

SPRATT+HAMER



Noise Impact Report

Project Details

Client	MCD Manchester Limited
Client Address	243 Barlow Moor Road Chorlton Manchester M21 7QL
Site Address	11-13 Piccadilly Manchester M1 1LY
Reference	22179E

Quality Assurance

Prepared by	Phil Lodge BSc (Hons) PGDip AMIOA
Reviewed by	Alejo Garcigoy MSc MIOA
Authorised by	Ben Bielicki BSc (Hons) MIOA
Issue date	07/10/2024

Revision History

Version	Date	Editor	Notes
V1	07/10/2024	Phil Lodge	First issue



Contents

1	Summary	5
2	Introduction	6
3	Assumptions, Limitations & Uncertainty	7
4	Planning Policies, Guidance and Criteria	8
4.1	National Planning Policy	8
4.2	Local Planning Authority Criteria	10
4.2.1	BS 4142 Method for rating and assessing industrial and commercial sound	10
4.2.2	BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings	10
4.2.3	IEMA (Institute of Environmental Management and Assessment) Guidance	11
4.3	Criteria Summary	11
5	Site Description	12
5.1	Subjective Observations	12
5.2	Weather	12
6	Noise Measurement Procedure	14
6.1	Survey Date(s)	14
6.2	Personnel Present	14
6.3	Survey Equipment Used	14
6.4	Calibration	14
6.5	Ambient & Background Sound Measurements	14
6.5.1	Monitoring Position 1	14
6.5.2	Monitoring Position 2	15
6.6	Location Plan of Monitoring Positions	15
7	Results and Analysis	16
7.1	Measurement Results	16
7.2	Background Noise Level Measurement Analysis – MP1	16
7.3	Background Noise Level Measurement Analysis – MP2	18
8	Patron Noise Impact Assessment	20
8.1	Assessment of Patron Noise in Accordance with BS4142:2014+A1:2019	20
8.1.1	Increase in Ambient Noise Levels (IANL) Assessment	21
8.2	Context	22
8.3	Assessment of L_{AFMax} Events from Patrons	22



SPRATT+HAMER

9	Plant Noise Assessment	24
9.1	Assessment of Mechanical Plant in Accordance with BS4142:2014+A1:2019.....	24
9.2	BS 4142:2014+A1:2019 Initial Assessment	24
10	Recommendations.....	25
11	Conclusion.....	26
12	References	27
	Appendix.....	28
	Photograph Showing Monitoring Position 1.....	28
	Photographs Showing McDonalds Plant	29
	Photograph Showing Location of Monitoring Position 2	30



1 Summary

A noise assessment has been conducted for a McDonalds Restaurant at 11-13 Piccadilly, Manchester M1 1LY.

The assessment is to be undertaken in order to support a planning application for the development site to Manchester City Council.

The assessment considers the impact of the proposed extended operating hours of the restaurant including plant noise on potentially noise sensitive neighbouring residential premises in comparison with the Local Authority's criteria.

Assessment of noise levels due to external activity following the applicants proposed extension of hours indicates no adverse impact on the amenity of the local community according to BS 8233:2014 and BS 4142: 2014 noise criteria.



2 Introduction

MCD Manchester Limited has instructed Spratt and Hamer Limited to undertake a noise survey and subsequent report in order to assess the impact of the noise emissions from the operation of the restaurant (including plant noise) during proposed extended operating time, which may have an impact on existing residents in the local area.

The proposed development site is a restaurant that currently operates between the hours of 06:00 to 00:00 Monday to Sunday. The proposal is to operate 24 hours a day.

A previous application was submitted (ref: 131068/JO/2021) for a proposed extension of hours (05:00 – 02:00). An acoustic assessment report to support the application was written by Sustainable Acoustics (ref: 14-0167-87-801) and the application was refused.

This report is prepared solely for MCD Manchester Limited Developments Spratt and Hamer Limited accepts no responsibility for its use by any third party.

This document has been prepared using the various documents listed within the appendices of this report, together with drawings, technical information and additional verbal representations made by third parties. We have not audited nor independently verified the content or accuracy of any of the documents and information provided to us in the preparation of this report.

If additional information comes to light subsequent to the production of this report, we reserve the right to revise our opinions, and the conclusions reached within this report.



3 Assumptions, Limitations & Uncertainty

- a. It is assumed that the sound pressure levels measured on site during the environmental noise surveys are typical of the site.
- b. It is assumed that documentation and all information supplied by MCD Manchester Limited are up to date and correct.
- c. At the time of writing, the extended operating hours are proposed and as such no measurements of the noise emissions from patrons during these hours have been conducted. It is assumed that the predicted noise emissions used in the report are representative of the proposed extended hours.
- d. The delivery schedule to the restaurant is assumed to be as existing and the proposed extension of hours does not include deliveries to the restaurant during these hours.
- e. Patron and overall commercial activity are assumed to be the same throughout the week with similar levels of noise for both weekdays and weekends.



4 Planning Policies, Guidance and Criteria

The planning policies and criteria listed below are taken from associated relevant guidance documents, all of which should be considered for the internal and external noise levels.

4.1 National Planning Policy

The National Planning Policy Framework (NPPF) December 2023 set out the Government's planning policies for England and how they are expected to be applied. It provides a framework within which the Local Authorities are to prepare local plans and use their planning powers to minimise the adverse impact of noise. It should contain the following in relation to noise impacts.

174. Planning policies and decisions should contribute to and enhance the natural and local environment by:

'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.'

185. 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:

'mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life'

NPPF previously characterised noise by grading and recommending actions and different effect levels as reproduced in Table 1.



SPRATT+HAMER

Perception	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Table 1: Noise exposure hierarchy based on likely average response.



