



## **NOISE IMPACT ASSESSMENT JIMMY'S, 27 BLOSSOM STREET**

**REC REFERENCE: AC108436-1R1**

**REPORT PREPARED FOR: JIMMY'S GROUP**

**DATE: 17<sup>TH</sup> JUNE 2020**



**DELIVERING ENVIRONMENTAL AND RISK MANAGEMENT SOLUTIONS**



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## EXECUTIVE SUMMARY

Resource and Environmental Consultants Ltd was commissioned by Jimmy's Group to provide a Noise Impact Assessment as part of a planning application for a change of use from an existing office to A3 at 27 Blossom Street, Manchester.

A series of noise surveys have been completed in order to determine the existing background noise levels of sound representative of the closest sensitive receptors. Internal restaurant noise at the Jimmy's Liverpool restaurant has also been measured and used to predict the noise breakout at the proposed Manchester site. Noise specification sheets have also been used for proposed external plant.

Noise modelling software has been used in order to predict the noise levels at the surrounding sensitive receptors due to restaurant and basement breakout and external plant noise.

The assessment has been based on robust and worst-case assumptions. This assessment has shown that, in principle, there should be no adverse impact at the neighbouring residents as a result of the proposed restaurant and associated noise emissions.



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## **1. INTRODUCTION**

Resource and Environmental Consultants Ltd were commissioned by Jimmy's Group to provide a Noise Impact Assessment as part of a planning application for a change of use from an existing office to A3 at 27 Blossom Street, Manchester, to be referred to hereafter as '*the Site*'.

This assessment has been undertaken to identify key noise sources associated with the Site which may have the potential to impact upon the existing noise-sensitive dwellings.

All acronyms used within this report are defined in the Glossary presented in Appendix II.

### **1.1 Site Location and Proposed Development**

The site is situated in the heart of Ancoats in the middle of a developed area on the corner of blossom street and cotton street. Surrounding the site are existing residential apartment blocks, as well as existing restaurants such as Canto and Rudy's Pizza. Next door to the site is the Seven Brothers Beerhouse.

Key noise sources assessed with potential to impact upon the Site are due to noise breakout from the restaurant bar area including patron and background music noise as well as external plant in the form of a rooftop kitchen extract fan and AC unit.

The nearest noise sensitive receptors have been taken as the neighbouring apartments located to the west of the development and above seven brothers to the east. The assessment has also considered the impact for the apartments to the north and south.

### **1.2 Limitations**

Where mitigation measures are specified in our report, it should be noted that these measures are relative to a specific sound source, both in terms of the measured sound pressure level and the character of the source. Where either the sound pressure level or the character of the sound varies following completion of the sound survey, REC cannot be held responsible for any subsequent variations in the proposed mitigation performance.

Further limitations of this report are presented in Appendix I.

### **1.3 Confidentiality**

REC has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from REC; a charge may be levied against such approval.



## 2. ASSESSMENT METHODOLOGY

### 2.1 Local Authority Consultation

In an email on 12<sup>th</sup> November 2019, Laura Miller of Manchester City Council responded to REC's request for methodology approval as per the following:

*"I agree with your proposals with regards to modelling the noise from external plant, patron noise and noise breakout from the building.*

*I would suggest that you download and read our planning guidance related to noise as this states the noise limits which will be required to be met, including some additional controls for entertainment noise.*

*Our noise guidance can be downloaded via this link: [https://secure.manchester.gov.uk/downloads/download/5199/environmental\\_and\\_public\\_protection\\_information\\_for\\_developers](https://secure.manchester.gov.uk/downloads/download/5199/environmental_and_public_protection_information_for_developers)*

*This is quite a noise sensitive area with a lot of old and new residential buildings (some very close to the proposed location of Jimmys on Loom Street, Blossom Street and Cotton Street)."*

### 2.2 Local Authority Guidance

#### 3.6.1.5 Industrial / commercial developments

BS 4142 should be used to assess the likely impact of noise from industrial and commercial sources at noise sensitive premises (section 3.5). One of the indications of the impact of a BS 4142 assessment is the lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, *depending on the context*. The Council consider that new developments should contribute and enhance the area in which they are located and where possible, contribute to the improvement of people's health and quality of life as per the NPSE. With this in mind, the design objective should be:

*'The development should be designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location'.*

Where this criterion cannot be achieved, the various noise control measures considered as part of the assessment should be fully explained (i.e. relocation of noise sources, use of quieter equipment, enclosures, screening, restriction of the hours of operation) and the achievable noise level should be identified. This information will allow us to make a judgement concerning the application and its likely impact on the surrounding area. In addition to the above, maximum noise levels should also be adequately controlled. Where Uses generate high noise levels of a short duration (e.g. loud bangs) on a regular basis, these should aim to be controlled so as not to exceed 60 dB (LAmax) at the façade of

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noise sensitive premises nearby in accordance with the recommendations of the World Health Organisation (section 3.5). Deliveries and collections are usually controlled by restricting operational hours but depending on the extent of these activities, a Noise Management Plan (NMP) may be requested, which would include an assessment of noise. This would usually involve assessing the noise upon arrival, loading/unloading period and then departure. The NMP may also need to



include controls such as acoustically sealed delivery bays, and restrictions on vehicle mounted refrigeration units and audible alarm systems. Where applicable, the noise assessment will take account of multiple noise sources operating simultaneously and the state cumulative level of these.

