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Town and Country Planning General Regulations 1992**

Noise Report of Michael Sugiura
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(Ref: 455/15)

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Executive Summary

Noise measurement surveys have established ambient and background noise levels in the vicinity of the proposed potential noise sensitive rooms at the application site.

Road traffic comprises the principal source of environmental noise in the vicinity to the front elevation of the building. Initial predictions of the sound insulation performance of the building façade overlooking Blagrove Street has assumed the proposed scheme as shown on the application drawings.

To achieve a target “good” internal noise level of 30 $L_{Aeq, T}$ for dwellings inside bedrooms, 35 $L_{Aeq, T}$ living rooms the design for the windows should incorporate glazing and ventilation specifications shown in Appendix 6. The single figure weighted noise reduction R'_w for glazing 10/12/16.8 laminate or equivalent is 45 dB (windows with a direct line of sight of Blagrove Street, for glazing 6/12/10 38 dB (windows on the rear elevation) respectively to allow a little flexibility for site conditions and internal layout.

Sound levels inside the dwellings incorporating these window specifications would ensure that a good standard of internal amenity could be achieved in terms of the criterion in BS 8233 1999 (Ref.3).

Taking into account the existing road traffic and mixed sources of mechanical plant, and late night activity noise levels at the site we do not anticipate they're being a problem achieving this standard. Consequently, extraneous noise levels will have no impact on the internal amenity of future occupiers as required by the Local Planning Authority.

1. Introduction

Michael Sugiura Limited have been commissioned by David Clarke Associates to carry out a noise assessment on behalf of Mr Murli Bhatti for the proposed development of additional bed and breakfast accommodation at 7 Blagrove Street.

The purpose of this noise assessment is to assess external noise levels impacting on the facades of 7 Blagrove Street from road traffic and noise sources associated with neighbouring licensed premises on the proposed new accommodation.

The noise assessment is in relation to the likely impacts of noise arising from environmental noise sources comprising road traffic, late night activity and mechanical plant in close proximity to the application site.

In Section 2 I briefly explain the nature, measurement and effect of noise and Section 3 reviews National Noise Policy and Assessment Criteria, the noise standards, which may be appropriate and discusses the requirements of Reading Borough Council (RBC) Environmental Health Authority.

In Section 4 I briefly describe the site and noise surveys of existing conditions that I carried out in November 2015. This report in Section 5 examines the likely implications for noise levels at the façades of the proposed residential units from road traffic, late night activity and from noise generated by existing mechanical plant. Section 6 outlines suggested mitigation of external noise levels. In Section 7 I present conclusions on effects of noise on the proposed residential amenity.

Definitions of the noise units used in this report are in Appendix 1 – Glossary of Terms.

2. The Nature, Measurement and Effect of Noise

Noise is often defined as sound that is undesired by the recipient. Whilst it is impossible to measure nuisance caused by noise directly, it is possible to measure the loudness of that noise. 'Loudness' is related to both sound pressure and frequency, both of which can be measured. The human ear is sensitive to a wide range of sound levels. The sound pressure level of the threshold of pain is over a million times that of the quietest audible sound. In order to reduce the relative magnitudes of the numbers involved, a logarithmic scale of decibels (dB) is normally used, based on a reference level of the lowest audible sound.

The response of the human ear is not constant over all frequencies. It is therefore usual to weight the measured frequencies to approximate the human response. The resulting 'A' weighted decibel, dB (A), has been shown to correlate closely to the subjective human response.

When related to changes in noise, a change of ten decibels from say 60 dB (A) to 70 dB (A) would represent a doubling in 'loudness'. Similarly, a decrease in noise from 70 dB (A) to 60 dB (A) would represent a halving in 'loudness'. A change of 3 dB (A) is generally considered to be just perceptible¹. **Table 2.1** details typical noise levels. An acoustic glossary is provided in **Appendix 1**.

Table 2.1: Typical Noise Levels

Approximate Noise Level (dB(A))	Example
0	Limit of hearing
30	Rural area at night
40	Library
50	Quiet office
60	Normal conversation at 1 m
70	In car noise without radio
80	Household vacuum cleaner at 1 m
100	Pneumatic drill at 1 m
120	Threshold of pain

¹ Communities & Local Government (1994). Planning Policy Guidance 24: Planning & Noise.

3. Noise Policy and Assessment Criteria

3.1 National Planning Policy Framework

The new National Planning Policy Framework (NPPF) (Ref.1) released in March 2012 has replaced the Planning Policy Guidance which previously covered planning and pollution control and new development in England. The purpose of the planning system is to contribute to the achievement of sustainable development. There are three dimensions to sustainable development: economic, social and environmental. The environmental role is to contribute to protecting and enhancing our natural, built and historic environment; and as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate to adapt to climate change including moving to a low carbon economy.

One of the core planning principles is to contribute to conserving and enhancing the natural environment and reducing pollution. Allocations of land for development should prefer land of lesser value, where consistent with other policies in the Framework. The planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.

Paragraph 123 of the NPPF (Ref.1) states that planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts (see Explanatory Note to the Noise Policy Statement for England (DEFRA)) (Ref.2) on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum other adverse impacts (see Explanatory Note to the Noise Policy Statement for England (DEFRA)) on health and quality of life arising from noise from new development, including through the use of conditions;
- Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land use since they were established (Subject to the provisions of the Environmental Protection Act 1990 and other relevant law); and
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

Planning Policy Guidance Note 24 'Planning and Noise' (PPG 24) was previously the main guidance document with respect to acceptable noise levels for dwellings (now revoked by NPPF).

3.2 Noise Policy Statement England (NPSE)

The Noise Policy Statement for England (NPSE) (Ref.2) was developed by DEFRA and published in March 2010. The vision of the NPSE is to *'Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development.'*

The NPSE aims to *'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'*

3.3 Reading Borough Council

Reading Borough Council (RBC) Core Strategy was adopted in January 2008 with alteration adopted in January 2015 (Ref.3). The Plan sets out the Council's policies for guiding and controlling the way that buildings and land are used and developed. The Local Plan in general states that when the proposed development is the generator of noise, RBC will require the applicant to demonstrate that any noise impacts can be successfully mitigated and where the occupiers of the new B&B accommodation would not be affected by unreasonable levels of environmental noise and where development would be physically integrated with the existing development and respect the character, amenity and outlook of existing properties.

