A CAF GROUP COMPANY

ENVIRONMENT

Rygor Commercials Limited

Rygor Spray Booth
Atworth

Noise Impact Assessment

243658

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Noise Impact Assessment

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EXECUTIVE SUMMARY

BWB Consulting has been instructed by Rygor Commercials Limited to undertake a Noise Impact Assessment to support a planning application for the proposed paint spray booth at Unit 3, Atworth Business Park, Atworth .

A baseline noise survey was undertaken from 26th – 29th January 2024 and the subsequent assessment work has been undertaken in accordance with current standards and guidance following consultation with Wiltshire Council.

Noise limits have also been set at nearby noise sensitive receptors using noise data measured during the baseline noise survey.

The assessment shows that with the recommended noise mitigation measure implemented, an appropriate level of protection could be afforded to nearby noise sensitive receptors.

Based on the results of this assessment, it has been demonstrated that noise from building services plant can be controlled in accordance with the national and local planning guidance. It is therefore considered that noise need not be a determining factor in granting planning approval.

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1. INTRODUCTION

Instruction

1.1 BWB Consulting was instructed by Rygor Commercials Limited to undertake a Noise Impact Assessment to support the planning application (ref: PL/2023/10236) for the Installation of a new vehicle spray booth at Unit 3, Atworth Business Park, Atworth(the Site).

1.2 Where appropriate, consideration has been given to noise mitigation measures to demonstrate how an appropriate level of protection could be afforded to existing Noise-Sensitive Receptors (NSRs) located adjacent to the Site.

1.3 This report is necessarily technical in nature, so to assist the reader, a glossary of acoustic terminology can be found in **Appendix A**.

