PEAK acoustics

# Noise Impact Assessment

| | |
|---|---|
| **Client:** | Ben Pond |
| **Site:** | Land adjacent to 8 Rutland Street, Heywood, OL10 4JJ |
| **Reference No.** | 2405245NR |
| **Revision:** | 0.0 |
| **Date of Issue:** | 04/07/2024 |


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# Executive Summary

A noise assessment has been undertaken at Land adjacent to 8 Rutland Street, Heywood, OL10 4JJ in relation to the proposed construction of 3 terraced houses and a bungalow.

Environmental noise monitoring was undertaken at the site from the 10th – 11th June 2024. Noise affecting the development was determined to be primarily from the nearby industrial estate and road traffic.

A glazing and ventilation scheme has been given to ensure conditions in habitable rooms remain within the desired design criteria of BS8233:2014. The derived scheme is summarised below.

*Glazing & Ventilation Scheme*

| Internal Space | Glazing | | Ventilation | |
|---|---|---|---|---|
| | *Minimum Performance* $R_w$ *(+$C_{tr}$)* | *Example Specification* | *Minimum Performance* $D_{ne,w}$ ,+$C_{tr\ (Open)}$ | *Example Specification* |
| Living Areas | 34(29) | *Double Glazing: 4/16/6* | 40 | *Acoustically Treated Trickle Vent (Open): Titon Xtra Sound Attenuator V75+C50* |
| Bedrooms | 34(29) | *Double Glazing: 4/16/6* | 45 | *Passive Thru-Wall Vent: Passivent Fresh 80dB* |
| Dining Rooms | 30 (26) | *Double Glazing: 4/16/4* | 32 | Hit & Miss Trickle Vent (Open): Titon Trimvent XS13 440EA |

Internal noise levels are anticipated to be within the guidelines of BS8233 with comments from ProPG.

An assessment of the external amenity spaces has also been undertaken and levels are within the 'desirable' guidelines of BS8233. Site plans are provided within **Appendix G.**

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# 1. Introduction

## 1.1. Proposal

It is proposed to construct 3 terraced houses and a detached Bungalow at land adjacent to 8 Rutland Street, Heywood. The site is currently a brownfield site.

## 1.2. Reason for Assessment

A noise assessment is to be submitted as part of the planning application to ensure desirable noise levels are met within the habitable rooms of the proposed development and external amenity areas. The assessment aims to provide a sound insulation scheme for the development.

## 1.3. Planning Conditions

No formal planning conditions are understood to have yet been set for the proposals. The applicant has advised that a noise assessment is requested due to potential noise from nearby roads and a small infrequently used industrial estate.

## 1.4. Assessment Guidance Documentation

Guidance on the assessment and design criteria will be drawn from BS8233:2014 - *Guidance on sound insulation and noise reduction for buildings.* Table 4 in Section 7.7.2 of this standard suggests indoor ambient noise levels for dwellings.

Additional guidance will be drawn from 'ProPG: Planning & Noise' which was published "*to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England.*"

Where necessary, mitigation recommendations will be given to comply with the requirements of the National Planning Policy Framework (2021) and the Noise Policy Statement for England (2010). Further information on all guidance documentation can be found in **Appendix H**.

# 2. Environmental Noise Survey

## 2.1. Survey Measurement

To assess the environmental noise levels affecting the proposed development, an unattended noise survey was undertaken at the site from the 10th – 11th June 2024. This period was selected to capture events and noise levels on a typical weekday from the nearby industrial units as well as noise from other nearby residential and commercial sources.

Measurements of $L_{Aeq,T}$ and $L_{AFmax}$ were logged in 5- minute intervals in accordance with the provisions of BS7445 - *'Description and Measurement of Environmental Noise'*.

## 2.2. Measurement Location

Monitoring position M1 is located on the Southern boundary of the site. The microphone was positioned approximately 1.7 metres above ground level and away from any reflective surfaces.

The site and monitoring locations are shown below in **Figure 1**.

**Figure 1: Site & Measurement Locations – google.com/maps**

*Monitoring Location (M1)* *Site Boundary (Approx.)*

## 2.3. Site Descriptions

The site is a brownfield area located between Starkey Street to the North and Rutland Street to the East. The site sits behind and beside the existing row of terraced houses at 2 – 8 Rutland Street. To the West of the site is a park / open grassland area. To the South of the site is a small industrial estate with uses including a vehicle repair shop, plant storage yard, scaffolding storage and aggregate storage yard.

