

**Assessment of the Existing Noise Climate in the
Vicinity of the Proposed Residential Development at
Mayton Street, Openshaw, Manchester.**

Report Prepared for:

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1.0 Summary

An initial assessment of the existing local noise climate in the vicinity of Mayton Street in Openshaw was undertaken in August 2019. The assessment was conducted to support a planning application for a new residential housing scheme, on a roughly cruciform parcel of land, bounded by Mayton, Herne and Beede Streets and Thames Close in Openshaw, Manchester. Using the noise climate data obtained from the surveys, calculations were performed to provide an indication of the likely internal noise levels, resulting from external noise break-in, within the proposed new dwellings. In addition, an assessment of the likely noise climate within the external amenity areas associated with the proposed dwellings was also undertaken.

Since the production of the original acoustic assessment report in August 2019 and the further re-evaluation undertaken in January 2020, additional design development of the proposed development has been undertaken. In summary the main design changes relate to a reduction in the number of dwellings from 23 to 21, the substitution of the triple glazed units for thermal sealed unit glazing and the substitution of whole house ventilation systems for a passive ventilation strategy. Consequently, this report contains a re-assessment of the internal noise levels within the proposed houses resulting from external noise break-in through the revised façade elements. For the purposes of this reassessment the previously obtained noise levels obtained from the existing noise surveys undertaken in August 2019 will be reapplied and the original acoustic report will be amended, where necessary, to include the new elements that are pertinent to this reassessment.

The existing noise climate in the vicinity of the proposed residential development at Mayton Street in Openshaw, Manchester was regarded as being typical of an urban environment that was primarily influenced by road traffic. Additional noise contributions were made by intermittent noise from the surrounding houses, occasional aircraft overflights, occasional dog barking noise etc. With reference to the presence of commercial enterprises in the vicinity of the proposed development, the only location that was believed to fall within the category was the BT telephone exchange at the junction of Fastnet and Herne Streets. At no time during the noise surveys was it possible to hear any noise of a commercial or industrial nature, which was believed to emanate from the telephone exchange or any plant associated with it.

With reference to the potential internal noise levels within the proposed dwellings, resulting from external noise break-in, the calculations have revealed that the internal noise climate would comply with the adopted design guide values, expressed in terms of the L_{Aeq} and L_{Amax} levels, for both the day and night time periods. As a result, it is suggested that the sound insulation provided by the building envelope components, detailed in this report, would be sufficient to control the break-in of external noise in compliance with the adopted design values.

Consequently it is contended that, based on the obtained sound levels from the existing noise climate surveys and the application of the sound insulation measures detailed in this report; the existing noise climate in the vicinity of the proposed residential development at Mayton Street should not be regarded as impediment to the granting of planning permission for the proposed residential housing scheme.

Report Prepared by:

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Robert Smith

2.0 Introduction

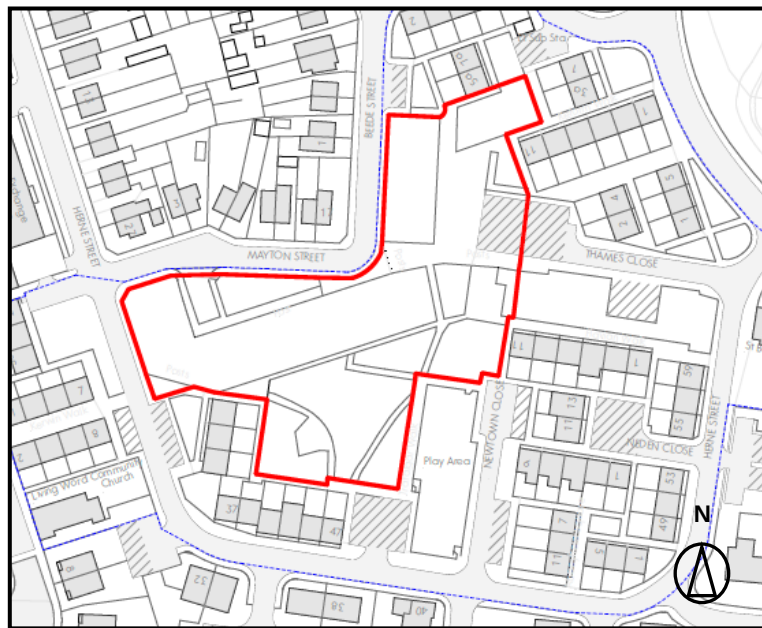
An initial assessment of the existing local noise climate around Mayton Street in Openshaw was undertaken in August 2019 and was conducted to support a planning application for a new residential housing scheme, on a roughly cruciform parcel of land, bounded by Mayton, Herne and Beede Streets and Thames Close in Openshaw, Manchester.

Since the production of the original acoustic assessment report in August 2019 and the further re-evaluation undertaken in January 2020, additional design development of the proposed development has been undertaken. In summary the main design changes relate to a reduction in the number of dwellings from 23 to 21, the substitution of the triple glazed units for thermal sealed unit glazing and the substitution of whole house ventilation systems for a passive ventilation strategy. Consequently, this report contains a re-assessment of the internal noise levels within the proposed houses resulting from external noise break-in through the revised façade elements. For the purposes of this reassessment the previously obtained noise levels obtained from the existing noise surveys undertaken in August 2019 will be reapplied and the original acoustic report will be amended, where necessary, to include the new elements that are pertinent to this reassessment.

3.0 Site Description

The proposed new residential development would be built on a roughly cruciform parcel of land in Openshaw, Manchester (figure 1 overleaf and photograph 1 overleaf). The proposed development site is surrounded by existing residential properties (photographs 2 - 5 overleaf). Approximately 30 metres to the north west of the western flank of the proposed development is the existing telephone exchange building (photograph 1 overleaf). Approximately 40 metres to the south west of the western flank of the proposed development is the Christ Apostolic Church building. Approximately 80 metres to the south of the proposed development site is the A635 Ashton Old Road. Approximately 80 metres to the west of the proposed development site is the existing Mill Court apartment block with the A6010 Alan Turing Way a further 120 metres beyond.

Figure 1. Location of the proposed residential development site (edged in red), Mayton Street



Photograph 1. Proposed development site (viewed from the west), edged in red, Mayton Street.



Source: GWP Architects 2019

Photograph 2. Existing residential houses on Beede Street (looking north)



Photograph 3. Children's play area and existing residential houses on Herne Street (looking south)



Photograph 4. Existing residential houses on Mayton Street (looking east)



Photograph 5. Existing residential houses on Thames Close (looking west)



4.0 Assessment Criteria

As planning permission is currently being sought, no formal planning conditions relating to the acoustic conditions to be achieved within the proposed dwellings currently exist. As a result, guidance relating to the form of the assessment of the existing noise climate in the vicinity of the proposed development site and the evaluation of the likely noise climate within the proposed dwellings, was obtained from Manchester City Council's Planning and Noise Technical Guidance document, published in December 2015.

In addition, the Manchester City Council Technical Guidance document also makes reference to World Health Organisation's (WHO) "Guidelines for Community Noise" document and British Standard (BS) 8233:2014 "Guidance on sound insulation and noise reduction for buildings". As a result, the relevant provisions of these additional documents will be summarised below.

4.1 Manchester City Council's Planning and Noise Technical Guidance

With regard to proposed new residential developments Manchester City Council's Planning and Noise Technical Guidance document expands on the guidance contained within the Noise Policy Statement for England (NPSE) document (originally released in 2010). The NPSE document provided guidance on 'acceptable' noise levels with particular reference to residential developments, and this was framed with reference to avoiding "significant adverse" impacts on health and quality of life and where necessary minimising such "adverse" impacts on health and quality of life.

In order to reflect these objectives the NPSE referenced concepts utilised by the World Health Organisation, which in turn employed two concepts from toxicology and applied them to noise impacts. These two concepts are:

- NOEL – No Observed Effects Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- LOAEL – Lowest Observed Adverse Effect Level This is the level above which adverse effects on health and quality of life can be detected.

In addition the NPSE introduced the further concept of a Significant Observed Adverse Effect Level (SOAEL) and defined this as "the level above which significant adverse effects on health and quality of life occur".

With the above in mind the Manchester City Council Technical Guidance document references the guidance contained within other published documents such as the World Health Organisations (WHO) "Guidelines for Community Noise" document published in 1999 and BS 8233:2014 "Guidance on sound insulation and noise reduction for buildings" amongst others. The Manchester City Council Technical Guidance combines elements of these documents to in order to define the internal noise limits that it deems are acceptable for residential properties. The relevant parts of this guidance are summarised in table 1 overleaf.

Table 1. Indoor ambient noise levels for dwellings (reproduced from page 16 of the Manchester City Council Technical Guidance document).

Assessment location	Time of day	$L_{Aeq,T}$	$L_{Amax,F}$
Bedrooms	Night time 2300 - 0700 hours	30dB	45dB*
Living rooms	Daytime 0700 - 2300 hours	35dB	-
Gardens and terraces	Daytime 0700 - 2300 hours	55 dB	-

* Individual noise events should not normally exceed this criterion on more than 15 occasions

The guidance detailed above largely replicates that which is contained within both the World Health Organisation document and BS 8233:2014.

4.2 World Health Organisation Guidance

The WHO “Guidelines for Community Noise” is a comprehensive document that codifies much of the work contained within the earlier “Community Noise” document produced in 1995. The 1999 document includes summaries: the effects of noise on health, guideline values, noise management proposals and recommendations. It is the guideline values on community noise levels, contained in Table 1 of the Executive Summary, that are amongst the most frequently cited elements of the document. For the sake of clarity the sections of this table that are applicable to residential dwellings are reproduced in Table 2 below.

Table 2. Guidelines for noise levels in specific environments (reproduced from Table 1 of the “Guidelines for Community Noise” document, WHO 1999)

Specific environment	Critical health effect(s)	L_{Aeq} [dB(A)]	Time base [hours]	L_{Amax} fast dB
Outdoor living area	Serious annoyance, daytime and evening.	55	16	-
	Moderate annoyance, daytime and evening.	50	16	-
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening.	35	16	-
Inside bedrooms	Sleep disturbance, night time	30	8	45

It should however be remembered that this is design guidance, it is not a set of rigid criteria. Also, there is the issue that the L_{Amax} criteria which many argue have little relevance in many areas, especially urban environments, where a higher level would certainly be more reasonable.

4.3 BS 8233:2014 “Guidance on Sound Insulation and Noise Reduction for Buildings”

BS 8233:2014 draws together research and best practice relating to building design and provides 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 3 below.

Table 3. 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, BS 8233:2014 also provides guidance on the external noise environment. In this situation BS 8233:2014, at paragraph 7.7.3.2, states the following: *“For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise climate does not exceed 50dB $L_{Aeq,T}$ with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments”*.

With reference to the 2014 version of BS 8233, it must be remembered that the advice contained within this documents is design guidance and the suggested levels are desirable. It does not represent a set of rigid criteria, below which a development ‘passes’ and above which a development ‘fails’. Indeed this point is reinforced in section 7.7.2 of BS 8233:2014 which states “In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guidance values in table 4”. Further in note 7 of table 4 in section 7.7.2 it is suggested that *“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”*.

5.0 Survey Details

5.1 Survey Times and Personnel

The surveys to evaluate the existing noise climate in the vicinity of the proposed residential development on Mayton Street were undertaken between: 07:45 - 09:45 hours on the 27th August 2019, between 23:00 - 01:00 hours on the 28th - 29th August 2019 and between 16:00 - 19:00 hours on the 29th August 2019.

All measurements were fully attended for the duration of the surveys and all survey work was conducted by Mr. R Smith of Druk Limited.

5.2 Weather

Throughout the assessments of the existing noise climate in the vicinity of the proposed residential development, the weather conditions were as follows:

27th August, Afternoon

All surfaces were dry, the sky was clear, the temperature was approximately 19°C, the wind speed was less than 0.3m/s and the barometric pressure was 1008mb.

28th - 29th August, Night time

All surfaces were dry, the sky was clear, the temperature was approximately 12°C, the wind speed was less than 0.3m/s and the barometric pressure was 1009mb.

29th August, Morning

All surfaces were dry, cloud cover was approximately 50%, the temperature was approximately 22°C, the wind speed was approximately 2.2 m/s and the barometric pressure was 1009mb.

5.3 Equipment

The noise surveys were conducted using the equipment detailed in the table 4 below.

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

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

Table 4. 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
Acoustic calibrator	Norsonic AS	Nor 1251	31522

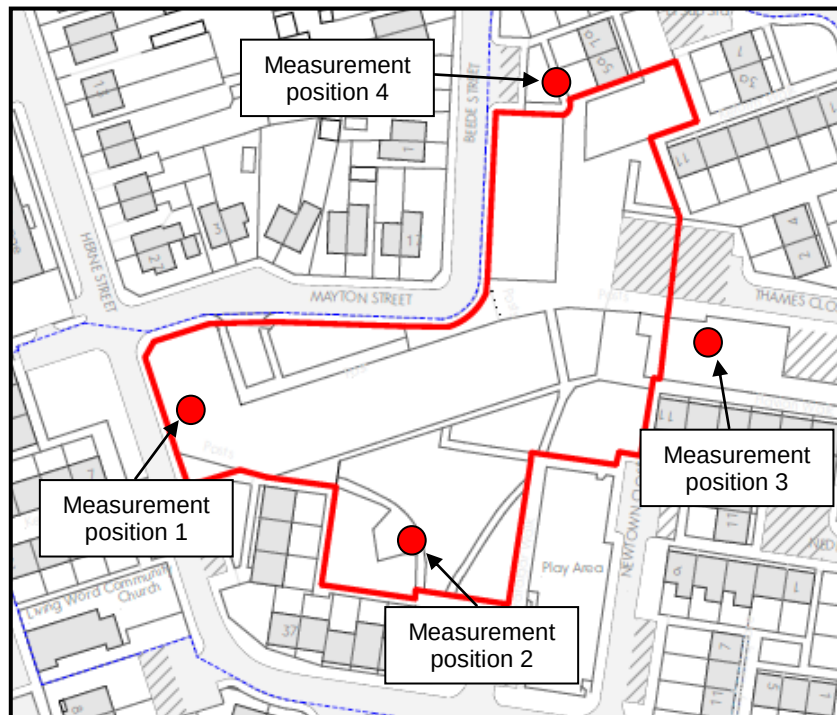
5.4 Measurement Procedure

The location of the proposed residential development suggested that the existing local noise climate was likely to be primarily influenced by road traffic noise, with additional contributions being made by noise from the surrounding residential houses and from children playing in the play area. An initial 'walkover' survey of the proposed development site confirmed this assumption and also highlighted that the primary noise sources were located around the perimeter of the proposed development site itself.

As a consequence, the assessment of the existing noise climate on the proposed development site was undertaken using four measurement positions located on the northern, southern, easterly and westerly boundaries of the proposed development site. All the measurements were made with one sound level meter that was used alternately

in the four measurement positions. Where possible the location of the measurement positions approximated the location of proposed houses on the perimeter of the proposed development. The approximate location of the measurement positions is detailed on figure 2 below.

Figure 2. Boundary of the proposed development detailing the approximate location of the measurement positions



Throughout the survey periods, the measurement time interval was reduced to 7½ minutes in order to ensure that two measurements per position per hour were obtained. Although the measurement time interval was a little shorter than is typically employed, it was regarded as being of sufficient duration to ensure that a representative 'picture' of the noise climate in each position was obtained. All the measurements were made consecutively in the four measurement positions and the fast time weighting was engaged.

6.0 Noise Survey Results

The noise climate in the vicinity of the proposed residential development on Mayton Street was regarded as being typical of an urban environment that was primarily influenced by road traffic and noise from the surrounding residential properties. However, the qualitative impression was formed that the existing noise climate in the vicinity of the proposed development site was not particularly noisy.

With reference to the presence of commercial enterprises in the vicinity of the proposed development, the only location that was believed to fall within the category was the BT telephone exchange at the junction of Fastnet and Herne Streets.

The following paragraphs contain qualitative descriptions of the noise sources noted during the survey periods. As the existing noise climate in the measurement positions

was of essentially the same character, the commentary presented in the following paragraphs is applicable to all the measurement positions.

6.1 Qualitative Assessment - Morning Period

As anticipated, the existing noise climate was influenced by a number of noise contributors. Despite this the sound of vehicles on the roads surrounding the proposed development site (primarily Herne and Parkhouse Streets) and the sound of more distant vehicles on both the Alan Turing Way and Ashton Old Road, were significant contributors to the existing noise climate. With reference to the road traffic, this comprised mainly private cars and taxis and these were most noticeable during the period 08:00 - 09:15 hours.

In addition to the sound of road vehicle noise, additional noise sources at this time included: noise from the surrounding houses, occasional aircraft overflights, occasional noise from the south of the proposed development site that sounded like the passage of trains, some dog barking noise and noise from birds. At no time during the survey was it possible to hear any noise believed to be of an industrial or commercial nature.

6.2 Qualitative Assessment - Night time Period

Overall the existing noise climate was noticeably quieter during this period with the principal contributor to the existing noise climate being road traffic, mainly on the Alan Turing Way and the Ashton Old Road. A minor contribution was made by traffic on the local roads. At this time the sound from the trains to the south of the development site was also more audible, however the frequency of the train movements was reduced when compared with the situation during the morning period. A short duration increase in the existing noise level occurred between 00:00 - 00:08 hours in position one. This short duration increase in the noise levels was the result of the exploding of a number of fireworks that appeared to be launched from one of the surrounding streets, and the activation of a car alarm.

Additional noise sources at this time included: occasional aircraft overflights, some dog barking noise and occasional bursts of music noise from the surrounding houses. At no time during the survey was it possible to hear any noise believed to be of an industrial or commercial nature.

6.3 Qualitative Assessment - Afternoon Period

The overall noise climate at this time was similar to that experienced during the morning period. Again, the existing noise climate was influenced by a number of contributors to the existing noise climate including: the sound of vehicles on the roads surrounding the proposed development site (primarily Herne and Parkhouse Streets), the sound of more distant vehicles on both the Alan Turing Way and Ashton Old Road, the sound of children playing and some noise from the surrounding houses.

With reference to the sound of children playing, activity was concentrated on the play area and on the central grassed area. The sound of children playing and the associated screams and shouts accounted for the slightly higher noise levels encountered between 17:00 - 17:45 hours, in positions 1 and 2. Turning to the road traffic noise, this again comprised mainly private cars and taxis.

Additional noise sources at this time included: occasional aircraft overflights, occasional noise from the south that sounded like the passage of trains, some dog barking noise and noise from birds including the screeching of gulls. Again, at no time during the survey was it possible to hear any noise believed to be of an industrial or commercial nature.

6.4 Basic Results

The measured noise levels from the four measurement positions are detailed in tables 5 - 16 below and overleaf. With reference to measured noise levels from all the measurement positions, these are presented in terms of the L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} parameters. Additionally the start times presented within the tables have been rounded to the nearest whole minute. Full data are presented in tabular form in Appendix 1.

