

fisher acoustics

Port Street, Manchester

Environmental Noise Study

December 2021

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PROJECT TITLE

PORT STREET, MANCHESTER

REPORT TITLE

ENVIRONMENTAL NOISE STUDY

CLIENT

MANCHESTER (PORT STREET) LIMITED

HORSESHOE FARM

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ALDERLEY EDGE

CHESHIRE

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1.0 SUMMARY

Fisher Acoustics Ltd has been commissioned by Manchester (Port Street) Limited to conduct an environmental noise study relating to a proposed residential development at Port Street, Manchester.

An assessment of environmental noise around the proposed site has determined the pre-existing environmental noise levels during the day and night at and around the site.

The recommended acoustic performance of curtain wall elements and windows to achieve the recommended internal noise levels within apartment rooms has been determined. In particular, it has been determined that double glazed units that achieve specific acoustic performances would be acoustically suitable for the windows and the vision panels of the curtain wall to the proposed apartments.

The expected acoustic sound insulation performance of the solid elements of the façade are also identified.

Overall environmental noise limits have also been recommended for building services plant serving the development and in relation to noise egress from the proposed commercial units on the ground floor of the Development.

2.0 INTRODUCTION

Fisher Acoustics Ltd has been commissioned by Manchester (Port Street) Limited to conduct an environmental noise assessment relating to a full planning application for a proposed residential development at Port Street, Manchester. The proposals provide for a new residential development of a part eight and to part thirty one-storey building. The development will provide residential units (Use Class C3) with ground floor commercial units (Use Class E), supported by amenity space for residents.

This report examines the pre-existing environmental noise conditions at the site and advises on the required sound insulation performance of façade elements to habitable rooms to achieve recommended internal noise criteria.

The steps undertaken in compiling this study are as follows:

- Assessment of daytime and night time external noise survey data to determine the typical levels of noise at the site during daytime and night time periods
- Calculation of the required sound reduction index of the vision panels and non-vision panels of the curtain wall to habitable rooms to allow the achievement of appropriate internal noise levels due to external noise sources.
- Determination of suitable overall noise limits for building services plant to safeguard residential amenity
- Calculation of noise limits relating to noise egress from the proposed commercial units at ground floor of the Development.

3.0 DESCRIPTION OF SITE

General Site Description

The Proposed Development Site ("the Site") is located on the corner of Great Ancoats Street and Port Street and is within the neighbourhood of Ancoats on the northern part of Manchester City Centre.

The Site extends to approximately 0.48 hectares (4845 sqm) and is bounded by Great Ancoats Street to the north, Brownsfield Mill ('Avro') and a surface car park to the east, surface car park to the south and Port Street to the west.

The Site is comprised of a surface level car park of low-quality hardstanding. The site levels drop by circa 2m from the northern and western boundaries to a lower level which also forms part of the car park.

There are a mixture of uses surrounding the Site. To the west of the Site there is The Astley, Oxid House and The Wentwood which are mid to high rise apartment buildings with ground floor commercial frontages as well as a surface level car park. To the north of the Site, across Great Ancoats Street is the heart of Ancoats, this is a newly regenerated area of Manchester containing a mixture of mid-rise developments including residential and commercial uses. To the east of the Site is the Rochdale Canal and Brownsfield Mill, ('Avro') a Grade II* Listed mill building which has been recently refurbished to create new apartments. To the south of the Site is a number of mid to high-rise developments comprising residential uses, which sit within the centre of the Piccadilly Basin.

Great Ancoats Street forms part of the inner ring road in Manchester. It is a major road that is heavily trafficked with HGV's, buses, coaches, cars and vans. Port Street is a side road that is trafficked by vehicles accessing local residential properties, offices and car parking areas. Tariff Street is lightly trafficked.

Figure 1 shows the Port Street Development site in the context of the surrounding roads and buildings.

