ACOUSTIC CONSULTANTS LTD

Proposed Kitchen Plant

4 New College Parade, Finchley Road

# Noise Impact Assessment

Reference: 7347/SL

November 2018

Proposed Plant
4 New College Parade, Finchley Road

# Noise Impact Assessment

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# Table of Contents

# 1. Introduction

Panayiotis Kypros Panayiotou appointed Acoustic Consultants Limited to undertake a noise survey and a noise impact assessment in support of a planning application for the proposed café at 4 New College Parade, Finchley Road, London NW3 5EP.

This report provides a noise impact assessment of the proposed plant and ductwork at the rear of the building on the noise sensitive dwellings in the vicinity.

The noise impact assessment has been undertaken in accordance with the NPPF, NPSE, NPPG, and British Standard 4142:2014.

The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above.

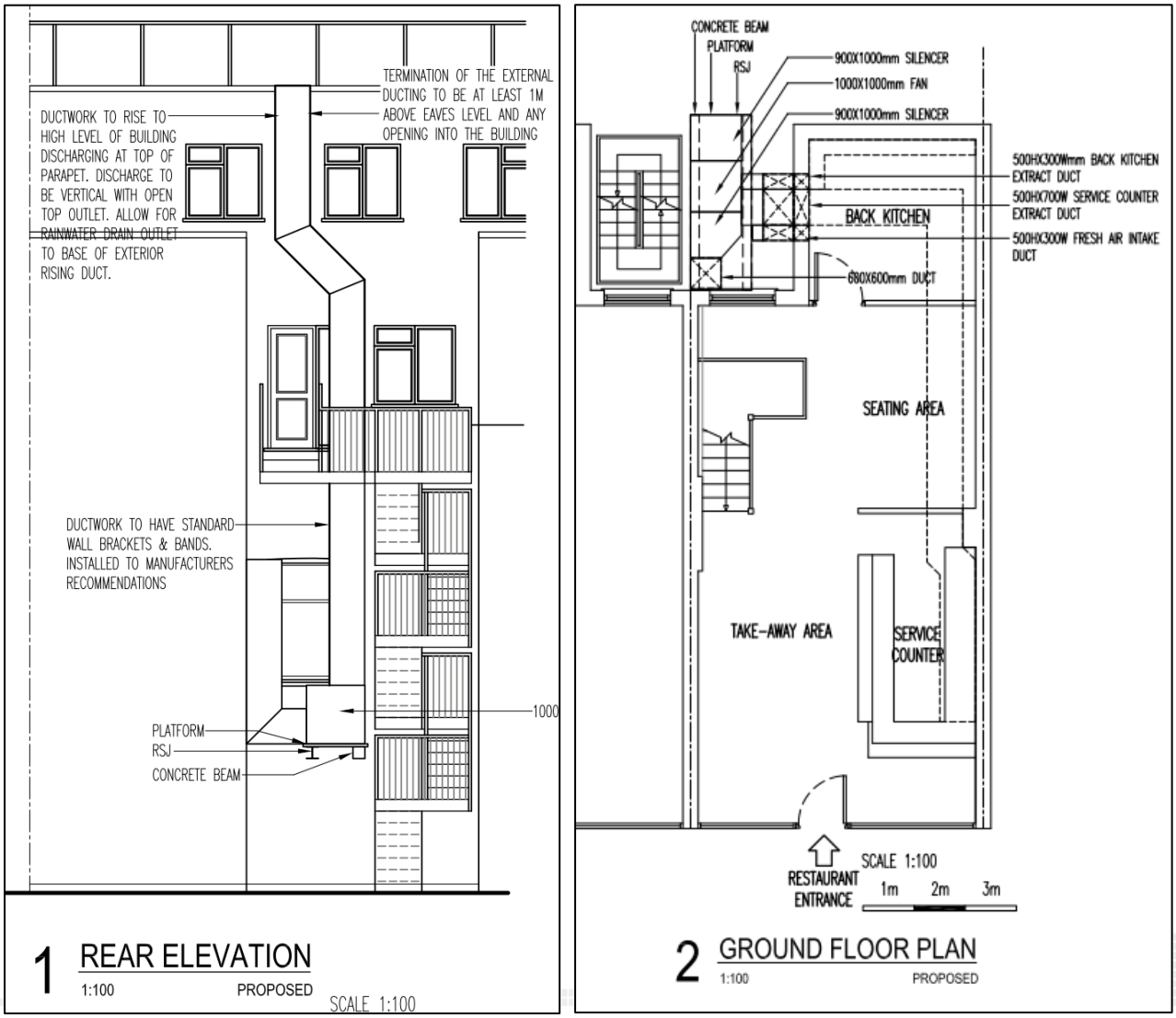
# 2. The Site

The site is located at 4 New College Parade, Finchley Road, London NW3 5EP. It is proposed to have a seating area and take-away counter on the ground floor, with a restaurant space in the basement below.