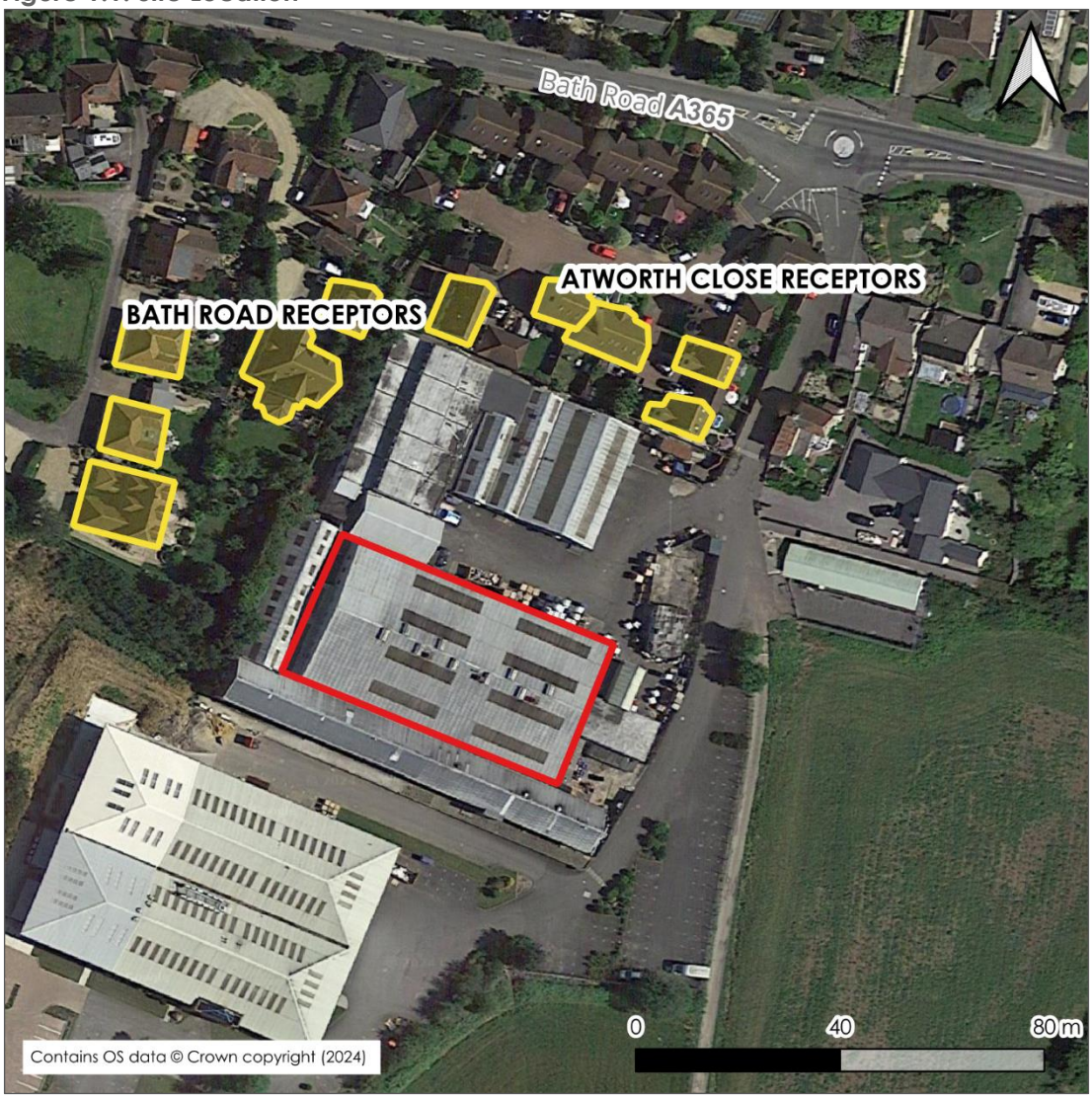
Site Setting

1.4 The Site is located within the administrative boundary of Wiltshire Council and currently comprises an industrial unit at Unit 3, Atworth Business Park, Bath Rd, Atworth, Melksham SN12 8SB. The Site is bound to the north and south by other units in Atworth Business Park with residential properties on Atworth Close situated to the north the units; open fields to the east and residential properties on Bath Road to the west.

1.5 Noise sensitive receptors have been identified as the residential dwellings on Bath Road and Atworth Close.

1.6 The location of the Site, along with the locations of the identified noise sensitive receptors are shown in **Figure 1.1**.

Figure 1.1: Site Location



Proposed Development

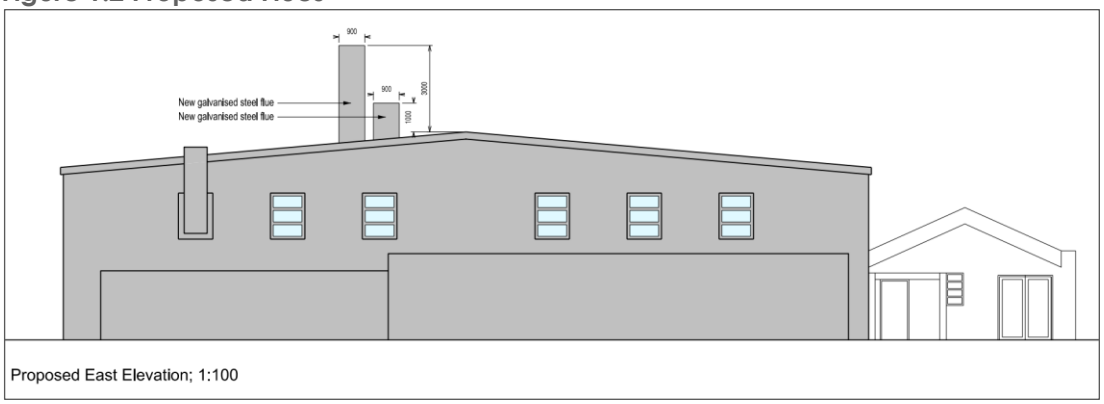
1.7 The development comprises the installation of a new vehicle spray booth within the main workshop/warehouse building with external extract flues.

1.8 Atworth Business Park have restrictions on the operating hours. Businesses can only operate between the following times:

- Mondays – Fridays: 08:00-18:00;
- Saturdays: 08:00-13:00; and
- Will not operate on Sundays and Bank Holidays.

1.9 A plan showing the proposed flues is shown in **Figure 1.2**.

Figure 1.2 Proposed Flues



Taylor Design drawing reference: 6334_203_P3_PROPOSED PLAN AND ELEVATION rev P3

2. STANDARDS AND GUIDANCE

National Planning policy Framework (NPPF)

2.1 Published in December 2023, this document sets out the Government's planning policies for England and supersedes the previous NPPF published in 2021. It makes the following reference to noise in the section entitled Conserving and enhancing the natural environment:

> "*180. Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> *[…]*
>
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."*

2.2 It also makes the following references to noise in the Section entitled *Ground conditions and pollution*:

> "*191. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
>
> *a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life[60];*
>
> *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*
>
> *[69] See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010)."*

BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound

2.3 BS 4142:2014+A1:2019 (BS 4142) describes methods for rating and assessing the following:

- Sound from industrial and manufacturing processes;

- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train movements on or around an industrial and/or commercial site.

2.4 The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes. The Standard advises that the purpose of the methodology should include the assessment of sound from any plant and activities associated with existing industrial and/or commercial uses at proposed or existing residential dwellings.

2.5 If appropriate, the specific sound level of the source ($L_{Aeq,T}$) is corrected by the application of one or more corrections for acoustic features such as tonal qualities and/or distinct impulses, to give a 'rating' level ($L_{Ar,Tr}$). The method compares and rates the difference between the rating level of the specific sound and the typical background sound level ($L_{A90,T}$), measured in the absence of the specific sound.

2.6 The standard confirms that the background sound level can in some circumstances legitimately include industrial and/or commercial sounds that are present in the area, such as noise from existing plant.

2.7 The Standard advises that the time interval ('T') of the background sound measurement should be sufficient to obtain a representative or typical value of the background sound level at the time(s) the source in question operates or is proposed to operate in the future.

2.8 Comparison of the Rating Level to background noise level indicates the significance of the new noise source at the receptor under assessment. If the Rating Level is higher than the background noise level, then there may be an impact:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse 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. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

2.9 In the case of low background noise levels and rating levels, BS4142 advises that absolute levels might be as, or more relevant than the margin by which the rating level exceeds the background. Furthermore, the context which the sound occurs is also important when assessing the possible impact.

