ACOUSTICS CENTRAL

Domino's, 1 Old Mill Square, Storrington RH20 4NQ

Plant Noise Assessment

20240212-0 R1

Acoustics Central Limited
Reg. In England and Wales no 08265823
Registered Office: 5 Manor Park, Froxfield, Marlborough, SN8 3LF

Domino's, 1 Old Mill Square, Storrington RH20 4NQ

Plant Noise Assessment

20240212-0 R1

Domino's Pizza UK & Ireland Limited

1 Thornbury
West Ashland
Milton Keynes
MK6 4BB

Document History and Version Control

Version	Purpose/Change	Author	Date
V1.0	First Issue	**Andy Emery** MEng(Hons) MIOA	14th March 2024
V1.1	Condenser location update	**Andy Emery** MEng(Hons) MIOA	2nd May 2024

Prepared by

Andy Emery
MEng(Hons) MIOA

Reviewed by

Matthew Heyes
BSc(Hons) MIOA

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ANC ACOUSTICS & NOISE CONSULTANTS

info@acousticscentral.com
acousticscentral.com
+44 (0)208 191 0330
acousticscentrl
acousticscentral
acoustics-central

Executive Summary

Planning consent is sought for the change of use of the ground floor of 1 Old Mill Square, Storrington to hot food takeaway (Sui Generis), including the installation of ventilation/plant equipment.

An assessment of plant noise emissions has been undertaken with reference to BS4142 guidance to consider the potential impact on nearby noise sensitive locations.

A noise survey has been undertaken at the site and based upon the results representative background noise levels have been derived.

In order to reduce noise from the supply and extract fans, atmospheric-side silencers are to be fitted, the minimum insertion losses for which have been set out.

The assessment has demonstrated that allowing for the specified mitigation measures, noise emissions from the proposed plant installation is calculated to be below the representative background noise levels during for both daytime and night-time at each nearby noise sensitive location. As per BS4142 guidance indicates a 'low impact' and therefore the proposed plant installation is expected to meet the noise requirements of the local planning authority.

ACOUSTICS CENTRAL

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Attachments

20240212-0 R1 TH1
Time history graph showing noise survey results

20240212-0 R1 SCH1
Schedule of plant noise data

20240212-0 R1 SCH2
Schedule of noise mitigation measures

20240212-0 R1 CS1 to 20240212-0 R1 CS12
Assessment calculation sheets and summaries

Appendix A
Glossary of Acoustics Terms

Appendix B
Document Naming and Version Control Policy

Appendix C
Proposed plant layout drawings

1 Introduction

1.1 Planning consent is sought for the change of use of the ground floor of 1 Old Mill Square, Storrington to hot food takeaway (Sui Generis), including the installation of ventilation/plant equipment.

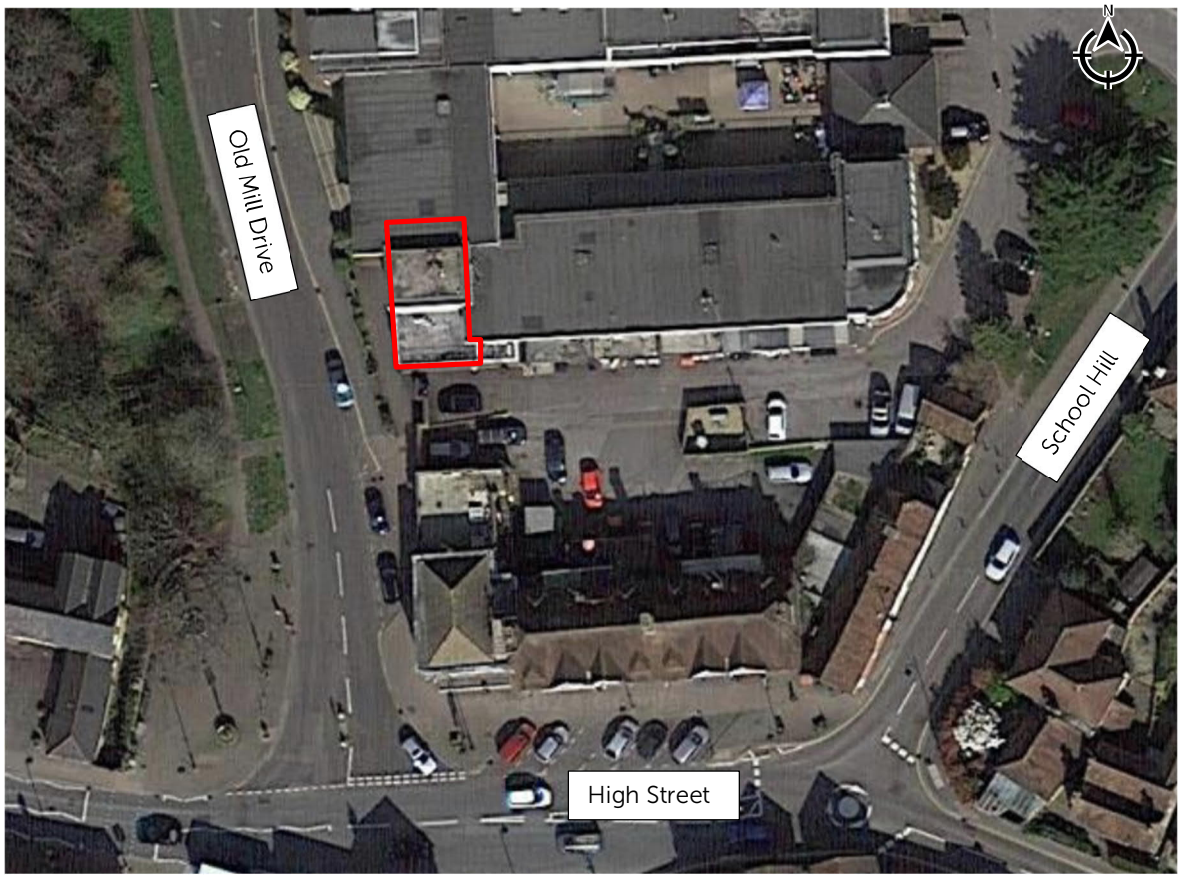
1.2 Acoustics Central has been instructed to undertake an assessment of mechanical services noise emissions. The aim of the assessment is to demonstrate that noise emissions from proposed plant will be suitably controlled to noise sensitivities within the vicinity of the site.

1.3 This report provides summary details of a noise survey undertaken at the site, details of the plant noise assessment undertaken using equipment manufacturer's noise data as a basis, and any subsequent conclusions or recommendations.

1.4 The report is necessarily technical in nature; however, every effort has been made to make it as clear as possible. In this regard, the Glossary of Acoustics Terms attached as Appendix A gives further explanation on relevant acoustics terminology used within the report.