Reading Borough Council (RBC) Local Planning Authority (LPA) validation checklist of the planning application pre application advice seeks information and reassurance on the impact of noise pollution issues for users of the proposed B&B accommodation specifically noise from road traffic (buses, delivery/refuse vehicles throughout the night, late night activity in the City Centre together with any other sources of noise for example air handling plant identified as part of the assessment process. Late night activity refers generally to night time noise attributable to licensed premises that operate until late. Reading Borough Council recommended that the likelihood of music and patron noise from such premises in the evening and early hours of the morning is taken into account as part of the character of the area when undertaking noise surveys or assessments for future development in the area.

Reading Borough Council require an acoustic report to show that the internal noise levels within any residential use at the property will be compliant with the requirements of the Council's Local Development Framework (LDF) Core Strategy (Adopted 2008 amended 2015) (Ref.3) and the Council's Environmental Statement for Sites and Detailed Policies Document SDPD (Adopted 2012) DM4 Safeguarding Amenity (Ref.4).

Reading Borough Council (RBC) has adopted in their environmental policies the noise criterion shown below.

Residential developments that will be exposed to high levels of existing noise will require design, features and sound insulation to enable residents to be protected from such external noise. These should be designed to enable the following BS 8233:1999 (Ref.5) and its replacement BS 8233:2014 (Ref.6) and WHO guideline levels (Ref.7) to be met in all residential developments:

- a) Living rooms: Upper limit (reasonable) <40 dB daytime (07:00hrs-23:00hrs), Design criteria (good) <30dB to prevent interference of speech and moderate annoyance
- b) Bedrooms: Upper limit (reasonable) <35 dB, Design criteria (good) <30 dB, night time (23:00hrs-07:00hrs), 45 dBL_{Amax} to prevent sleep disturbance
- c) Gardens and balconies Upper limit (reasonable) <55 dB, Design criteria (good) <50dB

For new build, RBC expect that the design will meet the 'good' standard. Where a building is being renovated and/or is listed, the 'reasonable' standard might be acceptable where the 'good' standard cannot be met.

Where proposed residential development would be subject to high levels of noise from mixed sources examples of conditions below would be imposed to ensure that the development incorporates effective protection against noise.

3.4 British Standard BS 8233

BS 8233: 1999 Sound Insulation and Noise Reduction for Buildings – Code of Practice (Ref.5) and its replacement BS 8233 Guidance on Sound Insulation and Noise Reduction for Buildings (Ref.6) has a number of design criteria and limits for intrusive external noise. The guidelines are designed to achieve reasonable resting/sleeping conditions in bedrooms and good listening conditions in other rooms. Those most appropriate to the residential environment are reproduced in **Table 3.1**.

Table 3.1: Summary of Internal Noise Criteria: BS 8233:1999

Criterion	Typical situations	Good Level $L_{Aeq,T}$	Reasonable Level $L_{Aeq,T}$	Reasonable Peak L_{Amax}
BS 8233:1999 Reasonable resting/sleeping conditions	Living rooms	30	40	-
	Bedrooms	30	35	45

3.5 World Health Organisation Guidelines for Community Noise

The World Health Organisation (WHO) (Ref.7) has developed guidelines designed to minimise the adverse effects of noise. The guidelines relevant to residential noise exposure are detailed in **Table 3.2**. For each specific environment the stated noise levels are the maximum noise levels to avoid the health effect noted.

Table 3.2: WHO Community Noise Guideline Values

Specific Environment	Critical health effect(s)	L _{Aeq} dB	Time Base (hours)	L _{Amax} (fast) dB
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60
Hospital, ward rooms, indoors	Sleep disturbance, night time	30	8	40
	Sleep disturbance, daytime and evenings	30	16	-

3.6 Noise Impact Matrix

The Noise Impact Matrix defines a set of parameters from which the magnitude of the impact of noise as a result of the development, on surrounding sensitive receptors, can be categorised. The Noise Impact Matrix parameters have been derived from guidance provided in BS 8233 (Ref.6) and the WHO guidelines (Ref.7).

The criteria used to determine the sensitivity of a receptor is given in **Table 3.3** below. In producing this criteria it is assumed that all buildings are naturally ventilated via partially open windows, giving 15 dB (A) of noise reduction from outside to inside. This is considered to represent a worst-case scenario.

Table 3.3: Sensitivity of receptor to noise

	High	Medium	Low	Negligible
Humans	Receptors of greatest sensitivity to noise such as World Heritage Sites and churches	Noise sensitive receptors such as dwellings, hospitals, schools, places of quiet recreation and places of recognised tranquillity	Receptors with some sensitivity to noise such as offices, other workplaces and play areas	Receptors of very low sensitivity to noise or marginal to the zone of influence of the proposals

The magnitude of the change in noise levels is considered using the criteria outlined in **Table 3.4** below. The relative and absolute changes are considered in parallel and the worst case taken. The relative levels are reproduced from the semantic scale found in the Department of Transport's 'Design Manual for Roads and Bridges' guidance document (Ref.8). The absolute noise levels are with reference to the recommendations for dwellings made in the World Health Organisation's 1999: Guidelines for Community Noise (Ref.7) and in BS 8233:2014 'Sound insulation and noise reduction for buildings (Ref.6).

Table 3.4: Magnitude of change in noise levels

	Large	Medium	Small	Negligible
Relative change	Greater than 10 dB(A) change in sound level	5 to 9.9 dB(A) change in sound level	3 to 4.9 dB(A) change in sound level	2.9 dB(A) or less change in sound level
Absolute change – Adverse daytime	If $b < 50$ dB $L_{Aeq,16hr}$ and $f \geq 55$ dB $L_{Aeq,16hr}$ If f triggers entitlement to statutory sound insulation	If $b < 50$ dB $L_{Aeq,16hr}$ and $50 \leq f < 55$ dB $L_{Aeq,16hr}$ If $50 \leq b < 55$ dB $L_{Aeq,16hr}$ and $f \geq 55$ dB $L_{Aeq,16hr}$		
Absolute change – Adverse night-time	If $b < 45$ dB $L_{Aeq,16hr}$ and $f \geq 45$ dB $L_{Aeq,16hr}$ If $b < 60$ dB L_{Amax} and $f \geq 60$ dB L_{Amax} If $b \geq 60$ dB L_{Amax} but does not exceed 85 dB L_{Amax} more than twice in a one hour period and $f \geq 85$ dB L_{Amax} more than twice in a one hour period	If $b > 85$ dB L_{Amax} though not regularly and f exceeds 85 dB L_{Amax} more than twice in any one hour period		
Absolute change – Beneficial daytime	If $b \geq 55$ dB $L_{Aeq,16hr}$ and $f < 50$ dB $L_{Aeq,16hr}$	If $50 \leq b < 55$ dB $L_{Aeq,16hr}$ and $f < 55$ dB $L_{Aeq,16hr}$ If $b \geq 55$ dB $L_{Aeq,16hr}$ and $50 \leq f < 55$ dB $L_{Aeq,16hr}$		
Absolute change – Beneficial night-time	If $b \geq 45$ dB $L_{Aeq,16hr}$ and $f < 45$ dB $L_{Aeq,16hr}$ If $b \geq 60$ dB L_{Amax} and $f < 60$ dB L_{Amax}			

Note: “b” denotes for the existing or future baseline noise levels and “f” stands for the predicted future noise levels.