## 2.4. Noise Affecting the Development

The primary noise sources affecting the development were identified as intermittent noise from the industrial estate including scaffolding being loaded onto vehicles and the vehicle repair shop using power tools intermittently. Secondary sources were noted as light road noise in the distance with occasional vehicles passing closer to the site.

## 2.5. Environmental Noise Survey Results

The results from the noise monitoring location M1 are summarised below.

The full-time history of the noise monitoring data is given in **Appendix E.**

| Measurement | Date(s) | Period | $L_{Aeq}$ (dB) | Typical* $L_{AFmax}$ (dB) |
|---|---|---|---|---|
| M1 | 10th & 11th June 2024 | Day *(16hr Aggregate Periods)* | 50 | - |
| | 10th – 11th June 2024 | Night *(8hr)* | 42 | 64 |

**Table 1: Environmental Measurement Summary**

** The given 'Typical' $L_{AFmax}$ levels are an average of the spectra of the noisiest 10 events of the night-time period.*

## 2.6. Weather Conditions

Daytime temperatures of 12°C were noted during the survey with winds of 3 – 5m/s. Detailed weather conditions are given in **Appendix C**.

## 2.7. Measurement Equipment

Measurement equipment complies with accuracy requirements for common environmental noise measurement standards. Equipment was calibrated before and after use and no significant drift occurred during measurements. Up-to-date calibration certification can be provided upon request. A detailed equipment list is given in **Appendix B** with calibration information in **Appendix D**.

# 3. Internal Noise Level Assessment

## 3.1. Design Criteria

BS8233:2014 - *Guidance on sound insulation and noise reduction for buildings* suggests indoor ambient noise levels for dwellings in Table 4, Section 7.7.2. These are summarised below.

| Activity | Location | 07:00 to 23:00 | 23:00 to 07:00 |
|---|---|---|---|
| Resting | Living Room | 35 dB $L_{Aeq,16hour}$ | - |
| Dining | Dining room/area | 40 dB $L_{Aeq,16hour}$ | - |
| Sleeping | Bedroom | 35 dB $L_{Aeq,16hour}$ | 30 dB $L_{Aeq,8hour}$ |

**Table 2: Indoor Ambient Noise Levels for Dwellings**

BS8233 states that the guideline values given above are for 'noise without character', further stating:

> *"Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate."*

Table 4 of BS8233 also has accompanying notes that were subject to additions in ProPG. The relevant notes with the additions of ProPG are given below.

> *"In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB LAmax,F more than 10 times a night."*

As the site is in close proximity to a small industrial estate, it is likely to be affected by noise which requires character based corrections to be made for the assessment.

In accordance with BS4142 guidance, the Specific Sound Levels may be corrected for characteristics that make the sound more noticeable at the NSR location such as tonality, impulsivity and intermittency. Section 9.2 of BS4142:2014 gives commentary on these characteristics and appropriate penalties:

> ***"Tonality***
> *For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.*
>
> ***Impulsivity***
> *A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.*
>
> ***Other sound characteristics***
> *Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.*
>
> *NOTE 2 Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.*
>
> ***Intermittency***
> *When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."*

Noise from the industrial estate may have tonality which is clearly perceptible and so a 4dB criteria penalty will be applied to reflect this.

Additionally, noise may have clearly perceptible impulsivity and so a further 6dB criteria penalty will be applied to account for this.

Noise from the industrial estate was also observed to be intermittent, which gives an additional 3dB penalty.

The total criteria penalty to be applied within the assessment is 13dB. This will be applied only to daytime criteria to reflect the working/operational hours of the industrial estate.

The rating-adjusted assessment criteria are provided below:

| Activity | Location | 07:00 to 23:00 | 23:00 to 07:00 |
|---|---|---|---|
| **Resting** | Living Room | 22 dB $L_{Aeq,16hour}$ | - |
| **Dining** | Dining room/area | 27 dB $L_{Aeq,16hour}$ | - |
| **Sleeping** | Bedroom | 22 dB $L_{Aeq,16hour}$ | 30 dB $L_{Aeq,8hour}$ |

**Table 3: Assessment Criteria**

The average night-time $L_{Amax}$ criteria for the assessment will be 45dB $L_{Amax,F}$.

## 3.2. Assessment Noise Levels

In the interest of a robust assessment, the loudest of the measurement intervals, subject to irregular events, are to be considered in the assessment of internal noise levels and determining the sound insulation scheme.

The resultant external noise levels for the assessment of internal ambient noise levels are summarised in the table below.

| Period | $L_{Aeq,T}$ (dB) | $L_{Amax}$ (dB) |
|---|---|---|
| **Daytime *(1hr)*** | 55 | - |
| **Night *(1hr)*** | 47 | 64 |

**Table 4: Assessment Noise Levels**

## 3.3. Internal Noise Calculations

Internal noise levels have been calculated to demonstrate that the proposed dwellings can achieve the desired design criteria when appropriate glazing and ventilation systems are utilised.

