14 MARKET STREET, LONDON E1 6DT

Noise Impact Assessment Report

Reference: 11806.RP01.NAR.0
Prepared: 13 April 2022
Revision Number: 1

Spitalfields Estate
65 Brushfield Street
Spitalfields
London
E1 6AA

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Revision	Comment	Date	Prepared By	Approved By
0	Draft issue of report	11 April 2022	Maxim Billingham	Torben Andersen
1	Final Issue	13 April 2022	Maxim Billingham	Torben Andersen

Terms of contract:

The recommendations within this report relate to acoustics performance only and will need to be integrated within the overall design by the lead designer to incorporate all other design disciplines such as fire, structural integrity, setting-out, etc. Similarly, any sketches appended to this report illustrate acoustic principles only and again will need to be developed in to full working drawings by the lead designer to incorporate all other design disciplines.

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1.0 INTRODUCTION

RBA Acoustics has been appointed by Spitalfields Estate to undertake a noise impact assessment in relation to a proposed premises licensed for both off and on sales to be known “Kill The Cat” at 14 Market Street, Spitalfields London E1. The venue is to include an external seating area at the front of the property.

This report provides the details of an environmental sound monitoring survey undertaken along Market Street at Spitalfields market and the results of a noise impact assessment related to the anticipated use of the outdoor seating area, considering relevant and appropriate assessment methodology.

The report occasionally employs technical terminology. In order to assist the reader, a glossary of terms is presented in Appendix A.

2.0 SITE DESCRIPTION

The site comprises a six-storey structure with a communal roof terrace, located to the south of Spitalfields market, within a mixed-use, commercially led area. Spitalfields market occupies most of the surrounding premises and provide lots of dynamic commercial spaces for independent clothing, jewellery and art retailers, as well as bars, restaurants and cafes.

The building itself comprises series of adjacent commercial properties at the ground floor-level and offices on the subsequent upper levels. The site is bordered by the local communal square, namely “Bishops Square” to the west and Crispin Place to the east. To the north of the site is located another adjacent office building, which has access to the site’s roof terrace. The building stretches from west to east along the Market Street, which is located south of the site. The Market Street is currently covered by the glass roof at second floor-level and bordered by a row of adjacent mixed-use buildings, comprising more commercial properties at ground floor-levels with residential dwellings on the upper levels. The pedestrian walkways are also provided between these houses for the Spitalfields Market visitors, which lead to Brushfield Street.

The new premises “Kill The Cat” is proposed at commercial unit formerly used as office space on Market Street, which is currently under construction. The venue will be located at ground floor-level of the building, adjacent to other existing commercial units to the west and east of the property. The proposed external seating area and main entrance will be located at Market Street, south of the site.

A plan of the site showing the location of a proposed external area at 14 Market Street and the nearby noise sensitive properties is illustrated in Figure 1 in Appendix B.

From our discussions with the Client, it is understood that the proposed trading hours for the venue will be from 08:00 to 23:30 Monday to Saturday, and from 08:00 until 23:00 hours on Sunday; with the external seating area closing at 22:00 hours. The new external area is anticipated to accommodate up to 25 patrons although after 21:00 hours this capacity will be reduced to reduce the risk of disturbance to local residents.

The closest residential receptor will be located at the first-floor window of 47 Brushfield Street, located above the commercial units to the south of 14 Market Street (across the Market Street) at approximately 5m above the ground, overlooking the proposed sitting area (referred to Receptor A from here on in).

These receptors are indicated on the site plan in Appendix B.

3.0 ENVIRONMENTAL NOISE SURVEY

Baseline environmental sound monitoring was undertaken at the Site on Thursday 31st of 2022. The survey was undertaken by Maxim Billingham (BA, MSc, AMIOA) and commenced at approximately 19:00 hours and concluded at approximately 22:00 hours. The full details of the monitoring survey are presented in the following sections.