2 Site Layout

2.1 The site is located at 1 Old Mill Square, Storrington RH20 4NQ, as outlined approximately in the following figure:



F1 Site location

2.2 The building comprises commercial use space on the ground floor and residences above. The ground floor extends further to the rear of the building than the first floor above, creating a flat roof area. The adjoining building to the east is similarly of commercial use at ground floor with residences above.

2.3 There are further residences to the south of the site, on the first floor of buildings fronting the High Street.

2.4 It is proposed to install two fans internally (supply and kitchen extract) and two external condenser units. The atmospheric side ductwork associated with the supply and extract fans will terminate through grilles in the southern façade of the building, the condensers are to be wall mounted externally on the southern façade.

3 Noise Criteria

3.1 BS 4142:2014

3.1.1 The relevant British Standard regarding noise from plant affecting dwellings is BS 4142:2014[1]. The primary methodology of the standard compares the rating level of the noise of the plant to the representative background noise level (during the relevant period of operation).

3.1.2 The rating level is the predicted noise level at the noise sensitive location, with various penalties added for acoustic features expected to increase the significance of the source, such as tonality, impulsivity and intermittency.

3.1.3 The greater the excess of rating level over background noise level, the greater the likelihood of an adverse noise impact. On this comparison of rating level to background noise, BS 4142:2014 notes:

a) Typically, the greater this difference, the greater the magnitude of the impact.

b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.

d) 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. 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.

3.1.4 With regards to low noise levels, BS 4142 notes in section 11 (1):

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

3.2 Local Planning Authority

3.2.1 The site falls within Horsham District. The current local plan (Horsham District Planning Framework. November 2015) includes policies relevant to noise, as quoted below:

Policy 24

Strategic Policy: Environmental Protection

The high quality of the district's environment will be protected through the planning process and the provision of local guidance documents. Taking into account any relevant Planning Guidance Documents, developments will be expected to minimise exposure to and the emission of pollutants including noise, odour, air and light pollution (...)

[1] BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

Policy 33

Development Principles

In order to conserve and enhance the natural and built environment developments shall be required to: (...)

2. Ensure that it is designed to avoid unacceptable harm to the amenity of occupiers/users of nearby property and land, for example through overlooking or noise, whilst having regard to the sensitivities of surrounding development; (...)

3.2.2 East and West Sussex also have published guidance on noise Planning Noise Advice Document: Sussex (November 2023). For industrial and commercial sound sources, including fixed mechanical plant, the document indicates the following relating to criteria:

The rating level of the industrial or commercial sound source should, where practicable, achieve a level no greater than the representative background sound (...)

4 Environmental Noise Survey

4.1 General

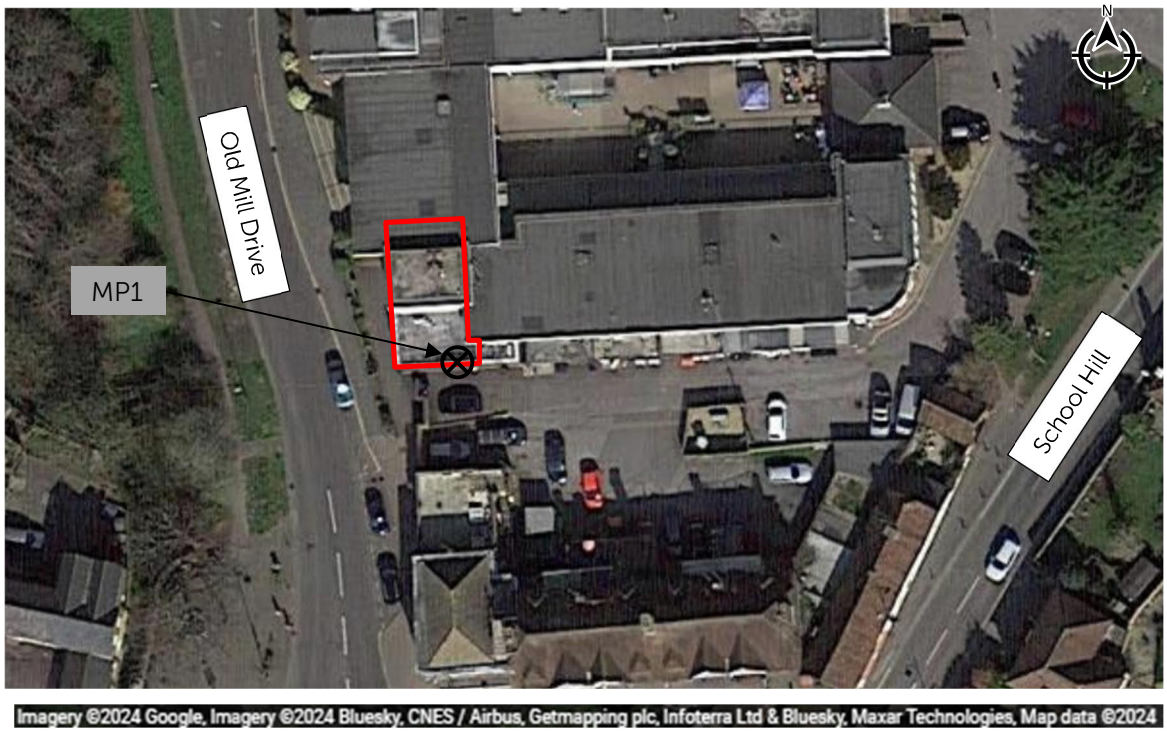
4.1.1 In order to quantify the noise levels at and around the site, an environmental noise survey was carried out, commencing at 14h15 on Wednesday 6th March and concluding at 12h30 on Friday 8th March 2024.

4.2 Guidance and Standards

4.2.1 The survey instrumentation, methodology and reporting of results has been carried out following guidance contained within British Standard 7445-1:2003 - *'Description and measurement of environmental noise - Part 1: Guide to quantities and procedures'*,

4.3 Measurement Positions

4.3.1 Noise measurements were made at a single position on the southern boundary. This location is illustrated as MP1 on the following figure, and a description given below.



F2 Measurement Positions Location

- MP1 The sound level meter microphone was mounted above the roof edge on the southern boundary, approximately 1m roof level. Measurements made at this position were intended to quantify the general existing noise climate currently experienced by sensitivities within the vicinity of the site.

4.4 Noise Monitoring Equipment

4.4.1 All noise measurements were made with the equipment detailed in the following table.

Item	Manufacturer	Type
Sound Level Analyser	NTi Audio	XL2-TA
Microphone	NTi Audio	MC230
Pre-Amp	NTi Audio	MA220
Acoustic Calibrator	Castle	GA607

T1 Equipment used during unattended noise survey.