4.2 Local Planning Authority Criteria

Manchester City Council Planning and Noise Technical Guidance (October 2022)

The aforementioned document discusses how a BS 4142:2014 assessment should be conducted, however in addition to BS 4142:2014 criteria, the document states:

"The development should be designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location."

It should be noted that this criterion only applies to assessment of noise sources (commercial in nature) that fall under the scope of BS 4142:2014.

4.2.1 BS 4142 Method for rating and assessing industrial and commercial sound.

BS 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound is routinely used by local authorities in assessing noise associated with industrial and/or commercial activity.

In brief, BS 4142 provides a means of assessment whereby noise from industrial and commercial sources (the "specific sound level", $L_{Aeq,T}$) is compared with background noise ("background sound level", L_{AF90}).

The specific sound level may be corrected by a numerical penalty if it includes acoustic features that are considered to be distinctive. The corrected specific sound level is termed a "rating level" ($L_{Aeq,T}$) and is designed to reflect people's subjective reaction to noise characteristics that may be considered annoying.

The rating level is then compared to the background sound level to assess its impact. BS 4142 describes an indication of the impact according to the numerical difference between the rating level and the background sound level. This is shown below in Table 2.

Rating Level – Background Sound Level	Indication of Impact
+ 10dB	Significant Adverse Impact
+ 5dB	Adverse Impact
≤ 0dB	Low Impact

Table 2: BS 4142 Rating Level Impact

4.2.2 BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

The British Standard BS 8233:2014, Guidance on Sound Insulation and noise reduction for buildings, provides appropriate internal levels of noise within dwellings, flats and rooms in residential use when unoccupied.

Section 7.2.2 'Internal ambient noise levels in dwellings' of BS 8233: 2014 states that 'In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values in Table 3'.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,16hour}$	–
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	–
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Table 3: Table 4 of BS 8233:2014 Indoor ambient levels for dwellings



Note 7 of section 7.7.2 states 'Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed up to 5 dB and reasonable internal conditions still achieved'.

4.2.3 IEMA (Institute of Environmental Management and Assessment) Guidance

Principles of noise impact assessment are set out in the IEMA guidelines and are applicable to all development proposals where noise effects may occur. The guidance provides advice with regards to the collection of baseline noise data, prediction of noise levels and how noise should be assessed recognizing that the effect associated with a noise impact will be dependent on a number of factors, including but not limited to, the sensitivity of the receptor, frequency and duration of the noise source and time of day. It also accepts that a simple change in noise levels using a single noise indicator may fail to adequately reveal the actual noise impact of the proposal. The character of the noise must be considered. Thus, the guidance suggests comparing several noise indicators such as the L_{Aeq} , L_{Amax} and L_{A90} as a more rigorous approach.

Guidance provided does not facilitate specific assessment criteria which developments should achieve but instead suggests that the methodology adopted should be selected on a site-by-site basis regarding relevant national and local standards. The Guidelines contain effect descriptors for changes in noise levels and for noise effect levels, as shown below:

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

Table 4: IEMA effect descriptors

4.3 Criteria Summary

In order to meet the requirements of Manchester City Council the assessment and recommendations will be made in accordance with BS 8233:2014, BS 4142+A1:2019, Manchester City Council Planning and Noise Technical Guidance (October 2022).

Plant noise must achieve 5dB below the prevailing background level as per MCCPNTG Local Policy.



5 Site Description

The proposed site is located in Manchester city centre and currently accommodates a McDonalds restaurant, approximately 600m northwest of Manchester Piccadilly rail station. Given the city centre location there is no car park or drive through facility associated with the operations of the restaurant.

The area is a busy urban location including a mix of commercial businesses and residential properties. Vehicular traffic predominantly consisting of trams was found to be moderate to heavy with regular pedestrian passings. The surrounding commercial premises include restaurants / takeaways (Greggs, Wing Stop, Five Guys) and retail premises (Boots, Superdrug). It is understood that the unrelated restaurants and takeaways operate from the earliest 06:00 to latest 00:00. There is also a hotel on the corner of Oldham Street and Piccadilly Gardens.

It is understood that the closest residential dwelling with respect to the front of the site is on the second floor above Five Guys at 15 Piccadilly Gardens (approximately 27m away).

On the roof to the rear of the front façade of the site are existing external plant units associated with the operation of McDonalds. The client has advised that the extraction is switched off between the hours of 01:30 and 05:00. However, it is assumed that other plant such as condensers may still be operating. Surrounding commercial premises have their fixed mechanical plant, including condenser and extraction vents, installed in the neighbouring flat roof. The closest noise sensitive receptor at the rear was found to be the building fronting on to Oldham Street (approximately 25m away).

It is also important to mention that the area is currently a lively and busy area in the centre of Manchester, with activity taking place until late hours of the night, particularly during weekends and particularly of note a 24-hour operational Burger King less than 100m from the site. It is also of note that the busy Northern Quarter area of the city is in close proximity to the site which attracts patrons for events throughout the week often till early hours of the morning.

5.1 Subjective Observations

During site attendance, subjectively the main source of noise at the front of the McDonalds site was vehicular traffic flow (including busses and trams) and patron noise. It was noted that tram and bus operations commenced from 06:00. Other noise sources considered secondary in nature included emergency sirens, bird song, refuse collection and road sweeping activity.

The main source of noise at the roof location was predominantly McDonalds commercial plant mixed with other unrelated commercial plant and distant vehicular traffic.