Internal arrangements of the dwellings are not yet available and so standard dimensions are utilised, proposed site plans can be found in **Appendix G**.

Assessment is not required for each individual room therefore a worst-case situation will be used in which the worst affected rooms/floors will be used.

Calculations of internal ambient noise levels have been undertaken using the 'rigorous calculation' method given in Annex G2 of BS8233:2014. Full details of the calculations are provided in **Appendix F.**

# 4. Sound Insulation Scheme

## 4.1. External Building Envelope

Material build-up of the façade will significantly dictate the noise levels within the proposed dwelling. For the purposes of this report, the heavyweight construction of the façade is assumed to provide a minimum sound reduction of 49 dB $R_w$.

Where the roof is to be utilised as a voided loft space with thermal insulation, no further details are required. If the proposed dwelling has rooms within the roof space, the additional material build-up will be assumed at a minimum sound reduction of 39 dB $R_w$.

## 4.2. Glazing and Ventilation

The following glazing and ventilation scheme for the development has been derived with a view of achieving the internal noise level criteria given in Table 2.

| Internal Space | Glazing | | Ventilation | |
|---|---|---|---|---|
| | *Minimum Performance* $R_w$ *(+$C_{tr}$)*[1] | *Example Specification*[2] | *Minimum Performance* $D_{ne,W}$ ,+$C_{tr\ (Open)}$ | *Example Specification*[3] |
| Living Areas | 34(29) | *Double Glazing: 4/16/6* | 40 | *Acoustically Treated Trickle Vent (Open): Titon Xtra Sound Attenuator V75+C50* |
| Bedrooms | 34(29) | *Double Glazing: 4/16/6* | 45 | *Passive Thru-Wall Vent: Passivent Fresh 80dB* |
| Dining Rooms | 30 (26) | *Double Glazing: 4/16/4* | 32 | Hit & Miss Trickle Vent (Open): Titon Trimvent XS13 440EA |

**Table 5: Glazing & Ventilation Scheme**

**N.B.** Note that other glazing configurations and ventilators can achieve the given minimum performance requirements.

***[1]*** *The sound insulation value of the glazing should take into account the glass as well as the frame and perimeter seal.*

***[2]*** *Example glazing specification format given as 'XXmm Float / 16mm Air gap / XXmm Float'*

***[3]*** *It is noted that BS8233 section 7.2.2 states '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 noise level'. This statement implies that the use of closed windows and an alternative means of ventilation is acceptable.*

# 5. Internal Noise Levels

It is determined that by using mitigation as specified in **Table 5** for the building façades, the outcome summarised in the following table is achieved.

| Internal Space | Noise Parameter | Internal Noise Level (dB) | Within Design Criteria? |
|---|---|---|---|
| Living Room | Daytime $L_{Aeq,\ 16hr}$ | 22 | Yes |
| Bedroom | Daytime $L_{Aeq,\ 16hr}$ | 22 | Yes |
| | Night-time $L_{Aeq,\ 8hr}$ | 11 | Yes |
| | Night-time $L_{Amax\ F}$ | 24 | Yes |

**Table 6: Internal Noise Levels**

For the daytime assessment for living areas, the desirable limit of BS8233:2014 with a 13dB penalty suggests a guideline of 22 dB $L_{Aeq,16hr}$ for resting conditions, and up to 27 dB is considered acceptable for necessary developments.

All results, with the implementation of the derived sound insulation scheme given in **Table 5**, would place the internal daytime noise levels below 22 dB, therefore within the desirable limit.

For the night-time assessment for bedrooms, BS8233:2014 suggests a desirable guideline of 30 dB $L_{Aeq,\ 8hr}$ for sleeping conditions, with an acceptable limit of 35 dB $L_{Aeq,\ 8hr}$.

Implementation of the derived sound insulation scheme given in **Table 5** would place the internal continuous night-time noise levels below 30 dB, therefore within the desirable category.

For the night-time assessment for bedrooms, ProPG suggests that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night.

Implementation of the derived sound insulation scheme given in **Table 5** would place the internal $L_{Amax,F}$ night-time events below 45 dB, therefore within the criteria.

# 6. External Amenity Areas

BS8233:2014 provides a desirable guideline of 50 dB LAeq,16hr for external amenity spaces and an acceptable guideline of 55 dB $L_{Aeq,16hr}$ for noisier environments.