Table 5. Measured noise levels, position 1, morning period

Start time	dB L_{Aeq} , (7½ minutes)	dB L_{Amax} , (7½ minutes)	dB L_{A10} , (7½ minutes)	dB L_{A90} , (7½ minutes)
0745	48	65	50	45
0815	49	67	50	44
0845	50	69	51	43
0915	50	69	51	44
Standard deviation	0.79	1.85	0.42	0.86

Table 6. Measured noise levels, position 1, night time period

Start time	dB L_{Aeq} , (7½ minutes)	dB L_{Amax} , (7½ minutes)	dB L_{A10} , (7½ minutes)	dB L_{A90} , (7½ minutes)
2300	47	56	49	45
2330	47	63	49	42
0000	52	74	49	44
0030	46	58	48	43
Standard deviation	2.91	8.23	0.69	1.17

Table 7. Measured noise levels, position 1, afternoon period

Start time	dB L_{Aeq} , (7½ minutes)	dB L_{Amax} , (7½ minutes)	dB L_{A10} , (7½ minutes)	dB L_{A90} , (7½ minutes)
1600	56	67	58	52
1630	56	73	58	52
1700*	61	86	60	52
1730*	61	81	62	54
1800	53	61	55	51
1830	58	74	60	52
Standard deviation	2.97	9.21	2.25	1.14

* Measurement affected by children playing

Table 8. Measured noise levels, position 2, morning period

Start time	dB L_{Aeq} , (7½ minutes)	dB L_{Amax} , (7½ minutes)	dB L_{A10} , (7½ minutes)	dB L_{A90} , (7½ minutes)
0753	50	70	52	44
0822	48	61	50	42
0853	47	62	50	42
0922	48	62	51	43
Standard deviation	1.31	4.32	0.99	0.88

Table 9. Measured noise levels, position 2, night time period

Start time	dB L_{Aeq} , (7½ minutes)	dB L_{Amax} , (7½ minutes)	dB L_{A10} , (7½ minutes)	dB L_{A90} , (7½ minutes)
2308	47	63	49	43
2338	46	57	49	43
0008	47	57	49	43
0038	44	63	46	41
Standard deviation	1.36	3.43	1.51	1.07

Table 10. Measured noise levels, position 2, afternoon period

Start time	dB L_{Aeq} , (7½ minutes)	dB L_{Amax} , (7½ minutes)	dB L_{A10} , (7½ minutes)	dB L_{A90} , (7½ minutes)
1608	56	69	58	52
1638	56	69	59	53
1708	56	75	57	51
1738*	59	84	57	48
1808	54	67	55	50
1838	58	68	60	54
Standard deviation	1.95	6.58	1.68	2.06

* Measurement affected by children playing

Table 11. Measured noise levels, position 3, morning period

Start time	dB L_{Aeq} , (7½ minutes)	dB L_{Amax} , (7½ minutes)	dB L_{A10} , (7½ minutes)	dB L_{A90} , (7½ minutes)
0801	51	66	56	43
0831	51	67	54	42
0901	48	61	52	42
0931	50	61	54	42
Standard deviation	1.36	3.45	1.69	0.40

Table 12. Measured noise levels, position 3, night time period

Start time	dB L_{Aeq} , (7½ minutes)	dB L_{Amax} , (7½ minutes)	dB L_{A10} , (7½ minutes)	dB L_{A90} , (7½ minutes)
2316	46	58	48	43
2346	47	57	49	44
0016	47	59	48	44
0046	45	64	46	43
Standard deviation	0.71	2.87	1.05	0.56

Table 13. Measured noise levels, position 3, afternoon period

Start time	dB $L_{Aeq,1}$ (7½ minutes)	dB $L_{Amax,1}$ (7½ minutes)	dB $L_{A10,1}$ (7½ minutes)	dB $L_{A90,1}$ (7½ minutes)
1616	56	70	59	51
1646	58	76	60	54
1716	56	69	58	52
1746	55	67	57	50
1816	54	65	56	50
1846	53	63	56	51
Standard deviation	1.75	4.65	1.52	1.54

Table 14. Measured noise levels, position 4, morning period

Start time	dB $L_{Aeq,1}$ (7½ minutes)	dB $L_{Amax,1}$ (7½ minutes)	dB $L_{A10,1}$ (7½ minutes)	dB $L_{A90,1}$ (7½ minutes)
0809	49	71	52	43
0839	50	73	52	42
0909	44	56	46	40
0939	44	59	46	41
Standard deviation	3.25	8.47	3.46	1.48

Table 15. Measured noise levels, position 4, night time period

Start time	dB $L_{Aeq,1}$ (7½ minutes)	dB $L_{Amax,1}$ (7½ minutes)	dB $L_{A10,1}$ (7½ minutes)	dB $L_{A90,1}$ (7½ minutes)
2324	46	57	47	44
2354	47	57	49	44
0024	46	59	48	43
0054	44	53	46	42
Standard deviation	0.92	2.86	1.14	0.94

Table 16. Measured noise levels, position 4, afternoon period

Start time	dB L_{Aeq} , (7½ minutes)	dB L_{Amax} , (7½ minutes)	dB L_{A10} , (7½ minutes)	dB L_{A90} , (7½ minutes)
1624	56	71	58	52
1654	56	66	58	52
1724	57	71	59	53
1754	55	74	57	50
1824	54	67	57	51
1854	54	67	56	50
Standard deviation	1.11	3.15	1.25	1.23

As can be seen from the above tables, the measured noise levels demonstrate a reasonable degree of variation, in terms of the L_{Aeq} , L_{A10} and L_{A90} parameters, over the three measurement periods in the four measurement positions. Despite this, the degree of variation in the measured levels is greater in positions 1 and 4 than it is in 2 and 3. With reference to the L_{Amax} noise levels at this time, these were a consequence of individual noise sources.

7.0 Noise Transmission Calculations

Using the measured ambient noise levels from the noise surveys, calculations have been undertaken to assess the likely internal noise levels within the proposed residential dwellings. The calculations have been undertaken using the façade elements detailed in the subsequent paragraphs.

The proposed development will comprise two and three bedroom houses and the arrangement of the various dwellings across the proposed development site will be as detailed on figure 1 in Appendix 2. The layouts and dimensions of the dwellings have been obtained from drawings issued by GWP Architects of Lidgett Lane, Leeds. The assessment of the potential internal noise levels, resulting from external noise break-in, within the proposed dwellings will be undertaken using the highest measured noise levels from the surveys and these noise levels are detailed in table 17 overleaf. Consequently, the subsequent assessments may be regarded as representing a worst case acoustically.

Table 17. Highest measured noise levels, Mayton Street development, Openshaw, Manchester

OBCF, Hz*	63	125	250	500	1k	2k	4k	8k	Overall, dB(A)
P1, Daytime, L_{Aeq} (17:30 - 17:38 hours)	69	62	57	57	57	52	49	42	61
P1, Night time, L_{Aeq} (00:00 - 00:08 hours)	58	53	50	48	50	41	33	26	52
P1, Night time, L_{Amax} (00:00 - 00:08 hours)	77	74	72	71	72	63	57	48	74
P2, Daytime, L_{Aeq} (17:38 - 17:46 hours)	56	50	47	51	56	54	48	37	59
P2, Night time, L_{Aeq} (23:08 - 23:16 hours)	53	49	47	42	44	37	29	26	47
P2, Night time, L_{Amax} (23:08 - 23:16) hours	61	64	64	51	56	55	56	56	63
P3, Daytime, L_{Aeq} (16:46 - 16:54 hours)	65	63	58	55	54	48	43	35	58
P3, Night time, L_{Aeq} (23:46 - 23:54 hours)	57	50	46	42	44	34	25	20	47
P3, Night time, L_{Amax} (23:46 - 23:54 hours)	69	57	55	49	52	50	48	42	57
P4, Daytime, L_{Aeq} (17:24 - 17:32 hours)	65	58	53	53	54	48	44	36	57
P4, Night time, L_{Aeq} (23:54 - 00:02 hours)	55	49	44	42	44	36	27	20	47
P4, Night time, L_{Amax} (00:24 - 00:32) hours	65	56	55	61	53	44	40	36	59

The sound insulation of a building envelope is calculated from the sound insulation provided by the various façade elements, such as the glazing, external walls etc., and the areas they cover. In the majority of cases it is the glazing that can be considered as the 'weak' link acoustically; therefore increasing the sound insulation of the glazing will improve the overall sound insulation of the façade. The result of the calculation is a composite sound insulation value for the whole façade.

The calculations are based on dimensions and layouts derived from drawings issued by GWP Architects of Lidgett Lane, Leeds. In addition to the internal and façade dimensions obtained from the drawings the following assumptions have been made:

- The reverberation times within the living rooms and bedrooms will be 0.5 seconds.
- The floor to ceiling height will be approximately 2.4 metres in the majority of locations.

The scheme drawings indicate that the proposed development will comprise new two and three bedroom houses arranged across the proposed development site. The internal layouts of the dwellings are reproduced in figures 2 and 3 in Appendix 2. The break-in noise calculations have been undertaken for all the various dwelling types using the most appropriate noise levels relating to their relative position on the proposed site layout. In this way it is believed that the calculations will be representative of the likely situation within all the dwelling types across the entire site.

7.1 Construction Specification

The building envelope constructional details described below and overleaf have been utilised for the purposes of the subsequent calculations.

External Walls

The external walls of the dwellings will consist of a timber frame structure comprising an 89 x 38mm CLS timber frame filled with 70mm rigid PIR insulation and lined with one layer of 9mm OSB board and one layer of 12.5mm plasterboard separated from the brick outer leaf by a 125mm cavity. Test results for a similar construction suggest that external walls of this type should provide an overall sound insulation value of around R_w 55dB, with the octave band sound insulation values being as detailed in table 18 below.

Table 18. Timber Frame External Wall Construction, Octave Band Sound Insulation Values

OBCF, Hz*	125	250	500	1k	2k	4k	Overall, R_w dB(A)
Sound Insulation, dB	40	47	53	62	70	74	55

* Octave Band Centre Frequency

Glazing

The assessments have been based on the application of sealed unit glazing to all the windows. The glazing specification used in the calculations is as follows:

- 6.4mm pane - 16.0mm cavity - 6.0mm toughened glass pane.

Laboratory data obtained from GGG Glass suggest that this configuration should provide an overall sound insulation value of 37dB R_w in the closed position. The applied octave band sound insulation values are as detailed in table 19 below. Alternative glazing configurations would be acceptable providing the sound insulation performances are at least equivalent to the specifications detailed in table 19 below.

Table 19. Proposed glazing, octave band sound insulation values

OBCF, Hz*	125	250	500	1k	2k	4k	Overall, R_w dB
6.4mm pane - 16mm cavity - 6.4mm pane	21	20	31	39	37	47	37

* Octave Band Centre Frequency

Ventilation

As the existing noise climate in the vicinity of the proposed residential housing scheme was not regarded as being noisy, it is proposed that a passive ventilation strategy will be adopted for the proposed houses. In this respect background ventilation provision in compliance with the requirements of Approved Document F, will be provided by window frame mounted ventilators of the Greenwood 4000S type units. However, units offering equivalent sound insulation performance would be acceptable. It is also anticipated that

local mechanical extract ventilation (MEV) being provided in areas of high humidity, such as bathrooms etc.

Laboratory test data indicates that the specified Greenwood window frame mounted ventilators should provide an overall sound insulation value of 33dB $D_{n,e,w}$ in their open position. The octave band sound insulation values for the selected window frame mounted ventilators are detailed in table 20 below. Alternative ventilator configurations would be acceptable providing the sound insulation performance is at least equivalent to the specification detailed in table 20 below.

Table 20. Background ventilation, octave band sound insulation values

OBCF, Hz*	125	250	500	1k	2k	4k	Overall, $D_{n,e,w}$ dB
Greenwood 4000S	36	37	34	30	33	38**	33

* Octave Band Centre Frequency

** Extrapolated value

7.2 Calculation Results

Calculations have been performed to evaluate the likely internal noise climate within the proposed dwellings, resulting from external noise break-in, using the measured noise levels from the four measurement positions. The results of the break-in noise calculations for the proposed dwellings are presented in terms of the day and night time, as appropriate, L_{Aeq} and L_{Amax} levels in tables 20 - 25 below and overleaf. With respect to the calculations relating to the night time situation, the L_{Aeq} and L_{Amax} results are presented in the same columns with the L_{Amax} results being contained in brackets. Full data are available in Appendix 3.

Table 20. Calculated internal noise levels, 3 bedroom 4 person house, position 1 noise levels

Location	Design target, daytime, dB L_{Aeq}	Calculated level, daytime, dB L_{Aeq}	Design target, night time, dB L_{Aeq} and (L_{Amax})	Calculated levels, night time, dB L_{Aeq} and (L_{Amax})
Living/kitchen/dining room	35	31	-	-
Bedroom 1	35	33	30 (45)	24 (44)
Bedroom 2	35	32	30 (45)	23 (45)
Bedroom 3	35	33	30 (45)	24 (44)

Table 21. Calculated internal noise levels, 3 bedroom 4 person house, position 2 noise levels

Location	Design target, daytime, dB L_{Aeq}	Calculated level, daytime, dB L_{Aeq}	Design target, night time, dB L_{Aeq} and (L_{Amax})	Calculated levels, night time, dB L_{Aeq} and (L_{Amax})
Living/kitchen/dining room	35	27	-	-
Bedroom 1	35	30	30 (45)	19 (34)
Bedroom 2	35	29	30 (45)	18 (33)
Bedroom 3	35	30	30 (45)	19 (33)

Table 22. Calculated internal noise levels, 3 bedroom 4 person house, position 4 noise levels

Location	Design target, daytime, dB L_{Aeq}	Calculated level, daytime, dB L_{Aeq}	Design target, night time, dB L_{Aeq} and (L_{Amax})	Calculated levels, night time, dB L_{Aeq} and (L_{Amax})
Living/kitchen/dining room	35	27	-	-
Bedroom 1	35	29	30 (45)	19 (30)
Bedroom 2	35	28	30 (45)	18 (29)
Bedroom 3	35	29	30 (45)	19 (30)

Table 23. Calculated internal noise levels, 2 bedroom 3 person house, position 1 noise levels

Location	Design target, daytime, dB L_{Aeq}	Calculated level, daytime, dB L_{Aeq}	Design target, night time, dB L_{Aeq} and (L_{Amax})	Calculated levels, night time, dB L_{Aeq} and (L_{Amax})
Living/kitchen/dining room	35	31	-	-
Bedroom 1	35	32	30 (45)	23 (45)
Bedroom 2	35	27	30 (45)	24 (45)

Table 24. Calculated internal noise levels, 2 bedroom 3 person house, position 2 noise levels

Location	Design target, daytime, dB L_{Aeq}	Calculated level, daytime, dB L_{Aeq}	Design target, night time, dB L_{Aeq} and (L_{Amax})	Calculated levels, night time, dB L_{Aeq} and (L_{Amax})
Living/kitchen/dining room	35	28	-	-
Bedroom 1	35	28	30 (45)	19 (34)
Bedroom 2	35	30	30 (45)	19 (33)

Table 25. Calculated internal noise levels, 2 bedroom 3 person apartment, position 4 noise levels

Location	Design target, daytime, dB L_{Aeq}	Calculated level, daytime, dB L_{Aeq}	Design target, night time, dB L_{Aeq} and (L_{Amax})	Calculated levels, night time, dB L_{Aeq} and (L_{Amax})
Living/kitchen/dining room	35	27	-	-
Bedroom 1	35	28	30 (45)	18 (29)
Bedroom 2	35	28	30 (45)	19 (30)

The calculated internal noise levels contained in the above tables have highlighted that the resulting internal noise levels within the proposed dwellings, expressed in terms of the L_{Aeq} levels, would comply with the design guide values, for both the day and night time periods, contained within section 4 above. Turning to the L_{Amax} levels, again based on the existing noise climate and the sound insulation provided by the building envelopes, the results have revealed that the adopted design guide value would not be exceeded. As a result, it is suggested that the sound insulation provided by the building envelope components, detailed in this report, would be sufficient to control the 'break-in' of external noise in compliance with the adopted design values.

Consequently, it is contended that the building envelope elements detailed above will be sufficient to limit the break-in of external noise in compliance with the stated design guide values. As a result it is suggested that the existing noise climate should not be regarded as an impediment to the granting of planning permission for the proposed dwellings.

7.3 External Amenity Areas

In addition to the resulting noise levels within the proposed dwellings, the design guidance contained in section 4.0 above also details guidance for external amenity areas. The Manchester City Council's Planning and Noise Technical Guidance specifies a design target are 55dB $L_{Aeq,T}$ for the period between 0700 - 2300 hours, for external amenity areas. The guidance contained within BS 8233:2014 specifies design targets of 50dB $L_{Aeq,T}$ with an upper guideline value of 55dB $L_{Aeq,T}$, which would be acceptable in noisier environments.

The proposed dwellings will include external amenity areas in the form of gardens serving the individual properties. In most cases it is the gardens to the rear of a dwelling that is often considered to have the principal amenity value. With reference to the proposed dwellings, the rear gardens are effectively shielded from the principal noise sources, traffic on the local roads surrounding the proposed development site, by the dwellings themselves. With reference to the rear gardens, the assessment of the noise climates will be based on the application of the procedure detailed in the Calculation of Road Traffic Noise Procedure (CRTN). For the purposes of this evaluation the following assumptions have been made:

- A typical dwelling will be regarded as a thin rigid barrier 8.0 metres high, to the roof ridge.
- The source height will be 0.5 metres.
- The effective centre point of the barrier (the centre point of a dwelling) will typically be 15 metres from the centre of the carriageway closest to the dwelling.
- The centre point of the rear garden will be 22 metres from the noise source.
- The height of the receiver, a seated person in the centre of the rear garden, will be 1.3 metres.

Applying the assumptions it is suggested that the path difference (δ) resulting from the intervening dwellings would be approximately 4.6 metres. Applying the suggested barrier correction from Chart 9B of CRTN, a path difference of this order would result in an overall reduction in the source noise level of at least 18dB. Applying this suggested reduction to the highest measured daytime noise levels, detailed in table 17 above, it can be seen that the resulting noise levels would be below the guidance contained within Manchester City Council's Planning and Noise Technical Guidance and BS 8233:2014. The noise levels in the gardens serving the remaining dwellings would be expected to be lower by virtue of both the screening provided by the intervening houses and the increased separation distance from the noise sources.

Consequently, it is suggested that the houses themselves would provide more than adequate 'protection' from the principal noise sources around the perimeter of the proposed development site, to the rear gardens serving the proposed dwellings themselves.