5.2 Weather

20-23/09/2024	Friday	Saturday	Sunday	Monday
Temperature (°C)	10.2 – 19.4	13.7 – 21.3	13.1 – 14.9	12.6 – 15.5
Wind Speed (m/s)	0.0 – 2.7	0.0 – 2.2	0.0 – 2.9	0.0 – 1.9
Wind Direction	ENE	E	E	E
Precipitation (mm/h)	0.0 – 0.0	0.0 – 4.8	0.0 – 4.8	0.0 – 9.0
Damp road/ wet ground	No	Damp	Damp	Wet
Fog/snow/ice	None	None	None	None

Table 5: Measuring Weather Conditions



All weather data taken from www.metoffice.gov.uk from the Chorlton weather station, located at approximately 5.5 km south of the proposed development.



6 Noise Measurement Procedure

6.1 Survey Date(s)

20/09/2024 - 23/09/2024

6.2 Personnel Present

Jonny Spratt BSc (Hons)

Luke Owen BSc

6.3 Survey Equipment Used

Manufacturer	Model	Serial No.	Description
Rion	NL-52	01032413	Integrating Sound Level Meter and Real Time Analyser
Pulsar	Model 105	93357	Acoustic Calibrator
Pulsar	Model 105	86702	Acoustic Calibrator
Rion	NL-52	00976149	Integrating Sound Level Meter and Real Time Analyser

Table 6: Survey Equipment Used

6.4 Calibration

NL-52 (01032413) sound level meter was calibrated with the field calibrator to a level of 94.0 dB @ 1 kHz prior to and on completion of the survey and NL-52 (00976149) calibrated to 93.8 dB. No significant drift in calibration was observed. The meters used during the survey are precision grade Class 1.

Calibration certificates are available on request.

6.5 Ambient & Background Sound Measurements

The measurement locations chosen during the survey were deemed suitable for the determination of the ambient and baseline noise levels of the area.

The sound level meters were set to measure A-weighted broadband and 1:1 octave frequency bands L_{Aeq} , L_{A90} , in 5-minute periods.

6.5.1 Monitoring Position 1

A microphone was placed on a blue corridor 1.5 m above the roof of the corridor overlooking the plant associated with McDonalds. The sound level meter was set to record WAV file audio recordings for all maximum sound level events above 77 dBA. The meter was set to measure the complete survey period.



6.5.2 Monitoring Position 2

Microphones were placed on the boundary of the adjacent street food stalls overlooking the pedestrianised area in front of McDonalds at a distance of at least 1m from any reflecting surface. The sound level meters were set to record WAV file audio recordings for all maximum sound level events above 70 dBA. The microphone position is considered to be free field.

Monitoring position 2 was set to measure between 05:10 and 07:00 on Sunday and between 22:55 Monday and 01:00 Tuesday.

Both measurements are considered representative of typical activity in the area. No subjective deviation in noise levels was noted.

6.6 Location Plan of Monitoring Positions

The location plan below shows the proposed development, positions of the monitoring equipment and location of the noise sensitive receptors.

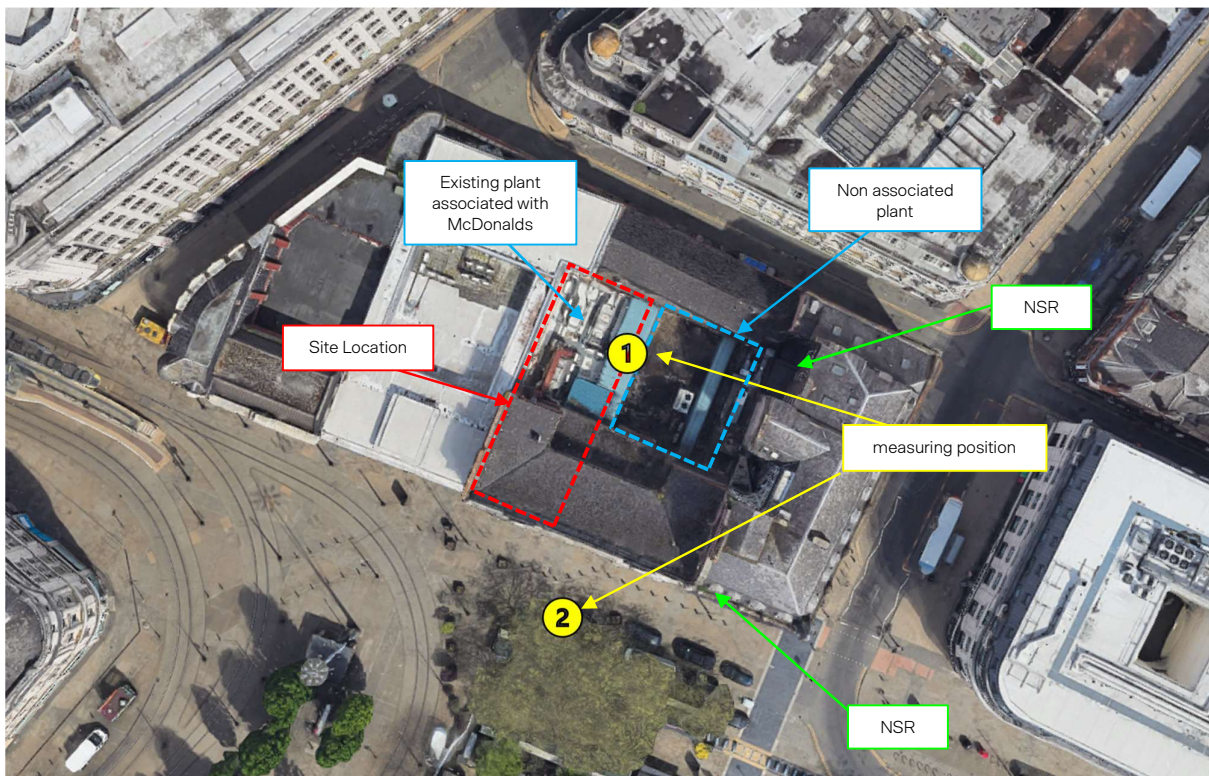


Figure 1: Indicative Location Map. Image taken from www.google.com/maps.