The kitchen is proposed to be located to the rear of the ground floor layout, with the fan located in the rear lower ground courtyard and ductwork running up the rear of the building to the outlet flue location at the top of the rear façade. The ductwork passes directly adjacent to the rear windows of the dwellings on the first floor of the building. These will be the 'most exposed' noise sensitive receivers.

Figure 1 below shows the proposed plant on the flat roof and the ductwork up the rear of the building.

Figure 1: Proposed rear elevation and roof plan showing plant location and ductwork



# 3. Planning and Noise

## 3.1. National Planning Policy Framework

The National Planning Policy Framework (NPPF) was published in March 2012 and revised in July 2018. Section 15 entitled 'Conserving and enhancing the natural environment' addresses noise as a requirement of planning. Paragraph 170 states:

*"170. Planning policies and decisions should contribute to and enhance the natural and local environment by:*

*e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate."*

Paragraph 180 states:

*"180. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

*a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life[60]*
*b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
*c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

*60 See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010).*

The NPPF does not prescribe any assessment methodology or criteria to assess the adverse effect of noise.

## 3.2. Noise Policy Statement for England

The NPPF refers to the Noise Policy Statement for England (NPSE). This was published in March 2010 and aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion and applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise.

The NPSE sets out the long term vision of Government noise policy. This long term vision is supported by three noise policy aims as follows:

*"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life."*

The NPSE introduces the concept of "Significant adverse" and "Adverse" impacts of noise which relate to the noise policy aims. These are applied as follows:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

The Noise Policy Statement for England (NPSE) states that noise levels above the Lowest Observed Adverse Effect Level are acceptable in planning where reduced to a minimum.

With regard to where there is potential for noise impact it states the following in relation to the second noise policy aim:

*"The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur."*

The NPSE does not provide any assessment criteria for the noted effect levels and each case must be considered on its merits. The NPSE does, however, emphasise that in dealing with noise Local Planning Authorities are required to take a balanced approach in considering the benefits of development as against any adverse effects which arise. Paragraph 2.18 of the NPSE is particularly relevant in this respect and states:

*"There is a need to integrate consideration of the economic and social benefits of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focusing solely on the noise impact without taking into account other related factors."*

The planning need is outside the scope of noise and acoustics and will need to be addressed by others.

## 3.3. National Planning Practice Guidance, Noise

The National Planning Practice Guidance (NPPG) on noise referred to here is based on the current version (January 2015) as provided on the Planning Guidance Website. It states that *"Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment."*

It provides generic guidance on how to determine the noise impact and what factors could be a concern.

It includes the option types to mitigate any adverse effects of noise stating that there are four broad types of mitigation. These are engineering, layout, using planning conditions or obligations and noise insulation.

Paragraph 5 of the NPPG provides a table identifying the effect level and examples of effect relating to the impact effect levels provided in the NPSE. The table is duplicated below:

Table 1: NPPG Noise – Perception of Effect Levels

| 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 Adverse 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 table does not provide any objective assessment which equates to the noted effect levels however the NPPG identifies that where noise is audible it is not necessarily intrusive. The effect and impact on people is based primarily on the level of noise.

# 4. Assessment Methodology

The British Standard 4142:2014 entitled 'Method for rating and assessing industrial and commercial sound' use outdoor sound levels to assess the likely effects of sound upon people who might be inside or outside a dwelling or other premises used for residential purposes.

The principle is that of establishing the 'difference' between the 'rating level' and the 'background sound level'. The 'rating level' is the 'specific sound level' of the source over a period of one hour during the day (07:00 to 23:00 hours) and over a period of 15 minutes during the night (23:00 to 07:00 hours). Section 9 entitled 'Rating Level' states: *"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level."*

An acoustic character correction should be added to the 'specific sound level' if it exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. The value of the character correction varies, dependent on the prominence of the character of the sound source at the assessment location.

