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bsi. ISO 9001 Quality Management
FS647646

Noise Impact Assessment…

Discharge of Planning Condition

Condition 13 and 16 of Permission 106594/FO/2014/C1

Project Name:	Pret a Manger Manchester Business School
Site Name:	KR06416
Site Address:	Unit 8, Manchester Business School. Manchester. M13 9GH.
Client:	Pret a Manger

Version Control…

Reference:	KR06416
Version:	v1.1
Date:	9th November 2018
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Author:	Mr. R. M. Scrivener, MSc, MIOA
Position:	Consultant
Date:	8th November 2018

Signed:

Report Conclusion…

The proposed fitout of unit 8 at the Manchester Business School includes the necessary mitigation measures to comply in full with the pre-occupation relating to noise detailed in conditions 13 and 16 within planning permission 106594/FO/2014/C1 granted by Manchester City Council.

Version History…

Reference	Version	Date	Author	Position	Document Status
KR06416	V1.0	08/11/18	R Scrivener	Consultant	Current document for issue
Details	Completed report for submission to the Local Authority				

Reference	Version	Date	Author	Position	Document Status
KR06416	V1.1	09/11/18	R Scrivener	Consultant	Current document for Issue
Details	Minor typographical errors corrected before submission.				

Note: Only the three latest version are shown above.

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1. Executive Summary…

1.1. Instruction

KR Associates have been instructed to prepare a noise impact assessment to discharge condition 13 and 16 of planning permission 106594/FO/2014/C1 with respect to the fitout of Unit 8 at Manchester Business School by Pret a Manger.

1.2. Summary of Report

1.2.1 Site Description (Section 2)

The Manchester Business School is located at the junction of Booth Street West and Oxford Road and forms part of the University of Manchester Campus. Unit 8 has been fitted out by Pret a Manger and is located on the ground floor facing onto Oxford Road.

1.2.2 Measured Background Noise Levels (Section 3)

Results	Day Time	Evening	Commentary
Background	$L_{Aeq,\ 90,\ 1\ hour}$ 48 dB	$L_{A90,\ 15\ minutes}$ 45 dB	Representative level in context of site

1.2.3 Planning Permission (section 4)

Planning permission was granted by Manchester City Council for the refurbishment and reconfiguration of Manchester Business School which included creating a Class A3 (Restaurant and Café Use) on the ground floor which will be fitted out by Pret a Manger. Planning permission 106594/FO/2014/C1 was conditionally granted on 13th August 2014 with two conditions relating to noise. Condition 13 relates to limiting the breakout noise from the unit and condition 16 relates to any externally mounted ancillary equipment resulting in levels 5 dB below the background noise level at the nearest noise sensitive property.

1.2.4 Assessment of Noise Levels (Section 5 and 6)

An assessment of the external noise emissions breaking out from the unit and any external ancillary equipment is undertaken.