Wiltshire Core Strategy

Core Policy 57

2.10 Policy CC11 of the Wiltshire Council Core Strategy, January 2015 has the following planning policy which covers new developments which may impact the amenity of existing uses.

> *Ensuring high quality design and place shaping*
>
> *A high standard of design is required in all new developments, including extensions, alterations, and changes of use of existing buildings. Development is expected to create a strong sense of place through drawing on the local context and being complementary to the locality. Applications for new development must be accompanied by appropriate information to demonstrate how the proposal will make a positive contribution to the character of Wiltshire through:*
>
> *[…]*
>
> *vii. having regard to the compatibility of adjoining buildings and uses, the impact on the amenities of existing occupants, and ensuring that appropriate levels of amenity are achievable within the development itself, including the consideration of privacy, overshadowing, vibration, and pollution (e.g. light intrusion, noise, smoke, fumes, effluent, waste or litter)*

Consultation with Wiltshire Council

2.11 Consultation was undertaken with Wiltshire Council via email on 18th January 2024 outlining the proposed survey and assessment methodologies. The email exchange can be found in **Appendix B**.

2.12 Key requirements for the noise assessment outlined by Wiltshire Council during the consultation were:

- Measurements to be carried out in 15-minute periods.
- Noise from new plant to be controlled to 5dB below the existing background noise level.

2.13 The remainder of the survey methodology presented in this report was agreed during the consultation.

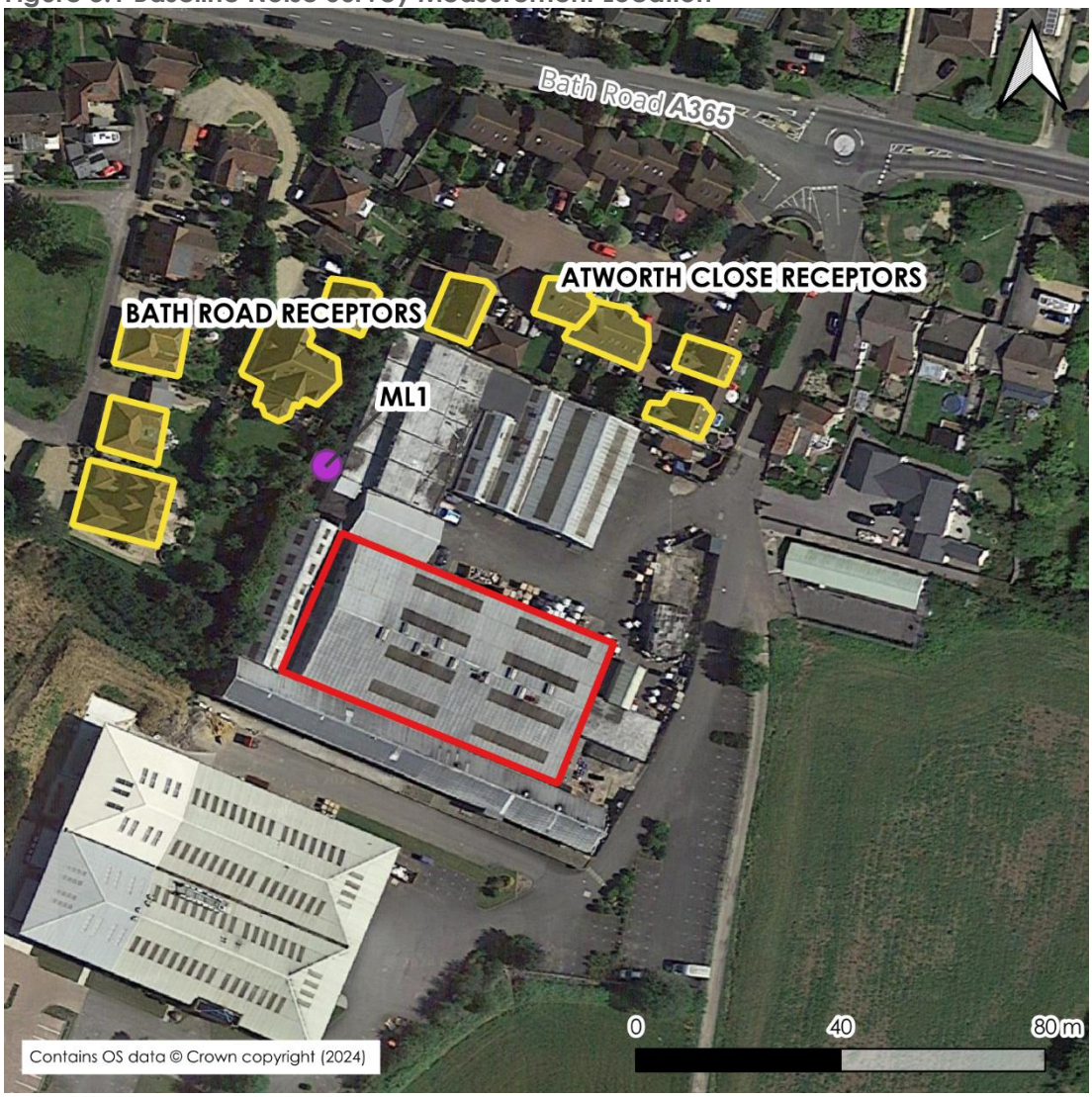
3. BASELINE NOISE MONITORING

3.1 A baseline noise survey has been undertaken to measure the noise levels representative of noise sensitive receptors in the vicinity of the Site.