In Section 11 of the Standard, entitled 'Assessment of the Impacts', it states: *"Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause 8) from the rating level (see Clause 9), and consider the following.*

- *Typically, the greater this difference, the greater the magnitude of the impact.*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- *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."*

Please note, we understand Camden Borough Council typically require an 'assessment difference' of -10 dB between the existing background sound levels and the cumulative level of plant from a development at the worst-case noise sensitive receiver. As such, this is the criteria we have worked to.

# 5. Baseline Noise Monitoring

A long-term noise survey was undertaken between 14:40 on the 2nd October 2018 and 12:05 on the 3rd October 2018 to measure extant background noise levels at the site.

## 5.1. Monitoring Equipment

Sound pressure levels were measured using a sound level meter with half-inch condenser microphone using the 'fast' setting. The equipment is checked annually using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2005 and in accordance with British Standard EN 10012:2003 and traceable to the National Standards. This equipment was checked and calibrated as noted below.

Table 2: Details of monitoring equipment used

| Equipment Description / Manufacturer / Type | Serial Number | Date of Calibration | Calibration Certification Number |
|---|---|---|---|
| SLM, NTI, XL2 | A2A-13561-E0 | 25/07/2018 | K354684 |
| Pre-Amp, NTI, MA220 | 7606 | 25/07/2018 | K354684 |
| Microphone, NTI, MC230A | A15862 | 25/07/2018 | K354684 |
| Larson Davis Calibrator CAL200 | 15064 | 25/07/2018 | K354684 |

A field calibration check was carried out before and after measurement and no significant drift was detected during the survey.