7 Results and Analysis

7.1 Measurement Results

The following table presents the measured results from monitoring position 1.

Day	Time Base T (hours)	Highest $L_{Aeq,5mins}$ (dB)	Min. $L_{A90,5mins}$ (dB)
Friday	10 hr 40 m	67.4	59.3
	8 hr	61.8	54.1
Saturday	16 hr	72.2	59.1
	8 hr	65.7	53.7
Sunday	16 hr	69.7	58.9
	8 hr	61.4	53.3
Monday	3 hr 35 m	69.7	58.9

Table 7: Measurement Results – MP1

The following table presents the measured results from monitoring positions 2 when McDonalds is open and when closed.

Day	Time Period	Open / Closed	Average $L_{Aeq,5mins}$	Highest $L_{Aeq,5mins}$ (dB)	L_{AFMax} (dB)	Min. $L_{A90,5mins}$ (dB)	Max. $L_{A90,5mins}$ (dB)
Sunday	05:10 – 06:00	Closed	52.4	56.6	61.9 – 83.7	46.8	48.4
	06:00 – 07:00	Open	59.3	66.1	64.2 – 87.3	47.8	53.6
Monday	22:55 – 00:00	Open	67.8	76.8	67.7 – 94.2	42.4	58.8
Tuesday	00:00 – 01:00	Closed	71.4	81.7	66.3 – 99.0	48.5	60.2

Table 8: Measurement Results – MP2.

It should be noted that it was not possible to conduct measurements from the first-floor window of the restaurant and for security reasons, it was only possible to measure between the hours of 23:00 – 01:00 and 05:00 – 06:00.

7.2 Background Noise Level Measurement Analysis – MP1

While the client has advised that the McDonalds plant is switched off between the hours of 01:30 and 05:00, the level time graph below indicates that the plant switches off at approximately 02:00 and switches back on at 05:30 on the three nights measured. As such, as a worst-case scenario, the background noise levels during this time period will be used.



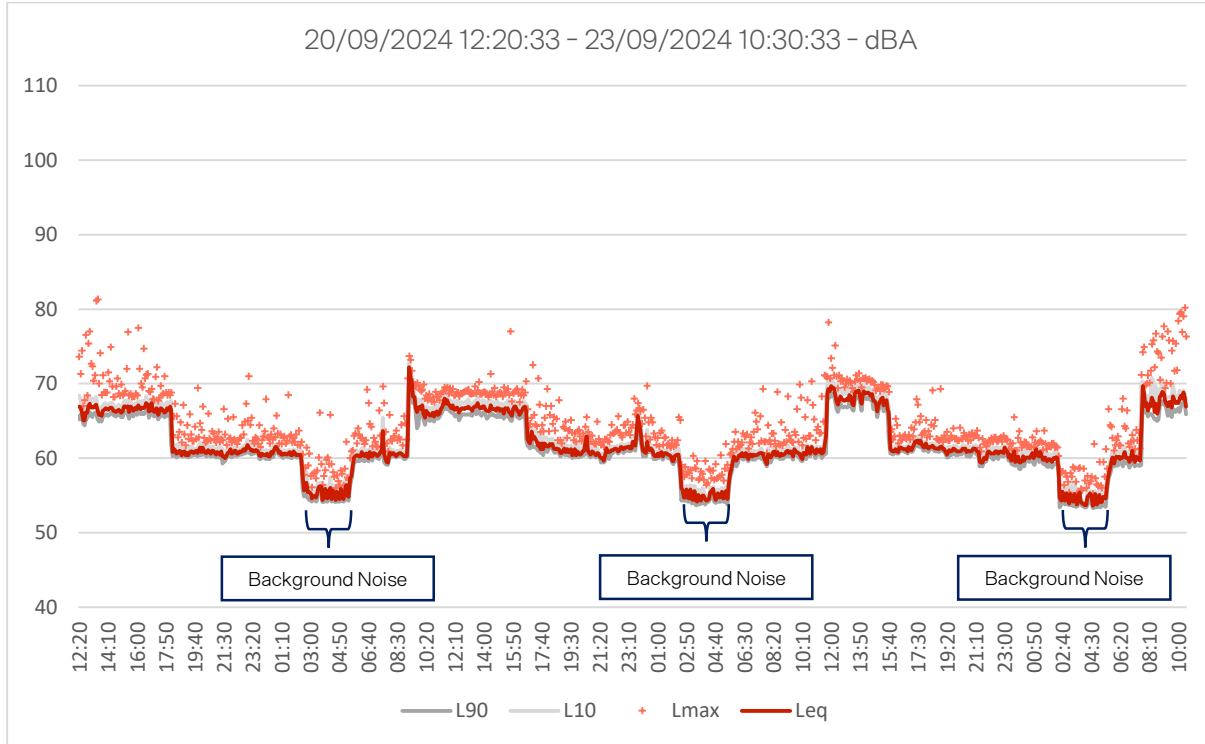


Figure 2: Level-Time Graph for MP1.

It should be noted that it is not possible to establish whether the measurement between these hours does not have influence from any other plant on the roof, however given the city centre location of the site it is reasoned that some plant noise would be considered part of the existing background noise climate.

The following histogram outlines the measured $L_{A90,5min}$ background results at MP1 during hours of 02:00-05:30. All values are rounded to integers such that 0.5 is rounded up.