4.4.2 The sound level analyser presented in the above table conforms to the Type 1 specification as given in BS EN 61672-1:2003 - *'Electroacoustics - Sound level meters - Part 1: Specifications'*. The calibrator presented in the above table conforms to the Class 1 specification as specified in IEC 60942:2003 – *'Electroacoustics - Sound calibrators'*.

4.5 Traceable Calibration

4.5.1 The measurement instrumentation, including sound level analyser, preamplifier and microphone has undergone traceable calibration by either a competent laboratory or the equipment manufacturer within the last two years. The acoustic calibrator has undergone traceable calibration by either a competent laboratory or the equipment manufacturer within the last year. The calibration certificates for the above equipment can be provided on request.

4.5.2 A field calibration check was undertaken on the noise measurement equipment before and after the survey to ensure a consistent and acceptable level of accuracy was maintained. No significant drift was noted to have occurred.

4.6 Data Recorded

4.6.1 Noise data was recorded over consecutive 15-minute periods in all relevant indices, including L_{Aeq}, L_{A90}, and $L_{AMax,F}$[2]. See attached Appendix A for an explanation of noise units used.

4.6.2 Octave band data for each of the above indices was also recorded at all positions, the filters for which met the requirements of BS EN 61260:1996, Class 1.

4.6.3 Audio recordings were also made throughout the duration of the survey for the purposes of identification of any atypical noise conditions occurring during the measurements.

4.7 Meteorological Conditions

4.7.1 The weather conditions at both the beginning and end of the survey period were cool and dry with little to no breeze. Publicly available weather data suggests during the intervening survey period temperatures remained cool, ranging between 0°C and 12°C, wind speeds were generally low, being typically < 5m/s, and it was dry throughout.

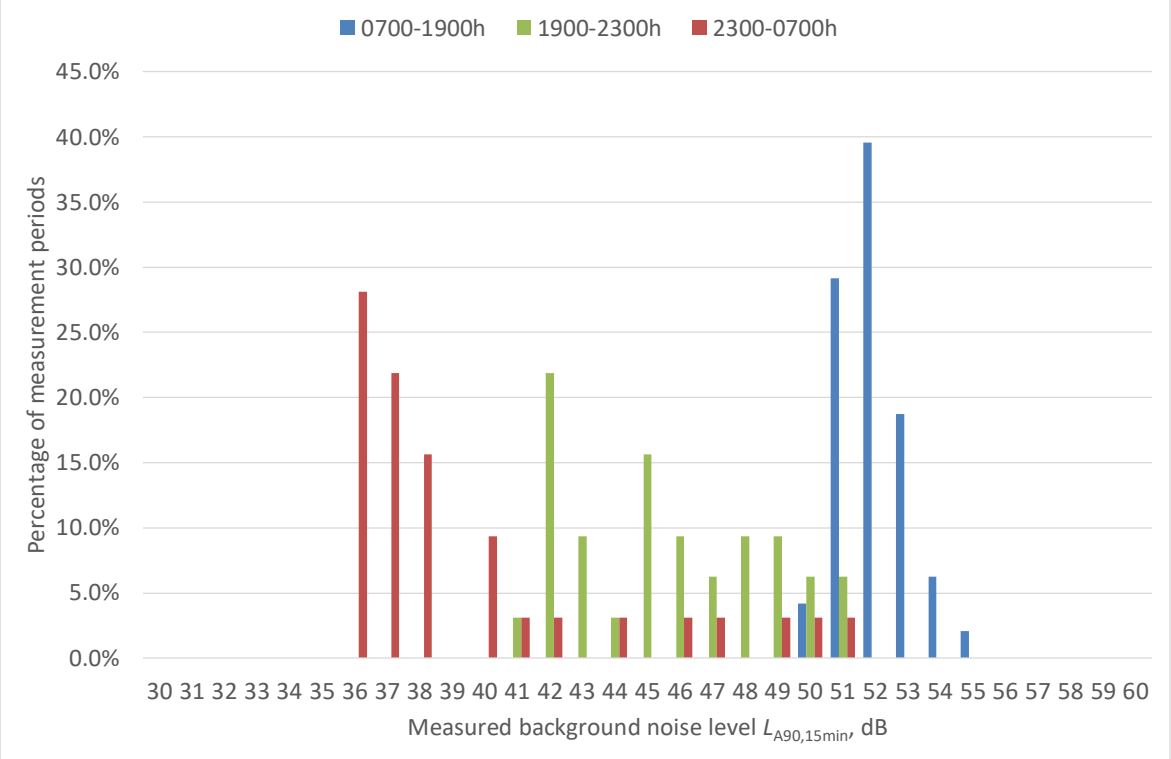
[2] Maximum A-weighted sound pressure level using time-weighting "F" and "S". As stated in BS EN 61672–1:2003 Design-goal time constants are 0,125 s for time-weighting F (Fast) and 1 s for time weighting S (Slow).

4.8 Results

4.8.1 The noise climate at the site was noted to be primarily affected by traffic on nearby roads. Mechanical services plant items serving other nearby commercial premises were also evident.

4.8.2 The attached time-history figures 20240212-0 R1 TH1 presents the noise levels measured at MP1.

4.8.3 A histogram of the measured background noise levels during the day (0700-1900h), evening (1900-2300h) and night time (2300-0700h) periods is shown in the following figure.



F3 Histogram of $L_{A90,15min}$ background noise levels measured during survey

4.8.4 Based on the measurement results, the following are considered to be representative background noise levels:

Location	Representative Background Noise Level, L_{A90} dB		
	Daytime (0700-1900h)	Evening (1900-2300h)	Night (2300-0700h)
MP1	51	42	36

T2 Representative background noise level (L_{A90}).

5 Atmospheric-Side Plant Noise Assessment

5.1 General

5.1.1 In order to compare the proposed plant items with the requirements, an atmospheric plant noise assessment has been carried out with reference to BS4142 guidance, as a means of assessing the likelihood of an adverse noise impact.

