Assessment of the Existing Noise Climate in the Vicinity of the New Residential Development on the site of the Former Rose and Crown Public House, Knowl Road, Golcar

Report Prepared for:

Mr. Sam Maqbool
Sovereign Development Group Ltd
12 Welney Road
Manchester
M16 0EN

Report Prepared By:

Robert Smith

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✉ ***Druk*** Limited, 87 St Albans Road, Halifax, HX3 0ND
☎ 07917 727 901
rsmith@druklimited.co.uk
www.druklimited.co.uk
Registered in England: 06380955

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1.0 Summary

Outline planning permission was secured in May 2023 permitting the partial demolition of the former Rose and Crown public house on Knowl Road in Golcar, and the formation of seven new residential dwellings on the land formerly occupied by the public house. The outline planning permission was granted subject to a number of planning conditions of which one, condition 21, dealt specifically with the existing acoustic environment in the vicinity of the residential dwellings and the effect this may have on the permitted development.

In compliance with the requirements contained with planning condition 21, Druk Limited was commissioned to undertake an assessment of the existing noise climate in the immediate vicinity of the permitted development. In addition the sound insulation of the permitted building envelopes will be assessed and, using the data from the existing noise climate survey, suitable façade elements will be specified to limit the ingress of external noise.

The existing noise climate in the vicinity of the former Rose and Crown public house was characteristic of a sub-urban environment, subject to noise contributions primarily from road traffic, but the overall noise climate was not regarded as being particularly noisy.

Applying the measured noise levels from the existing noise climate surveys and the stated assumptions relating to the sound insulation of the permitted development, calculations have been undertaken to assess the likely internal noise levels within the houses. The calculations have demonstrated that the sound insulation of the proposed building elements would ensure that the calculated break-in sound levels within the permitted houses would not exceed the adopted design guide values under the windows closed and ventilation openings, open, condition. Where the widows are partially opened for ventilation it is likely that this would result in the internal noise levels exceeding the design guide levels.

Despite this the daytime situation within plots 3, 4, 5 and 6 and the night time situation in all but plots 1 and 2, would indicate that the windows could be partially opened for ventilation purposes without resulting in the internal noise climate exceeding the design guide levels. As a consequence it is suggested that in all but plots 1 and 2, that natural ventilation of the permitted houses would be possible without leading to a significant deterioration in the internal noise climate. Despite this, it is suggested that consideration is given to providing plots 1 and 2 plots with an alternative means of ventilation, permitting the internal spaces to be ventilated without requiring the windows to be opened should be considered.

The results of the assessments have indicated that the sound insulation of the proposed façade elements and possible alternative ventilation provision, would be sufficient to limit the ingress of external noise to the permitted houses in compliance with the adopted design guidance. As such, it is suggested that the permitted houses could be integrated into the existing environment without the potential for "*unreasonable restrictions*" to be placed upon already established businesses in the vicinity.

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2.0 Introduction

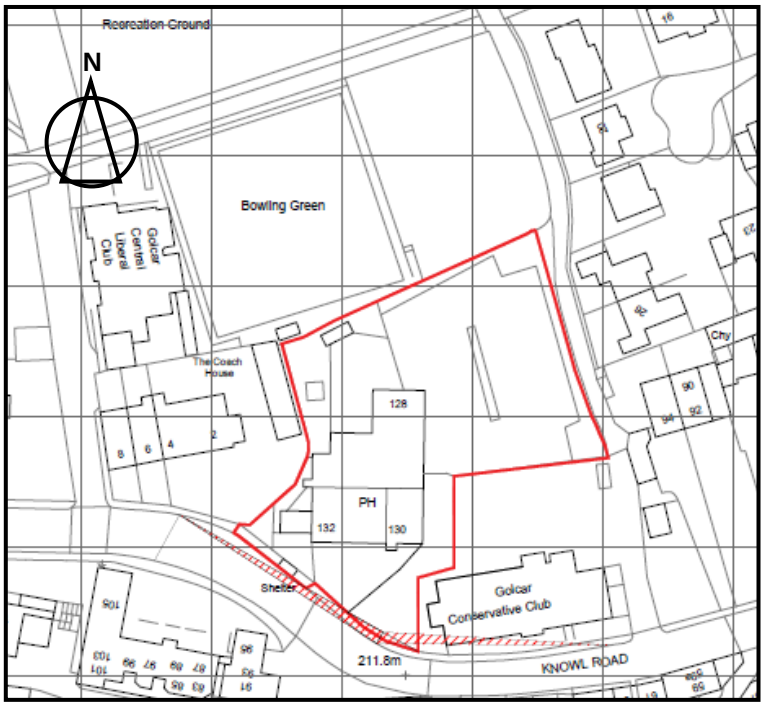
Outline planning permission was secured in May 2023 permitting the partial demolition of the former Rose and Crown public house on Knowl Road in Golcar, and the formation of seven new residential dwellings on the land formerly occupied by the public house. The outline planning permission was granted subject to a number of planning conditions of which one, condition 21, dealt specifically with the existing acoustic environment in the vicinity of the residential dwellings and the effect this may have on the permitted development.

In compliance with the requirements contained with planning condition 21, Druk Limited was commissioned to undertake an assessment of the existing noise climate in the immediate vicinity of the permitted development. In addition the sound insulation of the building envelopes will be assessed and, using the data from the existing noise climate survey, suitable façade elements will be specified to limit the ingress of external noise.

3.0 Site Description

The permitted residential development will be formed on the site of the former Rose and Crown public house on Knowl Road in Golcar (figure 1 below and photograph 1 overleaf). To the North of the former public house is the rear yard area (photograph 2 overleaf) that is appears to be used by a vehicle recovery business, with a bowling green beyond. With reference to the vehicle recovery business, it is understood that this will vacate the area upon commencement of the residential development. To the South of the former public house is Knowl Road itself with the existing residential dwellings beyond (photograph 3 overleaf). To the East of the former public house is the car park of the former public house itself and the rear car park serving the Golcar Conservative Club (photograph 4 overleaf). To the West of the former public house are further additional residential dwellings on Knowl Road (photograph 5 overleaf).

Figure 1. Site of the permitted residential development (edged in red), Former Rose and Crown p.h.



Photograph 1. Former Rose and Crown public house, Knowl Road, Golcar

Photograph 2. Vehicle recovery yard to the North of the former public house

Photograph 3. Knowl Road and existing residential dwellings to the South of the former public house

Photograph 4. Car park serving the former public house and the Conservative Club to the Est of the former public house

Photograph 5. Existing residential dwellings to the West of the former public house

4.0 Assessment Criteria

As planning permission has been granted, reference will be made to the conditions contained within the planning permission document. Of the conditions listed in the planning permission, condition 21 relates specifically to the acoustic conditions that are to be met within the permitted dwelling and in any garden or on any balconies appurtenant to the dwelling. The requirements of planning condition 21 are reproduced below:

21. *A noise assessment report by a suitably competent person, shall be submitted as part of the reserved matters submission for appearance and scale specifying the measures to be taken to protect the development from noise from Golcar Conservative Club and Golcar Liberal Club.*
The report shall:-
a. Determine the existing noise climate (daytime and night-time)
b. Predict the noise climate in gardens (daytime), bedrooms (night-time) and other habitable rooms of the development
c. Detail the proposed attenuation/design necessary to protect the amenity of the occupants of the new residences (including ventilation if required) and to allow the continued operational flexibility of the adjacent commercial properties.
The development shall not be brought into use until all works comprised within the measures specified in the approved report have been carried out in full and such works shall be thereafter retained.

Reason: *In the interests of residential amenity of future occupiers, to protect the*

continued operational flexibility of nearby commercial uses and to accord with Policies LP24 and LP52 of the Kirklees Local Plan and Policy within Chapter 15 of the National Planning Policy Framework.

With reference to the internal and external noise climate of the permitted dwellings reference will be made to guidance contained within documents such as British Standard (BS) 8233:2014 “Guidance on sound insulation and noise reduction for buildings” and other appropriate guidance contained within documents such as the Kirklees Council "Noise Design Advice" issued in May 2007 and the National Planning Policy Framework. In addition a basic overview of the ventilation options detailed within Approved Document F (ADF) will also be discussed below.

4.1 8233:2014 “Guidance on Sound Insulation and Noise Reduction for Buildings”

BS 8233:2014 draws together research and best practice relating to building design, providing guidance to facilitate the development of buildings that have internal noise environments that are consistent with and appropriate for their intended use. The Standard states that the guidance it contains is applicable to the design of new buildings, or refurbished buildings undergoing a change of use and as such it is deemed applicable to this proposal.

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 dwelling houses flats and rooms in residential use, it is suggested that the guidance is applicable to 'anonymous' noise without a '*specific'* character, and this is typically the situation where road traffic type noise is the dominant or principal contributor to the existing noise climate. This being the case BS 8233:2014 indicates that it would be desirable for the internal noise levels, resulting from the break-in of external noise, not to exceed the guide values detailed within table 4 of section 7.7.2. The main elements of the guidance contained within table 4 of section 7.7.2 of BS 8233:2014 are reproduced in table 1 below.

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

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

In addition to the internal noise design guidance detailed above, supplementary note 5 of section 7.7.2 is deemed appropriate to this assessment and states the following:

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

4.2 Kirklees Council "Noise Design Advice"

This document was produced in May 2007 and provides guidance to developers as to how acceptable noise levels can be achieved, so protecting the existing noise environment in the vicinity of the proposed development. The guidance document covers a range of scenarios ranging from the assessment of commercial, industrial, entertainment, residential noise etc., and the criteria that would be considered acceptable when evaluating what effect such development may have on the existing noise environment.

Of the many scenarios covered in the guidance document, it is thought that section 5 is the most directly applicable to the potential emission of sound from the Conservative and Liberal clubs and its potential interaction with the permitted development. With this in mind the relevant section is reproduced below:

5. New Noise Sensitive Premises near to Places of Entertainment

This advice aims to protect your new residents from noise from existing places of entertainment.

Developers should assess the likely impact of the entertainment premises on the noise environment. The residential premises must be designed to ensure that music and associated noise is inaudible inside any residential premises in the vicinity. The minimum acceptable standard is:

5.1.1 NR 20 in bedrooms (2300 to 0700)
5.1.2 NR 25 in all habitable rooms (0700 to 2300)
5.1.3 All indoor levels shall be taken with windows open or closed (which ever makes the music appear louder) or with alternatively provided acoustic ventilation over and above "background" ventilation.
5.1.4 Noise Rating curves should be measured as a 15 minute linear L_{eq} at the octave band centre frequencies 31.5 Hz to 8 kHz.
5.1.5 Other noise sources from the places of entertainment, such as air conditioning plant and kitchen odour extraction systems shall be treated as industrial development and scenario 3 is applicable.

4.3 National Planning Policy Framework (NPPF), the Noise Policy Statement for England (NPSE) and the National Planning Practice Guidance (NPPG)

The National Planning Policy Framework (NPPF), the Noise Policy Statement for England (NPSE), originally released in 2010, and the National Planning Practice Guidance (NPPG) do not provide quantitative criteria for assessment purposes. Instead the documents detail general policy aims, statements as well as providing some guidance on how certain situations can be interpreted.

The main statement on noise contained within the revised NPPF, issued in December 2023, is to be found in paragraph 185:

185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural

environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and

c) Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

In addition, paragraph 187 of the NPPF is of particular relevance to the requirements contained within planning condition 21, stating:

187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

4.4 Ventilation - Approved Document F (ADF)

With reference to the relevant guidance relating to the ventilation of dwellings, this is contained within Approved Document F (ADF) guidance to the Building Regulations 2010, currently in the 2021 edition as it relates to dwellings.

In summary the ventilation strategies outlined in ADF relies on a combination of approaches, including: Extract ventilation to remove water vapour or pollutants; whole dwelling ventilation to provide fresh air to the building and to dilute, disperse and remove water vapour and pollutants not removed by extract ventilation and purge ventilation to remove high concentrations of pollutants and water vapour. With reference to extract ventilation in individual rooms this is typically achieved via intermittent extraction fans, whole house ventilation is often achieved through a combination of background (trickle) ventilators and/or continuous supply fans and. It is acknowledged that purge ventilation is typically achieved through the opening of windows. ADF also states that "*Other ventilation systems may be acceptable if they can be shown to meet an equal level of performance*".

Approved Document F details four main types of ventilation systems that can be used to provide ventilation to dwellings, typically described as systems 1 to 4. A summary of these systems is provided within table 2 overleaf and this table also provides additional annotation that is expands upon the details provided within ADF.

Table 2. Summary of the ADF ventilation systems 1 - 4

Ventilation system	Purge ventilation
System 1: background ventilation (trickle ventilators) and intermittent extraction fans	Typically provided by opening windows
System 2: passive stack (natural)	Typically provided by opening windows
System 3: Continuous mechanical extraction (MEV) (Trickle ventilators provide inlet air)	Typically provided by opening windows
System 4: Continuous mechanical supply and extract with heat recovery (MVHR)	Typically provided by opening windows

Ventilation provisions conforming with the descriptions of systems 1, 3 and 4 are most commonly found within dwellings. With reference to purge ventilation, this can and is typically used to address the thermal comfort of occupants, although the issue of thermal comfort is not 'controlled' by the Building Regulations.

It should however be borne in mind that when specifying the ventilation provision for a dwelling, the interaction of the ventilation provision with the internal noise levels should be considered. This interaction is a result of the fact that the provision of suitable ventilation openings in a building façade can affect that the sound insulation of the façade elements, which in turn can affect the level of external noise break-in and so the internal noise levels that will prevail within a dwelling. Where this report proposes an appropriate type of ventilation provision in accordance with the general descriptions contained within table above, it is not intended to be a detailed ventilation design statement and a full evaluation of any ventilation provision is beyond the remit of this report.

The ventilation of the internal spaces of a dwelling can include the opening of windows to the provision of dedicated mechanical ventilation. With reference to the opening of windows, as suggested above this will not only permit the exchange of air but will also facilitate the ingress of external noise. In this respect the sound insulation provided by a window partially open for ventilation purposes can and do vary. With respect to the level of sound insulation provided by an open window, BS 8233:2014 quotes the 15dB 'rule of thumb' which suggests that where a window is partially open for ventilation purposes etc., the sound levels just outside the window will be around 15dB higher than the levels just inside the window. The "Acoustics Ventilation and Overheating Residential Design Guidance", formulated by the Association of Noise Consultants (ANC) suggests that a partially open window can provide a sound insulation value of around 13dB. Finally, data presented by Søndergaard & Egedal (2016) suggested that for a top hung window with an opening equivalent to 0.35m^2, a sound insulation value of around 9dB R_w would result.

5.0 Survey Details

5.1 Survey Times and Personnel

The noise surveys, to evaluate the existing noise climate in the vicinity of the former Rose and Crown public house on Knowl Road were undertaken between 16:00 - 19:00 hours on Friday 15th March 2024, between 23:00 - 02:00 hours on Friday 15th - Saturday 16th March 2024 and between 20:30 - 23:00 hours on Saturday 16th March 2024. These time periods were selected as they coincided with the peak afternoon traffic period (16:00 - 19:00 hours), The late evening/early night time shoulder period (23:00 - 02:00 hours) and a Saturday evening period (20:30 - 23:00 hours) which coincided with live music events were taking place within both the Golcar Conservative and Liberal clubs.

As a consequence it is suggested that the adopted measurement periods were representative of the existing noise climate and would include contributions from all the potential noise sources, including entertainment noise from both the Conservative and Liberal clubs, in the immediate vicinity of the permitted residential development. During the course of the existing noise climate surveys, the measurements were attended, and all measurements were conducted by Mr. R Smith of Druk Limited.

5.2 Weather

Throughout the existing noise climate surveys the weather conditions were as follows:

Friday 15th (afternoon) – Saturday 16th (early morning) March 2024

All surfaces were wet, cloud cover was 100%, the temperature ranged between 7 - 5°C throughout the surveys, the wind speed ranged between approximately 0.8m/s - 0.3m/s and the barometric pressure was approximately 977mb.

Saturday 16th (evening) March 2024

All surfaces were wet, cloud cover was 100%, the temperature was approximately 7°C, the wind speed was approximately 0.7m/s and the barometric pressure was approximately 990mb.

5.4 Equipment

All the noise surveys and measurements were conducted using the equipment detailed in the table 3 overleaf. The sound level meters were field calibrated before, after and during the surveys as necessary, during which time no significant deviations in the calibrated levels were observed. For the duration of the surveys the sound level meter microphones were mounted with weather protection enclosures.

