

Heartwood Collection

THE SUN INN, READING

Plant Noise Impact Assessment

Report No. 23-0096-0 R01

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Report No.: 23-0096-0 R01

Date: 30 June 2023

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1 INTRODUCTION

Heartwood Collection is proposing to refurbish and develop The Sun Inn Reading, 16 Castle Street, Reading, RG1 7RD. The site is currently vacant and not trading.

As part of the planned refurbishment, the currently installed plant is to be replaced and relocated in an extension to the rear.

The local authority has deemed it necessary to undertake a noise impact assessment to ensure that proposed units do not cause any adverse impact on the closest residential properties. Sustainable Acoustics Ltd has been appointed to undertake a noise assessment for this purpose.

2 SITE CONTEXT AND PROPOSALS

2.1 Context

The Sun Inn, Castle Street is located towards the centre of Reading approximately 200m from the A329 to the west. The site is surrounded by predominately commercial properties and a church building to the east. To the north is an open air street food arena known as the Blue Collar Bar. Directly to the west is the Reading Magistrates Court and car park. To the northeast is an electrical substation building. Context is provided in **Error! Reference source not found.** below:

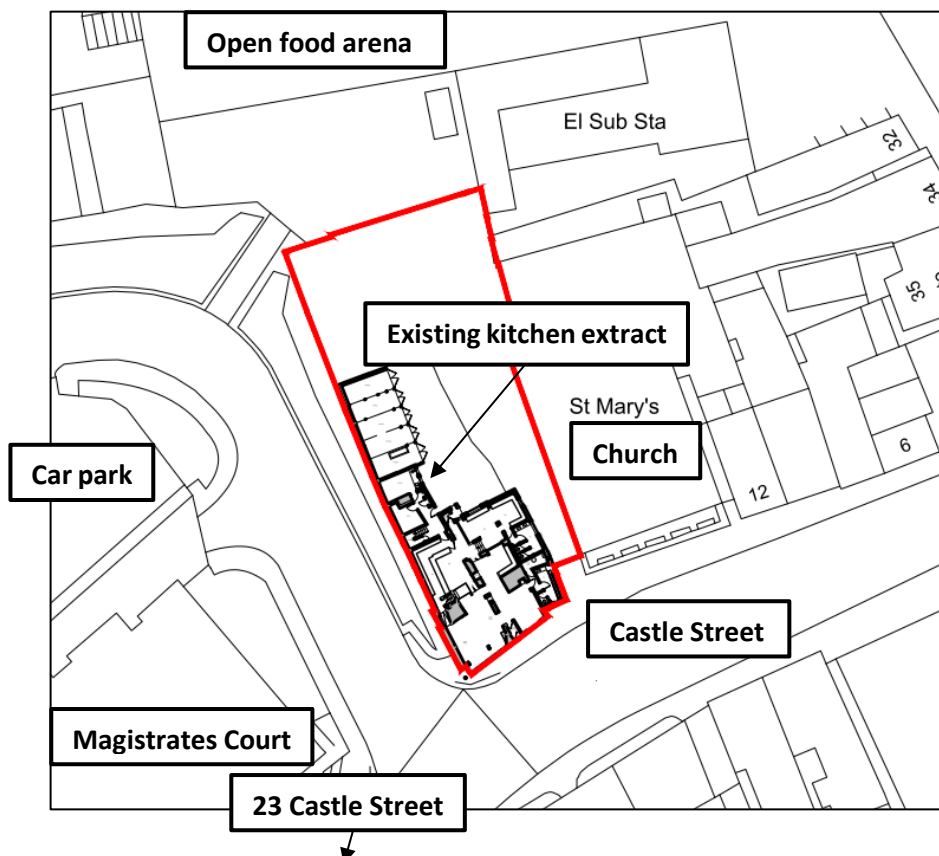


Figure 1: Site location plan

The nearest residential properties are flats across the opposite side of the roundabout at 23 Castle Street, approximately 30m from the front of the Sun Inn. There are some residential flats above

commercial further along Castle Street and at a property on St Mary's Butts Street, however these are well screened by buildings in between and have no view to any part of the Sun Inn.

2.2 Existing Plant

Below is shown the existing kitchen extract position.



Figure 2: Existing kitchen extract position

It has not been possible to measure noise levels from the existing kitchen extract.

2.3 Proposed Plant

It is proposed to extend the rear, which will include a new kitchen at the rear. The positions for the supply air in and extract air outlet are shown in Figure 2 below. The supply and extract fans and associated ductwork are to be located inside the roof.

It is understood that the plant is proposed to operate up to 2300.