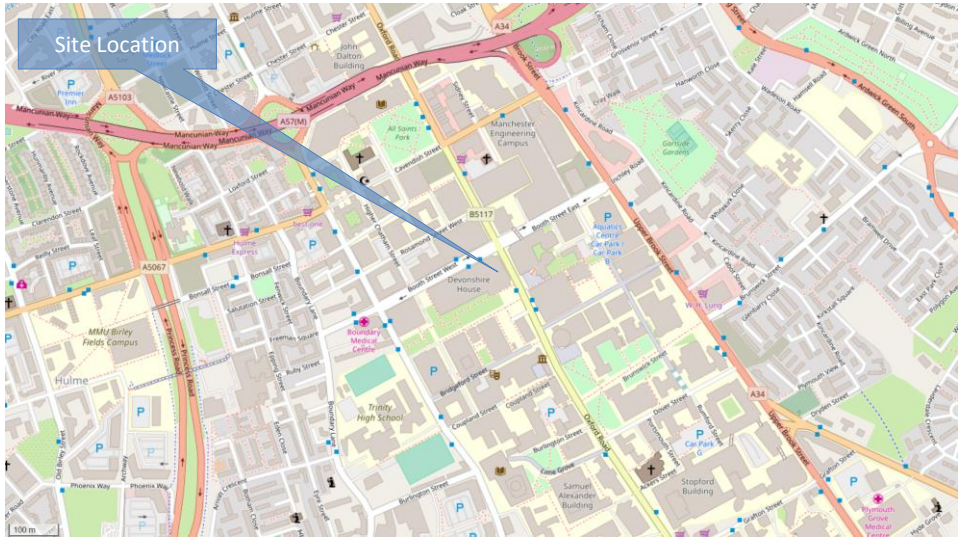
1.3. Conclusion

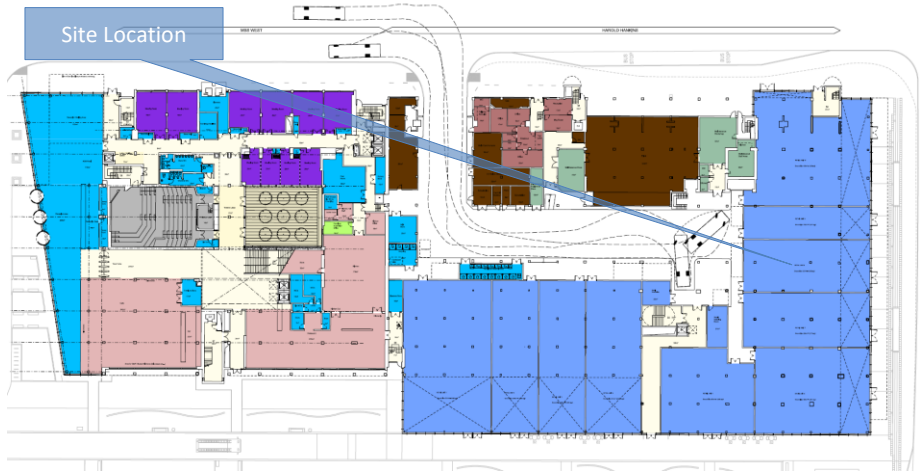
The fitout of unit 8 at the Manchester Business School includes the necessary mitigation measures to comply in full with the pre-occupation relating to noise detailed in conditions 13 and 16 within planning permission 106594/FO/2014/C1 granted by Manchester City Council.

2. Site Description…

2.1. Site Location

The Manchester Business School is located at the junction of Booth Street West and Oxford Road and forms part of the University of Manchester Campus. Unit 8 has been fitted out by Pret a Manger and is located on the ground floor facing onto Oxford Road.

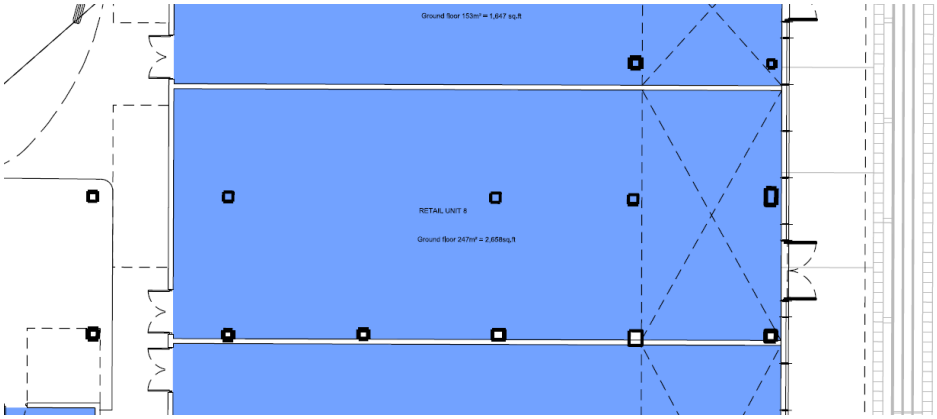




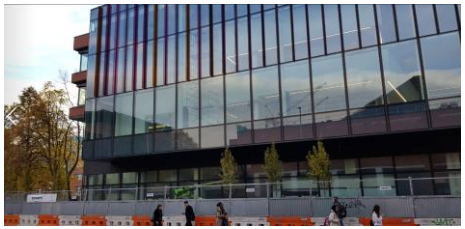
Latitude:	53.467931°	Longitude:	-2.235431°	Elevation:	45m MAMSL

2.2. Photographs of Site

2.2.1 General Pictures of Site



Unit 8 – Frontage on the right onto Oxford Road, Enclosed Service Yard on right.



