

ACOUSTIC DESIGN TECHNOLOGY  
Noise and Vibration Consultants

ADT 3748

31 August 2024

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**ALBION MILL, BURRY**  
**ENVIRONMENTAL NOISE IMPACT ASSESSMENT**  
**ACOUSTIC CONSULTANCY REPORT ADT 3748/ENIA**

| Revision | Date           | Issued By       | Checked by        | Revision Notes |
|----------|----------------|-----------------|-------------------|----------------|
| -        | 31 August 2024 | Andrew Lockwood | Philippa Lockwood | first issue    |

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## **1.0 SUMMARY**

The proposal is to develop the application site for residential accommodation as shown on the planning application drawings under Class MA Permitted Rights Development.

Acoustic Design Technology Limited have undertaken an environmental noise survey to determine the existing ambient noise levels on the site.

Preliminary analysis indicates that it should be possible to control external noise intrusion to the indoor levels recommended in BS 8233:2014 with standard glazing and basic acoustic trickle vents.

A recommended construction has also been provided to protect the upper floors of the old mill building from any possible future commercial use of the ground floor.

## **2.0 BASIS OF ASSESSMENT**

### **2.1 Site Location**

The application site is known as Albion Mill, and is located approximately 800 metres to the west of Bury town centre, on the south side of Bolton Road, the A58.

The site itself comprises a number of buildings including a large mill and a number of smaller, commercial units. The surrounding area comprises mixed residential, commercial and light industrial development.

### **2.2 Proposed Development**

The proposal is to develop the site for residential accommodation as shown on the planning application drawings.

### **2.3 Assessment Criteria**

The Noise Control team at the Council have asked that a noise investigation be conducted to determine the suitability of the site for the proposed development, including noise measurements and recommendations for the mitigation of noise if it is necessary. They have not, however, stipulated any specific requirements.

Applicable direction is to be found in British Standard 8233:2014 (hereafter referred to as BS 8233), which provides guidance on sound insulation and noise reduction for buildings. In relation to residential developments, it says in Section 7.7.2 that for steady external noise sources, it is desirable that the internal ambient noise levels do not exceed the following :-

| Area               | 07:00 – 23:00          | 23:00 – 07:00         |
|--------------------|------------------------|-----------------------|
| Living room        | 35 dB $L_{Aeq,16hour}$ | -                     |
| Dining room / area | 40 dB $L_{Aeq,16hour}$ | -                     |
| Bedroom            | 35 dB $L_{Aeq,16hour}$ | 30 dB $L_{Aeq,8hour}$ |

In relation to outdoor amenity areas, it states in Section 7.7.3.2 that:

*For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB  $L_{Aeq,T}$  with an upper guideline value of 55 dB  $L_{Aeq,T}$  which would be acceptable in noisier environments.*

*However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.*

### **3.0 ENVIRONMENTAL NOISE SURVEY**

#### **3.1 Introduction**

An environmental noise survey was undertaken between 14:00 hours on Friday 02 August 2024 and 13:00 hours on Tuesday 06 August 2024.

The purpose was to determine the typical levels of noise being generated by the noise sources impacting on the site, in order to model and predict the levels of noise likely to be incident upon the proposed residential development.

### **3.2 Instrumentation**

The instrumentation used for the survey is detailed in Appendix A of this report. All the meters were calibrated at the beginning and end of the survey period. No significant drift occurred.

### **3.3 Procedure**

Five measurement positions were selected as described below and indicated on the attached site plan 3748/SP1:

- i. outside the first floor, western elevation of the existing mill
- ii. outside the second floor eastern elevation of the existing mill
- iii. outside the second floor southern elevation of the existing mill
- iv. on the south-eastern site boundary
- v. on the southern site boundary

At positions 1, 2 and 3 a measurement microphone was suspended on a pole approximately 1 metre external to the building façade, and the octave band and 'A' weighted 100ms short-term  $L_{eq}$  noise levels were logged continuously for the duration of the survey for subsequent post processing.

Attended measurements were also taken on Friday 2 August between 14:00 and 16:30 hours at positions 4 and 5. For each measurement, the microphone was mounted on a tripod approximately 1.2 metres above the ground and at least 3.5 metres from any other acoustically reflective surface, again with the meter set to store the octave band and 'A' weighted 100ms short-term  $L_{eq}$  levels for subsequent post processing.

### **3.4 Results**

The logged data for the unattended measurements at positions 1, 2 and 3 has been post processed to determine  $L_{Aeq}$ ,  $L_{A90,T}$  and  $L_{Amax}$  levels for each 15 minute period, and these have been plotted on the attached time history graphs 3748/TH1, TH2 and TH3 for measurement positions 1, 2 and 3, respectively.

The logged data for the attended measurement at positions 4 and 5 has been post processed to determine  $L_{Aeq}$ ,  $L_{A90,T}$  and  $L_{Amax}$  levels for each 15 minute period and these are presented along with the octave band  $L_{eq,T}$  in the attached tables 3748/T1 and 3748/T2, for positions 4 and 5, respectively.

Please refer to Appendix B for the explanation of the noise units and the A-weighting term used in this report.

