Environmental Noise Impact Assessment Report

To Support a Planning Application for the Retention and Updating of the Kitchen Extract and Fresh Air Intake Systems Serving the Smugglers Tavern, 28 Warren Street London W1

Report for Enterprise Inns Ltd

Report Date: January 2015

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NOISE SURVEY REPORT/EIL/January 2015
ENTERPRISE INNS LTD
SMUGGLERS TAVERN, 28 WARREN STREET, LONDON W1,

1.0 INTRODUCTION

1.1	Instruction:	This report is to provide consultancy services including noise monitoring, advise and evaluation with reference to a noise assessment to support the retention and updating of the wall mounted Kitchen Extract and Fresh Air Intake Equipment.
1.2	Client:	Mr M Evetts, Property Manager, Enterprise Inns Ltd.
1.3	Survey Location:	Smugglers Tavern, 28 Warren Street, London W1
1.4	Survey Date:	Friday 16 January 2015 – Site visit and environmental background and specific noise measurements.
1.5	Weather Conditions:	No wind, cool and dry.
1.6	Instrumentation:	CEL 633 C1 Precision Sound Analyser Type 1 CEL 284/2 Acoustic Calibrator Type 1 (Calibration Status: Current Cert from Nov 2013)
1.7	Report Date:	18 January 2015
1.8	Consultant:	R B Parker, MIOA, MCIEH, DMS.

2.0 LOCATION DETAILS

2.1 Background Information

2.2 The Smugglers Tavern is an existing 4 storey brick built public house building having a single storey extension located at the rear of the building. The existing Kitchen Extraction/Intake systems are wall mounted and located on the rear elevation of the building above the single storey flat roof. The premises itself is situated on the south east side of Warren Street close to the junction with Conway Street W1.

2.3 It is understood that complaints have been received by the London Borough of Camden Council about noise emissions affecting local residents from the operation of the existing Kitchen Extract and Fresh Air Intake systems serving the Kitchen of the premise. These units serve the Kitchen which is located at the rear of the premises.

2.4 The nearest residential properties to the premises are 4 storey houses/flats in Conway Street. The rear of these properties are about 8 metres from the existing Kitchen Extract and about 6 metres from the existing Fresh Air Intake plant location. During the survey the nearest property was noted to be No 22 Conway Street W1.

2.5 There are residential properties closer in Richatdson Mews, which lies directly to the south east of the site. However, their positioning and orientation means they are not as likely as the Conway Street houses to be affected by noise from the proposed ventilation systems.

2.6 The Premises

2.7 Insofar as the Smugglers Tavern operation is concerned there are a number of items of plant associated with the provision of cooked food in the restaurant area. Noise from their use is likely to be an environmental consideration. The main items ie Kitchen Extract and the Fresh Air Intake have a discharge and intake located externally on the rear wall adjacent to the Kitchen.

2.8 The Kitchen Extract/Intake systems operate between 1000 hours to 2100 hours each day. The environmental noise assessment has been carried out to assess the impact of operational noise on nearby residential properties.

2.9 The Proposal

2.10 It is proposed that the existing Kitchen Extract and Fresh Air Intake systems are replaced with new systems including a revised external layout for the ductwork. These systems will include attenuation and acoustic lagging to ensure that the environmental noise criteria required by the London Borough of Camden Council is met.

2.11 There has been no specific information provided by the council, however, in general terms all new equipment of this type within the London Borough of Camden should be -10dB below BNL as measured at any nearby residential property. In this case, that criteria can be met with suitable acoustic treatment in place.

3.0 ENVIRONMENTAL NOISE MEASUREMENT CONSIDERATIONS.

3.1 The London Borough of Camden will require a survey and assessment of the operation of the plant involved to be submitted. The information in this report examines these issues and offers guidance on the way to minimize the impact of the operation of the new proposed systems.

3.2 In this case environmental measurements were made in accordance with BS7445:1991 Parts 1-3. The microphone was positioned 1.2 metres above ground level adjacent to the north boundary for specific noise measurements and at the north west boundary for background measurements.

3.3 Measurements made have been assessed and rated under procedures in British Standard 4142:2014 - Method for rating commercial and industrial noise sound. This standard is extensively used to assess the impact of noise from commercial/industrial activity upon residential properties.

3.4 Measurement periods of 5 minutes were used during the survey to ensure as these periods are considered an adequate range of measurements to be taken. Calibration of

instrumentation was carried out at the beginning and end of each monitoring period, in accordance with good practice.