Front of Site on Oxford Road



Shop front of Unit 8 – Pret a Manger



Enclosed Cage Area for AC Units



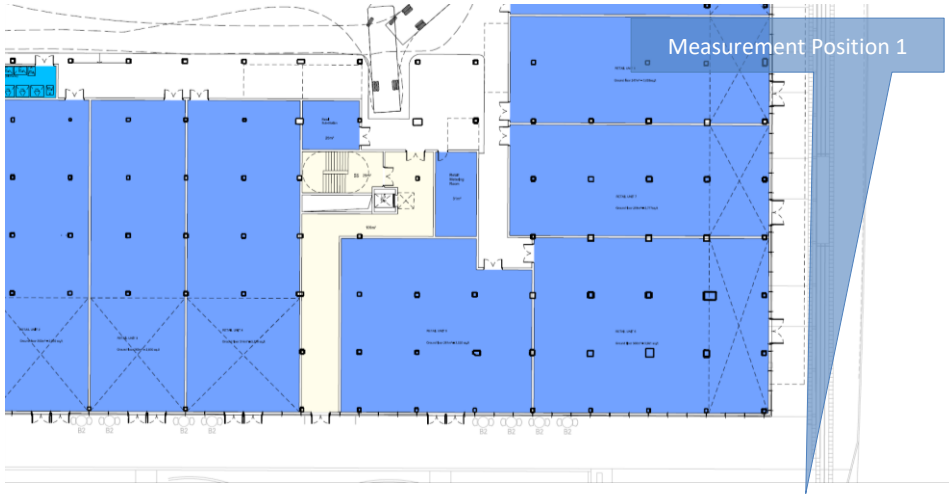
Enclosed Common Service Yard

3. Existing Background Noise Levels…

3.1. Measurement Details

3.1.1 Measurement Location

Background measurement were undertaken external and internally between Tuesday 8th November 2018 and Wednesday 9th November 2018 at the front of the site.

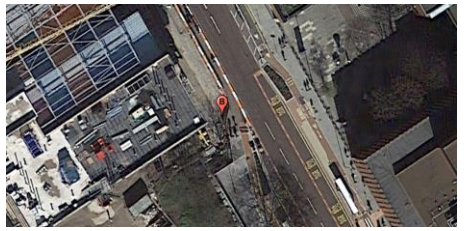


1	Latitude:	53.467687°	Longitude:	-2.235111°	Elevation:	45 m

3.1.2 Photographs of Background Measurements



Fixed to Hoarding



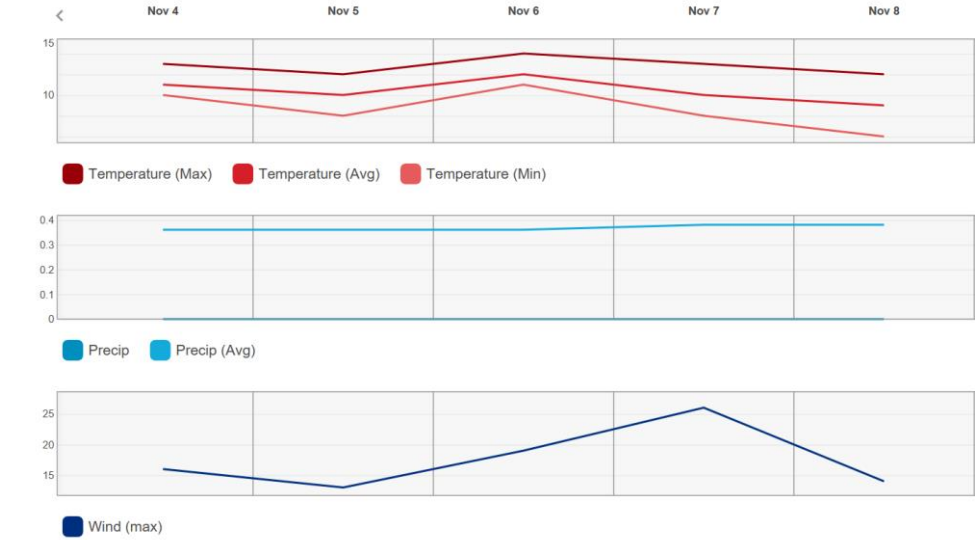
Microphone Facing Oxford Road

3.1.3 Calibration Details of Equipment (Position 1)

Type	Sound Level Meter	Microphone	Calibrator
	633.C1	251	120/1
Manufacturer	Casella	Casella	Casella
Serial Number	2145360	00709	5231002
Certificate Number	U24420	U24419	U27852
Calibration Date	12th January 2017	12th January 2017	21st February 2018