Finally to determine the overall noise impact the magnitude and sensitivity criteria are combined into a Degree of Effect matrix as shown in **Table 3.5** below, with the corresponding descriptors in **Table 3.6**.

Table 3.5: Degree of Effect Matrix

		Importance/sensitivity of receptor			
		High	Medium	Low	Negligible
Magnitude/scale of change	Large	Very Substantial	Substantial	Moderate	None
	Medium	Substantial	Substantial	Moderate	None
	Small	Moderate	Moderate	Slight	None
	Negligible	None	None	None	None

Table 3.6: Degree of Effect Matrix Descriptors

Very Substantial	Greater than 10 dB L_{Aeq} change in sound level perceived at a receptor of great sensitivity to noise
Substantial	Greater than 5 dB L_{Aeq} change in sound level at a noise sensitive receptor, or a 5 to 9.9 dB L_{Aeq} change in sound level at a receptor of great sensitivity to noise
Moderate	A 3 to 4.9 dB L_{Aeq} change in sound level at a sensitive or highly sensitive noise receptor, or a greater than 5 dB L_{Aeq} change in sound level at a receptor of some sensitivity
Slight	A 3 to 4.9 dB L_{Aeq} change in sound level at a receptor of some sensitivity
None/Not Significant	Less than 2.9 dB L_{Aeq} change in sound level and/or all receptors are of negligible sensitivity to noise or marginal to the zone of influence of the proposals

4. Baseline Noise climate

The noise climate in this Town Centre site is dominated by road traffic noise because of its close proximity to Blagrove Street and to the local highway network.

No. 7 Blagrove Street is opposite the Town Hall Museum and La Baguette's B&B comprises a café on the ground floor and B&B accommodation above. This A3 use and other commercial and retail uses in the locality all contribute to the vibrant mixed use character of Reading centre and its ambient noise climate throughout the day, evening and night. The site is approximately 5 minutes walking from Reading Station and 25m from a main bus route from the station.

To a lesser or greater extent in comparison to transportation noise sources the site is also affected by noise generated from various items of mechanical plant for internal processes including heating, kitchen extract and ventilation plant serving adjoining premises in the locality. There is also use of the rear areas of adjoining licensed premises for external outside spaces and smoking areas in common with similar commercial development in the Reading City Centre.

In order to determine the extent to which 7 Blagrove Street is currently affected by noise pollution noise measurement surveys have been carried out at the site. Noise measurements have been carried out in order to characterise the ambient noise climate for the daytime, evening and night-time periods. Noise measurement procedures were in accordance with BS 7445:2003 "Description and Measurement of Environmental Noise (Ref.9).

This baseline noise measurement information forms the basis of the acoustic analysis.

4.1 Semi-Permanent Noise Monitoring at rear of 7 Blagrove Street

Unattended automatic environmental noise measurement equipment was installed on the flat roof outside Room 23 on the 1st floor of the B&B, with weather protected microphone at the rear elevation of the building (MP1) approximately 4m above local ground pre-set to record noise levels every 15 minutes continuously for 24hrs on Friday 13th November 2015.

The noise measurements utilised a Rion NA-27 Type 1 Precision Sound Level Meter, which holds a current certificate of calibration. Before and after the measurement period the equipment was calibrated in order to ensure that the equipment had remained within reasonable calibration limits (+/- 0.5 dB).

The weather was dry, mild and cloudy with some showers prior to the commencement of the survey, light wind (<5 m/s) and a temperature of between 6°C - 11°C.

This 24hrs survey monitored noise arising from late night activity night activities from the neighbouring licensed premises. The licensed premises in close proximity to the rear of 7 Blagrove Street are O'Neil's (PH), Match Box, Walkabout, and Yates Wine Bar.

Premises/Location	Opening Times	Premises/Location	Opening Times
Walkabout/ Wiston Terrace off Friar Street RG1 1DG	12:00 – 02:00 Mon-Thurs 12:00-03:00 Fri 12:00-00:30 Sun	O'Neill's/4Friar Street RG1 1DB	09:00-00:00
Yates Wine Bar/The Former Post Office, Friar Street RG1 1DB	10:00-00:00 Mon, Thurs 10:00-23:00 Tues 10:00-02:30 Sat 10:00-22:30 Sun	Match Box/5-6 Friar Street RG1 1DB	22:00 –late Mon 17:00-late Thurs. – Sat Private Hire Tue, Wed, Sun

The full results of “free-field” noise levels from the semi-permanent noise monitoring position are shown in **Appendix 2 and Chart 1**.

During site attendance on 14th November 2015 a number of external satellite noise monitoring positions (MP3 and MP4) were established on the site in order to establish ambient noise levels from mechanical plant.

Noise measurements were recorded of the outdoor plant serving the neighbouring A3 uses outside the plane of a partially open window and on the existing FF roof to ascertain the contribution of the various ventilation plant and other equipment in situ. Noise measurements of existing conditions were also recorded inside the existing bedrooms with windows open and closed. The full results are detailed in Appendix 3.

The satellite noise monitoring utilised a Norsonic 140 Type 1 Precision Sound Level Meter and noise monitoring positions are shown on site layout plan in Figure 1. **Table 4.1** below summarises the noise levels measured at the rear of the B&B property. Full results are presented in **Appendix 3**.

Table 4.1: Noise Levels inside Room 22 and Room 23 at rear of B&B

Location	Time	L _{Aeq,10mins}	L _{A90,10mins} (dB)
Inside Room 22, top window fully open	10:51	46	42
Inside Room 22, top window part open	11:04	42	28
Inside Room 22, windows closed	11:19	33	27
Inside Room 23, top window part open (music)	11:24	40	37
Outside Room 22 (plant noise)	11:35	56	55
Outside Room 23 (music noise)	11:40	58	57

4.2 Semi-Permanent Noise Monitoring overlooking Blagrove Street

A survey of existing baseline conditions was carried out on Monday 16th November 2015. The weather was dry, mild and cloudy and a temperature of between 12°C - 15°C. Noise levels were continuously recorded between 11:30 on Monday 16th November to 12 noon on Tuesday 17th November in order to characterise the local noise climate on the Blagrove Street.

