

Environmental Noise Impact Report

Proposed Residential Development
121-123 Egerton Road South
Manchester
M21 0XN

Date of Report: Wednesday 1st July 2020

Reference: 13674

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1 General Information

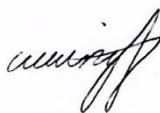
1.1 Client Instructing Survey

Mr Peter Walton
121-123 Egerton Road South
Manchester
M21 0XN

1.2 Date of Noise Survey

Wednesday 3rd June 2020

1.3 Report Author

	Name	Position	Signature	Date
Prepared by	W Wright BSc MIOA	Acoustic Consultant		01/07/2020
For and on behalf of: Soundtesting.co.uk Ltd				

1.4 Report Checked

	Name	Position	Signature	Date
Report Checked	M S Hamer MSc MIOA	Acoustic Consultant		01/07/2020
For and on behalf of: Soundtesting.co.uk Ltd				



2 Introduction

Mr Peter Walton has instructed Soundtesting.co.uk Limited to undertake an environmental noise survey in order to assess the impact of sound from the nearby tram line, as well as other general noise within the local environment, which may have an impact on future residents of the proposed development.

The proposed development site is an existing 3 storey building, consisting of ground floor commercial, 1st and 2nd floor residential. It is proposed to erect a 2-storey rear extension to form 2no. 2-bedroom apartments as well as the erection of 2no. dormers and a new shop front.

This report is prepared solely Mr Peter Walton. Soundtesting.co.uk 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.

2.1 An Environmental Noise Assessment

Soundtesting.co.uk Ltd has undertaken an environmental noise assessment at the above site with noise levels measured externally over a 3hour sample (10:20-13:20). The measurements were carried out during a week day (Wednesday).

This report will state the measured noise levels and will refer to guidance relevant to the nature of this survey whilst considering Local Planning Authority guidance and conditions.



3 Assumptions, Limitations & Uncertainty

- a. All suggested specifications require a good level of workmanship and for materials to be installed as the manufacture intends. Any poor workmanship may lead to weaknesses in the sound attenuation provided by the building elements.
- b. Due to the current COVID-19 pandemic, noise levels cannot be considered typical. In order to be representative of typical noise levels, all measured data will have a 3dB correction added to account for a doubling of sound pressure, as requested by Manchester City Council.
- c. It is assumed that the technical data provided by glazing and ventilation manufacturers is up to date and correct.
- d. It is assumed that drawings and information supplied by EBR Designs are up to date and correct.
- e. All distance attenuation calculations and noise maps have been carried out using the CADNA-A noise modelling software; so as to more easily take account of the spread of noise across such a large area of space.



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 and vibration levels.

4.1 National Planning Policy

The National Planning Policy Framework (NPPF) July 2018 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.

170. 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.'

180. 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 characterises noise by grading and recommending actions and different effect levels as reproduced in Table 1

Table 1: Noise exposure hierarchy based on likely average response			
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



4.2 Criteria

4.2.1 Local Authority Criteria

Manchester City Council has granted conditional planning for this application, Condition 7 of the decision notice states:

“Before the development commences a scheme for acoustically insulating the proposed residential accommodation against noise from the tram line and also the commercial premises shall be submitted to and approved in writing by the City Council as local planning authority. There may be other actual or potential sources of noise which require consideration on or near the site, including any local commercial/industrial premises. The approved noise insulation scheme shall be completed before any of the dwelling units are occupied. Noise survey data must include measurements taken during a rush-hour period and night time to determine the appropriate sound insulation measures necessary.”

4.2.2 BS8233:2014 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 BS8233: 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.

Table 2: Indoor ambient levels for dwellings			
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 $L_{Aeq,8hour}$

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’.

In addition, Note 4 of section 7.7.2 states, ‘Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values’.



In the absence of a specific performance criterion within BS8233 for short-term noise maxima, reference can be made to guidance published by the WHO. In particular, the WHO publication 'Guidelines for Community Noise' (1999), from which the guidance given in BS8233: 2014 is itself derived, states that 'for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than ten to fifteen times per night'.