3.1 Measurement Location

In order to determine the background noise climate at the nearest affected residential receptors to the site the equipment was installed at the hoarding, surrounding 14 Market Street as a part of the ongoing construction works. The sound level meter was positioned on a pole and attached to the hoarding, such that it was approximately 3m above the ground. The prevailing noise climate at this location was considered representative of the background noise climate at the nearest noise sensitive receptors.

The measurement location is also illustrated on the site plan in Figures 1 and photos Figure 2 in Appendix B.

3.2 Instrumentation

The details of the equipment used for the measurements are presented in Appendix C.

The sound level meter was calibrated both prior to and on completion of the survey with no calibration drift observed. The sound level meter and field calibrator have been laboratory calibrated within the past two years. Calibration certificates for all equipment are available on request.

3.3 Weather Conditions

Weather conditions throughout the survey were considered to be suitable for obtaining representative noise measurements, being predominantly dry with little wind.

3.4 Measured Sound Levels

Throughout the survey, continuous measurements were made of the L_{Aeq} noise levels. The number of pedestrian movements past the measurement position have also been recorded for the first 10 minutes, at the beginning of every hour. Table 1 below presents the measured sound levels measured during the periods immediately before closing with the respected number of visitors, which will be considered in the subsequent noise impact assessment for the proposed external sitting area. These times were utilised in our assessment as these were the periods with the lowest levels of background noise within the trading hours of the premises, and therefore provide a worst-case assessment.

Table 1 – Summary of Measurement Results

Measurement Period	Average $L_{Aeq,T}$	No. Movements (in 10 minutes)
19:00 hours to 20:00 hours	68	143
20:00 hours to 21:00 hours	66	94
21:00 hours to 22:00 hours	63	49
Overall	**66**	**286**

For the purpose of this assessment the lowest measured L_{Aeq} within the proposed trading hours of the external seating area will be used, so to assume a worst-case scenario. From the table above, the lowest background sound level without activity noise from the unit itself was 66dB and 63dB, before and after the external sitting area working hours, respectively. These levels will be used for the subsequent assessments of noise impact on the nearby noise sensitive property.

3.5 Prevailing Noise Climate

Subjectively, the market area and surroundings was noted to be relatively lively, particularly during the early parts of the evening with significant numbers of patron movements and noise associated with the other commercial units.

Road traffic and pedestrian activity along Brushfield Street and other roads in the area also contributed to the local noise climate.

4.0 ASSESSMENT CRITERIA

General planning guidance for England is included in Appendix D. The project-specific requirements are outlined below.

4.1 Criteria to be Adopted for This Assessment

Based on the various guidance documents in Appendix D, the guidance from IEMA is considered appropriate for the assessment of patron noise from the proposed external sitting area, and the methodology in the guidance will also be adopted for the assessment of noise impact upon the adjacent residential properties.

Typically, the greater the increase of the existing measured background noise levels caused by patron speech, the greater the magnitude of the impact. For the purposes of this assessment and considering the context of the local environment (it being mainly commercial use) it is considered that these response levels may be correlated to the effect levels within NPSE and PPG, as presented in Table 2.

Table 2 – IEMA Effect Levels Correlated with NPSE and PPG

Background Noise Level Increase Leq, T (dBA)	NPSE	PPG
0 and below	NOEL	No Observed Effect
0.1-2.9	NOEL / LOAEL	No Observed Adverse Effect
3.0 – 4.9	LOAEL	Observed Adverse Effect
5.0 – 9.9	LOAEL / SOAEL	Significant Observed Adverse Effect
10.0 and above	SOAEL/UAEL	Unacceptable Adverse Effect

5.0 NOISE IMPACT ASSESSMENT

In order to predict the likely resultant noise levels from customers within the proposed external area at the nearest affected residential windows, a detailed patron assessment has been carried out.

