



**Environmental Noise
Assessment Report**

**In Support of a Planning Application to Upgrade External Plant
Serving the Royal Oak Public House
Langstone High Street,
Havant, Hampshire.**

February 2014 (Updated from July 2013)

ENL

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NOISE SURVEY REPORT/GKPC/February 2014
ROYAL OAK PUBLIC HOUSE, LANGSTONE HIGH STREET, HAVANT, HANTS
GREENE KING PUB COMPANY LTD
NOISE CONTROL REPORT TO SUPPORT A RETROSPECTIVE PLANNING
APPLICATION TO UPGRADE THE EXTERNAL KITCHEN EXTRACT SYSTEM

1.0 INTRODUCTION

- 1.1 **Instruction:** To provide a noise assessment and evaluation with regard to external kitchen extract plant serving the Royal Oak Public House, Langstone.
- 1.2 **Client:** Greene King Pub Company Ltd.
- 1.3 **Survey Location:** The Royal Oak Public House, 19 Langstone High Street, Havant PO9 1RY.
- 1.4 **Survey Dates** 12 February 2014 - daytime specific noise monitoring and evening background noise monitoring.
- 1.5 **Survey Times:** i) Daytime - 1500 hrs to - 1600 hrs
ii) Evening - 2100 hrs to 2330 hrs
- 1.6 **Weather Conditions:** Clear skies, no wind and no rain.
- 1.7 **Instrumentation:** CEL 633 C1R Precision Sound Analyser Type 1
CEL 284/2 Acoustic Calibrator Type 1
(Calibration Status: Current Certification from Nov 2012)
- 1.8 **Report Date:** 14 February 2014 (Updated from July 2013).
- 1.9 **Consultant:** R B Parker, MIOA, MCIEH

2.0 SUMMARY/CONCLUSIONS

- 2.1 Greene King Pub Company Ltd has undertaken external works to the Kitchen Extract and Fresh Air Intake Systems to improve air flow in the kitchen and to address neighbour complaints concerning noise. In order to support an upgrade of this equipment to effectively treat the system for noise emissions an evaluation has been undertaken at the site. An assessment to demonstrate compliance with the Council's environmental noise criteria from operation of the external plant has been included in this report.
- 2.2 Noise measurements taken at the rear of the building confirm existing background noise levels in later part of the evening are in the region of LA90 43dB. The operation of the Kitchen Extract system as presently set up is in the region of LAeq 71dB at the boundary of the nearest house. Due to this fact and the proximity of the nearest residential property recommendations have been made in this regard. The Fresh Air Intake by contrast is compliant.



- 2.3 In conclusion, the noise assessments of the proposed operation of the plant indicate that retaining the Kitchen Extract and Fresh Air Intake systems with upgraded noise control measures in place will ensure compliance with noise related planning conditions in terms of environmental noise.
- 2.4 The plant, with its attenuation in place will achieve the local authority noise criteria which is believed to be -5dBA below existing background levels at the nearest noise sensitive facade. It is concluded that the nearest noise sensitive property is No 17 Langstone High Street which lies immediately to the west of the application site, about 5 metres from the Kitchen Extract plant.

3.0 LOCATION DETAILS

- 3.1 The public house is a listed 2 storey part single storey 15th Century Inn situated on the north quayside of Langstone Harbour, within the Borough of Havant. It is located in a picturesque setting overlooking the Harbour, Hayling Island road bridge and the northern shores of Hayling Island.
- 3.2 The main 2 storey element of the building is brick built under a tiled roof with a rear flat roof single storey extension, which partly houses the Kitchen Extract and fresh air supply equipment. There is a rear single storey pitched roof building attached to the north elevation of the flat roof extension, housing the main stores and refrigeration cabinets. There are several beer chillers and refrigeration condensers attached to this part of the premises.
- 3.3 The premises fronts on to Langstone Quay, which is a walkway to leisure walks and other residential properties. The nearest residential property is located immediately to the west and is No 17 Langstone High Street. The licensed premises currently has the permitted licensed hours 1000 hours to Midnight Monday to Saturday and Sundays 1100 hours to 2230 hours.

4.0 ENVIRONMENTAL NOISE MEASUREMENT CONSIDERATIONS.

- 4.1 In order to provide a background noise level from which to base assessments can be made, background noise readings were carried out at the rear of the Public House, partly at the rear boundary and partly in the north east area of the garden of the public house. These positions were selected to ensure extraneous noise from the various items of plant did not influence the measurements. These readings are in the table below and are used in the upcoming assessment tables.
- 4.2 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 at the proposed monitoring positions as in para 4.1 above.
- 4.3 Measurements made have been assessed and rated under the guidance in the procedures in British Standard 4142:1997 - Method for rating industrial noise affecting mixed residential and industrial areas. This standard is extensively used to assess the impact of noise from commercial/industrial activity upon residential properties.