The WHO publication 'Guidelines for Community Noise' (1999) has since been updated in 2018; however, it is widely accepted by Local Authorities that L_{AFmax} 45dB is the target level for short-term noise maxima between 23:00-07:00.

4.2.3 WHO Guidelines for Community Noise

In 1999, the WHO (World Health Organisation) published Guidelines for Community Noise, stating the following internal noise levels are applicable within dwellings.

Table 3: A Summary of the Guidance Noise Levels				
Specific Environment	Critical Health Effect (s)	L_{Aeq} (dB)	Time base (hours)*	L_{AFmax} (dB)
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime evening	50	16	-
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

* Typically taken to be daytime/evening - 07:00 – 23:00 and night time 23:00 – 07:00.



4.3 BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings

Vibration dose value ranges which might result in various probabilities of adverse comment within residential buildings.

Table 4: BS 6472-1:2008 Vibration Dose Value Ranges.			
Place and time	Low probability of adverse comment m.s ^{-1.75}	Adverse comment possible m.s ^{-1.75}	Adverse probable comment m.s ^{-1.75}
Residential buildings 16 hour day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8 hour night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

4.4 Other Standards

4.4.1 Calculation of Road Traffic Noise (CRTN)

CRTN sets out standard procedures for calculating noise levels from road traffic. The calculation method uses a number of input variables, including traffic flow volume, average vehicle speed, percentage of heavy goods vehicles (HGVs), type of road, site geometry and the presence of noise barriers or acoustically absorbent ground to predict the noise level for any receptor point at a given distance from the road.

CRTN states:

$$L_{A10, 18\text{hour}} = L_{A10, 3\text{hour}} - 1\text{dB}$$

This is then corrected to provide a $L_{Aeq, 16\text{hour}}$

$$L_{Aeq, 16\text{hour}} = L_{A10, 18\text{hour}} - 2\text{dB}$$

4.5 Criteria Summary

In order to meet the requirements of Manchester City Council the assessment and recommendations will be made in reference to BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings and BS6742:2008 Guide to Evaluation of Human Exposure to Vibration in Buildings.



5 Site Description

The proposed development at Egerton Road is an existing 3-storey building situated in the city of Manchester. It is proposed to erect a 2-storey rear extension to form 2no. 2-bedroom apartments as well as the erection of 2no. dormers and a new shop front. The proposed development will face South-West towards Manchester City Link Tram Line. The development site is bordered both sides by similar properties consisting of ground floor commercial and 1st floor residential, on Egerton Road South which is a relatively quiet, mostly residential road leading onto St. Werburgh's Road. St Werburgh's Road is a relatively busy road, approximately 30m East of the proposed development site.

At the time of the measurement, existing plant was observed to the rear of the commercial premises at 127 Egerton Road South. Due to the COVID-19 pandemic, the premises was closed and all plant was inactive and inaccessible.

The tram times stated on Manchester City Link website are as follows:

06:00-23:00 Every 12 minutes. As there are two lines running, a tram pass every 6 minutes is considered typical.

5.1 Subjective Observations

During site attendance, subjectively the main source of noise was road traffic. Regular trams were also audible.

5.2 Weather

Table 5: Weather Conditions	
Description	Daytime Average
Temperature	12°C
Wind Speed	2.5m/s
Wind Direction	NE
Precipitation	Dry
Damp road/ wet ground	None
Fog/snow/ice	None



6 Noise Measurement Procedure

6.1 Personnel Present

Ben Bielicki BSc MIOA

6.2 Survey Equipment Used

Table 6: Survey Equipment Used			
Manufacturer	Model	Serial No.	Description
Rion	NL52	1054205	Real Time Analyser Sound Level Meter
Rion	NA28	462266	Real Time Analyser Sound Level Meter
Pulsar	Model 105	59964	Acoustic Calibrator
Vibroek	V901 Digital Seismograph	1284	VDV Transducer

6.3 Calibration

The sound level meters were calibrated with the field calibrator to a level of 94.0 dB @ 1 kHz prior to and on completion of the survey. No significant drift in calibration was observed. The meters used during the survey are precision grade class 1.

Calibration certificates are available on request.



6.4 External Ambient Sound Measurements

The measurement locations chosen during the survey was deemed suitable for the determination of the noise levels able to impact upon the façades of the proposed development.