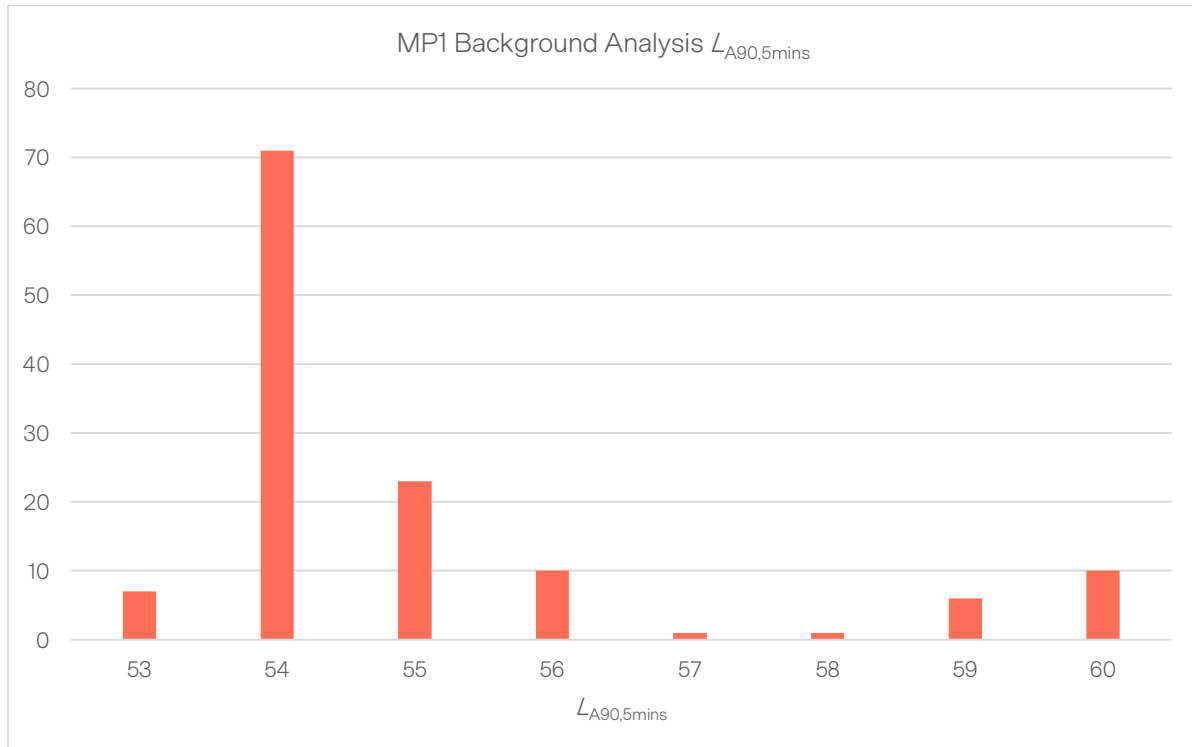


Figure 3: Background Noise Analysis – MP1

In the night-time, the statistically most repeated SMR 'modal' value $L_{A90,5min}$ is 54 dBA.

7.3 Background Noise Level Measurement Analysis – MP2

Given the current operational hours of 06:00 – 00:00, this time period will be removed from the analysis. For MP2 between the measurement period 05:10 and 06:00, $L_{A90,5min}$ 47dB and 48dB were repeated four and six times, respectively. To provide a robust and conservative assessment, $L_{A90,5min}$ 47dB will be used in the assessment.

The following histogram outlines the measured $L_{A90,5min}$ background results at MP2 between the measurement period 00:00 – 01:00. All values are rounded to integers such that 0.5 is rounded up.