Table 3. Equipment used during the existing noise climate measurements

Equipment description	Manufacturer	Model number	Serial number
Sound level meter	NTI Audio	XL2-TA	A2A-10232-E
Microphone pre-amplifier	NTI Audio	MA220	5537
Microphone	NTI Audio	M2230	8636
Sound level meter	NTI Audio	XL2-TA	A2A-23832-E1
Microphone pre-amplifier	NTI Audio	MA220	141157
Microphone	NTI Audio	M2230	A26843
Acoustic calibrator	Norsonic AS	Nor 1251	31522
Microphone weather protection enclosures	NTI Audio	WP30	-

5.4 Measurement Procedure

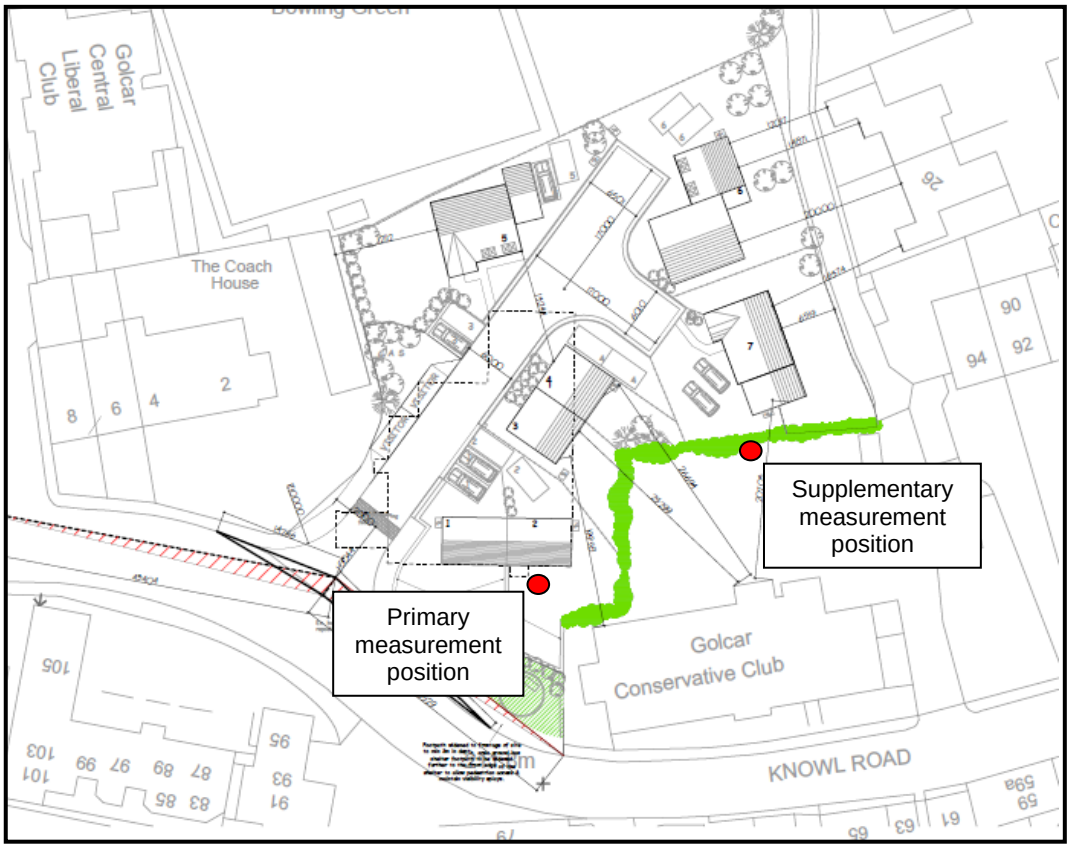
The location of the proposed development suggested that the principal contributors to the existing noise climate would be road traffic from vehicles on Knowl Road and potentially noise emanating from both the Conservative and Liberal clubs. As such two measurement positions were adopted during the noise surveys and these are detailed on figure 2 overleaf. The primary measurement position was used for continuous measurements made over the afternoon/evening and early night time of Friday 15th - Saturday 16th March. The supplementary measurement position was used to take a series of 'snapshot' measurements, to ascertain the difference in the overall noise levels between the two positions, over the same period.

With reference to potential noise emission from the Conservative and liberal clubs, the supplementary measurement position was used for continuous measurements on the evening of Saturday 16th March, during which live music events were being held at both the Conservative and Liberal clubs.

Ideally, further measurements would have been made towards the North of the site on what is currently the vehicle recovery yard. However, permission was not granted to make measurements in this area, therefore the measurements were restricted to those areas to which Druk Limited had free access. Despite this, it should be remembered that the vehicle recovery business will be relocated to facilitate to the construction of the permitted development. Therefore any contributions to the existing noise climate from this source would not affect the final residential development.

In both positions the sound level meter microphones were placed within weather protection enclosures which were mounted on tripods such that they were approximately 1.4 metres above ground level ad at least 3 metres from any large reflecting surfaces. Throughout the surveys all measurements were made with the ‘fast’ time weighting engaged, the measurement time interval was 5 minutes, all the measurements were made consecutively and the measurements were attended.

Figure 2. Approximate location of the noise survey measurement positions



6.0 Noise Survey Results

The existing noise climate in the vicinity of the former Rose and Crown public house was characteristic of a sub-urban environment, subject to noise contributions primarily from road traffic, but the overall noise climate was not regarded as being particularly noisy. With reference to the majority of the permitted development, plots 3 - 7 would be partially or fully screened from Knowl Road by the intervening buildings. The following paragraphs contain brief subjective descriptions of the noise sources noted during the survey periods.

6.1 Qualitative Assessment: 15th to 16th March - Afternoon and Night Time Periods

During the afternoon/evening survey period the principal contributor to the existing noise climate was road traffic on Knowl Road, the majority of witch comprised private cars although some light goods vehicles and buses were noted during the period. Overall the volume of traffic remained relatively constant throughout the measurement period, with a slight increase being noted between around 17:30 - 18:00 hours. With respect to the buses, a number of these stopped at the bus stop to the South West of the existing public house building. Whilst stationary the buses kept their engines running, although they were typically stationary for a relatively short period, as such it was felt the idling buses did not increase the overall noise levels from the respective measurement periods.

Additional sources of noise noted during this period included the intermittent use of what sounded like garden power tools from one of the nearby residential dwellings and occasional noise from children running across the car parks shouting to each other.

During the afternoon period noise believed to emanate from either the Conservative or Liberal clubs was audible in the primary or supplementary measurement positions.

Throughout the night time period, the principal contributor to the noise climate was road traffic noise, although the overall volume of traffic was considerably reduced when compared to the afternoon period. Again, private cars represented the dominant class of vehicle on the road, although the number of taxis on Knowl Road was significantly greater than was the case during the afternoon period. Despite this, after around 00:15 hours there were periods when there was no traffic on Knowl Road and during these periods the overall noise climate reduced quite significantly.

Additional sources of noise noted during the night time period included the intermittent sound of people walking along Knowl Road talking to each other, a very small number of vehicles entering and leaving the car park area to the rear of the Conservative Club and some noise from the surrounding houses. Again, no noise believed to emanate from either the Conservative or Liberal clubs was audible in the primary or supplementary measurement positions.

6.2 Qualitative Assessment: 16th March - Evening Period

Further measurements were made on the evening of the 16th March as both the Conservative and Liberal Clubs were hosting live music acts. In both cases the acts were male vocalists, Oli Patto at the Conservative Club and Ollie Whyte at the Liberal Club.

Between around 20:30 and 21:00 hours the principal contributor to the existing noise climate was road traffic noise and some noise from the vehicle recovery yard, including the sound of a recovery vehicle leaving the rear yard and what sounded like a motorcycle engine being revved. A further recovery vehicle arrived on the site to at around 21:30 hours and commenced the unloading of a vehicle, the whole process was achieved relatively quietly and took around 10 minutes to complete.

From around 21:00 hours it was noted that patrons of the Conservative Club tended to congregate within the smoking shelter to the rear of the Conservative Club building (photograph 6 overleaf). The number of patrons congregating on this structure ranged between approximately 4 -15 with a typical number being around 8. Whilst standing on the smoking platform the patrons tended to engage in conversation which at the time of the assessment included periods when the conversation was quite animated and louder in nature. With reference to the maximum number of patrons observed at any time on the smoking platform, the maximum of 15 patrons occurred between approximately 22:00 - 22:45 hours. With reference to the live act at the Conservative Club, observations indicated that this had ceased before 23:00 hours and discussions with the Conservative Club indicated that this finishing time was quite normal.

With respect to the live acts at both the Conservative and Liberal clubs, during the course of the evening survey, no noise from the direction of the Liberal Club was audible in the measurement position. Turning to the act at the Conservative Club, intermittent music noise was only just audible above the general traffic and patron noise during the very short periods that the back door of the club was open to allow people out onto the smoking area or back into the club. The live act within the Conservative

Club had finished at around 22:45 hours and the rear smoking area was clear by around 22:50 - 22:55 hours.

6.3 Basic Results and Discussion

By virtue of the large amounts of measured noise data collected from the surveys, tables 4 and 5 below and overleaf and graphs 1 - 3 overleaf contain summaries of the noise data from the afternoon and night time measurement surveys. A summary of the measured noise data are presented in Appendix 1.

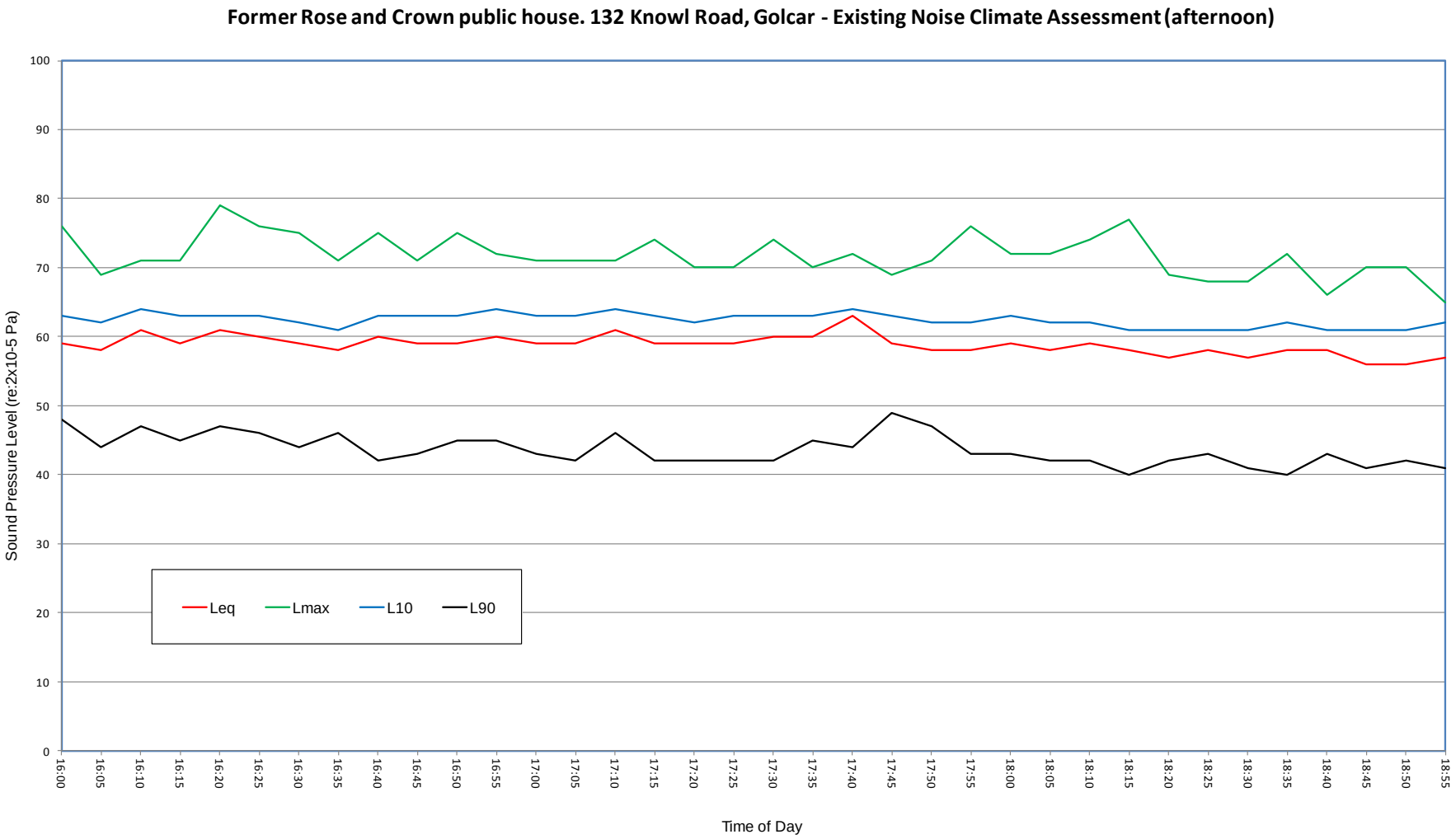
Table 4. Measured sound level summary, primary measurement position, former Rose and Crown public house, 15th to 16th March

	$L_{Aeq,T}$	$L_{Amax,T}$	$L_{A10,T}$	$L_{A90,T}$
Standard deviation, daytime period	1.42	2.81	0.99	2.07
Standard deviation, night time period	7.07	10.53	7.39	0.99
Mean (log), daytime period	59	73	62	44
Mean (log), night time period	49	68	50	32
Modal value, daytime period	59	71	63	42
Modal value, night time period	48	69	35	32
Maximum value daytime period	63	79	64	49
Minimum value daytime period	56	65	61	40
Maximum value night time period	56	76	58	35
Minimum value night time period	33	41	34	31

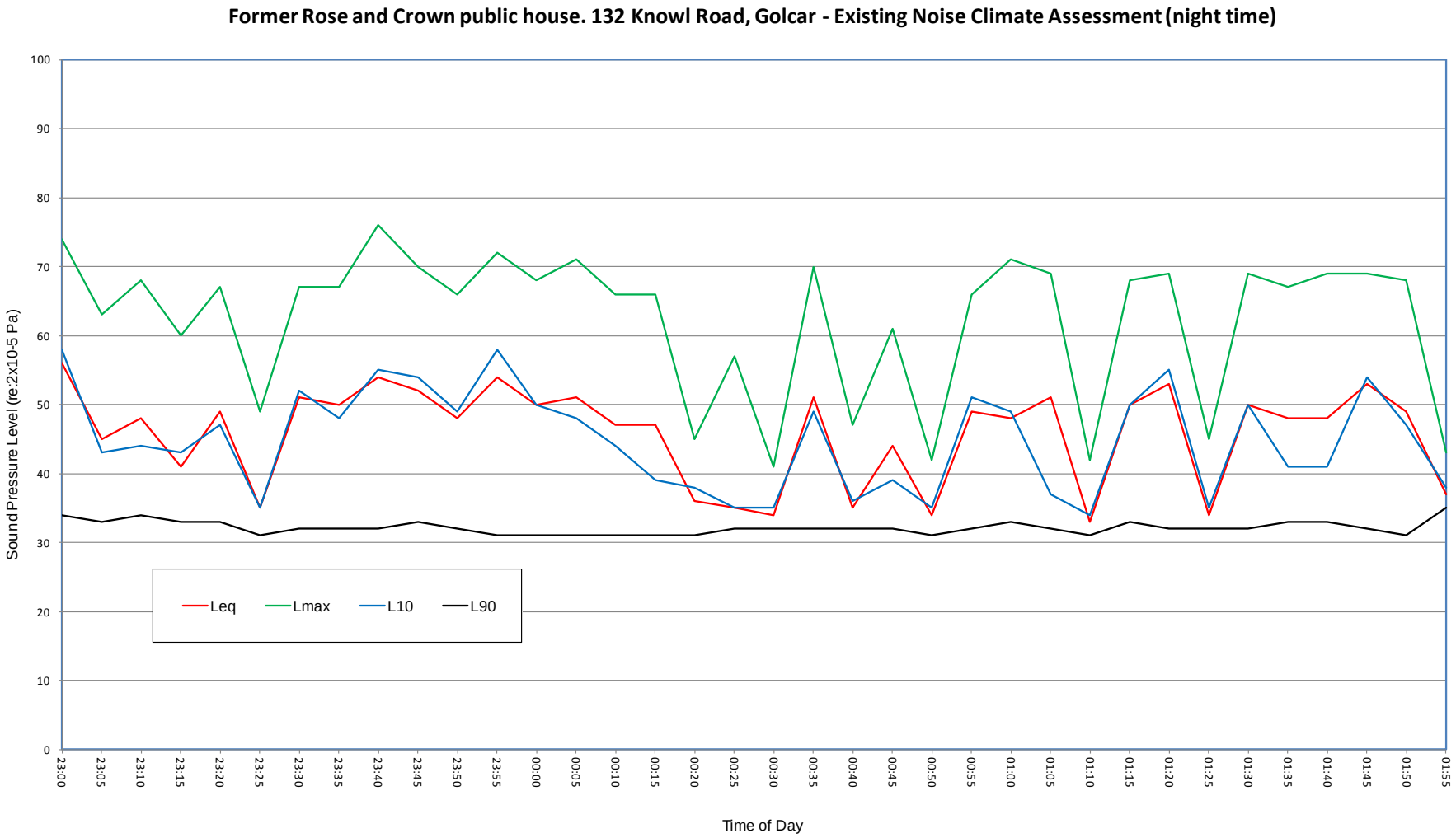
Table 5. Measured sound level summary, supplementary measurement position, former Rose and Crown public house, 16th March

	$L_{Aeq,T}$	$L_{Amax,T}$	$L_{A10,T}$	$L_{A90,T}$
Standard deviation, evening period	4.56	4.89	5.16	4.95
Mean (log), evening period	61	79	65	49
Modal value, evening period	57	78	63	49
Maximum value evening period	67	86	74	58
Minimum value evening period	50	68	53	38