The sound level meters were set to measure L_{Aeq} , L_{A90} , L_{A10} , and L_{AFmax} in 1 second periods, as well as A-weighted 1:1 octave spectrum analysis.

It should also be noted that St. Werburgh's Road and Egerton Road South are not on the Extrium national noise maps, and as a result a methodology for the measurement was agreed with the Environmental Health Officer of Manchester City Council. 1 second measurement periods were used to isolate each tram pass observed whilst on site. The tram passes can then be used to calculate the overall noise impact from trams based on the number of passes in the daytime and night time periods, detailed on the Manchester City Link website.

A sample of road noise was also measured whilst on site which has been used for a Calculation of Road Traffic Noise (CRTN) over the daytime and night time periods. Due to the reduced traffic flow and potentially fewer carriages on the trams during the COVID-19 pandemic, it has been agreed to add 3dB to all measurement data to account for potentially double the amount of road traffic and tram passes.

6.4.1 Monitoring Position 1

A microphone was placed 1.5m above ground floor surface level, 7m from the existing façade, at the location of the proposed façade.

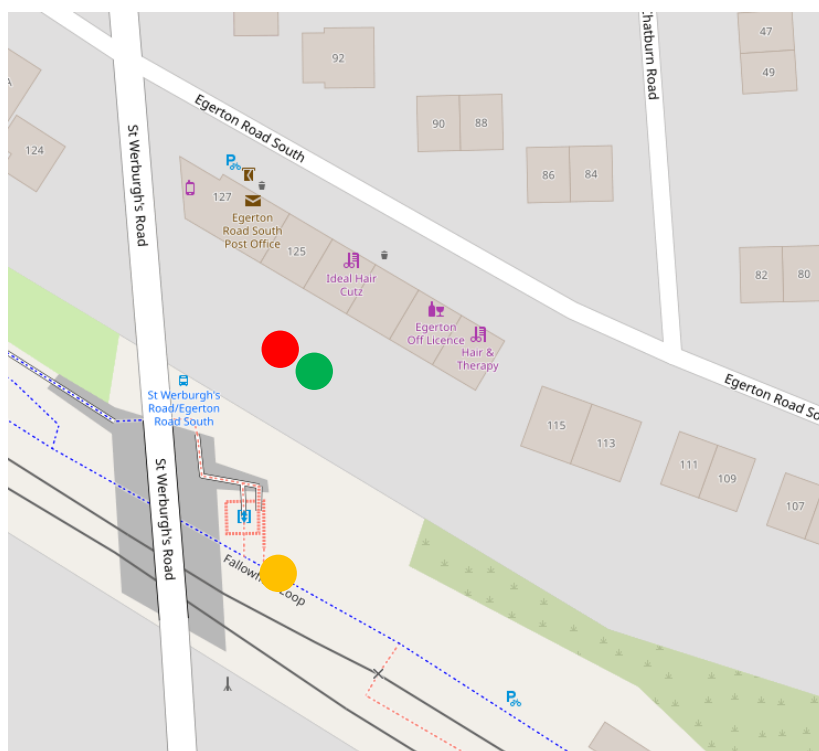
6.4.2 Monitoring Position 2

A microphone was placed 1.5m above ground floor surface level, 5m from the tram track, measuring tram passes.

6.4.3 Monitoring Position V1

The Vibrock digital Seismograph was set up on the ground floor surface level, 7m from the existing façade, at the location of the proposed facade. The x plane was oriented to be aligned parallel with the tram line.

The detail below shows the location of the measurement positions.



- Measurement Position 1
- Measurement Position V1
- Measurement Position 2



7 Results and Analysis

7.1 Tram Measurement Analysis in Accordance with BS8233:2014

As the data for tram noise has been measured as an L_{Aeq} , the data has been converted into Sound Exposure Levels (SEL), which is an L_{Aeq} normalised to 1 second. The SEL of each tram pass can then be compared.

The equation for calculating SEL is:

$$SEL = L_{Aeq} + (10 \cdot \log(\text{time}))$$

A table of the five highest measured SEL's can be seen below.