3.2. Prevailing Weather Conditions

3.2.1 Temperature, Precipitation and Wind Speed



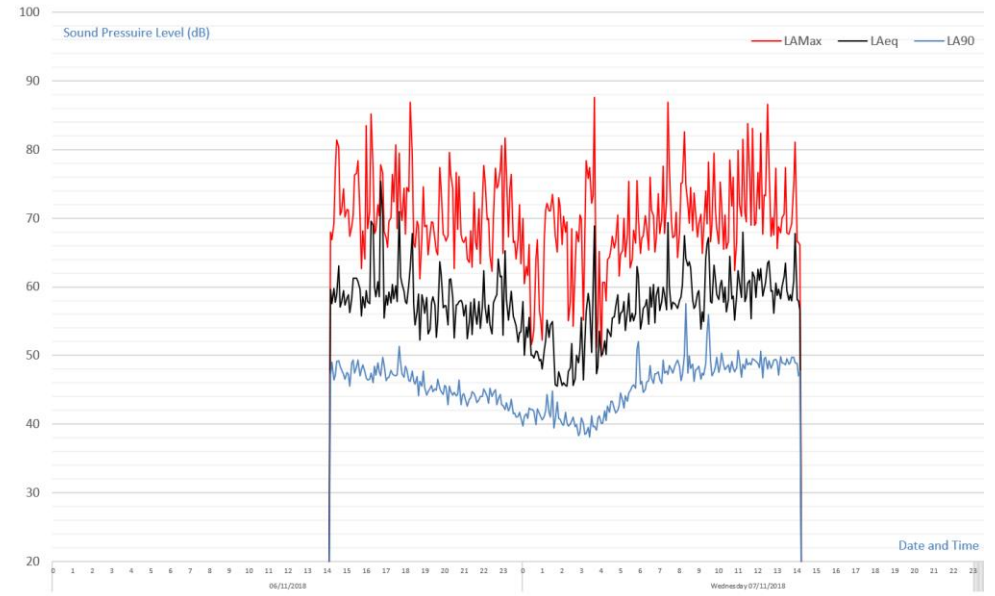
3.2.2 Impact of Weather

An analysis of the results indicate that the prevailing weather conditions did not adversely impact the background noise measurements and there were no technical reasons why any part of the background measurements should be excluded from the overall noise levels. The wind speed significantly reduced in the early evening and early morning of the survey.

3.3. Measurement Results

3.3.1 Position 1 - External Background Noise Profile

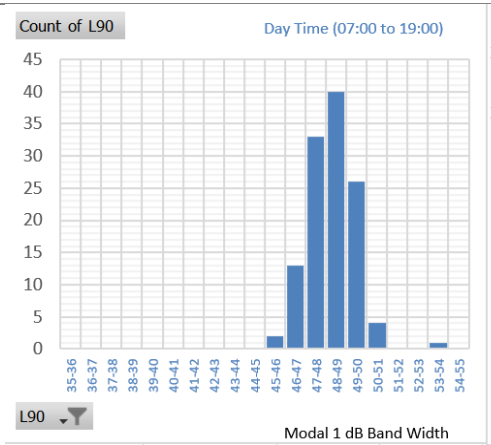
The following table shows the results of the background noise measurements with the raw data recorded every 0.125 seconds. The graphs is based on the 5 minute levels with the daytime and night time levels defined as 1 hour and 15 minute respectively.

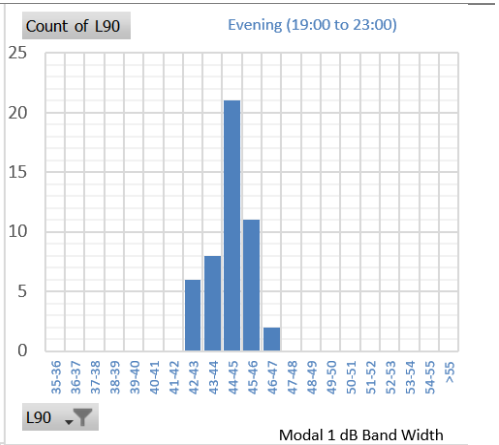


Day Time (07:00 to 19:00)			Evening Time (19:00 to 21:00)		
$L_{Amax, 1\ hour}$	$L_{Aeq, 1\ hour}$	$L_{A90, 1\ hour}$	$L_{Amax, 1\ hour}$	$L_{Aeq, 1\ hour}$	$L_{A90, 1\ hour}$
61 - 87	52 - 75	44 - 58	62 - 81	52 - 64	43 - 47

3.4. Context of Site

3.4.1 Modal Analysis of Results





Day Time (07:00 to 19:00)	Evening Time (19:00 to 21:00)
$L_{A90,1\ hour}$ 48 dB	$L_{A90,\ 1\ hour}$ 45 dB