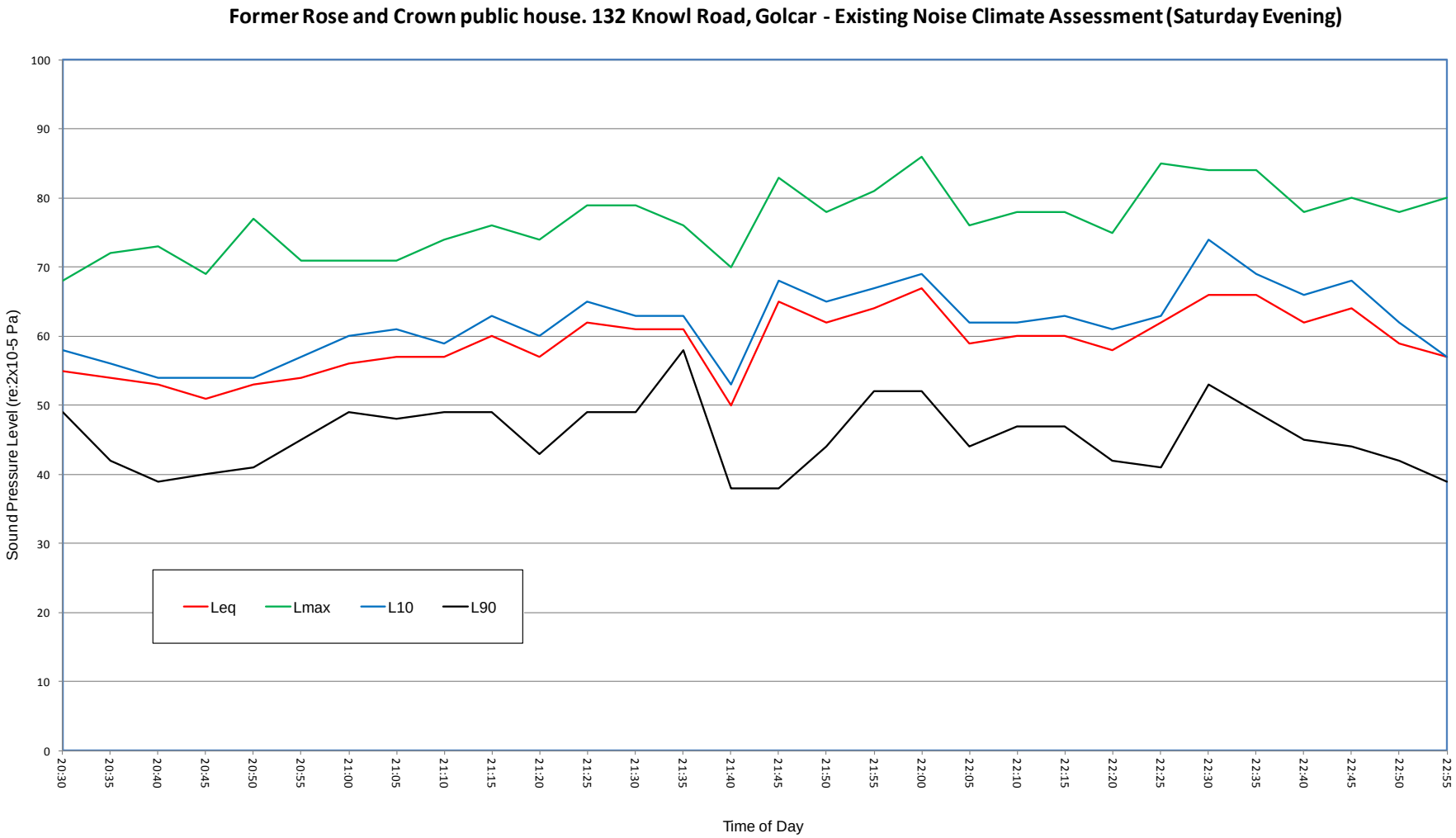
Graph1. Measured sound level summary, primary measurement position - daytime period, former Rose and Crown public house, 15th to 16th March



Graph 2. Measured sound level summary, primary measurement position - night time period, former Rose and Crown public house, 15th to 16th March



Graph 3. Measured sound level summary, supplementary measurement position - evening period, former Rose and Crown public house, 16th March



As can be seen from table 8 and graphs 1 and 2, the noise climate in the primary measurement position was considerably steadier during the afternoon/evening period than was the case during the night time period. The principal reason for the considerable variation in the overall noise level during the night time period was related to the fact that the volume of traffic on Knowl Road was greatly reduced. Consequently, there were periods when there were no cars on Knowl Road followed by periods during which a number of cars travelled along Knowl Road. The result being the considerable variation in the noise climate that is evident from table 8 and graph 1 and 2.

Turning to the evening measurements made in the supplementary measurement position on the Saturday evening, the noise climate was again quite variable during the period. This variability in the measured noise level was entirely a consequence of the source of the noise, the conversations of the people that had congregated on the rear smoking area, which itself varied with the number of patrons that had congregated to smoke.

7.0 Noise Propagation Modelling

As previously discussed, the measurements were obtained from areas that Druk Limited had free access to and this did not include the area that is currently used as the vehicle recovery yard. Figure 2 above highlights that the majority of the permitted development would be on land that was not available to Druk Limited. Consequently it is likely that the measured noise levels from the surveys would not fully represent the prevailing noise climate in the areas of the permitted development further to the North of the measurement positions.

With this in mind a noise modelling process was undertaken to provide an indication of the likely noise levels that would prevail across the permitted development as a consequence of 'normal' noise propagation. In this case the modelled noise propagation would relate to two scenarios: the propagation of road traffic noise only across the permitted development and the propagation of noise from a combination of road traffic noise and the noise from the Conservative Club patrons that had congregated on the rear smoking area. It is suggested that the two scenarios represent potentially the worst cases acoustically that the permitted dwellings may be exposed to. Noise modelling was not undertaken for any noise emission from the vehicle recovery yard as this will be relocated.

The modelling of the noise source propagation was undertaken using Cadna A software, produced by Datakustik. The Cadna A modelling software which calculates noise propagation based on the processes of *ISO 9613: Acoustics – Attenuation of sound during propagation outdoors*. With reference to the road traffic noise propagation, the measurements made in the supplementary measurement position were used to 'calibrate' the sound levels obtained from the primary measurement position and so also calibrate the noise model.

With reference to the propagation calculations, the software permits the effect of reflections and screening effects (from the intervening structures, buildings etc.), which would occur in what is a relatively complex propagation environment, to be taken into account. The noise modelling processes utilised the data obtained from the noise

surveys, with the highest noise levels from the surveys being as detailed in tables 6 and 7 below.

Table 6. Highest measured sound levels, primary measurement position, 15th - 16th March 2024

OBCF, Hz*	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**Overall, dB(A)**
Daytime, L_{Aeq}, (17:40 - 17:45 hours)	67	69	64	59	58	54	48	41	**63**
Night time, $L_{Aeq.}$ (23:00 - 23:05 hours)	66	57	53	50	53	48	37	27	**56**
Night time, $L_{Amax,}$ (23:40 - 23:45 hours)	77	69	66	66	75	64	61	46	**76**

Table 7. Highest measured sound levels, supplementary measurement position, 16th March 2024

OBCF, Hz*	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**Overall, dB(A)**
Daytime, L_{Aeq}, (22:00 - 22:05 hours)	58	52	56	66	65	56	48	36	**67**

The Cadna A modelling software, as with all other similar software, is reliant on all the inputs and assumptions. With reference to the assumptions made in the modelling process, the following key inputs and assumptions were applied during the propagation modelling:

- The ground is mainly reflective, with a coefficient of 0.25 assumed.
- Calculations are based on two orders of reflections.
- The site building and the surrounding buildings are assumed to be mainly reflective (0.5 dB loss on reflection assumed).
- The software then calculates the noise at the proposed locations of the permitted houses on the development. The predicted façade noise levels are calculated for both the front and rear elevations of the permitted houses.

The results of the noise modelling output are contained within Figures 3 - 6 overleaf. Figures 3 and 4 contain the results of the modelling of the road traffic noise propagation across the site during the day and night time periods respectively. Figure 5 contains the noise modelling results for the combined road traffic and Conservative Club patron noise levels scenario and figure 6 contains a 3D view of the development showing the general distribution of noise levels across the site.

The figures also contain a coloured key relating to the sound emission contours. Although useful as guides to the identification of the gross sound emission data, the contours presented on the images are not a substitute for the calculated noise levels displayed in the images. The calculated levels relate only to the transmission of noise from activity of the roof terraces and do not include any contributions from the plethora of other sources in the vicinity.

The yellow crosses present on figures 5 and 6 adjacent to both the Conservative and Liberal Clubs represent notional groups of people, typically 4 people per cross, concentrated on the rear elevations of the respective clubs.

Figure 3. Road traffic noise propagation, daytime scenario

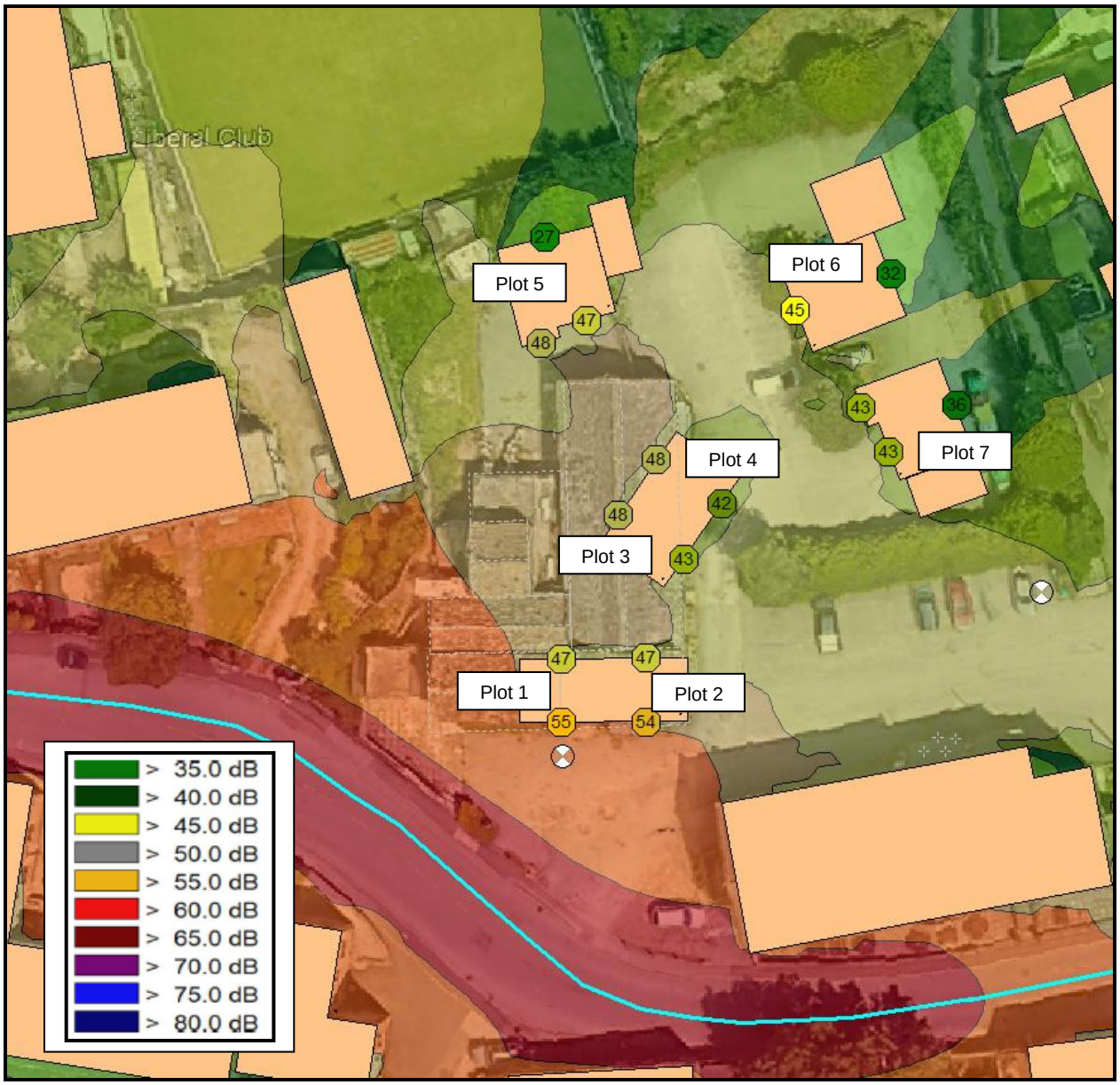


Figure 4. Road traffic noise propagation, night time scenario

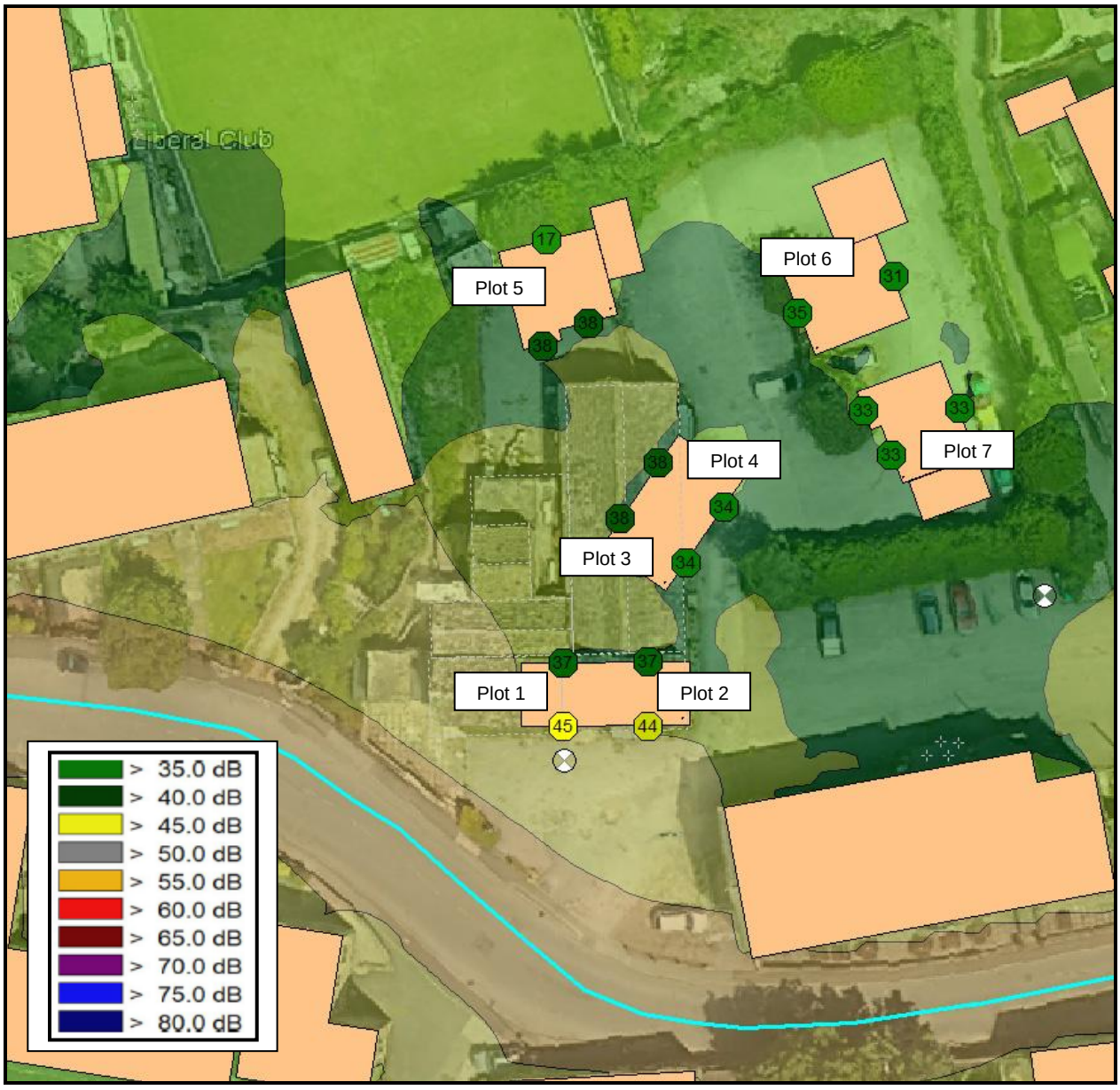


Figure 5. Road traffic and Conservative Club patron noise propagation, evening scenario