8.0 Conclusion

The noise climate in the vicinity of the proposed residential development on Mayton Street in Openshaw was regarded as being typical of an urban environment that was primarily influenced by road traffic. Additional noise contributions were made by intermittent noise from the surrounding houses, occasional aircraft overflights, occasional dog barking noise etc. At no time during the survey was it possible to hear any noise believed to be of an industrial or commercial nature.

The calculations have revealed that the internal noise climate, resulting from external noise break-in, within the proposed dwellings would comply with the design guide values, expressed in terms of the L_{Aeq} and L_{Amax} levels, for both the day and night time periods. As a result it is suggested that the sound insulation provided by the building envelope components, detailed in this report, would be sufficient to control the break-in of external noise in compliance with these design values. In addition it has been

demonstrated that the dwellings themselves will provide more than adequate 'protection' from the principal noise sources around the perimeter of the proposed development site, for the rear gardens serving the dwellings themselves.

Consequently it is contended that, based on the obtained sound levels from the noise surveys and the application of the sound insulation measures detailed in this report, the existing noise climate in the vicinity of the proposed residential development at Mayton Street should not be regarded as impediment to the granting of planning permission for the proposed residential housing scheme.

Appendix 1. Existing Noise Climate Survey Results

Mayton Street, Openshaw												
Existing noise climate assessment												
27 th August 2019, morning period. Position 1												
Octave Band Centre Frequency, Hz.		dB(A)	31.5	63	125	250	500	1k	2k	4k	8k	16k
0745												
<i>L</i> _{Aeq}		48	58	58	52	45	45	46	38	28	29	16
<i>L</i> _{max}		65	73	69	62	63	63	60	57	52	56	37
<i>L</i> ₁₀		50	60	60	54	47	47	47	39	29	25	18
<i>L</i> ₉₀		45	54	55	50	42	42	43	34	22	14	12
0815												
<i>L</i> _{Aeq}		49	61	60	53	47	44	46	40	32	27	17
<i>L</i> _{max}		67	77	71	66	62	57	59	65	51	47	36
<i>L</i> ₁₀		50	64	63	54	48	46	47	41	34	31	18
<i>L</i> ₉₀		44	56	56	49	42	40	41	34	23	14	11
0845												
<i>L</i> _{Aeq}		50	59	59	55	48	46	46	39	36	31	23
<i>L</i> _{max}		69	79	73	68	66	65	61	53	65	60	50
<i>L</i> ₁₀		51	61	61	59	49	47	47	40	34	29	21
<i>L</i> ₉₀		43	55	55	49	43	39	40	33	22	13	11
0915												
<i>L</i> _{Aeq}		50	60	60	54	50	46	47	40	34	27	16
<i>L</i> _{max}		69	77	76	71	71	66	65	57	53	46	36
<i>L</i> ₁₀		51	62	61	55	50	46	47	42	34	28	16
<i>L</i> ₉₀		44	55	55	50	43	39	41	34	26	17	11
Mayton Street, Openshaw												
Existing noise climate assessment												
28 th - 29 th August 2019, night time period. Position 1												
Octave Band Centre Frequency, Hz.		dB(A)	31.5	63	125	250	500	1k	2k	4k	8k	16k
2300												
<i>L</i> _{Aeq}		47	55	55	51	45	43	44	37	28	25	18
<i>L</i> _{max}		56	69	63	60	53	51	50	47	48	47	39
<i>L</i> ₁₀		49	57	57	53	47	44	46	39	29	26	18
<i>L</i> ₉₀		45	52	53	48	43	41	42	34	19	13	11
2330												
<i>L</i> _{Aeq}		47	53	54	48	45	43	45	38	30	24	17
<i>L</i> _{max}		63	68	65	62	63	58	59	53	52	45	35
<i>L</i> ₁₀		49	55	55	49	46	43	47	40	30	24	18
<i>L</i> ₉₀		42	49	51	46	41	38	39	31	17	12	11
0000												
<i>L</i> _{Aeq}		52	57	58	53	50	48	50	41	33	26	17
<i>L</i> _{max}		74	73	77	74	72	71	72	63	57	48	38
<i>L</i> ₁₀		49	59	59	52	47	44	47	38	28	23	17
<i>L</i> ₉₀		44	52	53	47	43	40	41	32	16	11	11
0030												
<i>L</i> _{Aeq}		46	52	54	48	44	41	43	36	27	21	16
<i>L</i> _{max}		58	61	62	60	59	50	51	50	51	44	36
<i>L</i> ₁₀		48	54	56	49	45	43	45	38	29	23	16
<i>L</i> ₉₀		43	49	52	47	42	39	39	31	16	11	12

Mayton Street, Openshaw												
Existing noise climate assessment												
30 th August 2019, afternoon period. Position 2												
Octave Band Centre Frequency, Hz.		dB(A)	31.5	63	125	250	500	1k	2k	4k	8k	16k
1600												
<i>L</i> _{Aeq}		56	72	65	56	52	51	53	47	42	36	27
<i>L</i> _{max}		67	94	82	71	66	64	62	56	51	48	42
<i>L</i> ₁₀		58	76	67	58	53	52	55	49	45	40	31
<i>L</i> ₉₀		52	57	56	51	47	47	50	43	36	29	19
1630												
<i>L</i> _{Aeq}		56	64	59	55	50	50	53	49	42	34	30
<i>L</i> _{max}		73	85	75	68	61	65	66	69	67	61	61
<i>L</i> ₁₀		58	66	62	57	52	52	55	50	44	37	27
<i>L</i> ₉₀		52	56	55	51	47	47	49	43	34	25	16
1700												
<i>L</i> _{Aeq}		61	71	65	58	55	53	55	48	44	59	43
<i>L</i> _{max}		86	91	88	77	72	71	70	61	60	87	71
<i>L</i> ₁₀		60	74	68	61	56	55	56	51	47	43	33
<i>L</i> ₉₀		52	57	56	50	47	47	50	43	35	27	16
1730												
<i>L</i> _{Aeq}		61	77	69	62	57	57	57	52	49	42	31
<i>L</i> _{max}		81	98	89	81	75	76	73	74	76	58	43
<i>L</i> ₁₀		62	79	72	64	58	56	58	53	50	45	35
<i>L</i> ₉₀		54	59	57	53	49	49	52	46	40	34	23
1800												
<i>L</i> _{Aeq}		53	63	60	53	50	48	51	44	35	28	18
<i>L</i> _{max}		61	83	75	62	60	54	57	52	50	42	32
<i>L</i> ₁₀		55	66	63	56	52	49	53	46	38	31	21
<i>L</i> ₉₀		51	55	55	50	46	45	49	41	32	23	14
1830												
<i>L</i> _{Aeq}		58	70	65	59	56	55	55	49	42	36	27
<i>L</i> _{max}		74	92	88	77	73	71	70	66	56	50	45
<i>L</i> ₁₀		60	71	65	62	59	56	57	51	46	39	30
<i>L</i> ₉₀		52	57	55	50	46	46	50	43	36	28	17

Mayton Street, Openshaw												
Existing noise climate assessment												
27 th August 2019, morning period. Position 2												
Octave Band Centre Frequency, Hz.		dB(A)	31.5	63	125	250	500	1k	2k	4k	8k	16k
0753												
<i>L</i> _{Aeq}		50	60	59	53	50	47	47	40	32	24	17
<i>L</i> _{max}		70	74	72	67	66	65	63	66	61	53	45
<i>L</i> ₁₀		52	62	61	56	52	48	49	40	33	25	16
<i>L</i> ₉₀		44	55	55	48	42	40	42	33	23	15	12
0822												
<i>L</i> _{Aeq}		48	60	60	51	46	42	45	38	32	25	15
<i>L</i> _{max}		61	76	75	69	63	56	55	49	50	42	30
<i>L</i> ₁₀		50	63	62	54	49	44	47	41	35	29	16
<i>L</i> ₉₀		42	55	54	47	41	38	40	32	22	15	12
0853												
<i>L</i> _{Aeq}		47	59	59	52	47	44	44	36	27	22	14
<i>L</i> _{max}		62	72	69	62	61	63	56	47	47	43	33
<i>L</i> ₁₀		50	62	61	56	49	46	46	38	29	24	14
<i>L</i> ₉₀		42	55	54	48	42	37	39	32	21	14	12
0922												
<i>L</i> _{Aeq}		48	62	59	53	48	45	44	36	28	21	14
<i>L</i> _{max}		62	79	74	69	63	57	53	57	45	41	29
<i>L</i> ₁₀		51	64	62	56	52	48	47	39	31	23	15
<i>L</i> ₉₀		43	55	55	49	41	38	39	31	22	15	12
Mayton Street, Openshaw												
Existing noise climate assessment												
28 th - 29 th August 2019, night time period. Position 2												
Octave Band Centre Frequency, Hz.		dB(A)	31.5	63	125	250	500	1k	2k	4k	8k	16k
2308												
<i>L</i> _{Aeq}		47	52	53	49	47	42	44	37	29	26	22
<i>L</i> _{max}		63	60	61	64	64	51	56	55	56	56	55
<i>L</i> ₁₀		49	54	55	50	49	45	47	39	31	26	19
<i>L</i> ₉₀		43	49	50	46	44	38	39	31	17	12	11
2338												
<i>L</i> _{Aeq}		46	53	54	50	44	42	43	36	26	20	15
<i>L</i> _{max}		57	69	63	58	57	52	53	48	46	43	32
<i>L</i> ₁₀		49	55	57	52	46	44	46	39	28	22	16
<i>L</i> ₉₀		43	49	51	47	41	39	40	30	17	12	11
0008												
<i>L</i> _{Aeq}		47	53	54	50	45	42	44	36	27	22	16
<i>L</i> _{max}		57	67	64	60	57	51	53	48	46	41	33
<i>L</i> ₁₀		49	54	56	52	47	44	46	38	30	25	18
<i>L</i> ₉₀		43	49	51	47	42	40	41	31	17	12	11
0038												
<i>L</i> _{Aeq}		44	50	53	48	43	40	41	33	27	21	18
<i>L</i> _{max}		63	62	61	53	54	59	58	56	54	44	36
<i>L</i> ₁₀		46	52	54	49	44	42	43	36	28	22	19
<i>L</i> ₉₀		41	47	51	46	41	37	37	28	18	14	16

Mayton Street, Openshaw												
Existing noise climate assessment												
30 th August 2019, afternoon period. Position 2												
Octave Band Centre Frequency, Hz.		dB(A)	31.5	63	125	250	500	1k	2k	4k	8k	16k
1608												
<i>L</i> _{Aeq}		56	69	64	56	50	52	53	47	42	36	29
<i>L</i> _{max}		69	87	79	68	66	66	65	62	54	48	41
<i>L</i> ₁₀		58	73	67	59	52	55	55	49	45	40	32
<i>L</i> ₉₀		52	57	58	51	47	48	50	44	37	29	18
1638												
<i>L</i> _{Aeq}		56	70	64	54	49	51	53	48	44	39	31
<i>L</i> _{max}		69	94	85	74	61	59	61	65	53	49	41
<i>L</i> ₁₀		59	73	66	56	51	54	56	50	47	42	34
<i>L</i> ₉₀		53	58	57	50	46	48	51	45	38	30	21
1708												
<i>L</i> _{Aeq}		56	65	60	53	52	53	53	47	41	35	26
<i>L</i> _{max}		75	81	73	67	72	71	74	62	58	56	39
<i>L</i> ₁₀		57	68	63	55	53	53	55	48	43	38	30
<i>L</i> ₉₀		51	58	57	49	46	47	49	42	34	25	16
1738												
<i>L</i> _{Aeq}		59	61	56	50	47	51	56	54	48	37	26
<i>L</i> _{max}		84	76	70	59	60	68	79	81	74	59	44
<i>L</i> ₁₀		57	64	59	52	49	53	55	48	44	38	29
<i>L</i> ₉₀		48	52	52	46	42	43	46	40	32	25	16
1808												
<i>L</i> _{Aeq}		54	67	60	53	49	49	51	45	40	34	26
<i>L</i> _{max}		67	89	80	67	66	64	63	58	52	46	38
<i>L</i> ₁₀		55	70	63	55	51	50	53	46	42	38	30
<i>L</i> ₉₀		50	54	54	48	44	45	47	41	35	29	20
1838												
<i>L</i> _{Aeq}		58	77	71	61	52	52	54	50	48	44	37
<i>L</i> _{max}		68	93	89	78	64	58	61	58	57	51	44
<i>L</i> ₁₀		60	82	75	64	55	53	56	52	52	48	41
<i>L</i> ₉₀		54	59	57	51	47	49	51	46	41	34	25

Mayton Street, Openshaw												
Existing noise climate assessment												
27 th August 2019, morning period. Position 3												
Octave Band Centre Frequency, Hz.		dB(A)	31.5	63	125	250	500	1k	2k	4k	8k	16k
0801												
<i>L</i> _{Aeq}		51	61	62	56	52	47	47	41	35	28	19
<i>L</i> _{max}		66	70	77	68	69	60	61	57	56	50	44
<i>L</i> ₁₀		56	63	64	59	56	52	52	46	38	31	21
<i>L</i> ₉₀		43	57	57	50	44	38	38	31	21	15	11
0831												
<i>L</i> _{Aeq}		51	61	64	56	52	48	45	41	36	28	20
<i>L</i> _{max}		67	76	86	71	65	66	59	57	58	52	46
<i>L</i> ₁₀		54	64	63	60	56	51	49	44	36	28	18
<i>L</i> ₉₀		42	56	56	48	42	38	37	31	22	14	11
0901												
<i>L</i> _{Aeq}		48	60	61	53	48	44	44	39	31	23	15
<i>L</i> _{max}		61	71	79	70	59	54	55	51	45	38	31
<i>L</i> ₁₀		52	62	62	54	51	47	48	43	35	27	17
<i>L</i> ₉₀		42	56	56	48	43	38	37	30	21	14	11
0931												
<i>L</i> _{Aeq}		50	60	62	55	50	45	45	41	34	25	15
<i>L</i> _{max}		61	70	75	66	62	56	56	52	50	41	32
<i>L</i> ₁₀		54	62	64	58	54	50	50	45	38	29	18
<i>L</i> ₉₀		42	57	58	51	43	37	37	30	22	14	11
Mayton Street, Openshaw												
Existing noise climate assessment												
28 th - 29 th August 2019, night time period. Position 3												
Octave Band Centre Frequency, Hz.		dB(A)	31.5	63	125	250	500	1k	2k	4k	8k	16k
2316												
<i>L</i> _{Aeq}		46	56	57	51	46	42	43	36	28	21	15
<i>L</i> _{max}		58	63	63	58	56	51	53	48	53	44	38
<i>L</i> ₁₀		48	59	59	53	49	43	44	39	30	23	16
<i>L</i> ₉₀		43	53	55	50	44	39	39	31	18	11	11
2346												
<i>L</i> _{Aeq}		47	57	57	50	46	42	44	34	25	20	16
<i>L</i> _{max}		57	65	69	57	55	49	52	50	48	42	33
<i>L</i> ₁₀		49	59	59	52	48	44	46	36	26	22	18
<i>L</i> ₉₀		44	54	54	48	44	40	41	32	19	13	14
0016												
<i>L</i> _{Aeq}		47	56	57	51	47	42	43	36	29	23	16
<i>L</i> _{max}		59	64	64	63	60	53	53	51	52	47	39
<i>L</i> ₁₀		48	58	59	52	49	44	45	37	29	22	16
<i>L</i> ₉₀		44	54	55	49	44	40	41	31	18	11	12
0046												
<i>L</i> _{Aeq}		45	56	58	50	45	41	42	34	26	21	18
<i>L</i> _{max}		64	66	65	58	59	65	55	53	48	41	35
<i>L</i> ₁₀		46	58	60	51	46	42	43	35	29	23	19
<i>L</i> ₉₀		43	53	55	49	43	39	39	31	19	13	16

Mayton Street, Openshaw												
Existing noise climate assessment												
30 th August 2019, afternoon period. Position 3												
Octave Band Centre Frequency, Hz.		dB(A)	31.5	63	125	250	500	1k	2k	4k	8k	16k
1616												
<i>L</i> _{Aeq}		56	67	63	59	55	53	52	46	40	33	23
<i>L</i> _{max}		70	84	78	72	71	65	60	61	62	58	46
<i>L</i> ₁₀		59	69	65	62	58	56	55	49	42	36	26
<i>L</i> ₉₀		51	57	58	53	48	47	48	41	33	24	14
1646												
<i>L</i> _{Aeq}		58	70	65	63	58	55	54	48	43	35	25
<i>L</i> _{max}		76	90	82	83	76	77	65	61	54	48	42
<i>L</i> ₁₀		60	71	67	64	57	56	56	51	46	40	29
<i>L</i> ₉₀		54	59	59	53	49	50	52	45	37	28	16
1716												
<i>L</i> _{Aeq}		56	66	62	57	53	52	52	47	42	35	25
<i>L</i> _{max}		69	83	76	66	70	68	63	60	57	49	38
<i>L</i> ₁₀		58	69	65	60	55	53	54	49	45	38	29
<i>L</i> ₉₀		52	57	57	52	48	48	50	43	36	29	17
1746												
<i>L</i> _{Aeq}		55	62	61	57	52	49	52	46	39	31	23
<i>L</i> _{max}		67	80	77	70	67	62	63	57	55	48	45
<i>L</i> ₁₀		57	64	63	62	54	51	54	48	41	34	24
<i>L</i> ₉₀		50	55	57	51	47	46	48	41	33	25	14
1816												
<i>L</i> _{Aeq}		54	64	62	56	52	49	51	45	37	29	19
<i>L</i> _{max}		65	81	77	68	64	61	61	57	50	43	34
<i>L</i> ₁₀		56	65	64	59	55	52	54	47	40	32	22
<i>L</i> ₉₀		50	57	57	52	47	45	48	41	32	23	13
1846												
<i>L</i> _{Aeq}		53	64	61	55	51	49	50	44	40	34	23
<i>L</i> _{max}		63	84	77	64	64	57	57	53	53	48	39
<i>L</i> ₁₀		56	66	63	58	54	52	52	46	43	38	27
<i>L</i> ₉₀		51	56	56	51	46	45	48	41	34	26	15