### **3.5 Weather Conditions**

The weather conditions during the setup, collection visit and the attended measurements were sunny and dry, with wind speeds no more than 5 m/s.

Reference to published weather data reveals that the dry and still conditions continued for the majority of the survey period, but with heavy showers from 24:00 on Saturday for a couple of hours and from 23:00 on Monday night.

### **3.6 Description of Existing Acoustic Environment**

As the survey was primarily unattended, it is not possible to provide a detailed description of the noise climate throughout the entire survey period. The following description is therefore based on observations during site visits, the pattern of the time history and analysis of periodic audio samples.

At positions 1, 2 and 3, the noise climate was primarily controlled by traffic on the local road network, and in particular on the A58. At position 3, there was occasional noise from vehicle movements in Albion Street, and at position 1 occasional noise from the car workshop below. Even so, reference to the graphs shows that the measured ambient noise levels ( $L_{Aeq,15mins}$ ) rarely exceeded 60 dB(A).

At positions 4 and 5, the noise climate was again predominately controlled by the local road network, with occasional vehicle noise from the Royal Mail Delivery Office to the south and also from the car workshop. However, the latter comprises part of the development site, so the associated noise will cease if the development is permitted.

Although lack of access precluded noise monitoring along the eastern boundary of the site, a walk around the Bridge Trading Estate to the east did not reveal any significant noise emanating from that area.

#### **4.0 ASSESSMENT OF EXTERNAL NOISE INTRUSION**

##### **4.1 Noise Sources**

The proposed development involves the conversion of most of the application site into dwellings, leaving Greenbrook Garage as the only remaining premises that generated any noticeable amount of noise during the survey. As measurement position 2 was close by, the noise generated by the premises has been captured by the datalogging at this position.

Thus, once the site has been redeveloped, the only significant noise sources will be the A58, occasional vehicle movements around the buildings and occasional noise from Greenbrook Garage.

## 4.2 Average Noise Levels

When assessing external noise intrusion into new dwellings and noise levels in gardens it must be borne in mind that the noise climate may change in the future. The following discussion is by necessity based on the results of the environmental noise survey described in Section 3.0 above.

As the analysis is relatively complex, a computer model of the proposed installation has been constructed using Datakustik Cadna/A 2023 to predict how noise from the dominant noise sources will impact upon the proposed development. Within the model all buildings and barriers have been assumed to be acoustically reflective, and no allowance has been made for any ground absorption.

The building evaluation feature of the software has been used to generate noise levels around all the buildings designated for conversion, and these are presented on the attached noise maps 3748/NM1 and NM2 for the daytime ( $L_{Aeq,16hour}$ ) and nighttime ( $L_{Aeq,8hour}$ ) periods respectively. In each case, the figure(s) in the white circle show the highest predicted noise level at any point on any façade of the associated building, and the numbers in the coloured boxes around the perimeter show the highest predicted level at any height in that area of the building.

The following table summarises the range of predicted noise levels for the daytime and nighttime periods, taken from the attached noise maps.

|                  | Day (07:00 - 23:00) | Night (23:00 - 07:00) |
|------------------|---------------------|-----------------------|
| predicted levels | 42 - 57             | 36 - 51               |

## 4.3 External Noise Intrusion with the Windows Open

It is generally accepted that for buildings affected by general environmental noise, the level inside a room with an open window will be between 10 and 12 dB(A) lower than the level outside the window.

The practical implication of this is that the internal noise levels recommended in BS 8233 would only be achieved with windows open if the external noise levels were lower than:-

| Area               | 07:00 – 23:00               | 23:00 – 07:00              |
|--------------------|-----------------------------|----------------------------|
| living rooms       | 45 - 47 dB $L_{Aeq,16hour}$ | -                          |
| Dining room / area | 40 dB $L_{Aeq,16hour}$      | -                          |
| bedrooms           | 45 - 47 dB $L_{Aeq,16hour}$ | 40 - 42 dB $L_{Aeq,8hour}$ |

Comparison of these figures with the levels summarised in Section 4.2 above shows that in the more sheltered areas, ventilation via openable windows would be acoustically viable, but that for much of the site, the internal noise levels would be above the levels recommended in BS 8233. This does not mean that the windows cannot be openable, but merely that an alternative means of background ventilation should be provided to obviate the need to open the windows.

#### **4.4 External Noise Intrusion with the Windows Closed – Average Levels**

A building façade fitted with standard, hermetically sealed double glazing and two basic acoustic trickle vents will typically provide at least 25 dB sound reduction. This is more than sufficient to reduce the average noise levels summarised in Section 4.2 to the levels recommended in BS 8233.

This is illustrated by the attached sample calculation 3748/C1, which takes the highest predicted daytime level of 57  $L_{Aeq,16hour}$  and shows a resultant noise level of 32 dB(A) inside a typical living room.

This therefore demonstrates that standard double glazing and trickle vents should reduce the average daytime and nighttime external noise levels to acceptable levels across the entire site.

#### **4.5 Noise Transfer from Ground Floor of Mill to Apartments Above**

The proposal is to convert the existing buildings with the exception of the ground floor of the large mill building under the provisions of Class MA Permitted Development Rights.