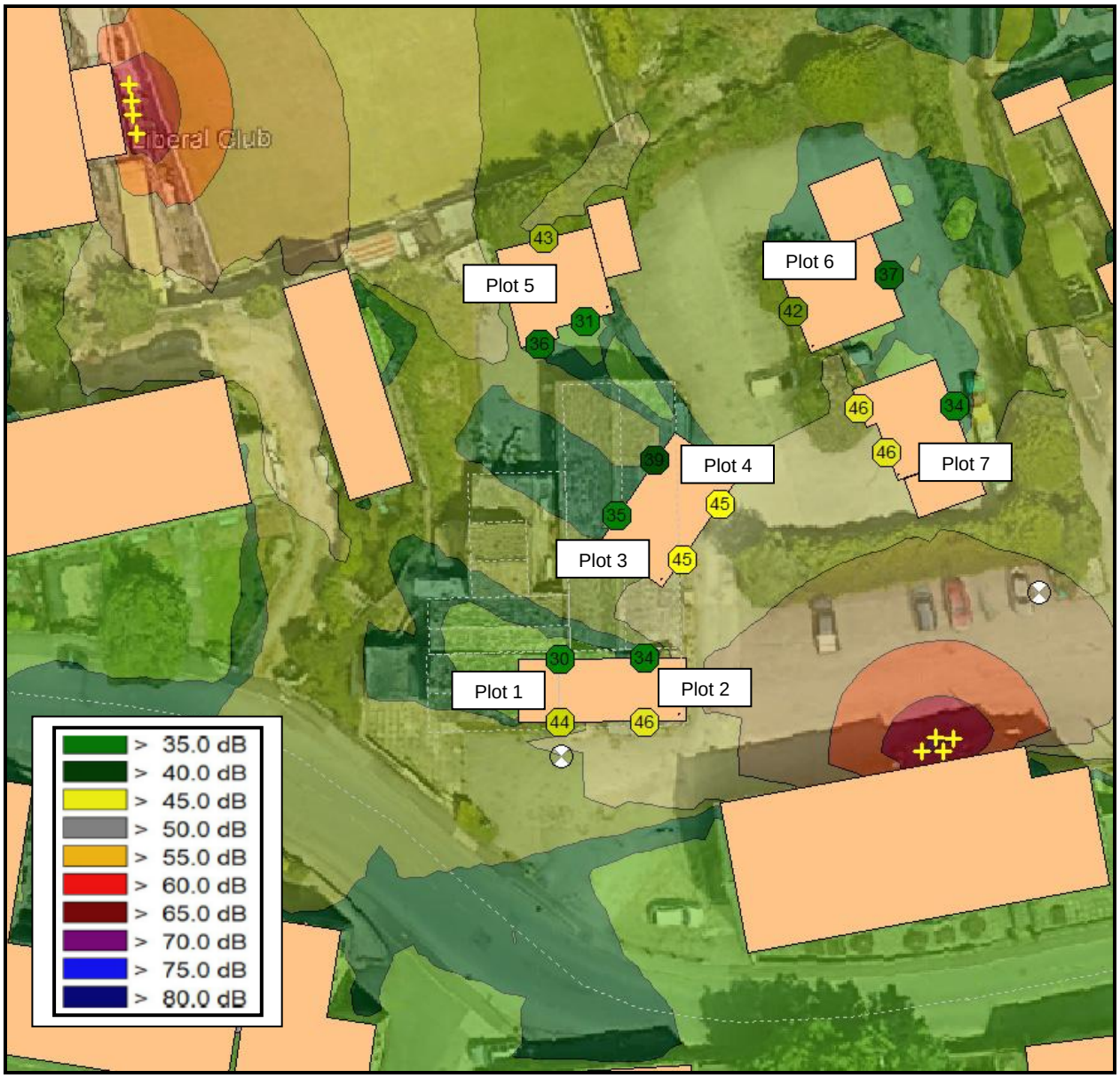
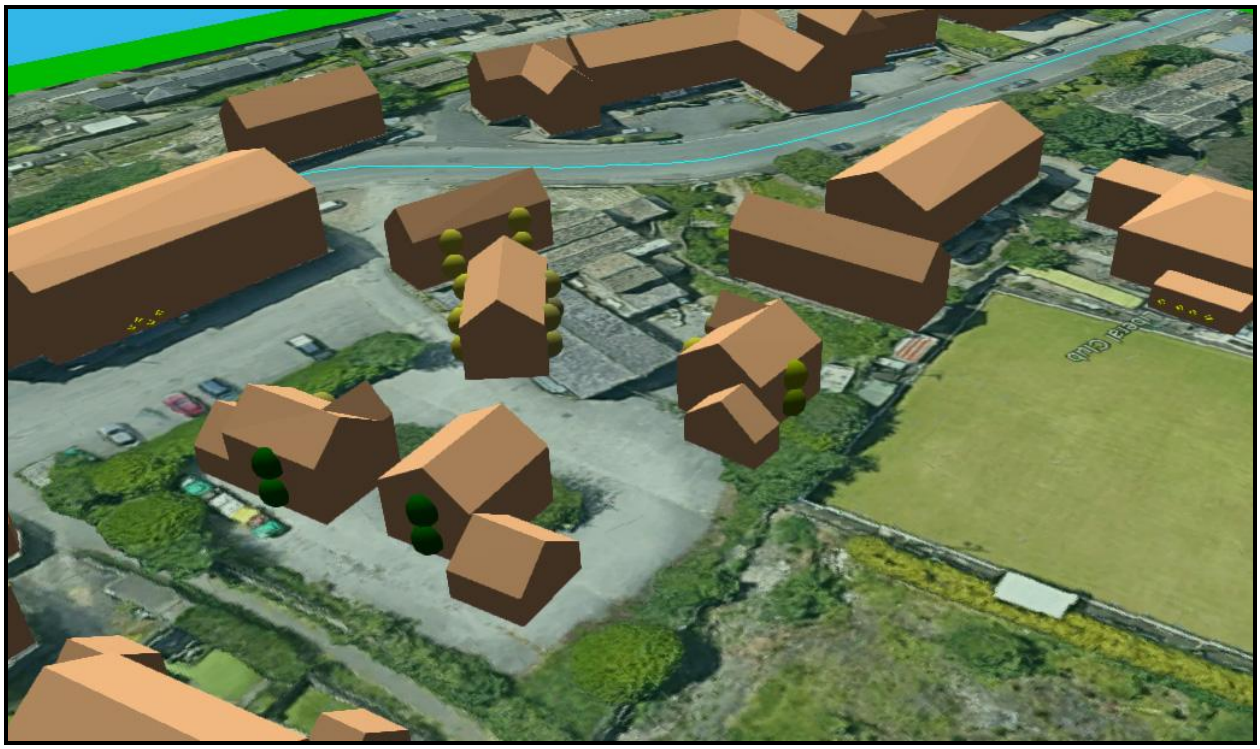


Figure 6. 3D plot of the distribution of sound across the development site



8.0 External Noise Break-in Calculations

Using the measured noise levels from the existing noise climate survey, calculations have been performed to assess the likely internal noise levels within the permitted residential development. The assessment has been conducted with reference to the design guidance detailed in section 4.0 above.

The subsequent assessment of the potential internal noise levels within the permitted houses, resulting from external noise break-in, will be undertaken using the highest measured levels from the noise surveys detailed in tables 6 and 7 above combined with the calculated levels from the noise propagation modelling detailed in figures 3 - 5 above. The modelled noise data will be particularly applicable for the houses towards the rear (North) of the permitted development site. By applying these measured and calculated noise levels, it is suggested that the following calculations may be regarded as worst case assessments using noise levels that are unlikely to persist for all but very short periods of time.

The following assessments of the likely internal noise levels within the proposed dwelling have been undertaken according to the room and façade dimensions detailed on the drawings issued by The Northern Design Partnership of Oldham. To facilitate the calculations to be made the following assumptions have been employed:

- The reverberation times within the habitable rooms will be 0.5 seconds.
- The floor to ceiling height will be approximately 2.4 metres.
- The calculations have been produced assuming the windows would be closed but the ventilation openings would be open.

Employing all the previous stages and stated assumptions, it is possible to provide an indication of the likely noise levels at the permitted house façades resulting from the propagation of both road traffic noise from Knowl Road and noise from the patrons of the Conservative Club using the rear smoking shelter.

With reference to the existing noise climate from the 15th - 16th March, this was dominated by noise that predominantly lacked specific character and so was regarded as being 'anonymous' in nature. This being the case, the assessment of the likely internal noise levels within the permitted residential development will be undertaken with reference to the design guide values detailed within BS8233:2014 and reproduced in table 1 above. With reference to the existing noise climate from the evening of the 16th March, as this contained noise with a 'specific character' and so was not regarded as being 'anonymous' noise, the guidance presented within section 5.0 of the Kirklees Council guidance, reproduced in section 4.3 above, will be employed and the internal noise levels will also be expressed in terms of the NR values. With reference to the calculated NR values, these will be assessed for plots 3, 4, 5, 6 and 7 only, as it is these dwellings that are most likely to be affected by the emission of noise from the Conservative and Liberal Clubs. As the observations indicated that the events within the Conservative Club had ceased before 23:00 hours, the NR assessments will be undertaken for the daytime period only.

The sound insulation provided by 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 and ventilation provision that can be considered as the ‘weak’ links acoustically, therefore increasing the sound insulation of these elements 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 basic construction specification of the permitted houses would be as follows.

8.1 Construction Specification

The external walls of the proposed development will include two types of construction. Plots 1 and 2 formed from the original public house building which is believed to be of solid masonry construction with the remaining new build houses being of cavity masonry construction.

External Walls - Solid Masonry Construction

The walls to the existing public house building are believed to be of solid masonry construction, at least 250 - 300mm thick. Test results for a similar construction suggest that solid masonry walls off this type should provide a sound insulation value of around 50dB R_w . The octave band sound insulation values for the solid wall construction being as detailed in table 8 below.

Table 8. External Solid Masonry Wall**,** Octave Band Sound Insulation Values

OBCF, Hz*	**125**	**250**	**500**	**1k**	**2k**	**4k**	**Overall, R_w dB(A)**
Sound Insulation, dB	36	41	45	49	57	61	50

* Octave Band Centre Frequency

External Walls - Cavity Masonry Walls

The new cavity walls are likely to be of the following general construction: an external brick leaf, a 75 - 100mm cavity and a 100mm thick aggregate block inner leaf lined with one layer of 12.5mm plasterboard on adhesive dabs. Test results for a similar construction suggest that cavity masonry walls of this type should provide a sound insulation value of around 502B R_w. The octave band sound insulation values being as detailed in table 9 below.

Table 9. Masonry Cavity Wall Construction**,** Octave Band Sound Insulation Values

OBCF, Hz*	**125**	**250**	**500**	**1k**	**2k**	**4k**	**Overall, R_w dB(A)**
Sound Insulation, dB	38	42	51	59	63	63	**52**

* Octave Band Centre Frequency

Glazing

The suggested glazing for the permitted residential development would be of the sealed unit type and would be of the following nominal specification: 4mm pane, 16/20mm cavity, 4mm pane. Laboratory test data obtained from Pilkington Glass indicate that this configuration should provide a sound insulation value of 29dB R_w. The octave band sound insulation values are as detailed in table 10 below.

Alternative glazing configurations would be acceptable providing the sound insulation performances are at least equivalent to the specifications detailed in table 10 below.

Table 10. Glazing, octave band sound insulation values

OBCF, Hz*	**125**	**250**	**500**	**1k**	**2k**	**4k**	**Overall, R_w (C_{tr}) dB**
4mm, 16/20mm, 4mm	24	20	25	35	38	35	**29 (-4)**

* Octave Band Centre Frequency

Ventilation

The initial assessments will be undertaken assuming the provision of input air via window frame mounted 'background' (trickle) ventilators. In this case the selected window frame mounted background ventilators of the Greenwood 4000EAV and Titan V5/C50 types have been selected. The Titan ventilator may be regarded as an 'acoustic' type ventilator, but units offering equivalent sound insulation performance to those selected would be acceptable.

Laboratory test data indicates that the Greenwood and Titan window frame mounted ventilators should provide sound insulation values of 33 and 42dB $D_{n,e,w}$ in their open positions. The octave band sound insulation values for the selected window frame mounted ventilator are detailed in table 11 overleaf. Alternative ventilator configurations would be acceptable providing the sound insulation performance of the units is at least equivalent to the specification detailed in table 11 overleaf.

Table 11. Background ventilation**,** octave band sound insulation values

OBCF, Hz*	125	250	500	1k	2k	4k	Overall, $D_{n,e,w}$ dB
Greenwood 40000EAV	36	37	34	30	33	38**	**33**
Titan V75/C50	40	37	34	43	50	53	**42**

* Octave Band Centre Frequency.
** Extrapolated value

8.2 Calculation Results and Discussion

For the purposes of the calculations the highest measured noise levels detailed in tables 6 and 7, distance corrected as appropriate, above were used for plots 1 and 2. In addition a combination of the highest measured levels and the highest calculated levels from the noise modelling exercise have been used for plots 3 - 7. For the purposes of the calculations it has been assumed that the windows would remain closed but the background ventilation would be in its open position.

The results of the break-in noise calculations, including the assumptions relating to the proposed façade elements detailed above, are presented with reference to the design guidance contained within section 4.0 above, in tables 12 - 16 below and overleaf. With respect to the presentation of the results of the calculations, with respect to the night time L_{Aeq} and L_{Amax} results these are presented in the same columns with the L_{Amax} results being contained within brackets. In order to comply with the guidance stated within the Kirklees 'Noise Design Advice' publication, the results of the daytime L_{Aeq} calculations are also presented in terms of the NR levels and these results are presented in red script in the appropriate columns for the daytime period only. Full data are available in Appendix 2.

Table 12. Calculated noise levels, plots 1 and 2

Location	Design target, daytime, dB L_{Aeq}	Calculated level, daytime, dB L_{Aeq}	Design target, night time, dB L_{Aeq}	Calculated levels, night time, dB L_{Aeq} and (L_{Amax})
Living room/kitchen*	35	**35**	-	**-**
Bedroom 1*	35	**35**	30 (45)	**26 (42)**
Bedroom 2*	35	**33**	30 (45)	**28 (44)**

*Titan V75/C50 ventilator

Table 13. Calculated noise levels, plots 3 and 4

Location	Design target, daytime, dB L_{Aeq}	Calculated level, daytime, dB L_{Aeq} and (NR value)	Design target, night time, dB L_{Aeq}	Calculated levels, night time, dB L_{Aeq} and (L_{Amax})
Living room/kitchen**	35	**20 (NR16)**	-	**-**
Bedroom 1**	35	**20 (NR17)**	30 (45)	**8 (41)**
Bedroom 2**	35	**20 (NR17)**	30 (45)	**8 (41)**
Bedroom 3**	35	**19 (NR17)**	30 (45)	**7 (41)**

**Greenwood 4000EAV ventilator

Table 14. Calculated noise levels, plot 5

Location	Design target, daytime, dB L_{Aeq}	Calculated level, daytime, dB L_{Aeq} and (NR value)	Design target, night time, dB L_{Aeq}	Calculated levels, night time, dB L_{Aeq} and (L_{Amax})
Dining/Lounge/kitchen**	35	**24 (NR21)**	-	**-**
Lounge*	35	**20 (NR18)**	-	**-**
Bedroom 1*	35	**20 (NR18)**	30 (45)	**9 (38)**
Bedroom 2**	35	**20 (NR18)**	30 (45)	**9 (38)**
Bedroom 3**	35	**20 (NR19)**	30 (45)	**9 (39)**

**Greenwood 4000EAV ventilator

Table 15. Calculated noise levels, plot 6

Location	Design target, daytime, dB L_{Aeq}	Calculated level, daytime, dB L_{Aeq} and (NR value)	Design target, night time, dB L_{Aeq}	Calculated levels, night time, dB L_{Aeq} and (L_{Amax})
Dining/Lounge/kitchen**	35	**19 (NR13)**	-	**-**
Lounge*	35	**18 (NR14)**	-	**-**
Bedroom 1*	35	**18 (NR13)**	30 (45)	**7 (37)**
Bedroom 2**	35	**19 (NR17)**	30 (45)	**8 (39)**
Bedroom 3**	35	**18 (NR15)**	30 (45)	**8 (39)**
Bedroom 4**	35	**21 (NR15)**	30 (45)	**10 (40)**

**Greenwood 4000EAV ventilator

Table 16. Calculated noise levels, plot 7

Location	Design target, daytime, dB L_{Aeq}	Calculated level, daytime, dB L_{Aeq} and (NR value)	Design target, night time, dB L_{Aeq}	Calculated levels, night time, dB L_{Aeq} and (L_{Amax})
Dining/Lounge/kitchen**	35	**29 (NR22)**	-	**-**
Lounge*	35	**30 (NR21)**	-	**-**
Bedroom 1*	35	**30 (NR24)**	30 (45)	**8 (39)**
Bedroom 2**	35	**30 (NR21)**	30 (45)	**8 (39)**
Bedroom 3**	35	**30 (NR20)**	30 (45)	**8 (39)**

**Greenwood 4000EAV ventilator

As can be seen from tables 12 - 16 above, employing the measured and calculated noise levels combined with the stated assumptions relating to the sound insulation of the proposed façade elements, the internal noise levels within the permitted houses would not exceed the design guidance contained within BS 8233:2014 or the guidance contained within the Kirklees Council 'Noise Design Advice' document.

The results presented within tables 12 - 16 highlight that the adopted guidance relating to the internal noise levels within the permitted houses can be achieved with closed windows and open background ventilation. It is however recognised that opening the windows for ventilation purposes, purge ventilation purposes excepted, would result in the internal noise levels exceeding the design guide levels. Indeed, it must be remembered that with windows open, there can be very few locations outside the very quietest of areas where the internal levels would not exceed the design guide values with windows open.

Taking into account the sound insulation of a partially open window, between 9 - 15dB, it can be seen that during the daytime period results presented within tables 12 - 16 above would suggest that partially opening the windows for ventilation purposes within plots 1, 2 and 7 would probably result in the internal noise levels exceeding the design guide levels. Despite this the daytime situation within plots 3, 4, 5 and 6 and the night time situation in all but plots 1 and 2, would indicate that the windows could be partially opened for ventilation purposes without resulting in the internal noise climate exceeding the design guide levels. As a consequence it is suggested that in all but plots 1 and 2, that natural ventilation of the permitted houses would be possible without leading to a significant deterioration in the internal noise climate. Despite this, it is suggested that consideration is given to providing plots 1 and 2 plots with an alternative means of ventilation, permitting the internal spaces to be ventilated without requiring the windows to be opened should be considered.

Two ventilation options that would be capable of meeting the above brief would fall under the description of what are termed systems 3 and 4 as defined within Approved Document F, guidance to the Building Regulations. System 3 relates to a continuous mechanical extraction (MEV) system which operates to remove air from the building with the 'make-up' air being drawn in via background ventilators. System 4 refers to a fully mechanical system incorporating heat recovery and is typically used in noisy

environments etc. In both cases the requirement to ventilate to internal spaces would need to be carefully considered as the benefit to the occupants should be balanced with the possible disincentives to use, such as the perceived complexity of the installation and running costs.