The unattended automatic environmental noise measurement equipment was installed inside Room 20 on the 1st floor, with weather protected microphone approximately 4m above local ground 1.0m outside the Blagrove Street elevation of the building location MP2 pre-set to record noise levels every 15 minutes continuously for 24hrs.

At location MP2 the noise climate was dominated by road traffic noise from Blagrove Street and Valpy Street. The noise monitoring position is shown on a site layout plan in Figure 1.

The full results of Blagrove Street “façade” noise levels from the semi-permanent noise monitoring position are shown in **Appendix 4 and Chart 2**.

Table 4.2: Noise Levels inside Room No. 20 overlooking Blagrove Street

Location	Time	L _{Aeq,5mins}	L _{A90,5mins} (dB)
Inside Room 20, secondary glazing outside window part open	10:20	30	27
Inside Room 20, secondary glazing open	10:28	30	35
Outside Room 20, plane of window	10:34	66	60

5. Results

5.1 Road Traffic Noise at Front Façade of 7 Blagrove Street

The results show that $L_{A10, 18hr}$ traffic noise levels “facade” at 7 Blagrove Street measured is 74 dB(A) based on current day traffic flows

The conversion for L_{A10} (18hr) to L_{Aeq} (16hr) is -2dB.

The estimated façade $L_{Aeq, 16h}$ at 7 Blagrove Street are representative of typical conditions daytime $L_{Aeq, 16h}$ (07:00 – 23:00 hours) 72 dB(A) and Night-time (23:00 -07:00 hours) 76 dB(A).

Road traffic does not constrain the development due to the alignment of Blagrove Street and Valpy Street and distance from the proposed B&B rooms.

5.2 External Noise Levels at Rear of 7 Blagrove Street

At the rear of the building (mp1) daytime background noise levels L_{A90} were consistently measured in the range 54 to 58 dB (A) during 07:00 to 18:00.

Background $L_{A90, 15mins}$ noise levels were measured in the range 59 to 64 dB(A) during the evening 19:00 - 22:00 and were recorded in the range 61 to 70 dB (A) during night time 23:00-03:00 the terminal hour of some of the neighbouring licensed premises.

It was noted that during 23:00 - 03:00 hours higher background and ambient noise levels were recorded than the evening period and this is attributed to the use of an external rear heated outdoors space by patrons of the nearby Walkabout, and other licensed premises outdoors smoking areas.

The lowest $L_{A90, 15mins}$ background noise levels at the rear of the building (mp1) were in the range 54 to 55dB(A) after 03:00 up to 07:00 hours.

The mechanical plant of neighbouring premises would have being selected as low noise emission plant to meet the requirements of the Local Planning Authority. The outdoor equipment is partially screened by the adjoining building (O'Neill's) and their location and distance from the closest potential noise sensitive B&B rooms at 7 Blagrove Street. This ensures that the minimum of noise is transmitted to the property. Under actual operating conditions the performance of the plant produce very low levels of noise to atmosphere.

L_{max} noise levels at the rear of 7 Blagrove Street occasionally exceed 80dB during the late evening and night time extended licensing hours 23:00-03:00.

Table 5.1: Summary of External Noise Levels

Location	Daytime (07:00-23:00)	Night time (23:00-07:00)
Front facade	72	76
Rear	62	68

5.3 Late Night Activity Noise

In general, noise is considered an important consideration for Entertainment premises where one of the four licensing objectives of the Licensing Act 2003 is 'prevention of public nuisance'. Proposed noise control measures are required to be included in an application for a premises licence.

Conditions relating to noise are usually attached to an existing or a new licence that address controls on noise, particularly the prevention of public nuisance. If a premises is located in a residential area or adjoining a premises, tighter controls on noise may need to be implemented particularly if the premises is operating after 23:00. Conditions can attached to the licence on the control of noise from amplified music, noise from smokers congregating outside licensed premises, outdoors spaces, and problem patrons.

Breaching the conditions of a licence is an offence under the Licensing Act 2003, for which the Licensing Authority may prosecute, or interested parties including the Council or local residents can call for a review of the premises licence. This may result in additional conditions being added to a licence, or the licence being suspended or even revoked in serious cases.

The Council can also take action under the Statutory Nuisance provisions of the Environmental Protection Act 1990. If noise amounting to a Statutory nuisance is witnessed then an Abatement notice will be served and failure to comply with an Abatement Notice is a criminal offence.

5.4 Noise Level inside a Room

An initial calculation of noise level inside a room has assumed the form of construction as follows: Block plus cavity plus block. The finishing either brick cladding, wooden cladding or render. Insulated glass unit, sound attenuated ventilator. The calculation makes assumptions and it is likely that the estimated levels differ from measured values.

Consideration of the required façade acoustic performance is based upon achieving internal noise levels as advised in British Standard BS 8233:2014 (Ref.7). The guidance in BS 8233 sets out maximum daytime and night time internal noise levels as indicated below.

Table 5.2: Summary of Internal Noise Criteria: BS 8233:2014

Period	Noise Criterion
Daytime (07:00-23:00) Living/dining rooms	35 dB LAeq,16hr
Night time (23:00-07:00) Bedrooms	30dB LAeq,8h

It should be noted that BS 8233:2014 no longer advises on a specific L_{Amax} internal noise criterion but comments that “A guideline value may be set in terms of SEL or L_{Amax} , depending on the character and number of events per night”.

Typically facades are designed to control break in noise to no more than 45 dB L_{Amax} within bedrooms. For the purposes of this assessment this internal noise criterion has been used as a basis for glazing and ventilation specification where appropriate.

Glazing and ventilator acoustic performance requirements have been suggested and are set out in Appendix 4.

6 Conclusions

This noise assessment has considered existing noise levels at 7 Blagrave Street, Reading.

The site is capable of residential development that will meet the requirements of Reading Borough Council the Local Planning Authority and the scheme will be in accordance with National Planning Policy Framework (NPPF) paragraph 123 (Ref.1) and Noise Policy Statement for England (NPSE) (Ref.2).

Residential noise standards can be met in line with the latest technical advice. Internal noise criteria as set out in BS 8233:2014 Sound Insulation and Noise Reduction for Buildings will be achieved (Ref.6).