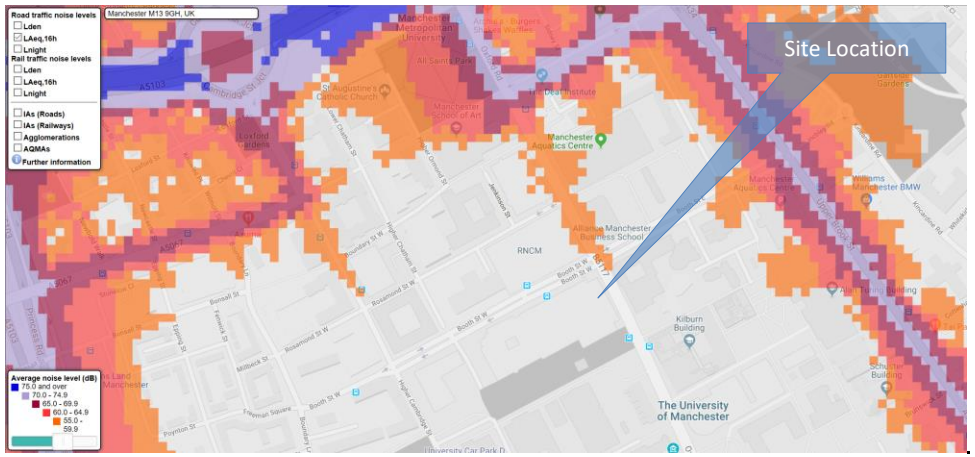
3.4.2 Correction of Measurement Results.

Using the guidance within British Standard 8233:2014 the following table indicates the adjustments for the context from external factors.

Results	Opening Time of Pret a Manger	Commentary
Measured	$L_{Aeq,\ 16\ hour}$ 48 dB	Average measured levels.
Climate	-3 dB	Correection due to interference of wind
Position	+0 dB	No correction for the position
Background	$L_{Aeq,\ 16\ hour}$ 45 dB	Representative level in context of site

3.4.3 Road Noise - Day Time (Strategic Noise Map)

The following noise map is produced as part of the UK wide noise mapping project and it shows that the noise levels recorded at the front of the site are very similar to the ones generated from the noise.



$L_{Aeq,16h}$	No colour					
	<55	55 – 59	60 – 64	65 – 69	70 – 74	75+

4. Criterion…

4.1. Planning Permission

Planning permission was granted by Manchester City Council for the refurbishment and reconfiguration of Manchester Business School which included which included creating a Class A3 (Restaurant and Café Use) on the ground floor which will be fitted out by Pret a Manger. Planning permission 106594/FO/2014/C1 was conditionally granted on 13th August 2014 with the following conditions relating to noise.

4.1.1 Condition 13

"13) Before use of each of the ground floor retail (Use Class A1, A2 or A3) commences each unit shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the premises and a scheme of acoustic treatment that has been submitted to and approved in writing by the City Council as local planning authority.

Reason - To safeguard the amenities of the occupiers of nearby residential accommodation, pursuant to policies SP1 and DM1 of the Core Strategy and saved UDP policies DC26."

4.1.2 Condition 16

"16) Before use of each of the ground floor retail (Use Class A1, A2 or A3) units commences a scheme for the acoustic insulation of any externally mounted ancillary equipment to ensure that it achieves a background noise level of 5dB below the existing background (La90) in each octave band at the nearest noise sensitive location shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the equipment. The approved scheme shall be implemented prior to occupancy of each unit.

Reason - To safeguard the amenities of the occupiers of nearby residential accommodation, pursuant to policies SP1 and DM1 of the Core Strategy and saved UDP policies DC26."

4.2. National Planning Policy (For Reference)

4.2.1 National Planning Policy Framework 2012

The revised *National Planning Policy Framework* (1) published in 2018 provides a presumption in favour of sustainable development that meets the three overarching objectives: economic, social and environmental. Paragraph 11 provides guidance for decision makers:

"For decision-taking means:…
c) approving development proposals that accord with an up-to-date development without delay; or
d) …granting planning permission…
i) the application of polies in this Framework… provides a clear reason for refusing development proposal; or
ii) any adverse impacts of doing so would significantly and demonstrably outweigh the benefits.