In this case, bearing in mind the existing noise climate was not regarded as being particularly noisy, the alternative ventilation strategy could take the form of a system 3 provision. As with any ventilation installation it is essential that the emission of sound from the ventilation system is adequately controlled to ensure that this element does not detrimentally affect the internal noise climate. In addition it is essential that the occupants must also be provided with the option to open windows as they choose.

As a consequence of the foregoing, it is suggested the sound insulation of the proposed façade elements and proposed alternative ventilation provision, would be sufficient to limit the ingress of external noise to the permitted houses in compliance with the adopted design guidance. As such, it is suggested that the permitted houses could be integrated into the existing environment without the potential for "*unreasonable restrictions*" to be placed upon already established businesses in the vicinity.

9.0 External Amenity Areas

In addition to the internal noise design guidance, BS 8233:2014 also provides guidance on the external noise environment. In this situation BS8233:2014, 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*".

Reference to figure 3, detailing the noise propagation calculations using the measured daytime traffic noise levels, highlights that accounting for the shielding provided by the existing buildings and the permitted houses that the around the houses would typically range between 27 - 48dB. As can be seen, the calculated noise levels around the permitted houses would not exceed either the 50 or 55dB values contained within the BS 8233: 2014 supplementary guidance. This being the case it is suggested that the existing noise climate would not prejudice the amenity of the external areas surrounding the permitted houses.

10.0 Conclusion

The existing noise climate in the vicinity of the former Rose and Crown public house was characteristic of a sub-urban environment, subject to noise contributions primarily from road traffic, but the overall noise climate was not regarded as being particularly noisy.

Applying the measured noise levels from the existing noise climate surveys and the stated assumptions relating to the sound insulation of the permitted development, calculations have been undertaken to assess the likely internal noise levels within the houses. The calculations have demonstrated that the sound insulation of the proposed building elements would ensure that the calculated break-in sound levels within the

permitted houses would not exceed the adopted design guide values assuming the windows closed and ventilation openings, open, scenario.

Taking into account the sound insulation of a partially open window, between 9 - 15dB, the measured daytime noise levels would suggest that partially opening the windows for ventilation purposes within plots 1, 2 and 7 would probably result in the internal noise levels exceeding the design guide levels. Despite this the daytime situation within plots 3, 4, 5 and 6 and the night time situation in all but plots 1 and 2, would indicate that the windows could be partially opened for ventilation purposes without resulting in the internal noise climate exceeding the design guide levels. As a consequence it is suggested that in all but plots 1 and 2, that natural ventilation of the permitted houses would be possible without leading to a significant deterioration in the internal noise climate. Despite this, it is suggested that consideration is given to providing plots 1 and 2 plots with an alternative means of ventilation, permitting the internal spaces to be ventilated without requiring the windows to be opened should be considered.

The results of the assessments have indicated that the sound insulation of the proposed façade elements and proposed alternative ventilation provision, would be sufficient to limit the ingress of external noise to the permitted houses in compliance with the adopted design guidance. As such, it is suggested that the permitted houses could be integrated into the existing environment without the potential for "*unreasonable restrictions*" to be placed upon already established businesses in the vicinity.

Appendix 1: Existing Noise Climate Survey, Measured Sound Levels

Primary measurement position, former Rose and Crown public house

Primary measurement position, measured sound levels, 15th March 2024 - afternoon/evening

Time	$L_{Aeq\ 5\ mins}$	$L_{Amax,\ 5\ mins}$	$L_{A10,\ 5\ mins}$	$L_{A90,\ 5\ mins}$
16:00	59	76	63	48
16:05	58	69	62	44
16:10	61	71	64	47
16:15	59	71	63	45
16:20	61	79	63	47
16:25	60	76	63	46
16:30	59	75	62	44
16:35	58	71	61	46
16:40	60	75	63	42
16:45	59	71	63	43
16:50	59	75	63	45
16:55	60	72	64	45
17:00	59	71	63	43
17:05	59	71	63	42
17:10	61	71	64	46
17:15	59	74	63	42
17:20	59	70	62	42
17:25	59	70	63	42
17:30	60	74	63	42
17:35	60	70	63	45
17:40	63	72	64	44
17:45	59	69	63	49
17:50	58	71	62	47
17:55	58	76	62	43

Time	$L_{Aeq\ 5\ mins}$	$L_{Amax,\ 5\ mins}$	$L_{A10,\ 5\ mins}$	$L_{A90,\ 5\ mins}$
18:00	59	72	63	43
18:05	58	72	62	42
18:10	59	74	62	42
18:15	58	77	61	40
18:20	57	69	61	42
18:25	58	68	61	43
18:30	57	68	61	41
18:35	58	72	62	40
18:40	58	66	61	43
18:45	56	70	61	41
18:50	56	70	61	42
18:55	57	65	62	41

Primary measurement position, measured sound levels,15th - 16th March 2024 - night time

Time	$L_{Aeq\ 5\ mins}$	$L_{Amax,\ 5\ mins}$	$L_{A10,\ 5\ mins}$	$L_{A90,\ 5\ mins}$
23:00	56	74	58	34
23:05	45	63	43	33
23:10	48	68	44	34
23:15	41	60	43	33
23:20	49	67	47	33
23:25	35	49	35	31
23:30	51	67	52	32
23:35	50	67	48	32
23:40	54	76	55	32
23:45	52	70	54	33
23:50	48	66	49	32
23:55	54	72	58	31
00:00	50	68	50	31
00:05	51	71	48	31
00:10	47	66	44	31
00:15	47	66	39	31
00:20	36	45	38	31
00:25	35	57	35	32
00:30	34	41	35	32
00:35	51	70	49	32
00:40	35	47	36	32
00:45	44	61	39	32
00:50	34	42	35	31
00:55	49	66	51	32

Time	$L_{Aeq\ 5\ mins}$	$L_{Amax,\ 5\ mins}$	$L_{A10,\ 5\ mins}$	$L_{A90,\ 5\ mins}$
01:00	48	71	49	33
01:05	51	69	37	32
01:10	33	42	34	31
01:15	50	68	50	33
01:20	53	69	55	32
01:25	34	45	35	32
01:30	50	69	50	32
01:35	48	67	41	33
01:40	48	69	41	33
01:45	53	69	54	32
01:50	49	68	47	31
01:55	37	43	38	35

Supplementary measurement position, measured sound levels,16th March 2024 - evening (live music event)

Time	$L_{Aeq\ 5\ mins}$	$L_{Amax,\ 5\ mins}$	$L_{A10,\ 5\ mins}$	$L_{A90,\ 5\ mins}$
20:30	55	68	58	49
20:35	54	72	56	42
20:40	53	73	54	39
20:45	51	69	54	40
20:50	53	77	54	41
20:55	54	71	57	45
21:00	56	71	60	49
21:05	57	71	61	48
21:10	57	74	59	49
21:15	60	76	63	49
21:20	57	74	60	43
21:25	62	79	65	49
21:30	61	79	63	49
21:35	61	76	63	58
21:40	50	70	53	38
21:45	65	83	68	38
21:50	62	78	65	44
21:55	64	81	67	52
22:00	67	86	69	52
22:05	59	76	62	44
22:10	60	78	62	47
22:15	60	78	63	47
22:20	58	75	61	42
22:25	62	85	63	41

Time	$L_{Aeq\ 5\ mins}$	$L_{Amax,\ 5\ mins}$	$L_{A10,\ 5\ mins}$	$L_{A90,\ 5\ mins}$
22:30	66	84	74	53
22:35	66	84	69	49
22:40	62	78	66	45
22:45	64	80	68	44
22:50	59	78	62	42
22:55	57	80	57	39

Appendix 2: Break-in Noise Calculations

Former Rose and Crown public house site, Knowl Road, Golcar

Break-in Noise Calculations

Plots 1 and 2

L_{Aeq} Assessment, daytime

Dining/kitchen/living room - front elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		63	65	67	69	64	59	58	54	48	41	30
B	Exposed façade, m^2	10		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
C	Volume of receiving room, m^3	78.3											
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)			-14.1	-14.1	-14.1	-14.1	-14.1	-14.1	-14.1	-14.1	-14.1	-14.1
F	Composite SRI			19.5	24.5	29.5	25.9	31.0	41.0	44.0	41.0	46.0	50.9
G	A + B + E - F		28	41.1	38.7	35.7	34.4	23.5	12.9	5.7	2.6	-9.4	-25.4
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		31	44.1	41.7	38.7	37.4	26.5	15.9	8.7	5.6	-6.4	-22.4
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				35	40	37	34	43	50	53	63	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				32.3	29.3	27.4	24.5	14.9	3.7	-5.3	-22.3	
N	Internal room noise level, vent open		32		42.2	39.2	37.8	28.6	18.4	9.9	6.0	-6.3	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Titan V75/C50*												

Dining/kitchen/living room - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		63	65	67	69	64	59	58	54	48	41	30
B	Exposed façade, m^2	11.5		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	78.3											
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)			-14.1	-14.1	-14.1	-14.1	-14.1	-14.1	-14.1	-14.1	-14.1	-14.1
F	Composite SRI			24.5	29.5	34.5	32.4	37.6	47.4	50.5	47.7	52.7	57.4
G	A + B + E - F		22	36.8	34.4	31.4	28.6	17.5	7.0	-0.3	-3.4	-15.4	-31.2
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		25	39.8	37.4	34.4	31.6	20.5	10.0	2.7	-0.4	-12.4	-28.2
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				35	40	37	34	43	50	53	63	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				31.7	28.7	26.8	23.9	14.3	3.1	-5.9	-22.9	
N	Internal room noise level, vent open		28		38.4	35.4	32.8	25.5	15.7	5.9	0.7	-12.1	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Titan V75/C50*												

Dining/kitchen/living room - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		63	65	67	69	64	59	58	54	48	41	30
B	Exposed façade, m^2	16.3		12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1
C	Volume of receiving room, m^3	78.3											
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)			-14.1	-14.1	-14.1	-14.1	-14.1	-14.1	-14.1	-14.1	-14.1	-14.1
F	Composite SRI			21.3	26.3	31.3	28.0	33.1	43.0	46.0	43.1	48.1	53.0
G	A + B + E - F		28	41.5	39.1	36.1	34.5	23.5	12.9	5.7	2.7	-9.3	-25.3
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		31	44.5	42.1	39.1	37.5	26.5	15.9	8.7	5.7	-6.3	-22.3
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				35	40	37	34	43	50	53	63	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				30.2	27.2	25.3	22.4	12.8	1.6	-7.4	-24.4	
N	Internal room noise level, vent open		32		42.3	39.3	37.7	27.9	17.6	9.5	5.9	-6.3	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Titan V75/C50*												
	Combined sound level, dB(A)		35										

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_{eq}		63	65	67	69	64	59	58	54	48	41	30
B	Exposed façade, m^2	13.9		11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4
C	Volume of receiving room, m^3	33.4											
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)			-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4
F	Composite SRI			20.5	25.5	30.5	27.0	32.1	42.0	45.0	42.1	47.1	52.0
G	A + B + E - F		32	45.3	42.9	39.9	38.5	27.5	16.9	9.7	6.7	-5.3	-21.3
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		35	48.3	45.9	42.9	41.5	30.5	19.9	12.7	9.7	-2.3	-18.3
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				35	40	37	34	43	50	53	63	
M	L_{Aeq} - $D_{n,e}$ + 10*log(10) - B				30.9	27.9	26.0	23.1	13.5	2.3	-6.7	-23.7	
N	Internal room noise level, vent open		35		46.0	43.0	41.6	31.2	20.8	13.1	9.8	-2.3	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Titan V75/C50*												

Bedroom 1 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		63	65	67	69	64	59	58	54	48	41	30
B	Exposed façade, m^2	5.8		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	33.4											
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)			-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4
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	34.0	31.6	28.6	19.7	5.8	-2.8	-11.0	-17.0	-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		19	37.0	34.6	31.6	22.7	8.8	0.2	-8.0	-14.0	-26.0	-37.1
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		35										

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_{eq}		58	60	62	64	59	54	53	49	43	36	25
B	Exposed façade, m^2	9.1		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	21											
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)			-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4
F	Composite SRI			18.6	23.6	28.6	24.9	29.9	39.9	42.9	39.9	44.9	49.9
G	A + B + E - F		29	42.3	39.9	36.9	35.7	24.8	14.2	7.0	4.0	-8.0	-24.1
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		32	45.3	42.9	39.9	38.7	27.8	17.2	10.0	7.0	-5.0	-21.1
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				31.7	28.7	22.8	19.9	23.3	16.1	5.1	-6.9	
N	Internal room noise level, vent open		33		43.2	40.2	38.8	28.5	24.3	17.1	9.2	-2.8	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Titan V75/C50*												

Bedroom 2 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		63	65	67	69	64	59	58	54	48	41	30
B	Exposed façade, m^2	5.5		7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
C	Volume of receiving room, m^3	21											
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)			-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4
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	35.7	33.3	30.3	21.4	7.5	-1.1	-9.3	-15.3	-27.3	-38.4
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	38.7	36.3	33.3	24.4	10.5	1.9	-6.3	-12.3	-24.3	-35.4
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		33										

L_{Aeq} Assessment, night time

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_{eq}		56	53	66	57	53	50	53	48	37	27	15
B	Exposed façade, m^2	13.9		11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4
C	Volume of receiving room, m^3	33.4											
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)			-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4
F	Composite SRI			20.2	25.2	30.2	26.7	31.8	41.7	44.7	41.8	46.8	51.7
G	A + B + E - F		23	33.8	41.4	27.8	27.5	19.7	12.2	3.8	-3.6	-18.5	-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		26	36.8	44.4	30.8	30.5	22.7	15.2	6.8	-0.6	-15.5	-32.5
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				35	40	37	34	43	50	53	63	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				29.1	15.5	14.7	15.0	8.5	-3.9	-17.3	-37.2	
N	Internal room noise level, vent open		26		44.5	30.9	30.6	23.4	16.1	7.2	-0.5	-15.5	

Glazing: *4mm, 16/20mm, 4mm*

Ventilator type: *Titan V75/C50*

Bedroom 1 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		56	53	66	57	53	50	53	48	37	27	15
B	Exposed façade, m^2	5.8		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	33.4											
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)			-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4
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	22.2	29.8	16.2	8.4	-2.3	-7.8	-17.2	-27.6	-42.5	-54.6
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	25.2	32.8	19.2	11.4	0.7	-4.8	-14.2	-24.6	-39.5	-51.6

Glazing: -

Ventilator type: -

Combined sound level, dB(A)	26

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_{eq}		56	53	66	57	53	50	53	48	37	27	15
B	Exposed façade, m^2	9.1		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	21											
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)			-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4
F	Composite SRI			18.6	23.6	28.6	24.9	29.9	39.9	42.9	39.9	44.9	49.9
G	A + B + E - F		25	35.5	43.1	29.5	29.4	21.7	14.2	5.8	-1.6	-16.5	-33.6
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		28	38.5	46.1	32.5	32.4	24.7	17.2	8.8	1.4	-13.5	-30.6
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				35	40	37	34	43	50	53	63	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				30.9	17.3	16.5	16.8	10.3	-2.1	-15.5	-35.4	
N	Internal room noise level, vent open		28		46.3	32.7	32.5	25.4	18.0	9.1	1.5	-13.5	

Glazing: *4mm, 16/20mm, 4mm*

Ventilator type: *Titan V75/C50*

Bedroom 2 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		56	53	66	57	53	50	53	48	37	27	15
B	Exposed façade, m^2	5.5		7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
C	Volume of receiving room, m^3	21											
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)			-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4
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	23.9	31.5	17.9	10.1	-0.6	-6.1	-15.5	-25.9	-40.8	-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		12	26.9	34.5	20.9	13.1	2.4	-3.1	-12.5	-22.9	-37.8	-49.9

Glazing: -

Ventilator type: -

Combined sound level, dB(A)	28

L_{Amax} Assessment, night time

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_{max}		76	77	77	69	66	66	75	64	61	46	32
B	Exposed façade, m^2	13.9		11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4
C	Volume of receiving room, m^3	33.4											
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)			-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4
F	Composite SRI			20.2	25.2	30.2	26.7	31.8	41.7	44.7	41.8	46.8	51.7
G	A + B + E - F		38	58.1	52.6	39.5	40.7	35.7	33.9	20.7	20.2	-0.1	-18.2
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		41	61.1	55.6	42.5	43.7	38.7	36.9	23.7	23.2	2.9	-15.2
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				35	40	37	34	43	50	53	63	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				40.3	27.2	27.9	31.0	30.2	13.0	6.5	-18.8	
N	Internal room noise level, vent open		42		55.7	42.6	43.8	39.4	37.8	24.1	23.3	2.9	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Titan V75/C50*												

Bedroom 1 - gable

	* Octave Band Centre Frequency, Hz		dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		76	77	77	69	66	66	75	64	61	46	32
B	Exposed façade, m^2	5.8		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	33.4											
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)			-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4
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		20	46.5	41.0	27.9	21.6	13.7	13.9	-0.3	-3.8	-24.1	-37.3
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		23	49.5	44.0	30.9	24.6	16.7	16.9	2.7	-0.8	-21.1	-34.3
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		42										