Mayton Street, Openshaw												
Existing noise climate assessment												
27 th August 2019, morning period. Position 4												
Octave Band Centre Frequency, Hz.		dB(A)	31.5	63	125	250	500	1k	2k	4k	8k	16k
0809												
<i>L</i> _{Aeq}		49	63	64	59	49	43	43	36	30	22	13
<i>L</i> _{max}		71	75	75	69	60	64	70	56	50	41	29
<i>L</i> ₁₀		52	66	67	63	54	46	44	38	31	25	14
<i>L</i> ₉₀		43	57	58	52	43	38	39	32	21	14	11
0839												
<i>L</i> _{Aeq}		50	58	59	53	47	49	44	41	33	28	19
<i>L</i> _{max}		73	79	78	70	66	67	64	70	58	56	49
<i>L</i> ₁₀		52	60	61	55	51	51	46	41	35	31	21
<i>L</i> ₉₀		42	55	55	49	41	38	38	31	21	14	11
0909												
<i>L</i> _{Aeq}		44	58	57	52	45	38	39	32	26	22	14
<i>L</i> _{max}		56	79	71	63	55	48	45	47	50	47	35
<i>L</i> ₁₀		46	60	59	54	47	40	41	35	27	22	14
<i>L</i> ₉₀		40	54	54	49	41	34	35	29	20	14	11
0939												
<i>L</i> _{Aeq}		44	58	57	53	43	38	40	34	25	18	12
<i>L</i> _{max}		59	68	66	62	50	55	56	51	41	37	28
<i>L</i> ₁₀		46	61	59	54	45	40	42	35	28	20	13
<i>L</i> ₉₀		41	54	53	51	40	35	36	30	20	14	11
Mayton Street, Openshaw												
Existing noise climate assessment												
28 th - 29 th August 2019, night time period. Position 4												
Octave Band Centre Frequency, Hz.		dB(A)	31.5	63	125	250	500	1k	2k	4k	8k	16k
2324												
<i>L</i> _{Aeq}		46	52	53	49	42	41	43	35	26	20	14
<i>L</i> _{max}		57	60	60	55	53	51	48	50	52	44	36
<i>L</i> ₁₀		47	54	55	51	44	42	44	37	25	20	14
<i>L</i> ₉₀		44	49	51	47	41	40	42	33	18	13	11
2354												
<i>L</i> _{Aeq}		47	54	55	49	44	42	44	36	27	20	14
<i>L</i> _{max}		57	69	69	61	56	52	53	49	44	38	32
<i>L</i> ₁₀		49	55	55	51	45	44	47	38	28	21	15
<i>L</i> ₉₀		44	49	50	46	42	40	41	33	17	12	11
0024												
<i>L</i> _{Aeq}		46	52	53	48	43	42	43	35	22	17	13
<i>L</i> _{max}		59	61	65	56	55	61	53	44	40	36	29
<i>L</i> ₁₀		48	54	54	49	44	43	46	38	25	19	14
<i>L</i> ₉₀		43	50	50	46	41	40	40	31	16	12	11
0054												
<i>L</i> _{Aeq}		44	53	53	47	42	40	42	34	23	18	16
<i>L</i> _{max}		53	64	61	56	55	46	48	44	39	34	30
<i>L</i> ₁₀		46	55	54	48	43	41	44	36	25	21	18
<i>L</i> ₉₀		42	49	50	45	41	39	39	31	17	13	14

Mayton Street, Openshaw												
Existing noise climate assessment												
30 th August 2019, afternoon period. Position 4												
Octave Band Centre Frequency, Hz.		dB(A)	31.5	63	125	250	500	1k	2k	4k	8k	16k
1624												
<i>L</i> _{Aeq}		56	70	64	58	53	51	53	46	41	33	20
<i>L</i> _{max}		71	90	81	72	64	62	70	61	58	47	32
<i>L</i> ₁₀		58	73	66	61	56	54	55	48	43	35	22
<i>L</i> ₉₀		52	58	59	52	48	47	49	42	35	27	14
1654												
<i>L</i> _{Aeq}		56	68	64	56	50	51	53	46	40	32	19
<i>L</i> _{max}		66	86	79	73	62	61	63	54	50	42	34
<i>L</i> ₁₀		58	71	66	58	53	54	55	48	43	35	21
<i>L</i> ₉₀		52	58	60	51	47	48	50	43	36	26	14
1724												
<i>L</i> _{Aeq}		57	70	65	58	53	53	54	48	44	36	25
<i>L</i> _{max}		71	88	81	72	67	71	65	64	54	47	40
<i>L</i> ₁₀		59	73	67	61	55	56	56	50	46	39	28
<i>L</i> ₉₀		53	58	60	52	47	48	51	44	37	27	15
1754												
<i>L</i> _{Aeq}		55	68	63	61	51	50	52	45	39	32	22
<i>L</i> _{max}		74	88	82	81	71	72	68	65	56	49	40
<i>L</i> ₁₀		57	72	65	65	53	51	53	47	42	35	25
<i>L</i> ₉₀		50	56	57	50	45	45	47	41	33	25	14
1824												
<i>L</i> _{Aeq}		54	70	63	55	49	49	52	45	40	32	20
<i>L</i> _{max}		67	87	78	69	61	65	64	55	49	46	42
<i>L</i> ₁₀		57	73	66	59	52	52	54	47	42	35	22
<i>L</i> ₉₀		51	56	55	50	45	46	49	42	35	26	14
1854												
<i>L</i> _{Aeq}		54	66	61	53	49	49	51	45	39	32	21
<i>L</i> _{max}		67	85	81	70	67	63	62	58	52	49	38
<i>L</i> ₁₀		56	69	63	55	51	50	53	46	41	34	23
<i>L</i> ₉₀		50	55	55	49	45	45	48	41	34	25	14

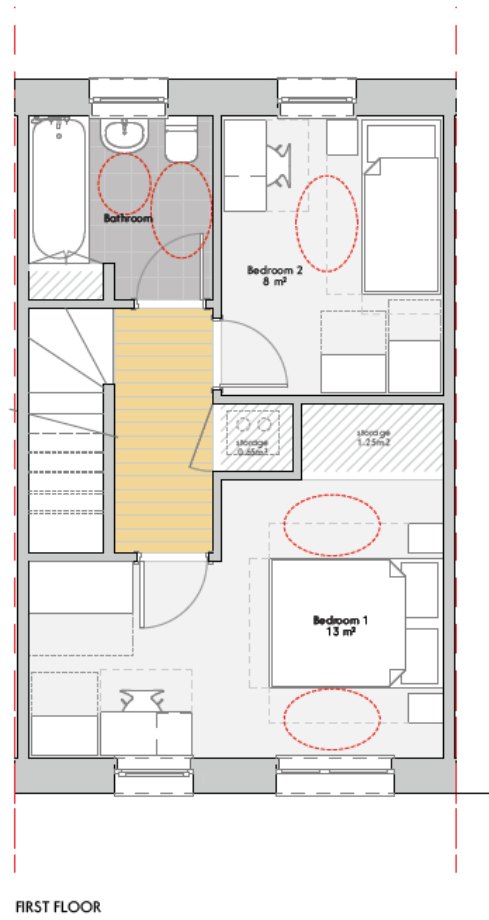
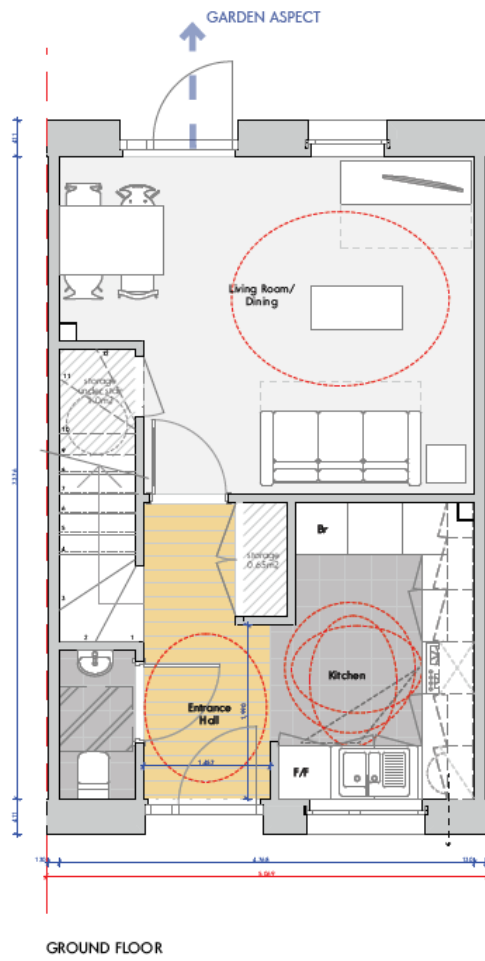
GROUND FLOOR

The Ground Floor plan shows a Living Room/Dining area, Kitchen, Entrance Hall, and a staircase. Red dashed circles highlight the Living Room/Dining area, the Kitchen, and the Entrance Hall. The plan also shows a staircase leading up and a storage area.

FIRST FLOOR

The First Floor plan shows three Bedrooms, an En Suite, and a Bathroom. Red dashed circles highlight the Bathroom, the En Suite, and the Bedrooms. The plan also shows a staircase leading down and a storage area.

Figure 3. Proposed internal arrangement - 2 bedroom, 3 person house



Appendix 3: Break-in Noise Calculations

Mayton Street, Openshaw													
Break-in Noise Calculations - 3 bedroom, 4 person house (position 1 levels)													
L _{Aeq} Assessment, daytime													
3 bedroom, 4 person house													
Living/dining room, rear elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L _{Aeq}	12.8	61	77	69	62	57	57	57	52	49	42	31
B	Exposed façade, m ²			11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1
C	Volume of receiving room, m ³		51.7										
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3
F	Composite SRI			18.3	23.3	28.3	27.5	39.4	48.3	41.6	53.2	58.2	62.5
G	A + B + E - F		25	57.1	44.7	32.6	28.3	16.5	7.9	9.5	-5.0	-17.8	-32.3
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		28	60.1	47.7	35.6	31.3	19.5	10.9	12.5	-2.0	-14.8	-29.3
K	Number of ventilators	1											
L	Ventilator D _{n,e}				31	36	37	34	30	33	38	43	
M	L _{Aeq} - D _{n,e} + 10*log(10) - B				37.1	25.0	18.9	22.0	26.3	18.2	10.3	-2.5	
N	Internal room noise level, vent open		31		48.1	36.0	31.5	24.0	26.5	19.3	10.6	-2.2	
Glazing:		6mm - 16mm - 6.4mm (SGG)											
Ventilator type:		Greenwood 4000S											
3 bedroom, 4 person house													
Living/dining room, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L _{Aeq}	11	61	77	69	62	57	57	57	52	49	42	31
B	Exposed façade, m ²			10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4
C	Volume of receiving room, m ³		51.7										
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		13	46.7	34.3	22.2	13.1	5.2	-2.5	-11.6	-14.5	-27.3	-37.5
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		16	49.7	37.3	25.2	16.1	8.2	0.5	-8.6	-11.5	-24.3	-34.5
Glazing:		-											
Ventilator type:		-											
3 bedroom, 4 person house													
Living/dining room, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L _{Aeq}	5	61	77	69	62	57	57	57	52	49	42	31
B	Exposed façade, m ²			7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
C	Volume of receiving room, m ³		51.7										
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		10	43.3	30.9	18.8	9.7	1.8	-5.9	-15.0	-17.9	-30.7	-40.9
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		13	46.3	33.9	21.8	12.7	4.8	-2.9	-12.0	-14.9	-27.7	-37.9
Glazing:		-											
Ventilator type:		-											
			Combined noise level, dB(A)	31									

3 bedroom, 4 person house																						
Bedroom 1, front elevation																						
* Octave Band Centre Frequency, Hz												dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}	6.9	27.6	61	77	69	62	57	57	57	52	49	42	31								
B	Exposed façade, m ²			8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4									
C	Volume of receiving room, m ³																					
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5									
E	10 x Log(RT60/(0.163 x V))			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5									
F	Composite SRI			17.4	22.4	27.4	26.5	38.4	47.4	40.6	52.3	57.3	61.8									
G	A + B + E - F			26	58.0	45.6	33.5	29.3	17.5	8.8	10.5	-4.1	-16.9	-31.6								
H	K = 3				3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0								
I																						
J	Calculated internal noise level			29	61.0	48.6	36.5	32.3	20.5	11.8	13.5	-1.1	-13.9	-28.6								
K	Number of ventilators	1																				
L	Ventilator $D_{n,e}$					31	36	37	34	30	33	38	43									
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$					39.8	27.7	21.6	24.7	29.0	20.9	13.0	0.2									
N	Internal room noise level, vent open			33		49.2	37.1	32.7	26.1	29.1	21.6	13.2	0.4									
Glazing: 6mm - 16mm - 6.4mm (SGG)																						
Ventilator type: Greenwood 4000S																						
3 bedroom, 4 person house																						
Bedroom 1, gable																						
* Octave Band Centre Frequency, Hz												dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}	9	27.6	61	77	69	62	57	57	57	52	49	42	31								
B	Exposed façade, m ²			9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5								
C	Volume of receiving room, m ³																					
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5								
E	10 x Log(RT60/(0.163 x V))			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5								
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0									
G	A + B + E - F			15	48.6	36.2	24.1	15.0	7.1	-0.6	-9.7	-12.6	-25.4	-35.6								
H	K = 3				3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0								
I																						
J	Calculated internal noise level			18	51.6	39.2	27.1	18.0	10.1	2.4	-6.7	-9.6	-22.4	-32.6								
Glazing: -																						
Ventilator type: -																						
Combined noise level, dB(A)				33																		
3 bedroom, 4 person house																						
Bedroom 2, rear elevation																						
* Octave Band Centre Frequency, Hz												dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}	6.9	20.4	61	77	69	62	57	57	57	52	49	42	31								
B	Exposed façade, m ²			8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4								
C	Volume of receiving room, m ³																					
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5								
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2								
F	Composite SRI			21.8	26.8	31.8	31.5	43.0	51.8	45.8	56.6	61.6	64.7									
G	A + B + E - F			23	54.9	42.5	30.4	25.7	14.2	5.7	6.7	-7.0	-19.8	-33.2								
H	K = 3				3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0								
I																						
J	Calculated internal noise level			26	57.9	45.5	33.4	28.7	17.2	8.7	9.7	-4.0	-16.8	-30.2								
K	Number of ventilators	1																				
L	Ventilator $D_{n,e}$					31	36	37	34	30	33	38	43									
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$					39.8	27.7	21.6	24.7	29.0	20.9	13.0	0.2									
N	Internal room noise level, vent open			32		46.6	34.5	29.4	25.4	29.1	21.2	13.1	0.3									
Glazing: 6mm - 16mm - 6.4mm (SGG)																						
Ventilator type: Greenwood 4000S																						
3 bedroom, 4 person house																						
Bedroom 2, gable																						
* Octave Band Centre Frequency, Hz												dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}	7.1	20.4	61	77	69	62	57	57	57	52	49	42	31								
B	Exposed façade, m ²			8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5								
C	Volume of receiving room, m ³																					
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5								
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2								
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0									
G	A + B + E - F			15	48.9	36.5	24.4	15.3	7.4	-0.3	-9.4	-12.3	-25.1	-35.3								
H	K = 3				3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0								
I																						
J	Calculated internal noise level			18	51.9	39.5	27.4	18.3	10.4	2.7	-6.4	-9.3	-22.1	-32.3								
Glazing: -																						
Ventilator type: -																						
Combined noise level, dB(A)				32																		

3 bedroom, 4 person house														
Bedroom 3, front elevation														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}		61	77	69	62	57	57	57	52	49	42	31	
B	Exposed façade, m ²	5.7		7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	
C	Volume of receiving room, m ³	18												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	
F	Composite SRI			21.2	26.2	31.2	30.7	42.3	51.2	44.9	56.0	61.0	64.4	
G	A + B + E - F		23	55.3	42.9	30.8	26.1	14.6	6.1	7.2	-6.7	-19.5	-33.1	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		26	58.3	45.9	33.8	29.1	17.6	9.1	10.2	-3.7	-16.5	-30.1	
K	Number of ventilators	1												
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43		
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				40.6	28.5	22.4	25.5	29.8	21.7	13.8	1.0		
N	Internal room noise level, vent open		32		47.0	34.9	30.0	26.2	29.9	22.0	13.9	1.1		
Glazing:		6mm - 16mm - 6.4mm (SGG)												
Ventilator type:		Greenwood 4000S												
3 bedroom, 4 person house														
Bedroom 3, gable														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}		61	77	69	62	57	57	57	52	49	42	31	
B	Exposed façade, m ²	7.4		8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	
C	Volume of receiving room, m ³	18												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		16	49.6	37.2	25.1	16.0	8.1	0.4	-8.7	-11.6	-24.4	-34.6	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		19	52.6	40.2	28.1	19.0	11.1	3.4	-5.7	-8.6	-21.4	-31.6	
Glazing:		-												
Ventilator type:		-												
			Combined noise level, dB(A)	33										
L_{Aeq} Assessment, night time														
3 bedroom, 4 person house														
Bedroom 1, front elevation														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}		52	57	58	53	50	48	50	41	33	26	17	
B	Exposed façade, m ²	6.9		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	
C	Volume of receiving room, m ³	27.6												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	
F	Composite SRI			17.4	22.4	27.4	26.5	38.4	47.4	40.6	52.3	57.3	61.8	
G	A + B + E - F		16	38.1	34.3	24.1	22.3	8.7	1.2	-0.6	-20.1	-32.6	-46.4	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		19	41.1	37.3	27.1	25.3	11.7	4.2	2.4	-17.1	-29.6	-43.4	
K	Number of ventilators	1												
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43		
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				28.5	18.3	14.6	15.9	21.4	9.8	-3.0	-15.5		
N	Internal room noise level, vent open		24		37.9	27.7	25.7	17.3	21.5	10.5	-2.8	-15.3		
Glazing:		6mm - 16mm - 6.4mm (SGG)												
Ventilator type:		Greenwood 4000S												