The intention is also to apply for planning permission to convert the ground floor of the mill to residential dwellings. However, there is no guarantee that permission would be granted, so for the purposes of this assessment, it is also necessary to consider the transfer of noise from the ground floor of the mill to the new apartments directly above.

From a Building Regulations perspective, the use of the ground floor is immaterial, as the acoustic requirements for the control of airborne noise from the ground floor to the apartments above would normally be the same. For impact noise, the requirement is actually less onerous, since there is no requirement to control impact noise to below unless the space below is used for residential purposes, which it currently is not.

It is understood that the ground floor is currently not in use, so there is therefore no noise that requires control. However, to cater for the eventuality that the Class MA development is implemented but the ground floor of the mill is not redeveloped, it would be appropriate for the ground / first floor separating structure to provide a reasonable amount of airborne sound insulation.

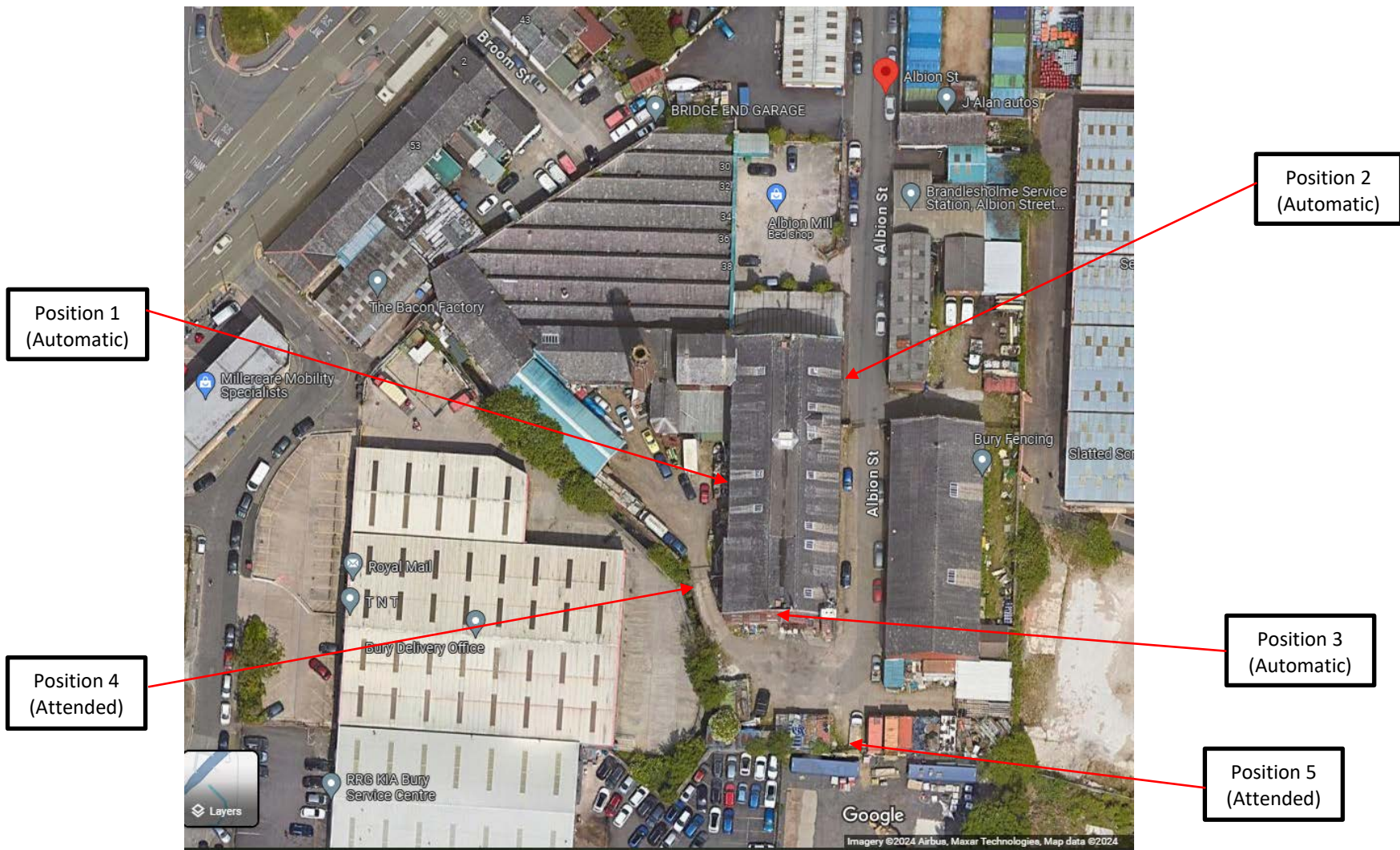
The attached sketch 3748/SK1 illustrates a suitable construction that should significantly outperform the Building Regulations requirement, and should be acoustically suitable for most situations. The attached output from Insul shows that the predicted performance of this construction is  $R_w + C_{tr}$  55 dB.