Paragraph 170 of the NPPF provides the following guidance on conserving and enhancing the natural environment in terms of noise:

"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 …noise pollution…"

Paragraph 180 of the NPPF requires the development to be appropriate for its location:

"Planning… decisions should also ensure that new development is appropriate for its location…
a) mitigate and reduce to a minimum potential adverse impact resulting from noise form new development and avoid noise giving rise to significant adverse impacts on health and quality of life [60]
b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for the recreational and amenity value…

60 See Explanatory Note to the Noise Policy Statement for England: 2010"

4.2.2 Noise Policy Statement for England: 2010

The *Noise Policy Statement for England* (2) was published in 2010 defines three aims:

> *"**Avoid** significant adverse impact on health and the quality of life;*
> ***Mitigate** and minimise adverse impacts on health and quality of life; and*
> ***Contribute** to the improvement of health and the quality of life."*

The NPSE defines significant adverse and adverse impact in terms of noise:

> *"**NOEL – No Observed Effect Level** – This is the level of noise below which no effect can be detected.*
> ***LOAEL – Lowest Observed Adverse Effect Level** - This is the level above which adverse effects on health and quality of life can be detected.*
> ***SOAEL – Significant Observed Adverse Effect Level** -This is the level above which significant adverse effects on health and quality of life occur."*

4.2.3 Planning Practice Guidance: 2014

The *Planning Practice Guidance – Noise* (3) last updated in 2014 is an online resource published by the Ministry of Housing, Communities and Local Government and provides specific advice on the NPPF and NPSE.

The NPPG expands the concept of effect levels and provides a useful table on the link between the effect, perception and typical outcomes.

Effect	Perception	Typical Outcomes
NOEL	Not Noticeable	No effect
	Noticeable & Not Intrusive	Audible, small behaviour change
LOAEL	Noticeable & Intrusive	Audible, behaviour change, Quality of Life Change
SOAEL	Noticeable & Disruptive	Dominant, Sleep disturbance.
	Noticeable & Very Disruptive	Extensive, Harmful Impact on Health

5. Condition 13 (Break-out Noise)…

5.1. Scope of Condition

In determining compliance with condition 13 the following is the assumed scope of the assessment of the breakout noise from the Pret a Manger occupying unit 8 on the ground floor.

- Breakout of noise through the shop front.
- Breakout of noise from the unit horizontally to the adjoining retail units.
- Breakout of noise from the unit vertically to the Business School above.

For reference the ancillary equipment in terms of the air conditioning units is covered in the assessment of condition 16 below.

5.2. Acoustic Criterion

The following criterion are assumed to allow the design of the acoustic mitigation measures.

5.2.1 Internal Pret a Manger Levels

Measurement Location	Broadband		Octave Centre Band Frequency (Hz)						
	NR	(A)	63	125	250	500	1K	2K	4K
Internal Pret a Manger	67	70	69	72	69	65	65	64	61
Maximum Sound Pressure Levels (dB) – $L_{Max, fast}$ reference level 2 x 10^{-5} Nm^{-2}									

5.2.2 External Criterion 1m from the Shop Front

Measurement Location	Broadband		Octave Centre Band Frequency (Hz)						
	NR	(A)	63	125	250	500	1K	2K	4K
Criterion 1m Facade	60	63	67	65	62	60	55	55	55
Maximum Sound Pressure Levels (dB) – $L_{Max, fast}$ reference level 2 x 10^{-5} Nm^{-2}									

5.2.3 Internal Criterion within Adjoining Retail Units

Measurement Location	Broadband		Octave Centre Band Frequency (Hz)						
	NR	(A)	63	125	250	500	1K	2K	4K
Criterion Internal Retail	40	43	50	45	41	39	37	34	34

Maximum Sound Pressure Levels (dB) – $L_{Max, fast}$ reference level 2 x 10^{-5} Nm^{-2}

5.2.4 Internal Criterion within Business School Circulation Spaces.

Measurement Location	Broadband		Octave Centre Band Frequency (Hz)						
	NR	(A)	63	125	250	500	1K	2K	4K
Criterion University	35	38	48	42	38	35	31	30	30

Maximum Sound Pressure Levels (dB) – $L_{Max, fast}$ reference level 2 x 10^{-5} Nm^{-2}

5.3. Breakout Noise through Shop Front

The following calculation is based on the existing shop front glazing which it is assumed will have the following overall transmission loss including with the entrance door being open.