External daytime noise levels were measured on-site at position M1 (Figure 1)

| Measurement Position | Noise Parameter | Garden Noise Level (dB) | BS8233 Criteria | Attenuation Required (dB) |
|---|---|---|---|---|
| M1 | Daytime $L_{Aeq, 16hr}$ | 50 | 50 – 55 dB $L_{Aeq, 16hr}$ | 0 |

**Table 7: External Amenity Area Assessment**

As this is within the limits of the BS8233 criteria, this value is deemed acceptable. It is also noted that once the buildings have been completed and boundary treatments such as fences etc are installed, levels in the external amenity areas are potentially even lower.

# 7. Conclusions

A noise assessment has been undertaken at Land adjacent to 8 Rutland Street, Heywood, OL10 4JJ in relation to the proposed construction of 3 terraced houses and a bungalow.

Environmental noise monitoring was undertaken at the site from the 10th – 11th June 2024. Noise affecting the development was determined to be primarily from the nearby industrial estate and road traffic.

A glazing and ventilation scheme has been given to ensure conditions in habitable rooms remain within the design criteria.

Internal noise levels are anticipated to be within the guidelines of BS8233 with comments from ProPG.

## APPENDIX A – Measurement Details

| Measurement(s) | Kit | Start Date | Start Time | End Date | End Time |
|---|---|---|---|---|---|
| **M1** | A5 | 10/06/2024 | 09:45 | 11/06/2024 | 09:25 |

## APPENDIX B - Equipment Details

| Kit | Equipment | Make | Model | Class | Serial Number |
|---|---|---|---|---|---|
| **A5** | Sound Meter | RION | NL-52 | 1 | 00219828 |
| **A5** | Pre-Amp | RION | NH-25 | 1 | 00344 |
| **A5** | Microphone | RION | UC-59 | 1 | 18806 |
| **A5** | Calibrator | RION | NL-75 | 1 | 34212936 |

## APPENDIX C - Meteorology Details

| Date | Temp C° | Wind Speed m/s | Wind Direction | Humidity % | Precipitation mm | Cloud Cover (Oktas) |
|---|---|---|---|---|---|---|
| 10/06/2024 | 12 | 3 | N | 61 | 0 | 6/8 |
| 11/06/2024 | 12 | 5 | NW | 58 | 0 | 8/8 |

## APPENDIX D - Calibration Details

| Kit | Calibrator Ref Level (dB) | Deviation Before (dB) | Deviation After (dB) |
|---|---|---|---|
| **A5** | 94.00 | 0.00 | 0.00 |