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_{max}		76	77	77	69	66	66	75	64	61	46	32
B	Exposed façade, m^2	9.1		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	21											
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)			-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4
F	Composite SRI			18.6	23.6	28.6	24.9	29.9	39.9	42.9	39.9	44.9	49.9
G	A + B + E - F		40	59.8	54.3	41.2	42.6	37.7	35.9	22.7	22.2	1.9	-16.3
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		43	62.8	57.3	44.2	45.6	40.7	38.9	25.7	25.2	4.9	-13.3
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				35	40	37	34	43	50	53	63	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				42.1	29.0	29.7	32.8	32.0	14.8	8.3	-17.0	
N	Internal room noise level, vent open		44		57.5	44.4	45.7	41.4	39.7	26.0	25.3	4.9	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Titan V75/C50*												

Bedroom 2 - gable

	* Octave Band Centre Frequency, Hz		dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		76	77	77	69	66	66	75	64	61	46	32
B	Exposed façade, m^2	5.5		7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
C	Volume of receiving room, m^3	21											
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)			-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4
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		22	48.2	42.7	29.6	23.3	15.4	15.6	1.4	-2.1	-22.4	-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		25	51.2	45.7	32.6	26.3	18.4	18.6	4.4	0.9	-19.4	-32.6
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		44										

Former Rose and Crown public house site, Knowl Road, Golcar

Break-in Noise Calculations

Plots 3 and 4

L_{Aeq} Assessment, daytime

Living room - rear elevation

	* Octave Band Centre Frequency, Hz		dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		**48**		51	44	43	44	45	39	29	17	
B	Exposed façade, m^2	**10.3**		10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
C	Volume of receiving room, m^3	**24.8**											
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)			-9.1	-9.1	-9.1	-9.1	-9.1	-9.1	-9.1	-9.1	-9.1	-9.1
F	I bed existing			18.6	23.6	28.6	24.9	29.9	39.9	42.9	39.9	44.9	49.9
G	A + B + E - F		**15**	-17.5	28.0	16.6	19.2	15.2	6.2	-3.0	-9.9	-27.4	-48.8
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**	-14.5	31.0	19.6	22.2	18.2	9.2	0.0	-6.9	-24.4	-45.8
K	Number of ventilators	**1**											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				19.4	8.0	5.9	10.0	14.9	5.8	-9.1	-26.6	
N	Internal room noise level, vent open		**20**		31.3	19.9	22.3	18.8	15.9	6.8	-4.8	-22.3	

Glazing: *4mm, 16/20mm, 4mm*

Ventilator type: *Greenwood 4000EAV*

Bedroom 1 - rear elevation

	* Octave Band Centre Frequency, Hz		dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		**48**		51	44	43	44	45	39	29	17	
B	Exposed façade, m^2	**6.5**		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	**18.1**											
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)			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	Composite SRI			20.0	25.0	30.0	26.5	31.6	41.5	44.6	41.6	46.6	51.5
G	A + B + E - F		**13**	-19.6	25.9	14.5	16.9	13.0	3.9	-5.2	-12.2	-29.7	-51.1
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**	-16.6	28.9	17.5	19.9	16.0	6.9	-2.2	-9.2	-26.7	-48.1
K	Number of ventilators	**1**											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				21.4	10.0	7.9	12.0	16.9	7.8	-7.1	-24.6	
N	Internal room noise level, vent open		**20**		29.6	18.2	20.2	17.4	17.3	8.2	-5.0	-22.5	

Glazing: *4mm, 16/20mm, 4mm*

Ventilator type: *Greenwood 4000EAV*

Bedroom 1 - gable

	* Octave Band Centre Frequency, Hz		dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		**48**		51	44	43	44	45	39	29	17	
B	Exposed façade, m^2	**6.7**		8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
C	Volume of receiving room, m^3	**18.1**											
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)			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	I bed existing			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**	-27.4	18.1	6.7	1.6	-5.3	-12.4	-22.5	-32.4	-49.9	-66.4
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		**1**	-24.4	21.1	9.7	4.6	-2.3	-9.4	-19.5	-29.4	-46.9	-63.4

Glazing: -

Ventilator type: -

	Combined sound level, dB(A)		**20**

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_{eq}		48		51	44	43	44	45	39	29	17	
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	18.1											
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)			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	Composite SRI			20.0	25.0	30.0	26.5	31.6	41.5	44.6	41.6	46.6	51.5
G	A + B + E - F		13	-19.6	25.9	14.5	16.9	13.0	3.9	-5.2	-12.2	-29.7	-51.1
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	-16.6	28.9	17.5	19.9	16.0	6.9	-2.2	-9.2	-26.7	-48.1
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				21.4	10.0	7.9	12.0	16.9	7.8	-7.1	-24.6	
N	Internal room noise level, vent open		20		29.6	18.2	20.2	17.4	17.3	8.2	-5.0	-22.5	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

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_{eq}		48		51	44	43	44	45	39	29	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	27.5											
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			21.1	26.1	31.1	27.8	32.8	42.8	45.8	42.9	47.9	52.8
G	A + B + E - F		11	-21.9	23.6	12.2	14.4	10.4	1.4	-7.7	-14.7	-32.2	-53.6
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		14	-18.9	26.6	15.2	17.4	13.4	4.4	-4.7	-11.7	-29.2	-50.6
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				20.8	9.4	7.3	11.4	16.3	7.2	-7.7	-25.2	
N	Internal room noise level, vent open		19		27.6	16.2	17.8	15.5	16.6	7.5	-6.2	-23.7	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

L_{Aeq} Assessment, night time

Bedroom 1 - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		35		42	34	31	28	33	27	14	1	
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	18.1											
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)			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	Composite SRI			20.0	25.0	30.0	26.5	31.6	41.5	44.6	41.6	46.6	51.5
G	A + B + E - F		0	-19.6	16.9	4.4	5.2	-3.5	-8.4	-17.4	-27.1	-45.6	-51.1
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		3	-16.6	19.9	7.4	8.2	-0.5	-5.4	-14.4	-24.1	-42.6	-48.1
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				12.4	-0.1	-3.8	-4.5	4.6	-4.4	-22.0	-40.5	
N	Internal room noise level, vent open		8		20.6	8.1	8.5	0.9	5.0	-4.0	-19.9	-38.4	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 1 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		35		42	34	31	28	33	27	14	1	
B	Exposed façade, m^2	6.7		8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
C	Volume of receiving room, m^3	18.1											
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)			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	I bed existing			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	-27.4	9.1	-3.4	-10.1	-21.8	-24.7	-34.7	-47.3	-65.8	-66.4
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		-10	-24.4	12.1	-0.4	-7.1	-18.8	-21.7	-31.7	-44.3	-62.8	-63.4
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		8										

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_{eq}		35		42	34	31	28	33	27	14	1	
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	18.1											
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)			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	Composite SRI			20.0	25.0	30.0	26.5	31.6	41.5	44.6	41.6	46.6	51.5
G	A + B + E - F		0	-19.6	16.9	4.4	5.2	-3.5	-8.4	-17.4	-27.1	-45.6	-51.1
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		3	-16.6	19.9	7.4	8.2	-0.5	-5.4	-14.4	-24.1	-42.6	-48.1
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				12.4	-0.1	-3.8	-4.5	4.6	-4.4	-22.0	-40.5	
N	Internal room noise level, vent open		8		20.6	8.1	8.5	0.9	5.0	-4.0	-19.9	-38.4	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

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_{eq}		35		42	34	31	28	33	27	14	1	
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	27.5											
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			21.1	26.1	31.1	27.8	32.8	42.8	45.8	42.9	47.9	52.8
G	A + B + E - F		-2	-21.9	14.6	2.1	2.7	-6.1	-10.9	-19.9	-29.6	-48.1	-53.6
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		1	-18.9	17.6	5.1	5.7	-3.1	-7.9	-16.9	-26.6	-45.1	-50.6
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*log(10) - B				11.8	-0.7	-4.4	-5.1	4.0	-5.0	-22.6	-41.1	
N	Internal room noise level, vent open		7		18.6	6.1	6.1	-1.0	4.3	-4.7	-21.1	-39.6	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

L_{Amax} Assessment, night time

Bedroom 1 - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		69	71	70	62	60	60	68	58	54	39	26
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	18.1											
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)			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	Composite SRI			20.0	25.0	30.0	26.5	31.6	41.5	44.6	41.6	46.6	51.5
G	A + B + E - F		31	51.1	45.6	32.5	33.7	28.8	27.0	13.8	13.2	-7.1	-25.2
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		34	54.1	48.6	35.5	36.7	31.8	30.0	16.8	16.2	-4.1	-22.2
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				41.1	28.0	24.7	27.8	40.0	26.8	18.3	-2.0	
N	Internal room noise level, vent open		41		49.3	36.2	37.0	33.2	40.4	27.2	20.4	0.1	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 1 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		69	71	70	62	60	60	68	58	54	39	26
B	Exposed façade, m^2	6.7		8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
C	Volume of receiving room, m^3	18.1											
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)			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	I bed existing			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	43.3	37.8	24.7	18.4	10.5	10.7	-3.5	-7.0	-27.3	-40.5
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		20	46.3	40.8	27.7	21.4	13.5	13.7	-0.5	-4.0	-24.3	-37.5
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		41										

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_{max}		69	71	70	62	60	60	68	58	54	39	26
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	18.1											
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)			-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7	-7.7
F	Composite SRI			20.0	25.0	30.0	26.5	31.6	41.5	44.6	41.6	46.6	51.5
G	A + B + E - F		31	51.1	45.6	32.5	33.7	28.8	27.0	13.8	13.2	-7.1	-25.2
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		34	54.1	48.6	35.5	36.7	31.8	30.0	16.8	16.2	-4.1	-22.2
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				41.1	28.0	24.7	27.8	40.0	26.8	18.3	-2.0	
N	Internal room noise level, vent open		41		49.3	36.2	37.0	33.2	40.4	27.2	20.4	0.1	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

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_{max}		69	71	70	62	60	60	68	58	54	39	26
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	27.5											
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			21.1	26.1	31.1	27.8	32.8	42.8	45.8	42.9	47.9	52.8
G	A + B + E - F		29	48.8	43.3	30.2	31.2	26.2	24.5	11.3	10.7	-9.6	-27.7
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		32	51.8	46.3	33.2	34.2	29.2	27.5	14.3	13.7	-6.6	-24.7
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				40.5	27.4	24.1	27.2	39.4	26.2	17.7	-2.6	
N	Internal room noise level, vent open		41		47.3	34.2	34.6	31.3	39.7	26.5	19.2	-1.1	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Former Rose and Crown public house site, Knowl Road, Golcar

Break-in Noise Calculations

Plot 5

L_{Aeq} Assessment, daytime

Dining/kitchen/lounge - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		48		51	43	41	40	46	42	25	12	
B	Exposed façade, m^2	13.4		11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3
C	Volume of receiving room, m^3	55.1											
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)			-12.5	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5
F	Composite SRI			14.5	19.5	24.5	20.5	25.6	35.5	38.5	35.6	40.6	45.5
G	A + B + E - F		16	-15.8	30.0	17.6	19.3	13.2	9.2	2.2	-11.5	-30.0	-46.8
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	-12.8	33.0	20.6	22.3	16.2	12.2	5.2	-8.5	-27.0	-43.8
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				18.5	6.1	2.8	4.7	14.7	7.7	-14.0	-32.5	
N	Internal room noise level, vent open		20		33.2	20.8	22.3	16.5	16.6	9.6	-7.4	-25.9	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Dining/kitchen/lounge - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		48		51	43	41	40	46	42	25	12	
B	Exposed façade, m^2	19.4		12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
C	Volume of receiving room, m^3	55.1											
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)			-12.5	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5
F	I bed existing			18.8	23.8	28.8	25.1	30.1	40.1	43.1	40.1	45.1	50.1
G	A + B + E - F		13	-18.5	27.3	14.9	16.3	10.2	6.2	-0.8	-14.5	-33.0	-49.8
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		16	-15.5	30.3	17.9	19.3	13.2	9.2	2.2	-11.5	-30.0	-46.8
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				16.9	4.5	1.2	3.1	13.1	6.1	-15.6	-34.1	
N	Internal room noise level, vent open		18		30.5	18.1	19.4	13.6	14.6	7.6	-10.1	-28.6	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Dining/kitchen/lounge - front elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		48		51	43	41	40	46	42	25	12	
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	55.1											
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)			-12.5	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5
F	Composite SRI			18.4	23.4	28.4	24.7	29.7	39.7	42.7	39.8	44.8	49.7
G	A + B + E - F		8	-22.9	22.9	10.5	12.0	5.8	1.9	-5.2	-18.9	-37.4	-54.1
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		11	-19.9	25.9	13.5	15.0	8.8	4.9	-2.2	-15.9	-34.4	-51.1
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				21.7	9.3	6.0	7.9	17.9	10.9	-10.8	-29.3	
N	Internal room noise level, vent open		20		27.3	14.9	15.5	11.4	18.1	11.1	-9.6	-28.1	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												
	Combined sound level, dB(A)		24										

Living room - front elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		48		51	43	41	40	46	42	25	12	
B	Exposed façade, m^2	6.7		8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
C	Volume of receiving room, m^3	26.2											
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)			-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3
F	Composite SRI			20.7	25.7	30.7	27.3	32.4	42.4	45.4	42.4	47.4	52.3
G	A + B + E - F		9	-21.8	24.0	11.6	12.7	6.5	2.6	-4.4	-18.2	-36.7	-53.4
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		12	-18.8	27.0	14.6	15.7	9.5	5.6	-1.4	-15.2	-33.7	-50.4
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*log(10) - B				21.5	9.1	5.8	7.7	17.7	10.7	-11.0	-29.5	
N	Internal room noise level, vent open		20		28.1	15.7	16.1	11.7	18.0	11.0	-9.6	-28.1	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

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_{eq}		48		51	43	41	40	46	42	25	12	
B	Exposed façade, m^2	6.8		8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
C	Volume of receiving room, m^3	29.5											
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)			-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8
F	Composite SRI			18.9	23.9	28.9	25.2	30.3	40.3	43.3	40.3	45.3	50.2
G	A + B + E - F		11	-20.4	25.4	13.0	14.3	8.2	4.2	-2.8	-16.5	-35.0	-51.8
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		14	-17.4	28.4	16.0	17.3	11.2	7.2	0.2	-13.5	-32.0	-48.8
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				21.5	9.1	5.8	7.7	17.7	10.7	-11.0	-29.5	
N	Internal room noise level, vent open		20		29.2	16.8	17.6	12.8	18.1	11.0	-9.1	-27.6	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 1 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		48		51	43	41	40	46	42	25	12	
B	Exposed façade, m^2	96		19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8
C	Volume of receiving room, m^3	29.5											
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)			-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8
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	-18.0	27.8	15.4	9.1	0.0	-2.0	-10.0	-26.7	-45.2	-57.0
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		10	-15.0	30.8	18.4	12.1	3.0	1.0	-7.0	-23.7	-42.2	-54.0
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		20										

Bedroom 2 - front elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		48		51	43	41	40	46	42	25	12	
B	Exposed façade, m^2	7		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	18.6											
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)			-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8
F	Composite SRI			20.9	25.9	30.9	27.5	32.6	42.6	45.6	42.6	47.6	52.5
G	A + B + E - F		11	-20.3	25.5	13.1	14.2	8.0	4.1	-3.0	-16.7	-35.2	-51.9
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		14	-17.3	28.5	16.1	17.2	11.0	7.1	0.0	-13.7	-32.2	-48.9
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				21.3	8.9	5.6	7.5	17.5	10.5	-11.2	-29.7	
N	Internal room noise level, vent open		20		29.3	16.9	17.5	12.6	17.9	10.9	-9.2	-27.7	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 2 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		48		51	43	41	40	46	42	25	12	
B	Exposed façade, m^2	9.4		9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
C	Volume of receiving room, m^3	18.6											
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)			-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8
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	-26.1	19.7	7.3	1.0	-8.1	-10.1	-18.1	-34.8	-53.3	-65.1
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		2	-23.1	22.7	10.3	4.0	-5.1	-7.1	-15.1	-31.8	-50.3	-62.1
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												
	Combined sound level, dB(A)		20										

Bedroom 3 - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		48		51	43	41	40	46	42	25	12	
B	Exposed façade, m^2	6		7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
C	Volume of receiving room, m^3	18.6											
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)			-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8
F	Composite SRI			20.3	25.3	30.3	26.9	31.9	41.9	44.9	42.0	47.0	51.9
G	A + B + E - F		10	-20.4	25.4	13.0	14.2	8.0	4.1	-3.0	-16.7	-35.2	-51.9
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	-17.4	28.4	16.0	17.2	11.0	7.1	0.0	-13.7	-32.2	-48.9
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				22.0	9.6	6.3	8.2	18.2	11.2	-10.5	-29.0	
N	Internal room noise level, vent open		20		29.3	16.9	17.5	12.9	18.5	11.5	-8.8	-27.3	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 3 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		48		51	43	41	40	46	42	25	12	
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	18.6											
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)			-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8
F	I bed existing			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	-27.1	18.7	6.3	0.0	-9.1	-11.1	-19.1	-35.8	-54.3	-66.1
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		1	-24.1	21.7	9.3	3.0	-6.1	-8.1	-16.1	-32.8	-51.3	-63.1
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		20										