Measurement Location	Broadband		Octave Centre Band Frequency (Hz)						
	NR/R_w	(A)	63	125	250	500	1K	2K	4K
Internal Pret a Manger	67	70	69	72	69	65	65	64	61
Transmission Loss	15	12	6	8	10	11	12	12	12
Level 1m from Façade	**59**	**55**	**63**	**64**	**59**	**54**	**53**	**52**	**49**
Criterion 1m Facade	60	63	67	65	62	60	55	55	55

Maximum Sound Pressure Levels (dB) – $L_{Max, fast}$ reference level 2 x 10^{-5} Nm^{-2}

5.4. Breakout Internal to Adjoining Retail Units

The following calculation is based on the landlord's blockwork wall separating the units and the plasterboard / tiling used as part of the Pret a Manger fitout.

Measurement Location	Broadband		Octave Centre Band Frequency (Hz)						
	NR/R_w	(A)	63	125	250	500	1K	2K	4K
Internal Pret a Manger	67	70	69	72	69	65	65	64	61
Transmission Loss	52	48	26	34	39	44	53	61	61
Internal Level	**20**	**26**	**43**	**38**	**30**	**21**	**12**	**3**	**0**
Criterion Internal Retail	40	43	50	45	41	39	37	34	34

Maximum Sound Pressure Levels (dB) – $L_{Max, fast}$ reference level 2 x 10^{-5} Nm^{-2}

5.5. Breakout Internal to University Above

The following calculation is based on the landlord's 125 to 140mm concrete slab with a 50mm screed and 1 layers of 12mm plasterboard installed as part of the Pret a Manger fitout.

Measurement Location	Broadband		Octave Centre Band Frequency (Hz)						
	NR/R_w	(A)	63	125	250	500	1K	2K	4K
Internal Pret a Manger	67	70	69	72	69	65	65	64	61
Transmission Loss	53	49	36	38	38	48	58	64	70
Internal Level	**21**	**24**	**33**	**34**	**31**	**17**	**7**	**<0**	**<0**
Criterion University	35	38	48	42	38	35	31	30	30

Maximum Sound Pressure Levels (dB) – $L_{Max, fast}$ reference level 2 x 10^{-5} Nm^{-2}

5.5.1 Compliance with Condition 13

The resultant levels comply in full with condition 13 of planning permission 06594/FO/2014/C.

6. Condition 16 (Mechanical Break-out Noise)…

6.1. Scope of Condition

In determining compliance with condition 16 the following is the assumed scope of the assessment of the breakout noise from the Pret a Manger occupying unit 8 on the ground floor.

- Ventilation to front of Venue.

In terms of the AC units these are located internally within the Bin Store at the rear of the unit within a common service area. Ventilation is provided to the large enclosed service yard area with an open entrance onto Booth Street West which is some 150m internal from the bin store. There is no direct line of site and therefore it is considered that the AC units within the Bin Store are located internally and as such condition 16 does not apply as it refers to *"externally mounted ancillary equipment"*.

6.2. Ventilation Equipment to Front Facade

6.2.1 Specific Sources under Consideration

Source	Description of Source	Annex C 13487: 2003	
		Day Time	Night Time
1	Supply Ventilation System	$L_{p(1)}$ 29 dB	$L_{p(1)}$ 20 dB
2	Extract Ventilation System	$L_{p(1)}$ 29 dB	$L_{p(1)}$ 20 dB

6.2.2 Calculation of Levels at Assessment Position

The International Standards Organisation ("ISO") published ISO 9613 – Part 2: 1996 entitled *"Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculations"* details the method for calculating the noise levels at a specific position.

6.2.3 Source Directivity (D_c)

A correction is made to account for the location of the source and the effect of reflective surfaces excluding the ground and is contained within section 6 of ISO 9613 - Part 2:1996.

Number of Surfaces	Correction in dB (D_c)		
1 Reflective Surface	+3 dB		
2 Reflective Surfaces	+6 dB		
3 Reflective Surfaces	+9 dB		
Site Specific Correction	Source	Surfaces	Correction
	Source 1 and 2	1 Reflective Surface	+3 dB

6.2.4 Geometric Divergence (A_{div})

A correction is made for the distance between the source and assessment position using the following formula defined in section 7.1 of ISO 9613-Part 2:1996.

Formula	Symbols		
$A_{div} = 20 . Log_{10} (d/d_0) +11$	A_{div} = Reduction due to Geometric Divergence (dB) d = Distance from source to receiver (m) d_0 = reference distance (1m)		
Site Specific Correction	Source	Distance	Correction
	Source 1 and 2	4 m	- 23 dB

The distance is taken as the centre of the louvres above the shop front to a position 1.5m above the first floor slab external 1m from the façade.