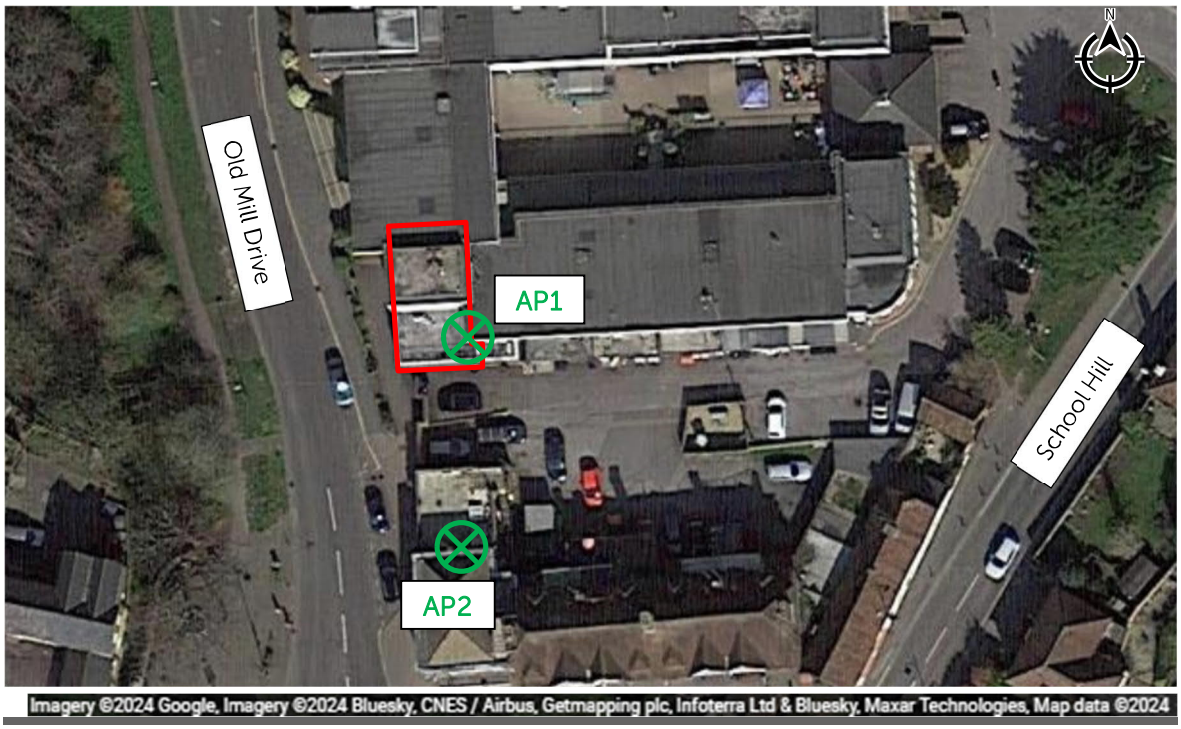
5.1.2 The assessment process involves calculating the noise levels from the proposed units at the noise sensitive locations, applying any penalties necessary to account for acoustic character, and comparing these with the existing noise levels.

5.1.3 Our calculations take into account propagation losses such as distance and, where relevant, screening from building, roof and wall edges where these obscure the plant from direct view.

5.2 Assessment Receiver Locations

5.2.1 The closest residential premises potentially affected by the proposed plant will be the flats on the first floor above the store, and the flats to the south on the first floor of building fronting the High Street.

5.2.2 The assessment receiver positions are identified on figure F4 and described below:



F4 Figure indicating the plant and assessment receptor locations

- AP1 – Flats above store
- AP2 – Flats opposite rear of store

5.3 Proposed Scheme

5.3.1 It is proposed to install the following items of plant:

- EF1 – Kitchen Extract Fan (ductwork terminating through grille in southern façade)
- SF1 – Fresh Air Supply AHU (ductwork terminating through grille in southern façade)
- CU1 – AC condenser (wall mounted externally on southern façade)
- CU2 – Cold store condenser (wall mounted externally on southern façade)

5.3.2 The details and manufacturer's noise data for the proposed plant items can be seen in the attached schedule 20240212-0 R1 SCH1. For the AC condenser unit we have utilised the noise spectrum from the manufacturer's sound pressure levels and scaled up to match the manufacturer's singe figure (dBA) sound power level.

5.3.3 The plant noise spectra do not indicate specific tonality, therefore no character corrections have been applied in the calculations in this case, meaning the assessed noise level is the same as rating level.

5.3.4 The proposed plant layout drawings are included within the attached Appendix C for reference.

5.4 Hours of Operation

5.4.1 The fans and the AC condenser unit are expected to operate during the store opening hours between 11h00-23h00. The cold store condenser only will be available for use 24 hours a day.

5.5 Mitigation

5.5.1 The condensers and ventilation grilles will be screened from assessment receiver position AP1 by the edge of the flat roof, this has been accounted for within the calculations.

5.5.2 In order to reduce noise from the supply and extract fans, atmospheric-side silencers are to be fitted, the minimum insertion losses for which are set out in the attached mitigation schedule 20240212-0 R1 SCH2.

5.5.3 The performances noted in the schedule are the minimum that must be achieved in each octave band. Indicative lengths for in duct silencers are indicated on the schedule based upon generic selections.

5.5.4 The silencers and duct termination devices should be sized to avoid creating excessive pressure drops or regenerative noise that might otherwise increase the assessed noise at the receptor.

5.5.5 The condensers and supply and extract fans should be installed on suitable AV mounts/hangers to minimise structure borne noise transmission. Flexible connections should be used between fans and rigid ductwork.

5.6 Assessment Results

5.6.1 By utilising the methodology set out above we calculate noise levels at the aforementioned assessment positions as presented in the following table. The representative background noise levels are also reproduced for ease of comparison.

Location	Plant rating noise level, dBA (Background sound levels, dBA)		
	Daytime (0700-1900h)	Evening (1900-2300h)	Night time (2300-0700h)
AP1 – Flats above store	35 (51)	35 (42)	28 (36)
AP2 – Flats opposite rear of store	42 (51)	42 (42)	35 (36)

T3 Levels calculated for the proposed plant

5.6.2 As the above table T3 shows, the noise arising as a result of the proposed plant items is calculated to be below the representative background noise levels during each of the daytime, evening and night time periods at each assessment position. As per BS4142 guidance set out under paragraph 3.1.3, this indicates a 'low impact' and therefore the proposed plant installation is expected to meet the noise requirements of the local planning authority.

5.6.3 Details of the calculations and the summary sheets for the combined daytime/evening and night time noise at each assessment position are presented in attached calculation sheets 20240212-0 R1 CS1 to 20240212-0 R1 CS12.

6 Conclusion

6.1 Planning consent is sought for the change of use of the ground floor of 1 Old Mill Square, Storrington to hot food takeaway (Sui Generis), including the installation of ventilation/plant equipment.

