	40	31
07:35	36	46	39	30
07:40	36	48	39	31
07:45	36	47	39	30
07:50	37	52	39	34
07:55	37	44	39	34
08:00	38	46	40	36
08:05	39	52	41	32
08:10	38	48	41	32
08:15	38	49	41	34
08:20	36	47	38	31
08:25	35	46	38	30
08:30	36	47	39	32
08:35	35	49	37	29
08:40	36	49	39	31
08:45	35	49	39	30
08:50	37	45	39	35
08:55	37	51	39	34

Time	L_{Aeq} 5 mins	L_{Amax} , 5 mins	L_{A10} , 5 mins	L_{A90} , 5 mins
09:00	36	44	38	34
09:05	38	49	40	34
09:10	34	44	37	27
09:15	35	46	38	30
09:20	34	42	37	28
09:25	36	48	39	31
09:30	34	48	37	30
09:35	34	46	37	29
09:40	35	48	38	30
09:45	38	43	39	35
09:50	38	45	40	35
09:55	38	49	39	35
10:00	37	48	39	35
10:05	34	45	37	29
10:10	39	61	40	27
10:15	37	50	40	30
10:20	35	48	37	30
10:25	36	52	39	29
10:30	36	45	39	32
10:35	36	49	39	30
10:40	39	56	41	34
10:45	38	48	41	35
10:50	37	50	39	34
10:55	38	48	39	35

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
11:00	35	50	39	30
11:05	35	50	38	30
11:10	45	66	42	31
11:15	35	47	38	31
11:20	34	47	37	29
11:25	35	45	37	30
11:30	35	54	37	29
11:35	38	52	40	34
11:40	37	45	39	35
11:45	37	48	40	35
11:50	37	46	39	34
11:55	34	47	37	29
12:00	37	55	38	29
12:05	38	55	40	35
12:10	38	49	39	35
12:15	38	48	39	35
12:20	38	47	39	35
12:25	37	44	39	35
12:30	37	44	39	35
12:35	37	47	39	35
12:40	34	48	37	29
12:45	36	46	39	30
12:50	35	46	38	31
12:55	37	46	39	32

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
13:00	36	47	39	30
13:05	36	46	38	30
13:10	36	49	39	32
13:15	39	61	39	33
13:20	37	48	38	34
13:25	37	52	39	35
13:30	38	47	40	35
13:35	36	48	38	31
13:40	36	48	38	29
13:45	33	42	36	27
13:50	36	48	39	29
13:55	35	46	39	30
14:00	36	47	38	30
14:05	35	51	38	30
14:10	35	45	37	29
14:15	35	47	38	30
14:20	37	51	38	34
14:25	37	45	39	35
14:30	38	57	39	35
14:35	37	49	39	32
14:40	36	51	38	31
14:45	34	43	37	30
14:50	35	47	38	31
14:55	35	45	37	31

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
15:00	34	49	37	30
15:05	38	54	40	30
15:10	34	43	36	28
15:15	37	56	39	29
15:20	38	54	39	34
15:25	36	46	38	34
15:30	36	48	38	34
15:35	37	58	38	30
15:40	34	51	36	28
15:45	36	52	39	28
15:50	35	48	37	29
15:55	35	48	38	29
16:00	34	48	37	28
16:05	33	43	37	27
16:10	42	65	38	28
16:15	33	42	36	27
16:20	35	52	38	29
16:25	37	49	39	34
16:30	38	53	39	34
16:35	37	44	39	34
16:40	36	48	39	29
16:45	38	57	39	28
16:50	34	43	36	29
16:55	33	42	36	27

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
17:00	34	45	37	28
17:05	34	45	37	27
17:10	34	47	37	28
17:15	35	53	37	29
17:20	33	42	37	27
17:25	36	48	38	29
17:30	36	45	38	33
17:35	36	44	39	33
17:40	36	50	38	33
17:45	37	53	39	34
17:50	34	42	37	28
17:55	34	45	37	26
18:00	37	57	39	26
18:05	35	46	38	26
18:10	40	62	40	33
18:15	37	52	39	34
18:20	37	47	39	32
18:25	35	51	38	26
18:30	35	48	38	26
18:35	37	57	38	26
18:40	33	44	37	26
18:45	36	47	40	24
18:50	34	48	37	25
18:55	34	47	38	26