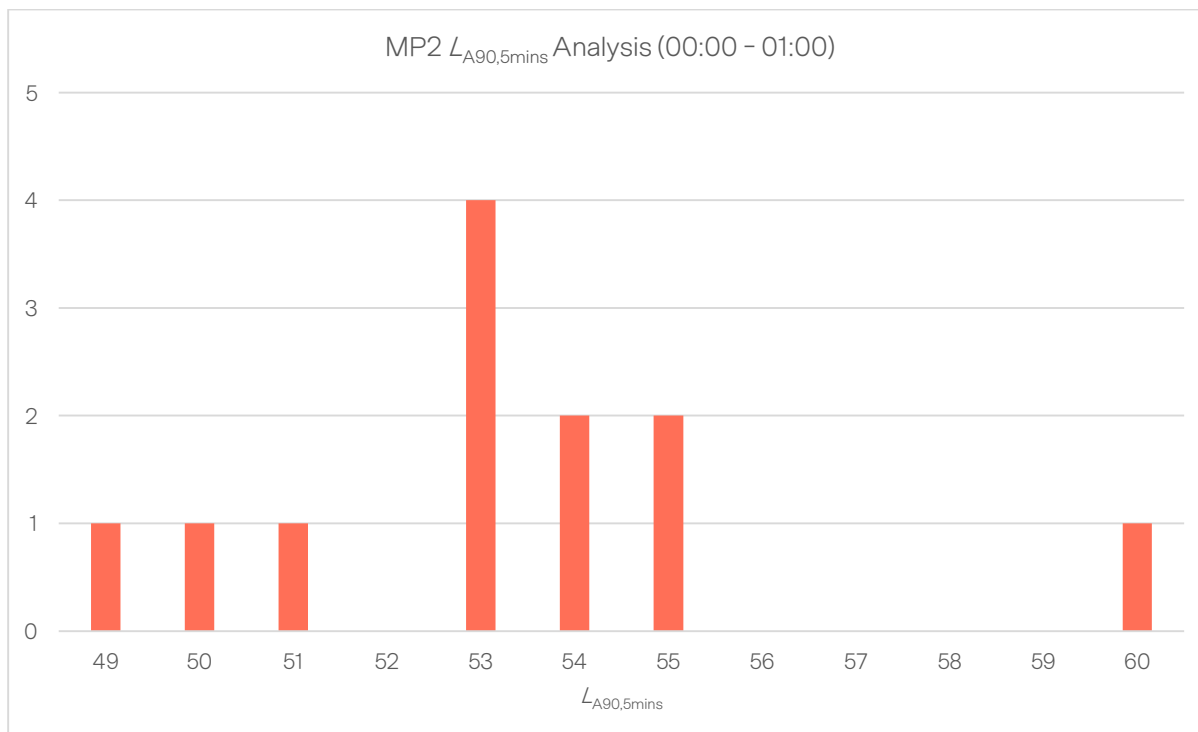


Figure 4: Background Noise Analysis – MP2 (00:00 – 01:00)

The statistically most repeated SMR 'modal' value $L_{A90,5min}$ is 53 dBA. This value will be used from 00:00 – 03:00 in the assessment as it was repeated for 50% more of the time.



8 Patron Noise Impact Assessment

8.1 Assessment of Patron Noise in Accordance with BS4142:2014+A1:2019

Given the applicant is proposing to extend opening hours to open between 00:00 and 06:00, it is not possible to survey the number of patrons using the restaurant during these times. Therefore, the following considerations and/or assumptions will be taken into account:

- A prediction of the no. of patrons using the restaurant is based on a survey conducted at a similar McDonalds restaurant operating 24h. over nights during the Pride event at St Annes Square.
- A client survey for the typical patron attendance between 23:00 and 00:00 is 110 patrons on a typical evening and 325 patrons on event evenings.

The following table provides an estimate for the number of patrons per proposed extended hour based at the applicant's site.

Time Period	No. Patrons @ St Annes Sq.	% Reduction of Previous Hr	Predicted Patrons (Typical) *	Predicted Patrons (Event)**
23:00 – 00:00	222	N/A		
00:00 – 01:00	205	92.1%	101	299
01:00 – 02:00	161	78.8%	80	236
02:00 – 03:00	126	77.9%	62	184
03:00 – 04:00	104	83.0%	52	153
04:00 – 05:00	56	53.4%	28	81
05:00 – 06:00	47	84.4%	23	69

Table 9: Estimate of Patrons Using McDonalds During Proposed Extended Hours During an Event

* Reduction from 110 patrons per hour based on reduction per hour at St Annes Square McDonalds Restaurant for a typical night.

** Reduction from 325 patrons per hour based on reduction per hour at St Annes Square McDonalds Restaurant for an event night.

In order to calculate the specific sound at the receptor, the following considerations and/or assumptions will be taken into account:

- It is assumed that the majority of patrons would exit the premises and walk away from the site.
- Assumed 10% of patrons with raised voices (66dBA at 0.9m) will loiter in front of the restaurant. The remainder will use normal voices (60dBA at 0.9m). This is considered to represent a conservative scenario. Values at 0.9m have been taken from www.engineeringtoolbox.com.
- The distance from source to receptor is approximately 27m.
- The number of patrons shown is based on a 15-minute reference period in accordance with BS 4142:2014 for the nighttime period.
- Due to the nature of the source, no character corrections will be applied.
- No. of patrons during an event will be used as a worst-case scenario.
- $L_{A90,T}$ of 53dB adopted for 00:00 – 03:00 and 47dB adopted for 03:00 – 06:00



SPRATT+HAMER

The following table estimates the sound pressure level at the receptor window for each proposed extended opening hour and sets out the BS 4142:2014 assessment.

Time Period	No. Patrons at Raised Voice	No. Patrons at Normal Voice	Rating Level at NSR $L_{Aeq,15mins}$ (dB)	Background $L_{A90,5mins}$ (dB)	Excess Rating Level (dBA)
00:00	7	67	50	53	-3
01:00	6	53	49	53	-4
02:00	5	41	48	53	-5
03:00	4	34	47	47	0
04:00	2	18	45	47	-2
05:00	2	15	44	47	-3

Table 10: BS 4142:2014 Assessment

The assessment indicates that the excess rating level due to extended operational hours does not exceed the background noise level and therefore considered to equate to a Low Impact according to BS 4142 definitions reproduced in Table 2 of this report. This is also considered as having No Observed Adverse Effect Level (NOAEL) in accordance with NPPF.

In addition, further descriptors need to be taken into account in order to assess the impact of the proposed extension of hours. As such, the following section will analyse the increase in ambient noise levels as per IEMA guidelines.

8.1.1 Increase in Ambient Noise Levels (IANL) Assessment

In addition, the following table will assess any potential increase in the ambient sound levels in the area in accordance with IEMA (Institute of Environmental Management and Assessment) guidance.

The assessment takes into account the lowest ambient sound level (residual) measured at Monitoring Position 2, and logarithmically adds the specific sound level of the noise source at the most exposed receptor. The higher the increase the higher the level of impact on the nearby receptors. Calculations have been conducted for all hours between 00:00 – 06:00 and the worst case is presented.



Description	MP2 Sound Level dBA	
	(00:00 – 03:00)	(03:00 – 06:00)
Lowest measured ambient sound level $L_{Aeq,T}$	54.4	49.6
Highest Specific sound level at NSR	50.4	44.0
Cumulative sound level	55.8	50.6
Increase in ambient sound level	+1.4	+1.0
IEMA guidance	Not significant	Not significant

Table 11: Estimated Increase in Ambient Noise Levels

As shown above, the assessment indicates that the expected increase in ambient noise levels would be 'Not Significant' as per IEMA guidelines, which would equate to NOAEL (No Observed Adverse Effect Level) in accordance with NPPF.