#### **3.6.1.5.1 Noise and Vibration from Fixed Plant / Equipment**

Noise from fixed plant, equipment or machinery can be very annoying and disruptive to people living nearby particularly where that item involved emits a noise with impulsive or tonal characteristics. Many of the noise complaints Environmental Health receive about noise from plant, equipment and machinery specifically concern the character of the noise emitted. Any noise assessment needs to consider not only the overall level of noise emitted but also its particular characteristics. The noise assessment should be based on BS 4142: 2014 and any application for fixed plant, equipment or machinery must demonstrate that:

*'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location'.*

By designing the sound pressure level of any plant items to generate a noise impact of at least 5dB below the existing background level, any plant noise impact should be of a negligible level which should not give rise to complaints from users or occupiers of existing noise-sensitive usages. Past experience has shown that this criterion can be readily achieved. Where available, product specification data for new items should be submitted with the acoustic report. Consultants should be using these to compare with data from the noise survey, and propose mitigation where the levels are above those specified in the criterion. Where this information is not available a consultant may choose to measure the noise levels generated by the equipment in question where the equipment has already been installed elsewhere (and in accordance with the guidance in BS 4142). Where fixed plant, equipment or machinery is attached to a building the vibration caused by it can pass through the building structure and cause structure borne noise elsewhere in the building. Where it is to be installed in or on a building containing a noise sensitive use structure borne noise should be considered in the noise assessment and adequate control measures should be proposed. An example of where this would be required is where there is a proposal to install fixed plant or equipment on the roof of a residential apartment block.

## **2.3 National Planning Practice Guidance**

Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- ▶ Whether or not a significant adverse effect is occurring or likely to occur;
- ▶ Whether or not an adverse effect is occurring or likely to occur; and
- ▶ Whether or not a good standard of amenity can be achieved.

In line with the Explanatory Note of the Noise Policy Statement for England, this would include



identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

The Observed Effect Levels are as follows:

- ▶ Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur.
- ▶ Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected.
- ▶ No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected.

Table 1 summarises the noise exposure hierarchy, based on the likely average response.

**Table 1 Noise Exposure Hierarchy**

| Perception                                | Examples of Outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Increasing Effect Level     | Action                           |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------------------------------|
| Not Noticeable                            | No Effect                                                                                                                                                                                                                                                                                                                                                                                                                                                            | No Observed Effect          | No specific measures required    |
| Noticeable and not intrusive              | Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.                                                                                                                                                                                                                                                              | No Observed Adverse Effect  | No specific measures required    |
| Lowest Observed Adverse Effect Level      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                             |                                  |
| Noticeable and intrusive                  | Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.                                                          | Observed Adverse Effect     | Mitigate and reduce to a minimum |
| Significant Observed Adverse Effect Level |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                             |                                  |
| Noticeable and disruptive                 | The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area. | Significant Observed Effect | Avoid                            |
| Noticeable and very disruptive            | Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory                                                                                                                                                                               | Unacceptable Adverse Effect | Prevent                          |



The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.

These factors include:

- ▶ The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;
- ▶ For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- ▶ the spectral content of the noise and the general character of the noise. The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.

More specific factors to consider when relevant:

- ▶ where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;
- ▶ consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations.
- ▶ If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

## **2.4 British Standard BS8233: 2014: Guidance on Sound Insulation and Noise Reduction for Buildings**

### **Noise Criteria Limits**

The scope of this standard is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.

The standard suggests suitable internal noise levels within different types of buildings, including dwellings, as shown in Table 3:

**Table 2 BS8233 Recommended Internal Noise Levels**

| Criterion                             | Typical Situation | Design $L_{Aeq, T}$ (dB) |
|---------------------------------------|-------------------|--------------------------|
| Suitable resting/ sleeping conditions | Living Room       | 35                       |
|                                       | Bedroom           | 30                       |



| Criterion                                                                                                                                    | Typical Situation | Design $L_{Aeq, T}$ (dB) |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------|
| For a Reasonable standard in bedrooms at night, individual noise events (measured with fast time weighting) should not exceed 45dB $L_{max}$ |                   |                          |

BS8233 goes on to recommend noise levels for gardens. According to BS8233;

*"It is desirable that the external noise level does not exceed 50dB  $L_{Aeq, T}$ , with an upper guideline value of 55dB  $L_{Aeq, T}$  which would be acceptable in noisier environments. However, it is also recognised 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 might be warranted".*

BS8233 goes on to say:

*"In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited".*

## Ventilation Requirements

Where a partially open window cannot be relied upon to provide an adequate level of facade sound insulation performance, it is necessary to consider alternative ventilation for habitable rooms. Section 8.4.5.4 within BS8233 states:

*"The Building Regulations' supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice.*

*Alternatively, acoustic ventilation units (see 7.7.2 below) are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans."*

Section 7.7.2 states:

*"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 noise level."*

## 2.5 World Health Organisation's (WHO) 'Guidelines for Community Noise'

The WHO 'Guidelines for Community Noise' offers advice with regard to setting noise criteria applicable to sleep disturbance. Section 4.2.3 specifies:

*'If the noise is not continuous,  $L_{Amax}$  or SEL are used to indicate the probability of noise-induced awakenings. Effects have been observed at individual  $L_{Amax}$  exposures of 45 dB or less. Consequently, it is important to limit the number of noise events with a  $L_{Amax}$  exceeding 45 dB.'*

The guidelines go on to state:



*'At night, sound pressure levels at the outside façades of the living spaces should not exceed 45 dB  $L_{Aeq}$  and 60 dB  $L_{Amax}$ , so that people may sleep with bedroom windows open. These values have been obtained by assuming that the noise reduction from outside to inside with the window partly open is 15 dB.'*

The sound insulation performance value of 15dB for a façade containing a partially open window accords with the guidance offered in BS8233:2014.