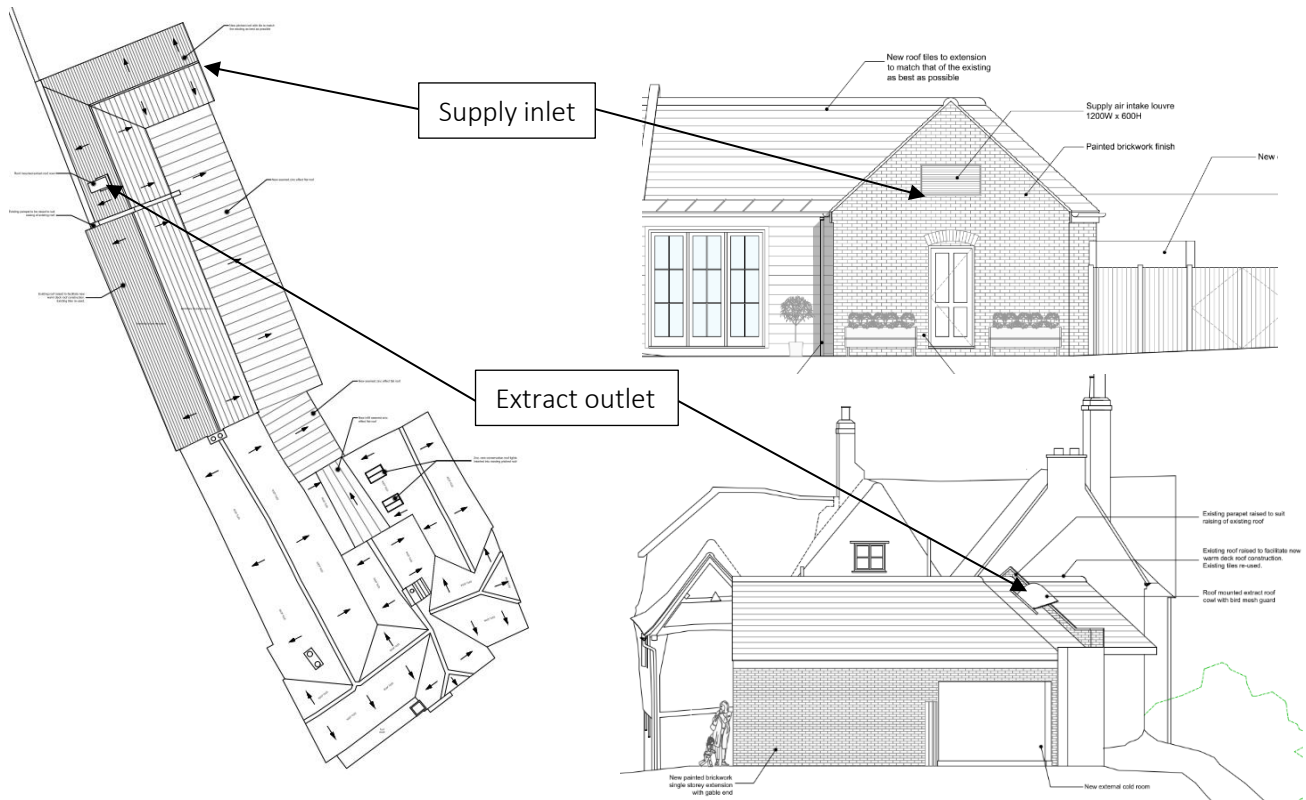


Figure 3: Proposed kitchen plant

The proposed supply and extract fan units are as follows with manufacturer's data provided:

Item	SPL (dB) in Octave Band centre Frequency (Hz)								
	A	63	125	250	500	1k	2k	4k	8k
Supply : SystemAir MUB/T 062 560D4									
Inlet	83	76	90	83	80	77	73	71	64
Outlet	84	77	91	84	81	79	75	72	66
Extract : SystemAir MUB/T 062 630D4									
Inlet	88	82	96	88	85	83	78	75	68
Outlet	90	83	97	89	86	85	80	77	70

Table 1: Proposed plant sound power levels

Item	Insertion Loss (dB) in Octave Band centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Supply: SystemAir LDK 70 Silencer	2	5	7	19	24	23	15	10
Extract: Attenuated ductwork to cowl*	1	2	6	10	14	12	10	8

*no data available – assumption used is based on typical data for short 600mm 100% open area attenuator

Table 2: Insertion loss for attenuators



3 POLICY AND RELEVANT GUIDANCE ON NOISE

3.1 National Policy

National planning policy is provided in the National Planning Policy Framework (NPPF). Policy on noise implications is to *avoid* significant adverse impacts, *mitigate* and reduce other adverse impacts and to *recognise* the need for development. This is further qualified in the Noise Policy Statement for England (NPSE).

Further information is given in Planning Policy Guidance on Noise (July 2019), in which it is stated that “*good acoustic design needs to be considered early in the planning process*”. Examples of outcomes of given; at the Lowest Observed Adverse Effect Level (LOAEL), “Noise can be heard and causes small changes in behaviour, attitude or other physiological response”.

Commercial and industrial noise sources (including plant and ventilation) should normally be assessed using the methodology in BS4142: 2014, which compares the rating noise from the source with the existing background noise level to determine the likelihood of adverse impact.

Further information on the national policy and guidance is provided in Appendix 1 of this report.

3.2 Local Policy

The Reading Borough Council (RBC) Local Plan, adopted on 4th November 2019, contains several relevant policies pertaining to noise impact on residential properties, copied below.