## 5.0 CONCLUSIONS

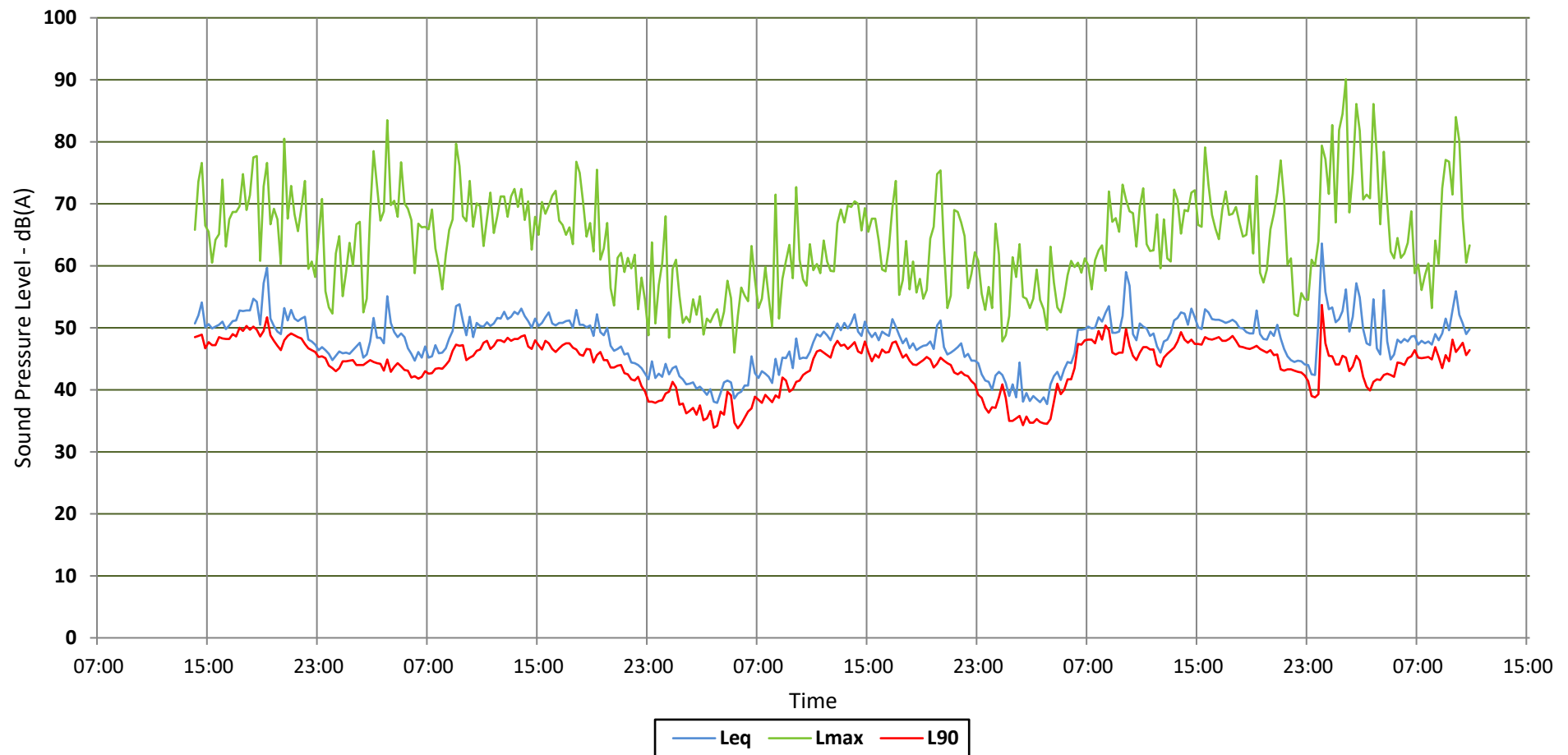
- 5.1 The application site is set back from the A58, and the site survey did not reveal any other noise sources of any major significance impacting on the site. In consequence, the ambient noise levels are relatively low for an urban location.
- 5.2 Calculations show that the internal noise levels recommended in BS 8233 should be achieved with the windows closed, irrespective of the type of glazing used, even if basic acoustic trickle vents are used to provide background ventilation.
- 5.3 The ground floor of the mill building is understood to be currently unoccupied. However, as it cannot be converted to residential development under Class MA Permitted Development Rights, there is the potential for future commercial use after the upper floors of the building have been converted. To cater for this eventuality, a floor construction has been proposed, which should more than satisfy the acoustic requirements set out in Part E of The Building Regulations.

A handwritten signature in black ink, reading "Andrew Lockwood". The signature is fluid and cursive, with a long, sweeping underline that extends to the right.