L_{Aeq} Assessment, night time

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_{eq}		36		41	34	32	29	34	28	16	2	
B	Exposed façade, m^2	6.8		8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
C	Volume of receiving room, m^3	29.5											
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)			-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8
F	Composite SRI			18.9	23.9	28.9	25.2	30.3	40.3	43.3	40.3	45.3	50.2
G	A + B + E - F		0	-20.4	16.0	3.5	5.0	-3.1	-7.5	-16.5	-26.1	-44.8	-51.8
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	-17.4	19.0	6.5	8.0	-0.1	-4.5	-13.5	-23.1	-41.8	-48.8
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				12.1	-0.4	-3.5	-3.6	6.0	-3.0	-20.6	-39.3	
N	Internal room noise level, vent open		9		19.8	7.3	8.3	1.5	6.4	-2.7	-18.7	-37.4	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 1 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		36		41	34	32	29	34	28	16	2	
B	Exposed façade, m^2	96		19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8
C	Volume of receiving room, m^3	29.5											
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)			-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8
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	-18.0	18.4	5.9	-0.2	-11.3	-13.7	-23.7	-36.3	-55.0	-57.0
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		0	-15.0	21.4	8.9	2.8	-8.3	-10.7	-20.7	-33.3	-52.0	-54.0
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		9										

Bedroom 2 - front elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		36		41	34	32	29	34	28	16	2	
B	Exposed façade, m^2	7		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	18.6											
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)			-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8
F	Composite SRI			20.9	25.9	30.9	27.5	32.6	42.6	45.6	42.6	47.6	52.5
G	A + B + E - F		0	-20.3	16.1	3.6	4.9	-3.3	-7.6	-16.7	-26.3	-45.0	-51.9
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		3	-17.3	19.1	6.6	7.9	-0.3	-4.6	-13.7	-23.3	-42.0	-48.9
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				11.9	-0.6	-3.7	-3.8	5.8	-3.2	-20.8	-39.5	
N	Internal room noise level, vent open		8		19.9	7.4	8.2	1.3	6.2	-2.8	-18.8	-37.5	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 2 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		36		41	34	32	29	34	28	16	2	
B	Exposed façade, m^2	9.4		9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
C	Volume of receiving room, m^3	18.6											
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)			-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8
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	-26.1	10.3	-2.2	-8.3	-19.4	-21.8	-31.8	-44.4	-63.1	-65.1
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	-23.1	13.3	0.8	-5.3	-16.4	-18.8	-28.8	-41.4	-60.1	-62.1
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												
	Combined sound level, dB(A)		9										

Bedroom 3 - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		36		41	34	32	29	34	28	16	2	
B	Exposed façade, m^2	6		7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
C	Volume of receiving room, m^3	18.6											
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)			-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8
F	Composite SRI			20.3	25.3	30.3	26.9	31.9	41.9	44.9	42.0	47.0	51.9
G	A + B + E - F		0	-20.4	16.0	3.5	4.9	-3.3	-7.6	-16.7	-26.3	-45.0	-51.9
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		3	-17.4	19.0	6.5	7.9	-0.3	-4.6	-13.7	-23.3	-42.0	-48.9
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				12.6	0.1	-3.0	-3.1	6.5	-2.5	-20.1	-38.8	
N	Internal room noise level, vent open		9		19.9	7.4	8.2	1.6	6.8	-2.2	-18.4	-37.1	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 3 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		36		41	34	32	29	34	28	16	2	
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	18.6											
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)			-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8
F	I bed existing			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	-27.1	9.3	-3.2	-9.3	-20.4	-22.8	-32.8	-45.4	-64.1	-66.1
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	-24.1	12.3	-0.2	-6.3	-17.4	-19.8	-29.8	-42.4	-61.1	-63.1
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		9										

L_{Amax} Assessment, night time

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_{max}		66	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	6.8		8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
C	Volume of receiving room, m^3	29.5											
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)			-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8
F	Composite SRI			18.9	23.9	28.9	25.2	30.3	40.3	43.3	40.3	45.3	50.2
G	A + B + E - F		28	47.3	41.8	28.7	30.0	25.1	23.3	10.1	9.6	-10.7	-28.9
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		31	50.3	44.8	31.7	33.0	28.1	26.3	13.1	12.6	-7.7	-25.9
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				37.9	24.8	21.5	24.6	36.8	23.6	15.1	-5.2	
N	Internal room noise level, vent open		38		45.6	32.5	33.3	29.7	37.2	23.9	17.0	-3.3	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 1 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		66	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	96		19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8
C	Volume of receiving room, m^3	29.5											
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)			-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8
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		24	49.7	44.2	31.1	24.8	16.9	17.1	2.9	-0.6	-20.9	-34.1
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		27	52.7	47.2	34.1	27.8	19.9	20.1	5.9	2.4	-17.9	-31.1
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		38										

Bedroom 2 - front elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		66	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	7		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	18.6											
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)			-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8
F	Composite SRI			20.9	25.9	30.9	27.5	32.6	42.6	45.6	42.6	47.6	52.5
G	A + B + E - F		28	47.4	41.9	28.8	29.9	24.9	23.2	9.9	9.4	-10.9	-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		31	50.4	44.9	31.8	32.9	27.9	26.2	12.9	12.4	-7.9	-26.0
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				37.7	24.6	21.3	24.4	36.6	23.4	14.9	-5.4	
N	Internal room noise level, vent open		38		45.7	32.6	33.2	29.5	37.0	23.8	16.9	-3.4	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 2 - gable

	* Octave Band Centre Frequency, Hz		dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		66	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	9.4		9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
C	Volume of receiving room, m^3	18.6											
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)			-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8
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	41.6	36.1	23.0	16.7	8.8	9.0	-5.2	-8.7	-29.0	-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		18	44.6	39.1	26.0	19.7	11.8	12.0	-2.2	-5.7	-26.0	-39.2
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												
	Combined sound level, dB(A)		38										

Bedroom 3 - rear elevation

	* Octave Band Centre Frequency, Hz		dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		66	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	6		7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
C	Volume of receiving room, m^3	18.6											
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)			-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8
F	Composite SRI			20.3	25.3	30.3	26.9	31.9	41.9	44.9	42.0	47.0	51.9
G	A + B + E - F		28	47.3	41.8	28.7	29.9	24.9	23.2	9.9	9.4	-10.9	-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		31	50.3	44.8	31.7	32.9	27.9	26.2	12.9	12.4	-7.9	-26.0
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				38.4	25.3	22.0	25.1	37.3	24.1	15.6	-4.7	
N	Internal room noise level, vent open		39		45.7	32.6	33.2	29.8	37.6	24.4	17.3	-3.0	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 3 - gable

	* Octave Band Centre Frequency, Hz		dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		66	68	67	59	57	57	65	55	51	36	23
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	18.6											
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)			-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8
F	I bed existing			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	40.6	35.1	22.0	15.7	7.8	8.0	-6.2	-9.7	-30.0	-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		17	43.6	38.1	25.0	18.7	10.8	11.0	-3.2	-6.7	-27.0	-40.2
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		39										

Former Rose and Crown public house site, Knowl Road, Golcar

Break-in Noise Calculations

Plot 6

L_{Aeq} Assessment, daytime

Dining/kitchen/lounge - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		45		51	44	43	42	42	37	27	14	
B	Exposed façade, m^2	12.7		11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
C	Volume of receiving room, m^3	46											
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)			-11.8	-11.8	-11.8	-11.8	-11.8	-11.8	-11.8	-11.8	-11.8	-11.8
F	Composite SRI			15.9	20.9	25.9	22.0	27.0	37.0	40.0	37.0	42.0	47.0
G	A + B + E - F		15	-16.6	29.2	17.4	20.1	14.5	4.3	-3.7	-10.4	-29.2	-47.7
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		18	-13.6	32.2	20.4	23.1	17.5	7.3	-0.7	-7.4	-26.2	-44.7
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				18.8	7.0	4.8	7.2	11.0	3.0	-11.7	-30.5	
N	Internal room noise level, vent open		19		32.4	20.6	23.2	17.9	12.5	4.5	-6.1	-24.9	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Dining/kitchen/lounge - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		45		51	44	43	42	42	37	27	14	
B	Exposed façade, m^2	10		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
C	Volume of receiving room, m^3	46											
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)			-11.8	-11.8	-11.8	-11.8	-11.8	-11.8	-11.8	-11.8	-11.8	-11.8
F	I bed existing			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	-29.8	16.0	4.2	-1.0	-9.6	-17.8	-26.8	-36.5	-55.3	-68.8
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		-2	-26.8	19.0	7.2	2.0	-6.6	-14.8	-23.8	-33.5	-52.3	-65.8
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		19										

Living room - front elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		45		51	44	43	42	42	37	27	14	
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	24.6											
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)			-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0
F	Composite SRI			18.7	23.7	28.7	25.1	30.1	40.1	43.1	40.1	45.1	50.1
G	A + B + E - F		12	-19.7	26.1	14.3	16.8	11.2	1.0	-7.0	-13.7	-32.5	-51.0
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	-16.7	29.1	17.3	19.8	14.2	4.0	-4.0	-10.7	-29.5	-48.0
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				21.7	9.9	7.7	10.1	13.9	5.9	-8.8	-27.6	
N	Internal room noise level, vent open		18		29.9	18.1	20.1	15.6	14.3	6.3	-6.7	-25.5	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Living room - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		45		51	44	43	42	42	37	27	14	
B	Exposed façade, m^2	9.1		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	24.6											
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)			-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0
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		-2	-27.5	18.3	6.5	1.3	-7.3	-15.5	-24.5	-34.2	-53.0	-66.5
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		1	-24.5	21.3	9.5	4.3	-4.3	-12.5	-21.5	-31.2	-50.0	-63.5
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												
	Combined sound level, dB(A)		18										

Bedroom 1 - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		45		51	44	43	42	42	37	27	14	
B	Exposed façade, m^2	10.3		10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
C	Volume of receiving room, m^3	30											
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)			-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9
F	Composite SRI			19.0	24.0	29.0	25.3	30.3	40.3	43.3	40.3	45.3	50.3
G	A + B + E - F		13	-18.7	27.1	15.3	17.7	12.1	1.9	-6.1	-12.8	-31.6	-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		16	-15.7	30.1	18.3	20.7	15.1	4.9	-3.1	-9.8	-28.6	-47.1
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				19.7	7.9	5.7	8.1	11.9	3.9	-10.8	-29.6	
N	Internal room noise level, vent open		18		30.4	18.6	20.9	15.9	12.7	4.7	-7.3	-26.1	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

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_{eq}		45		51	44	43	42	42	37	27	14	
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	25.9											
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)			-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3
F	Composite SRI			17.2	22.2	27.2	23.3	28.3	38.3	41.3	38.3	43.3	48.3
G	A + B + E - F		14	-18.3	27.5	15.7	18.3	12.7	2.5	-5.5	-12.2	-31.0	-49.5
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		17	-15.3	30.5	18.7	21.3	15.7	5.5	-2.5	-9.2	-28.0	-46.5
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*log(10) - B				21.7	9.9	7.7	10.1	13.9	5.9	-8.8	-27.6	
N	Internal room noise level, vent open		19		31.0	19.2	21.5	16.8	14.5	6.5	-6.0	-24.8	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 2 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		45		51	44	43	42	42	37	27	14	
B	Exposed façade, m^2	9.6		9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8
C	Volume of receiving room, m^3	25.9											
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)			-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3
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		-2	-27.4	18.4	6.6	1.4	-7.2	-15.4	-24.4	-34.1	-52.9	-66.4
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		1	-24.4	21.4	9.6	4.4	-4.2	-12.4	-21.4	-31.1	-49.9	-63.4
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												
	Combined sound level, dB(A)		19										

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_{eq}		45		51	44	43	42	42	37	27	14	
B	Exposed façade, m^2	5.8		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	20.8											
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)			-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3
F	Composite SRI			20.2	25.2	30.2	26.7	31.8	41.8	44.8	41.8	46.8	51.7
G	A + B + E - F		11	-20.9	24.9	13.1	15.4	9.7	-0.4	-8.5	-15.2	-34.0	-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		14	-17.9	27.9	16.1	18.4	12.7	2.6	-5.5	-12.2	-31.0	-49.4
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*log(10) - B				22.2	10.4	8.2	10.6	14.4	6.4	-8.3	-27.1	
N	Internal room noise level, vent open		18		28.9	17.1	18.8	14.8	14.6	6.6	-6.8	-25.6	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 3 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		45		51	44	43	42	42	37	27	14	
B	Exposed façade, m^2	8.6		9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
C	Volume of receiving room, m^3	20.8											
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)			-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3
F	I bed existing			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	-27.0	18.8	7.0	1.8	-6.8	-15.0	-24.0	-33.7	-52.5	-66.0
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		1	-24.0	21.8	10.0	4.8	-3.8	-12.0	-21.0	-30.7	-49.5	-63.0
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		18										

Bedroom 4 - front elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		45		51	44	43	42	42	37	27	14	
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	15.6											
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)			-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1
F	Composite SRI			16.8	21.8	26.8	23.0	28.0	38.0	41.0	38.0	43.0	48.0
G	A + B + E - F		16	-15.8	30.0	18.2	20.9	15.3	5.1	-2.9	-9.6	-28.4	-46.9
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	-12.8	33.0	21.2	23.9	18.3	8.1	0.1	-6.6	-25.4	-43.9
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				21.7	9.9	7.7	10.1	13.9	5.9	-8.8	-27.6	
N	Internal room noise level, vent open		21		33.3	21.5	24.0	18.9	14.9	6.9	-4.6	-23.4	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 4 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		45		51	44	43	42	42	37	27	14	
B	Exposed façade, m^2	5.8		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	15.6											
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)			-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1
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	-27.4	18.4	6.6	1.4	-7.2	-15.4	-24.4	-34.1	-52.9	-66.4
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		1	-24.4	21.4	9.6	4.4	-4.2	-12.4	-21.4	-31.1	-49.9	-63.4
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		21										

L_{Aeq} Assessment, night time

Bedroom 1 - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		35		41	34	32	27	33	27	14	0	
B	Exposed façade, m^2	10.3		10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
C	Volume of receiving room, m^3	30											
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)			-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9
F	Composite SRI			19.0	24.0	29.0	25.3	30.3	40.3	43.3	40.3	45.3	50.3
G	A + B + E - F		1	-18.7	17.3	4.8	6.5	-2.9	-7.4	-16.2	-26.1	-45.3	-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		4	-15.7	20.3	7.8	9.5	0.1	-4.4	-13.2	-23.1	-42.3	-47.1
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				9.9	-2.6	-5.5	-6.9	2.6	-6.2	-24.1	-43.3	
N	Internal room noise level, vent open		7		20.6	8.1	9.7	0.9	3.4	-5.4	-20.6	-39.8	

Glazing: *4mm, 16/20mm, 4mm*

Ventilator type: *Greenwood 4000EAV*

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_{eq}		35		41	34	32	27	33	27	14	0	
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	25.9											
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)			-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3
F	Composite SRI			17.2	22.2	27.2	23.3	28.3	38.3	41.3	38.3	43.3	48.3
G	A + B + E - F		2	-18.3	17.7	5.2	7.1	-2.3	-6.8	-15.6	-25.5	-44.7	-49.5
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		5	-15.3	20.7	8.2	10.1	0.7	-3.8	-12.6	-22.5	-41.7	-46.5
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*log(10) - B				11.9	-0.6	-3.5	-4.9	4.6	-4.2	-22.1	-41.3	
N	Internal room noise level, vent open		8		21.2	8.7	10.3	1.8	5.2	-3.6	-19.3	-38.5	

Glazing: *4mm, 16/20mm, 4mm*

Ventilator type: *Greenwood 4000EAV*

Bedroom 2 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		35		41	34	32	27	33	27	14	0	
B	Exposed façade, m^2	9.6		9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8
C	Volume of receiving room, m^3	25.9											
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)			-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3
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	-27.4	8.6	-3.9	-9.8	-22.2	-24.7	-34.5	-47.4	-66.6	-66.4
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		-10	-24.4	11.6	-0.9	-6.8	-19.2	-21.7	-31.5	-44.4	-63.6	-63.4

Glazing: *4mm, 16/20mm, 4mm*

Ventilator type: *Greenwood 4000EAV*

Combined sound level, dB(A)	8

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_{eq}		35		41	34	32	27	33	27	14	0	
B	Exposed façade, m^2	5.8		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	20.8											
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)			-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3
F	Composite SRI			20.2	25.2	30.2	26.7	31.8	41.8	44.8	41.8	46.8	51.7
G	A + B + E - F		-1	-20.9	15.1	2.6	4.2	-5.3	-9.7	-18.6	-28.5	-47.7	-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		2	-17.9	18.1	5.6	7.2	-2.3	-6.7	-15.6	-25.5	-44.7	-49.4
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*log(10) - B				12.4	-0.1	-3.0	-4.4	5.1	-3.7	-21.6	-40.8	
N	Internal room noise level, vent open		8		19.1	6.6	7.6	-0.2	5.3	-3.5	-20.1	-39.3	

Glazing: *4mm, 16/20mm, 4mm*

Ventilator type: *Greenwood 4000EAV*

Bedroom 3 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		35		41	34	32	27	33	27	14	0	
B	Exposed façade, m^2	8.6		9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
C	Volume of receiving room, m^3	20.8											
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)			-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3
F	I bed existing			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	-27.0	9.0	-3.5	-9.4	-21.8	-24.3	-34.1	-47.0	-66.2	-66.0
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		-10	-24.0	12.0	-0.5	-6.4	-18.8	-21.3	-31.1	-44.0	-63.2	-63.0
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		8										