EN17: NOISE GENERATING EQUIPMENT

“Where noise generating equipment is proposed, the noise source specific level (plant noise level) should be at least 10dBA below the existing background level as measured at the nearest noise sensitive receptor”.

It should be noted that Policy EN17 states an assessment of the specific sound level of noise generating equipment, not the rating noise level (with reference to BS4142 – See terms in Appendix 4).

3.3 British Standard BS 4142

Commercial and industrial noise sources are normally assessed using the methodology in the British Standard BS 4142: 2014, *Methods for rating and assessing industrial and commercial sound*. The standard describes methods for rating and assessing sound of an industrial and/or commercial nature, to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

The sound from the industrial/commercial source is rated by taking into account the sound level of the source, known as the specific sound level, and its characteristics, such as tonal, impulsive or intermittency of the source, and applying an appropriate correction to give the rating level of the sound source. To gain an initial estimate of the potential impacts of the sound source, it is compared to the background sound level, and the level by which the rating level exceeds the background sound level indicates the following potential impacts:



Difference	Assessment
Around 10 dB or more	Likely to be an indication of a significant adverse impact, depending on the context
Around 5 dB	Likely to be an indication of an adverse impact, depending on the context
0 dB or less	An indication of the specific sound source having a low impact, depending on the context

Table 3: BS 4142 Assessment criteria

Typically the greater the difference, the greater the magnitude of the impact. 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.

The standard states that *“where an initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following:*

- 1) The absolute level of the sound*
- 2) The character and level of the residual sound compared to the character and level of the specific sound*
- 3) The sensitivity of the receptor.”*

4 SURVEY

4.1 Methodology

An environmental sound level survey was undertaken between Friday 16th and Tuesday 20th June 2023. Sound levels were measured with unattended logging sound level meters at two positions; with the microphones placed at 1m from the front façade at first floor level (MP1), and on a flat roof area at the rear (MP2). Sound levels and statistical parameters were measured in 15 minute intervals with a 1 minute time history. The microphones were fitted with outdoor windshields.

In addition, a series of short, attended measurements were taken when setting up on the 16th to observe any significant variation in sound levels across the site. The measurement positions are shown in Figure 4 below. Positions 1 and 3 were at 1.5m above ground, position 2 was at 2.5m above ground, above the height of the rear wall.

Details of equipment used and calibration are shown in Appendix 2. Prior to and on completion of the survey the calibration of the microphones and sound level meters was checked with the field calibrator and no drift was observed.



Figure 4: Measurement positions



Weather during the period was hot, with temperatures up to 32°C during daytimes and falling to 15°C during night-times. Wind speeds were generally low at around 0 to 2m/s starting from the east and moving to the west on the 18th. A short period of rain occurred on 20th at 0600; this latter period has been excluded from the analysis.

4.2 Survey Results

A summary of the overall measured sound levels is shown in the tables and graph below. The measured levels at the front façade have been corrected to free-field by subtracting 2.5 dB.

		Ambient sound level, dB LAeq, 15 min		Maximum sound level, dB LAmax, 15 min		Background sound level, dB LA90, 15 min	
		Range	Period	Range	Typical ¹	Range	Typical ²
Daytime	07:00-23:00	51 - 69	59	58 - 83	72	40 - 54	48
	07:00-19:00	51 - 69	59	59 - 79	72	40 - 54	49
Evening	19:00-23:00	51 - 66	57	58 - 83	68	41 - 50	45
Night	23:00-07:00	42 - 66	55	53 - 79	67	38 - 48	39

¹ Typical maximum sound level taken as the 10th highest of 2min samples during the period.

² Typical background sound level shown is arithmetic average during day and 20th percentile at night and in the evening periods.

Table 4: Measured sound levels at front façade of property at MP1 (free-field corrected)

		Ambient sound level, dB LAeq, 15 min		Maximum sound level, dB LAmax, 15 min		Background sound level, dB LA90, 15 min	
		Range	Period	Range	Typical ¹	Range	Typical ²
Daytime	07:00-23:00	43 - 58	50	58 - 83	72	41 - 54	46
	07:00-19:00	43 - 54	49	59 - 79	72	41 - 51	45
Evening	19:00-23:00	43 - 58	52	58 - 83	68	41 - 54	46
Night	23:00-07:00	41 - 52	45	53 - 79	67	39 - 49	40

¹ Typical maximum sound level taken as the 10th highest of 2min samples during the period.

² Typical background sound level shown is arithmetic average during day and 20th percentile at night and in the evening periods.

Table 5: Measured sound levels at rear of property on flat roof area (MP2)

A summary of the short, attended measurements at other positions on site is shown in Table 6 below. These demonstrate that there is not significant variation around the area at the rear and side of the site during the day.

Start Time	Duration	Position on site	Measured sound level, dB		
			LAeq	LAmax	LA90
10:57	5 min	End of existing pub garden	51	66	45
11:05	10 min	Cark park boundary to east	49	60	47
11:09	10 min	Side of church	51	73	46

Table 6: Short attended measurements around site

The measured sound levels are shown graphically in Figure 5 and Figure 6 below; the period of rain in the morning of the 20th (excluded from the analysis) is highlighted in blue. During the day, sound levels were observed to be controlled by road traffic in the surrounding area. From the plots of sound levels, it can be seen that higher sound levels occur on the Friday and Saturday evenings. At the rear, it is considered that sound levels may be influenced by the open air food arena/bar immediately to the north.