# APPENDIX E – Noise Survey Time History

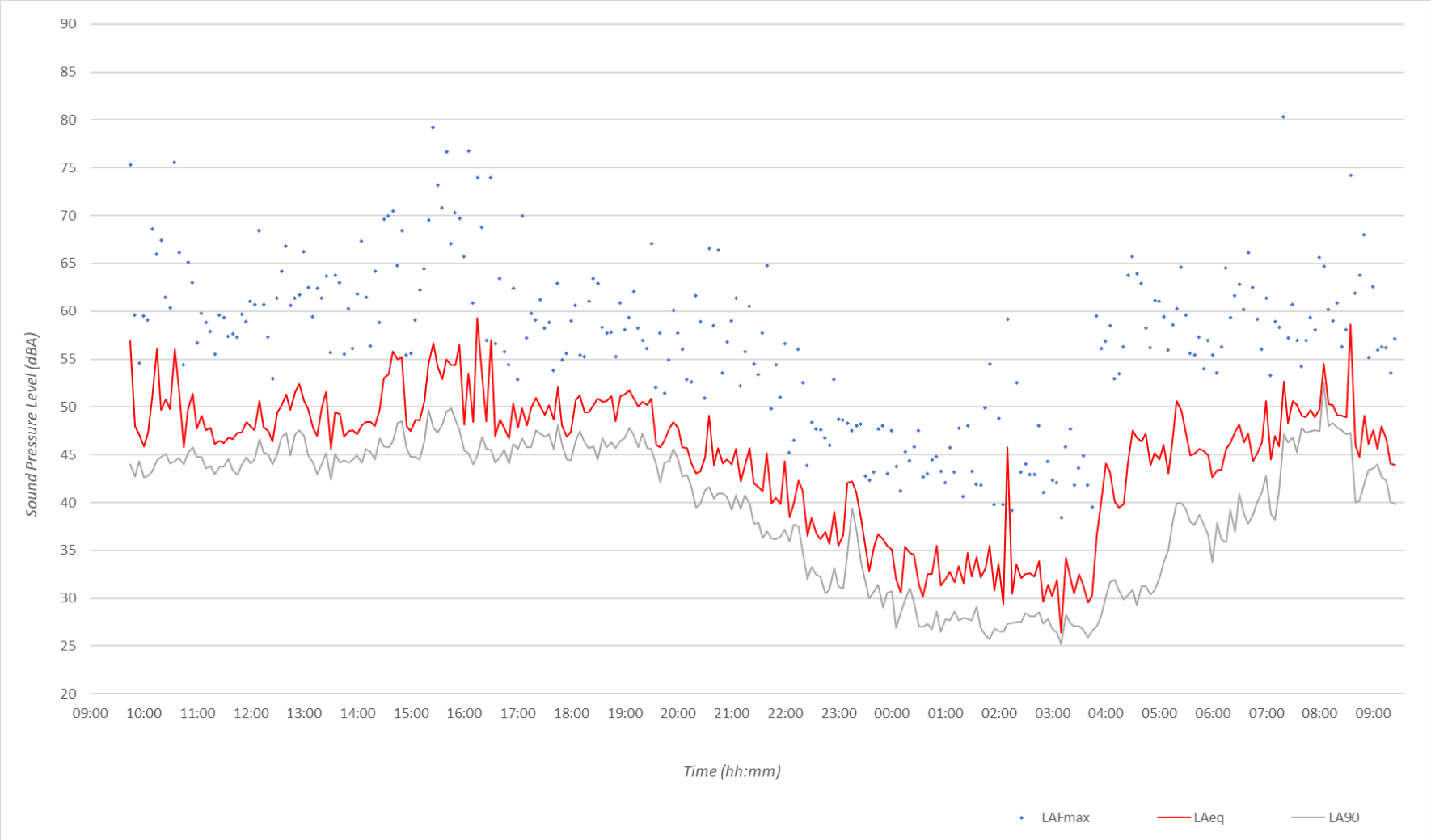



**Figure 2: Environmental Noise Measurement M1 Time History: 10th – 11th June 2024**

# APPENDIX F – BS8233 Rigorous Design Calculations

## Living Room

**BS8233:2014 Façade Noise Break In Calculator**

| | 125 | 250 | 500 | 1k | 2k | dBA |
|---|---|---|---|---|---|---|
| **Daytime External Noise Level - LAeq - 1 hour** | 55.4 | 52.7 | 50.2 | 50.6 | 47.7 | 54 |
| **Night-time External Noise Level - LAeq - 1 hour** | | | | | | |
| **Night-time Lmax Noise Levels - 10 times per night** | | | | | | |

| Room Properties | | | | | Room Coefficient | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Width (m)** | **Height (m)** | **Depth (m)** | **Glazing** | **Reverb Time** | 10 | 11 | 12 | 12 | 12 | A |
| 5 | 2.4 | 4 | 1.5 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.7 | RT |

| Façade Construction | | SRI (Sound Reduction Index) | | | | | Rw |
|---|---|---|---|---|---|---|---|
| **Wall Construction** | Brick and block, 75mm cavity, 60mm Fibreglass | 31 | 46 | 43 | 49 | 56 | 49(44) |
| **Roof Construction** | Not Within Roof Space | 0 | 0 | 0 | 0 | 0 | N/A |
| **Glazing Spec** | 4 / 16 / 6 | 24 | 21 | 29 | 43 | 43 | 34(29) |
| **Ventilation Spec** | Acoustically Treated Trickle Vent (Open) | 40.7 | 38.8 | 35.8 | 42.3 | 43.9 | 40 |

| Calculation Results | | | 125 | 250 | 500 | 1k | 2k | dBA |
|---|---|---|---|---|---|---|---|---|
| **Daytime Internal Noise Level - LAeq** | **Target Value <** | 22 | 13.4 | 18.0 | 16.2 | 11.3 | 8.0 | 21.6 |
| **Night-time Internal Noise Level - LAeq** | **Target Value <** | | | | | | | |
| **Internal LAmax Noise Levels** | **Target Value <** | | | | | | | |

### Sound Insulation Requirement

| | Minimum Sound Insulation Requirement | | Suitable Systems |
|---|---|---|---|
| Glazing | **34(29)** | dB $R_{W(+Ctr)}$ | *Double Glazing* |
| | | | *4 / 16 / 6* |
| Ventilation | **40** | $D_{n,e,w+Ctr}$ | *Acoustically Treated Trickle Vent (Open)* |
| | | | *Titon Xtra Sound Attenuator V75+C50* |

***Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.***

*Calculations conducted in accordance with BS8233:2014 rigorous calculation method*

$$L_{eq,2} = L_{eq,ff} + 10\log_{10}\left(\frac{A_0}{S}10^{\frac{-D_{ss}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{tr}}{S}10^{\frac{-R_{tr}}{10}}\right) + 10\log_{10}\left(\frac{S}{A}\right) + 3$$

# Bedroom

**BS8233:2014 Façade Noise Break In Calculator**

| | 125 | 250 | 500 | 1k | 2k | dBA |
|---|---|---|---|---|---|---|
| **Daytime External Noise Level - LAeq - 1 hour** | 55.4 | 52.7 | 50.2 | 50.6 | 47.7 | 54 |
| **Night-time External Noise Level - LAeq - 1 hour** | 33.0 | 39.0 | 43.1 | 38.2 | 42.3 | 46 |
| **Night-time Lmax Noise Levels - 10 times per night** | 51.1 | 53.0 | 54.1 | 58.1 | 58.9 | 63 |

| Room Properties | | | | | Room Coefficient | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Width (m)** | **Height (m)** | **Depth (m)** | **Glazing** | **Reverb Time** | 7 | 7 | 8 | 8 | 8 | A |
| 3 | 2.4 | 4 | 1.5 | 0.6 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | RT |

| Façade Construction | | SRI (Sound Reduction Index) | | | | | Rw |
|---|---|---|---|---|---|---|---|
| **Wall Construction** | Brick and block, 75mm cavity, 60mm Fibreglass | 31 | 46 | 43 | 49 | 56 | 49(44) |
| **Roof Construction** | Not Within Roof Space | 0 | 0 | 0 | 0 | 0 | N/A |
| **Glazing Spec** | 4 / 16 / 6 | 24 | 21 | 29 | 43 | 43 | 34(29) |
| **Ventilation Spec** | Passive Thru-Wall Vent | 42 | 43 | 43 | 49 | 64 | 45 |

| Calculation Results | | | 125 | 250 | 500 | 1k | 2k | dBA |
|---|---|---|---|---|---|---|---|---|
| **Daytime Internal Noise Level - LAeq** | **Target Value <** | 22 | 15.1 | 19.6 | 15.7 | 9.1 | 2.8 | 22.3 |
| **Night-time Internal Noise Level - LAeq** | **Target Value <** | 30 | -7.3 | 5.9 | 8.6 | -3.3 | -2.7 | 10.9 |
| **Internal LAmax Noise Levels** | **Target Value <** | 45 | 10.8 | 19.9 | 19.5 | 16.6 | 14.0 | 24.3 |

## Sound Insulation Requirement

| | Minimum Sound Insulation Requirement | | Suitable Systems |
|---|---|---|---|
| Glazing | **34(29)** | dB $R_{W(+Ctr)}$ | *Double Glazing* |
| | | | *4 / 16 / 6* |
| Ventilation | **45** | $D_{n,e,w+Ctr}$ | *Passive Thru-Wall Vent* |
| | | | *Passivent Fresh 80dB* |

***Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.***

*Calculations conducted in accordance with BS8233:2014 rigorous calculation method*

$$L_{eq,2} = L_{eq,ff} + 10\log_{10}\left(\frac{A_0}{S}10^{\frac{-D_{nT}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{tr}}{S}10^{\frac{-R_{tr}}{10}}\right) + 10\log_{10}\left(\frac{S}{A}\right) + 3$$

# Dining Room

**BS8233:2014 Façade Noise Break In Calculator**

| | 125 | 250 | 500 | 1k | 2k | dBA |
|---|---|---|---|---|---|---|
| **Daytime External Noise Level - LAeq - 1 hour** | 55.4 | 52.7 | 50.2 | 50.6 | 47.7 | 54 |
| **Night-time External Noise Level - LAeq - 1 hour** | | | | | | |
| **Night-time Lmax Noise Levels - 10 times per night** | | | | | | |

| Room Properties | | | | | Room Coefficient | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Width (m)** | **Height (m)** | **Depth (m)** | **Glazing** | **Reverb Time** | 10 | 11 | 12 | 12 | 12 | A |
| 5 | 2.4 | 4 | 1.5 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.7 | RT |

| Façade Construction | | SRI (Sound Reduction Index) | | | | | Rw |
|---|---|---|---|---|---|---|---|
| **Wall Construction** | Brick and block, 75mm cavity, 60mm Fibreglass | 31 | 46 | 43 | 49 | 56 | 49(44) |
| **Roof Construction** | Not Within Roof Space | 0 | 0 | 0 | 0 | 0 | N/A |
| **Glazing Spec** | 4 / 16 / 4 | 24 | 18 | 26 | 40 | 45 | 30(26) |
| **Ventilation Spec** | Hit & Miss Trickle Vent (Open) | 38.4 | 36.8 | 33.8 | 29.7 | 33.8 | 32 |