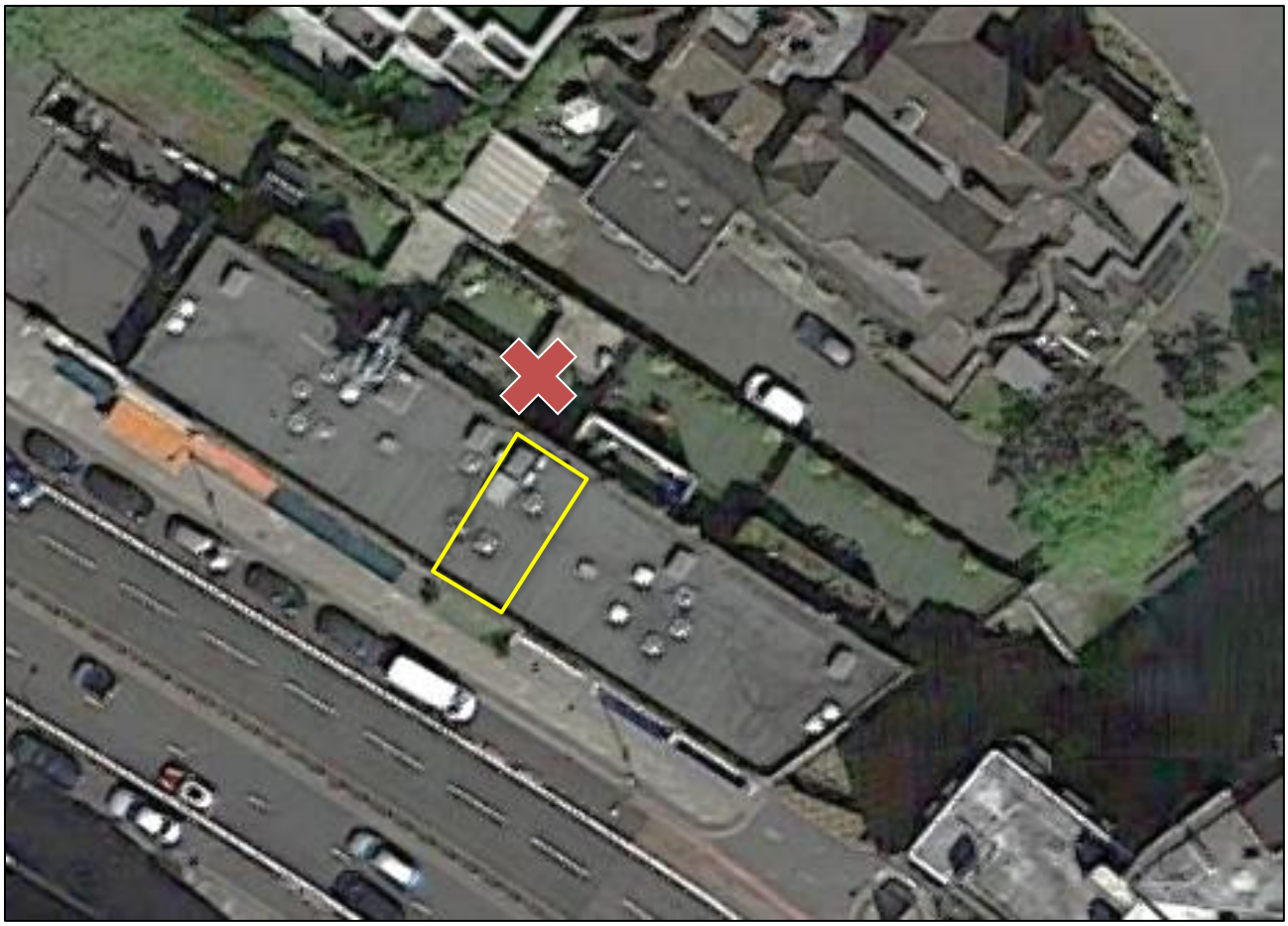
## 5.2. Weather Conditions

Monitoring took place under dry conditions, with an air temperature of approximately 13 degrees centigrade during survey. There was no precipitation and wind did not exceed 5 metres per second. These conditions are not expected to have affected the measured levels.

## 5.3. Monitoring Procedure

The long term-monitoring exercise was carried out at the monitoring location X. the location was at ground floor height, with the microphone mounted on a tripod in the courtyard to the rear of the site in a façade position. The monitoring position is as indicated on Figure 2 below.

Figure 2: Monitoring Location

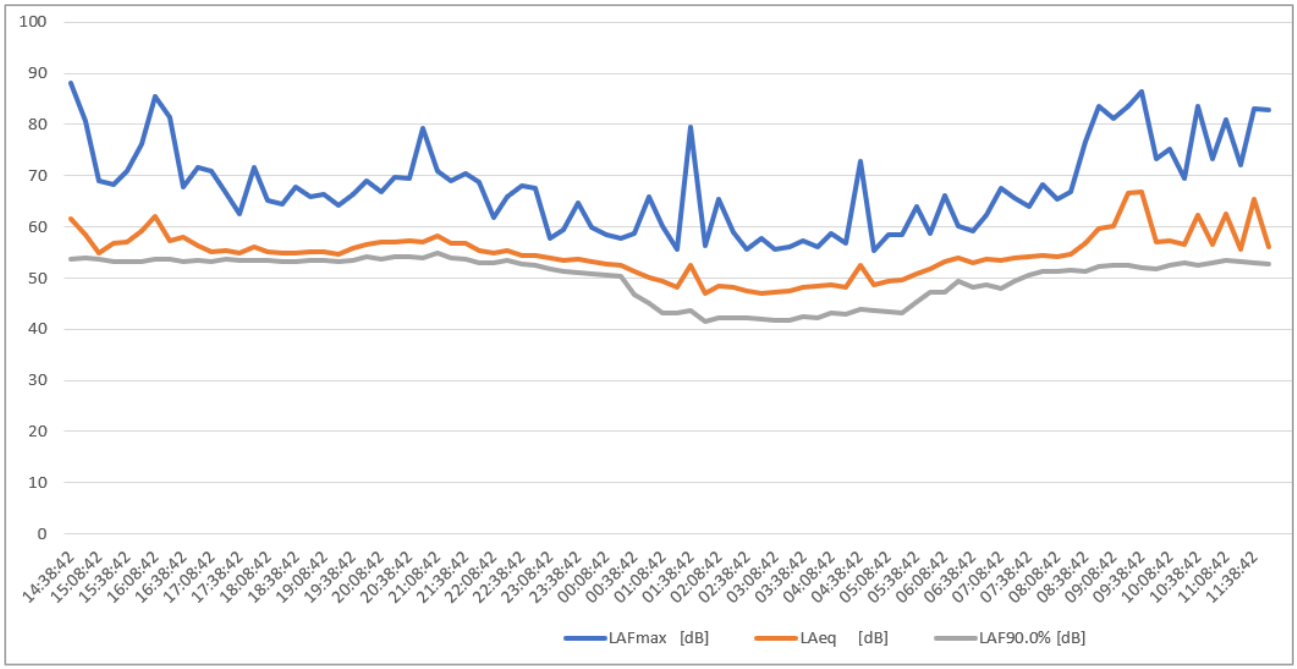


The baseline noise levels affecting the noise sensitive receivers in the area were primarily determined by road traffic from the surrounding city, most prominently from Finchley Road.