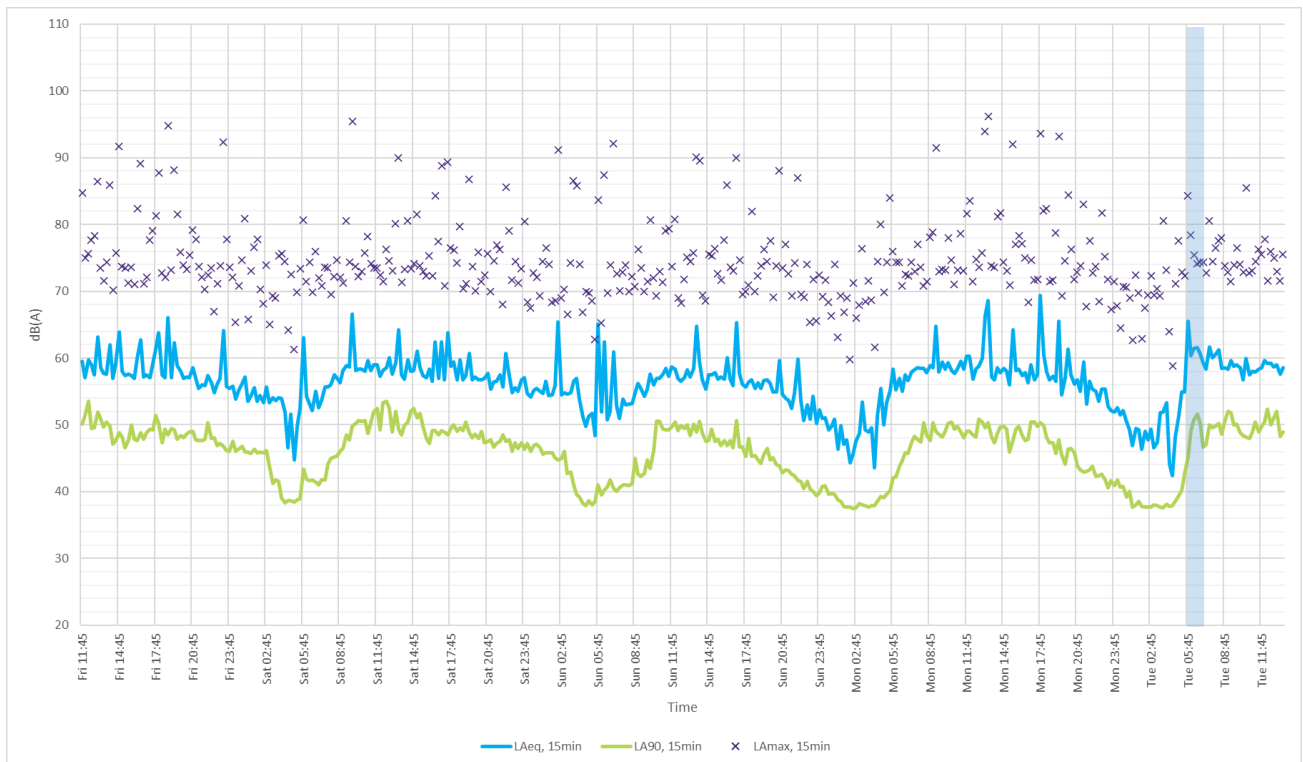


Figure 5: Measured sound levels at front, free-field corrected (MP1)