Table 7: Sound Exposure Levels			
	Time (s)	L_{Aeq} (dB)	SEL (dB)
1	20	68.4	81.4
2	10	67.2	77.2
3	19	64	76.7
4	21	62.8	76.0
5	15	59.7	71.5

The highest calculated SEL has been identified as 81.4dB. This will be used throughout the assessment and will assume a worst case for measured tram passes.

7.1.1 16hour Daytime and 8hour Night time in Accordance with BS8233:2014

In order to calculate the noise exposure at the proposed development site, a calculation to determine the Daytime $L_{Aeq, 16\text{hour}}$ and Night time $L_{Aeq, 8\text{hour}}$ has been carried out based on the number of tram passes during each period.

It is our understanding that the tram times are as follows:

06:00-23:00 every 12 minutes. There are two lines that run along the track in question, therefore we can assume one tram pass every 6 minutes.

One tram pass every 6 minutes equates to:

160 tram passes during the daytime period (07:00-23:00)

10 tram passes during the night-time period (23:00-07:00). It should be noted that the tram line is only operational during one hour of the night-time period (06:00-07:00).



The calculation to convert SEL into an $L_{Aeq, 16\text{hour}}$ is as follows:

$$\text{SEL} + 10\log(\text{number of passes}) - 10\log(\text{hours} \times 3600)$$

Therefore:

$$81.4 + 10\log(160) - 10\log(16 \times 3600)$$

$$= 55.8\text{dB } L_{Aeq, 16\text{hour}}$$

COVID-19 correction +3dB (doubling)

$$= \mathbf{58.8\text{dB } L_{Aeq, 16\text{hour}}}$$

The same calculation for the night time period is shown below:

$$81.4 + 10\log(10) - 10\log(8 \times 3600)$$

$$= 46.8\text{dB } L_{Aeq, 16\text{hour}}$$

COVID-19 correction +3dB (doubling)

$$= \mathbf{49.8\text{dB } L_{Aeq, 8\text{hour}}}$$

The following table presents the calculated results from measurement position 2

Data charts can be found in the appendix.

Table 8: Measurement Results				
Monitoring position	Time Period	Time Base T (hours)	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)
2	Daytime	16	58.8	-
	Night time	8	49.8	40.8-77.5



7.2 External Ambient Measurement Analysis in Accordance with BS8233:2014

Road traffic noise was measured for three consecutive hours between 10:20 hours and 13:20 hours on Wednesday 3rd June 2020. The calculation of road traffic (CRTN) shortened form measurement method was used to calculate the free field $L_{Aeq, 16hour}$.

Using the $L_{10, 3 hour}$ as the arithmetic mean of 36 consecutive values of 5 minute L_{A10} , the current value of $L_{A10, 18 hour}$ can be calculated from the following:

$$L_{A10, 3 hour} = 51.5 \text{ dB}$$

$$L_{A10, 18hour} = L_{10, 3 hour} - 1 \text{ dB}$$

$$L_{A10, 18hour} = 51.5 \text{ dB} - 1 \text{ dB}$$

$$L_{A10, 18hour} = 50.5 \text{ dB}$$

PPG24 States that the $L_{Aeq, 16 hour}$ is approximately 2 dB less than the $L_{A10, 18hour}$.

Therefore $50.5 \text{ dB} - 2 \text{ dB} = 48.5 \text{ dB(A)}$

$$L_{Aeq, 16hours} = 48.5 \text{ dB}$$

COVID-19 Correction +3dB

$$= L_{Aeq, 16hours} = 51.5 \text{ dB}$$

Huybregts and Samuels (1998) regression analysis of these indices reveals that the following relationship can be assumed:

$$L_{A10, 18hour} = L_{Aeq, 8hour} + 6.7 \text{ dB}$$

Therefore $L_{Aeq, 8hour} = 50.5 - 6.7 \text{ dB}$

$$L_{Aeq, 8hours} = 43.8 \text{ dB}$$

COVID-19 Correction +3dB

$$L_{Aeq, 8hours} = 46.8 \text{ dB}$$

The following table shows the calculated results from measurement position 1.