5.1 Site Layout and Proposals

The proposed external seating area will be located at a ground floor level to the south of the property at 14 Market Street, Spitalfields

A layout of the premises is shown in Figure 3 in Appendix B

Patron Numbers

For the purpose of this assessment, we have assumed that the maximum capacity of 25 patrons using the facility at any one time before 21:00 hours; and up to 12 patrons between 21:00 and 22:00 hours, as advised to us by the client. Typically, in a conversation between 2 people one would be talking and the other listening. Therefore, for our analysis we have considered a maximum number of 12 and 6 patrons talking simultaneously, for the pre 21:00 hours and 21:00-22:00 hours scenarios respectively. This considered to be the worst-case, as it tends to over-estimate the number of voices at any one time as typically the proposed external area is unlikely to regularly be at its maximum capacity.

5.2 Affected Receptors

Our assessment has considered noise associated with the use of the proposed external sitting area upon nearest affected residential receptor at Receptor A. Noise levels at other receptors will be lower than those indicated above and hence the potential impact will be further reduced.

In order to predict the likely resultant noise levels from customers within the new external seating areas at the nearest affected residential windows, a detailed noise modelling exercise using the commercial noise modelling software CadnaA has been undertaken. This modelling package is based on the guidance within ISO 9613-2:1996 “Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation”

Predicted noise levels used within our assessment are based on extrapolated data for each person speaking at a normal voice level. The levels used are presented in a table below, which are derived from ANSI/ASA S3.5-1997 (R2017) “*Methods for Calculation of the Speech Intelligibility Index*”

Table 3 – Sound Power Levels of One Person Speaking with a Normal and Raised Voice

Voice Level	Sound Power Level of Voice (dB re $1x10^{-12}$ W) at Octave-Band Centre Frequency (Hz)								Overall (dBA, L_w)
	63	125	250	500	1k	2k	4k	8k	
Normal	45	55	65	69	63	56	50	45	68
Raised	48	59	70	75	72	64	57	48	76

Based on our experience of using this method of prediction for similar outdoor recreation areas, a good correlation between predicted and measured data on completion has been found.

Based on the above data and assumptions, predictions of noise affecting the nearby noise sensitive properties have been undertaken. The results of the noise model are illustrated in Appendix E in Figure 4.

The tables below provide a comparison of the predicted worst-case L_{Aeq} noise levels associated with the use of the proposed external area against the adopted criteria. Table 4 represents the situation with up to 25 patrons within the external area up to 21:00 hours. Table 5 represents the post 9pm scenario with a total of up to 12 patrons externally.

Table 4 – Summary of Predicted L_{Aeq} Noise Levels at Receptor A – up to 25 patrons

Voice Level	Predicted Noise Due to Patron Activity	Measured Background Noise Level at the Receptor	Overall Noise Level	Level Increase	NPSE & PPG Category
Normal	58	66	66.6	0.6	NOEL / LOAEL (NPSE) No Observed Adverse Effect (PPG)
Raised	65	66	68.5	2.5	NOEL / LOAEL (NPSE) No Observed Adverse Effect (PPG)

Table 5 – Summary of Predicted L_{Aeq} Noise Levels at Receptor A – up to 12 patrons

Voice Level	Predicted Noise Due to Patron Activity	Measured Background Noise Level at the Receptor	Overall Noise Level	Level Increase	NPSE & PPG Category
Normal	55	63	63.3	0.6	NOEL / LOAEL (NPSE) No Observed Adverse Effect (PPG)
Raised	62	63	65.9	2.5	NOEL / LOAEL (NPSE) No Observed Adverse Effect (PPG)

5.3 Discussion of Results

The purpose of our patron noise assessment is to provide a worst-case assessment of patron noise levels from the proposed external seating area when full to capacity.

Based upon capacity levels of up to 25 patrons before 21:00 hours and 12 patrons between 21:00 and 22:00 hours the predicted noise levels result in 0.6 to 2.5dB increase in comparison to the existing ambient noise levels and falling within the "NOEL / LOAEL" according to the guidance given by the NPSE and "No Observed Adverse Effect" according to the guidance given by the PPG before and past 21:00 hours, and with both normal and raised voice at the nearest noise-sensitive receptor; suggesting that the impact of the noise associated with the use of the external seating area is not likely to give rise to complaints from the occupants of the nearby dwellings. Similarly, patron noise being an integral part of the Spitalfields Market is not a new noise source and, as such, the surrounding receptors are familiar with the character of sound within the area.