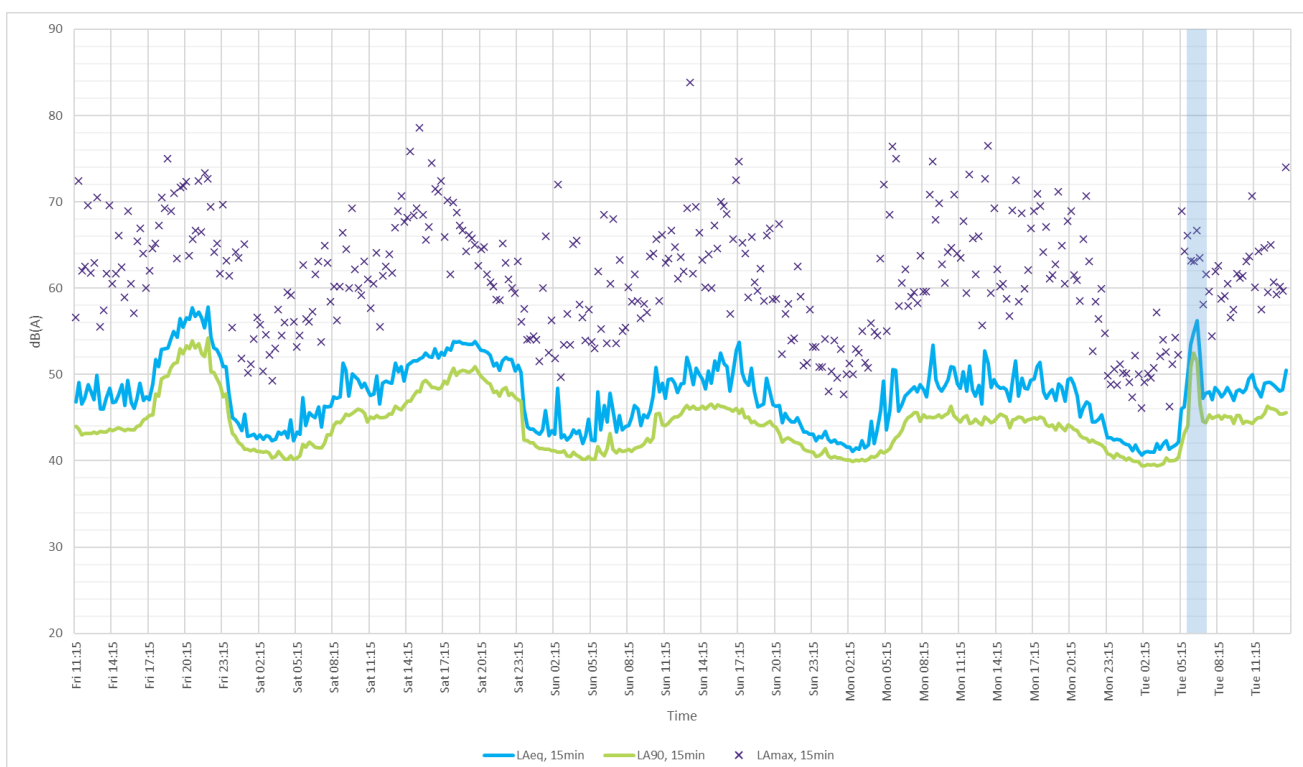


Figure 6: Measured sound levels at rear façade (MP2)

A more thorough analysis of evening background sound levels is deemed appropriate to establish a sensible representative typical lowest background sound level for use in the assessment. This follows the statistical analysis approach in BS 4142:2014. As stated in BS4142: 2014 at paragraph 8: "it is

important to ensure values that are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods”.

Figure 7 and Figure 8 below show histograms of occurrences of different $L_{A90,15min}$ values during evening periods between 19:00 – 23:00.