The Master plan makes good use of the internal layout of the proposed B&B residential units to minimise the effect of external noise on the amenity of future residents.

This assessment of the likely levels of noise at the residential facades has further considered the expected façade acoustic performance based on achieving internal levels as advised in BS 8233:2014 (Ref.6).

The internal noise levels are subject to overall insulation provided by the façade and glazing and ventilator acoustic performance requirements including construction detailing, window specification etc.

The window frame system must provide no less sound insulation than the glazing.

A night time maximum noise level 45dB for bedrooms should be achieved to maintain consistency with earlier standards.

References

1. National Planning Policy Framework
2. Noise Policy Statement England March 2010
3. Reading Borough Council Core Strategy January 2008 with alteration adopted January 2015
4. Reading Borough Council's Environmental Statement for Sites and Detailed Policies Document SDPD (Adopted 2012) DM4 Safeguarding Amenity
5. BS 8233:1999 Sound Insulation and Noise Reduction for Buildings – Code of Practice
6. BS 8233:2014 Sound Insulation and Noise Reduction for Buildings
7. World Health Organisation "Guidelines for Community Noise" 1999
8. Department of Transport 'Design Manual for Roads and Bridges' Guidance Document
9. BS7445: 2003 Description and Measurement of Environmental Noise Parts 1-3
10. Department of Transport Welsh Office Calculation of Road Traffic Noise CRTN 1988

Appendix 1: Glossary of Terms

Term	Description
'A'-Weighting	<i>This is the main way of adjusting measured sound pressure levels to take into account human hearing, and our uneven frequency response.</i>
Decibel (dB)	<i>This is a tenth (deci) of a bel. The decibel can be a measure of the magnitude of sound, changes in sound level and a measure of sound insulation. Decibels are not an absolute unit of measurement but are an expression of ratio between two quantities expressed in logarithmic form.</i>
$L_{Aeq,T}$	<i>The equivalent steady sound level in dB containing the same acoustic energy as the actual fluctuating sound level over the given period, T. T may be as short as 1 second when used to describe a single event, or as long as 24 hours when used to describe the noise climate at a specified location. $L_{Aeq,T}$ can be measured directly with an integrating sound level meter.</i>
L_{A10}	<i>The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 10 per cent of a given time and is the L_{A10T}. The L_{A10} is used to describe the levels of road traffic noise at a particular location.</i>
L_{A50}	<i>The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 50 per cent of a given time and is the L_{A50T}.</i>
L_{A90}	<i>The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 90 per cent of a given time and is the L_{A90T}. The L_{A90} is used to describe the background noise levels at a particular location.</i>
L_{Amax}	<i>The 'A'-weighted maximum sound pressure level measured over a measurement period.</i>

Appendix 2: Semi-Permanent Location Noise Measurements - Rear of Site (MP1)

Name: M S Sugiura M-Time: 15 min
Date of survey: 13/11/2015 Measurement mode: Lx
Location: 7 Blagrove Street-rear Lmax/Lmin type: AP
Instrument: NA-27 F-weight (Main) : A
Store mode: Auto store F-weight (Sub) : A
1
Description: Ambient noise levels T-weight (Main) : Fast

Time	Lmax	Leq	L1	L10	L90
12:45:54	74.0	58.6	63.0	59.6	57.5
13:00:54	71.7	59.1	62.2	60.2	57.9
13:15:54	64.3	57.1	60.3	58.1	56.0
13:30:54	71.4	58.4	61.1	59.3	57.5
13:45:54	83.5	58.7	62.9	59.6	57.0
14:00:54	62.6	56.8	58.4	57.6	56.2
14:15:54	70.0	57.5	59.7	58.6	56.6
14:30:54	70.9	58.0	61.1	58.6	57.4
14:45:54	69.8	58.0	59.8	58.7	57.3
15:00:54	68.5	57.2	59.7	58.3	55.9
15:15:54	69.2	57.8	62.5	58.6	56.8
15:30:54	64.5	57.6	60.2	58.5	56.8
15:45:54	77.9	57.6	61.1	58.5	55.7
16:00:54	70.2	56.5	61.7	57.0	55.5
16:15:54	64.4	57.3	59.0	58.1	56.5
16:30:54	70.9	58.1	62.9	58.5	57.3
16:45:54	69.6	58.3	60.9	59.0	57.5
17:00:54	73.4	58.2	62.7	58.9	57.1
17:15:54	69.6	58.3	63.2	59.3	57.3
17:30:54	69.9	59.0	63.7	60.2	57.6
17:45:54	70.9	60.4	65.1	62.1	58.4
18:00:54	70.6	60.3	64.5	62.0	58.1
18:15:54	75.1	62.7	67.4	64.4	60.6
18:30:54	76.8	62.3	67.3	63.9	60.2
18:45:54	72.4	62.8	67.4	64.7	60.6
19:00:54	71.9	61.8	66.9	63.8	59.4
19:15:54	72.4	62.8	67.7	64.7	60.5
19:30:54	74.0	62.9	68.5	65.1	60.0
19:45:54	80.0	63.1	71.0	64.5	60.2
20:00:54	73.9	61.3	66.7	63.7	58.7
20:15:54	76.4	61.5	71.0	64.3	56.7
20:30:54	77.3	63.6	70.0	66.0	60.1
20:45:54	77.0	63.5	69.5	65.7	60.4
21:00:54	87.2	66.0	72.5	66.6	61.7
21:15:54	78.5	64.2	70.4	66.6	60.6
21:30:54	82.8	65.8	71.1	68.0	62.5
21:45:54	77.3	66.2	70.7	68.2	63.8