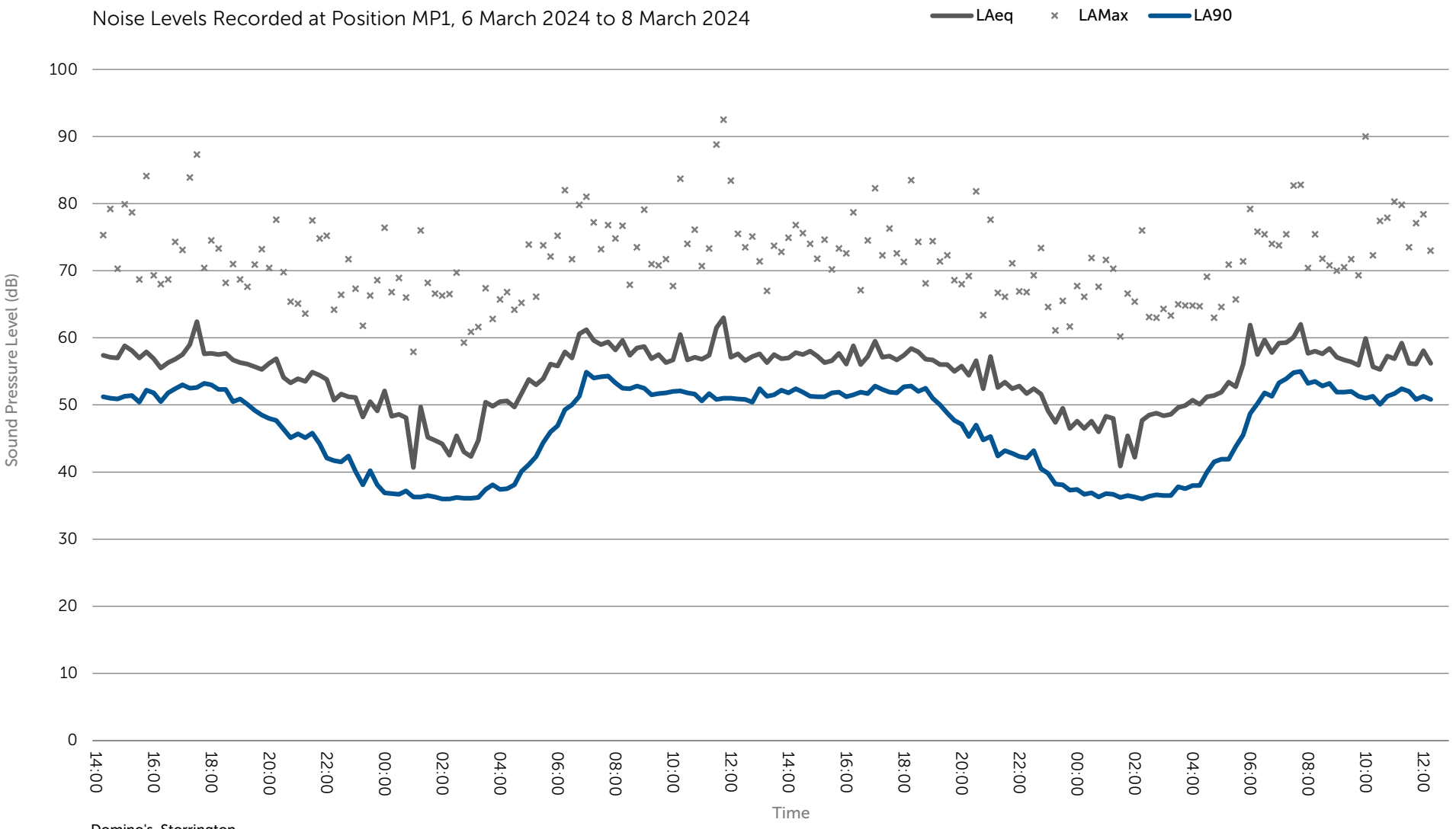
6.2 A noise impact assessment has been undertaken with reference to BS4142 guidance to consider potential impact of the proposed plant installation on nearby noise sensitive locations.

6.3 A noise survey undertaken at the site and based upon the results representative background noise levels have been derived.

6.4 Accounting for atmospheric side silencers specified for the supply and extract fans, noise emissions from the proposed plant installation is calculated to be below the representative background noise levels during for both daytime and night-time at each nearby noise sensitive location. As per BS4142 guidance indicates a 'low impact' and therefore the proposed plant installation is expected to meet the noise requirements of the local planning authority.

Figure 20240212-0 R1 TH1

Noise Levels Recorded at Position MP1, 6 March 2024 to 8 March 2024



Plant Noise Schedule

Reference	Description	Unit Details	Data Source	Noise Level Type	dB(A)	Noise Levels (dB)							
						63	125	250	500	1k	2k	4k	8k
EF1	Extract Fan	Vent-Axia Black Sabre BSC500/4	Man	Sound Power, Lw		80.0	79.0	76.0	72.0	75.0	75.0	68.0	61.0
SF1	Supply Fan	Air Vent Tech Model 5	Man	Sound Power, Lw		77.0	79.0	73.0	74.0	77.0	77.0	74.0	69.0
CU1	AC Condenser	Mitsubishi Heavy Industries FDC100VNX	Man	Sound Power, Lw		52.0	59.0	63.0	65.0	62.0	59.0	55.0	47.0
CU2	Cold Store Condenser	Karbox 2464	Man	Sound Power, Lw		64.0	61.5	61.5	62.5	59.4	57.3	54.1	46.9

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t/ +44(0)208 191 0330

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w/ www.acousticscentral.com e/ info@acousticscentral.com

Mitigation Schedule

Reference	Description	Location	Insertion Losses (dB)							
			63	125	250	500	1k	2k	4k	8k
AS1	38% free area- 900mm long (Melinex)	EF1 atmospheric side exhaust	6	10	19	21	24	15	8	8
AS2	45% free area- 900mm long	SF1 atmospheric side intake	2	5	11	17	20	19	12	10

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Calculation Sheet

EF1 to AP1

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - EF1										
Sound Power Levels		80	79	76	72	75	75	68	61	80 dBA
Silencer										
Silencer - AS1										
		-6	*-10*	*-19*	*-21*	*-24*	*-15*	*-8*	*-8*	
Bend loss										
Dimension (mm)	500									
No. of Bends (no.)	1									
Type - Radiussed Bend - With Vanes										
		0	*0*	*-1*	*-2*	*-3*	*-3*	*-3*	*-3*	
Circ Unlined Duct Losses										
Diameter (m)	0.5									
Length (m)	4									
		0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
End Reflection										
Width/Diameter (m)	0.65									
Length (m)	0.65									
Rec or Circ - Rectangular										
Free or Flush - Flush										
		-7	*-2*	*0*	*0*	*0*	*0*	*0*	*0*	
Point Source Radiation Loss										
Radiation - Hemispherical										
		-8	*-8*	*-8*	*-8*	*-8*	*-8*	*-8*	*-8*	
External Grille Directivity										
Width (m)	0.65									
Height (m)	0.65									
Angle (°)	90									
		-1	*-3*	*-6*	*-9*	*-12*	*-15*	*-15*	*-15*	