The guidelines reference a study by Vallet & Vernet, 1991, which concluded that:

*'For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB  $L_{AF,max}$  more than 10-15 times per night.'*

Accordingly, this assessment has utilised the 10<sup>th</sup> highest measured maximum noise level from the night-time period and allows for an assessment of a typical maximum noise level in determining façade sound insulation performance.

## **2.6 BS4142: 2014 'Methods for rating and assessing industrial and commercial sound'**

This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- ▶ Sound from industrial and manufacturing processes;
- ▶ Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- ▶ Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and,
- ▶ Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

The procedure detailed in the standard compares the measured or predicted noise level 'the specific noise level' from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is typical.'

The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

- ▶ Daytime (07:00 – 23:00): 1 hr; and,
- ▶ Night-time (23:00 – 07:00): 15 minutes.

There are a number of 'penalties' which can be attributed to the specific sound level depending upon the 'acoustic features' of the sound level under investigation as follows. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows:

### **Tonality**

- ▶ +2dB: where the tonality is just perceptible;
- ▶ +4dB: where the tonality is clearly perceptible; and,



- ▶ +6dB: where the tonality is highly perceptible.

### **Impulsivity**

- ▶ +3dB: where the impulsivity is just perceptible;
- ▶ +6dB: where the impulsivity is clearly perceptible; and,
- ▶ +9dB: where the impulsivity is highly perceptible.

### **Intermittency**

- ▶ +3dB: where the intermittency is readily distinctive against the acoustic environment.

In addition to the above acoustic features, there is a penalty for 'other sound characteristics' of +3dB where a sound exhibits characteristics that are neither tonal nor impulsive, though are readily distinctive against the acoustic environment.

BS4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

Assessment of the rating level relative to the background noise level can yield the following commentary:

- ▶ Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact;
- ▶ A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- ▶ A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and,
- ▶ The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

With the above in mind, it is common that a Local Planning Authority will specify their own criteria for the rating level relative to the background sound level and, where this is the case, this criterion usually takes precedence over a simple comparison of the rating level against the background sound level.



### 3. SOUND SURVEYS

#### 3.1 Internal Noise Survey – Jimmy's Liverpool

REC has conducted an attended measurement within restaurant at Jimmy's in Liverpool, which is considered representative to the proposed Manchester Site in both size and function. The survey was carried out over the following time period:

▶ 17:55 to 18:15 on Tuesday 26<sup>th</sup> November 2019.

The above periods were selected primarily to gain a measured level of the background music throughout the restaurant area with patrons also using the restaurant.

A summary of the 1-minute measured sound pressure levels is presented in Table 5.

**Table 3 Summary of Measured Sound Levels**

| Measurement Period<br>Start | Measured Sound Pressure Levels<br>(dB) |                    |                   |
|-----------------------------|----------------------------------------|--------------------|-------------------|
|                             | L <sub>Aeq,T</sub>                     | L <sub>A90,T</sub> | L <sub>Amax</sub> |
| 26/11/2019 17:56            | 74.0                                   | 69.9               | 76.1              |
| 26/11/2019 17:57            | 73.8                                   | 70.9               | 75.9              |
| 26/11/2019 17:58            | 71.5                                   | 60.5               | 76.4              |
| 26/11/2019 17:59            | 70.9                                   | 60.5               | 75.2              |
| 26/11/2019 18:00            | 71.0                                   | 60.7               | 76.5              |
| 26/11/2019 18:01            | 74.9                                   | 70.3               | 78.2              |
| 26/11/2019 18:02            | 73.0                                   | 59.7               | 76.8              |
| 26/11/2019 18:03            | 74.1                                   | 70.4               | 77.8              |
| 26/11/2019 18:04            | 72.9                                   | 66.9               | 77.0              |
| 26/11/2019 18:05            | 72.7                                   | 64.8               | 76.5              |
| 26/11/2019 18:06            | 74.2                                   | 70.8               | 79.8              |
| 26/11/2019 18:07            | 74.0                                   | 70.1               | 77.5              |
| 26/11/2019 18:08            | 72.1                                   | 61.3               | 75.3              |
| 26/11/2019 18:09            | 72.0                                   | 65.6               | 77.8              |



| Measurement Period Start | Measured Sound Pressure Levels (dB) |                    |                   |
|--------------------------|-------------------------------------|--------------------|-------------------|
|                          | L <sub>Aeq,T</sub>                  | L <sub>A90,T</sub> | L <sub>Amax</sub> |
| 26/11/2019 18:10         | 72.4                                | 64.2               | 78.9              |
| 26/11/2019 18:11         | 73.5                                | 68.6               | 76.3              |
| 26/11/2019 18:12         | 72.8                                | 70.1               | 75.4              |
| 26/11/2019 18:13         | 73.2                                | 67.9               | 78.1              |
| 26/11/2019 18:14         | 72.4                                | 69.5               | 75.7              |
| 26/11/2019 18:15         | 74.4                                | 71.7               | 77.4              |

Music break-out, patron noise and other noise associated with the premises was audible.