8.2 Context

The proposed restaurant extended operational hours has been assessed using the measured background sound levels during the hours 00:00 – 01:00 and 05:00 – 06:00. It is acknowledged that the background levels between 01:00 and 05:00 will potentially reduce, however as presented in table 10, the rating level also reduces during these times.

The noise due to patrons entering and exiting the restaurant has been assessed at full capacity during an event. It is assumed that for the majority of the time i.e. during typical times, the noise emissions will be lower.

In addition, given the busy city centre location including a Burger King operating 24 hours a day and the proximity to the busy entertainment venues, it is considered that the proposed restaurant extended operating hours will not form an entirely new source of noise in the area and likely to be a slight intensification (if any). This is demonstrated by the IEMA assessment above.

It should be noted that the applicant is not proposing a new development as such and instead proposing an extension to the operational hours of an existing development, therefore it is reasoned that the criteria of 5 dB below the background for new developments would not apply in this case.

Taking the context into account, the extended operating hours are unlikely to present any additional impact on the existing noise sensitive receptors.

8.3 Assessment of L_{AFMax} Events from Patrons

In accordance with the World Health Organisation (WHO) L_{AFMax} events during the hours of 23:00 and 07:00 should not exceed 45 dB inside a noise sensitive room i.e., a bedroom.

With reference to engineeringtoolbox.com, the sound pressure level of a person shouting at a distance of 0.9m is 78 dBA. Adopting a point source propagation over one reflective surface this equates to a sound power of 85 dBA.

Based on the propagation of a point source with one reflective surface to the receptor window approximately 27m away from the source, this equates to a sound pressure level of 48 dBA.



SPRATT+HAMER

The NANR116 is a research document and discusses the attenuation of open / closed windows being between 10 and 15 dBA. Therefore, a sound pressure level of 48 dBA is likely to be attenuated to 38 dBA or less inside a bedroom hence not exceeding the level specified by the WHO.

Description	Sound Level (dB)
Shouting Voice Sound Power Level L_{WA}	85
Specific L_{AFMax} at Receptor	48
Partially open window attenuation	-10
Noise Level inside receptor L_{AFMax}	38
BS 8233 criteria	45
Exceedance	-7

Table 12: Estimated L_{AFMax} Event Noise Level Inside a Noise Sensitive Room.



9 Plant Noise Assessment

9.1 Assessment of Mechanical Plant in Accordance with BS4142:2014+A1:2019

Given the proposed extended operating hours, the existing external mechanical plant will operate during these proposed hours.

Section 7 of this report sets out the selected representative background noise level to adopt for the assessment as 54 dB $L_{Aeq,5mins}$.

A sound pressure of 62 dBA is the highest measured $L_{Aeq,5mins}$ at a distance of approximately 2m from the edge of the source.

9.2 BS 4142:2014+A1:2019 Initial Assessment

The following considerations have been taken into account.

- The receptor is a distance of 25m from the source for which the assessment will assume point source distance attenuation using $20\log(r_2/r_1)$.
- 62 dBA $L_{Aeq,5mins}$ is an ambient measurement and is likely to have influence from other unrelated noise sources. Therefore, this level is considered a conservative noise level.
- It is considered that the tonal component of the operating plant is likely to be just perceptible at the receptor and that no intermittency or impulsivity will be associated with the operation.

The following table outlines the BS 4142:2014 assessment:

Description	Sound Level (dB)
Predicted Specific Sound Level $L_{Aeq,5mins}$	40
Character Corrections (tonality)	2
Predicted Rating Level	42
Background Noise Level $L_{A90,5mins}$	54
Excess Rating Level	-12

Table 13: Plant Noise BS 4142:2014 Assessment

The assessment indicates that the excess rating level due to extended operational hours will be at least 12dB the background noise level, equating to Low Impact according to BS 4142:2014 definitions reproduced in Table 2, of this report and no observed effect level (NOEL) in accordance with NPPF.

The assessment also indicates that the Manchester City Council criteria of a specific sound not exceeding 5 dB below the prevailing background level is also achieved.

It should be noted that the above assessment is based on the measurements conducted and that should the applicants plant loading increase beyond that measured, the excess rating level is likely to increase and subsequently a further assessment may be required.



10 Recommendations

It is recommended that a noise management plan is implemented which should include (but should not be limited to) the following:

Topic	Impact	Mitigation
Responsible Personnel	The noise management plan must be assigned to a member of staff, to ensure the mitigation measures are carried out.	- It is imperative that a member of staff is assigned the responsibility to ensure the Noise Management Plan is implemented at all times. - Regular checks should be carried out to ensure mitigation measures are followed in all areas of the workplace.
Liaison with Residents	A point of contact should be established for the neighbouring residents to contact to maintain a positive relationship.	- The point of contact should have regular liaison with the residents of the neighbouring properties providing point of contact for any potential feedback or complaints. - Residents should be informed of any likely busy periods of work and/or any potential increase in noise levels. - A phone number and email address should be available to the residents should they have any concerns.
Equipment	Poorly maintained equipment is likely to have a higher noise output.	All equipment should be well maintained and serviced regularly as recommended by the manufacturer.
Complaints Procedure	A complaints procedure should be implemented in order to deal with any potential complaints and maintain a positive relationship with neighbouring residents.	- A formal complaints procedure should be in place to detail any potential complaints as well as highlighting mitigation methods. - All residents should have access to a phone number and email address to contact should they have any concerns rather than issuing a formal complaint.