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		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Point Source Distance Loss										
Start Distance (m)	1									
End Distance (m)	6									
		-16	*-16*	*-16*	*-16*	*-16*	*-16*	*-16*	*-16*	
Maekawa Screening Loss										
Path Difference (m)	0.10									
		-6	*-6*	*-8*	*-9*	*-12*	*-14*	*-17*	*-20*	
External Receiver										
External Receiver - AP1										
Sound Pressure, Lp		36	33	19	7	0	4	1	-9	19 dBA

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Calculation Sheet

EF1 to AP2

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - EF1										
Sound Power Levels		80	79	76	72	75	75	68	61	80 dBA
Silencer										
Silencer - AS1										
		-6	*-10*	*-19*	*-21*	*-24*	*-15*	*-8*	*-8*	
Bend loss										
Dimension (mm)	500									
No. of Bends (no.)	1									
Type - Radiussed Bend - With Vanes										
		0	*0*	*-1*	*-2*	*-3*	*-3*	*-3*	*-3*	
Circ Unlined Duct Losses										
Diameter (m)	0.5									
Length (m)	4									
		0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
End Reflection										
Width/Diameter (m)	0.65									
Length (m)	0.65									
Rec or Circ - Rectangular										
Free or Flush - Flush										
		-7	*-2*	*0*	*0*	*0*	*0*	*0*	*0*	
Point Source Radiation Loss										
Radiation - Hemispherical										
		-8	*-8*	*-8*	*-8*	*-8*	*-8*	*-8*	*-8*	
External Grille Directivity										
Width (m)	0.65									
Height (m)	0.65									
Angle (°)	15									
		2	*3*	*3*	*4*	*5*	*6*	*6*	*6*	

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		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Point Source Distance Loss										
Start Distance (m)	1									
End Distance (m)	17									
		-25	*-25*	*-25*	*-25*	*-25*	*-25*	*-25*	*-25*	
Maekawa Screening Loss										
Path Difference (m)	-1.00									
		0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
External Receiver										
External Receiver - AP2										
Sound Pressure, Lp		36	36	26	20	20	30	30	23	35 dBA

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Calculation Sheet

SF1 to AP1

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - SF1										
Sound Power Levels		77	79	73	74	77	77	74	69	82 dBA
Silencer										
Silencer - AS2										
		-2	*-5*	*-11*	*-17*	*-20*	*-19*	*-12*	*-10*	
Bend loss										
Dimension (mm)	400									
No. of Bends (no.)	1									
Type - Radiussed Bend - With Vanes										
		0	*0*	*0*	*-1*	*-2*	*-3*	*-3*	*-3*	
Circ Unlined Duct Losses										
Diameter (m)	0.4									
Length (m)	7									
		-1	*-1*	*-1*	*-1*	*-1*	*-1*	*-1*	*-1*	
End Reflection										
Width/Diameter (m)	0.55									
Length (m)	0.55									
Rec or Circ - Rectangular										
Free or Flush - Flush										
		-8	*-3*	*0*	*0*	*0*	*0*	*0*	*0*	
Point Source Radiation Loss										
Radiation - Hemispherical										
		-8	*-8*	*-8*	*-8*	*-8*	*-8*	*-8*	*-8*	
External Grille Directivity										
Width (m)	0.55									
Height (m)	0.55									
Angle (°)	90									
		-1	*-3*	*-5*	*-8*	*-12*	*-15*	*-15*	*-15*	

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		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Point Source Distance Loss										
Start Distance (m)	1									
End Distance (m)	6									
		-16	*-16*	*-16*	*-16*	*-16*	*-16*	*-16*	*-16*	
Maekawa Screening Loss										
Path Difference (m)	-1.00									
		0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
External Receiver										
External Receiver - AP1										
Sound Pressure, Lp		42	44	33	24	19	16	20	17	31 dBA

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w/ www.acousticscentral.com e/ info@acousticscentral.com

Calculation Sheet

SF1 to AP2

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - SF1										
Sound Power Levels		77	79	73	74	77	77	74	69	82 dBA
Silencer										
Silencer - AS2										
		-2	*-5*	*-11*	*-17*	*-20*	*-19*	*-12*	*-10*	
Bend loss										
Dimension (mm)	400									
No. of Bends (no.)	1									
Type - Radiussed Bend - With Vanes										
		0	*0*	*0*	*-1*	*-2*	*-3*	*-3*	*-3*	
Circ Unlined Duct Losses										
Diameter (m)	0.4									
Length (m)	7									
		-1	*-1*	*-1*	*-1*	*-1*	*-1*	*-1*	*-1*	
End Reflection										
Width/Diameter (m)	0.55									
Length (m)	0.55									
Rec or Circ - Rectangular										
Free or Flush - Flush										
		-8	*-3*	*0*	*0*	*0*	*0*	*0*	*0*	
Point Source Radiation Loss										
Radiation - Hemispherical										
		-8	*-8*	*-8*	*-8*	*-8*	*-8*	*-8*	*-8*	
External Grille Directivity										
Width (m)	0.55									
Height (m)	0.55									
Angle (°)	15									
		1	*2*	*3*	*4*	*5*	*6*	*6*	*6*	

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		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Point Source Distance Loss										
Start Distance (m)	1									
End Distance (m)	17									
		-25	*-25*	*-25*	*-25*	*-25*	*-25*	*-25*	*-25*	
Maekawa Screening Loss										
Path Difference (m)	-1.00									
		0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
External Receiver										
External Receiver - AP2										
Sound Pressure, Lp		35	40	32	27	27	27	32	29	36 dBA

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Calculation Sheet

CU1 to AP1

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - CU1										
Sound Power Levels		52	59	63	65	62	59	55	47	67 dBA
Silencer										
Silencer - NONE										
		0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
Point Source Radiation Loss										
Radiation - Hemispherical										
		-8	*-8*	*-8*	*-8*	*-8*	*-8*	*-8*	*-8*	
Point Source Distance Loss										
Start Distance (m)	1									
End Distance (m)	6									
		-16	*-16*	*-16*	*-16*	*-16*	*-16*	*-16*	*-16*	
Maekawa Screening Loss										
Path Difference (m)	0.20									
		-7	*-8*	*-9*	*-12*	*-14*	*-17*	*-20*	*-23*	
External Receiver										
External Receiver - AP1										
Sound Pressure, Lp		22	28	30	30	24	18	12	1	30 dBA

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Calculation Sheet

CU1 to AP2

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - CU1										
Sound Power Levels		52	59	63	65	62	59	55	47	67 dBA
Silencer										
Silencer - NONE										
		0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
Point Source Radiation Loss										
Radiation - Quarterspherical										
		-5	*-5*	*-5*	*-5*	*-5*	*-5*	*-5*	*-5*	
Point Source Distance Loss										
Start Distance (m)	1									
End Distance (m)	17									
		-25	*-25*	*-25*	*-25*	*-25*	*-25*	*-25*	*-25*	
Maekawa Screening Loss										
Path Difference (m)	-1.00									
		0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
External Receiver										
External Receiver - AP2										
Sound Pressure, Lp		22	29	33	35	32	29	25	17	37 dBA