- 4.4 Measurement periods of 5 to 15 minutes are used during the survey to ensure 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.

5.0 ENVIRONMENTAL NOISE MONITORING RESULTS

5.1 Table 1 - Specific Noise Monitoring of Equipment – 10 February 2014

Monitoring Position – 1m from each unit	Octave Frequencies in Hertz ref 2×10^{-5} Pascals							
	'A'	63	125	250	500	1K	2K	4K
Flat Roof Mounted Equipment								
Kitchen Extract (1)	77	75	75	67	69	70	71	70
Kitchen Extract (2)	71	71	74	68	61	65	66	61
Kitchen Fresh Air In (3)	Inaudible above Kitchen Extract							

Notes

- (1) Fully operational Kitchen Extract system – taken 1 metre from outlet.
- (2) Levels taken at roof boundary adjacent to residential house (2 metres from KE outlet).
- (3) Fully operational Kitchen Fresh Air Intake system.

5.2 Table 2 - Environmental Background Noise Monitoring – 10 February 2014

Monitoring Positions	Period (hrs) of readings	SPL dB ref 2×10^{-5} Pascals				
		L_{Aeq}	L_{A90}	L_{AMAX}	L_{AMIN}	L_{A10}
Position 2 – Northern western end of pub garden.	2130-2200	44	43	52	42	46
	2200-2300	45	44	52	40	47
	2300-0000	42	41	58	38	44

5.3 Comments

- 5.4 This is a relatively low noise area with the only influence being traffic using the Hayling Island Bridge, the A3024 highway, which is about 150metres to the west of the public house and constant traffic noise from the nearby A27 highway. Background noise levels at the rear of the site were mainly by noise from the A27 highway.
- 5.5 Background remained steady for most of the daytime readings and throughout the early evening, dropping off slightly during the latter part of the evening. Typically background L_{A90} levels range from 44dB to 45dB during the period 0700 hours to 0000 hours.

6.0 NOISE ASSESSMENT.

6.1 Existing External Plant Serving the Public House Kitchen Operation

- 6.2 The following plant and equipment is located externally in the rear areas:
- i) Kitchen Extract system – on the rear flat roof discharging at roof level,



- ii) directly over the Kitchen Hood.
 - ii) Kitchen Fresh Air Intake on the rear flat roof intaking air at roof level, directly over the Kitchen.
- 6.3 Observations confirmed that none of the above plant has acoustic controls in place. The nearest residential facade is about 5 metres from the Kitchen Extract discharge and although the bedroom windows do not look on to the plant the noise emissions from the operation of the equipment is likely to be audible at present.
- 6.4 For the most part the Kitchen Extract and Kitchen Fresh Air Intake will operate during the restaurant serving times. This is up to 2100 hours each evening, although the equipment above would be switched off at about 2130 hours.
- 6.5 Sound Data for the Proposed Kitchen Extract System
- 6.6 The proposed Kitchen Extract Fan is to be a Helios GDB 560/4/4 Backward Curved Centrifugal Fan Unit. This is an induct fan unit, which will be installed as part of the extract duct system and attenuator. The attenuator specification is set out below. The efflux velocity should be less than 6m/s. The proposed new discharge point will be 10 metres from any residential window.
- 6.7 Calculations to assess noise emissions from the kit as operating at the venue are set out below. The calculations are made allowing for the acoustic controls and enclosures needed to ensure compliance with planning conditions and ensure no adverse impact on local residents by way of noise.
- 6.8 Assessments
- 6.9 The British Standard 4142:1997 - 'rating of industrial noise affecting mixed residential and industrial areas' - offers guidance and calculation procedures for the assessment of noise that is likely to give rise to complaint. Although the title indicates that any such assessment is restricted to industrial noise, in the absence of any other suitable environmental noise standard, is used extensively by acoustic professionals, local authorities and academics for the assessment purpose.
- 6.10 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 (0700 hours to 2300 hours) and 5 minutes during the night (2300 hours to 0700 hours), of the specific noise to which are applied certain corrections which take into account any tone, impulsive or irregular character of the noise.
- 6.11 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 with the intrusive noise ceased, can be compared with the rating level.
- 6.12 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.

- 6.13 In summary, the acoustic changes that are proposed is attenuation to the Kitchen Extract system. The assessments below reflects these changes and the introduction of an odour filtration unit to the Kitchen Extract system.