**FOR ACOUSTIC DESIGN TECHNOLOGY**



|              |                                         |                    |                                                                                                                                                            |
|--------------|-----------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Notes</u> | <u>Description</u>                      |                    | <br><br>ACOUSTIC DESIGN TECHNOLOGY<br>Noise and Vibration Consultants |
|              | Site plan showing measurement positions |                    |                                                                                                                                                            |
|              | <u>Project</u>                          |                    |                                                                                                                                                            |
|              | Albion Mill, Bury                       |                    |                                                                                                                                                            |
|              | <u>Date</u>                             | <u>Drawing No.</u> |                                                                                                                                                            |
|              | 02 August 2024 to 06 August 2024        | 3748/SP1           |                                                                                                                                                            |



### Notes

### Description

Time History Graph - Measurement Position 1 (West Elevation)

### Project

Albion Mill, Burry

### Survey Period

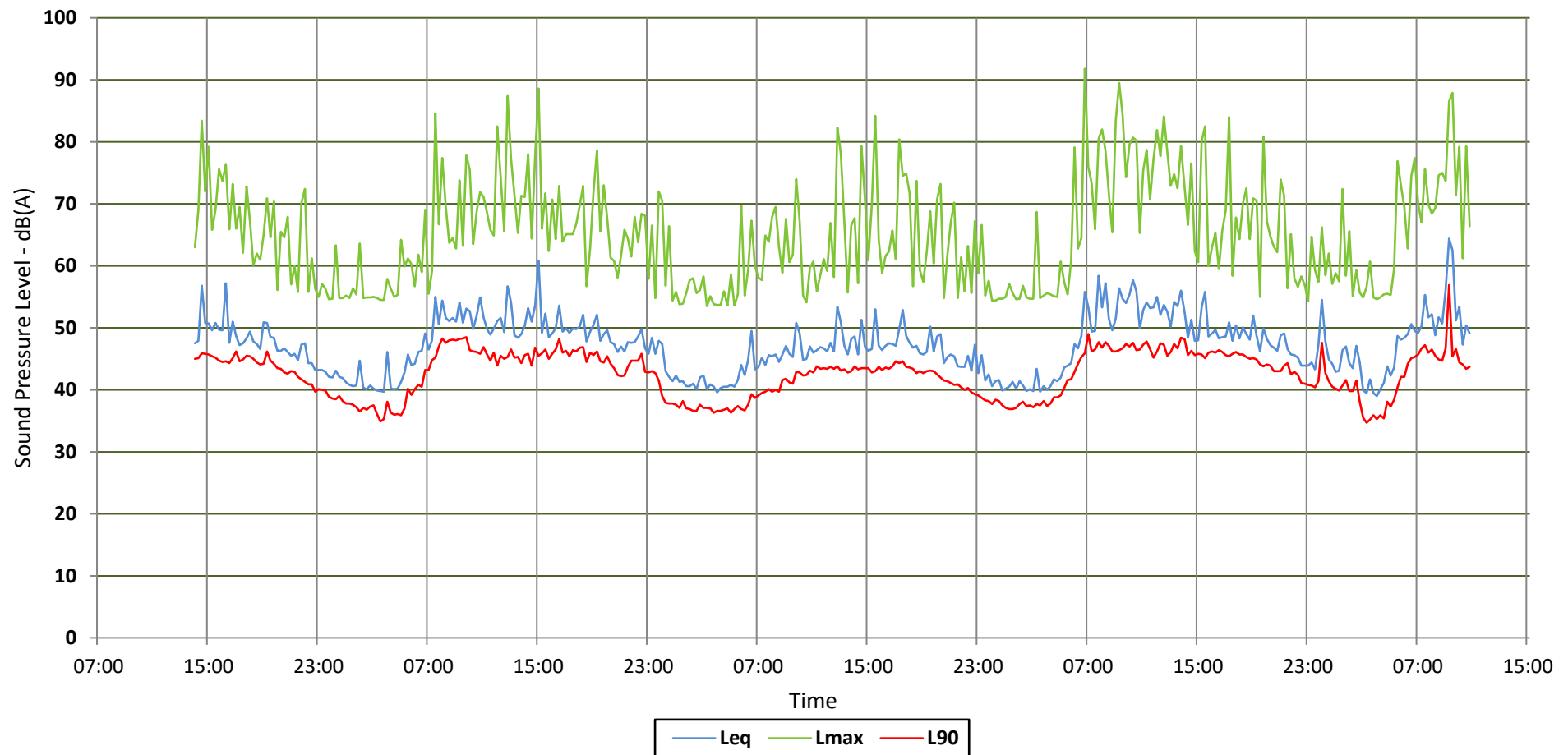
02 August 2024 to 06 August 2024

### Drawing No.

3748/TH1



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### Notes

### Description

Time History Graph - Measurement Position 2 (East Elevation)