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
19:00	36	58	38	26
19:05	34	45	38	24
19:10	35	54	37	25
19:15	33	41	36	25
19:20	37	51	39	32
19:25	37	52	39	33
19:30	39	58	39	33
19:35	36	50	38	32
19:40	34	46	37	24
19:45	33	43	37	24
19:50	35	51	38	25
19:55	32	42	36	24
20:00	35	49	38	24
20:05	33	46	37	22
20:10	33	48	37	23
20:15	33	45	37	23
20:20	40	61	39	23
20:25	35	47	38	28
20:30	36	51	38	33
20:35	35	43	38	33
20:40	35	44	37	33
20:45	32	47	36	23
20:50	32	42	36	23
20:55	33	44	37	24

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
21:00	31	43	35	22
21:05	42	65	36	25
21:10	32	44	36	22
21:15	31	43	35	22
21:20	32	44	36	23
21:25	34	47	38	25
21:30	35	42	38	33
21:35	36	49	38	33
21:40	36	52	38	29
21:45	32	45	36	22
21:50	31	45	34	22
21:55	32	45	36	22
22:00	31	45	34	21
22:05	36	58	34	20
22:10	40	57	37	23
22:15	31	43	35	22
22:20	30	45	33	20
22:25	33	46	36	22
22:30	35	46	37	33
22:35	35	51	36	32
22:40	32	49	36	20
22:45	38	61	37	19
22:50	35	56	36	19
22:55	29	43	33	19

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
23:00	34	52	35	21
23:05	30	44	34	20
23:10	35	51	39	19
23:15	35	50	39	21
23:20	34	48	37	32
23:25	35	42	36	33
23:30	33	48	36	25
23:35	32	51	34	19
23:40	42	65	39	19
23:45	28	42	32	19
23:50	28	43	31	18
23:55	27	40	32	18
00:00	29	41	34	19
00:05	30	44	34	19
00:10	31	46	35	19
00:15	32	47	36	19
00:20	34	44	36	32
00:25	33	37	34	33
00:30	29	46	34	19
00:35	26	41	30	18
00:40	26	39	29	18
00:45	26	39	30	18
00:50	27	49	28	18
00:55	28	50	28	18

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
01:00	21	35	22	18
01:05	25	43	28	18
01:10	33	48	34	29
01:15	34	41	35	32
01:20	32	46	34	24
01:25	19	30	20	18
01:30	25	40	27	18
01:35	26	38	30	18
01:40	21	36	23	18
01:45	25	41	28	18
01:50	20	35	22	17
01:55	26	42	29	18
02:00	27	47	31	18
02:05	33	37	34	32
02:10	34	40	35	33
02:15	31	46	34	18
02:20	22	36	25	18
02:25	24	41	27	18
02:30	26	40	30	18
02:35	22	37	25	18
02:40	24	39	28	18
02:45	23	37	26	18
02:50	23	37	24	18
02:55	31	47	35	18

Time	L_{Aeq} 5 mins	L_{Amax} , 5 mins	L_{A10} , 5 mins	L_{A90} , 5 mins
03:00	33	40	34	32
03:05	33	39	34	32
03:10	29	46	33	18
03:15	25	44	23	18
03:20	25	39	27	18
03:25	25	40	28	18
03:30	23	39	24	18
03:35	22	35	25	18
03:40	28	44	32	19
03:45	27	38	32	19
03:50	32	47	34	19
03:55	34	42	35	32
04:00	34	42	35	33
04:05	26	41	30	19
04:10	27	41	31	19
04:15	28	42	32	19
04:20	28	42	32	20
04:25	29	42	34	20
04:30	31	45	36	20
04:35	30	41	34	21
04:40	31	44	35	22
04:45	34	47	37	27
04:50	35	45	38	33
04:55	35	46	38	29

Time	L_{Aeq} 5 mins	L_{Amax} , 5 mins	L_{A10} , 5 mins	L_{A90} , 5 mins
05:00	32	46	36	23
05:05	32	53	35	22
05:10	33	46	36	25
05:15	36	55	39	28
05:20	33	46	37	27
05:25	33	42	37	28
05:30	34	43	38	28
05:35	35	44	38	29
05:40	37	50	40	33
05:45	38	51	40	34
05:50	37	49	39	34
05:55	35	50	39	26
06:00	33	44	38	25
06:05	35	50	38	26
06:10	32	43	36	25
06:15	34	45	38	27
06:20	36	51	39	27
06:25	38	62	38	27
06:30	35	45	38	27
06:35	36	47	39	28
06:40	38	49	40	33
06:45	37	43	39	34
06:50	38	51	40	34
06:55	37	51	40	30