22:00:54	75.2	65.6	70.1	67.5	63.3
22:15:54	79.7	68.8	74.5	71.0	65.8
22:30:54	81.4	70.1	75.6	72.2	67.2
22:45:54	80.4	70.5	74.5	72.3	68.3
23:00:54	79.6	71.0	74.9	72.7	69.0
23:15:54	79.1	71.3	74.7	72.8	69.5
23:30:54	83.4	71.7	75.2	73.2	69.7
23:45:54	79.4	71.9	75.3	73.4	70.1
00:00:54	79.6	72.6	75.8	74.2	70.7
00:15:54	82.1	71.0	74.7	72.7	68.7
00:30:54	79.7	71.3	74.9	72.8	69.4
00:45:54	95.1	72.2	76.6	73.2	69.7
01:00:54	79.1	70.5	74.9	72.2	68.5
01:15:54	85.1	72.5	77.4	74.2	70.1
01:30:54	81.1	71.2	75.4	72.9	69.2
01:45:54	78.2	71.5	75.2	73.1	69.7
02:00:54	83.4	70.5	75.2	72.5	67.3
02:15:54	83.2	69.1	74.6	71.1	66.1
02:30:54	77.4	68.5	73.0	70.7	65.7
02:45:54	80.7	70.3	75.1	72.3	67.8
03:00:54	75.5	65.4	70.8	67.8	60.8
03:15:54	68.6	56.7	62.8	57.6	54.9
03:30:54	70.3	56.8	62.1	57.7	54.7
03:45:54	82.6	58.1	66.0	59.2	54.7
04:00:54	78.1	57.7	65.1	58.8	55.0
04:15:54	72.5	55.8	64.2	55.7	54.1
04:30:54	78.8	56.1	61.2	57.2	53.9
04:45:54	68.9	56.0	60.1	57.2	54.3
05:00:54	65.2	54.4	57.1	55.2	53.5
05:15:54	58.4	56.0	57.5	57.1	54.2
05:30:54	68.7	54.4	55.6	55.0	53.8
05:45:54	64.5	56.3	57.9	57.2	54.8
06:00:54	58.6	56.1	57.5	57.1	53.8
06:15:54	59.2	56.0	57.8	57.2	54.2
06:30:54	61.7	55.0	57.4	56.1	54.1
06:45:54	73.2	55.2	58.6	55.8	54.1
07:00:54	64.7	56.4	58.5	57.3	54.7
07:15:54	61.5	54.8	57.6	55.6	54.0
07:30:54	74.7	56.6	62.6	57.9	54.1
07:45:54	65.0	55.2	58.9	56.9	53.5
08:00:54	63.3	55.7	58.1	57.3	54.1
08:15:54	69.1	55.9	59.6	57.1	53.6
08:30:54	64.0	56.5	58.9	57.6	55.0
08:45:54	62.0	57.2	58.9	58.1	55.9
09:00:54	72.8	58.0	63.5	60.2	55.6
09:15:54	67.1	57.2	62.5	58.3	55.8
09:30:54	68.4	58.2	64.6	59.4	56.0
09:45:54	68.0	57.5	62.0	59.0	55.9
10:00:54	66.8	57.5	60.7	58.8	55.8
10:15:54	61.5	56.4	59.0	57.6	55.3

10:30:54	62.7	57.5	60.3	58.5	56.2
10:45:54	63.2	57.4	60.2	58.6	56.0
11:00:54	65.9	57.2	59.8	58.5	55.6
11:15:54	69.9	58.0	65.4	59.6	55.8
11:30:54	73.4	57.3	62.7	58.5	55.7

Appendix 3: Semi-Permanent Location Noise Measurements - Front Façade (MP2)

Name:	M S Sugiura	M-Time:	15 min
Date of measurement:	16/11/2015	Measurement mode:	Lx
Location:	Blagrove Street	Lmax/Lmin type:	AP
Instrument:	NA-27	F-weight (Main) :	A
Store mode:	Auto store 2	F-weight (Sub) :	A
Description:	Ambient noise levels	T-weight (Main) :	Fast

Time	Lmax	Leq	L1	L10	L90
11:30:21	82.7	65.3	74.7	68.6	57.3
11:45:21	79.6	66.0	75.0	69.7	58.0
12:00:21	78.9	66.2	75.2	69.6	58.5
12:15:21	81.8	69.5	77.5	72.3	59.6
12:30:21	97.7	75.1	83.4	73.1	58.4
12:45:21	94.3	71.9	76.5	72.7	60.3
13:00:21	96.4	72.3	77.5	72.8	69.5
13:15:21	98.3	73.8	80.8	70.8	58.2
13:30:21	97.7	73.6	79.7	73.3	61.3
13:45:21	80.5	68.6	75.1	71.9	59.6
14:00:21	97.2	72.9	77.9	71.5	59.4
14:15:21	81.7	70.4	76.9	72.6	63.0
14:30:21	98.7	76.9	88.9	72.6	68.3
14:45:21	80.4	68.5	75.5	71.5	58.1
15:00:21	86.5	70.1	76.9	72.6	62.6
15:15:21	88.2	68.2	76.0	71.5	58.1
15:30:21	79.5	66.7	75.2	70.5	59.0
15:45:21	91.1	66.8	75.4	69.8	59.2
16:00:21	80.0	66.5	76.7	69.8	58.7
16:15:21	80.6	67.0	77.5	70.4	56.3
16:30:21	80.8	66.4	76.8	70.2	57.6
16:45:21	82.3	66.6	76.1	70.3	57.0
17:00:21	79.4	66.5	74.9	70.4	58.3
17:15:21	82.0	66.1	75.5	70.1	56.9
17:30:21	85.6	66.5	76.4	70.0	57.4
17:45:21	80.8	66.4	75.7	70.2	56.9
18:00:21	81.8	65.2	73.6	69.5	55.6
18:15:21	80.3	65.7	74.8	69.5	57.1
18:30:21	81.7	66.7	76.7	70.3	57.4
18:45:21	79.1	66.2	75.1	70.4	55.8
19:00:21	82.0	65.4	74.6	69.5	54.9
19:15:21	79.6	64.7	73.9	68.2	53.6
19:30:21	81.1	65.1	74.9	69.2	54.2
19:45:21	80.2	71.1	76.1	73.0	66.6
20:00:21	86.6	72.5	76.9	73.7	70.2
20:15:21	82.2	73.0	77.2	74.3	72.0
20:30:21	81.8	73.2	76.7	74.0	72.4
20:45:21	82.9	73.4	77.2	74.6	71.8