### 3.2 Background Sound Survey

To obtain representative noise levels of the closest proposed receptors, the background sound levels have been taken from periods of the measurements at NMP1 on Sunday 27<sup>th</sup> October 2019.

The measured background and ambient noise levels are presented in Table 6, below.

**Table 6 Measured Background Sound Levels**

| Assessment Period | Measured Ambient Noise Level, L <sub>Aeq</sub> , (dB) | Measured Background Sound Level, L <sub>A90,T</sub> (dB) |
|-------------------|-------------------------------------------------------|----------------------------------------------------------|
| 27/10/2019 07:00  | 53.0                                                  | 46.2                                                     |
| 27/10/2019 08:00  | 55.4                                                  | 47.2                                                     |
| 27/10/2019 09:00  | 56.8                                                  | 48.2                                                     |
| 27/10/2019 10:00  | 56.6                                                  | 48.5                                                     |
| 27/10/2019 11:00  | 56.9                                                  | 50.9                                                     |
| 27/10/2019 12:00  | 59.3                                                  | 51.2                                                     |
| 27/10/2019 13:00  | 58.6                                                  | 51.8                                                     |
| 27/10/2019 14:00  | 58.8                                                  | 52.5                                                     |
| 27/10/2019 15:00  | 58.8                                                  | 52.9                                                     |



| Assessment Period           | Measured Ambient Noise Level,<br>$L_{Aeq}$ ,<br>(dB) | Measured Background Sound Level,<br>$L_{A90,T}$<br>(dB) |
|-----------------------------|------------------------------------------------------|---------------------------------------------------------|
| 27/10/2019 16:00            | 59.3                                                 | 52.9                                                    |
| 27/10/2019 17:00            | 60.7                                                 | 53.1                                                    |
| 27/10/2019 18:00            | 63.6                                                 | 53.9                                                    |
| 27/10/2019 19:00            | 60.2                                                 | 53.5                                                    |
| 27/10/2019 20:00            | 58.6                                                 | 52.7                                                    |
| 27/10/2019 21:00            | 58.6                                                 | 51.8                                                    |
| 27/10/2019 22:00 (to 23:00) | 57.7                                                 | 50.6                                                    |
| 27/10/2019 23:00            | 55.3                                                 | 50.2                                                    |
| 27/10/2019 23:15            | 53.9                                                 | 48.6                                                    |
| 27/10/2019 23:30            | 55.8                                                 | 49.3                                                    |
| 27/10/2019 23:45            | 56.5                                                 | 48.7                                                    |
| 28/10/2019 00:00            | 58.3                                                 | 47.5                                                    |
| 28/10/2019 00:15            | 53.4                                                 | 46.4                                                    |
| 28/10/2019 00:30            | 54.1                                                 | 45.7                                                    |
| 28/10/2019 00:45            | 51.3                                                 | 45.7                                                    |

During the noise surveys the weather conditions with conducive to the measurement of environmental noise, i.e. wind speeds no more than 5m/s and dry conditions. The following equipment was used for the Noise Surveys. Calibration dates relate to those at the time of the surveys.

**Table 7 Noise Measurement Equipment**

| Measurement Position | Equipment Description | Manufacturer & Type No. | Serial No. | Calibration Due Date          |
|----------------------|-----------------------|-------------------------|------------|-------------------------------|
| NMP1                 | Sound Level Meter     | 01dB-Metravib Fusion    | 11536      | 23 <sup>rd</sup> October 2019 |
|                      | Pre-amplifier         | 01dB Metravib           | Internal   |                               |
|                      | Microphone            | GRAS 40CE               | 291871     |                               |



| Measurement Position | Equipment Description | Manufacturer & Type No. | Serial No. | Calibration Due Date           |
|----------------------|-----------------------|-------------------------|------------|--------------------------------|
|                      | Calibrator            | 01dB-Metravib CAL-21    | 34975432   | 20 <sup>th</sup> October 2020  |
| NMP2                 | Sound Level Meter     | 01dB-Metravib Fusion    | 10819      | 27 <sup>th</sup> November 2020 |
|                      | Pre-amplifier         | 01dB Metravib           | Internal   |                                |
|                      | Microphone            | GRAS 40CE               | 217637     |                                |
|                      | Calibrator            | 01dB-Metravib CAL-21    | 34554787   | 10 <sup>th</sup> June 2020     |

The sound level meters were field calibrated prior to and following the survey. No significant drift was reported. Calibration certificates are available on request.



## 4. NOISE IMPACT ASSESSMENT

### 4.1 BS4142:2014 Assessment of Breakout Noise

For the purposes of this assessment, REC has used noise modelling software CadnaA 2019 to determine the impact of noise from building breakout and the external extraction fan. A noise model has therefore been constructed in order to calculate predicted noise levels at the facades of the closest sensitive receptors.