3 bedroom, 4 person house														
Bedroom 1, gable														
* Octave Band Centre Frequency, Hz														
			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}	9 27.6	52	57	58	53	50	48	50	41	33	26	17	
B	Exposed façade, m ²		9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	
C	Volume of receiving room, m ³													
D	Reverb Time, seconds		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))		-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		5	28.7	24.9	14.7	8.0	-1.7	-8.2	-20.8	-28.6	-41.1	-50.4	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		8	31.7	27.9	17.7	11.0	1.3	-5.2	-17.8	-25.6	-38.1	-47.4	
Glazing:				-										
Ventilator type:				-										
				Combined noise level, dB(A)										
				24										
3 bedroom, 4 person house														
Bedroom 2, rear elevation														
* Octave Band Centre Frequency, Hz														
			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}	6.9 20.4	52	57	58	53	50	48	50	41	33	26	17	
B	Exposed façade, m ²		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	
C	Volume of receiving room, m ³													
D	Reverb Time, seconds		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))		-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	
F	Composite SRI			21.8	26.8	31.8	31.5	43.0	51.8	45.8	56.6	61.6	64.7	
G	A + B + E - F		13	35.0	31.2	21.0	18.7	5.4	-1.9	-4.4	-23.0	-35.5	-48.0	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		16	38.0	34.2	24.0	21.7	8.4	1.1	-1.4	-20.0	-32.5	-45.0	
K	Number of ventilators	1												
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43		
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				28.5	18.3	14.6	15.9	21.4	9.8	-3.0	-15.5		
N	Internal room noise level, vent open		23		35.3	25.1	22.4	16.6	21.5	10.1	-2.9	-15.4		
Glazing:				6mm - 16mm - 6.4mm (SGG)										
Ventilator type:				Greenwood 4000S										
3 bedroom, 4 person house														
Bedroom 2, gable														
* Octave Band Centre Frequency, Hz														
			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}	7.1 20.4	52	57	58	53	50	48	50	41	33	26	17	
B	Exposed façade, m ²		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	
C	Volume of receiving room, m ³													
D	Reverb Time, seconds		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))		-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		5	29.0	25.2	15.0	8.3	-1.4	-7.9	-20.5	-28.3	-40.8	-50.1	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		8	32.0	28.2	18.0	11.3	1.6	-4.9	-17.5	-25.3	-37.8	-47.1	
Glazing:				-										
Ventilator type:				-										
				Combined noise level, dB(A)										
				23										
3 bedroom, 4 person house														
Bedroom 3, front elevation														
* Octave Band Centre Frequency, Hz														
			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}	5.7 18	52	57	58	53	50	48	50	41	33	26	17	
B	Exposed façade, m ²		7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	
C	Volume of receiving room, m ³													
D	Reverb Time, seconds		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))		-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	
F	Composite SRI			21.2	26.2	31.2	30.7	42.3	51.2	44.9	56.0	61.0	64.4	
G	A + B + E - F		13	35.4	31.6	21.4	19.1	5.8	-1.5	-3.9	-22.7	-35.2	-47.9	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		16	38.4	34.6	24.4	22.1	8.8	1.5	-0.9	-19.7	-32.2	-44.9	
K	Number of ventilators	1												
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43		
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				29.3	19.1	15.4	16.7	22.2	10.6	-2.2	-14.7		
N	Internal room noise level, vent open		24		35.7	25.5	23.0	17.4	22.3	10.9	-2.1	-14.6		
Glazing:				6mm - 16mm - 6.4mm (SGG)										
Ventilator type:				Greenwood 4000S										

3 bedroom, 4 person house														
Bedroom 3, gable														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}		52	57	58	53	50	48	50	41	33	26	17	
B	Exposed façade, m ²	7.4		8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	
C	Volume of receiving room, m ³	18												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		6	29.7	25.9	15.7	9.0	-0.7	-7.2	-19.8	-27.6	-40.1	-49.4	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		9	32.7	28.9	18.7	12.0	2.3	-4.2	-16.8	-24.6	-37.1	-46.4	
Glazing:			-											
Ventilator type:			-											
			Combined noise level, dB(A)	24										
L _{Amax} Assessment, night time														
3 bedroom, 4 person house														
Bedroom 1, front elevation														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Amax}		74	73	77	74	72	71	72	63	57	48	38	
B	Exposed façade, m ²	6.9		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	
C	Volume of receiving room, m ³	27.6												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	
F	Composite SRI			17.4	22.4	27.4	26.5	38.4	47.4	40.6	52.3	57.3	61.8	
G	A + B + E - F		38	54.6	53.3	45.4	44.0	31.1	23.3	21.1	3.1	-10.3	-25.0	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		41	57.6	56.3	48.4	47.0	34.1	26.3	24.1	6.1	-7.3	-22.0	
K	Number of ventilators	1												
L	Ventilator $D_{n,e}$				31	36	37	34	34	33	38	43		
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				47.5	39.6	36.3	38.3	39.5	31.5	20.2	6.8		
N	Internal room noise level, vent open		44		56.9	49.0	47.4	39.7	39.7	32.2	20.4	7.0		
Glazing:			6mm - 16mm - 6.4mm (SGG)											
Ventilator type:			Greenwood 4000S											
3 bedroom, 4 person house														
Bedroom 1, gable														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Amax}		74	73	77	74	72	71	72	63	57	48	38	
B	Exposed façade, m ²	9		9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	
C	Volume of receiving room, m ³	27.6												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		26	45.2	43.9	36.0	29.7	20.7	13.9	0.9	-5.4	-18.8	-29.0	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		29	48.2	46.9	39.0	32.7	23.7	16.9	3.9	-2.4	-15.8	-26.0	
Glazing:			-											
Ventilator type:			-											
			Combined noise level, dB(A)	44										

3 bedroom, 4 person house														
Bedroom 2, rear elevation														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Amax}	6.9 20.4	74	73	77	74	72	71	72	63	57	48	38	
B	Exposed façade, m ²			8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	
C	Volume of receiving room, m ³													
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	
F	Composite SRI			21.8	26.8	31.8	31.5	43.0	51.8	45.8	56.6	61.6	64.7	
G	A + B + E - F		34	51.5	50.2	42.3	40.4	27.8	20.2	17.3	0.2	-13.2	-26.6	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		37	54.5	53.2	45.3	43.4	30.8	23.2	20.3	3.2	-10.2	-23.6	
K	Number of ventilators	1												
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43		
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				47.5	39.6	36.3	38.3	43.5	31.5	20.2	6.8		
N	Internal room noise level, vent open		45		54.3	46.4	44.1	39.0	43.6	31.8	20.3	6.9		
Glazing:				6mm - 16mm - 6.4mm (SGG)										
Ventilator type:				Greenwood 4000S										
3 bedroom, 4 person house														
Bedroom 2, gable														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Amax}	7.1 20.4	74	73	77	74	72	71	72	63	57	48	38	
B	Exposed façade, m ²			8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	
C	Volume of receiving room, m ³													
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		26	45.5	44.2	36.3	30.0	21.0	14.2	1.2	-5.1	-18.5	-28.7	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		29	48.5	47.2	39.3	33.0	24.0	17.2	4.2	-2.1	-15.5	-25.7	
Glazing:				-										
Ventilator type:				-										
			Combined noise level, dB(A)	45										
3 bedroom, 4 person house														
Bedroom 3, front elevation														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Amax}	5.7 18	74	73	77	74	72	71	72	63	57	48	38	
B	Exposed façade, m ²			7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	
C	Volume of receiving room, m ³													
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	
F	Composite SRI			21.2	26.2	31.2	30.7	42.3	51.2	44.9	56.0	61.0	64.4	
G	A + B + E - F		35	51.9	50.6	42.7	40.8	28.2	20.6	17.8	0.5	-12.9	-26.5	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		38	54.9	53.6	45.7	43.8	31.2	23.6	20.8	3.5	-9.9	-23.5	
K	Number of ventilators	1												
L	Ventilator $D_{n,e}$				31	36	37	34	34	33	38	43		
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				48.3	40.4	37.1	39.1	40.3	32.3	21.0	7.6		
N	Internal room noise level, vent open		44		54.7	46.8	44.7	39.8	40.4	32.6	21.1	7.7		
Glazing:				6mm - 16mm - 6.4mm (SGG)										
Ventilator type:				Greenwood 4000S										
3 bedroom, 4 person house														
Bedroom 3, gable														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Amax}	7.4 18	74	73	77	74	72	71	72	63	57	48	38	
B	Exposed façade, m ²			8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	
C	Volume of receiving room, m ³													
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		27	46.2	44.9	37.0	30.7	21.7	14.9	1.9	-4.4	-17.8	-28.0	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		30	49.2	47.9	40.0	33.7	24.7	17.9	4.9	-1.4	-14.8	-25.0	
Glazing:				-										
Ventilator type:				-										
			Combined noise level, dB(A)	44										

Mayton Street, Openshaw													
Break-in Noise Calculations - 3 bedroom, 4 person house (position 2 levels)													
L _{Aeq} Assessment, daytime													
3 bedroom, 4 person house													
Living/dining room, rear elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L _{Aeq}	12.8	59	61	56	50	47	51	56	54	48	37	26
B	Exposed façade, m ²		11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1
C	Volume of receiving room, m ³		51.7										
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3
F	Composite SRI			18.3	23.3	28.3	27.5	39.4	48.3	41.6	53.2	58.2	62.5
G	A + B + E - F		16	41.2	31.7	20.0	18.2	10.1	6.1	11.3	-6.3	-22.4	-37.8
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		19	44.2	34.7	23.0	21.2	13.1	9.1	14.3	-3.3	-19.4	-34.8
K	Number of ventilators	1											
L	Ventilator D _{n,e}				31	36	37	34	30	33	38	43	
M	L _{Aeq} - D _{n,e} + 10*log(10) - B				24.1	12.4	8.8	15.6	24.5	20.0	9.0	-7.1	
N	Internal room noise level, vent open		27		35.1	23.4	21.4	17.6	24.7	21.1	9.3	-6.8	
Glazing:		6mm - 16mm - 6.4mm (SGG)											
Ventilator type:		Greenwood 4000S											
3 bedroom, 4 person house													
Living/dining room, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L _{Aeq}	11	59	61	56	50	47	51	56	54	48	37	26
B	Exposed façade, m ²		10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4
C	Volume of receiving room, m ³		51.7										
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		3	30.8	21.3	9.6	3.0	-1.2	-4.3	-9.8	-15.8	-31.9	-43.0
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		6	33.8	24.3	12.6	6.0	1.8	-1.3	-6.8	-12.8	-28.9	-40.0
Glazing:		-											
Ventilator type:		-											
3 bedroom, 4 person house													
Living/dining room, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L _{Aeq}	5	59	61	56	50	47	51	56	54	48	37	26
B	Exposed façade, m ²		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
C	Volume of receiving room, m ³		51.7										
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		-1	27.4	17.9	6.2	-0.4	-4.6	-7.7	-13.2	-19.2	-35.3	-46.4
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		2	30.4	20.9	9.2	2.6	-1.6	-4.7	-10.2	-16.2	-32.3	-43.4
Glazing:		-											
Ventilator type:		-											
Combined noise level, dB(A)			27										

3 bedroom, 4 person house														
Bedroom 1, front elevation														
* Octave Band Centre Frequency, Hz														
			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}		59	61	56	50	47	51	56	54	48	37	26	
B	Exposed façade, m ²	6.9		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	
C	Volume of receiving room, m ³	27.6												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	
F	Composite SRI			17.4	22.4	27.4	26.5	38.4	47.4	40.6	52.3	57.3	61.8	
G	A + B + E - F		17	42.1	32.6	20.9	19.2	11.1	7.0	12.3	-5.4	-21.5	-37.1	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		20	45.1	35.6	23.9	22.2	14.1	10.0	15.3	-2.4	-18.5	-34.1	
K	Number of ventilators	1												
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43		
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				26.8	15.1	11.5	18.3	27.2	22.7	11.7	-4.4		
N	Internal room noise level, vent open		30		36.2	24.5	22.6	19.7	27.3	23.4	11.9	-4.2		
Glazing:				6mm - 16mm - 6.4mm (SGG)										
Ventilator type:				Greenwood 4000S										
3 bedroom, 4 person house														
Bedroom 1, gable														
* Octave Band Centre Frequency, Hz														
			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}		59	61	56	50	47	51	56	54	48	37	26	
B	Exposed façade, m ²	9		9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	
C	Volume of receiving room, m ³	27.6												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		5	32.7	23.2	11.5	4.9	0.7	-2.4	-7.9	-13.9	-30.0	-41.1	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		8	35.7	26.2	14.5	7.9	3.7	0.6	-4.9	-10.9	-27.0	-38.1	
Glazing:				-										
Ventilator type:				-										
			Combined noise level, dB(A)	30										
3 bedroom, 4 person house														
Bedroom 2, rear elevation														
* Octave Band Centre Frequency, Hz														
			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}		59	61	56	50	47	51	56	54	48	37	26	
B	Exposed façade, m ²	6.9		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	
C	Volume of receiving room, m ³	20.4												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	
F	Composite SRI			21.8	26.8	31.8	31.5	43.0	51.8	45.8	56.6	61.6	64.7	
G	A + B + E - F		14	39.0	29.5	17.8	15.6	7.8	3.9	8.5	-8.3	-24.4	-38.7	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		17	42.0	32.5	20.8	18.6	10.8	6.9	11.5	-5.3	-21.4	-35.7	
K	Number of ventilators	1												
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43		
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				26.8	15.1	11.5	18.3	27.2	22.7	11.7	-4.4		
N	Internal room noise level, vent open		29		33.6	21.9	19.3	19.0	27.3	23.0	11.8	-4.3		
Glazing:				6mm - 16mm - 6.4mm (SGG)										
Ventilator type:				Greenwood 4000S										
3 bedroom, 4 person house														
Bedroom 2, gable														
* Octave Band Centre Frequency, Hz														
			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}		59	61	56	50	47	51	56	54	48	37	26	
B	Exposed façade, m ²	7.1		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	
C	Volume of receiving room, m ³	20.4												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		5	33.0	23.5	11.8	5.2	1.0	-2.1	-7.6	-13.6	-29.7	-40.8	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		8	36.0	26.5	14.8	8.2	4.0	0.9	-4.6	-10.6	-26.7	-37.8	
Glazing:				-										
Ventilator type:				-										
			Combined noise level, dB(A)	29										

3 bedroom, 4 person house													
Bedroom 3, front elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}	5.7 18	59	61	56	50	47	51	56	54	48	37	26
B	Exposed façade, m ²		7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
C	Volume of receiving room, m ³												
D	Reverb Time, seconds		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))		-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	Composite SRI		21.2	26.2	31.2	30.7	42.3	51.2	44.9	56.0	61.0	64.4	
G	A + B + E - F		14	39.4	29.9	18.2	16.0	8.2	4.3	9.0	-8.0	-24.1	-38.6
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		17	42.4	32.9	21.2	19.0	11.2	7.3	12.0	-5.0	-21.1	-35.6
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				27.6	15.9	12.3	19.1	28.0	23.5	12.5	-3.6	
N	Internal room noise level, vent open		30		34.0	22.3	19.9	19.8	28.1	23.8	12.6	-3.5	
Glazing:		6mm - 16mm - 6.4mm (SGG)											
Ventilator type:		Greenwood 4000S											
3 bedroom, 4 person house													
Bedroom 3, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}	7.4 18	59	61	56	50	47	51	56	54	48	37	26
B	Exposed façade, m ²		8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7
C	Volume of receiving room, m ³												
D	Reverb Time, seconds		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))		-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		6	33.7	24.2	12.5	5.9	1.7	-1.4	-6.9	-12.9	-29.0	-40.1
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		9	36.7	27.2	15.5	8.9	4.7	1.6	-3.9	-9.9	-26.0	-37.1
Ventilator type:		-											
Combined noise level, dB(A)			30										
L_{Aeq} Assessment, night time													
3 bedroom, 4 person house													
Bedroom 1, front elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}	6.9 27.6	47	52	53	49	47	42	44	37	29	26	22
B	Exposed façade, m ²		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
C	Volume of receiving room, m ³												
D	Reverb Time, seconds		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))		-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5
F	Composite SRI			17.4	22.4	27.4	26.5	38.4	47.4	40.6	52.3	57.3	61.8
G	A + B + E - F		12	33.3	29.3	20.0	18.9	2.5	-4.7	-5.0	-24.3	-32.7	-40.6
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		15	36.3	32.3	23.0	21.9	5.5	-1.7	-2.0	-21.3	-29.7	-37.6
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				23.5	14.2	11.2	9.7	15.5	5.4	-7.2	-15.6	
N	Internal room noise level, vent open		19		32.9	23.6	22.3	11.1	15.6	6.1	-7.0	-15.4	
Glazing:		6mm - 16mm - 6.4mm (SGG)											
Ventilator type:		Greenwood 4000S											

3 bedroom, 4 person house													
Bedroom 1, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	52	53	49	47	42	44	37	29	26	22
B	Exposed façade, m²	9		9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
C	Volume of receiving room, m³	27.6											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		0	23.9	19.9	10.6	4.6	-7.9	-14.1	-25.2	-32.8	-41.2	-44.6
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		3	26.9	22.9	13.6	7.6	-4.9	-11.1	-22.2	-29.8	-38.2	-41.6
Glazing: -													
Ventilator type: -													
Combined noise level, dB(A)			19										
3 bedroom, 4 person house													
Bedroom 2, rear elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	52	53	49	47	42	44	37	29	26	22
B	Exposed façade, m²	6.9		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
C	Volume of receiving room, m³	20.4											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2
F	Composite SRI			21.8	26.8	31.8	31.5	43.0	51.8	45.8	56.6	61.6	64.7
G	A + B + E - F	9		30.2	26.2	16.9	15.3	-0.8	-7.8	-8.8	-27.2	-35.6	-42.2
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		12	33.2	29.2	19.9	18.3	2.2	-4.8	-5.8	-24.2	-32.6	-39.2
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				23.5	14.2	11.2	9.7	15.5	5.4	-7.2	-15.6	
N	Internal room noise level, vent open		18		30.3	21.0	19.0	10.4	15.6	5.7	-7.1	-15.5	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													
3 bedroom, 4 person house													
Bedroom 2, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	52	53	49	47	42	44	37	29	26	22
B	Exposed façade, m²	7.1		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
C	Volume of receiving room, m³	20.4											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F	1		24.2	20.2	10.9	4.9	-7.6	-13.8	-24.9	-32.5	-40.9	-44.3
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		4	27.2	23.2	13.9	7.9	-4.6	-10.8	-21.9	-29.5	-37.9	-41.3
Glazing: -													
Ventilator type: -													
Combined noise level, dB(A)			18										
3 bedroom, 4 person house													
Bedroom 3, front elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	52	53	49	47	42	44	37	29	26	22
B	Exposed façade, m²	5.7		7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
C	Volume of receiving room, m³	18											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	Composite SRI			21.2	26.2	31.2	30.7	42.3	51.2	44.9	56.0	61.0	64.4
G	A + B + E - F	9		30.6	26.6	17.3	15.7	-0.4	-7.4	-8.3	-26.9	-35.3	-42.1
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		12	33.6	29.6	20.3	18.7	2.6	-4.4	-5.3	-23.9	-32.3	-39.1
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				24.3	15.0	12.0	10.5	16.3	6.2	-6.4	-14.8	
N	Internal room noise level, vent open		19		30.7	21.4	19.6	11.2	16.4	6.5	-6.3	-14.7	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													