### Project

Albion Mill, Burry

### Survey Period

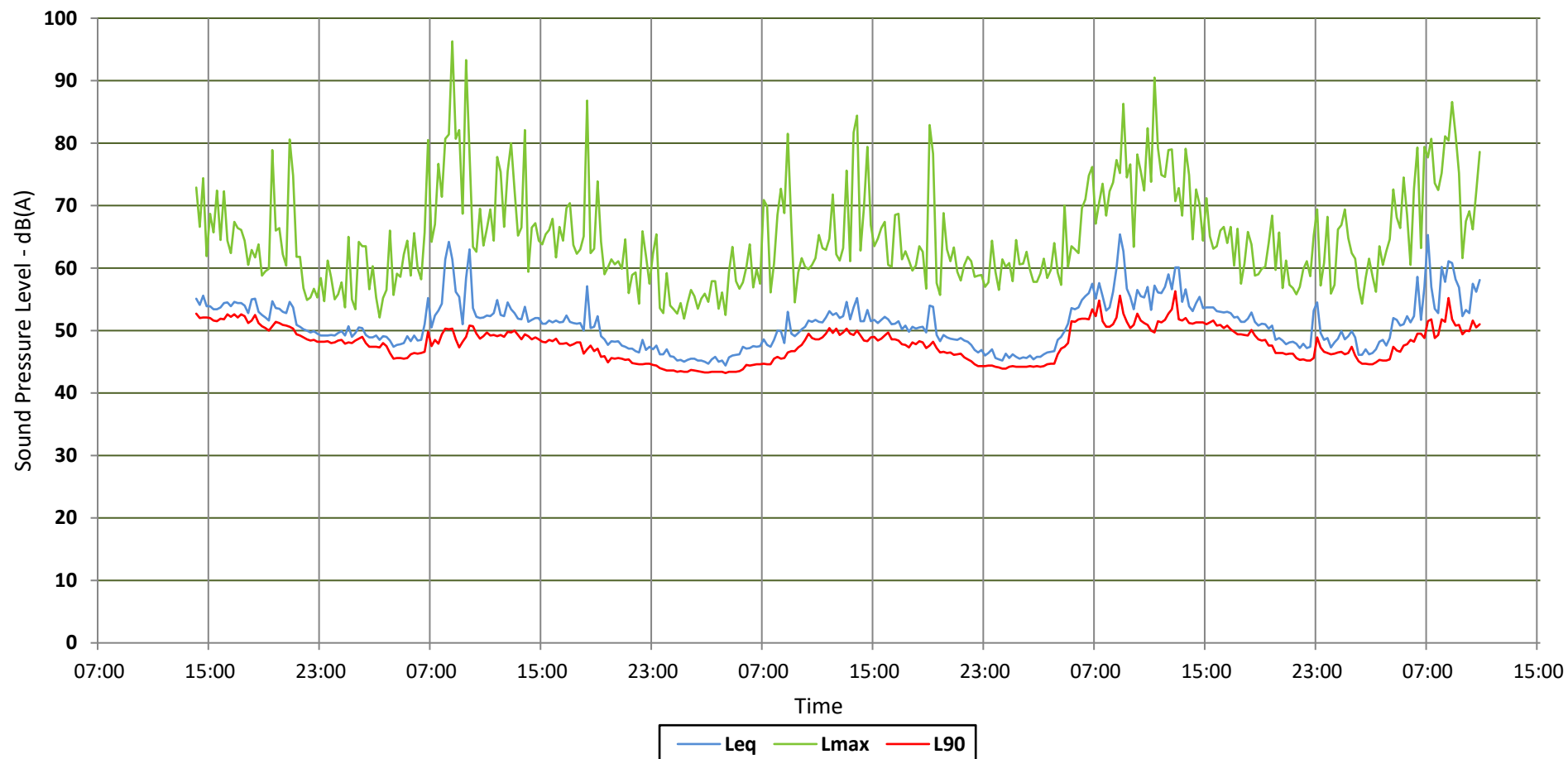
02 August 2024 to 06 August 2024

### Drawing No.

3748/TH2



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### Notes

### Description

Time History Graph - Measurement Position 3 (South Elevation)

### Project

Albion Mill, Burry

### Survey Period

02 August 2024 to 06 August 2024

### Drawing No.

3748/TH3



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**Summary of Attended Daytime Survey Results**

| Position   | Date           | Time          | Duration   | Average $L_{eq,T}$ (dB) at octave band centre frequency (Hz) |     |     |     |    |    |    |    | $L_{Aeq}$ | $L_{Amax}$ | $L_{A90}$ |
|------------|----------------|---------------|------------|--------------------------------------------------------------|-----|-----|-----|----|----|----|----|-----------|------------|-----------|
|            |                |               |            | 63                                                           | 125 | 250 | 500 | 1k | 2k | 4k | 8k |           |            |           |
| Position 4 | 02 August 2024 | 14:00 – 14:10 | 10 minutes | 62                                                           | 56  | 53  | 48  | 48 | 46 | 42 | 36 | <b>53</b> | <b>72</b>  | <b>51</b> |
|            |                | 15:00 – 15:10 | 10 minutes | 64                                                           | 56  | 51  | 47  | 47 | 45 | 40 | 33 | <b>52</b> | <b>66</b>  | <b>50</b> |
|            |                | 16:00 – 16:10 | 10 minutes | 57                                                           | 55  | 52  | 48  | 46 | 43 | 39 | 32 | <b>51</b> | <b>64</b>  | <b>50</b> |
| Position 5 | 02 August 2024 | 14:15 – 14:25 | 10 minutes | 54                                                           | 49  | 47  | 43  | 42 | 39 | 35 | 25 | <b>47</b> | <b>66</b>  | <b>45</b> |
|            |                | 15:15 – 15:25 | 10 minutes | 58                                                           | 55  | 50  | 43  | 43 | 38 | 34 | 25 | <b>48</b> | <b>75</b>  | <b>44</b> |
|            |                | 16:15 – 16:25 | 10 minutes | 54                                                           | 50  | 46  | 43  | 41 | 39 | 39 | 34 | <b>37</b> | <b>61</b>  | <b>43</b> |