Table 9: Measurement Results				
Monitoring position	Time Period	Time Base T (hours)	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)
1	Daytime	16	51.5	-
	Night time	8	46.8	35.2-77.7



7.3 Night-time L_{AFmax} Analysis

L_{AFmax} events measured during the daytime will be carried forward for the assessment of the night time period in the absence of measured night time levels. It is the consultant's view that an L_{AFmax} event measured during the daytime will be similar in sound level to those that occur during the night time period, although less frequently occurring at night due to the reduced traffic flow.

The L_{AFmax} levels measured during the 3-hour period are therefore considered to be representative of those that are potentially present during the night time. WHO Community Noise Guidelines states "For a good night sleep it is believed that indoor sound pressure should not exceed approximately 45dB L_{AFmax} more than 10 – 15 times per night (Vallet & Vernet 1991).

7.3.1 Night Time L_{AFmax} at Monitoring Position 1

The maximum measured L_{AFmax} is 77.7 dB. The next highest L_{AFmax} is 77.0 dB. 75.0 L_{AFmax} dB is exceeded three times and 65.0 L_{AFmax} dB is exceeded forty-three times.

The frequency spectrum data indicate that the L_{AFmax} 77.7 dB event was from traffic noise which corroborates with the attending consultant's experience on site.

The 77.7 L_{AFmax} dB event will be used for the assessment at this monitoring position as this is considered representative of other L_{AFmax} events during the night-time period.

7.4 Vibration Measurement Results in Accordance with BS 6472-1:2008

Table 10 shows the vibration results for the measurement period.

Table 10: Vibration Measurement Results			
Wednesday			
Measurement Duration	VDVx ($m.s^{-1.75}$)	VDVy ($m.s^{-1.75}$)	VDVz ($m.s^{-1.75}$)
11:20 – 14:20	0.035	0.034	0.034

The results show the maximum VDV for the measurement period to be $0.035 m.s^{-1.75}$.

These results indicate a low probability of adverse comment due to vibrations.



7.5 Sound Insulation Assessment Between Existing and Proposed Properties

At the time of writing this report, it is our understanding that the existing wall at the rear of 121-123 Egerton Road South is of Brick and Block construction. The acoustic performance of a brick and block wall as stated in BS8233:2014 can be seen below.

Table 11: Performance of Separating Wall						
		Octave band centre frequency (Hz)				
Construction	Rw	125	250	500	1000	2000
Brick and Block External Wall (BS8233:2014)	50	40	44	45	51	56

In addition to the construction of the separating wall, another important factor in regard to sound insulation is the layout of the premises either side of the wall. The proposed plans for the ground and 1st floor can be seen below.

Ground Floor Plan





1st Floor Plan



The proposed plans indicate that the layout of the development is beneficial in regard to sound transfer into habitable rooms. On the ground floor the commercial spaces meet either lobby space or a kitchen in the proposed residential. On the first floor, kitchens and bathrooms are located either side of the separating wall.

It is the consultants opinion that the combination of room layout, and separating wall construction will provide sufficient sound insulation to all liveable areas within the development.



8 CadnaA Noise Modelling

A 3D model of the development site has been recreated in order to assess the resultant noise levels at the proposed façades of the apartments. Results from the 3D model will be taken forward to form recommendations to ensure internal noise levels within the proposed dwellings conform with the recommended values stated in BS8233:2014.

Condition 7 issued by Manchester City Council highlights concern for the nearby tram line. The following noise model shows the resultant noise levels at the proposed façade of the development, over a 16hour daytime period from tram noise only.