21:00:21	80.7	74.8	78.0	76.5	72.4
21:15:21	80.7	71.7	77.9	75.5	62.2
21:30:21	85.3	65.8	75.0	68.5	61.0
21:45:21	88.3	65.8	73.7	68.5	61.5
22:00:21	83.6	75.7	81.4	79.8	61.0
22:15:21	83.6	76.6	80.6	78.4	73.7
22:30:21	81.4	75.4	80.3	77.4	64.7
22:45:21	85.7	78.3	82.7	81.3	73.5
23:00:21	83.5	75.2	78.1	76.9	72.7
23:15:21	83.5	75.2	78.0	76.8	72.7
23:30:21	82.2	75.9	78.4	76.9	72.8
23:45:21	80.9	76.2	78.3	77.6	71.9
00:00:21	85.1	77.4	80.6	79.5	71.1
00:15:21	86.8	74.0	81.4	78.9	51.5
00:30:21	86.8	65.1	71.6	67.2	61.5
00:45:21	80.4	67.8	74.5	70.1	65.6
01:00:21	79.1	67.6	74.2	69.8	65.2
01:15:21	74.2	65.8	71.9	67.4	63.3
01:30:21	76.5	67.4	73.7	69.3	64.8
01:45:21	75.7	66.7	72.7	68.2	65.0
02:00:21	75.4	65.2	70.7	67.7	61.0
02:15:21	77.4	63.2	72.2	65.4	50.4
02:30:21	75.7	62.3	72.4	66.6	49.5
02:45:21	79.0	65.4	75.5	69.0	58.2
03:00:21	78.3	64.3	74.9	68.2	50.1
03:15:21	77.6	61.9	74.0	65.4	48.5
03:30:21	77.8	59.4	73.3	61.3	47.0
03:45:21	73.8	57.8	70.3	61.4	46.5
04:00:21	80.9	57.7	70.4	59.1	47.2
04:15:21	81.4	62.9	75.5	65.1	47.2
04:30:21	71.7	55.5	66.6	59.3	47.7
04:45:21	74.7	57.4	70.3	59.5	47.3
05:00:21	78.5	59.8	72.0	62.7	48.8
05:15:21	84.3	62.9	74.6	65.6	48.8
05:30:21	80.4	65.2	76.6	69.5	50.0
05:45:21	84.3	65.2	77.0	68.1	50.5
06:00:21	91.5	65.9	76.2	69.0	52.2
06:15:21	89.2	71.3	80.7	75.7	55.7
06:30:21	83.4	70.8	80.8	77.2	55.6
06:45:21	84.7	67.3	77.1	71.2	53.8
07:00:21	83.5	66.7	76.8	70.7	55.4
07:15:21	87.6	67.5	77.1	71.3	55.7
07:30:21	82.0	67.9	76.7	71.7	57.8
07:45:21	90.8	67.3	76.0	70.5	57.2
08:00:21	79.4	67.8	76.3	71.6	59.9
08:15:21	93.6	69.7	77.8	72.4	62.1
08:30:21	87.9	70.3	77.8	74.1	61.5
08:45:21	90.7	69.5	80.2	71.9	58.9
09:00:21	82.5	71.4	78.2	74.2	61.0

09:15:21	92.5	72.8	78.4	73.7	70.0
09:30:21	84.3	70.3	77.3	72.9	60.7
09:45:21	81.2	70.1	76.8	73.1	61.4
10:00:21	98.0	74.3	81.6	72.9	69.1
10:15:21	82.6	67.3	77.1	70.6	58.7
10:30:21	80.4	66.0	74.9	69.1	60.3

Appendix 4: Glazing and Ventilation Options

Glazing Acoustic Specifications Options

Glazed elements, including all fixed and open able sections, related framework, mullions, transoms and, where applicable furniture, all as are intended within the 7 Blagrove Street front and rear façades, shall provide an airborne sound insulation index rating of not less than those shown below:

Level over base	Example glazing configurations	Acoustic Performance
<base level	4/12/4	R'w 31 dB
+5 dB	4/12/4	R'w 31 dB
+10 dB	4/12/10	R'w 36 dB
+15 dB	6/12/10	R'w 38 dB
+20 dB	10/12/16.8 laminate	R'w 45 dB
+25 dB	16.8/16/12.8 laminate	R'w 51 dB

Performance shall be as measured in accordance with BS EN ISO 10140-2:2010 and rated in accordance with BS EN ISO 717-1:1997, and evidence to this effect shall be published as part of the tender response. Elements as described above shall further offer not less than the minimum airborne sound reduction index (R) when measured in accordance with BS EN ISO 10140-2:2010 shown below:

Glazing Acoustic Performance	Octave band centre frequency (Hz)						
	63	125	250	500	1k	2k	4k
	Sound reduction index (R), dB						
R'w 31 dB	20	24	20	25	35	38	35
R'w 36 dB	21	25	22	33	40	43	44
R'w 38 dB	22	26	27	34	40	38	46
R'w 45 dB	24	28	32	43	46	48	55
R'w 51 dB	25	34	41	47	53	60	68

Ventilation Specification Options

Ventilators, including all fixed and open able sections and related framework, all as are intended to be included within the building, shall provide a weighted element-normalised level difference ($D_{n,e,w}$) of not less than those shown below:

Level over base	Ventilator	Acoustic Performance
<base level	Non-acoustic trickle vent	-
+5 dB	Non-acoustic trickle vent	-
+10 dB	Trickle vent	37 dB $D_{n,e,w}$
+15 dB	Through the wall vent	47 dB $D_{n,e,w}$
+20 dB	Through the wall vent	47 dB $D_{n,e,w}$
+25 dB	Through the wall vent	55 dB $D_{n,e,w}$
+30 dB	Through the wall vent	55 dB $D_{n,e,w}$

Performance shall be as measured in accordance with BS EN 20140-10:1992 and rated in accordance with BS EN ISO 717-1:1997, and evidence to this effect shall be published as part of the tender response.

Elements as described above shall offer not less than the minimum element-normalised level difference ($D_{n,e}$) when measured in accordance with BS EN 20140-10:1992 shown below.

Ventilation Acoustic Performance	Octave band centre frequency (Hz)						
	63	125	250	500	1k	2k	4k
	Element-Normalised Level Difference, $D_{n,e}$ (dB)						
37 dB $D_{n,e,w}$	36	36	37	37	34	37	37
40 dB $D_{n,e,w}$	29	29	28	36	44	44	44
47 dB $D_{n,e,w}$	39	39	34	43	55	60	60
55 dB $D_{n,e,w}$	40	47	46	49	56	66	75

Should laboratory acoustic performance information be unavailable or be unrepresentative for the configurations required, or pre-tender laboratory testing cannot be accommodate within tender submittal and evaluation timescale, the contractors submittal must be supported by third party calculation of sufficient detail to show attenuation contributions arising from framing and suchlike features at tender submittal stage. In this event, the successful tenderer shall be required to promptly undertake laboratory testing and rating to demonstrate conformance of particular test pieces, yet to be selected, with this specification and to make available such substantive evidence to an agreed timescale and at the tenderers cost.

Note: The window frame system must provide no less sound insulation than the glazing – hollow uPVC type frames may not achieve this requirement.