Measurement Locations

3.2 The measurement location (ML) adopted during the survey is shown in **Figure 3.1**. Details of the monitoring undertaken at the measurement location is provided in the paragraphs following the figure.

Figure 3.1 Baseline Noise Survey Measurement Location



Measurement Location 1 (ML1)

3.3 Noise measurements were undertaken at ML1 from 14:30 on Friday 26th January 2023 until 13:00 on Monday 29th January 2023. The microphone was located approximately 2.5m above local ground level in free-field conditions.

3.4 Noise sources noted on site were bird song and distant road traffic noise from Bath Road. No noise from the existing commercial operations were audible during the noise survey.

Measurement Equipment

3.5 The baseline noise survey was undertaken using the Class 1 noise measurement equipment detailed in **Table 3.1**. Equipment was calibrated using a portable calibrator immediately before and after the measurements with no significant drift in calibration observed. The sound level meter, pre-amplifier and microphone was calibrated to traceable standards within the 24 months prior to the measurements. The portable calibrator was calibrated within the 12 months preceding the date of the survey.

Table 3.1: Noise Measurement Equipment

Equipment	Make and Model	Serial Number	Calibration Due Date
Sound Level Meter	Svantek SVAN 971	72616	16/06/2024
Microphone	ACO 7052E	69463	
Pre-amplifier	Svantek SV18	72283	
Calibrator	Svantek SV33A	73412	22/08/2024

Weather Conditions

3.6 During the survey period weather conditions were generally conducive to environmental noise monitoring, it being dry with negligible wind speeds. Temperatures ranged from 3°C-12°C during the noise survey.

Measurement Results

3.7 A summary of measured sound pressure levels measured at ML1 are presented in **Table 3.2**. Full results are provided in **Appendix C.**

3.8 The noise data presented in the table below aligns with the time periods the spray booth will be operating.

Table 3.2 Summary of Measured Sound Pressure Levels at ML1

Period	Measurement Period	Duration	dB $L_{Aeq,T}$[1]	dB $L_{A90,T}$[2]
Friday daytime	26/01/2024 14:30-18:00	3.5-hours	51	40
Saturday daytime	27/01/2024 08:00-13:00	5-hours	45	35
Monday daytime	27/01/2024 08:00-13:00	5-hours	44	37

[1] Logarithmic average sound pressure levels during measurement period

[2] Typical backgrounds determined from the mean $L_{A90,T}$ values during measurement period

4. ASSESSMENT

Operational Noise from Building Services

4.1 This section presents the noise generating activities (operational noise) that will be assessed, namely noise from fans which will be fitted within the extract and intake flues.

4.2 Sound power levels measured by the manufacturer for the fans are presented in **Table 4.1.**

Table 4.1 Operational Noise Sources

Noise source	Octave Band Sound Power Levels (L_w), dB								dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4kHz	8kHz	
In-duct Fan Inlet	91	89	92	93	94	91	87	82	98
In-duct Fan Outlet	93	89	93	94	95	91	88	83	99

4.3 It is understood that the operation of the fans will be during the daytime period only on weekdays and Saturdays.

Noise Limits

4.4 Noise from external plant on the development site should achieve the following noise level limits, shown in **Table 4.2**.

4.5 The limits are based on the background noise levels measured during the survey at the time periods the spray booth will be operating and include the requirement of Wiltshire Council that plant noise should 5dB below the existing background noise level.

Table 4.2 Noise Limits for Fixed Plant

Noise sensitive receptor	Rating Noise Limit to be Achieved at NSRs ($L_{Ar,T}$), dB
	Day (Mon-Fri 08:00-18:00; Sat 0800-13:00 no Sun or Bank Holidays)
Atworth Court & Bath Road	30

4.6 The above rating level limit will apply at least 3.5 metres from the façade of any residential property i.e., in free-field conditions.

4.7 In accordance with BS4142, the assessment of plant noise emissions should include appropriate rating corrections for tonal, irregular, or intermittent plant where applicable, before comparison with the above limits.