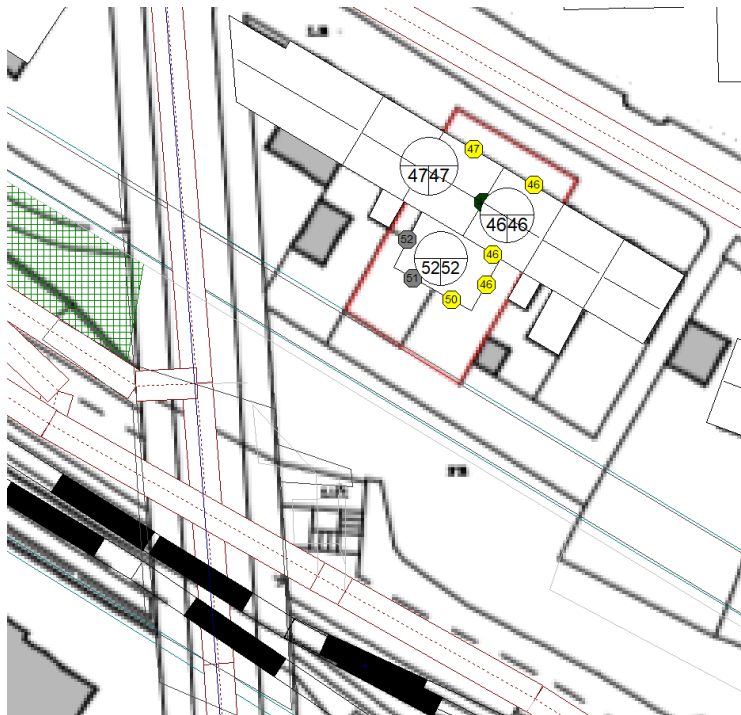
The noise model assessing trams in isolation indicated that the worst affected façade of the development will experience an $L_{Aeq, 16\text{hour}}$ of 34dB.

During site attendance it was noted that road noise from St Werburgh's Road was the dominant noise source. Data from measurement position 1, at the proposed façade of the development, shows a resultant $L_{Aeq, 16\text{hour}}$ of 51.5dB (3dB correction for COVID-19). Therefore, it can be concluded that the tram noise is not the dominant noise source at the development site.

From this point, a combination of tram noise and ambient noise levels measure on site will be assessed in order to form our recommendations and satisfy Manchester City Council as well as conforming with BS8233:2014.



The following noise model shows the resultant noise levels at the development site, over a 16hour day time period, based on a combination of noise sources in the area.



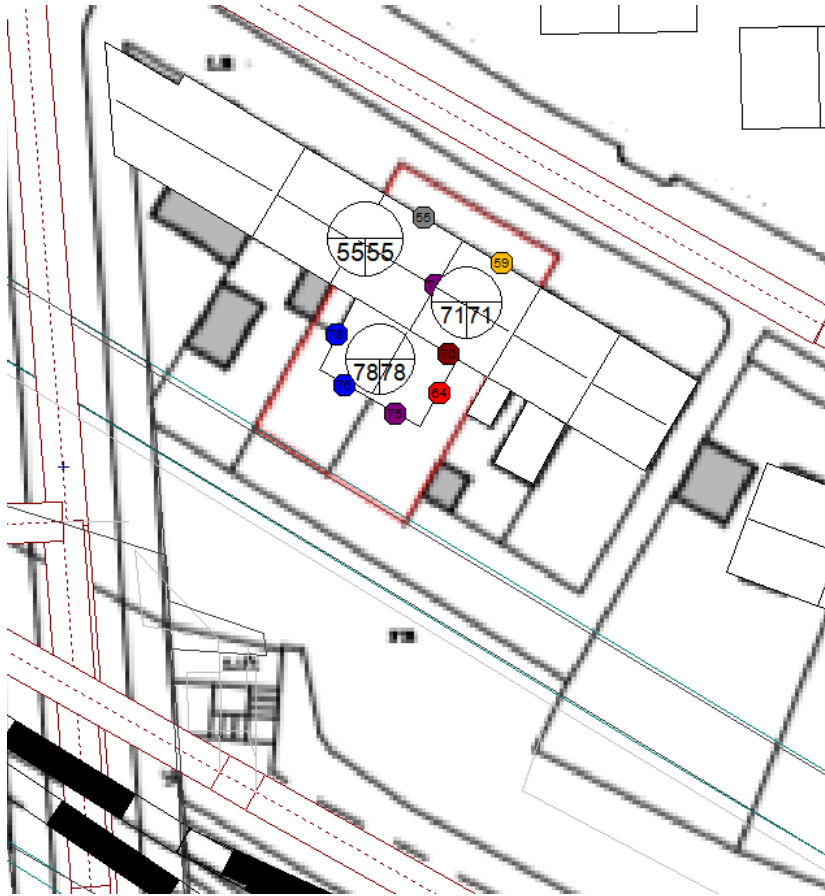
The combined noise map shows the worst affected façade of the development will experience an $L_{Aeq, 16\text{hour}}$ of 52dB.