3 bedroom, 4 person house													
Bedroom 3, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	52	53	49	47	42	44	37	29	26	22
B	Exposed façade, m ²	7.4		8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7
C	Volume of receiving room, m ³	18											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V)			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		1	24.9	20.9	11.6	5.6	-6.9	-13.1	-24.2	-31.8	-40.2	-43.6
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		4	27.9	23.9	14.6	8.6	-3.9	-10.1	-21.2	-28.8	-37.2	-40.6
Glazing:		-											
Ventilator type:		-											
Combined noise level, dB(A)			19										
L_{Amax} Assessment, night time													
3 bedroom, 4 person house													
Bedroom 1, front elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		63	60	61	64	64	51	56	55	56	56	55
B	Exposed façade, m ²	6.9		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
C	Volume of receiving room, m ³	27.6											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V)			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5
F	Composite SRI			17.4	22.4	27.4	26.5	38.4	47.4	40.6	52.3	57.3	61.8
G	A + B + E - F		29	41.1	37.4	35.6	36.5	11.7	6.9	12.9	2.0	-2.5	-8.2
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		32	44.1	40.4	38.6	39.5	14.7	9.9	15.9	5.0	0.5	-5.2
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				31.6	29.8	28.8	18.9	27.1	23.3	19.1	14.6	
N	Internal room noise level, vent open		34		41.0	39.2	39.9	20.3	27.2	24.0	19.3	14.8	
Glazing:		6mm - 16mm - 6.4mm (SGG)											
Ventilator type:		Greenwood 4000S											
3 bedroom, 4 person house													
Bedroom 1, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		63	60	61	64	64	51	56	55	56	56	55
B	Exposed façade, m ²	9		9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
C	Volume of receiving room, m ³	27.6											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V)			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		16	31.7	28.0	26.2	22.2	1.3	-2.5	-7.3	-6.5	-11.0	-12.2
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		19	34.7	31.0	29.2	25.2	4.3	0.5	-4.3	-3.5	-8.0	-9.2
Glazing:		-											
Ventilator type:		-											
Combined noise level, dB(A)			34										

3 bedroom, 4 person house														
Bedroom 2, rear elevation														
* Octave Band Centre Frequency, Hz				dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		63	60	61	64	64	51	56	55	56	56	55	
B	Exposed façade, m ²	6.9		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	
C	Volume of receiving room, m ³	20.4												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	
F	Composite SRI			21.8	26.8	31.8	31.5	43.0	51.8	45.8	56.6	61.6	64.7	
G	A + B + E - F		25	38.0	34.3	32.5	32.9	8.4	3.8	9.1	-0.9	-5.4	-9.8	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		28	41.0	37.3	35.5	35.9	11.4	6.8	12.1	2.1	-2.4	-6.8	
K	Number of ventilators	1												
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43		
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				31.6	29.8	28.8	18.9	27.1	23.3	19.1	14.6		
N	Internal room noise level, vent open		32		38.4	36.6	36.6	19.6	27.2	23.6	19.2	14.7		
Glazing: 6mm - 16mm - 6.4mm (SGG)														
Ventilator type: Greenwood 4000S														
3 bedroom, 4 person house														
Bedroom 2, gable														
* Octave Band Centre Frequency, Hz				dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		63	60	61	64	64	51	56	55	56	56	55	
B	Exposed façade, m ²	7.1		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	
C	Volume of receiving room, m ³	20.4												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		16	32.0	28.3	26.5	22.5	1.6	-2.2	-7.0	-6.2	-10.7	-11.9	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		19	35.0	31.3	29.5	25.5	4.6	0.8	-4.0	-3.2	-7.7	-8.9	
Glazing: -														
Ventilator type: -														
Combined noise level, dB(A)				33										
3 bedroom, 4 person house														
Bedroom 3, front elevation														
* Octave Band Centre Frequency, Hz				dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		63	60	61	64	64	51	56	55	56	56	55	
B	Exposed façade, m ²	5.7		7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	
C	Volume of receiving room, m ³	18												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	
F	Composite SRI			21.2	26.2	31.2	30.7	42.3	51.2	44.9	56.0	61.0	64.4	
G	A + B + E - F		26	38.4	34.7	32.9	33.3	8.8	4.2	9.6	-0.6	-5.1	-9.7	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		29	41.4	37.7	35.9	36.3	11.8	7.2	12.6	2.4	-2.1	-6.7	
K	Number of ventilators	1												
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43		
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				32.4	30.6	29.6	19.7	27.9	24.1	19.9	15.4		
N	Internal room noise level, vent open		33		38.8	37.0	37.2	20.4	28.0	24.4	20.0	15.5		
Glazing: 6mm - 16mm - 6.4mm (SGG)														
Ventilator type: Greenwood 4000S														
3 bedroom, 4 person house														
Bedroom 3, gable														
* Octave Band Centre Frequency, Hz				dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		63	60	61	64	64	51	56	55	56	56	55	
B	Exposed façade, m ²	7.4		8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	
C	Volume of receiving room, m ³	18												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		17	32.7	29.0	27.2	23.2	2.3	-1.5	-6.3	-5.5	-10.0	-11.2	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		20	35.7	32.0	30.2	26.2	5.3	1.5	-3.3	-2.5	-7.0	-8.2	
Glazing: -														
Ventilator type: -														
Combined noise level, dB(A)				33										

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3 bedroom, 4 person house																						
Bedroom 1, front elevation																						
* Octave Band Centre Frequency, Hz												dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		57	70	65	58	53	53	54	48	44	36	25									
B	Exposed façade, m²	6.9		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4									
C	Volume of receiving room, m³	27.6																				
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5									
E	10 x Log(RT60/(0.163 x V))			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5									
F	Composite SRI			17.4	22.4	27.4	26.5	38.4	47.4	40.6	52.3	57.3	61.8									
G	A + B + E - F		21	51.2	41.5	29.0	25.2	13.6	4.9	6.5	-9.8	-22.3	-37.7									
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0									
I																						
J	Calculated internal noise level		24	54.2	44.5	32.0	28.2	16.6	7.9	9.5	-6.8	-19.3	-34.7									
K	Number of ventilators	1																				
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43										
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				35.7	23.2	17.5	20.8	25.1	16.9	7.3	-5.2										
N	Internal room noise level, vent open		29		45.1	32.6	28.6	22.2	25.2	17.6	7.5	-5.0										
Glazing:				6mm - 16mm - 6.4mm (SGG)																		
Ventilator type:				Greenwood 4000S																		
3 bedroom, 4 person house																						
Bedroom 1, gable																						
* Octave Band Centre Frequency, Hz												dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		57	70	65	58	53	53	54	48	44	36	25									
B	Exposed façade, m²	9		9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5									
C	Volume of receiving room, m³	27.6																				
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5									
E	10 x Log(RT60/(0.163 x V))			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5									
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0									
G	A + B + E - F		10	41.8	32.1	19.6	10.9	3.2	-4.5	-13.7	-18.3	-30.8	-41.7									
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0									
I																						
J	Calculated internal noise level		13	44.8	35.1	22.6	13.9	6.2	-1.5	-10.7	-15.3	-27.8	-38.7									
Glazing:				-																		
Ventilator type:				-																		
			Combined noise level, dB(A)	29																		
3 bedroom, 4 person house																						
Bedroom 2, rear elevation																						
* Octave Band Centre Frequency, Hz												dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		57	70	65	58	53	53	54	48	44	36	25									
B	Exposed façade, m²	6.9		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4									
C	Volume of receiving room, m³	20.4																				
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5									
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2									
F	Composite SRI			21.8	26.8	31.8	31.5	43.0	51.8	45.8	56.6	61.6	64.7									
G	A + B + E - F		18	48.1	38.4	25.9	21.6	10.3	1.8	2.7	-12.7	-25.2	-39.3									
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0									
I																						
J	Calculated internal noise level		21	51.1	41.4	28.9	24.6	13.3	4.8	5.7	-9.7	-22.2	-36.3									
K	Number of ventilators	1																				
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43										
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				35.7	23.2	17.5	20.8	25.1	16.9	7.3	-5.2										
N	Internal room noise level, vent open		28		42.5	30.0	25.3	21.5	25.2	17.2	7.4	-5.1										
Glazing:				6mm - 16mm - 6.4mm (SGG)																		
Ventilator type:				Greenwood 4000S																		
3 bedroom, 4 person house																						
Bedroom 2, gable																						
* Octave Band Centre Frequency, Hz												dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		57	70	65	58	53	53	54	48	44	36	25									
B	Exposed façade, m²	7.1		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5									
C	Volume of receiving room, m³	20.4																				
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5									
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2									
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0									
G	A + B + E - F		11	42.1	32.4	19.9	11.2	3.5	-4.2	-13.4	-18.0	-30.5	-41.4									
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0									
I																						
J	Calculated internal noise level		14	45.1	35.4	22.9	14.2	6.5	-1.2	-10.4	-15.0	-27.5	-38.4									
Glazing:				-																		
Ventilator type:				-																		
			Combined noise level, dB(A)	28																		

3 bedroom, 4 person house													
Bedroom 3, front elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		57	70	65	58	53	53	54	48	44	36	25
B	Exposed façade, m²	5.7		7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
C	Volume of receiving room, m³	18											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	Composite SRI			21.2	26.2	31.2	30.7	42.3	51.2	44.9	56.0	61.0	64.4
G	A + B + E - F		18	48.5	38.8	26.3	22.0	10.7	2.2	3.2	-12.4	-24.9	-39.2
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		21	51.5	41.8	29.3	25.0	13.7	5.2	6.2	-9.4	-21.9	-36.2
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				36.5	24.0	18.3	21.6	25.9	17.7	8.1	-4.4	
N	Internal room noise level, vent open		28		42.9	30.4	25.9	22.3	26.0	18.0	8.2	-4.3	
Glazing:		6mm - 16mm - 6.4mm (SGG)											
Ventilator type:		Greenwood 4000S											

3 bedroom, 4 person house													
Bedroom 3, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		57	70	65	58	53	53	54	48	44	36	25
B	Exposed façade, m²	7.4		8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7
C	Volume of receiving room, m³	18											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		11	42.8	33.1	20.6	11.9	4.2	-3.5	-12.7	-17.3	-29.8	-40.7
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		14	45.8	36.1	23.6	14.9	7.2	-0.5	-9.7	-14.3	-26.8	-37.7
Glazing:		-											
Ventilator type:		-											
Combined noise level, dB(A)			29										

L_{Aeq} Assessment, night time													
3 bedroom, 4 person house													
Bedroom 1, front elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	54	55	49	44	42	44	36	27	20	14
B	Exposed façade, m²	6.9		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
C	Volume of receiving room, m³	27.6											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5
F	Composite SRI			17.4	22.4	27.4	26.5	38.4	47.4	40.6	52.3	57.3	61.8
G	A + B + E - F		11	35.0	31.2	20.5	16.4	2.6	-4.3	-5.7	-27.0	-38.6	-49.2
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		14	38.0	34.2	23.5	19.4	5.6	-1.3	-2.7	-24.0	-35.6	-46.2
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				25.4	14.7	8.7	9.8	15.9	4.7	-9.9	-21.5	
N	Internal room noise level, vent open		19		34.8	24.1	19.8	11.2	16.0	5.4	-9.7	-21.3	
Glazing:		6mm - 16mm - 6.4mm (SGG)											
Ventilator type:		Greenwood 4000S											

3 bedroom, 4 person house													
Bedroom 1, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	54	55	49	44	42	44	36	27	20	14
B	Exposed façade, m²	9		9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
C	Volume of receiving room, m³	27.6											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		0	25.6	21.8	11.1	2.1	-7.8	-13.7	-25.9	-35.5	-47.1	-53.2
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		3	28.6	24.8	14.1	5.1	-4.8	-10.7	-22.9	-32.5	-44.1	-50.2
Glazing:		-											
Ventilator type:		-											
Combined noise level, dB(A)			19										
3 bedroom, 4 person house													
Bedroom 2, rear elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	54	55	49	44	42	44	36	27	20	14
B	Exposed façade, m²	6.9		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
C	Volume of receiving room, m³	20.4											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2
F	Composite SRI			21.8	26.8	31.8	31.5	43.0	51.8	45.8	56.6	61.6	64.7
G	A + B + E - F		8	31.9	28.1	17.4	12.8	-0.7	-7.4	-9.5	-29.9	-41.5	-50.8
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		11	34.9	31.1	20.4	15.8	2.3	-4.4	-6.5	-26.9	-38.5	-47.8
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				25.4	14.7	8.7	9.8	15.9	4.7	-9.9	-21.5	
N	Internal room noise level, vent open		18		32.2	21.5	16.5	10.5	16.0	5.0	-9.8	-21.4	
Glazing:		6mm - 16mm - 6.4mm (SGG)											
Ventilator type:		Greenwood 4000S											
3 bedroom, 4 person house													
Bedroom 2, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	54	55	49	44	42	44	36	27	20	14
B	Exposed façade, m²	7.1		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
C	Volume of receiving room, m³	20.4											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		1	25.9	22.1	11.4	2.4	-7.5	-13.4	-25.6	-35.2	-46.8	-52.9
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		4	28.9	25.1	14.4	5.4	-4.5	-10.4	-22.6	-32.2	-43.8	-49.9
Glazing:		-											
Ventilator type:		-											
Combined noise level, dB(A)			18										
3 bedroom, 4 person house													
Bedroom 3, front elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	54	55	49	44	42	44	36	27	20	14
B	Exposed façade, m²	5.7		7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
C	Volume of receiving room, m³	18											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	Composite SRI			21.2	26.2	31.2	30.7	42.3	51.2	44.9	56.0	61.0	64.4
G	A + B + E - F		9	32.3	28.5	17.8	13.2	-0.3	-7.0	-9.0	-29.6	-41.2	-50.7
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		12	35.3	31.5	20.8	16.2	2.7	-4.0	-6.0	-26.6	-38.2	-47.7
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				26.2	15.5	9.5	10.6	16.7	5.5	-9.1	-20.7	
N	Internal room noise level, vent open		19		32.6	21.9	17.1	11.3	16.8	5.8	-9.0	-20.6	
Glazing:		6mm - 16mm - 6.4mm (SGG)											
Ventilator type:		Greenwood 4000S											

3 bedroom, 4 person house														
Bedroom 3, gable														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}		47	54	55	49	44	42	44	36	27	20	14	
B	Exposed façade, m²	7.4		8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	
C	Volume of receiving room, m³	18												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		1	26.6	22.8	12.1	3.1	-6.8	-12.7	-24.9	-34.5	-46.1	-52.2	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		4	29.6	25.8	15.1	6.1	-3.8	-9.7	-21.9	-31.5	-43.1	-49.2	
Glazing:			-											
Ventilator type:			-											
			Combined noise level, dB(A)	19										
L _{Amax} Assessment, night time														
3 bedroom, 4 person house														
Bedroom 1, front elevation														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Amax}		59	61	65	56	55	61	53	44	40	36	29	
B	Exposed façade, m²	6.9		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	
C	Volume of receiving room, m³	27.6												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	
F	Composite SRI			17.4	22.4	27.4	26.5	38.4	47.4	40.6	52.3	57.3	61.8	
G	A + B + E - F		23	42.0	40.9	27.0	27.2	21.1	4.8	2.6	-14.0	-22.7	-34.0	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		26	45.0	43.9	30.0	30.2	24.1	7.8	5.6	-11.0	-19.7	-31.0	
K	Number of ventilators	1												
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43		
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				35.1	21.2	19.5	28.3	25.0	13.0	3.1	-5.6		
N	Internal room noise level, vent open		30	44.5	30.6	30.6	29.7	25.1	13.7	3.3	-5.4			
Glazing:			6mm - 16mm - 6.4mm (SGG)											
Ventilator type:			Greenwood 4000S											
3 bedroom, 4 person house														
Bedroom 1, gable														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Amax}		59	61	65	56	55	61	53	44	40	36	29	
B	Exposed façade, m²	9		9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	
C	Volume of receiving room, m³	27.6												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		11	32.6	31.5	17.6	12.9	10.7	-4.6	-17.6	-22.5	-31.2	-38.0	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		14	35.6	34.5	20.6	15.9	13.7	-1.6	-14.6	-19.5	-28.2	-35.0	
Glazing:			-											
Ventilator type:			-											
			Combined noise level, dB(A)	30										
3 bedroom, 4 person house														
Bedroom 2, rear elevation														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Amax}		59	61	65	56	55	61	53	44	40	36	29	
B	Exposed façade, m²	6.9		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	
C	Volume of receiving room, m³	20.4												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	
F	Composite SRI			21.8	26.8	31.8	31.5	43.0	51.8	45.8	56.6	61.6	64.7	
G	A + B + E - F		19	38.9	37.8	23.9	23.6	17.8	1.7	-1.2	-16.9	-25.6	-35.6	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		22	41.9	40.8	26.9	26.6	20.8	4.7	1.8	-13.9	-22.6	-32.6	
K	Number of ventilators	1												
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43		
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				35.1	21.2	19.5	28.3	25.0	13.0	3.1	-5.6		
N	Internal room noise level, vent open		29	41.9	28.0	27.3	29.0	25.1	13.3	3.2	-5.5			
Glazing:			6mm - 16mm - 6.4mm (SGG)											
Ventilator type:			Greenwood 4000S											

3 bedroom, 4 person house														
Bedroom 2, gable														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Amax}	7.1 20.4	59	61	65	56	55	61	53	44	40	36	29	
B	Exposed façade, m ²			8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	
C	Volume of receiving room, m ³													
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		12	32.9	31.8	17.9	13.2	11.0	-4.3	-17.3	-22.2	-30.9	-37.7	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		15	35.9	34.8	20.9	16.2	14.0	-1.3	-14.3	-19.2	-27.9	-34.7	
Glazing:				-										
Ventilator type:				-										
			Combined noise level, dB(A)	29										
3 bedroom, 4 person house														
Bedroom 3, front elevation														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Amax}	5.7 18	59	61	65	56	55	61	53	44	40	36	29	
B	Exposed façade, m ²			7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	
C	Volume of receiving room, m ³													
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	
F	Composite SRI			21.2	26.2	31.2	30.7	42.3	51.2	44.9	56.0	61.0	64.4	
G	A + B + E - F		20	39.3	38.2	24.3	24.0	18.2	2.1	-0.7	-16.6	-25.3	-35.5	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		23	42.3	41.2	27.3	27.0	21.2	5.1	2.3	-13.6	-22.3	-32.5	
K	Number of ventilators	1												
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43		
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				35.9	22.0	20.3	29.1	25.8	13.8	3.9	-4.8		
N	Internal room noise level, vent open		30	42.3	28.4	27.9	29.8	25.9	14.1	4.0	-4.7			
Glazing:				6mm - 16mm - 6.4mm (SGG)										
Ventilator type:				Greenwood 4000S										
3 bedroom, 4 person house														
Bedroom 3, gable														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Amax}	7.4 18	59	61	65	56	55	61	53	44	40	36	29	
B	Exposed façade, m ²			8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	
C	Volume of receiving room, m ³													
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		12	33.6	32.5	18.6	13.9	11.7	-3.6	-16.6	-21.5	-30.2	-37.0	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		15	36.6	35.5	21.6	16.9	14.7	-0.6	-13.6	-18.5	-27.2	-34.0	
Glazing:				-										
Ventilator type:				-										
			Combined noise level, dB(A)	30										