Market Street is currently covered by the glass roof at second floor-level. We understand this glass roof will be removed by the time the proposed external sitting area is trading, leading to an overall lower reverberant sound build-up in the area.

The assessment considers a maximum capacity and the lowest measured background noise levels which, though appropriate, do represent a minor portion of the trading year. In reality the subjective response is likely to vary, especially with regards to evenings, as the noise levels could reasonably be expected to fluctuate between different trading days due to existing changes in customer numbers and amount of background noise from Spitalfields Market visitors and traffic and pedestrian activity along Market Street and Brushfield Street.

The maximum capacity of the proposed external area is expected to be 25 before 21:00 hours with this reduced to 12 patrons between 21:00 and 22:00 hours. However, the lowest numbers of Spitalfields Market visitors observed in the same area within a 10-minute sample, during the survey are 94 and 49 people, which is approximately four times greater; and further suggesting no to low impact from the proposed development onto the existing noise climate.

6.0 CONCLUSION

RBA Acoustics has been appointed by Spitalfields Estate to undertake a noise impact assessment in relation to a proposed new licensed premises known as "Kill The Cat" at 14 Market Street, Spitalfields London E1. The venue is to include an external seating area, which will provide a customer external seating area at the entrance of the property.

Baseline environmental sound monitoring was undertaken at the site on Thursday 31st of 2022 in order to determine typically prevailing background sound levels at the nearest noise sensitive properties to the unit. The nearest affected residential properties to the unit are those located to the south overlooking the premises and seating area.

Based on the measurements undertaken and our subsequent noise model our assessment suggests that noise levels from patron activity associated with the proposed external seating area would not give rise to a significant noise impact.

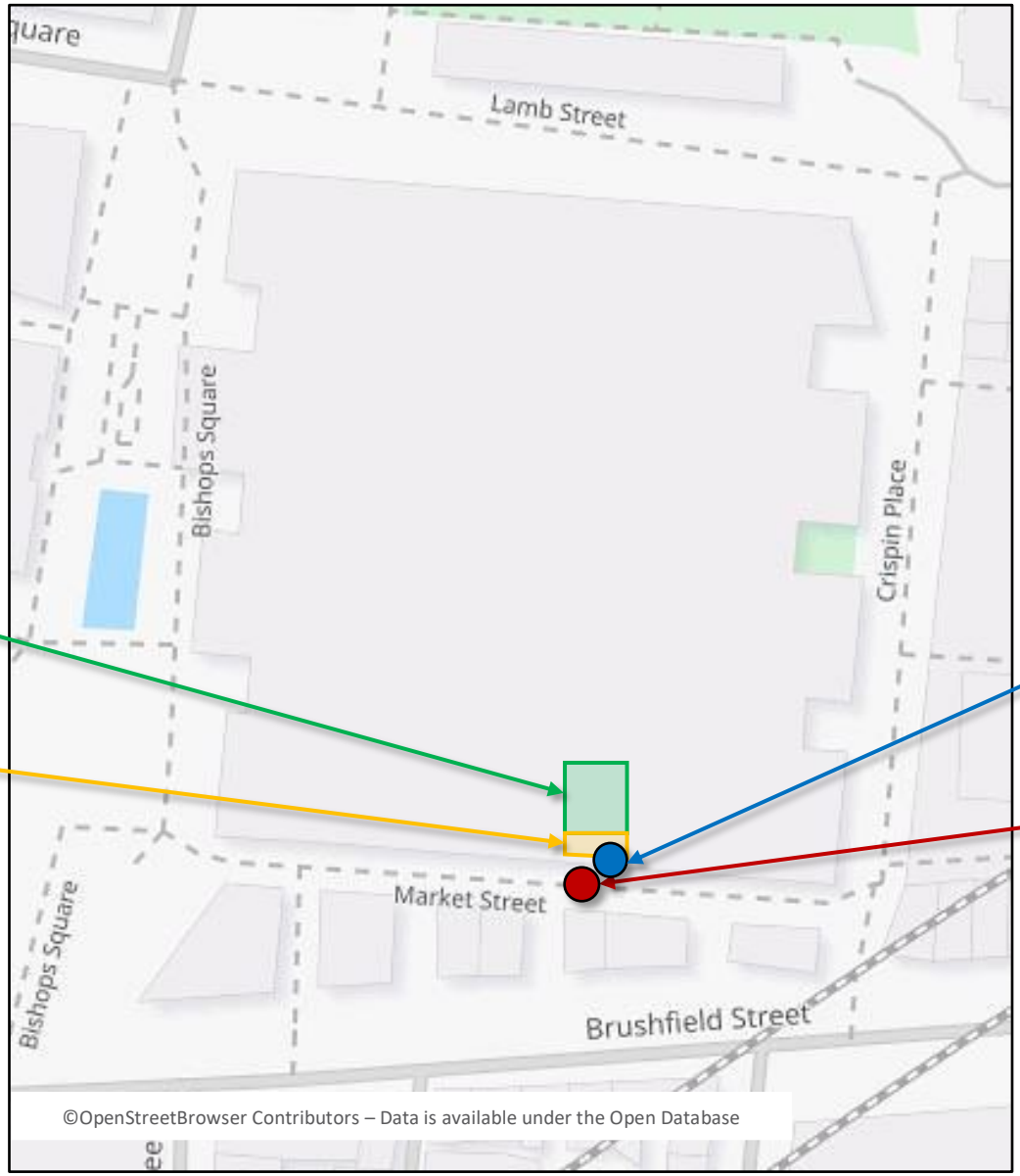
Notwithstanding the above formal assessment, as the new proposed development is located in a mixed-use, commercially led area and adjacent to the other existing commercial units, adding more weight to the assessment and suggesting low impact from the proposed external sitting area onto the existing noise climate.