Living room, standardised internal levels

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
07:00	37	49	39	32
07:05	36	47	38	30
07:10	36	45	39	31
07:15	36	49	39	31
07:20	44	64	41	29
07:25	37	56	39	29
07:30	38	57	40	31
07:35	36	46	39	30
07:40	36	48	39	31
07:45	36	47	39	30
07:50	37	52	39	34
07:55	37	44	39	34
08:00	38	46	40	36
08:05	39	52	41	32
08:10	38	48	41	32
08:15	38	49	41	34
08:20	36	47	38	31
08:25	35	46	38	30
08:30	36	47	39	32
08:35	35	49	37	29
08:40	36	49	39	31
08:45	35	49	39	30
08:50	37	45	39	35
08:55	37	51	39	34

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
09:00	36	44	38	34
09:05	38	49	40	34
09:10	34	44	37	27
09:15	35	46	38	30
09:20	34	42	37	28
09:25	36	48	39	31
09:30	34	48	37	30
09:35	34	46	37	29
09:40	35	48	38	30
09:45	38	43	39	35
09:50	38	45	40	35
09:55	38	49	39	35
10:00	37	48	39	35
10:05	34	45	37	29
10:10	39	61	40	27
10:15	37	50	40	30
10:20	35	48	37	30
10:25	36	52	39	29
10:30	36	45	39	32
10:35	36	49	39	30
10:40	39	56	41	34
10:45	38	48	41	35
10:50	37	50	39	34
10:55	38	48	39	35

Time	$L_{Aeq\ 5\ mins}$	$L_{Amax,\ 5\ mins}$	$L_{A10,\ 5\ mins}$	$L_{A90,\ 5\ mins}$
11:00	35	50	39	30
11:05	35	50	38	30
11:10	45	66	42	31
11:15	35	47	38	31
11:20	34	47	37	29
11:25	35	45	37	30
11:30	35	54	37	29
11:35	38	52	40	34
11:40	37	45	39	35
11:45	37	48	40	35
11:50	37	46	39	34
11:55	34	47	37	29
12:00	37	55	38	29
12:05	38	55	40	35
12:10	38	49	39	35
12:15	38	48	39	35
12:20	38	47	39	35
12:25	37	44	39	35
12:30	37	44	39	35
12:35	37	47	39	35
12:40	34	48	37	29
12:45	36	46	39	30
12:50	35	46	38	31
12:55	37	46	39	32

Time	$L_{Aeq\ 5\ mins}$	$L_{Amax,\ 5\ mins}$	$L_{A10,\ 5\ mins}$	$L_{A90,\ 5\ mins}$
13:00	36	47	39	30
13:05	36	46	38	30
13:10	36	49	39	32
13:15	39	61	39	33
13:20	37	48	38	34
13:25	37	52	39	35
13:30	38	47	40	35
13:35	36	48	38	31
13:40	36	48	38	29
13:45	33	42	36	27
13:50	36	48	39	29
13:55	35	46	39	30
14:00	36	47	38	30
14:05	35	51	38	30
14:10	35	45	37	29
14:15	35	47	38	30
14:20	37	51	38	34
14:25	37	45	39	35
14:30	38	57	39	35
14:35	37	49	39	32
14:40	36	51	38	31
14:45	34	43	37	30
14:50	35	47	38	31
14:55	35	45	37	31

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
15:00	34	49	37	30
15:05	38	54	40	30
15:10	34	43	36	28
15:15	37	56	39	29
15:20	38	54	39	34
15:25	36	46	38	34
15:30	36	48	38	34
15:35	37	58	38	30
15:40	34	51	36	28
15:45	36	52	39	28
15:50	35	48	37	29
15:55	35	48	38	29
16:00	34	48	37	28
16:05	33	43	37	27
16:10	42	65	38	28
16:15	33	42	36	27
16:20	35	52	38	29
16:25	37	49	39	34
16:30	38	53	39	34
16:35	37	44	39	34
16:40	36	48	39	29
16:45	38	57	39	28
16:50	34	43	36	29
16:55	33	42	36	27

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
17:00	34	45	37	28
17:05	34	45	37	27
17:10	34	47	37	28
17:15	35	53	37	29
17:20	33	42	37	27
17:25	36	48	38	29
17:30	36	45	38	33
17:35	36	44	39	33
17:40	36	50	38	33
17:45	37	53	39	34
17:50	34	42	37	28
17:55	34	45	37	26
18:00	37	57	39	26
18:05	35	46	38	26
18:10	40	62	40	33
18:15	37	52	39	34
18:20	37	47	39	32
18:25	35	51	38	26
18:30	35	48	38	26
18:35	37	57	38	26
18:40	33	44	37	26
18:45	36	47	40	24
18:50	34	48	37	25
18:55	34	47	38	26