**TABLE 3748/T1**

## APPENDIX A

### Instrumentation

| Manufacturer     | Type and / or Model                | Serial Number | Last Laboratory Calibration | Free Field Correction (dB) |
|------------------|------------------------------------|---------------|-----------------------------|----------------------------|
| 01dB             | Fusion 1 Class 1 Sound Level Meter | 15131         | April 2023                  | -0.20                      |
| 01dB             | Fusion MCE3 Microphone             | 14038         |                             |                            |
| 01dB             | Fusion 2 Class 1 Sound Level Meter | 15130         | April 2023                  | -0.20                      |
| 01dB             | Fusion MCE3 Microphone             | 14050         |                             |                            |
| Svantek          | Svan 958 4 Channel Analyser        | 23430         | March 2023                  | 0.0                        |
| Microtech Gefell | MK 255 Microphone (Mic 4)          | 12328         |                             |                            |
| Svantek          | SV12L Preamplifier                 | 47684         |                             |                            |
| Norsonic         | Nor140 Class 1 Sound Level Meter   | 1404515       | February 2024               | -0.2                       |
| Norsonic         | Nor1225 ½" Microphone              | 142527        |                             |                            |
| Norsonic         | Nor1209 Preamplifier               | 13885         |                             |                            |

## **APPENDIX B**

### **Acoustic Terminology**

The annoyance produced by noise is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and any variations in its level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

**A-weighting**     The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the A-weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average person. It is also possible to calculate the A-weighted noise level by applying certain corrections to an un-weighted spectrum.

When the noise being measured has variable amplitude, such as traffic noise, it is necessary to qualify the basic dB unit. This may be done using a statistical index  $L_n$  dB, where  $n$  is any value between 0 and 100, and is the percentage of the sample time for which the stated level is exceeded. In defining the use of the index, both the value of  $n$  and the length of the sample period must be stated.

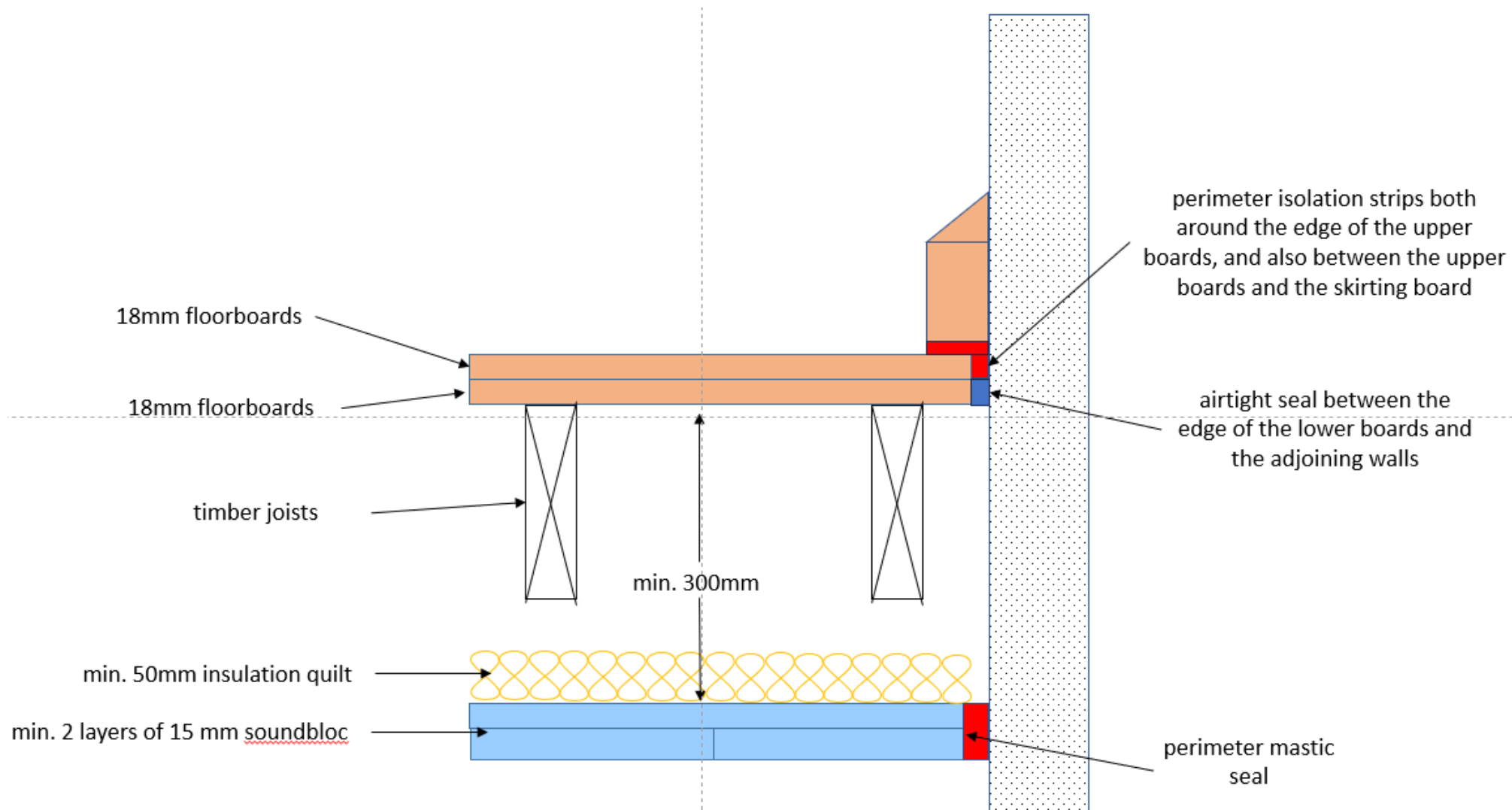
$L_{10}$               $L_{10}$ , being the level exceeded for 10% of the time, has been shown to be a good indicator for traffic noise intrusion, and is used in assessing the effect of traffic noise on residential or commercial premises.