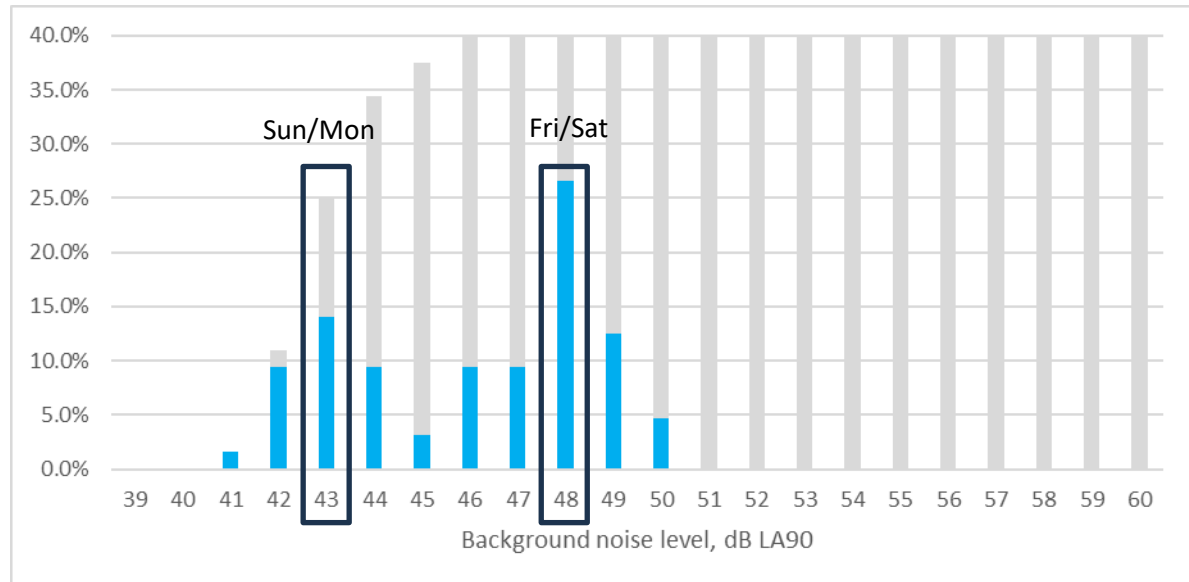


Figure 7: Analysis of background sound levels at front in evening

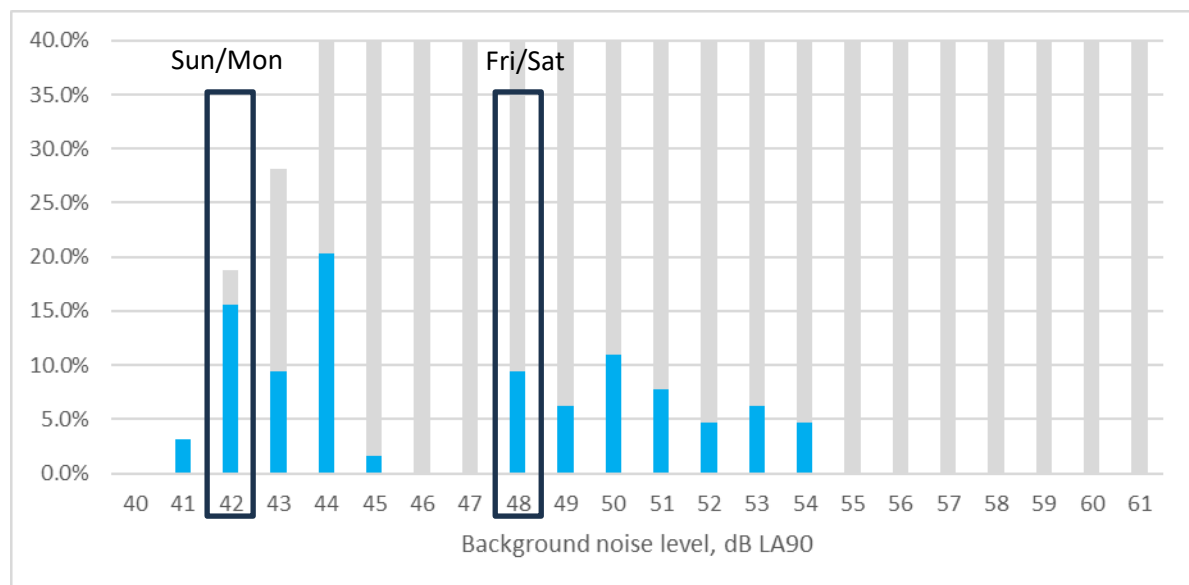


Figure 8: Analysis of background sound levels at rear in evening

It can be seen that there is a significant split between the background sound levels on the Sunday/Monday and the Friday/Saturday periods. Values of 43 & 42 dB L_{A90} are considered representative of the worst case weekday evening sound levels on Castle Street at the front and at the rear respectively. However, it is noted that during the busier Friday and Saturday evenings a value of 48 dB L_{A90} is more typical.



5 ASSESSMENT

5.1 Nearest residential receptors

The calculated sound level from the kitchen supply and extract fans is shown in Appendix 3. The calculations take account of any in-duct losses, directivity at the inlet/outlet, any screening between source and receiver, reflections, and attenuation with distance. The nearest residential property at 23 Castle Street is approximately 60m from the extract outlet. The calculated sound level at maximum rated duty is **28 dB(A)**. There are no residential properties with a direct line of site to the supply inlet.

A BS 4142:2014 assessment for the nearest residential property is shown below:

BS 4142 Assessment	Level, dB	Relevant Clauses of BS 4142	Commentary
Specific sound level	28	7.3.7, 7.3.9	From calculations at Appendix 3.
Penalty for character*	0*	9.2	See note below*
Rating level	28	9.2	Specific sound level + acoustic feature correction)
Background sound level	43 / 48	8.1, 8.2	There is a significant difference between measured levels on Mon-Sun / Fri-Sat.
Excess of rating level over background	-15 / -20	11	
BS 4142 assessment of impact in amenity area	<i>An indication of the specific sound source having a low 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</i>		
Uncertainty	+/- 3dB	10	<i>Uncertainty has been estimated from variability in plant sound operating capacity, existing background sound levels, and assumptions used in calculations. The absolute levels are such that the degree of uncertainty in the assessment would not change the outcome.</i>

Table 7: BS 4142 assessment to 23 Castle Street in evening period

*The Reading Borough Council policy EN17 refers to the specific sound level, not the rating sound level. It is also noted that in context there is existing plant at this location and the use type for the site is the same. The plant is not expected to have any significant tonal characteristics, although plant does have a low frequency bias and may be identifiable against the background sound level. It is therefore not considered appropriate to add any penalty for sound characteristics and the rating level = the specific sound level. It is noted, however, that even if a penalty of 3 dB for other sound characteristics were added, the criterion of 10 dB below the background sound level would still be met.

Context : In this scenario, the context is a busy central location with traffic noise and commercial nearby; this would normally be considered favourable for plant sound to be less prominent with the environment. The use type of the site is the same and there are other food and restaurant outlets nearby.

The predicted sound level is therefore more than 10 dB below the background sound level and would meet Reading Borough Council policy EN17. The BS4142:2014 assessment is that the impact is likely to be very low.

The assessment is therefore that the sound from the kitchen plant would be No Observable Effect Level (NOEL). The advice in PPG:Noise (see Appendix A1.2) for NOEL is 'No specific measures required'.

5.2 Church

A calculation of the predicted sound level to the adjacent church has also been undertaken and is shown in Appendix 4. The calculated sound level incident on the nearest part of the façade is approximately **32 dBA**. This is 10 dB or more below the typical background sound level in the evening.