The following inputs have been included in the model:

- ▶ Site elevations have been taken as existing using 1m contours;
- ▶ Existing buildings that provide shielding from any of the noise sources have been included in the model;
- ▶ Noise survey data from the Liverpool survey has been used within the restaurant to obtain the frequency bands and scaled up to 85dB to meet MCC criteria. The basement also utilises this data but has been given a further scale up of 5dB;
- ▶ The provided data from the Kitchen extraction fan manufacturer has been which can be seen in Appendix IV;
- ▶ The restaurant windows are modelled as per the modelling software's specification sheet for double glazed windows, which are currently in place in the property. The windows are to remain closed at all times;
- ▶ All 3 floors of the building have been included with noise emanating from the entire façade, this can be seen in Figure 3 in the appendix;
- ▶ A floor height of 3m has been assumed for all existing dwellings which is a standard separation distance between ground and first floors in a typical dwelling;
- ▶ A reflection order of 2 has been used in all calculations;
- ▶ The extraction fan includes a plan for an attenuator. This is modelled with a conservative attenuation of 10dBA;
- ▶ The hours of operation are proposed to be 0900 to midnight with the kitchen closing at 2300;
- ▶ The highest sound level is displayed, taken from between the ground to the top floor of the surrounding receptors for every section of façade.
- ▶ The grids were run at a height of 8m to account for the rooftop fan noise, as the adjacent sensitive receptors overlook the rooftop; and
- ▶ Noise levels generated using ISO 9613-1 and ISO 9613-2 "*Acoustics – Attenuation of sound during propagation outdoors*" as incorporated into CadnaA software.

#### 4.1.1 Internal Sound Breakout Assessment from Restaurant Use

The highest 1-minute measured noise level (18:01 to 18:02) has been used to inform the assessment.

The attended measurement at the existing Site in Liverpool was used to calibrate the external breakout from internal sources. The entire building façade and roof has been modelled as vertical and horizontal area sources within the noise model with a power level of 49.2L<sub>w</sub>. This includes attenuation for standard brick wall, standard glazing (unopenable) windows and the entrance doorway. This includes all facades of the basement function space.



A background comparison assessment has been undertaken in accordance with the criterion requested by MCC.

At the time of surveying we only had a small window to get the representative levels measured. It is to be noted that our main aim was to get representative levels of the background music levels within the restaurant. However, when on site, the surveyor noted that the restaurant was at around 1/3 capacity. He also took measurements next to an occupied set of tables. Accounting for this, the noise levels have been scaled up to 85dB within the restaurant area and 90dB within the basement area, to give an absolute worst-case scenario.

The measured frequency band data has been used and calculated at the worst affected façades using noise modelling

Table 8 shows the sound pressure level for each frequency at the closest receptors.

**Table 8 Calculation of Combined Sound Pressure Levels at the nearest receptors.**

| Assessment Period    | Receptor   | Highest predicted facade sound pressure level (dB) | Measured Background Level (dB) | Council Criterion Level (dB) | Difference with Council Criterion (dB) |
|----------------------|------------|----------------------------------------------------|--------------------------------|------------------------------|----------------------------------------|
| Daytime 0700 - 2300  | R1 - North | 21                                                 | 48                             | 38                           | -17                                    |
|                      | R2 - West  | 37                                                 |                                |                              | -1                                     |
|                      | R3 - South | 24                                                 |                                |                              | -14                                    |
|                      | R4 - East  | 37                                                 |                                |                              | -1                                     |
| Night-time 2300-0700 | R1 - North | 21                                                 | 46                             | 36                           | -15                                    |
|                      | R2 - West  | 37                                                 |                                |                              | +1                                     |
|                      | R3 - South | 24                                                 |                                |                              | -12                                    |
|                      | R4 - East  | 37                                                 |                                |                              | +1                                     |

Table 8 shows that there will be a slight exceedance at any nearby receptors due to sound from the outbreak of the building. The assessment assumes absolute maximum noise outbreak over the whole façade for a completely continuous period. In addition, the background levels used within the assessment are the lowest levels recorded during the survey time periods, with both 'lowest' levels falling outside the proposed operational times of the restaurant. Furthermore, a 1dB change in noise level is considered barely perceptible. Taking all this in to consideration, it is reasonable to request that the council relax an exceedance of 1dB for the night time period, as it is still 9dB below the current background levels.



#### 4.1.2 External Plant Assessment

The AC units have been inputted point source as a with a power level of 52dB  $L_{w,a}$ . The data sheet in Appendix IV for the kitchen extract unit and silencer have been included in the model as a point source.

No correction has been made for operational time; it is assumed that the noise from the premises will be constant, to provide a worst-case approach.

Furthermore, all extraction fan plant noise is assumed to be internal, or through the modelled units on the roof.

Table 9 determines the applicable penalties to be applied in accordance with BS4142:2014.

**Table 9 Identification of Applicable Penalties**

| Penalty                    | Applicable? | Attributable Penalty | Comment                                                                 |
|----------------------------|-------------|----------------------|-------------------------------------------------------------------------|
| Tonality                   | Yes         | 2dB                  | Fan noise is usually tonal in nature, built in to the model             |
| Impulsivity                | No          | -                    | No impulsive characteristics.                                           |
| Intermittency              | No          | -                    | No distinct on/off conditions identifiable. Source apparently constant. |
| Other Sound Characteristic | No          | -                    | Not applicable.                                                         |

Table 10 calculates the Rating Level at the receptor and compares with the lowest measured background level for daytime and night-time periods to inform a worst-case assessment. The nearest noise sensitive receptors have been taken as the apartments directly to the west of the development. A tonality penalty has not been included in Table 10 as it was included within the model.

The location of the receptors can be seen in Figure 2 of the appendix.