Mayton Street, Openshaw														
Break-in Noise Calculations - 2 bedroom, 3 person house (position 1 levels)														
L _{Aeq} Assessment, daytime														
2 bedroom, 3 person house														
Living/dining room, rear elevation														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L _{Aeq}		61	77	69	62	57	57	57	52	49	42	31	
B	Exposed façade, m ²	11.4		10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	
C	Volume of receiving room, m ³	40.1												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	
F	Composite SRI			18.3	23.3	28.3	27.6	39.4	48.3	41.6	53.3	58.3	62.5	
G	A + B + E - F		25	57.7	45.3	33.2	28.9	17.1	8.5	10.1	-4.5	-17.3	-31.7	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		28	60.7	48.3	36.2	31.9	20.1	11.5	13.1	-1.5	-14.3	-28.7	
K	Number of ventilators	1												
L	Ventilator D _{n,e}				31	36	37	34	30	33	38	43		
M	L _{Aeq} - D _{n,e} + 10*log(10) - B				37.6	25.5	19.4	22.5	26.8	18.7	10.8	-2.0		
N	Internal room noise level, vent open		31		48.6	36.5	32.1	24.5	27.0	19.8	11.1	-1.7		
Glazing:				6mm - 16mm - 6.4mm (SGG)										
Ventilator type:				Greenwood 4000S										
2 bedroom, 3 person house														
Living/dining room, gable														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L _{Aeq}		61	77	69	62	57	57	57	52	49	42	31	
B	Exposed façade, m ²	4.5		6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	
C	Volume of receiving room, m ³	40.1												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		10	44.0	31.6	19.5	10.4	2.5	-5.2	-14.3	-17.2	-30.0	-40.2	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		13	47.0	34.6	22.5	13.4	5.5	-2.2	-11.3	-14.2	-27.0	-37.2	
Glazing:				-										
Ventilator type:				-										
2 bedroom, 3 person house														
Living/dining room, gable														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L _{Aeq}		61	77	69	62	57	57	57	52	49	42	31	
B	Exposed façade, m ²	9.2		9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	
C	Volume of receiving room, m ³	40.1												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		14	47.1	34.7	22.6	13.5	5.6	-2.1	-11.2	-14.1	-26.9	-37.1	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		17	50.1	37.7	25.6	16.5	8.6	0.9	-8.2	-11.1	-23.9	-34.1	
Glazing:				-										
Ventilator type:				-										
				Combined noise level, dB(A)	31									

2 bedroom, 3 person house													
Bedroom 1, front elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		61	77	69	62	57	57	57	52	49	42	31
B	Exposed façade, m ²	11.4		10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			18.3	23.3	28.3	27.6	39.4	48.3	41.6	53.3	58.3	62.5
G	A + B + E - F		27	58.8	46.4	34.3	29.9	18.2	9.6	11.2	-3.4	-16.2	-30.6
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		30	61.8	49.4	37.3	32.9	21.2	12.6	14.2	-0.4	-13.2	-27.6
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				37.6	25.5	19.4	22.5	26.8	18.7	10.8	-2.0	
N	Internal room noise level, vent open		32		49.6	37.5	33.1	24.9	27.0	20.0	11.1	-1.7	
Glazing:				6mm - 16mm - 6.4mm (SGG)									
Ventilator type:				Greenwood 4000S									
2 bedroom, 3 person house													
Bedroom 1, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		61	77	69	62	57	57	57	52	49	42	31
B	Exposed façade, m ²	9.7		9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		15	48.4	36.0	23.9	14.8	6.9	-0.8	-9.9	-12.8	-25.6	-35.8
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		18	51.4	39.0	26.9	17.8	9.9	2.2	-6.9	-9.8	-22.6	-32.8
Glazing:				-									
Ventilator type:				-									
2 bedroom, 3 person house													
Bedroom 1													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		61	77	69	62	57	57	57	52	49	42	31
B	Exposed façade, m ²	5.2		7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		12	45.7	33.3	21.2	12.1	4.2	-3.5	-12.6	-15.5	-28.3	-38.5
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		15	48.7	36.3	24.2	15.1	7.2	-0.5	-9.6	-12.5	-25.3	-35.5
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				41.0	28.9	22.8	25.9	30.2	22.1	14.2	1.4	
N	Internal room noise level, vent open		32		42.3	30.2	23.5	26.0	30.2	22.1	14.2	1.4	
Glazing:				-									
Ventilator type:				-									
			Combined noise level, dB(A)	32									

2 bedroom, 3 person house													
Bedroom 2, rear elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		61	77	69	62	57	57	57	52	49	42	31
B	Exposed façade, m ²	6.1		7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
C	Volume of receiving room, m ³	19.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI			21.4	26.4	31.4	31.0	42.6	51.4	45.2	56.2	61.2	64.5
G	A + B + E - F		23	55.1	42.7	30.6	25.9	14.4	5.9	7.0	-6.9	-19.7	-33.2
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		26	58.1	45.7	33.6	28.9	17.4	8.9	10.0	-3.9	-16.7	-30.2
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				40.3	28.2	22.1	25.2	29.5	21.4	13.5	0.7	
N	Internal room noise level, vent open		32		46.8	34.7	29.7	25.9	29.6	21.7	13.6	0.8	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													
2 bedroom, 3 person house													
Bedroom 2, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		61	77	69	62	57	57	57	52	49	42	31
B	Exposed façade, m ²	7.6		8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
C	Volume of receiving room, m ³	19.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		16	49.4	37.0	24.9	15.8	7.9	0.2	-8.9	-11.8	-24.6	-34.8
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		19	52.4	40.0	27.9	18.8	10.9	3.2	-5.9	-8.8	-21.6	-31.8
Glazing: -													
Ventilator type: -													
			Combined noise level, dB(A)	27									
L _{Aeq} Assessment, night time													
2 bedroom, 3 person house													
Bedroom 1, front elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		52	57	58	53	50	48	50	41	33	26	17
B	Exposed façade, m ²	11.4		10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			18.3	23.3	28.3	27.6	39.4	48.3	41.6	53.3	58.3	62.5
G	A + B + E - F		17	38.9	35.1	24.9	22.9	9.4	2.0	0.1	-19.4	-31.9	-45.4
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		20	41.9	38.1	27.9	25.9	12.4	5.0	3.1	-16.4	-28.9	-42.4
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				26.3	16.1	12.4	13.7	19.2	7.6	-5.2	-17.7	
N	Internal room noise level, vent open		23		38.3	28.1	26.1	16.1	19.4	8.9	-4.9	-17.4	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													

2 bedroom, 3 person house													
Bedroom 1, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		52	57	58	53	50	48	50	41	33	26	17
B	Exposed façade, m ²	9.7		9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		4	28.5	24.7	14.5	7.8	-1.9	-8.4	-21.0	-28.8	-41.3	-50.6
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		7	31.5	27.7	17.5	10.8	1.1	-5.4	-18.0	-25.8	-38.3	-47.6
Glazing:			-										
Ventilator type:			-										
2 bedroom, 3 person house													
Bedroom 1, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		52	57	58	53	50	48	50	41	33	26	17
B	Exposed façade, m ²	5.2		7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		2	25.8	22.0	11.8	5.1	-4.6	-11.1	-23.7	-31.5	-44.0	-53.3
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		5	28.8	25.0	14.8	8.1	-1.6	-8.1	-20.7	-28.5	-41.0	-50.3
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				29.7	19.5	15.8	17.1	22.6	11.0	-1.8	-14.3	
N	Internal room noise level, vent open		24		31.0	20.8	16.5	17.2	22.6	11.0	-1.8	-14.3	
Glazing:			-										
Ventilator type:			-										
2 bedroom, 3 person house													
Bedroom 2, rear elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		52	57	58	53	50	48	50	41	33	26	17
B	Exposed façade, m ²	6.1		7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
C	Volume of receiving room, m ³	19.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI			21.4	26.4	31.4	31.0	42.6	51.4	45.2	56.2	61.2	64.5
G	A + B + E - F		13	35.2	31.4	21.2	18.9	5.6	-1.7	-4.1	-22.9	-35.4	-48.0
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		16	38.2	34.4	24.2	21.9	8.6	1.3	-1.1	-19.9	-32.4	-45.0
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				29.0	18.8	15.1	16.4	21.9	10.3	-2.5	-15.0	
N	Internal room noise level, vent open		24		35.5	25.3	22.7	17.1	22.0	10.6	-2.4	-14.9	
Glazing:			6mm - 16mm - 6.4mm (SGG)										
Ventilator type:			Greenwood 4000S										
2 bedroom, 3 person house													
Bedroom 2, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		52	57	58	53	50	48	50	41	33	26	17
B	Exposed façade, m ²	7.6		8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
C	Volume of receiving room, m ³	19.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		5	29.5	25.7	15.5	8.8	-0.9	-7.4	-20.0	-27.8	-40.3	-49.6
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		8	32.5	28.7	18.5	11.8	2.1	-4.4	-17.0	-24.8	-37.3	-46.6
Glazing:			-										
Ventilator type:			-										

<u>L_{Amax} Assessment, night time</u>													
2 bedroom, 3 person house													
<u>Bedroom 1, front elevation</u>													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L _{Amax}		74	73	77	74	72	71	72	63	57	48	38
B	Exposed façade, m ²	11.4		10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			18.3	23.3	28.3	27.6	39.4	48.3	41.6	53.3	58.3	62.5
G	A + B + E - F		38	55.4	54.1	46.2	44.6	31.8	24.1	21.8	3.8	-9.6	-24.0
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		41	58.4	57.1	49.2	47.6	34.8	27.1	24.8	6.8	-6.6	-21.0
K	Number of ventilators	1											
L	Ventilator D _{n,e}				31	36	37	34	30	33	38	43	
M	L _{Aeq} - D _{n,e} + 10*log(10) - B				45.3	37.4	34.1	36.1	41.3	29.3	18.0	4.6	
N	Internal room noise level, vent open		45		57.3	49.4	47.8	38.5	41.5	30.6	18.3	4.9	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													
2 bedroom, 3 person house													
<u>Bedroom 1, gable</u>													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L _{Amax}		74	73	77	74	72	71	72	63	57	48	38
B	Exposed façade, m ²	9.7		9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		25	45.0	43.7	35.8	29.5	20.5	13.7	0.7	-5.6	-19.0	-29.2
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		28	48.0	46.7	38.8	32.5	23.5	16.7	3.7	-2.6	-16.0	-26.2
Glazing: -													
Ventilator type: -													
2 bedroom, 3 person house													
<u>Bedroom 1, gable</u>													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L _{Amax}		74	73	77	74	72	71	72	63	57	48	38
B	Exposed façade, m ²	5.2		7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		23	42.3	41.0	33.1	26.8	17.8	11.0	-2.0	-8.3	-21.7	-31.9
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		26	45.3	44.0	36.1	29.8	20.8	14.0	1.0	-5.3	-18.7	-28.9
K	Number of ventilators	1											
L	Ventilator D _{n,e}				31	36	37	34	30	33	38	43	
M	L _{Aeq} - D _{n,e} + 10*log(10) - B				48.7	40.8	37.5	39.5	44.7	32.7	21.4	8.0	
N	Internal room noise level, vent open		46		50.0	42.1	38.2	39.6	44.7	32.7	21.4	8.0	
Glazing: -													
Ventilator type: -													
Combined noise level, dB(A)			45										

2 bedroom, 3 person house													
Bedroom 2, rear elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		74	73	77	74	72	71	72	63	57	48	38
B	Exposed façade, m ²	6.1		7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
C	Volume of receiving room, m ³	19.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI			21.4	26.4	31.4	31.0	42.6	51.4	45.2	56.2	61.2	64.5
G	A + B + E - F		34	51.7	50.4	42.5	40.6	28.0	20.4	17.6	0.3	-13.1	-26.6
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		37	54.7	53.4	45.5	43.6	31.0	23.4	20.6	3.3	-10.1	-23.6
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	32	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				48.0	40.1	36.8	38.8	42.0	32.0	20.7	7.3	
N	Internal room noise level, vent open		45		54.5	46.6	44.4	39.5	42.1	32.3	20.8	7.4	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													
2 bedroom, 3 person house													
Bedroom 2, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		74	73	77	74	72	71	72	63	57	48	38
B	Exposed façade, m ²	7.6		8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
C	Volume of receiving room, m ³	19.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		27	46.0	44.7	36.8	30.5	21.5	14.7	1.7	-4.6	-18.0	-28.2
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		30	49.0	47.7	39.8	33.5	24.5	17.7	4.7	-1.6	-15.0	-25.2
Glazing: -													
Ventilator type: -													
				Combined noise level, dB(A)		45							
Mayton Street, Openshaw													
Break-in Noise Calculations - 2 bedroom, 3 person house (position 2 levels)													
L_{Aeq} Assessment, daytime													
2 bedroom, 3 person house													
Living/dining room, rear elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		59	61	56	50	47	51	56	54	48	37	26
B	Exposed façade, m ²	11.4		10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
C	Volume of receiving room, m ³	40.1											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2
F	Composite SRI			18.3	23.3	28.3	27.6	39.4	48.3	41.6	53.3	58.3	62.5
G	A + B + E - F		17	41.8	32.3	20.6	18.8	10.7	6.7	11.9	-5.8	-21.9	-37.2
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		20	44.8	35.3	23.6	21.8	13.7	9.7	14.9	-2.8	-18.9	-34.2
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				24.6	12.9	9.3	16.1	25.0	20.5	9.5	-6.6	
N	Internal room noise level, vent open		28		35.6	23.9	22.0	18.1	25.2	21.6	9.8	-6.3	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													

2 bedroom, 3 person house													
Living/dining room, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		59	61	56	50	47	51	56	54	48	37	26
B	Exposed façade, m ²	4.5		6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
C	Volume of receiving room, m ³	40.1											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		0	28.1	18.6	6.9	0.3	-3.9	-7.0	-12.5	-18.5	-34.6	-45.7
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		3	31.1	21.6	9.9	3.3	-0.9	-4.0	-9.5	-15.5	-31.6	-42.7
Glazing:			-										
Ventilator type:			-										

2 bedroom, 3 person house													
Living/dining room, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		59	61	56	50	47	51	56	54	48	37	26
B	Exposed façade, m ²	9.2		9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6
C	Volume of receiving room, m ³	40.1											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		3	31.2	21.7	10.0	3.4	-0.8	-3.9	-9.4	-15.4	-31.5	-42.6
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		6	34.2	24.7	13.0	6.4	2.2	-0.9	-6.4	-12.4	-28.5	-39.6
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				25.6	13.9	10.3	17.1	26.0	21.5	10.5	-5.6	
N	Internal room noise level, vent open		28		28.2	16.5	11.7	17.2	26.0	21.5	10.5	-5.6	
Glazing:			-										
Ventilator type:			-										
			Combined noise level, dB(A)	28									

2 bedroom, 3 person house													
Bedroom 1, front elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		59	61	56	50	47	51	56	54	48	37	26
B	Exposed façade, m ²	11.4		10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			18.3	23.3	28.3	27.6	39.4	48.3	41.6	53.3	58.3	62.5
G	A + B + E - F		18	42.9	33.4	21.7	19.8	11.8	7.8	13.0	-4.7	-20.8	-36.1
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		21	45.9	36.4	24.7	22.8	14.8	10.8	16.0	-1.7	-17.8	-33.1
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				24.6	12.9	9.3	16.1	25.0	20.5	9.5	-6.6	
N	Internal room noise level, vent open		28		36.6	24.9	23.0	18.5	25.2	21.8	9.8	-6.3	
Glazing:			6mm - 16mm - 6.4mm (SGG)										
Ventilator type:			Greenwood 4000S										

2 bedroom, 3 person house													
Bedroom 1, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		59	61	56	50	47	51	56	54	48	37	26
B	Exposed façade, m ²	9.7		9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		4	32.5	23.0	11.3	4.7	0.5	-2.6	-8.1	-14.1	-30.2	-41.3
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		7	35.5	26.0	14.3	7.7	3.5	0.4	-5.1	-11.1	-27.2	-38.3
Glazing:			-										
Ventilator type:			-										

2 bedroom, 3 person house														
Bedroom 1, gable														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}		59	61	56	50	47	51	56	54	48	37	26	
B	Exposed façade, m ²	5.2		7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	
C	Volume of receiving room, m ³	31.2												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		2	29.8	20.3	8.6	2.0	-2.2	-5.3	-10.8	-16.8	-32.9	-44.0	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		5	32.8	23.3	11.6	5.0	0.8	-2.3	-7.8	-13.8	-29.9	-41.0	
Glazing:		-												
Ventilator type:		-												
			Combined noise level, dB(A)	28										
2 bedroom, 3 person house														
Bedroom 2, rear elevation														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}		59	61	56	50	47	51	56	54	48	37	26	
B	Exposed façade, m ²	6.1		7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	
C	Volume of receiving room, m ³	19.2												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	
F	Composite SRI			21.4	26.4	31.4	31.0	42.6	51.4	45.2	56.2	61.2	64.5	
G	A + B + E - F		14	39.2	29.7	18.0	15.8	8.0	4.1	8.8	-8.2	-24.3	-38.7	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		17	42.2	32.7	21.0	18.8	11.0	7.1	11.8	-5.2	-21.3	-35.7	
K	Number of ventilators	1												
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43		
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				27.3	15.6	12.0	18.8	27.7	23.2	12.2	-3.9		
N	Internal room noise level, vent open		30		33.8	22.1	19.6	19.5	27.8	23.5	12.3	-3.8		
Glazing:		6mm - 16mm - 6.4mm (SGG)												
Ventilator type:		Greenwood 4000S												
2 bedroom, 3 person house														
Bedroom 2, gable														
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*	
A	Measured L_{Aeq}		59	61	56	50	47	51	56	54	48	37	26	
B	Exposed façade, m ²	7.6		8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	
C	Volume of receiving room, m ³	19.2												
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0	
G	A + B + E - F		5	33.5	24.0	12.3	5.7	1.5	-1.6	-7.1	-13.1	-29.2	-40.3	
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
I														
J	Calculated internal noise level		8	36.5	27.0	15.3	8.7	4.5	1.4	-4.1	-10.1	-26.2	-37.3	
Glazing:		-												
Ventilator type:		-												
			Combined noise level, dB(A)	30										