Figure 9: Side of adjacent church

The church to the east does not have openable windows facing the site, however these do have small opening ventilation louvres at the top as shown in the photo below. It is estimated that the internal sound level contribution with the nearest ventilation louvre open would be significantly less than 20dBA and therefore not significant.

It is noted that in context the existing pub garden and kitchen extract are facing the church building. The proposed supply air inlet is further to the north and the kitchen extract outlet proposed to be facing away from the church.

The assessment is therefore that the sound from the kitchen plant would be No Observable Effect Level (NOEL). The advice in PPG:Noise (see Appendix A1.2) for NOEL is 'No specific measures required'.



6 SUMMARY AND CONCLUSION

A noise impact assessment has been carried out for the proposed kitchen plant for the refurbishment and extension of The Sun Inn, Castle Street, Reading.

The proposed kitchen plant is proposed towards the north of the site. The nearest residential property is approximately 60m from the kitchen extract on Castle Street. There is a Church adjacent to the site. There are existing restaurant and food outlets close by, such as the Blue Collar Bar open air street food arena to the north.

An environmental sound level survey has been undertaken which has determined representative background sound levels. It is noted that the background sound level is significantly higher on Friday and Saturday evenings. No measurements of the existing kitchen plant have been undertaken.

Calculations of the proposed kitchen plant have been undertaken. The assessment to the nearest residential receptor is 15 dB below the evening background level on the Sunday and Monday evenings, and 20 dB below the evening background level on the Friday and Saturday evenings. The assessment is that the plant will be a very low impact and that the kitchen plant would be No Observable Effect Level (NOEL).

At the adjacent church, the predicted plant sound level is at least 10 dB below the measured background sound level, and the absolute level is also low. It is also noted that the proposed plant is also further away from the church than the existing plant. The assessment is therefore also NOEL.

The proposal for kitchen plant is therefore considered to meet Reading Borough Council planning policy EN17, the requirements of the NPPF, and is not expected to give rise to any adverse impacts on health and the quality of life.



APPENDIX 1 Policy and Guidance on Noise



A1.1 National Planning Policy Framework

Current planning policy is based on the National Planning Policy Framework (NPPF), revised in July 2021, which supports a presumption in favour of sustainable development, unless the adverse impacts of that development would outweigh the benefits when assessed against the policies in the Framework, taken as a whole.

The noise implications of development are recognised at paragraph 185, where it is stated that planning policies and decisions should:

- *“mitigate and reduce to a minimum potential adverse impacts from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life¹”*
- *“Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason”*

The Government’s objective is to significantly boost the supply of homes, but puts in place protections for existing business in paragraph 187:

“Planning policies and decisions should ensure that new development can be integrated effectively with existing business and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses should not have “unreasonable restrictions placed on them as a result of development permitted after they were established”. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.”

A2.1 NATIONAL PLANNING POLICY GUIDANCE ON NOISE (JULY 2019)

The newly refreshed guidance says *“Good acoustic design needs to be considered early in the planning process to ensure that the most appropriate and cost-effective solutions are identified from the outset”*. It also says noise can override other planning concerns, where justified, *“although it is important to look at noise in the context of the wider characteristics of a development proposal”*. It makes clear that *“As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy”*.

It is stated that as exposure *“crosses the ‘lowest observed adverse effect’ level boundary above which the noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise)”*.

This indicates that below the Lowest Observable Adverse Effect Level upper threshold (LOAEL) would be considered acceptable. The noise exposure hierarchy is set out in a table which suggest that at a LOAEL that is “present and intrusive” that the action should be to mitigate and reduce to a minimum.

¹ See Explanatory Note to the Noise Policy Statement for England.



Above this is considered to be an Observable Adverse Effect (OAE). It makes clear that when the effect becomes significant (SOAEL) that it should be avoided. This guidance is consistent with the policy within NPSE.

It also talks of a positive soundscape “where natural sounds” are more prominent than background noise from manmade sources. The guidance indicates that this can be considered to be tranquillity in terms of identifying areas that justify being protected or improved.

Further government advice on how planning can manage potential noise impacts in new development is given in PPG: Noise². The table below summarises the noise exposure hierarchy, based on the likely average response of those affected:

Response	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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 small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, 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
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

² <https://www.gov.uk/guidance/noise--2>



A1.4 Noise Policy Statement for England

Paragraph 180 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England³ (NPSE). This document sets out a policy vision to

“Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development”.