$L_{90}$               $L_{90}$  is the level exceeded for 90% of the time, and is used as a measure of background noise level, as it excludes the effects of occasional transient levels, such as individual passing cars or aircraft.

In addition to the statistical noise indices defined above, the following noise units are also used to define variable amplitude noise sources:

$L_{eq,T}$             $L_{eq,T}$  is defined as the notional steady sound pressure level which, over a stated period of time, would contain the same amount of acoustical energy as the actual fluctuating sound measured over the same period. In other words, it is a measure of the "average" noise level

$L_{max}$             $L_{max}$  is the maximum time-weighted sound pressure level recorded over the stated time period



|                     |                                                                                                  |                                       |                                                                                                                                                               |
|---------------------|--------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><u>Notes</u></b> | <b><u>Description</u></b><br>Proposed Construction for Ground / First Floor Separating Structure |                                       | <br><b>ACOUSTIC DESIGN TECHNOLOGY</b><br>Noise and Vibration Consultants |
|                     | <b><u>Project</u></b><br>Albion Mill, Burry                                                      |                                       |                                                                                                                                                               |
|                     | <b><u>Date</u></b><br>31 August 2024                                                             | <b><u>Drawing No.</u></b><br>3748/SK1 |                                                                                                                                                               |

### SAMPLE FAÇADE CALCULATION

|                                         | Area | Octave Band Centre Frequency - Hz |     |     |     |     |     |     | dB(A) |    |
|-----------------------------------------|------|-----------------------------------|-----|-----|-----|-----|-----|-----|-------|----|
|                                         |      | 63                                | 125 | 250 | 500 | 1k  | 2k  | 4k  |       | 8k |
| Incident noise level                    |      | 63                                | 55  | 53  | 53  | 54  | 49  | 40  | 26    | 57 |
| Direct Field                            |      |                                   |     |     |     |     |     |     |       |    |
| Composite SRI of structure (from below) |      | -22                               | -27 | -24 | -28 | -32 | -31 | -30 | -30   |    |
| Direct L <sub>p</sub>                   |      | 41                                | 28  | 29  | 25  | 22  | 18  | 10  | -4    | 27 |
| Reverberant Field                       |      |                                   |     |     |     |     |     |     |       |    |
| Composite SRI of structure (from below) |      | -22                               | -27 | -24 | -28 | -32 | -31 | -30 | -30   |    |
| 10 log (S / A)                          |      | 3                                 | 3   | 3   | 2   | 0   | -1  | -1  | -1    |    |
| Constant (for line source)              |      | 1                                 | 1   | 1   | 1   | 1   | 1   | 1   | 1     |    |
| Reverberant L <sub>p</sub>              |      | 45                                | 32  | 33  | 28  | 23  | 18  | 10  | -4    | 30 |
| Total L <sub>p</sub>                    |      | 47                                | 34  | 35  | 30  | 26  | 21  | 13  | -1    | 32 |
| Composite SRI Calculation               |      |                                   |     |     |     |     |     |     |       |    |
| 103 mm brick + 100 mm block with ties   | 6.6  | 28                                | 34  | 40  | 45  | 50  | 55  | 55  | 55    |    |
| 4/12/4 sealed (Pilkington)              | 3    | 18                                | 24  | 20  | 25  | 35  | 38  | 35  | 35    |    |
| Acoustic Trickle Vent (BS 8233)         | 10   | 37                                | 37  | 36  | 35  | 36  | 34  | 34  | 34    |    |
| Acoustic Trickle Vent (BS 8233)         | 10   | 37                                | 37  | 36  | 35  | 36  | 34  | 34  | 34    |    |

**CALCULATION 3748/C1**



|       |                                |                    |                                                                                                                                                            |
|-------|--------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NOTES | <u>DESCRIPTION</u>             |                    | <br><br>ACOUSTIC DESIGN TECHNOLOGY<br>Noise and Vibration Consultants |
|       | Predicted Daytime Noise Levels |                    |                                                                                                                                                            |
|       | <u>PROJECT</u>                 |                    |                                                                                                                                                            |
|       | Albion Mill, Bury              |                    |                                                                                                                                                            |
|       | <u>DATE</u>                    | <u>DRAWING NO.</u> |                                                                                                                                                            |
|       | 30 August 2024                 | 3748/NM1           |                                                                                                                                                            |