**Table 10 Calculation of Rating Level and Comparison with Background Sound Level**

| Receptor | Period | Calculated Specific Noise Level at Receptor (dB) | Total Additional Penalty (dB) | Calculated Rating Level $L_{A,r}$ (dB) | Lowest Measured Background Sound Level $L_{A90,t}$ (dB) | Council -5dB Criterion (dB) | Difference + / - (dB) |
|----------|--------|--------------------------------------------------|-------------------------------|----------------------------------------|---------------------------------------------------------|-----------------------------|-----------------------|
| R1 West  | Day    | 35                                               | 0                             | 35                                     | 48                                                      | 43                          | -8                    |
|          | Night  | 35                                               | 0                             | 35                                     | 46                                                      | 41                          | -6                    |
| R2 North | Day    | 30                                               | 0                             | 30                                     | 48                                                      | 43                          | -13                   |
|          | Night  | 30                                               | 0                             | 30                                     | 46                                                      | 41                          | -11                   |



| Receptor  | Period | Calculated Specific Noise Level at Receptor (dB) | Total Additional Penalty (dB) | Calculated Rating Level $L_{A,r}$ (dB) | Lowest Measured Background Sound Level $L_{A90,t}$ (dB) | Council -5dB Criterion (dB) | Difference + / - (dB) |
|-----------|--------|--------------------------------------------------|-------------------------------|----------------------------------------|---------------------------------------------------------|-----------------------------|-----------------------|
| R3 South  | Day    | 17                                               | 0                             | 17                                     | 48                                                      | 43                          | -26                   |
|           | Night  | 17                                               | 0                             | 17                                     | 46                                                      | 41                          | -24                   |
| R4 - East | Day    | 33                                               | 0                             | 32                                     | 48                                                      | 43                          | -10                   |
|           | Night  | 33                                               | 0                             | 32                                     | 46                                                      | 41                          | -8                    |

Table 10 indicates the rating level archives MCC's criterion at all receptors during the daytime and night-time periods.

BS4142:2014 states that:

*'The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.'*



## 5. CONCLUSION

Resource and Environmental Consultants Ltd was commissioned by Jimmy's Group to provide a Noise Impact Assessment as part of a planning application for a change of use from an existing office to A3 at 27 Blossom Street, Manchester.

A series of noise surveys have been completed in order to determine the existing background noise levels of sound representative of the closest sensitive receptors. Internal restaurant noise at the Jimmy's Liverpool restaurant has also been measured and used to predict the noise breakout at the proposed Manchester site. Noise specification sheets have also been used for proposed external plant.

Noise modelling software has been used in order to predict the noise levels at the surrounding sensitive receptors due to restaurant and basement breakout and external plant noise.

The assessment has been based on robust and worst-case assumptions. This assessment has shown that, in principle, there should be no adverse impact at the neighbouring residents as a result of the proposed restaurant and associated noise emissions.



## APPENDIX I LIMITATIONS



1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between REC Limited and the Client as indicated in Section 1.2.
2. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
3. REC cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by REC is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by REC in this connection without their explicit written agreement there to by REC.



## APPENDIX II GLOSSARY OF ACOUSTIC TERMINOLOGY



## Noise

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or  $L_{Aeq}$ ,  $L_{A90}$  etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

**Table A1** Typical Sound Pressure Levels

| Sound Pressure Level | Location/Example           |
|----------------------|----------------------------|
| 0                    | Threshold of hearing       |
| 20 - 30              | Quiet bedroom at night     |
| 30 - 40              | Living room during the day |
| 40 - 50              | Typical office             |
| 50 - 60              | Inside a car               |
| 60 - 70              | Typical high street        |
| 70 - 90              | Inside factory             |
| 100 - 110            | Burglar alarm at 1m away   |
| 110 - 130            | Jet aircraft on take off   |
| 140                  | Threshold of pain          |



## Acoustic Terminology

**Table A2** Terminology

| Descriptor          | Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| dB (decibel)        | The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ( $2 \times 10^{-5}$ Pa).                                                                                                                                                                                                                                                                                                           |
| dB(A)               | A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.                                                                                                                                                                                                                                                                                    |
| $L_{Aeq, T}$        | $L_{Aeq}$ is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.                                                                                                                                                                                                                                                                                                             |
| $L_{Amax}$          | $L_{Amax}$ is the maximum A - weighted sound pressure level recorded over the period stated. $L_{Amax}$ is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall $L_{eq}$ noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.                                                                                                                             |
| $L_{10}$ & $L_{90}$ | If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The $L_n$ indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence $L_{10}$ is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, $L_{90}$ is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the $L_{10}$ index to describe traffic noise. |
| Free-field Level    | A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.                                                                                                                                                                                                                                                                                                    |
| Fast                | A time weighting used in the root mean square section of a sound level meter with a 125 millisecond time constant.                                                                                                                                                                                                                                                                                                                                                                                                               |
| Slow                | A time weighting used in the root mean square section of a sound level meter with a 1000 millisecond time constant.                                                                                                                                                                                                                                                                                                                                                                                                              |



## APPENDIX III FIGURES



**Figure 1 Receptors**





Figure 2 - LAeq Noise Levels - Basement and Restaurant Outbreak - Calculation at 8m above ground