Table 14: Recommended Noise Management Plan.



11 Conclusion

The report concludes that, based on the predicted noise emissions of the site at the location of the nearby receptors, the noise emissions from the proposed restaurant extended operating hours should have a low impact on the amenity of the residents of neighbouring dwellings. It is however recommended that a noise management plan is implemented.



12 References

National Planning Policy Framework (NPPF).

BS 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound.

BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures.

NANR116: 'Open/Closed Window Research' Sound Insulation Through Ventilated Domestic Windows

Sustainable Acoustics Report Reference ref: 14-0167-87-801



Appendix

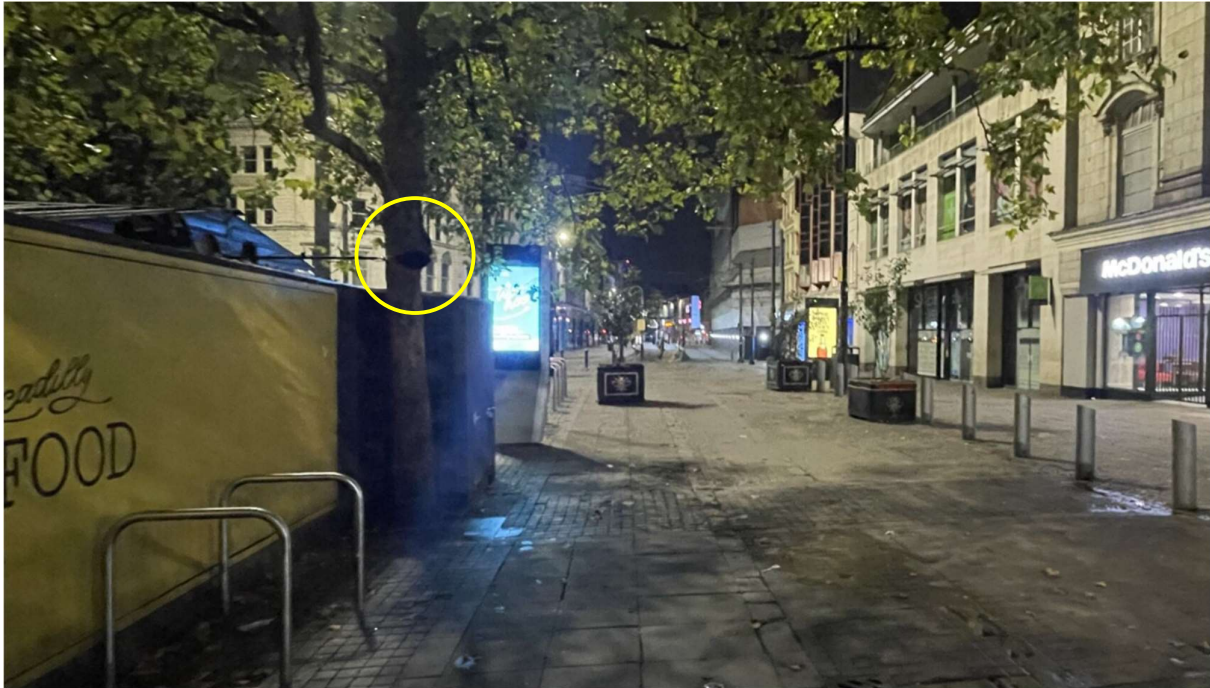
Photograph Showing Monitoring Position 1



Photographs Showing McDonalds Plant



Photograph Showing Location of Monitoring Position 2.



Glossary of Acoustical Terms

A-weighting

Noise levels are corrected to represent human response to sound.

L_{Aeq}

This is a continuous equivalent of time varying noise, or effectively the average measured (A weighted) noise level over a defined period of time.

$L_{Aeq,16hour}$

A 16 hour long measurement of the L_{Aeq} over the period between 07:00 and 23:00, also known as a daytime measurement.

$L_{Aeq,8hour}$

An 8 hour long measurement of the L_{Aeq} over the period between 23:00 and 07:00, also known as a night time measurement.

L_{AFmax}

The highest, or maximum A-weighted sound pressure level measured over a specified time period. The 'F' defines a time weighting in Fast.

L_{A90}

The A-weighted noise level or average level which is exceeded for 90 percent of the measured time period. Also known as a background level.

L_{A10}

The A-weighted noise level or average level which is exceeded for 10 percent of the measured time period.

1:1 & 1:3 octave spectrum analysis

A single measurement that is separated into frequency bands to allow for a more detailed analysis of the noise source in question.

R_w

The weighted sound reduction index of a partition or facade. A single number value based on the performance of a partition between two rooms across the frequency range 100Hz to 3150Hz. The level is adjusted for the effects of reverberation and background noise.



$D_{n,e,w}$

The weighted level difference of a partition or façade which takes into account a small element such as a grill or vent.

SEL (sound exposure level)

A measure of A-weighted sound energy used to describe a particular event, such as a train pass. It is the sound energy, which, if occurring over one second would contain the same energy as the event.

Free field sound pressure

Is where the radiation or spread of sound is completely unaffected by the presence of any reflecting surfaces or boundaries.

Low Frequency Noise

A term generally used for sound below a frequency of 100 to 150Hz.





SPRATT+HAMER

Online
sprattandhamer.co.uk

Email
info@sprattandhamer.co.uk

Birmingham
Lewis Building, Bull Street
Birmingham, B4 6AF
0121 628 3120

London
100 Borough High Street
London, SE1 1LB
0203 286 2019

Liverpool
23 Roscoe Street, Liverpool
L1 2SX
0151 933 6186

Manchester
Peter House, Oxford Street
Manchester, M1 5AN
0161 521 9383