For these reasons we consider the proposed external seating area to be reasonable and acceptable.

Appendix A - Acoustic Terminology

dB	Decibel - Used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.
dB(A)	The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level. Because of being a logarithmic scale noise levels in dB(A) do not have a linear relationship to each other. For similar noises, a change in noise level of 10dB(A) represents a doubling or halving of subjective loudness. A change of 3dB(A) is just perceptible.
L_{eq}	L_{eq} is defined as a notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (1 hour).
L_{Aeq}	The level of notional steady sound which, over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measured over that period.
L_{An} (e.g L_{A10}, L_{A90})	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the average minimum level and is often used to describe the background noise.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during the measurement period, T. It is commonly used to measure the effect of very short duration bursts of noise, such as for example sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the general level of, say, traffic noise, but because of their very short duration, maybe only a very small fraction of a second, may not have any effect on the L_{eq} value.

Appendix B – Site Plans



14 Market Street

Proposed External Sitting Area

Measurement Position

Receptor A

14 Market Street, London E1 6DT
Site Plan Showing the Measurement Position
Project 11806

Figure 1
13 April 2022
Not to Scale

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14 Market Street, London E1 6DT
Photos Showing the Microphone Position
Project 11806

Figure 2
13 April 2022
Not to Scale

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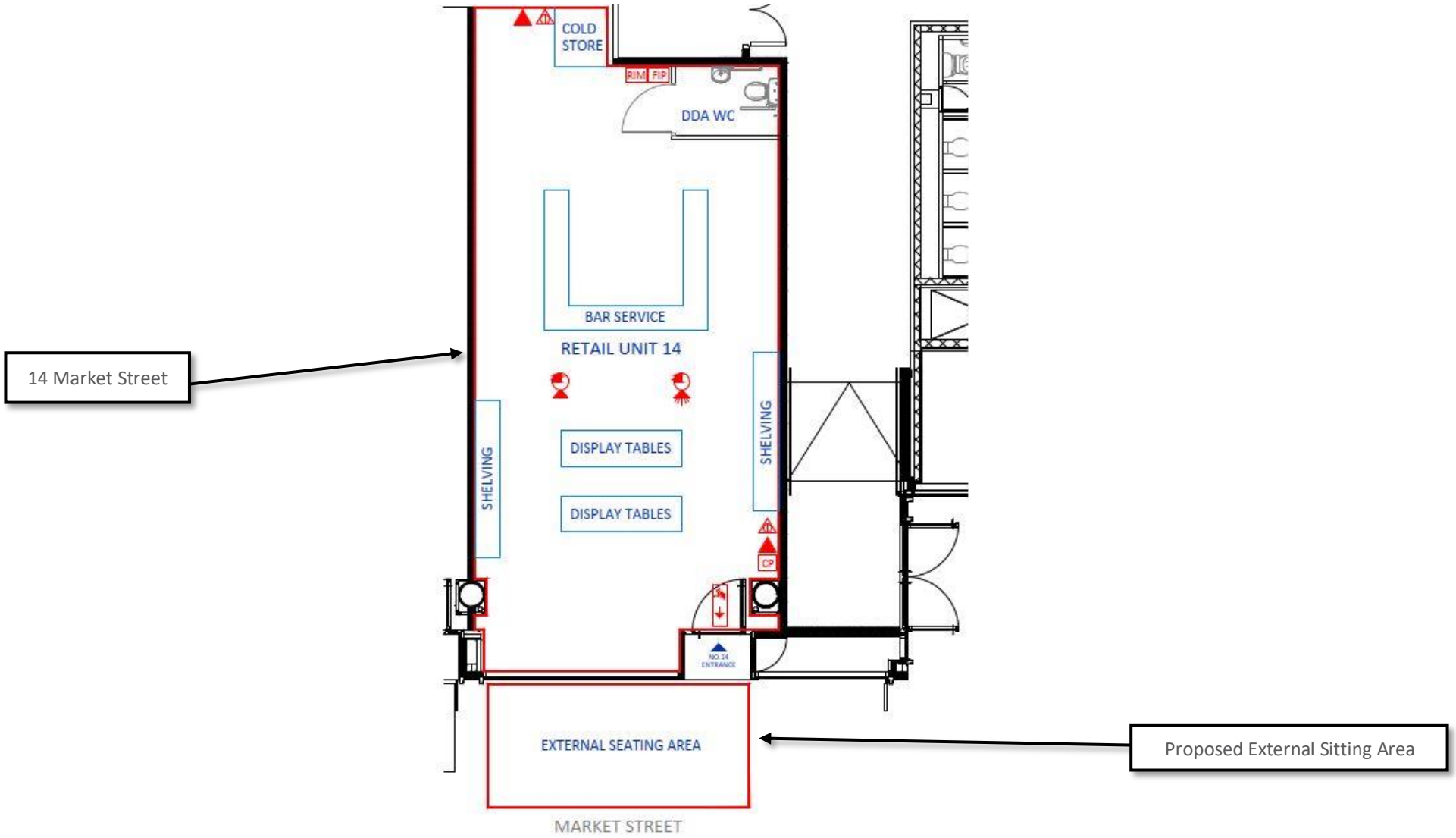

14 Market Street, London E1 6DT
Photo Showing the Proposed Site Layout
Project 11806

Figure 3
13 April 2022
Not to Scale

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Appendix C - Instrumentation

The following equipment was used for the measurements

Use	Manufacturer	Model Type	Serial No.	Calibration	
				Certificate No.	Expiry Date
Background Noise Monitoring Survey	Norsonic Type 1 Sound Level Meter	Nor140	1407477	U39227	19 October 2023
	Norsonic Pre Amplifier	1209	22341		
	Norsonic ½“ Microphone	1225	358196	39226	
	Norsonic Sound Calibrator	1255	125525259	U39225	19 October 2023

Appendix D – Planning Criteria

D1 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) states that, with respect to noise, planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum, other adverse impacts on health and quality of life arising from noise from a new development, including through the use of conditions;
- Recognise that development will often create some noise and existing business wanting to develop in continuance of their business should not have unreasonable restrictions put upon them because of changes in nearby land uses since they were established; and
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

The guidance contained within the NPPF further determines that consideration should be given to the Noise Policy Statement for England (DEFRA, March 2010).