## 5.4. Measured Baseline Noise Levels

The façade level 15-minute A-weighted background sound level, maximum noise level and equivalent noise level are provided in the chart below. The tabular data is available upon request.

Chart 1: Measured maximum, equivalent and background levels (façade level)




From the measured data we have determined the typical background sound level during daytime hours to be 50 dB $L_{A90,1hour}$ and 39 dB $L_{A90,15min}$ during night-time hours (free-field levels). The levels have been corrected for façade effect.

# 6. Plant Noise Calculations

## 6.1. Proposed Plant

It is proposed in the revised plans to install the Estoc Targe Powerbox GF 80-560-3 fan within the rear courtyard at lower ground level.

We have been provided with the following acoustic data by the manufacturer:

Table 3: Unweighted spectral and total A weighted sound power levels for the outlet flue and fan breakout

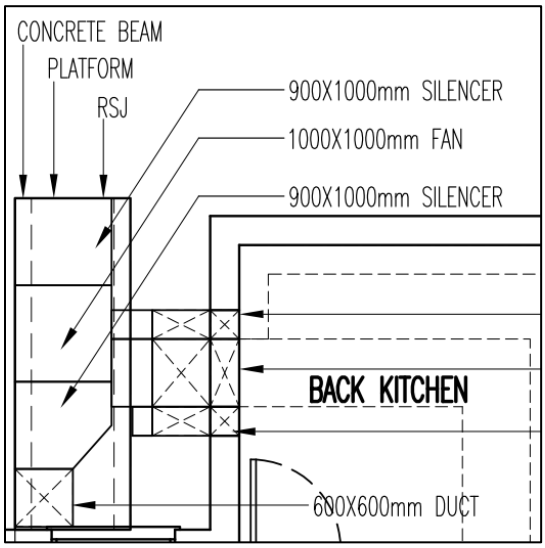
| | Sound Power Level ($L_w$) | | | | | | | dB(A) |
|---|---|---|---|---|---|---|---|---|
| | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | |
| Outlet | 91 | 85 | 81 | 78 | 75 | 70 | 64 | 84 |
| Breakout | 76 | 70 | 62 | 59 | 58 | 54 | 50 | 67 |

Please note that the manufacturer's data does not contain figures for the 63 Hertz octave band. As such, we are unable to address this frequency band in our assessment.

## 6.2. Proposed Attenuator

An attenuation is required on the atmosphere side of the fan, to mitigate outlet flue noise and duct breakout noise close to noise sensitive dwellings. The figure below shows the attenuator locations.

Figure 3: Attenuators shown in amended plans



We have not been provided with specific insertion loss data for the attenuators. We recommend that the attenuator on the atmosphere side meets the following minimum insertion losses:

Table 4: Minimum insertion losses required of the attenuator

| Location | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|
| Atmosphere side | 28 | 35 | 40 | 42 | 35 | 35 | 30 |

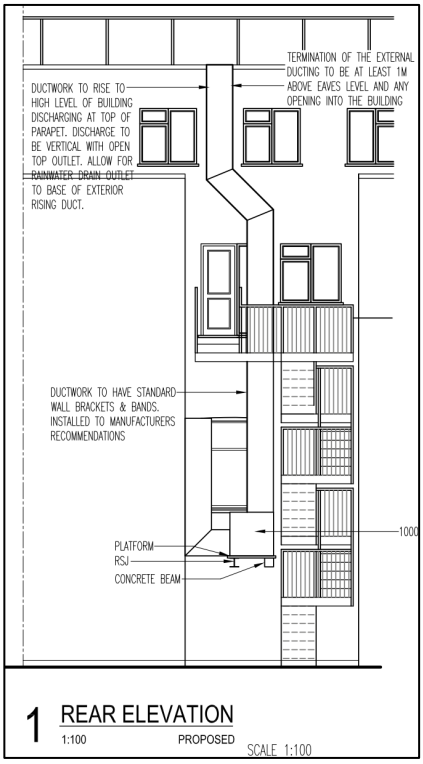
Please note the insertion losses above would most likely need to be achieved by combining two or more attenuators.

Also note, as stated in Section 6.1, we have not been provided with fan noise emission data for the 63 Hertz octave band and resultantly are unable to specify the required insertion losses to mitigate this frequency band.