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Calculation Sheet

CU2 to AP1

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - CU2										
Sound Power Levels		64	62	62	63	59	57	54	47	65 dBA
Silencer										
Silencer - NONE										
		0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
Point Source Radiation Loss										
Radiation - Hemispherical										
		-8	*-8*	*-8*	*-8*	*-8*	*-8*	*-8*	*-8*	
Point Source Distance Loss										
Start Distance (m)	1									
End Distance (m)	6									
		-16	*-16*	*-16*	*-16*	*-16*	*-16*	*-16*	*-16*	
Maekawa Screening Loss										
Path Difference (m)	0.20									
		-7	*-8*	*-9*	*-12*	*-14*	*-17*	*-20*	*-23*	
External Receiver										
External Receiver - AP1										
Sound Pressure, Lp		34	30	28	27	22	17	11	1	28 dBA

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Calculation Sheet

CU2 to AP2

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - CU2										
Sound Power Levels		64	62	62	63	59	57	54	47	65 dBA
Silencer										
Silencer - NONE										
		0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
Point Source Radiation Loss										
Radiation - Quarterspherical										
		-5	*-5*	*-5*	*-5*	*-5*	*-5*	*-5*	*-5*	
Point Source Distance Loss										
Start Distance (m)	1									
End Distance (m)	17									
		-25	*-25*	*-25*	*-25*	*-25*	*-25*	*-25*	*-25*	
Maekawa Screening Loss										
Path Difference (m)	-1.00									
		0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
External Receiver										
External Receiver - AP2										
Sound Pressure, Lp		34	32	32	33	30	28	25	17	35 dBA

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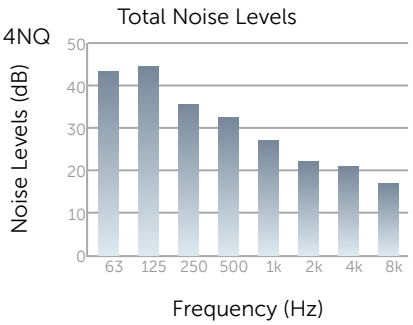
Project Name	Domino's, 1 Old Mill Square, Storrington RH20 4NQ
Project Reference	20240212-0
Reference	AP1
Description	Flats above store
Noise Limit (dBA)	42
Calculated Level (dBA)	35



Noise Sources

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
EF1	1	36	33	19	7	0	4	1	-9
SF1	1	42	44	33	24	19	16	20	17
CU1	1	22	28	30	30	24	18	12	1
CU2	1	34	30	28	27	22	17	11	1

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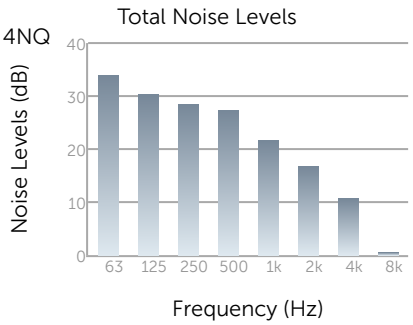
Project Name	Domino's, 1 Old Mill Square, Storrington RH20 4NQ
Project Reference	20240212-0
Reference	AP1 night
Description	Flats above store
Noise Limit (dBA)	36
Calculated Level (dBA)	28



Noise Sources

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
CU2	1	34	30	28	27	22	17	11	1

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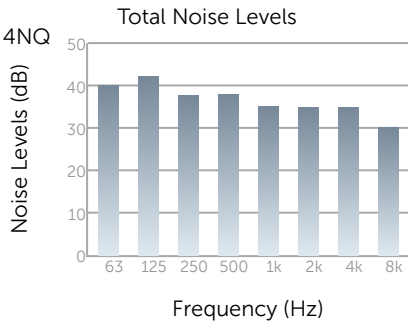
Project Name	Domino's, 1 Old Mill Square, Storrington RH20 4NQ
Project Reference	20240212-0
Reference	AP2
Description	Flats opposite rear of store
Noise Limit (dBA)	42
Calculated Level (dBA)	42



Noise Sources

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
SF1	1	35	40	32	27	27	27	32	29
CU1	1	22	29	33	35	32	29	25	17
CU2	1	34	32	32	33	30	28	25	17
EF1	1	36	36	26	20	20	30	30	23

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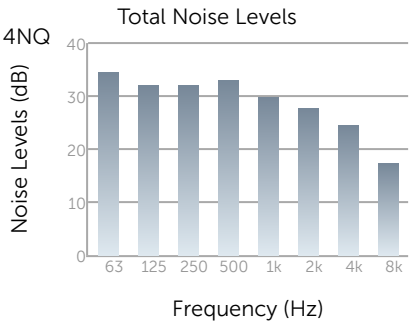
Project Name	Domino's, 1 Old Mill Square, Storrington RH20 4NQ
Project Reference	20240212-0
Reference	AP2 night
Description	Flats opposite rear of store
Noise Limit (dBA)	36
Calculated Level (dBA)	35



Noise Sources

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
CU2	1	34	32	32	33	30	28	25	17

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Appendix A

Glossary of Acoustics Terms – Noise Levels

Single Figures and Spectra

Generally speaking, the human ear is capable of hearing noise within the frequency range 20Hz to 20kHz. To make handling of data more meaningful and manageable, the range is often divided into 'bands', each of which covers a specific part.

For most acoustics applications, either octave or third-octave bands are used. Each band has a specific centre frequency which is used to identify it. When reported, the band centre frequency is given, along with the associated noise level, e.g. 63dB L_{eq} at 500Hz.

Noise levels can also be reported as single figure values where all energy contained within the measured frequency range is summed to provide a single figure. However, as the human ear does not hear noise at different frequencies with equal loudness, a weighting curve is often applied to levels before summing to account for this fact.

The most common curve is the A-weighting curve, and its use is denoted by including the letter 'A' with either the index e.g. 63dB L_{Aeq}, or with the decibel suffix (if the index is described elsewhere), e.g. 63dBA. 'B' and 'C' weighting curves may also be applied, depending on the application. A 'Z' is used to indicate a single figure where no weighting has been applied, e.g. 63dB L_{Zeq}.

Noise Level Indices

Noise level measurements can be made and reported in a variety of indices. The index is reported using the letter *L* to indicate Level, followed by, for example, abbreviations to represent the specifics of the index, and time intervals where applicable. The most commonly used are given below.

$L_{eq,T}$, (dB) - Equivalent Continuous Sound Pressure Level

The $L_{eq,T}$ value is the sound pressure level in decibels of a continuous steady sound that within a specified time interval, T, has the same mean-squared sound pressure as a sound that varies with time. It is often used as a descriptor of the **ambient noise climate**, and commonly seen as a single A-weighted figure $L_{Aeq,T}$.