To achieve this vision the Statement sets the following three aims:

“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.*

³ Department for Environment, Food and Rural Affairs, *Noise Policy Statement for England*, London, 2010



APPENDIX 2 Instrumentation



Equipment	Type	Serial Number	Calibration	
			Date	Certificate no
MP1 (and attended)				
Svantek Class 1 Sound and Vibration Analyser	958A	45544	17/11/22	1503898-1S
Microphone	MK 255	11369	17/11/22	1503898-1S
Preamplifier	SV 12L	77851	17/11/22	1503898-1S
MP2 (and attended)				
Svantek Class 1 Sound Level Meter	971	60684	16/07/21	1500361-1
Preamplifier	SV18	62752	16/07/21	1500361-1
Microphone	7052E	66699	16/07/21	1500361-1
Calibrator				
Svantek SV33	SV33	58228	11/08/22	1503139-1



APPENDIX 3 Calculations



Description		Notes		NR	dBA	63	125	250	500	1000	2000	4000	8000
Extract fan					90	83	97	89	86	85	80	77	70
Supply fan					83	76	90	83	80	77	73	71	64
<u>To 23 Castle Street</u>													
Fan Lw						83	97	89	86	85	80	77	70
Attenuated duct to cowl						-1	-2	-6	-10	-14	-12	-10	-8
Bends in cowl			2			0	0	-2	-4	-6	-6	-6	-6
Directivity at outlet		EPA 207-1(1994)				-2	-4	-5	-6	-7	-8	-8	-9
Screening from roof edge						-5	-5	-5	-5	-5	-5	-5	-5
Distance attenuation	hemi	Distance:	60			-44	-44	-44	-44	-44	-44	-44	-44
					28	31	43	27	18	10	6	4	-1
<u>To church</u>													
Fan Lw						76	90	83	80	77	73	71	64
Attenuator to supply		LDK 70				-2	-5	-7	-19	-24	-23	-15	-10
Bend			1			0	0	-1	-2	-3	-3	-3	-3
Filter						-1	-2	-2	-3	-3	-4	-4	-5
Weather louvre						-2	-2	-2	-2	-3	-3	-3	-3
Directivity at inlet		CIBSE 60deg1m2				-3	-2	-2	-2	0	0	0	0
Distance attenuation	hemi	Distance:	18			-33	-33	-33	-33	-33	-33	-33	-33
					32	35	46	35	19	11	7	13	10
Attenuation through small louvre						-2	-2	-3	-3	-4	-4	-5	-5
Area correction		Area	0.5			-3	-3	-3	-3	-3	-3	-3	-3
		Volume	1500		RT	2	2	1.5	1.5	1.5	1	1	1
Internal contribution from nearest ventilation windows					11	15	26	13	-3	-12	-18	-13	-16





APPENDIX 4 Acoustic Terminology



Environmental Noise

Environmental noise is normally described in terms of the single figure A-weighted sound pressure level, in decibels (dB). The A-weighting corresponds to the frequency sensitivity of the ear and, therefore, provides an approximation to the subjective response to sound at different frequencies. When a sound level is expressed in this way, the units can be denoted dB(A).

When sound is time varying, it is convenient to express the sound level using an indicator, or descriptor that takes account of this variation. Two types of indicator are in common use, the equivalent continuous sound level and the statistical indicators.

Equivalent continuous sound level

$L_{Aeq, T}$: This indicator provides the overall noise exposure to time varying sound and is the energy average of the sound over a specified time period. It is the notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound over the same period. It is denoted $L_{eq, T}$, or, if A-weighted, $L_{Aeq, T}$, where T is the time period of interest.

Statistical indicators

The statistical indicators are also single figure descriptors, but provide additional information on the temporal variation of the noise level with time. The indicators are expressed as the sound level exceeded for a specified percentage of the time period of interest and the most commonly used are described below:

$L_{A90, T}$: the A-weighted noise level exceeded for 90% of the time period T. This indicator is representative of the noise level occurring in the absence of short-term events and is used in the UK to represent the background noise level.

$L_{Amax, T}$: the maximum A-weighted noise level that occurred during the time period T. It usually includes an additional subscript, slow (s) or fast (f), ie $L_{Amax, slow, T}$ or $L_{Amax, fast, T}$ which denotes the response time used in the analysis algorithm. The fast response tracks the maximum level of a rapidly changing sound more accurately than the slow response and the value is generally higher for impulsive or transient sounds.

$L_{Amin, T}$: the minimum A-weighted sound level occurring in the time period T, expressed in a similar way to the $L_{Amax, T}$.



Definition of terms used in BS 4142

Specific sound source

The sound source under investigation for assessing the likelihood of complaints.

Reference time interval, T_r

The specified interval over which an equivalent continuous A-weighted sound pressure level is determined. This is 1 hour during the day from 07:00 to 23:00 and 15 min from 23:00 to 07:00.

Specific sound level, $L_s = L_{Aeq, T_r}$

The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific sound source over a given reference time interval.

Measurement time interval, T_m

The total time over which measurements are taken.

Rating level, L_{Ar, T_r}

The Specific sound level plus any adjustment for the characteristic features of the sound.

Ambient sound level $L_a = L_{Aeq, T}$

Totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far, at the assessment location over a given time interval, T.

Residual sound

The ambient sound remaining at the assessment location when the specific sound source is suppressed to a degree such that it does not contribute to the ambient sound.

Residual sound level, $L_r = L_{Aeq, T_r}$

The equivalent continuous A-weighted sound pressure level of the residual sound, at the assessment location over a given time interval, T.

Background sound level, $L_{A90, T}$

The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting, F, and quoted to the nearest whole number of decibels.