## 6.3. Plant Location

Figure 4 below shows the proposed plant layout, with the fan located to the rear courtyard, the outlet flue located at least 1 metre above the eaves level and ductwork running by the windows of the noise sensitive receivers:

Figure 4: Proposed rear elevation showing plant location and ductwork



## 6.4. Predicted Specific Sound Level

The most exposed noise sensitive receivers are those at first floor height above the site, where the proposed ductwork runs directly adjacent to the rear windows, which are also closest to the outlet flue.

The total cumulative level of plant at the noise sensitive receiver will comprise noise from three elements: the atmospheric side terminal, fan breakout from below and duct breakout adjacent to the rear windows.

### Atmospheric Side Terminal

It is proposed to install an attenuator between the fan and the atmosphere on the flue side. The minimum required insertion losses of the attenuator(s) between the fan and the atmosphere are as outlined in Section 6.2 of this report.

The terminal is 1.25 metres from the nearest window. As follows are the attenuation contributions and calculated sound pressure level due to the outlet flue at the noise sensitive receiver:

| | |
|---|---|
| Sound Power Level of Outlet Flue | 84 dB(A) |
| Attenuator(s) (see insertion losses in Section 6.2) | -34 dB |
| Distance Attenuation | -16 dB |
| Calculated Sound Pressure Level at NSR | 33.5 dB(A) |

### Fan Breakout

The fan location is at lower ground level and experiences distance and barrier attenuation (from the stairwell) to the noise sensitive receiver. The fan also experiences +6 dB of reflections. It is approximately 8 metres from the noise sensitive window. We have also allowed for 15 dB of attenuation for the line of sight between the fan.

As follows are the attenuation contributions and calculated sound pressure level due to fan breakout at the noise sensitive receiver:

| | |
|---|---|
| Sound Power Level of Fan | 67 dB(A) |
| Attenuation due to distance and reflections | -23 dB |
| Barrier Effect | -15 dB |
| Calculated Sound Pressure Level at NSR | 29 dB(A) |

## Duct Breakout

The "in-duct" level at the vertical section of duct adjacent to the noise sensitive receivers has been predicted based on the specified atmosphere side attenuator(s) (in Section 6.2 of this report), the duct length, diameter and the number of bends between the fan and the section (based on the methodology of *The Control of Noise in Ventilation Systems (1977)*).

The radiation sound power level of the duct has been calculated using the Allen Formula below:

$$PWL_B = PWL_D - R + 10\log_{10}(S_w / A)$$

Where $PWL_B$ is the breakout sound power level, $PWL_D$ is the in-duct sound power level, $R$ is the sound reduction index of the duct wall, $S_w/A$ is the ratio of the exposed surface area of the duct to its cross sectional-area

The dimensions of the duct have been measured from the supplied drawings. The minimum sound reduction indices of the duct are for 0.55-millimetre-thick galvanised steel of a density 2.5 $kgm^{-2}$ and are as follows:

Table 5: Minimum sound reduction indices required of the duct walls

| 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|
| 8 | 14 | 20 | 23 | 26 | 27 | 35 |

0.5 metres of distance attenuation has been considered from the duct wall to the centre of the window.

Below are summarised the spectral calculations to determine noise breakout of the duct.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Spectral Lw in duct:** | | | | | | | | | |
| | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 dB | |
| *Lw* | | 91.0 | 85.0 | 81.0 | 78.0 | 75.0 | 70.0 | 64.0 | 92.6 dB |
| *LwA* | | | | | | | | | 84.0 dB(A) |
| **Silencer** | | | | | | | | | |
| *Insertion losses* | | 28 | 35 | 40 | 42 | 35 | 35 | 30 | |
| *Level leaving silencer* | | 63.0 | 50.0 | 41.0 | 36.0 | 40.0 | 35.0 | 34.0 | 49.6 dB(A) |
| | | | | | | | | | |
| **Duct attenuation** | | | | | | | | | |
| *Distance* | 8.3 m | | | | | | | | |
| | | 5.5 | 2.8 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | |
| *With duct attenuation* | | | | | | | | | |
| | | 57.5 | 47.2 | 39.6 | 34.6 | 38.6 | 33.6 | 32.6 | 46.2 dB(A) |
| | | | | | | | | | |
| *Radiation Lw of ductwork (4 x 0.6 x 0.6 duct)* | | | | | | | | | |
| | | 57.7 | 41.4 | 27.8 | 19.8 | 20.8 | 14.8 | 5.8 | 42.4 dB(A) |
| | | | | | | | | | |
| Level allowing for Distance attenuation to window | | 52.75969 | 36.45969 | 22.85969 | 14.85969 | 15.85969 | 9.859687 | 0.859687 | 37.4 dB(A) |

