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PROJECT TECHNICAL MEMORANDUM

JOB TITLE : Ciaooo Pizzeria, Sky Gardens
REF : HT: 27205/PTM1
DATE : 14 October 2022
FROM : Michael Hartley
ISSUED TO : Paul Butler Associates

RE: CIAOOO PIZZERRIA, SKY GARDENS, MANCHESTER NOISE TRANSFER ASSESSMENT

1.0 Introduction

We understand that the above project has been granted planning permission subject to a number of conditions. Planning Condition 6 which relates to the extract ventilation systems and Planning Condition 8 which relates to potential noise transfer and egress. The conditions are presented below:

Condition 6

Before any A3 or A4 use hereby approved commences a scheme for the extraction of any fumes, vapours and odours from the premises hereby approved shall be submitted to, and approved in writing by, the City Council as local planning authority. The approved scheme shall be implemented prior to occupancy and shall remain operational thereafter"

Condition 8

Before any of the commercial uses hereby approved commence, the premises shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the premises and a scheme of acoustic treatment that has been submitted to and approved in writing by the City Council as local planning authority."



2.0 Planning Criteria

2.1 Condition 6

As presented in the submitted Noise Impact Assessment Report prepared by REC, reference “AC103122-1R0” dated 31st January 2017, the suggested free-field plant noise emission limits are as follows. These have been set with reference to the guidance set-out in BS 4142:2014.

Plant Noise Emission Criteria (Rating Level, $L_{A,T}$ dB)	
Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
53	39

2.2 Condition 8

The aim should be to achieve an internal noise level 10 dB below the standard BS 8233:2014 internal ambient noise level criteria.

Based on the this, and with consideration to the need for spectral noise control in octave bands between 63 Hz and 4 kHz, we would propose that reverberant noise levels from the restaurant within the residential spaces above should be controlled so as to not exceed NR 20 $L_{eq,T}$ (in octave bands).

3.0 Typical Commercial Noise Levels

At present, the usage of the lower ground floor is proposed to be occupied by Ciaooo Pizzeria. Hann Tucker has therefore referred to historical noise data for similar unit types (see below) to inform whether the intended use case is likely commensurate with compliance with aforementioned criteria.

Description	Reverberant Noise Level (dB $L_{eq,1hr}$) at Octave Band Centre Frequency (Hz)							dBA
	63	125	250	500	1k	2k	4k	
Restaurant (Typical restaurant with low background music)	60	67	69	71	70	66	60	74
Pie Minster (Typical restaurant busy lunch time service with low background music)	67	67	69	72	70	66	63	74

4.0 Noise Transfer Assessment

The following sections outline the findings of our noise transfer assessment based on the on-site sound insulation tests (i.e. as existing/no enhancements).



4.1 Existing Building Fabric

Following our review of the separating floors in the building, the construction is understood to be as follows:

- Raised timber floor and installed floor finishes located on all residential floors of the building;
- Circa 250mm concrete structural slab.

The measured performance of the floor construction as currently proposed is as follows:

Element	Sound Level Difference, <i>D</i> (dB) at Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Floor	26	35	38	51	54	56	58

4.2 Assessment

With consideration to the criteria set out in Section 2.0, and the measured level of sound reduction through the floor, we have assessed the noise transfer to the floor above. The table below outlines the permissible noise output of the lower ground commercial unit (i.e. tenant noise limits).

Description	Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Criteria in Residential (NR 20)	51	39	31	24	20	17	14
Room to Room Level difference (dB D)	26	35	38	51	54	56	58
Internal noise level limit in retail unit (dB L _{eq})	77	84	69	75	74	73	72

4.3 Comparison with Proposed Use Cases

The following table compares the tenant noise limits calculated in Section 4.2, which are based on the currently proposed floor construction, with typical noise levels for differing use classes.



Description	Octave Band Centre Frequency (Hz)							Compliance
	63	125	250	500	1k	2k	4k	
Tenant Noise Limit (dB Leq)	77	84	69	75	74	73	72	-
Restaurant Typical restaurant noise levels with low background music)	60	67	69	71	70	66	60	✓
Pie Minster (Typical restaurant busy lunch time service with low background music)	67	67	69	72	70	66	63	✓

The comparison table above shows that with no enhancements to the ceiling, use case of a typical restaurant with background music, is likely to be compliant with the noise transfer criteria of NR20.

5.0 Noise Breakout Assessment

The following sections outline the findings of our noise breakout assessment based on the on-site façade sound insulation tests (i.e. as existing/no enhancements).

5.1 Existing Building Fabric

Following our review of the external building fabric, the construction is understood to be as follows:

- Thermal double glazed façade elements
- Thermal double glazed entrance doors
- Structural columns along the façade line

The measured performance of the floor construction as currently proposed is as follows:

Element	Sound Level Difference, <i>D</i> (dB) at Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Façade	13	23	24	28	22	32	37



5.2 Assessment

With consideration to the measured façade sound insulation performance set out in Section 5.1, we have assessed the noise transfer to the 1m from the external façade. The table below outlines the expected noise output of the lower ground unit and predicted external noise level from the use of the ground floor unit.