<u>L_{Aeq} Assessment, night time</u>													
2 bedroom, 3 person house													
<u>Bedroom 1, front elevation</u>													
<i>* Octave Band Centre Frequency, Hz</i>			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	52	53	49	47	42	44	37	29	26	22
B	Exposed façade, m ²	11.4		10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			18.3	23.3	28.3	27.6	39.4	48.3	41.6	53.3	58.3	62.5
G	A + B + E - F		13	34.1	30.1	20.8	19.5	3.2	-3.9	-4.3	-23.6	-32.0	-39.6
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		16	37.1	33.1	23.8	22.5	6.2	-0.9	-1.3	-20.6	-29.0	-36.6
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				21.3	12.0	9.0	7.5	13.3	3.2	-9.4	-17.8	
N	Internal room noise level, vent open		18		33.3	24.0	22.7	9.9	13.5	4.5	-9.1	-17.5	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													
2 bedroom, 3 person house													
<u>Bedroom 1, gable</u>													
<i>* Octave Band Centre Frequency, Hz</i>			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	52	53	49	47	42	44	37	29	26	22
B	Exposed façade, m ²	9.7		9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		0	23.7	19.7	10.4	4.4	-8.1	-14.3	-25.4	-33.0	-41.4	-44.8
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		3	26.7	22.7	13.4	7.4	-5.1	-11.3	-22.4	-30.0	-38.4	-41.8
Glazing: -													
Ventilator type: -													
2 bedroom, 3 person house													
<u>Bedroom 1, gable</u>													
<i>* Octave Band Centre Frequency, Hz</i>			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	52	53	49	47	42	44	37	29	26	22
B	Exposed façade, m ²	5.2		7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		-3	21.0	17.0	7.7	1.7	-10.8	-17.0	-28.1	-35.7	-44.1	-47.5
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		0	24.0	20.0	10.7	4.7	-7.8	-14.0	-25.1	-32.7	-41.1	-44.5
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				24.7	15.4	12.4	10.9	16.7	6.6	-6.0	-14.4	
N	Internal room noise level, vent open		18		26.0	16.7	13.1	11.0	16.7	6.6	-6.0	-14.4	
Glazing: -													
Ventilator type: -													
			Combined noise level, dB(A)	19									

2 bedroom, 3 person house													
Bedroom 2, rear elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	52	53	49	47	42	44	37	29	26	22
B	Exposed façade, m ²	6.1		7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
C	Volume of receiving room, m ³	19.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI			21.4	26.4	31.4	31.0	42.6	51.4	45.2	56.2	61.2	64.5
G	A + B + E - F		9	30.4	26.4	17.1	15.5	-0.6	-7.6	-8.5	-27.1	-35.5	-42.2
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		12	33.4	29.4	20.1	18.5	2.4	-4.6	-5.5	-24.1	-32.5	-39.2
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				24.0	14.7	11.7	10.2	16.0	5.9	-6.7	-15.1	
N	Internal room noise level, vent open		18		30.5	21.2	19.3	10.9	16.1	6.2	-6.6	-15.0	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													

2 bedroom, 3 person house													
Bedroom 2, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	52	53	49	47	42	44	37	29	26	22
B	Exposed façade, m ²	7.6		8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
C	Volume of receiving room, m ³	19.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		1	24.7	20.7	11.4	5.4	-7.1	-13.3	-24.4	-32.0	-40.4	-43.8
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		4	27.7	23.7	14.4	8.4	-4.1	-10.3	-21.4	-29.0	-37.4	-40.8
Glazing: -													
Ventilator type: -													
			Combined noise level, dB(A)	19									

<u>L_{Amax} Assessment, night time</u>													
2 bedroom, 3 person house													
Bedroom 1, front elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		63	60	61	64	64	51	56	55	56	56	55
B	Exposed façade, m ²	11.4		10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			18.3	23.3	28.3	27.6	39.4	48.3	41.6	53.3	58.3	62.5
G	A + B + E - F		29	41.9	38.2	36.4	37.1	12.4	7.7	13.6	2.7	-1.8	-7.2
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		32	44.9	41.2	39.4	40.1	15.4	10.7	16.6	5.7	1.2	-4.2
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				29.4	27.6	26.6	16.7	24.9	21.1	16.9	12.4	
N	Internal room noise level, vent open		34		41.4	39.6	40.3	19.1	25.1	22.4	17.2	12.7	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													

2 bedroom, 3 person house													
Bedroom 1, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		63	60	61	64	64	51	56	55	56	56	55
B	Exposed façade, m ²	9.7		9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		15	31.5	27.8	26.0	22.0	1.1	-2.7	-7.5	-6.7	-11.2	-12.4
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		18	34.5	30.8	29.0	25.0	4.1	0.3	-4.5	-3.7	-8.2	-9.4
Glazing:			-										
Ventilator type:			-										
2 bedroom, 3 person house													
Bedroom 1, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		63	60	61	64	64	51	56	55	56	56	55
B	Exposed façade, m ²	5.2		7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		13	28.8	25.1	23.3	19.3	-1.6	-5.4	-10.2	-9.4	-13.9	-15.1
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		16	31.8	28.1	26.3	22.3	1.4	-2.4	-7.2	-6.4	-10.9	-12.1
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				32.8	31.0	30.0	20.1	28.3	24.5	20.3	15.8	
N	Internal room noise level, vent open		32		34.1	32.3	30.7	20.2	28.3	24.5	20.3	15.8	
Glazing:			-										
Ventilator type:			-										
2 bedroom, 3 person house													
Bedroom 2, rear elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		63	60	61	64	64	51	56	55	56	56	55
B	Exposed façade, m ²	6.1		7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
C	Volume of receiving room, m ³	19.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI			21.4	26.4	31.4	31.0	42.6	51.4	45.2	56.2	61.2	64.5
G	A + B + E - F		25	38.2	34.5	32.7	33.1	8.6	4.0	9.4	-0.8	-5.3	-9.8
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		28	41.2	37.5	35.7	36.1	11.6	7.0	12.4	2.2	-2.3	-6.8
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				32.1	30.3	29.3	19.4	27.6	23.8	19.6	15.1	
N	Internal room noise level, vent open		33		38.6	36.8	36.9	20.1	27.7	24.1	19.7	15.2	
Glazing:			6mm - 16mm - 6.4mm (SGG)										
Ventilator type:			Greenwood 4000S										
2 bedroom, 3 person house													
Bedroom 2, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		63	60	61	64	64	51	56	55	56	56	55
B	Exposed façade, m ²	7.6		8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
C	Volume of receiving room, m ³	19.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		16	32.5	28.8	27.0	23.0	2.1	-1.7	-6.5	-5.7	-10.2	-11.4
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		19	35.5	31.8	30.0	26.0	5.1	1.3	-3.5	-2.7	-7.2	-8.4
Glazing:			-										
Ventilator type:			-										

Mayton Street, Openshaw													
Break-in Noise Calculations - 2 bedroom, 3 person house (position 4 levels)													
<u>L_{Aeq} Assessment, daytime</u>													
2 bedroom, 3 person house													
<u>Living/dining room, rear elevation</u>													
<i>* Octave Band Centre Frequency, Hz</i>			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L _{Aeq}		57	70	65	58	53	53	54	48	44	36	25
B	Exposed façade, m ²	11.4		10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
C	Volume of receiving room, m ³	40.1											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2
F	Composite SRI			18.3	23.3	28.3	27.6	39.4	48.3	41.6	53.3	58.3	62.5
G	A + B + E - F		21	50.9	41.2	28.7	24.8	13.2	4.6	6.1	-10.2	-22.7	-37.8
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		24	53.9	44.2	31.7	27.8	16.2	7.6	9.1	-7.2	-19.7	-34.8
K	Number of ventilators	1											
L	Ventilator D _{n,e}				31	36	37	34	30	33	38	43	
M	L _{Aeq} - D _{n,e} + 10*log(10) - B				33.5	21.0	15.3	18.6	22.9	14.7	5.1	-7.4	
N	Internal room noise level, vent open		27		44.5	32.0	28.0	20.6	23.1	15.8	5.4	-7.1	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													
2 bedroom, 3 person house													
<u>Living/dining room, gable</u>													
<i>* Octave Band Centre Frequency, Hz</i>			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L _{Aeq}		57	70	65	58	53	53	54	48	44	36	25
B	Exposed façade, m ²	4.5		6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
C	Volume of receiving room, m ³	40.1											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		6	37.2	27.5	15.0	6.3	-1.4	-9.1	-18.3	-22.9	-35.4	-46.3
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		9	40.2	30.5	18.0	9.3	1.6	-6.1	-15.3	-19.9	-32.4	-43.3
Glazing: -													
Ventilator type: -													
2 bedroom, 3 person house													
<u>Living/dining room, gable</u>													
<i>* Octave Band Centre Frequency, Hz</i>			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L _{Aeq}		57	70	65	58	53	53	54	48	44	36	25
B	Exposed façade, m ²	9.2		9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6
C	Volume of receiving room, m ³	40.1											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		9	40.3	30.6	18.1	9.4	1.7	-6.0	-15.2	-19.8	-32.3	-43.2
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		12	43.3	33.6	21.1	12.4	4.7	-3.0	-12.2	-16.8	-29.3	-40.2
K	Number of ventilators	1											
L	Ventilator D _{n,e}				31	36	37	34	30	33	38	43	
M	L _{Aeq} - D _{n,e} + 10*log(10) - B				34.5	22.0	16.3	19.6	23.9	15.7	6.1	-6.4	
N	Internal room noise level, vent open		26		37.1	24.6	17.7	19.7	23.9	15.7	6.1	-6.4	
Glazing: -													
Ventilator type: -													
			Combined noise level, dB(A)	27									

2 bedroom, 3 person house													
Bedroom 1, front elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		57	70	65	58	53	53	54	48	44	36	25
B	Exposed façade, m²	11.4		10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
C	Volume of receiving room, m³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			18.3	23.3	28.3	27.6	39.4	48.3	41.6	53.3	58.3	62.5
G	A + B + E - F		22	52.0	42.3	29.8	25.8	14.3	5.7	7.2	-9.1	-21.6	-36.7
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		25	55.0	45.3	32.8	28.8	17.3	8.7	10.2	-6.1	-18.6	-33.7
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				33.5	21.0	15.3	18.6	22.9	14.7	5.1	-7.4	
N	Internal room noise level, vent open		28		45.5	33.0	29.0	21.0	23.1	16.0	5.4	-7.1	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													
2 bedroom, 3 person house													
Bedroom 1, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		57	70	65	58	53	53	54	48	44	36	25
B	Exposed façade, m²	9.7		9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
C	Volume of receiving room, m³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		10	41.6	31.9	19.4	10.7	3.0	-4.7	-13.9	-18.5	-31.0	-41.9
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		13	44.6	34.9	22.4	13.7	6.0	-1.7	-10.9	-15.5	-28.0	-38.9
Glazing: -													
Ventilator type: -													
2 bedroom, 3 person house													
Bedroom 1, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		57	70	65	58	53	53	54	48	44	36	25
B	Exposed façade, m²	5.2		7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
C	Volume of receiving room, m³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		7	38.9	29.2	16.7	8.0	0.3	-7.4	-16.6	-21.2	-33.7	-44.6
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		10	41.9	32.2	19.7	11.0	3.3	-4.4	-13.6	-18.2	-30.7	-41.6
Glazing: -													
Ventilator type: -													
			Combined noise level, dB(A)	28									
2 bedroom, 3 person house													
Bedroom 2, rear elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		57	70	65	58	53	53	54	48	44	36	25
B	Exposed façade, m²	6.1		7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
C	Volume of receiving room, m³	19.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI			21.4	26.4	31.4	31.0	42.6	51.4	45.2	56.2	61.2	64.5
G	A + B + E - F		18	48.3	38.6	26.1	21.8	10.5	2.0	3.0	-12.6	-25.1	-39.3
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		21	51.3	41.6	29.1	24.8	13.5	5.0	6.0	-9.6	-22.1	-36.3
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				36.2	23.7	18.0	21.3	25.6	17.4	7.8	-4.7	
N	Internal room noise level, vent open		28		42.7	30.2	25.6	22.0	25.7	17.7	7.9	-4.6	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													

2 bedroom, 3 person house													
Bedroom 1, front elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		57	70	65	58	53	53	54	48	44	36	25
B	Exposed façade, m²	11.4		10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
C	Volume of receiving room, m³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			18.3	23.3	28.3	27.6	39.4	48.3	41.6	53.3	58.3	62.5
G	A + B + E - F		22	52.0	42.3	29.8	25.8	14.3	5.7	7.2	-9.1	-21.6	-36.7
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		25	55.0	45.3	32.8	28.8	17.3	8.7	10.2	-6.1	-18.6	-33.7
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				33.5	21.0	15.3	18.6	22.9	14.7	5.1	-7.4	
N	Internal room noise level, vent open		28		45.5	33.0	29.0	21.0	23.1	16.0	5.4	-7.1	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													
2 bedroom, 3 person house													
Bedroom 1, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		57	70	65	58	53	53	54	48	44	36	25
B	Exposed façade, m²	9.7		9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
C	Volume of receiving room, m³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		10	41.6	31.9	19.4	10.7	3.0	-4.7	-13.9	-18.5	-31.0	-41.9
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		13	44.6	34.9	22.4	13.7	6.0	-1.7	-10.9	-15.5	-28.0	-38.9
Glazing: -													
Ventilator type: -													
2 bedroom, 3 person house													
Bedroom 1, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		57	70	65	58	53	53	54	48	44	36	25
B	Exposed façade, m²	5.2		7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
C	Volume of receiving room, m³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		7	38.9	29.2	16.7	8.0	0.3	-7.4	-16.6	-21.2	-33.7	-44.6
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		10	41.9	32.2	19.7	11.0	3.3	-4.4	-13.6	-18.2	-30.7	-41.6
Glazing: -													
Ventilator type: -													
			Combined noise level, dB(A)	28									
2 bedroom, 3 person house													
Bedroom 2, rear elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		57	70	65	58	53	53	54	48	44	36	25
B	Exposed façade, m²	6.1		7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
C	Volume of receiving room, m³	19.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI			21.4	26.4	31.4	31.0	42.6	51.4	45.2	56.2	61.2	64.5
G	A + B + E - F		18	48.3	38.6	26.1	21.8	10.5	2.0	3.0	-12.6	-25.1	-39.3
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		21	51.3	41.6	29.1	24.8	13.5	5.0	6.0	-9.6	-22.1	-36.3
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				36.2	23.7	18.0	21.3	25.6	17.4	7.8	-4.7	
N	Internal room noise level, vent open		28		42.7	30.2	25.6	22.0	25.7	17.7	7.9	-4.6	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													

2 bedroom, 3 person house													
Bedroom 2, rear elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	54	55	49	44	42	44	36	27	20	14
B	Exposed façade, m ²	6.1		7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
C	Volume of receiving room, m ³	19.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI			21.4	26.4	31.4	31.0	42.6	51.4	45.2	56.2	61.2	64.5
G	A + B + E - F		8	32.1	28.3	17.6	13.0	-0.5	-7.2	-9.2	-29.8	-41.4	-50.8
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		11	35.1	31.3	20.6	16.0	2.5	-4.2	-6.2	-26.8	-38.4	-47.8
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				25.9	15.2	9.2	10.3	16.4	5.2	-9.4	-21.0	
N	Internal room noise level, vent open		18		32.4	21.7	16.8	11.0	16.5	5.5	-9.3	-20.9	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													
2 bedroom, 3 person house													
Bedroom 2, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Aeq}		47	54	55	49	44	42	44	36	27	20	14
B	Exposed façade, m ²	7.6		8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
C	Volume of receiving room, m ³	19.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		1	26.4	22.6	11.9	2.9	-7.0	-12.9	-25.1	-34.7	-46.3	-52.4
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		4	29.4	25.6	14.9	5.9	-4.0	-9.9	-22.1	-31.7	-43.3	-49.4
Glazing: -													
Ventilator type: -													
			Combined noise level, dB(A)	19									
L _{Amax} Assessment, night time													
2 bedroom, 3 person house													
Bedroom 1, front elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		59	61	65	56	55	61	53	44	40	36	29
B	Exposed façade, m ²	11.4		10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			18.3	23.3	28.3	27.6	39.4	48.3	41.6	53.3	58.3	62.5
G	A + B + E - F		23	42.8	41.7	27.8	27.8	21.8	5.6	3.3	-13.3	-22.0	-33.0
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		26	45.8	44.7	30.8	30.8	24.8	8.6	6.3	-10.3	-19.0	-30.0
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				32.9	19.0	17.3	26.1	22.8	10.8	0.9	-7.8	
N	Internal room noise level, vent open		29		44.9	31.0	31.0	28.5	23.0	12.1	1.2	-7.5	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													

2 bedroom, 3 person house													
Bedroom 1, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		59	61	65	56	55	61	53	44	40	36	29
B	Exposed façade, m ²	9.7		9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		11	32.4	31.3	17.4	12.7	10.5	-4.8	-17.8	-22.7	-31.4	-38.2
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		14	35.4	34.3	20.4	15.7	13.5	-1.8	-14.8	-19.7	-28.4	-35.2
Glazing: -													
Ventilator type: -													
2 bedroom, 3 person house													
Bedroom 1, gable													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		59	61	65	56	55	61	53	44	40	36	29
B	Exposed façade, m ²	5.2		7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
C	Volume of receiving room, m ³	31.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
F	Composite SRI			28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		8	29.7	28.6	14.7	10.0	7.8	-7.5	-20.5	-25.4	-34.1	-40.9
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		11	32.7	31.6	17.7	13.0	10.8	-4.5	-17.5	-22.4	-31.1	-37.9
Glazing: -													
Ventilator type: -													
Combined noise level, dB(A)			29										
2 bedroom, 3 person house													
Bedroom 2, rear elevation													
* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}		59	61	65	56	55	61	53	44	40	36	29
B	Exposed façade, m ²	6.1		7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
C	Volume of receiving room, m ³	19.2											
D	Reverb Time, seconds			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))			-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI			21.4	26.4	31.4	31.0	42.6	51.4	45.2	56.2	61.2	64.5
G	A + B + E - F		19	39.1	38.0	24.1	23.8	18.0	1.9	-0.9	-16.8	-25.5	-35.6
H	K = 3			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I													
J	Calculated internal noise level		22	42.1	41.0	27.1	26.8	21.0	4.9	2.1	-13.8	-22.5	-32.6
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10 \cdot \log(10) - B$				35.6	21.7	20.0	28.8	25.5	13.5	3.6	-5.1	
N	Internal room noise level, vent open		30		42.1	28.2	27.6	29.5	25.6	13.8	3.7	-5.0	
Glazing: 6mm - 16mm - 6.4mm (SGG)													
Ventilator type: Greenwood 4000S													

2 bedroom, 3 person house														
Bedroom 2, gable														
* Octave Band Centre Frequency, Hz														
				dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{Amax}			59	61	65	56	55	61	53	44	40	36	29
B	Exposed façade, m ²	7.6			8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
C	Volume of receiving room, m ³	19.2												
D	Reverb Time, seconds				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
E	10 x Log(RT60/(0.163 x V))				-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
F	Composite SRI				28.0	33.0	38.0	42.0	50.0	58.0	62.0	62.0	67.0	67.0
G	A + B + E - F		12		33.4	32.3	18.4	13.7	11.5	-3.8	-16.8	-21.7	-30.4	-37.2
H	K = 3				3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
I														
J	Calculated internal noise level			15	36.4	35.3	21.4	16.7	14.5	-0.8	-13.8	-18.7	-27.4	-34.2
Glazing:			-											
Ventilator type:			-											
Combined noise level, dB(A)				30										