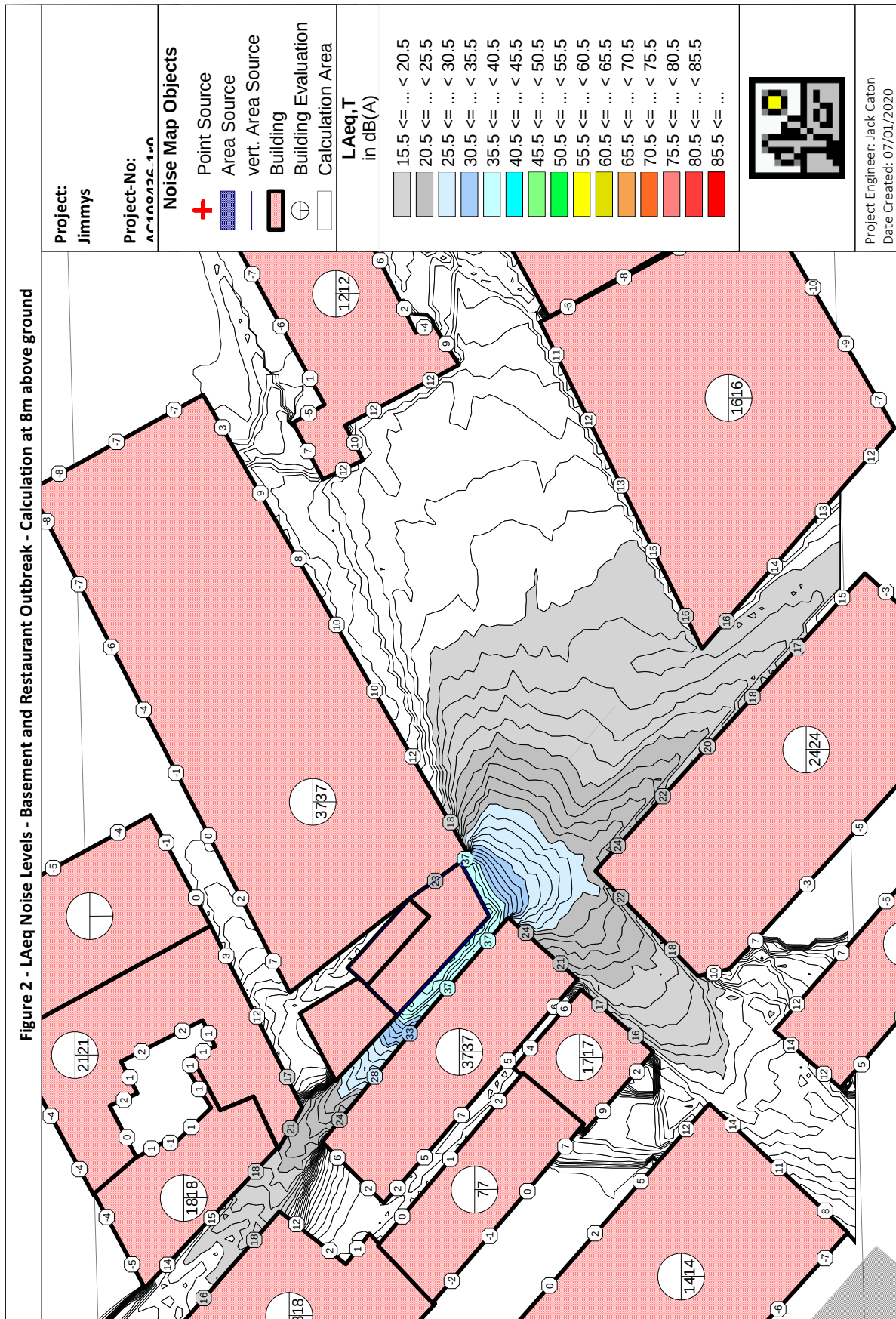
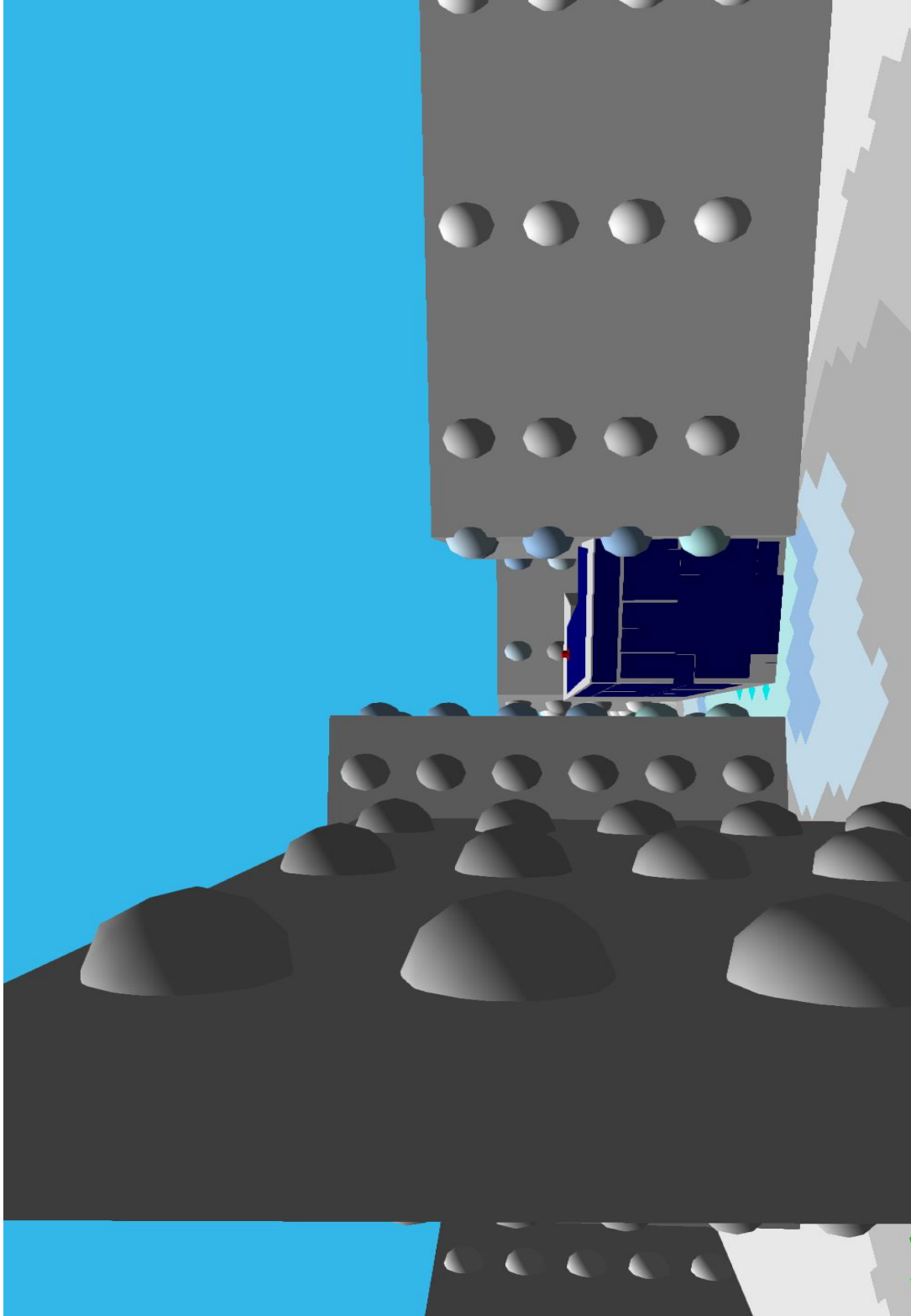