| Calculation Results | | | 125 | 250 | 500 | 1k | 2k | dBA |
|---|---|---|---|---|---|---|---|---|
| **Daytime Internal Noise Level - LAeq** | **Target Value <** | 27 | 13.5 | 20.8 | 18.5 | 22.8 | 17.3 | 26.6 |
| **Night-time Internal Noise Level - LAeq** | **Target Value <** | | | | | | | |
| **Internal LAmax Noise Levels** | **Target Value <** | | | | | | | |

## Sound Insulation Requirement

| | Minimum Sound Insulation Requirement | | Suitable Systems |
|---|---|---|---|
| Glazing | **30(26)** | dB $R_{W(+Ctr)}$ | *Double Glazing* |
| | | | *4 / 16 / 4* |
| Ventilation | **32** | $D_{n,e,w+Ctr}$ | *Hit & Miss Trickle Vent (Open)* |
| | | | *Titon Trimvent XS13 4400EA* |

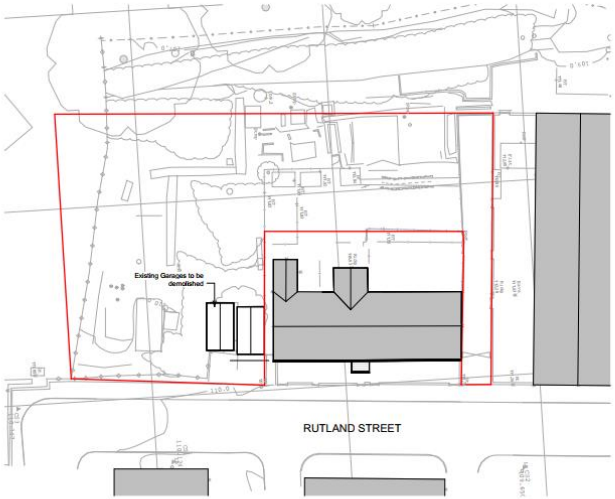
***Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.***

*Calculations conducted in accordance with BS8233:2014 rigorous calculation method*

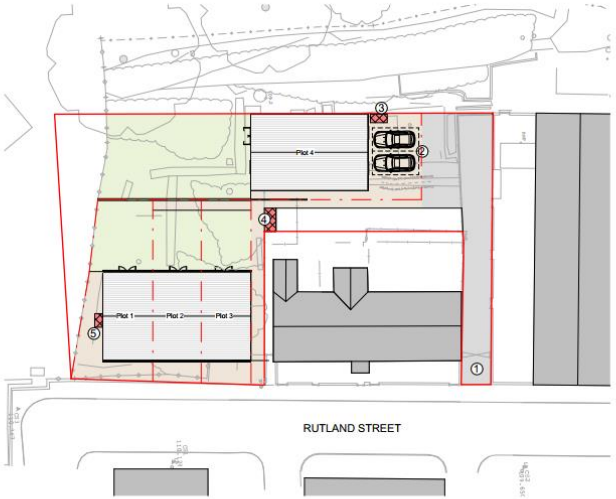
$$L_{eq,2} = L_{eq,ff} + 10\log_{10}\left(\frac{A_0}{S}10^{\frac{-D_{ss}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{tr}}{S}10^{\frac{-R_{tr}}{10}}\right) + 10\log_{10}\left(\frac{S}{A}\right) + 3$$

# APPENDIX G – Site Plans

1. Existing Vehicle Access Road to be retained.
2. Plot 4 Bungalow 2No. Parkign Spaces and turning
3. Plot 2 & 3 Refuse Store (2.4x1.2m)
4. Plot 4 Bungalow Refuse Store (1.8x0.8m)
5. Plot 1 Refuse Store (1.8x0.8m)




1 Existing Site Plan
1 : 200




2 Proposed Site Plan
1 : 200

Do not scale from this drawing. Use figured dimensions only, which are displayed in millimetres unless stated otherwise. The contractor is requested to check all dimensions before work is put in hand. Any discrepancies within the drawing should be reported prior to commencement of works.