## Cumulative Plant Level at Noise Sensitive Receiver

The noise level contributions from each element of plant at the worst-case noise sensitive receiver are combined using log addition:

$$L_{Total} = 10 * \log10 ((10\text{^}(L_{(Outlet\ Flue)}/10) + (10\text{^}( L_{(Fan\ Breakout)}/10) + (10\text{^}( L_{(Duct\ Breakout)}/10))$$

Based on the supplied manufacturer's data for the fan, site plans and our recommended attenuator insertion losses, the combined level of the outlet flue, fan breakout and duct breakout at the noise sensitive receiver is 39 dB $L_{Aeq(T)}$.

# 7. British Standard 4142:2014 Assessment

A British Standard 4142:2014 assessment has been undertaken for the worst-case noise sensitive receiver. We understand that the plant will operate only during daytime hours, when the café is operating.

## 7.1. Initial Estimate

### Background Sound Level

From the measured data we have determined that the typical free-field design background sound level is 50 dB $L_{A90,\,1hr}$ during the day and 39 dB $L_{A90,\,15min}$ during the night at the boundary of the nearest noise-sensitive receiver.

### Specific Sound Level

With the mitigation measures in Section 6.2 applied, the predicted cumulative specific sound level at the same location is 39 dB $L_{Aeq,T}$. This is the level determined at the noise-sensitive receivers without any character corrections applied.

### Character Corrections

Character corrections should be added to the specific sound level if it exhibits any *tonality, impulsivity, other specific characteristics and/or intermittency* at the assessment location. Based on our site visit the character corrections to be applied are as follows:

*Tonality* – It is not possible to determine if the plant will be tonal. The supplier should ensure that any tonality is suitably controlled and not clearly distinguishable at the noise sensitive receivers.
*Impulsivity* – Plant noise is not normally impulsive.
*Intermittency* – Kitchen extraction plant is not normally intermittent and operates continuously during opening hours.
*Other Sound Characteristics* – We do not believe a character correction is necessary for other sound characteristics.

The plant will operate during coffee shop opening hours only, according to demand. A daytime British Standard 4142:2014 assessment has been undertaken at the nearest sensitive receiver.

Table 6: British Standard 4142:2014 initial estimate

| Parameter | Level at NSR | |
|---|---|---|
| | Day | Night |
| Background sound level, $L_{A90, 1hr}$ | 50 dB | 39 dB |
| Specific sound level, $L_{Aeq, 1hr}$ | 39 dB | 39 dB |
| Character correction | 0 dB | 0 dB |
| Rating level, $L_{Ar, 1hr}$ | 39 dB | 39 dB |
| Difference between rating and background levels | -11 dB | 0 dB |

The result of the assessment is a difference of 0 dB at worst which is a low impact.

## 7.2. Summary of British Standard 4142:2014 Assessment

As can be seen above, the British Standard 4142:2014 'assessment difference' is 0 dB. As such, we consider that the proposal will be acceptable in terms of noise, providing that the attenuators achieve the insertion losses stated in Section 6.2 of this report.

# 8. Limitations

The report limits itself to addressing solely on the plant noise control and acoustic aspects as included herein. We provide advice only in relation to noise and acoustics.

The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above.

The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

It should be noted that noise predictions are based on the current information as we understand it and on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

# 9. Summary & Conclusions

Panayiotis Kypros Panayiotou appointed Acoustic Consultants Limited to undertake a noise survey and a noise impact assessment in support of a planning application for the proposed café at 4 New College Parade, Finchley Road, London NW3 5EP.

This report provides a noise impact assessment of the proposed plant and ductwork at the rear of the building on the noise sensitive dwellings in the vicinity.

The noise impact assessment has been undertaken in accordance with the NPPF, NPSE, NPPG, local authority criteria and British Standard 4142:2014.

The British Standard 4142:2014 'assessment difference' is 0 dB, which is a low impact when assessed to BS 4142:2014. This is providing that the attenuators achieve the insertion losses stated in Section 6.2 of this report.

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