**Figure 3 - 3D Noise Model**





## APPENDIX IV NOISE LEVEL DATA



## **NOTES**

### **PLANT WEIGHTS:-**

|                          |                         |
|--------------------------|-------------------------|
| KITCHEN EXTRACT SILENCER | 60KG                    |
| KITCHEN EXTRACT FAN      | 105KG                   |
| CARBON FILTERS           | 280KG X 2 (560KG TOTAL) |
| KITCHEN SUPPLY FAN       | 57KG                    |
| ESP                      | 118KG X 2 (236KG TOTAL) |

### **EMAQ+ (REVISED DEFRA) RISK ASSESSMENT:-**

|            |           |      |      |       |
|------------|-----------|------|------|-------|
| DISPERSION | PROXIMITY | SIZE | TYPE | TOTAL |
| 15         | 10        | 3    | 10   | 38    |

### **FANS:-**

#### **EXTRACT FAN:**

DUTY (TO DW172): 1.5M<sup>3</sup>/S @ 600pa (TBC)

MODEL: HELIOS GIGABOX GBD 560/4/4 T120

#### **SOUND POWER LEVELS:-**

|        |    |     |     |     |    |    |    |    |     |
|--------|----|-----|-----|-----|----|----|----|----|-----|
| hz     | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | tot |
| INLET  | NA | 69  | 78  | 75  | 74 | 73 | 70 | 62 | 82  |
| OUTLET | NA | 76  | 77  | 79  | 79 | 77 | 72 | 64 | 85  |

#### **SILENCER SOUND POWER LEVELS**

|    |    |     |     |     |     |     |     |    |
|----|----|-----|-----|-----|-----|-----|-----|----|
| hz | 63 | 125 | 250 | 500 | 1k  | 2k  | 4k  | 8k |
|    | -6 | -8  | -12 | -20 | -18 | -13 | -11 | -9 |

#### **SUPPLY FAN:**

DUTY (TO DW172): 1.28M<sup>3</sup>/S @ 150pa (TBC)

MODEL: HELIOS GIGABOX GBD 500/4/4

#### **SOUND POWER LEVELS:-**

|        |    |     |     |     |    |    |    |    |     |
|--------|----|-----|-----|-----|----|----|----|----|-----|
| hz     | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | tot |
| INLET  | NA | 57  | 66  | 69  | 74 | 70 | 64 | 55 | 77  |
| OUTLET | NA | 77  | 73  | 74  | 74 | 73 | 69 | 60 | 80  |

### **CARBON FILTERS:**

MANUFACTURER: PURIFIED AIR

QUANTITY: 24 SITE SAFE FILTERS (2 BANKS OF 12 FILTERS) GIVING 0.58 SECONDS DWELL TIME

### **ESP:**

MANUFACTURER: PURIFIED AIR

MODEL: 4500E

QUANTITY: 2

CONFIGURATION: IN LINE (ONE AFTER THE OTHER) DOUBLE PASS

### **DISCHARGE:**

ROOF LEVEL, VERTICAL VIA HIGH VELOCITY DISCHARGE CONE

### **CONTROLS:**

BOTH SUPPLY AND EXTRACT FANS TO BE FITTED WITH 5 STAGE SPEED CONTROLLERS

KITCHEN VENTILATION TO BE INTERLOCKED WITH GAS SUPPLY VIA A GAS SOLENOID VALVE AND PROVING SYSTEM ALSO INCORPORATING APPROPRIATE SAFETY INTERLOCKS FOR THE CHARCOAL GRILL IN ACCORDANCE WITH THE REVISED DW172