D2 Noise Policy Statement for England (NPSE, March 2010)

The NPSE attends to three types of noise;

- "Environmental noise" which includes noise from transportation sources;
- "Neighbour noise" which includes noise from inside and outside people's homes; and
- "Neighbourhood noise", which includes noise arising from within the community such as industrial and entertainment premises, trade and business premises, construction sites and noise in the street.

In line with the aims determined in the NPPF, the NPSE determines three aims;

1. Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development;
2. Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development; and,
3. Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

The guidance detailed within the NPSE relates a number of key phrases with regards to adverse effects which can be applied to noise impacts as used by the World Health Organisation.

- **NOEL – No Observed Effect Level** - The level below which no health effect or detrimental impact on the quality of life is observed.
- **LOAEL – Lowest Observed Adverse Effect Level** - The level at which adverse effects on health and quality of life can be detected
- **SOAEL – Significant Observed Adverse Effect Level** - The level above which significant adverse effects on health and quality of life occur.

The guidance indicates that it is not possible to have a single objective noise-based measure that defines SOAEL, and as such the SOAEL is likely to be different for different noise sources and receptors. The document indicates that further research is required to establish what may constitute a significant adverse impact on health and quality of life from noise.

While the NPSE determines the NOEL, LOAEL and SOAEL descriptions, the document indicates that, unlike other environmental disciplines, there are currently no European or national noise limits which have to be met, although the NPSE states that "there can be specific local limits for specific developments" allowing for negotiation.

D3 Planning Practice Guidance - Noise

The Planning Practice Guidance for noise 2014 (updated July 2019) broadly considers the same issues as demonstrated within both the NPPF and the NPSE with regards to noise within the planning realm. The information detailed within the PPG indicates that noise should be considered when:

- New developments may create additional noise; and/ or,
- New developments would be sensitive to the prevailing acoustic environment.

The guidance indicates that Local Planning Authorities should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and,
- Whether or not a good standard of amenity can be achieved.

The impact of noise is rated within the policy document in terms of the relative 'Observed Effect Level', defined in line with the guidance within the NPSE. Based upon this, the Planning Practice Guidance provides the following matrix of likely average response:

Table D1 - PPG Observed Effect Levels

Perception	Example of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour and/ or attitude, 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 perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum

Table D2 - PPG Observed Effect Levels

Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/ or attitude, 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 character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/ or an ability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/ awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

D4 Institute of Environment Management & Assessment (IEMA) and Institute of Acoustics Guidelines on Noise Impact Assessment

When assessing the subjective impact of any development it is important to consider the specific circumstances of the site. The characteristics of the various sources must therefore be considered in addition to factors common to all noise impact assessments such as existing background noise level comparisons.

The Institute of Environmental Management and Assessment (IEMA) document "Guidelines on Noise Impact Assessment" gives guidance as to how basic noise changes may be categorised.

Table D3 has been adopted to categorise the difference between the measured levels as identified in the guidelines published jointly by the IOA and IEMA. This identifies the impact of different levels of noise above the prevailing background noise.

Table D3 - Significance of Noise Level Change

Noise Change (dBA)	Category
0	No Impact
0.1 – 2.9	Slight Impact
3.0 – 4.9	Moderate Impact
5.0 – 9.9	Substantial Impact
10.0 and above	Severe Impact