Note: - The 47 dB $D_{n,e,w}$ and the 55 $D_{n,e,w}$ ventilators are high performance through the wall units

Charts

Chart 1 Time Histories of Noise Levels rear of existing building (MP1)

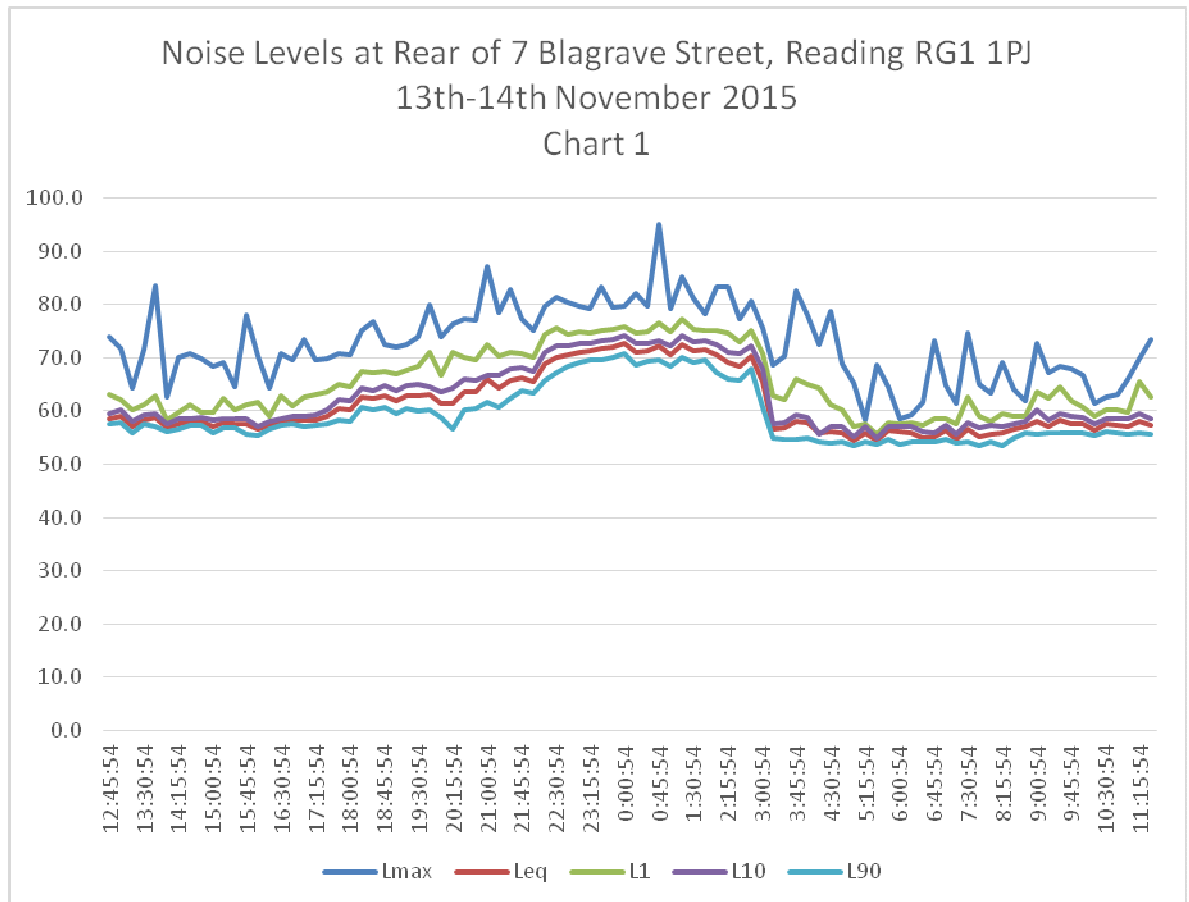
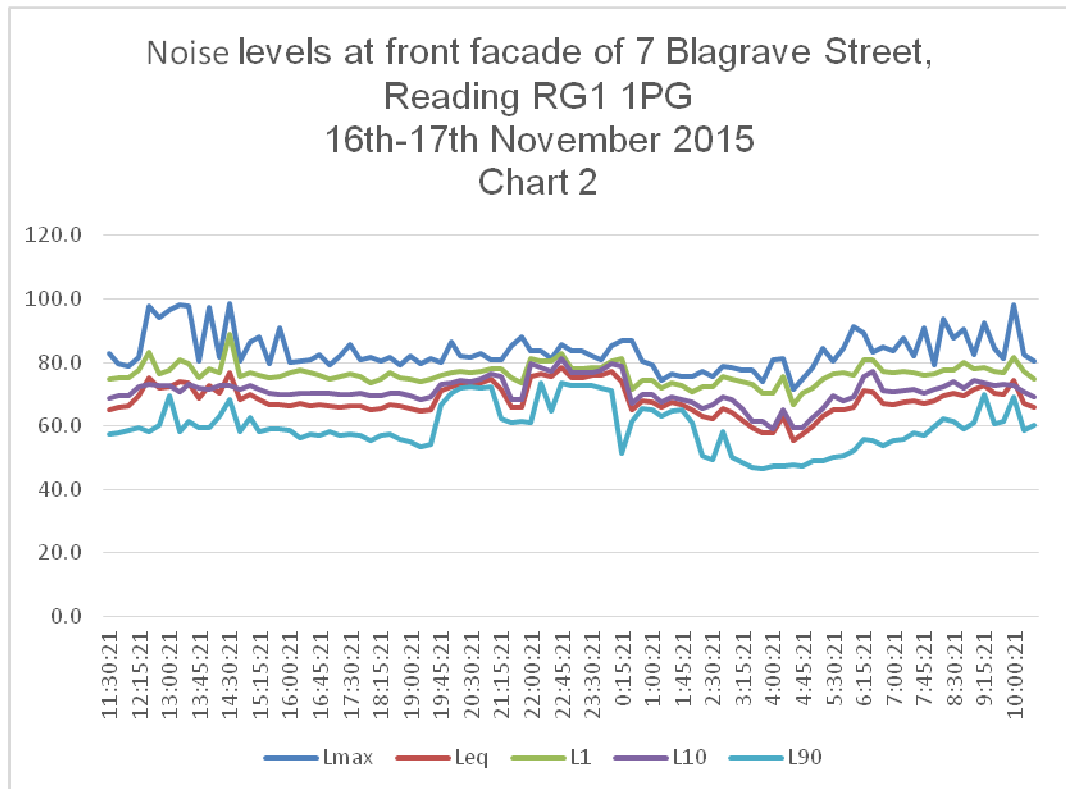


Chart 2 Time Histories of Noise Levels at the front of the site



Figures

Figure 1 Plan showing Noise Survey Measurement Locations