6.2.5 Atmospheric Absorption (A_{atm})

As the source was less than 100m from the receiver position (assessment position) no correction was made for atmospheric absorption.

6.2.6 Ground Absorption (A_{gr})

A correction is made for the effect of the ground between the source and receiver depending on whether it is considered hard or soft ground.

Type of ground	Correction in dB (A_{gr})		
Hard Ground	+ 3 dB		
Soft Ground	+ 0 dB		
Site Specific Correction	Source	Ground	Correction
	Source 1 and 2	Hard Ground	+3 dB

6.2.7 Barrier Effect (A_{bar})

A correction is made for any barrier in the direct line of site between the source and the assessment position and is detailed in section 7.4 of ISO 9613-Part 2:1996. For clarity the K_{met} meteorological correction has been ignored and C_2 equals 40 and C_3 equals 1.

Formula	Symbols		
$A_{bar} = 10 . Log_{10} [3 + (40 . \delta / \lambda) - A_g]$ *Note 1 where $\delta = a + b – r$ and $\lambda = c / f$	A_{bar} = Effective barrier attenuation (dB) A_{gr} = Total Ground Absorption (dB) *Note 1: Only apply the A_{gr} correction if $A_{gr} > 0$ δ = Path difference (m) a = Distance from source to barrier head (m) b = Distance from barrier head to assessment position (m) r = Distance from source to assessment position (m) λ = Wavelength of sound (m) c = Speed of sound – Assumed to be 342 ms^{-1} f = Octave band centre frequency (Hz)		
Site Specific Correction	Source	Path Difference	Correction
	Source 1 and 2	0.00 m	-5 dB

The barrier attenuation is assumed as a line of site off axis correction for the windows of the business school located at first floor level above Unit 8.

6.2.8 Calculations (Operating Hours)

Source		ISO 9613 – Part 2: 1996 Corrections					Receiver
Description	L_w	D_c	A_{div}	A_{gr}	A_{atm}	A_{bar}	L_p
Source 1 and 2	59 dB	+3 dB	-23 dB	+3 dB	-0 dB	-5 dB	34 dB

6.2.9 Resultant Specific Noise Levels

The following are the overall specific noise levels using the above calculations

Results	Day Time	Commentary
Specific Noise Levels	$L_{Aeq, 1\ hour}$ 43 dB	7.3.6 – Calculated levels

During the survey an audible check was made of the extract ventilation and it was found to be at a level that could not be measured due to the traffic noise from Oxford Street.

6.2.10 Feature Correction

The feature corrections have been added in accordance with British Standard 4142: 2014 and the general context of the proposed plant at the existing site.

Source	Feature Correction				
	Tonality	Impulsivity	Character	Intermittent	TOTAL
Time Period	Day	Day	Day	Day	Day
Source 1 & 2	+0dB	+0dB	+0 dB	+0 dB	+0dB

6.2.11 Assessment of Noise Levels

The assessment is undertaken in accordance with British Standard 4142: 2014.

Results	Opening Time of Pret a Manger	Commentary
Residual	$L_{Aeq,\ 1\ hour}$ 57 dB	7.3.2 – Source not yet installed
Background	$L_{A90,\ 1\ hour}$ 45 dB	8.1.4 – Typical & representative
Specific	$L_{Aeq,\ 1\ hour}$ 34 dB	7.3.6 – Calculated levels
Feature	+0 dB	9.2 - Subjective corrections
Rating	$L_{Aeq,\ 1\ hour}$ 34 dB	9.2 - Worst case scenario
Background	$L_{A90,\ 1\ hour}$ 45 dB	8 - No correction for residual
Assessment	-11 dB	Rating Level – Background Level
Conclusion	Low Impact	11 - Assessment of Impact
UIncertainty	+- 2.3 dB	10 – 95% Confidence, k = 2

6.2.12 Compliance with Condition 16

The resultant levels comply in full with condition 16 of planning permission 06594/FO/2014/C.

END OF DOCUMENT

7. Bibliography…

1. **Ministry of Housing, Communities and Local Government.** *National Planning Policy Framework.* 2018. NPPF.

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3. **Ministry of Housing, Communities and Local Government.** *Planning Policy Guidance - Noise.* 2015. PPGN.

4. **European Union and World Health Organisation.** *Night Noise Guidelines for Europe.* 2009. NNGL.

5. **World Health Organisation.** *Criteria for Community Noise.* 1999. WHO.

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