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
19:00	36	58	38	26
19:05	34	45	38	24
19:10	35	54	37	25
19:15	33	41	36	25
19:20	37	51	39	32
19:25	37	52	39	33
19:30	39	58	39	33
19:35	36	50	38	32
19:40	34	46	37	24
19:45	33	43	37	24
19:50	35	51	38	25
19:55	32	42	36	24
20:00	35	49	38	24
20:05	33	46	37	22
20:10	33	48	37	23
20:15	33	45	37	23
20:20	40	61	39	23
20:25	35	47	38	28
20:30	36	51	38	33
20:35	35	43	38	33
20:40	35	44	37	33
20:45	32	47	36	23
20:50	32	42	36	23
20:55	33	44	37	24

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
21:00	31	43	35	22
21:05	42	65	36	25
21:10	32	44	36	22
21:15	31	43	35	22
21:20	32	44	36	23
21:25	34	47	38	25
21:30	35	42	38	33
21:35	36	49	38	33
21:40	36	52	38	29
21:45	32	45	36	22
21:50	31	45	34	22
21:55	32	45	36	22
22:00	31	45	34	21
22:05	36	58	34	20
22:10	40	57	37	23
22:15	31	43	35	22
22:20	30	45	33	20
22:25	33	46	36	22
22:30	35	46	37	33
22:35	35	51	36	32
22:40	32	49	36	20
22:45	38	61	37	19
22:50	35	56	36	19
22:55	29	43	33	19

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
23:00	34	52	35	21
23:05	30	44	34	20
23:10	35	51	39	19
23:15	35	50	39	21
23:20	34	48	37	32
23:25	35	42	36	33
23:30	33	48	36	25
23:35	32	51	34	19
23:40	42	65	39	19
23:45	28	42	32	19
23:50	28	43	31	18
23:55	27	40	32	18
00:00	29	41	34	19
00:05	30	44	34	19
00:10	31	46	35	19
00:15	32	47	36	19
00:20	34	44	36	32
00:25	33	37	34	33
00:30	29	46	34	19
00:35	26	41	30	18
00:40	26	39	29	18
00:45	26	39	30	18
00:50	27	49	28	18
00:55	28	50	28	18

Time	$L_{Aeq, 5 \text{ mins}}$	$L_{Amax, 5 \text{ mins}}$	$L_{A10, 5 \text{ mins}}$	$L_{A90, 5 \text{ mins}}$
01:00	21	35	22	18
01:05	25	43	28	18
01:10	33	48	34	29
01:15	34	41	35	32
01:20	32	46	34	24
01:25	19	30	20	18
01:30	25	40	27	18
01:35	26	38	30	18
01:40	21	36	23	18
01:45	25	41	28	18
01:50	20	35	22	17
01:55	26	42	29	18
02:00	27	47	31	18
02:05	33	37	34	32
02:10	34	40	35	33
02:15	31	46	34	18
02:20	22	36	25	18
02:25	24	41	27	18
02:30	26	40	30	18
02:35	22	37	25	18
02:40	24	39	28	18
02:45	23	37	26	18
02:50	23	37	24	18
02:55	31	47	35	18

Time	L_{Aeq} 5 mins	L_{Amax} , 5 mins	L_{A10} , 5 mins	L_{A90} , 5 mins
03:00	33	40	34	32
03:05	33	39	34	32
03:10	29	46	33	18
03:15	25	44	23	18
03:20	25	39	27	18
03:25	25	40	28	18
03:30	23	39	24	18
03:35	22	35	25	18
03:40	28	44	32	19
03:45	27	38	32	19
03:50	32	47	34	19
03:55	34	42	35	32
04:00	34	42	35	33
04:05	26	41	30	19
04:10	27	41	31	19
04:15	28	42	32	19
04:20	28	42	32	20
04:25	29	42	34	20
04:30	31	45	36	20
04:35	30	41	34	21
04:40	31	44	35	22
04:45	34	47	37	27
04:50	35	45	38	33
04:55	35	46	38	29

Time	L_{Aeq} 5 mins	L_{Amax} , 5 mins	L_{A10} , 5 mins	L_{A90} , 5 mins
05:00	32	46	36	23
05:05	32	53	35	22
05:10	33	46	36	25
05:15	36	55	39	28
05:20	33	46	37	27
05:25	33	42	37	28
05:30	34	43	38	28
05:35	35	44	38	29
05:40	37	50	40	33
05:45	38	51	40	34
05:50	37	49	39	34
05:55	35	50	39	26
06:00	33	44	38	25
06:05	35	50	38	26
06:10	32	43	36	25
06:15	34	45	38	27
06:20	36	51	39	27
06:25	38	62	38	27
06:30	35	45	38	27
06:35	36	47	39	28
06:40	38	49	40	33
06:45	37	43	39	34
06:50	38	51	40	34
06:55	37	51	40	30