Modelling

4.8 A detailed acoustic model of the site has been generated in order to calculate the noise propagation across the site and at noise sensitive receptors from the proposed flues. during the proposed periods of operation. This noise model was generated applying the following methodology:

- The noise model was set up to apply the noise prediction methodology set out in ISO 9613-2[1];
- Indicative ground topography was approximated using the LIDAR Composite 2m DTM information freely available from the data.gov website;
- Off-site buildings which would provide screening to The Site have been incorporated as reflective façades;
- To reflect the local ground cover, ground absorption was set G = 0.5;
- The model was set to include second order reflected noise from solid structures;
- Flues were modelled as point sources, located at 3m and 1m above the roof as shown on **Figure 1.2**, in order to account for screening that is provided by the existing building;

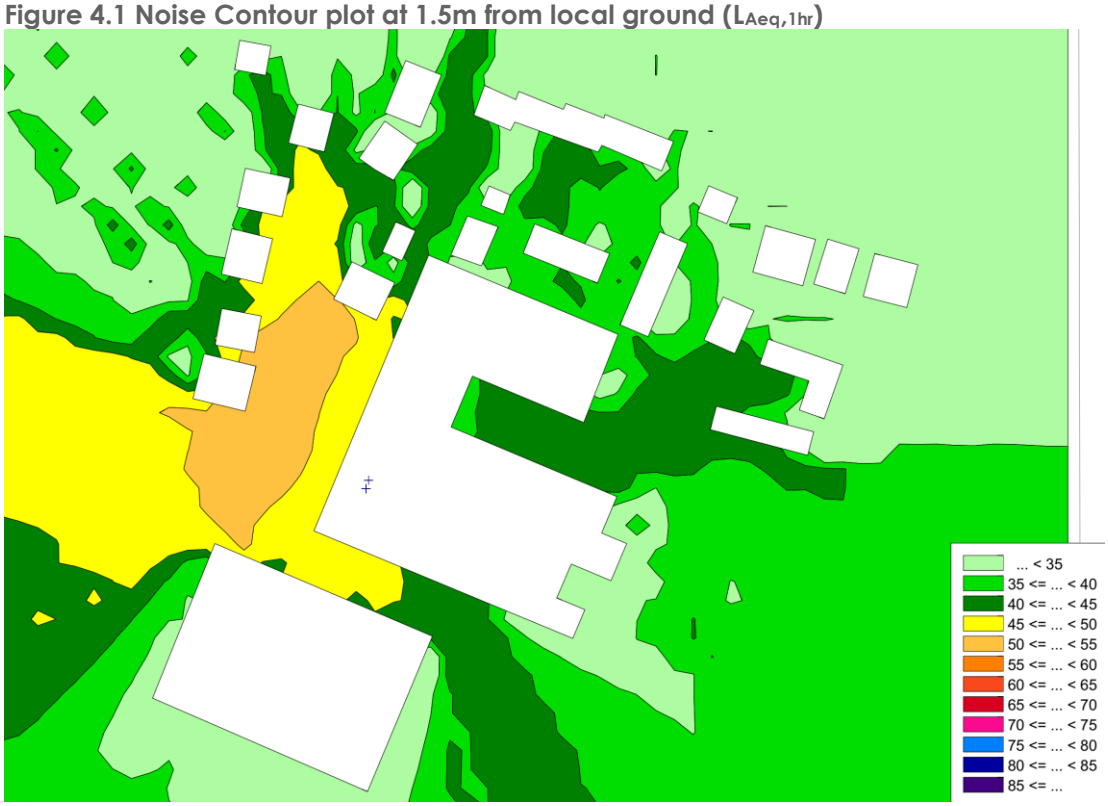
4.9 The site layout, shown in **Figure 1.2**, has been incorporated into the model, and the free-field level at each façade has been calculated. Noise contours have been calculated showing the external free-field noise level in external areas of noise sensitive receptors. The predicted noise levels have been used to inform the assessment.

[1] International Standards Organisation (1996) ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation

Predicted Noise from Building Services Plant

4.10 Noise contour maps have been generated across The Site and surrounding area, including outdoor amenity areas of NSRs at heights of 1.5m. The noise map is presented in **Figure 4.1**.

Figure 4.1 Noise Contour plot at 1.5m from local ground ($L_{Aeq,1hr}$)



4.11 The specific sound levels due to operational noise have been predicted at the NSRs. As the façade of the nearest NSR borders the site, the highest predicted level incident at the first floor level of the NSR are presented in **Table 4.3**. Facades which do not have a window or garage facades have been excluded from the assessment.

Table 4.3 Predicted Specific Sound Level for Operational Noise

NSR	Daytime Specific Noise Level ($L_{Aeq,1hr}$), dB
Bath Road	56
Atworth Court	51

BS4142 Assessment

4.12 In accordance with BS4142: 2014+A1:2019, penalties are applied to the specific sound level in order to account for characteristics associated with the sound such as tonality, impulsivity etc. **Table 4.4** presents the features have been accounted for in accordance with the subjective methods detailed in BS4142: 2014+A1:2019, for the flues.

Table 4.4 Identification of Acoustic Penalties (without mitigation)

Source	Penalty	Applicable?	Attributable penalty	Comment
Intake/outlet fans	Tonality	Yes	+4	Predicted specific noise level is significantly above the existing ambient noise level so it is considered that tonality from the fans within the flues will clearly be perceptible at the NSRs.
	Impulsivity	No	0	It is considered that noise from intake/outlet fans will not be impulsive in nature.
	Intermittency	Yes	+3	The fans will have clear on/off characteristics when the spray booth is in use/not in use.
	Other Sound Characteristics	No	0	Not applicable as other penalties have been assigned.