3.5 The noise level descriptors to be used for the survey:

i) L_{AeqT}dB - Time weighted equivalent continuous A-weighted sound pressure level in decibels. This index is used to describe events over the period of the event.

ii) L_{A90T}dB - A-weighted sound pressure level exceeded for 90% of the measurement period. This index is used to measure background noise level.

iii) L_{Amax}dB - A-weighted maximum sound pressure level measured at 125msecs. This is used to describe short period noise events.

4.0 MONITORING RESULTS

4.1 Table 1 - Environmental Background and Specific Noise Monitoring

Monitoring Position	**Time (Hrs)**	**dB ref 2 x 10^{-5} Pascals**				
		L_{Aeq}	**L_{A90}**	**L_{AMax}**	**L_{AMin}**	**L_{A10}**
Friday 16 January2015						
Position 1 – on flat roof of premises	1300-1400	62	61	80	59	65
	1400-1430	63	62	82	60	65
Position 2 – Mid point of Richardson Mews - for background noise levels	1400-1430	55	51	71	48	59
	2000-2100	55	51	70	48	57
	2100-2200	53	50	63	47	54
	2200-2300	52	50	64	46	55

4.2 Table 2 – Specific Operational Levels - Octave Frequency Data

Position 3	**'A' Wtg**	**Octave Frequency in Hz ref dB 2 x 10^{-5} Pascals**						
		63	125	250	500	1K	2K	4K
Kitchen Extract + Intake taken at 2 metres from units	62	56	58	58	62	55	55	50
	63	58	64	61	63	57	56	50

4.3 Comments

4.4 The existing Kitchen Extract and Intake system were operating during the monitoring period. The measurements taken at Position 1 reflect this situation.

5.0 NOISE ASSESSMENT.

5.1 Manufacturer's Details for Proposed Plant and Equipment

5.2 The Kitchen Extract and Fresh Air Intake Systems are located externally on the rear elevation of the premises. The new replacement systems are to retain this position. The Kitchen systems include the following:

i) Kitchen Extract System

The Kitchen Extract Fan is an S&P TCBBx2/4-450 Unit. This is to be an Induct fan unit with an induct SPL of 76dBA at 1 metre. The efflux velocity should be less than 2m/s.

ii) Fresh Air Intake
The Fresh Air Intake Fan is to be an Elta SMB500/4-4-2 Axial Fan with an induct SPL of 68dBA at 1 metre. The efflux velocity should be less than 2m/s.

5.3 Local Authority Environmental Noise Requirements

5.4 The background noise level close to the nearest noise sensitive property was measured, in accordance with BS4142:2014. The calculations below show the assessment of likely impact of the operational plant without and with the attenuation measures in place. It is understood that the London Borough of Camden require all plant to be no more than -10dBA below existing background levels and exhibit no operational tonality.

5.5 Assessment of Operational Plant Noise

5.6 The British Standard 4142:2014 - 'rating of commercial and industrialsound' - offers guidance and calculation procedures for the assessment of noise that is likely to give rise to complaint. In the absence of any other suitable environmental noise standard, is used extensively by acoustic professionals, local authorities and academics for the assessment purpose.

5.7 The measurement technique is a system which utilises the measures equivalent continuous A-weighted sound pressure level over a given reference time period, being 1 hour during the day and 5 minutes during the night, of the specific noise to which are applied certain corrections which take into account any tone, impulsive or irregular character of the noise.

5.8 In Section 8 reference is made to the corrected noise level, called the 'rating level'. The background noise level ("BNL" BS4142:1997 Section 7.0), which is measured at the same position without the intrusive noise, to be compared with the rating level.

5.9 In Section 9 reference is made to the assessment method. This section describes a methodology by which the simple arithmetic difference between the rating level and the BNL can be evaluated. It is stated that a difference of +5dB (ie Rating Level - BNL) is of marginal significance. A difference of +10dB or more (ie Rating Level - BNL) indicates that complaints are likely.

5.10 Assessment for the Existing Kitchen Extract/Fresh Air Intake Systems - During Period 1000 hours to 2300 hours at rear elevation windows of nearest House in Conway Street W1.

Assessment Criteria	Levels
1. Measured sound pressure level from Kitchen Extract fan system	65dB
2. Angle of deflection	-3dB
3.Distance Correction to residential windows 8 metres	-18dB
4. Acoustic Feature Correction - existing tonality	+5dB
5. Façade reflection of houses	+3dB
6. Resultant	53dB
7. Lowest Background Noise Level (1000 - 2300 hrs)	50dB
8. Assessment Level (Line 7-8)	+2dB
9. Uncertainty of the assessment	Low

5.11 The assessment undertaken for this plant as existing indicates that there is a signifivant exceedance of existing background levels at the residential properties from the external plant operation and therefore not compliant with the Council's noise criteria.