L_{max}, (dB) - Maximum Sound Pressure Level

The L_{max} value is the highest recorded sound pressure level in decibels averaged across a specified time constant during a noise measurement of certain duration. Two time constants are used, Fast and Slow, where the time constants are 0.125s and 1s respectively. The time constant is denoted in the index, $L_{max,F}$ for Fast and $L_{max,S}$ for Slow. It is often used to identify transient events that have a high-level relative to the ambient noise climate, and commonly seen as a single A-weighted figure L_{Amax}.

$L_{10,T}$, (dB) - Equivalent Continuous Sound Pressure Level

The $L_{10,T}$, value is the sound pressure level in decibels that is exceeded for 10% of a given time interval, T. It is often used as a measurement of noise from transportation sources such as road and rail. It is commonly seen as a single A-weighted figure $L_{A10,T}$.

$L_{90,T}$, (dB) - Equivalent Continuous Sound Pressure Level

The $L_{90,T}$, value is the sound pressure level in decibels that is exceeded for 90% of a given time interval, T. It is often used as a descriptor of the **background noise climate**, and commonly seen as a single A-weighted figure $L_{A90,T}$.

Appendix B

Document Naming and Version Control Policy

All documents are issued with a unique number which comprises the principle 8-digit project and 1-digit subsection numbers, for example 20151203-0, and a reference indicting iteration of document type, for example R1 for Report 1, M2 for Memorandum 2 etc.

All documents employ version control through the use of a unique version number. The version numbers employ two levels of hierarchy, and use the format illustrated below:

V 1 . 2

Major Minor

Major

A major revision occurs when the report is revised to reflect significant changes in design strategy. For example, wide scale changes to building footprint or general arrangements, changes to principle construction type (e.g. masonry to lightweight), reselection of mechanical services plant etc. A change in strategy that takes place within the same RIBA work stage for example will prompt a major revision to a document.

Minor

A minor revision occurs when the report is revised to reflect minor changes to the design implementation. For example a change in the type of natural vent, extract fan, surface finish etc. to be used, on the project. Minor revisions will also occur when there is a change in wording of the report text.

Reporting

The Document History and Version Control table on the second page of each report identifies the versions through which the document has moved, along with the date, author that produced the version, and a description of its purpose or change.

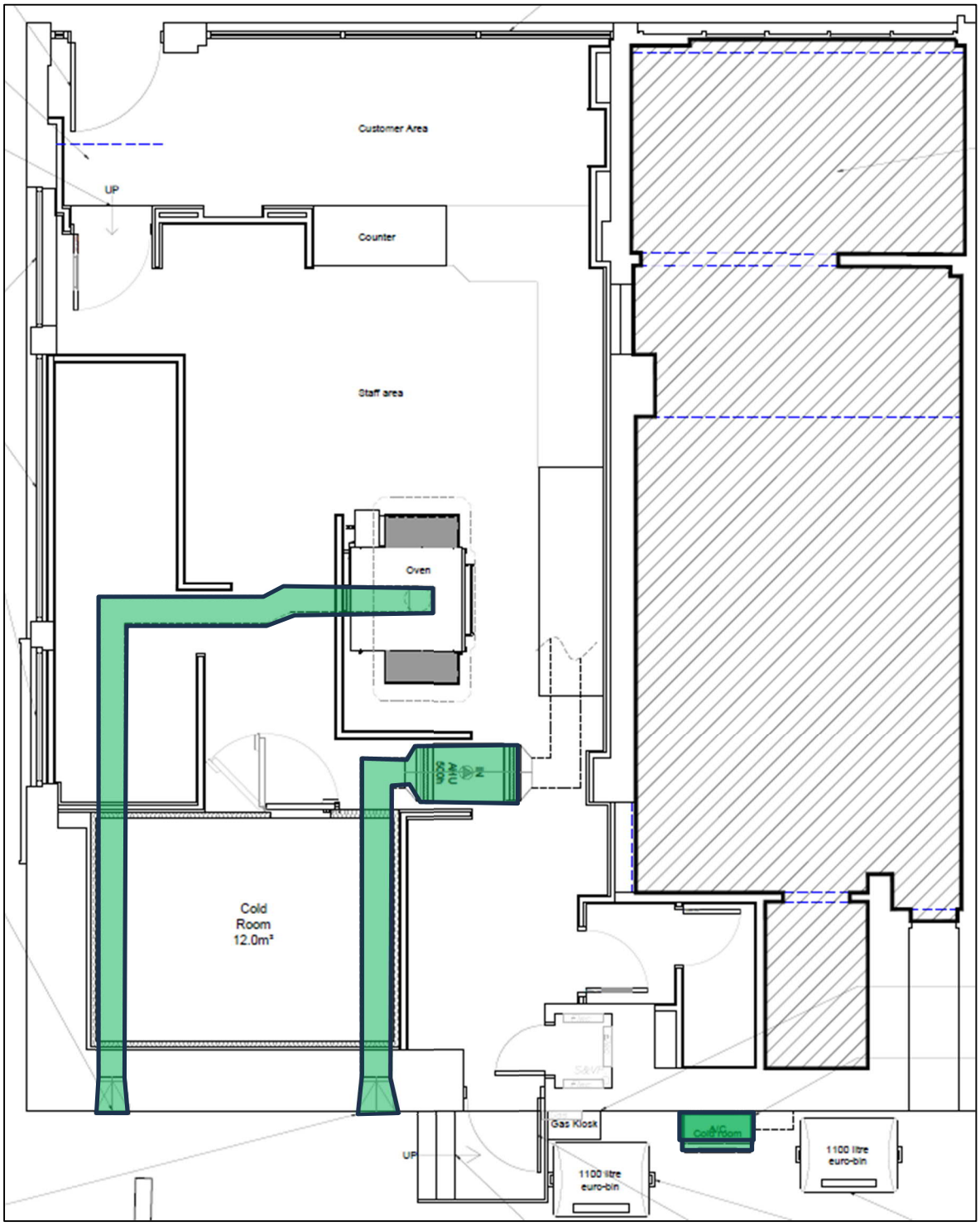
Electronic File Naming

Reports issued electronically use the following format:

2012xxxx	- x	Rx	Noise Assessment Report	v1.0	yyyy.mm.dd.pdf
Project Number	Subsection	Report Number	Report Name	Version	Date File Extension

Appendix C

Proposed plant layout



ANC | ACOUSTICS & NOISE CONSULTANTS

info@acousticscentral.com
acousticscentral.com
+44 (0)208 191 0330
acousticscentrl
acousticscentral
acoustics-central