4.13 The rated noise levels at the NSRs have been assessed in accordance with BS4142 and are presented in **Table 4.5**.

Table 4.5 BS4142 Noise Assessment (Daytime)

Description	Bath Road	Atworth Court	BS4142 clause
Specific sound level ($L_{Aeq,T}$), dB	55	43	7.3.6
Acoustic feature correction, dB	+7	+7	9.2
Predicted rating level ($L_{Ar,T}$), dB	62	50	9.2
Rating noise limit ($L_{Ar,T}$),dB	30	30	
Excess over limit, dB	+32	+20	-
BS 4142 impact	**Significant Adverse Impact**	**Significant Adverse Impact**	**11, part d)**
Meets Wiltshire Council criteria?	**No**	**No**	**-**

4.14 The predicted rating level exceeds the existing background level by a margin greater than +10dB. Therefore, in accordance with the assessment method in BS4142, a significant adverse impact is likely.

4.15 Mitigation measures to reduce noise levels at the noise sensitive receptors will therefore be considered in the following section.

5. MITIGATION

5.1 In **Section 4**, it has been determined that consideration should be given to mitigation measures to protect the amenity of sensitive receptors in the vicinity of the development.

5.2 Noise from the flues will need to be reduced by at least +32dBA. The following minimum insertion loss is required to each flue to provide the required reduction.

Table 5.1 Minimum Insertion Loss for Each Flue

Description	Octave Band Sound Pressure Levels (L_{eq}), dB							
	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4kHz	8kHz
Minimum insertion loss	4	12	19	28	32	32	31	25

5.3 The following insertion loss can be applied to the extract system as an induct attenuator. This is likely to require a bespoke product and the final details of any such products should be reviewed by an acoustic consultant to ensure that the insertion loss detailed above is achieved.

5.4 Noise contour maps have been generated across The Site and surrounding area with the proposed mitigation measures in place at heights of 1.5m. The noise map is presented in **Figure 5.1**.

Figure 5.1 Noise Contour plot at 1.5m from local ground ($L_{Aeq,1hr}$)



BS4142 Assessment

5.5 **Table 4.4** presents the features have been accounted for in accordance with the subjective methods detailed in BS4142: 2014+A1:2019, for the flues with the recommended attenuation.

Table 5.2 Identification of Acoustic Penalties (with mitigation)

Source	Penalty	Applicable?	Attributable penalty	Comment
Intake/outlet fans	Tonality	No	0	Predicted specific noise level is below the existing ambient and background noise level so it is considered that tonality will not be perceivable at the noise sensitive receptor.
	Impulsivity	No	0	It is considered that noise from intake/outlet fans will not be impulsive in nature.
	Intermittency	No	0	Predicted specific noise level is below the existing ambient and background noise level so it is considered that intermittency will not be perceivable at the noise sensitive receptor.
	Other Sound Characteristics	No	0	Not applicable as other penalties have been assigned.

5.6 The predicted noise levels at the NSRs have been assessed in accordance with BS4142 for and is presented in **Table 4.5**.

Table 5.3 BS4142 Noise Assessment (Daytime)

Description	Bath Road	Atworth Court	BS4142 clause
Specific sound level ($L_{Aeq,T}$), dB	30	25	7.3.6
Acoustic feature correction, dB	0	0	9.2
Predicted rating level ($L_{Ar,T}$), dB	30	25	9.2
Rating noise limit ($L_{Ar,T}$),dB	30	30	
Excess over limit, dB	0	-5	-
BS 4142 impact	**Low impact**	**Low impact**	**11, part d)**
Meets Wiltshire Council criteria?	**Yes**	**Yes**	**-**

5.7 With the proposed mitigation, the predicted rating level is 5dB below the existing background noise at nearby NSRs, which indicates a low impact and meets the requirements of Wiltshire Council.

6. CONCLUSIONS

6.1 BWB Consulting (BWB) was instructed by Rygor Commercials Limited (the Client) to carry out a Noise Impact Assessment for the proposed paint spray booth at Unit 3, Atworth Business Park, Atworth.

6.2 A baseline noise survey was undertaken in January 2024 and the subsequent assessment work has been undertaken in accordance with current standards and guidance, following consultation with Wiltshire Council.

6.3 Noise limits have been set at nearby receptors to which any fixed plant items and other applicable commercial noise should meet, based on the results of the baseline noise survey and requirements of BS 4142:2014+A1:2019.

6.4 The assessment shows that, with the minimum insertion losses for each flue, an appropriate level of protection could be afforded to future noise sensitive receptors on the Site.

6.5 Based on the results of the assessment, it has been demonstrated that The Site is suitable for the proposed use. It is therefore considered that noise need not be a determining factor in granting approval for the Proposed Development.

APPENDICES

APPENDIX A: Glossary of Acoustic Terms

Noise

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq}, L_{A90} etc., according to the parameter being measured.