5.12 Assessment for the Proposed Kitchen Extract/Fresh Air Intake Systems - During Period 1000 hours to 2300 hours at rear elevation windows of nearest House in Conway Street W1 post acoustic works .

Assessment Criteria	Levels
1 Predicted sound pressure level from Kitchen Extract fan system at 1 metre	71dB
2. Attenuation from in line silencer	-14dB
3. Attenuation due to acoustic lagging	-5dB
4. Qo reflectivity correction	+6dB
3. Angle of deflection	-3dB
4.Distance Correction to residential windows 8 metres	-18dB
5. Acoustic Feature Correction	0dB
7. Resultant	37dB
8 Predicted sound pressure level from Fresh Air Intake fan system at 1 metre	62dB
9. Attenuation from in line silencer	-14dB
10. Attenuation due to acoustic lagging	-5dB
11. Qo reflectivity correction	+6dB
12. Angle of deflection	0dB
13.Distance Correction to residential windows 6 metres	-16dB
14. Acoustic Feature Correction	0dB
15. Resultant	33dB
16. Overall Resultant (7+15)	38Db
17. Lowest Background Noise Level (1000 - 2300 hrs)	50dB
18. Assessment Level (Line 16-17)	-12dB
19. Uncertainty of the assessment	Low

5.13 This assessment undertaken for this plant after installation of the proposed scheme indicates that there should be no exceedance of existing background levels at the residential properties from the external plant operation and therefore in compliance with the Council's noise criteria.

5.14 BS8233:2014

5.15. This British Standard sets out guidance on the internal comfort levels that should be aimed for within a dwelling space. Noise from unpredictable sources such as road traffic noise, outside the control of the company, are more likely to cause sleep disturbance problems in this area.

5.16 In BS8233:2014 the criteria which needs to be considered is that noise levels within the dwellings. The British Standard providing guidance for the control of noise in and around both new and refurbished buildings applying for change of use, has been updated. Changes in noise standards could impact on planning decisions. The new document provides recommended guideline values for internal noise levels within dwellings which are similar in scope to guideline values contained within the World Health Organisation Guidelines for Community Noise, 1999 (WHO).

5.17 Unlike the previous version, BS 8233:2014 doesn't provide recommendations in relation to maximum noise levels in residential bedrooms at night from individual noise events such as vehicle pass-bys or aircraft movements. Instead, it advises that: *"regular individual noise events…can cause sleep disturbance. A guideline value may be set in terms of SEL (Sound Exposure Level) or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values".*

5.18 The new guidance does, however, provide limited guidance for indoor noise levels from external noise events for hotel bedrooms, with a recommended indoor noise range of 45 – 55 dB L_{Amax}. The Standard also adopts guideline external noise values provided in WHO for external amenity areas such as gardens and patios. The Standard states that it is "desirable" that the external noise does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ whilst recognising that development in higher noise areas such as urban areas or those close to the transport network may require a compromise between elevated noise levels and other factors that determine if development in such areas is warranted.

5.19 In this case when the acoustic works have been completed to the scheme the noise levels within the adjacent residential properties should fall within the requirements of the above standard.

6.0 CONCLUSIONS

6.1 The expected operational noise levels of the premises have been examined and the noise levels at the nearest noise sensitive receptors calculated. The calculations indicate that plant noise at the nearest noise sensitive receptors with attenuation in place the operation of the systems should meet London Borough of Camden noise criteria. Therefore, it is considered that the upgraded installation will be acceptable in

environmental noise terms.

7.0 RECOMMENDATIONS

7.1 At present the Kitchen Extract and Fresh Air Intake systems operate without attenuation. The London Borough of Camden have reported that noise from the units operation is audible and tonal at the nearest residential properties. To resolve this is sue and in support of a planning applications the recommendations below offer solutions to these issues, and should be covered by the proposed planning application..

7.2 Kitchen Extract System

7.3
i) Remove the existing fan and cowling.
ii) Provide a 90^0 galvanised steel rectangular ductwork bend exiting from the building to run vertically. Dimensions to be approved by the M&E Contractor.
iii) To this duct attach a minimum 600mm straight section of rectangular galvanized steel duct. No attenuator.
iv) Provide a suitably designed fan and housing.
v) After the fan attach a minimum 600mm straight section of rectangular galvanized steel duct.
vi) To the transition piece attach a suitably dimensioned 1500 long galvanized mild steel rectangular attenuator having 100mm sideliners and 125 mm centre splitter elements. Airways should ideally be 125mm wide. 2D cylindrical attenuators are not recommended for this project. The attenuator internal absorbent material needs to be ideally wrapped in Mylar or equivalent material to ensure no contamination by grease build up. The attenuator should provide the following minimum insertion loss:

Octave Frequency in Hertz (dB ref 2 x 10^{-5} Pascals)							
63	125	250	500	1K	2K	4K	8K
7	12	22	38	47	47	34	20

vii). After the attenuator provide a 300mm long square transition piece with an upward angled termination piece to complete.
viii). Clad the arrangement externally from the duct exiting the building, around the fan, flexible couplings and splitter attenuator to include the transition pieces with Muftilag PB50 acoustic lagging material. The acoustic lagging should be fitted to all sides of the above including the rear face.
ix). All the above should be suitably supported.
N.B. The fan system should be fitted with a tamper proof speed controller on the system

7.4 Fresh Air Intake System

7.5
i) From the new internal arrangements provide a 90^0 galvanised steel rectangular ductwork bend exiting from the building to run horizontally along the rear wall facing east. Dimensions to be approved by the M&E Contractor.
ii) Provide a suitably designed fan and housing
iii) To the fan houseing attach a 300 mm straight transition piece of straight steel duct.

iv) To the transition piece attach a suitably dimensioned 1200 long galvanized mild steel rectangular attenuator having 100mm sideliners and 125 mm centre splitter elements. Airways should ideally be 100mm wide. 2D cylindrical attenuators are not recommended for this project. The attenuator should provide the following minimum insertion loss:

Octave Frequency in Hertz (dB ref 2 x 10^{-5} Pascals)							
63	125	250	500	1K	2K	4K	8K
6	12	23	40	51	51	41	29

v). After the attenuator provide a 300mm long square transition piece with a termination piece to complete. It may be necessary to attach a further 90^0 steel duct bend due to restricted space.

vi). Clad the whole arrangement externally including the splitter attenuator to include the transition pieces with Muftilag PB50 acoustic lagging material

vii). All the above should be suitably supported.

N.B. The fan system should be fitted with a tamper proof speed controller on the system

8.0 LIMITATIONS OF THIS REPORT

8.1 This is a preliminary report and matters of detail may be required as the project progresses. It should be noted that acoustic installations are heavy and all connections, supports and fixings require approval of a qualified Structural Engineer. All Health and Safety matters associated with this project shall be addressed by others. ENL Acoustic Consultants Ltd accept no responsibility for the above matters and offer acoustic advise only.

9.0 ENVIRONMENTAL NOISE DURING THE CONSTRUCTION PHASE

9.1 Reference to BS5228 can offer guidance on construction noise limitations and methods of control during the contract period. This particular site is relatively remote from housing and apart from any piling requirements (should this be necessary) there should be no specific environmental noise issues apart from those required under the Health & Safety at Work Act 1974 and the Control of Noise at Work Regulations 2005.

APPENDIX 1 - GLOSSARY OF ACOUSTIC TERMS

1. **A-weighted decibels - dB(A)** - Approximately equivalent to the human ear frequency response. A simulated measure of the loudness level of the noise as heard by the listener. Specific corrections are made to simulate this response.
2. **Ambient noise** - Totally encompassing sound in a given situation at a given time.
3. **Attenuation** - the amount by which a noise is reduced.
4. **Corrected Noise Level or Rating level L_{ArT}** - the specific noise level plus any adjustment for the character of the noise.
5. **Decibels** - a unit of sound level using a logarithmic scale. It is the ratio of the measured sound pressure and the reference level ie $10 \log_{10}(P^2_1/P^2_{ref})$ where 1 = rms pressure and ref = 2×10^{-5} N/m^2.
6. **Frequency in Hertz** - sound is propagated in wave form. Sound frequency is expressed in cycles per second or Hertz. Most noises comprise many frequencies. One Hertz equals one cycle per second.
7. **L_{AeqT} - Equivalent Continuous A-weighted sound pressure level** - the value of the A-weighted sound pressure level in decibels of the continuous steady sound that within a specified time interval has the same mean square sound pressure as a sound that varies with time.
8. **L_{A90T} - Background Noise Level (BNL)** - the A-weighted level of the residual noise in decibels exceeded for 90% of a given time interval. The level of noise underlying all fluctuating noise s reaching a given location. This tends to be dominated by the more distant, non-local sources and events.
9. **$L_{A10(1hour)}$ dBA - Road Traffic Noise** - the value of $L_{A10(1hour)}$ dBA is the noise exceeded for 10% of a period of one hour.
10. **Noise** - A complex sound often defined as unwanted sound.
11. **Precision Grade Instrumentation** - There are 2 basic grades of instrumentation guaranteeing different grades of accuracy of which precision grade instrumentation is the most accurate.
12. **Sound Pressure Level** - the sound pressure level in decibels is given by:
    $20 \log_{10} (P_1/P_2)$.