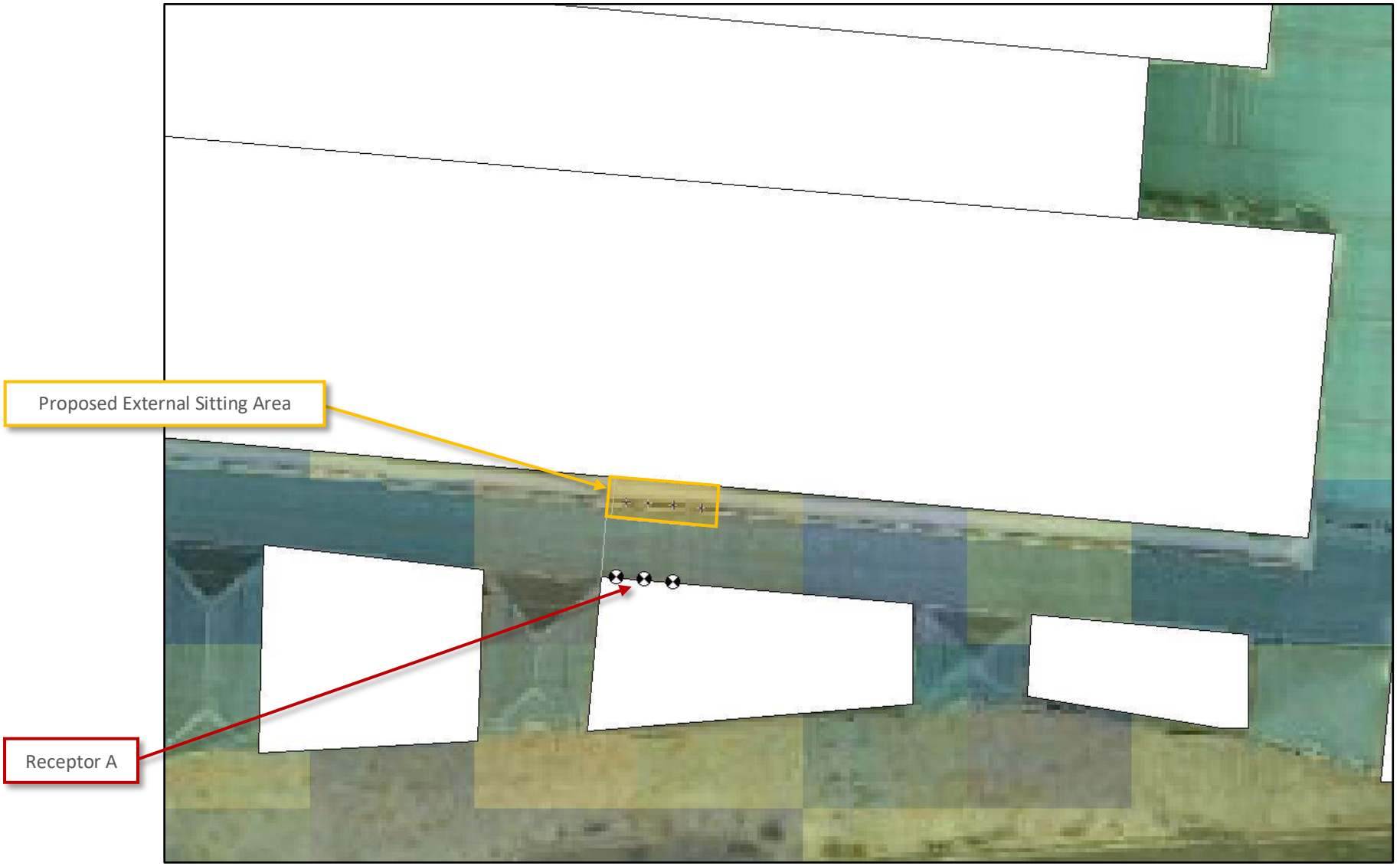
D5.1 Subjective Impact

In addition to the comparison of the difference in background noise levels in line with the above guidelines, it is important to understand the potential subjective effect of such changes in the noise level. Table D4 compares the generally accepted subjective response of typical subjects to variations in sound pressure level.

Table D4 – Subjective Response to Noise Levels

Change In Sound Level (dB)	Change in Power		Apparent Change in Loudness
	Decrease	Increase	
3	1/2	2	Just Perceptible
5	1/3	3	Clearly Noticeable
10	1/10	10	Half or Twice as Loud
20	1/100	100	Much Quieter or Louder

Appendix E – Noise Modelling Results



14 Market Street, London E1 6DT
Predicted Noise Map of Patron Noise Levels with Normal Voice
Project 11806

Figure 4
13 April 2022
Not to Scale

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