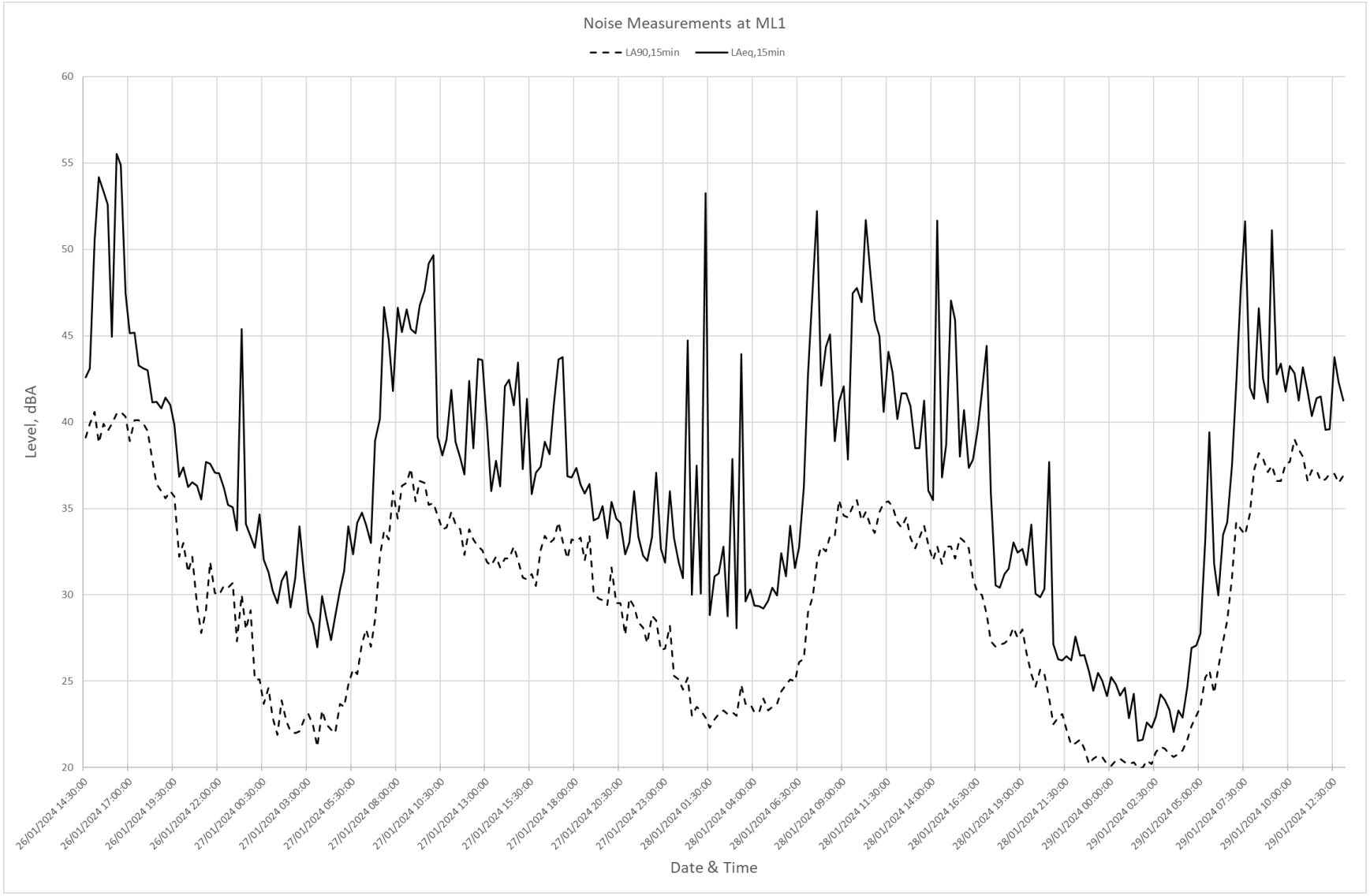
The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

Acoustic Terminology

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10-5Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq,T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} and L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time, and the L_{90} is the level exceeded for 90% of the time.
Sound Power Level, L_w	logarithm of the ratio of a given sound power to the reference sound power. Such power level in decibels is ten times the logarithm to the base ten of the ratio. unless otherwise specified, the reference sound power is 1 pW. Sound power is the total sound energy radiated by a sound source and measured in watts (W). Sound power level
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Façade Level	A sound field determined at a distance of 1m in front of a large sound reflecting object such as a building façade.
R/R_w	R is the laboratory measurement of the sound insulating properties of a material or building element in a stated frequency band R_w is the weighted Sound Reduction Index a single number quantity which characterises the airborne sound insulation of a material or building element over a range of frequencies, based on laboratory measurements.
D_{ne}/$D_{ne,w}$	D_{ne} is the laboratory measured level difference of a building element which has been normalised to a referenced absorption of 10$m^{2.}$ $D_{ne,w}$ is the is the weighted Sound Reduction Index a single number quantity which characterises the airborne sound insulation of a material or building element over a range of frequencies, based on laboratory measurements.
C_{tr}	Spectrum Adaptation Terms (C and C_{tr}) the single number rating method defined in BS EN ISO 717 uses a standard reference curve to determine the weighted value of airborne sound insulation. The spectrum adaptation term C_{tr} is used to take into urban traffic noise.