6.14 Assessment Table 1 - Kitchen Extract System – Post Acoustic Treatment – during operating hours

Assessment Criteria	Levels
1. Measured sound pressure level 1 m from KE fan system	77dB
2. Attenuation TL including acoustic lagging	-22dB
3. Distance Correction from discharge point to residential windows - 10 metres	-20dB
4. Angle of Incidence	-5dB
5. Acoustic Feature Correction	0dB
6. Façade Reflection of incident building	+3dB
7. $L_{Aeq(5mins)}$ Rating Level	33dB
8. Lowest Background Noise Level (1100 - 2200 hrs)	43dB
9. Assessment Level (Line 7-8)	-10dB

- 6.15 The assessment indicates that there is unlikely to be any intrusion from kitchen fan noise during the operating period, providing the recommended acoustic measures are maintained. The table sets out the calculations showing compliance.

6.16 British Standard 8233:1999.

- 6.17 The guidance in BS 8233:1999 in relation to acceptable noise levels within buildings has been considered also and does not raise any issues in relation to the operation of the units when acoustical controls are applied.

- 6.18 In BS8233:1999 the criteria which needs to be considered is that noise levels within the dwellings should not exceed L_{AeqT} 30dB, where $T = 5$ minutes (ref BS4142:1997). The internal criteria of L_{Aeq} 30dB is unlikely to be exceeded in any nearby resident property by the operations of the plant due to the noise control measures proposed.

6.19 Odour Control

- 6.20 Provision has been made in the revised system layout to accommodate a bag filter 3odour control system. This will be specific by the Mechanical and Ventilation Installers, but should be designed to required environmental standards.

6.21 Local Authority Environmental Noise Requirements

- 6.22 The Havant Borough Council have indicated that all new equipment of this type should be -5dBA below BNL as measured at any nearby residential property. In this case, that criteria is met.



6.23 Planning Position

- 6.24 A recent retrospective planning application for the retention of the Kitchen Extract and Fresh Air Intake serving the Kitchen of the public house was refused on the grounds that the installation was not acceptable to the Conservation Officer and in respect of noise issues. The Council have states they require a full detailed technical scheme to support the application.
- 6.25 This report provides an assessment of the updated Kitchen Extract System proposal. As part of that proposal decorative screening has been included. However, due to the nature of the proposed Kitchen Extract System acoustic lagging of the type described in the recommendations section of this report are required. Inclusion of this acoustic lagging is necessary as part of the acoustic specification.
- 6.26 The screening provided as part of the scheme will, however, effectively screen the acoustic lagging which them have no adverse visual impact on the proposal.

7.0 CONCLUSIONS

- 7.1 It is concluded that the technical detail provided in this report supports the retention of the Kitchen Extract and Fresh Air Intake systems with the proposed acoustic attenuation. With the implementation of the recommended acoustical controls, the retention of the Kitchen Extract noise from the plant should not cause nuisance to nearby residential occupiers.
- 7.2 The recommended level of attenuation should ensure that during the hours of operation set out above does not cause disturbance and is unlikely to have a adverse impact on nearby residential occupiers.

8.0 RECOMMENDATIONS

8.1 Kitchen Extract System

- 8.2 At the present time the Kitchen Extract System outlet is directed across the roof of the public house facing north. The following noise control treatment is recommended to ensure sound emissions from the operation of the system is in accordance with the assessments above:
1. Remove the existing duct and fan unit.
 2. Ductwork from the kitchen extract should be isolated from the building structure, where is passes through building elements. This can be in conjunction with acoustic lagging.
 3. Reposition the first section of ductwork face north to connect to the Kitchen side of the extract fan..
 4. The Extract System Fan is a centrifugal type fan positioned at the change of direction of the ductwork – to turn 90° to face east.
 5. All ductwork should be as low a profile as possible.. The support feet should be provided with anti-vibration pads such as 20mm TICO LF.
 6. Connect ductwork to the atmospheric side of the fan provide a 600mm long square transition duct.



7. To the transition piece attach a suitably dimensioned 1500 long galvanized mild steel rectangular attenuator having 100mm sideliners and 3 No 100 mm centre splitter elements. Airways should ideally be 100mm wide. The absorbent material needs to be ideally wrapped in Mylar or equivalent material to ensure no contamination by grease build up. The attenuator should have a cross sectional area of 900 mm wide by 720mm high fitted to the duct it serves and be capable of providing the following minimum insertion loss:

Octave Frequency in Hertz (dB ref 2×10^{-5} Pascals)							
63	125	250	500	1K	2K	4K	8K
8	14	26	43	53	53	40	24

8. Provide a 300mm long square steel transition piece to the grill termination.
9. Provide a suitable MF framework around the fan housing being 50mm off any point.
10. Clad the framework around the fan and 500mm either side of the fan with 1 layer of 19mm Gyproc Plank material tightly jointed, to include the underside of the fan housing.
11. Clad the section of the duct to 1 metre either side of and including the fan to include 500mm along the attenuator with Muftilag PB50 acoustic lagging material, to include the flexible fan couplings. Fitted in accordance with manufacturers and Structural Engineers instructions/approvals.
12. All the above should be suitably supported.