Bedroom 4 - front elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		35		41	34	32	27	33	27	14	0	
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	15.6											
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)			-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1
F	Composite SRI			16.8	21.8	26.8	23.0	28.0	38.0	41.0	38.0	43.0	48.0
G	A + B + E - F		4	-15.8	20.2	7.7	9.7	0.3	-4.2	-13.0	-22.9	-42.1	-46.9
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		7	-12.8	23.2	10.7	12.7	3.3	-1.2	-10.0	-19.9	-39.1	-43.9
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				11.9	-0.6	-3.5	-4.9	4.6	-4.2	-22.1	-41.3	
N	Internal room noise level, vent open		10		23.5	11.0	12.8	3.9	5.6	-3.2	-17.9	-37.1	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 4 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		35		41	34	32	27	33	27	14	0	
B	Exposed façade, m^2	5.8		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	15.6											
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)			-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1
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	-27.4	8.6	-3.9	-9.8	-22.2	-24.7	-34.5	-47.4	-66.6	-66.4
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		-10	-24.4	11.6	-0.9	-6.8	-19.2	-21.7	-31.5	-44.4	-63.6	-63.4
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		10										

L_{Amax} Assessment, night time

Bedroom 1 - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		66	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	10.3		10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
C	Volume of receiving room, m^3	30											
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)			-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9
F	Composite SRI			19.0	24.0	29.0	25.3	30.3	40.3	43.3	40.3	45.3	50.3
G	A + B + E - F		29	49.0	43.5	30.4	31.7	26.8	25.0	11.8	11.3	-9.0	-27.2
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	52.0	46.5	33.4	34.7	29.8	28.0	14.8	14.3	-6.0	-24.2
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				36.1	23.0	19.7	22.8	35.0	21.8	13.3	-7.0	
N	Internal room noise level, vent open		37		46.8	33.7	34.9	30.6	35.8	22.6	16.8	-3.5	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

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_{max}		66	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	25.9											
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)			-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3
F	Composite SRI			17.2	22.2	27.2	23.3	28.3	38.3	41.3	38.3	43.3	48.3
G	A + B + E - F		30	49.4	43.9	30.8	32.3	27.4	25.6	12.4	11.9	-8.4	-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		33	52.4	46.9	33.8	35.3	30.4	28.6	15.4	14.9	-5.4	-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*log(10) - B				38.1	25.0	21.7	24.8	37.0	23.8	15.3	-5.0	
N	Internal room noise level, vent open		39		47.4	34.3	35.5	31.5	37.6	24.4	18.1	-2.2	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 2 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		66	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	9.6		9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8
C	Volume of receiving room, m^3	25.9											
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)			-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3
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		14	40.3	34.8	21.7	15.4	7.5	7.7	-6.5	-10.0	-30.3	-43.5
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		17	43.3	37.8	24.7	18.4	10.5	10.7	-3.5	-7.0	-27.3	-40.5
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												
	Combined sound level, dB(A)		39										

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_{max}		66	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	5.8		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	20.8											
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)			-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3
F	Composite SRI			20.2	25.2	30.2	26.7	31.8	41.8	44.8	41.8	46.8	51.7
G	A + B + E - F		27	46.8	41.3	28.2	29.4	24.4	22.7	9.4	8.9	-11.4	-29.5
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		30	49.8	44.3	31.2	32.4	27.4	25.7	12.4	11.9	-8.4	-26.5
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*log(10) - B				38.6	25.5	22.2	25.3	37.5	24.3	15.8	-4.5	
N	Internal room noise level, vent open		39		45.3	32.2	32.8	29.5	37.7	24.5	17.3	-3.0	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 3 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		66	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	8.6		9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
C	Volume of receiving room, m^3	20.8											
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)			-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3
F	I bed existing			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	40.7	35.2	22.1	15.8	7.9	8.1	-6.1	-9.6	-29.9	-43.1
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		18	43.7	38.2	25.1	18.8	10.9	11.1	-3.1	-6.6	-26.9	-40.1
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		39										

Bedroom 4 - front elevation

	* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}			**66**	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	**6.5**			8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	**15.6**												
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)				-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1
F	Composite SRI				16.8	21.8	26.8	23.0	28.0	38.0	41.0	38.0	43.0	48.0
G	A + B + E - F			**33**	51.9	46.4	33.3	34.9	30.0	28.2	15.0	14.5	-5.8	-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			**36**	54.9	49.4	36.3	37.9	33.0	31.2	18.0	17.5	-2.8	-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					38.1	25.0	21.7	24.8	37.0	23.8	15.3	-5.0	
N	Internal room noise level, vent open			**40**		49.7	36.6	38.0	33.6	38.0	24.8	19.5	-0.8	
Glazing:	*4mm, 16/20mm, 4mm*													
Ventilator type:	*Greenwood 4000EAV*													

Bedroom 4 - gable

	* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}			**66**	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	**5.8**			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	**15.6**												
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)				-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1
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			**14**	40.3	34.8	21.7	15.4	7.5	7.7	-6.5	-10.0	-30.3	-43.5
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			**17**	43.3	37.8	24.7	18.4	10.5	10.7	-3.5	-7.0	-27.3	-40.5
Glazing:	-													
Ventilator type:	-													
	Combined sound level, dB(A)			**40**										

Former Rose and Crown public house site, Knowl Road, Golcar

Break-in Noise Calculations

Plot 7

L_{Aeq} Assessment, daytime

Dining/kitchen/lounge - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		58	43	48	43	47	56	55	47	39	26	14
B	Exposed façade, m^2	19.4		12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
C	Volume of receiving room, m^3	62.3											
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)			-13.1	-13.1	-13.1	-13.1	-13.1	-13.1	-13.1	-13.1	-13.1	-13.1
F	Composite SRI			18.1	23.1	28.1	24.3	29.3	39.3	42.3	39.4	44.4	49.3
G	A + B + E - F		25	24.8	25.0	14.5	22.0	26.7	15.8	4.4	-0.6	-18.1	-35.2
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	27.8	28.0	17.5	25.0	29.7	18.8	7.4	2.4	-15.1	-32.2
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				14.4	3.9	6.6	19.3	22.4	11.0	-2.0	-19.5	
N	Internal room noise level, vent open		29		28.2	17.7	25.0	30.0	24.0	12.6	3.7	-13.8	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Dining/kitchen/lounge - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		58	43	48	43	47	56	55	47	39	26	14
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	62.3											
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)			-13.1	-13.1	-13.1	-13.1	-13.1	-13.1	-13.1	-13.1	-13.1	-13.1
F	I bed existing			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	10.5	10.7	0.2	-0.1	1.6	-7.3	-19.7	-27.7	-45.2	-57.3
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		3	13.5	13.7	3.2	2.9	4.6	-4.3	-16.7	-24.7	-42.2	-54.3
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		29										

Living room - front elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		58	43	48	43	47	56	55	47	39	26	14
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	25.9											
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)			-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3
F	Composite SRI			18.7	23.7	28.7	25.1	30.1	40.1	43.1	40.1	45.1	50.1
G	A + B + E - F		23	23.2	23.4	12.9	20.3	25.0	14.1	2.7	-2.3	-19.8	-36.9
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	26.2	26.4	15.9	23.3	28.0	17.1	5.7	0.7	-16.8	-33.9
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				19.2	8.7	11.4	24.1	27.2	15.8	2.8	-14.7	
N	Internal room noise level, vent open		30		27.2	16.7	23.6	29.5	27.6	16.2	4.9	-12.6	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Living room - gable

	* Octave Band Centre Frequency, Hz		dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		58	43	48	43	47	56	55	47	39	26	14
B	Exposed façade, m^2	9.6		9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8
C	Volume of receiving room, m^3	25.9											
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)			-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3
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		6	15.7	15.9	5.4	5.1	6.8	-2.1	-14.5	-22.5	-40.0	-52.1
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	18.7	18.9	8.4	8.1	9.8	0.9	-11.5	-19.5	-37.0	-49.1
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												
	Combined sound level, dB(A)		30										

Bedroom 1 - rear elevation

	* Octave Band Centre Frequency, Hz		dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		58	43	48	43	47	56	55	47	39	26	14
B	Exposed façade, m^2	6.2		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	26.2											
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)			-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3
F	Composite SRI			18.6	23.6	28.6	24.9	29.9	39.9	42.9	39.9	44.9	49.9
G	A + B + E - F		23	23.1	23.3	12.8	20.3	24.9	14.0	2.6	-2.4	-19.9	-36.9
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	26.1	26.3	15.8	23.3	27.9	17.0	5.6	0.6	-16.9	-33.9
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				19.4	8.9	11.6	24.3	27.4	16.0	3.0	-14.5	
N	Internal room noise level, vent open		30		27.1	16.6	23.5	29.5	27.8	16.4	5.0	-12.5	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 2 - front elevation

	* Octave Band Centre Frequency, Hz		dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		58	43	48	43	47	56	55	47	39	26	14
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	22											
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)			-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6
F	Composite SRI			19.1	24.1	29.1	25.5	30.5	40.5	43.5	40.6	45.6	50.5
G	A + B + E - F		23	23.5	23.7	13.2	20.6	25.2	14.4	2.9	-2.1	-19.6	-36.6
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		26	26.5	26.7	16.2	23.6	28.2	17.4	5.9	0.9	-16.6	-33.6
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*log(10) - B				19.2	8.7	11.4	24.1	27.2	15.8	2.8	-14.7	
N	Internal room noise level, vent open		30		27.4	16.9	23.8	29.6	27.6	16.2	5.0	-12.5	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 2 - gable

	* Octave Band Centre Frequency, Hz		dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		58	43	48	43	47	56	55	47	39	26	14
B	Exposed façade, m^2	8.2		9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1
C	Volume of receiving room, m^3	22											
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)			-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6
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	15.7	15.9	5.4	5.1	6.8	-2.1	-14.5	-22.5	-40.0	-52.1
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	18.7	18.9	8.4	8.1	9.8	0.9	-11.5	-19.5	-37.0	-49.1
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												
	Combined sound level, dB(A)		30										

Bedroom 3 - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		58	43	48	43	47	56	55	47	39	26	14
B	Exposed façade, m^2	5.8		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	21.3											
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)			-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4
F	Composite SRI			20.2	25.2	30.2	26.7	31.8	41.8	44.8	41.8	46.8	51.7
G	A + B + E - F		22	22.1	22.3	11.8	19.0	23.6	12.8	1.3	-3.7	-21.2	-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		25	25.1	25.3	14.8	22.0	26.6	15.8	4.3	-0.7	-18.2	-35.2
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				19.7	9.2	11.9	24.6	27.7	16.3	3.3	-14.2	
N	Internal room noise level, vent open		30		26.3	15.8	22.4	28.7	27.9	16.5	4.7	-12.8	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 3 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		58	43	48	43	47	56	55	47	39	26	14
B	Exposed façade, m^2	8.9		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	21.3											
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)			-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4
F	I bed existing			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	16.2	16.4	5.9	5.6	7.3	-1.6	-14.0	-22.0	-39.5	-51.6
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		9	19.2	19.4	8.9	8.6	10.3	1.4	-11.0	-19.0	-36.5	-48.6
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		30										

L_{Aeq} Assessment, night time

Bedroom 1 - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		35		41	34	32	27	33	27	14	0	
B	Exposed façade, m^2	6.2		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	26.2											
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)			-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3
F	Composite SRI			18.6	23.6	28.6	24.9	29.9	39.9	42.9	39.9	44.9	49.9
G	A + B + E - F		0	-20.0	16.0	3.5	5.4	-4.1	-8.6	-17.4	-27.3	-46.5	-51.2
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	-17.0	19.0	6.5	8.4	-1.1	-5.6	-14.4	-24.3	-43.5	-48.2
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				12.1	-0.4	-3.3	-4.7	4.8	-4.0	-21.9	-41.1	
N	Internal room noise level, vent open		8		19.8	7.3	8.6	0.5	5.2	-3.6	-19.9	-39.1	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 2 - front elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		35		41	34	32	27	33	27	14	0	
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	22											
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)			-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6
F	Composite SRI			18.7	23.7	28.7	25.1	30.1	40.1	43.1	40.1	45.1	50.1
G	A + B + E - F		1	-19.2	16.8	4.3	6.1	-3.3	-7.8	-16.6	-26.5	-45.7	-50.5
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		4	-16.2	19.8	7.3	9.1	-0.3	-4.8	-13.6	-23.5	-42.7	-47.5
K	Number of ventilators	1											
L	Ventilator $D_{n,e}$				31	36	37	34	30	33	38	43	
M	$L_{Aeq} - D_{n,e} + 10*\log(10) - B$				11.9	-0.6	-3.5	-4.9	4.6	-4.2	-22.1	-41.3	
N	Internal room noise level, vent open		8		20.5	8.0	9.3	1.0	5.0	-3.8	-19.8	-39.0	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 2 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		35		41	34	32	27	33	27	14	0	
B	Exposed façade, m^2	8.2		9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1
C	Volume of receiving room, m^3	22											
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)			-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6
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	-27.4	8.6	-3.9	-9.8	-22.2	-24.7	-34.5	-47.4	-66.6	-66.4
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		-10	-24.4	11.6	-0.9	-6.8	-19.2	-21.7	-31.5	-44.4	-63.6	-63.4
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												
	Combined sound level, dB(A)		8										

Bedroom 3 - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		35		41	34	32	27	33	27	14	0	
B	Exposed façade, m^2	5.8		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	21.3											
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)			-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4
F	Composite SRI			20.2	25.2	30.2	26.7	31.8	41.8	44.8	41.8	46.8	51.7
G	A + B + E - F		-1	-21.0	15.0	2.5	4.1	-5.4	-9.8	-18.7	-28.6	-47.8	-52.5
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		2	-18.0	18.0	5.5	7.1	-2.4	-6.8	-15.7	-25.6	-44.8	-49.5
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*log(10) - B				12.4	-0.1	-3.0	-4.4	5.1	-3.7	-21.6	-40.8	
N	Internal room noise level, vent open		8		19.0	6.5	7.5	-0.3	5.3	-3.5	-20.2	-39.4	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 3 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{eq}		35		41	34	32	27	33	27	14	0	
B	Exposed façade, m^2	8.9		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	21.3											
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)			-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4
F	I bed existing			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	-26.9	9.1	-3.4	-9.3	-21.7	-24.2	-34.0	-46.9	-66.1	-65.9
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		-10	-23.9	12.1	-0.4	-6.3	-18.7	-21.2	-31.0	-43.9	-63.1	-62.9
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		8										

L_{Amax} Assessment, night time

Bedroom 1 - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		66	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	6.2		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	26.2											
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)			-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3	-9.3
F	Composite SRI			18.6	23.6	28.6	24.9	29.9	39.9	42.9	39.9	44.9	49.9
G	A + B + E - F		28	47.7	42.2	29.1	30.6	25.6	23.8	10.6	10.1	-10.2	-28.3
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		31	50.7	45.2	32.1	33.6	28.6	26.8	13.6	13.1	-7.2	-25.3
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				38.3	25.2	21.9	25.0	37.2	24.0	15.5	-4.8	
N	Internal room noise level, vent open		39		46.0	32.9	33.8	30.2	37.6	24.4	17.5	-2.8	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 2 - front elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		66	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	6.5		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
C	Volume of receiving room, m^3	22											
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)			-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6
F	Composite SRI			18.7	23.7	28.7	25.1	30.1	40.1	43.1	40.1	45.1	50.1
G	A + B + E - F		29	48.5	43.0	29.9	31.3	26.4	24.6	11.4	10.9	-9.4	-27.6
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		32	51.5	46.0	32.9	34.3	29.4	27.6	14.4	13.9	-6.4	-24.6
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*log(10) - B				38.1	25.0	21.7	24.8	37.0	23.8	15.3	-5.0	
N	Internal room noise level, vent open		39		46.7	33.6	34.5	30.7	37.4	24.2	17.6	-2.7	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 2 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		66	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	8.2		9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1
C	Volume of receiving room, m^3	22											
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)			-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6
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	40.3	34.8	21.7	15.4	7.5	7.7	-6.5	-10.0	-30.3	-43.5
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		17	43.3	37.8	24.7	18.4	10.5	10.7	-3.5	-7.0	-27.3	-40.5
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												
	Combined sound level, dB(A)		39										

Bedroom 3 - rear elevation

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		66	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	5.8		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	21.3											
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)			-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4
F	Composite SRI			20.2	25.2	30.2	26.7	31.8	41.8	44.8	41.8	46.8	51.7
G	A + B + E - F		27	46.7	41.2	28.1	29.3	24.3	22.6	9.3	8.8	-11.5	-29.6
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	49.7	44.2	31.1	32.3	27.3	25.6	12.3	11.8	-8.5	-26.6
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*log(10) - B				38.6	25.5	22.2	25.3	37.5	24.3	15.8	-4.5	
N	Internal room noise level, vent open		39		45.2	32.1	32.7	29.4	37.7	24.5	17.2	-3.1	
Glazing:	*4mm, 16/20mm, 4mm*												
Ventilator type:	*Greenwood 4000EAV*												

Bedroom 3 - gable

* Octave Band Centre Frequency, Hz			dB(A)	31.5*	63*	125*	250*	500*	1k*	2k*	4k*	8k*	16k*
A	Measured L_{max}		66	68	67	59	57	57	65	55	51	36	23
B	Exposed façade, m^2	8.9		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	21.3											
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)			-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4
F	I bed existing			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	40.8	35.3	22.2	15.9	8.0	8.2	-6.0	-9.5	-29.8	-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		18	43.8	38.3	25.2	18.9	11.0	11.2	-3.0	-6.5	-26.8	-40.0
Glazing:	-												
Ventilator type:	-												
	Combined sound level, dB(A)		39										

Appendix 3. References

L.S. Søndergaard, R. Egeda. “Open windows with better sound insulation”, DELTA Acoustics, Denmark, 2016.