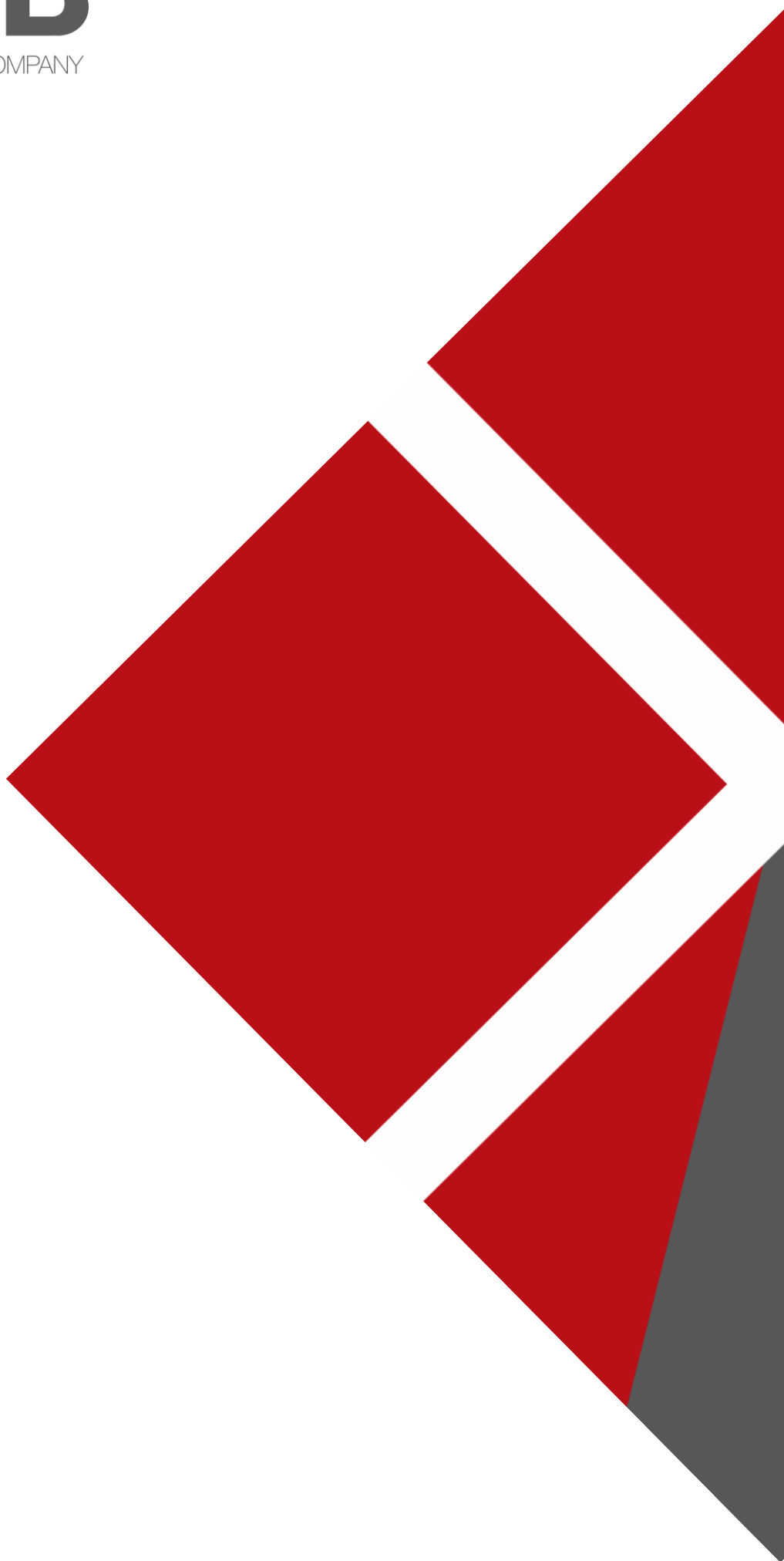
APPENDIX B: Consultation with Wiltshire Council

APPENDIX C: Noise Survey Data


Noise Measurements at ML1
LA90,15min
LAeq,15min
Level, dBA
60
55
50
45
40
35
30
25
20
26/01/2024 14:30:00
26/01/2024 17:00:00
26/01/2024 19:30:00
26/01/2024 22:00:00
27/01/2024 00:30:00
27/01/2024 03:00:00
27/01/2024 05:30:00
27/01/2024 08:00:00
27/01/2024 10:30:00
27/01/2024 13:00:00
27/01/2024 15:30:00
27/01/2024 18:00:00
27/01/2024 20:30:00
27/01/2024 23:00:00
28/01/2024 01:30:00
28/01/2024 04:00:00
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28/01/2024 11:30:00
28/01/2024 14:00:00
28/01/2024 16:30:00
28/01/2024 19:00:00
28/01/2024 21:30:00
29/01/2024 00:00:00
29/01/2024 02:30:00
29/01/2024 05:00:00
29/01/2024 07:30:00
29/01/2024 10:00:00
29/01/2024 12:30:00
Date & Time

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