The following noise map shows the resultant noise levels at the development site, over an 8hour night time period.





The following noise model shows the resultant noise level at the development site, based on the highest measured L_{AFmax} event.



The noise model shows the resultant noise levels at the proposed development site will experience a 78dB L_{AFmax} .

All façade calculation from the CadnaA noise models will be taken forward to provide the basis for our recommendations.

The 3D model of the development is shown in the appendix.



9 Recommendations

The estimated internal noise levels attributed by the external noise sources have been assessed over an average of $L_{Aeq,T}$ from the daytime and night-time survey periods and L_{AFmax} values from the night time. This along with the results from 3D modelling provide the basis for the following recommendations.

9.1 Glazing Specification for all Bedrooms

The glazing specification in bedrooms should consist of at least 8mm glass/ 16mm void/ 9.1mm Pilkington Optiphon Laminated glass, double glazed unit; in well-sealed frames and without trickle vents.

9.2 Glazing Specification for all Living Rooms

The glazing specification in living rooms should consist of at least 4mm glass / 12mm void / 4mm glass, double glazed unit; in well-sealed frames and without trickle vents.

9.3 Ventilation Specification for all Bedrooms

The ventilation in all habitable rooms can be a quality mechanical system or a passive acoustic wall vent such as Greenwoods MA3051.

9.4 Ventilation Specification for all Living Rooms

The ventilation in all habitable rooms can be a quality mechanical system or a passive acoustic window vent such as Greenwoods EA5000 (2 Acoustic Sets).

9.4.1 Notes on Ventilation

NOTE 5 in section 7.7.2 of BS8233:2014 states “if relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.”

The above recommendations state that in order to meet the requirements stated in BS8233:2014, the dwellings can be passively or mechanically ventilated. Where mechanical ventilation is utilised, the system is to be designed by a suitably qualified engineer or M&E consultant. The system shall be designed so the sound levels from any external plant or inlet/outlets do not exceed the background noise level at any noise receptor, i.e. outside a neighbouring window. This may require further assessment once the type and location of system has been specified.



The glazing and ventilation suggestions have been calculated assuming the windows are tightly closed. However, it must be noted that windows are suggested to be openable to provide rapid or purge ventilation or means of escape.

9.5 Calculation Methodology

The BRE Building Envelope Insulation calculator has been used for the noise break in calculations for the BS8233:2014 assessment which is based on the rigorous calculation method of BS8233:2014 and BS EN 12354-3.

All measurements were undertaken at a free-field location, therefore no façade correction has been applied.

As requested by Manchester City Council, due to the current COVID-19 pandemic, a 3dB correction has been added to all measurement data to account for a doubling in sound pressure.

All façade calculations have been undertaken using Cadna A noise mapping software by DataKustik in order to model propagation of noise from the identified sources.

The calculations are based on one vent per room. If more ventilation is required then further calculations will need be carried out.

All room dimensions are taken from the smallest room of type on the worst affected façade of the development:

Living Rooms	5m x 4m x 2.5m	window size 5m ²
Bedrooms	4m x 3m x 2.5m	window size 1.5m ²

The calculations assume the external walls to be brick and block as stated in BS8233:2014.

The calculations assume each room has a reverberation time of 0.5 seconds.

The predictions also have been calculated assuming all windows are tightly closed.



9.6 Building Elements

Table 12: Table showing suggested Glazing & Ventilation								
Element	Description*	$R_w/D_{n,e,w}$ (dB)	Octave Centre Frequencies (Hz)					
			SRI / $D_{n,e}$ (dB)					
			125	250	500	1k	2k	4k
Glazing	4mm glass/12mm void/4mm glass	29	21	15	25	36	39	31
	8mm glass/16mm void/ 9.1mm Pilkington Optiphon Laminated Glass	43	24	29	41	47	47	55
Ventilation	Greenwoods EA5000 (2 acoustic sets)	42	40	38	32	47	53	48
	Greenwoods MA3051	55	47	46	49	56	66	69

The following table shows the expected performance of the recommended building elements. **The selected units or products described have been used as a guide to form part of the specification. Other similar units or products can be used provided they can achieve the given minimum acoustic performance.*

9.7 Example of Estimated Performance

The following table compares the estimated performance values with the measured values.