Description	Octave Band Centre Frequency (Hz)							dBA
	63	125	250	500	1k	2k	4k	
Restaurant Typical restaurant noise levels with low background music)	60	67	69	71	70	66	60	74
Room to Room Level difference (dB D)	13	23	24	28	22	32	37	-
Predicted External noise level (dB L _{eq})	47	44	45	43	48	34	23	49

The comparison table above shows that with no enhancements to the existing building façade, noise levels as a result of the use case '*Typical restaurant noise levels with low background music*' is likely to be circa 49 dBA at 1m from the façade.

The noise level expected as a result of noise break-out from the ground floor commercial unit is calculated to be 9dB below the typical lowest background sound level.

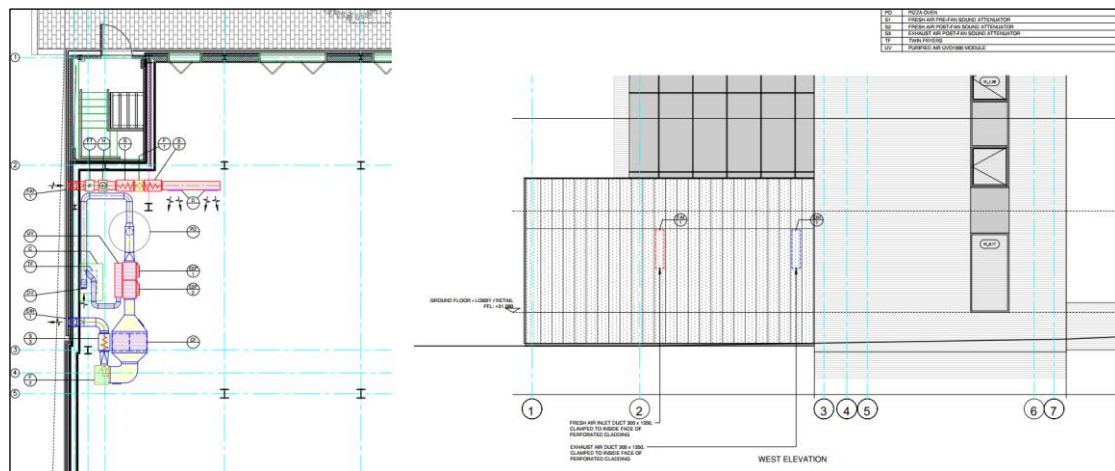
External noise levels during the daytime have been previously measured by REC and are in the range of 62-68 dB L_{Aeq,16hr}. Calculated external noise levels due to noise transfer from the ground floor unit, fall well below that of the measured external noise level due to environmental noise from the road. Given this, the noise break-out from the ground floor unit and subsequent break-into the residential apartment above via the façade is expected to be suitably controlled to below NR20 under normal background ventilation conditions.

6.0 Plant Noise Impact Assessment

6.1 Proposed Plant

The proposed development will be served by a pizza oven and fryer extract ventilation system and a fresh (replacement) air ventilation system located at ground level within the unit. The proposed units will be ducted to atmosphere at ground floor level on the south façade.

A layout showing the location of the ground floor ventilation plant locations is indicated below.



Plan of ventilation plant items c/o Swan Project

The building services plant installation includes the following proposed plant items:

- 1No. pizza oven and kitchen extract fan, model Flakt Woods Estoc Targe (powerBox 67-450-1) with a Northern Fans Ltd in-line attenuator.
- 1No. fresh air ventilation fan, model Flakt Woods 31 MaXfan Compac with a Northern Fans Ltd in-line attenuator.

The following table presents the manufacturer's sound power level data for the above

Description	In-duct Sound Power Level (dB) at Octave Band Centre Frequency (Hz)						
	125	250	500	1k	2k	4k	8k
Pizza Extract Fan	76	70	66	69	67	64	53
Fresh Air Ventilation Fan	81	82	84	81	77	72	67

An in-line acoustic attenuator is proposed within both the extract fan and fresh air ventilation fan atmospheric side ductwork. The sound reduction performance of the acoustic louvre is provided in the table below:

Description	Insertion Loss (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Pizza Extract Fan	4	8	13	17	23	17	12	11
Fresh Air Ventilation Fan	4	8	13	17	23	17	12	11

We understand that the operational times of all plant items can be between 07:00 – 23:00 weekdays and weekends.



6.2 Assessment

The sound pressure level at each affected noise sensitive receptor (residential dwelling above the ground floor unit) has been calculated, accounting for attenuating factors such as distance attenuation and barrier attenuation provided by the existing site geometry. The full calculations are not presented for brevity but are available upon request.

The table below presents the predicted incident noise levels from fixed plant items at the nearest receptors.

Description	Receptor
Type	Residential
Predicted Noise Level at Receptor (Leq)	47 dB
Criteria	53 dB
Compliance	✓

In summary, our calculations have indicated that the current proposals should be capable of achieving the proposed plant noise criteria.

7.0 Conclusion

Based on the assessment and guidance set out within this memo, the acoustic separation between ground floor and first floor level can achieve a sufficient performance to allow 'typical restaurant noise levels with low background music' with minimal expected adverse impact on the adjacent residential dwelling.

Ultimately, management of the ground floor unit space will be critical given some of the building limitations.

Our assessment of the proposed development considers the potential noise impact on its surroundings from noise relating to the operation of fixed items of building services in line with criteria set out in Condition 6.

Our assessment of the development indicates that the current proposals should be capable of achieving the proposed plant noise criteria.



Yours sincerely

Michael Hartley
for HANN TUCKER ASSOCIATES