N.B. The fan should be supported on anti-vibration mountings

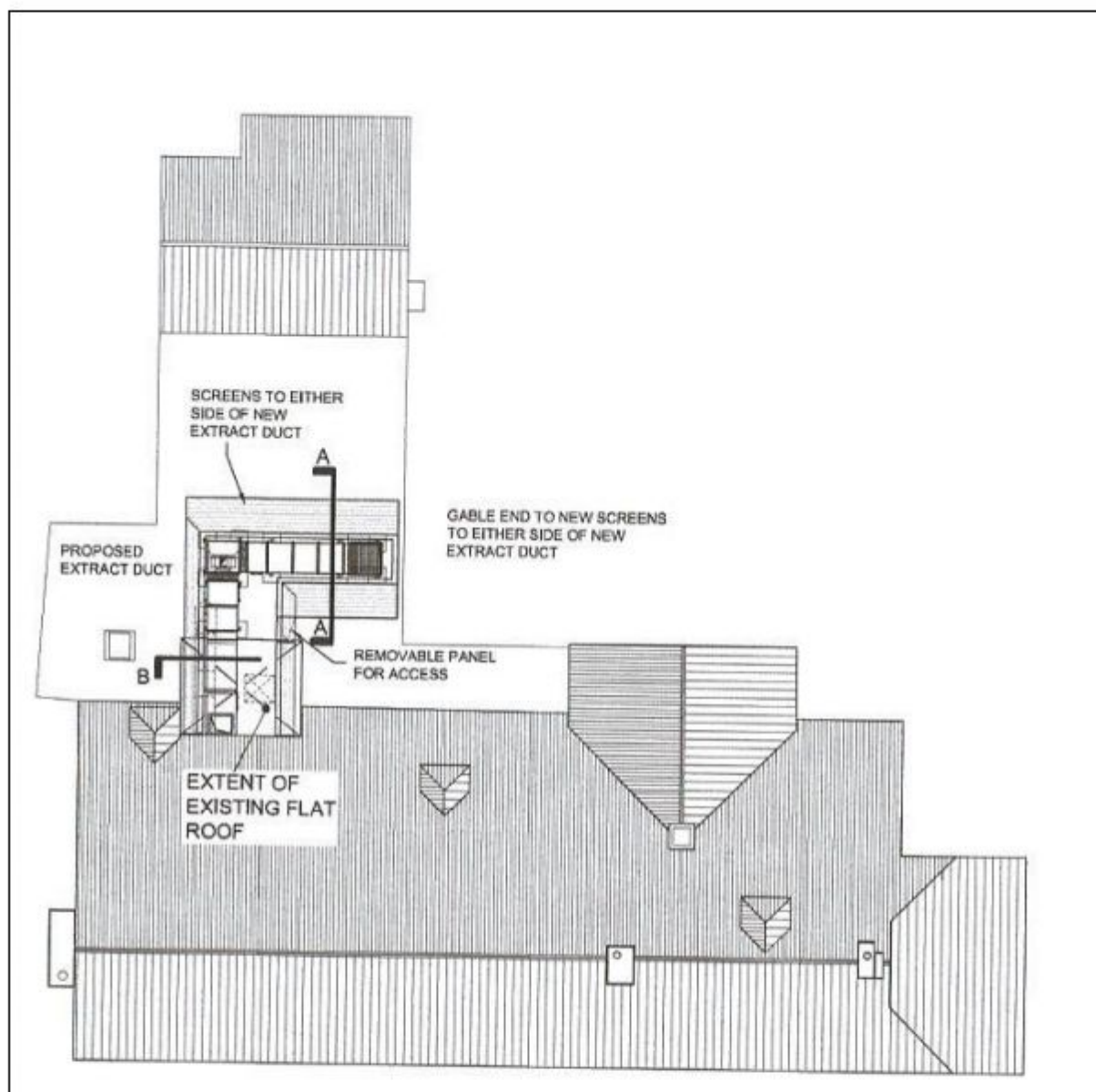
The above dimensions may need to be adjusted based on site conditions.

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

- 8.3 The above Kitchen Extract System is to be screened by a lightweight decorative screen to be approved by the Council. This screen will not add sufficiently to the acoustic control requirements of the Kitchen Extract System and as such the above acoustic cladding will be required to be installed. This will ensure that the assessment criteria is met.
- 8.4 The above recommendations are for acoustic purposes only, to support to retention of the equipment as part of a planning application. All matters associated with Health & Safety, Structural Stability, Structural support and Conservation issues should be dealt with by others.



APPENDIX 1 - PROPOSED ROOF PLAN





APPENDIX 2 - 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 $ref = 2 \times 10^{-5} \text{ N/m}^2$.
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:
 $20 \log_{10} (P_1/P_2)$.