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Notes

Previous Revisions

| No. | Description | Date | By |
|---|---|---|---|
| 1 | Planning | 12/04/24 | BP |

**BP Architects**

| | |
|---|---|
| Project | Rutland Street |
| Client | Mr L. Owen |
| Title | Existing & Proposed Site Plan |
| Number | 015 101 |
| Scale | 1 : 200 at A1 |
| Revision | 1 |
| Description | Planning |
| Status | Planning |
| Drawn | Author |
| Date | 12/04/24 |

# APPENDIX H – Legislation, Policy and Guidance

Guidance for the assessment of noise affecting new residential development is given in the National Planning Policy Framework (NPPF). Section 15 of the NPPF states:

> *"174. Planning policies and decisions should contribute to and enhance the natural and local environment by:*
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of…noise pollution."*

Section 185 further states:

> *"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 impact 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."*

Section 187 states:

> *"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."*

To avoid and mitigate adverse noise effects on health arising from and impacting on new development, the NPPF makes reference to NPSE. The Noise Policy Statement for England (NPSE) was published in March 2010 and covers all forms of noise other than occupational noise.

The Noise Policy Statement for England (NPSE) states the following aims in paragraph 2.2.

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

The NPSE does not define the SOAEL numerically, stating in paragraph 2.22:

> *"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the "NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."*

There is no local or national guidance on how the three terms should be defined numerically, it is for the assessor to collate and interpret appropriate guidance on noise, such as may be found in British Standards, and correlate the guidance with the concepts of NOEL, LOAEL and SOAEL.

BS8233:2014 - *Guidance on sound insulation and noise reduction for buildings* suggests indoor ambient noise levels for dwellings in Table 4, Section 7.7.2. These are summarised below.

| Activity | Location | 07:00 to 23:00 | 23:00 to 07:00 |
|---|---|---|---|
| **Resting** | Living Room | 35 dB $L_{Aeq,16hour}$ | - |
| **Dining** | Dining room/area | 40 dB $L_{Aeq,16hour}$ | - |
| **Sleeping** | Bedroom | 35 dB $L_{Aeq,16hour}$ | 30 dB $L_{Aeq,8hour}$ |

BS8233 states that the guideline values given above are for 'noise without character', further stating:

> *"Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate."*

Table 4 of BS8233 also has accompanying notes that were subject to additions in ProPG. The relevant notes with the additions of ProPG are given below.

> *"NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or LAmax,F, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB LAmax,F more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events."*

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

# APPENDIX I – Acoustic Terminology

To aid the understanding of acoustic terminology and the relative difference between noise levels the following background information is provided.

We perceive sound when the ear detects fluctuations in air pressure (sound waves), which are then processed by the brain and perceived as sound. Humans can hear an incredibly wide range of sound intensities ranging from jet engines to fingertips lightly brushing against each other. This range is quantified using a logarithmic scale called the decibel scale (dB). The comfortable range of the decibel scale typically ranges from 0dB (the threshold of hearing) to around 140dB. Here are some examples of common environments and their typical noise levels.

| Noise Level | Environment |
|---|---|
| **0 dB(A)** | Threshold of hearing |
| **20 to 30 dB(A)** | Quiet bedroom at night |
| **30 to 40 dB(A)** | Living room during the day |
| **40 to 50 dB(A)** | Typical office |
| **50 to 60 dB(A)** | Inside a moving car |
| **60 to 70 dB(A)** | Typical high street |
| **100 to 110 dB(A)** | Fire alarm at 1 meter away |
| **140 dB(A)** | Threshold of pain |

## Terminology

**dB (decibel)** – A unit used to quantify the pressure level of sound. Defined as 20 times the logarithm of the ratio between the root-mean-square pressure of a given sound field and a reference pressure level ($2x10^{-5}$ Pa – threshold of hearing).

**$L_{Aeq,T}$** – The equivalent continuous sound pressure level over a stated period. It quantifies a fluctuating sound level over a given period as the equivalent continuous sound level over which the same amount of acoustic energy is contained over. This is A-weighted in order to assess human perception.

**$L_{Amax}$** – the maximum RMS A-weighted sound pressure level occurring within a specified time period; the time weighting is typically either Fast or Slow.

**A-Weighting** – A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.

**$R_w$** – The Weighted Sound Reduction Index ($R_w$) is a number used to rate the effectiveness of a soundproofing system or material.

**$D_{n,e,W}$** – The Weighted Sound Reduction Index specifically for ventilators.

**$C_{tr}$** – $C_{tr}$ is a spectrum adaptation term which method is defined in BS EN ISO 717. The standard uses a reference curve to determine the weighted value of airborne sound insulation. The spectrum adaptation terms C and $C_{tr}$ may are used to take into account different source spectra. '$C_{tr}$' is the A-weighted urban traffic noise spectrum.