Table 13: Estimated performance					
Specification	Time period	Measured External		Estimated Internal	
		Average $L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)
Bedrooms	Night time (23:00 – 07:00)	57	78.0	19.4	40.4
Living Rooms	Daytime (07:00 – 23:00)	47	-	18.5	-



10 Conclusion

This report demonstrates that by following our recommendations noise levels described in BS8233:2014 and WHO Guidelines for Community Noise can be achieved for internal noise levels in all habitable rooms; therefore, satisfying the requirements of Manchester City Council stated in condition 7 of the planning application.



11 References

National Planning Policy Framework (NPPF)

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

World Health Organisation Guidelines for Community Noise

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

Cadna A noise mapping software by DataKustik

openstreetmap.org

www.google.co.uk/maps

<http://www.extrium.co.uk/noiseviewer.html>

11.1 Drawing References

125836_FO_2019-PLANS__ELEVATIONS__LOCATION_PLAN-1355209



Appendix



Figure 1: Picture Showing Monitoring Position 1





Figure 2: Picture Showing Monitoring Position 2





Figure 3: Picture Showing Monitoring Position 3

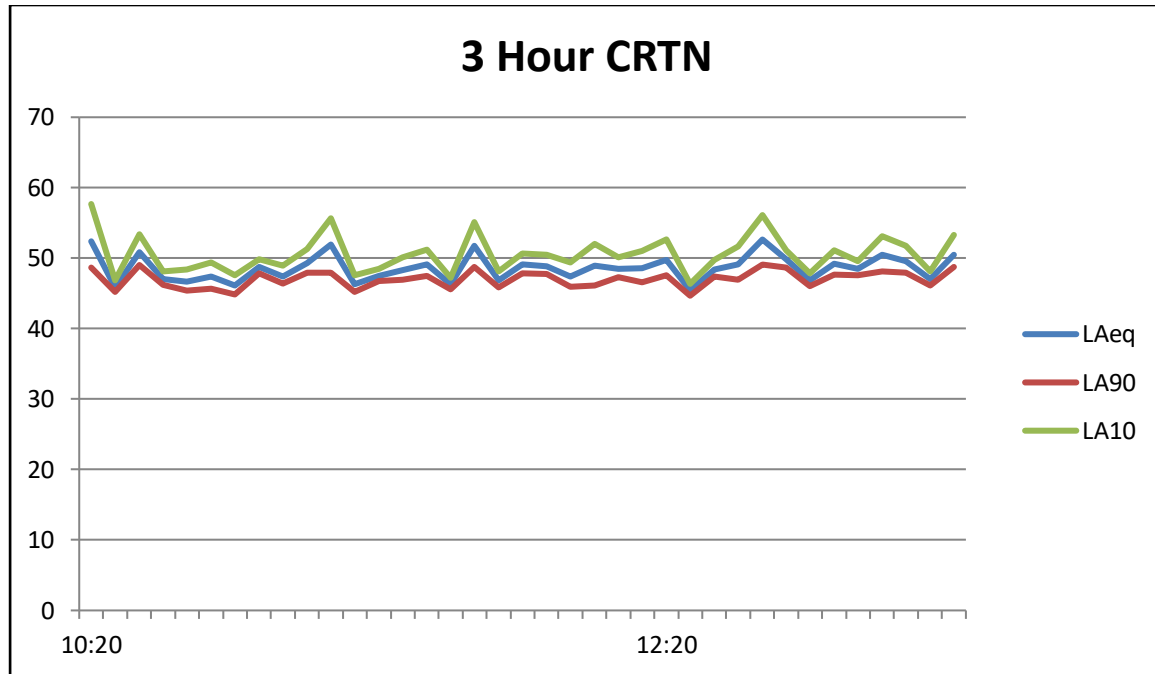




Measurement Results

Monitoring Position 1

Wednesday





3D Model of Development