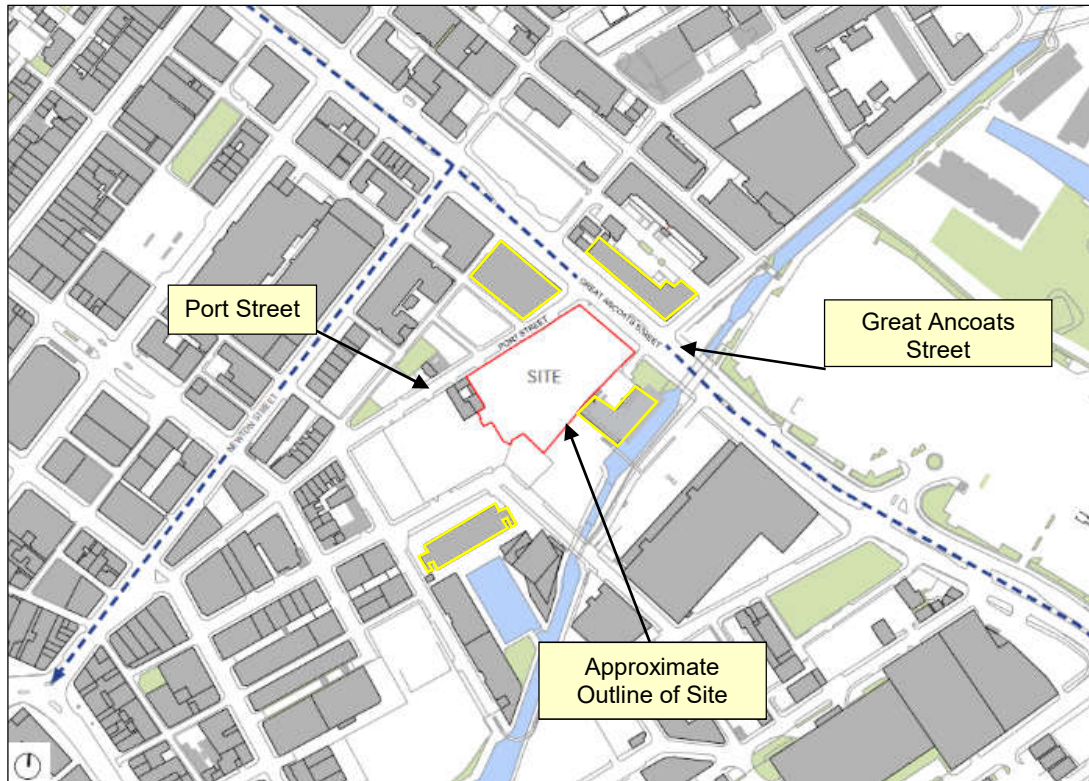


Figure 1: Site location plan

4.0 DESCRIPTION OF PROPOSED DEVELOPMENT

Specific Development Description

‘Full Planning Permission for the erection of part 8 and part 34-storey building comprising residential units (Use Class C3) and associated amenity space, ground floor commercial space (Use Class E), basement, access, landscaping, and other associated works’.

The proposed uses within the building are as follows:

- Basement Level 1: Car park, bike store, plant rooms
- Ground Floor: Management Suite, Bin Store, Plant, Amenity, Retail units, Substation
- Level 01 to 06: Apartments
- Level 07: Apartments, residents amenity
- Level 08: Apartments, void over residents amenity
- Level 09 to 33: Apartments
- Level 31: Roof

Figure 2 shows the proposed floor at Level 1 of the building

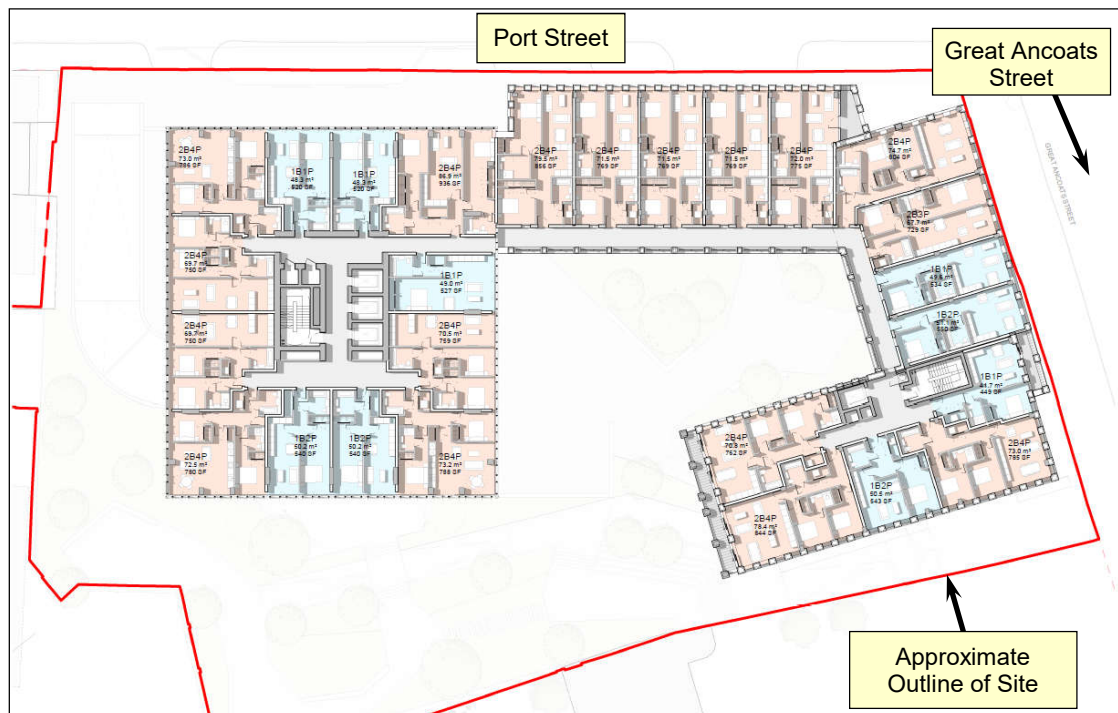


Figure 2: Proposed floor plan at Level 01

5.0 RELEVANT GUIDANCE DOCUMENTS

NATIONAL PLANNING POLICY

The National Planning Policy Framework (NPPF), published in July 2021 by the Ministry of Housing, Communities and Local Government ‘sets out the Government’s planning policies for England and how these should be applied’.

Clause 174 of the National Planning Policy Framework states that ‘Planning policies and decisions should contribute to 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’.

Clause 185 of the National Planning Policy Framework states:

“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:

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.”

The National Planning Policy Framework document cross references the ‘Explanatory Note to the Noise Policy Statement for England’. The ‘Noise Policy Statement for England’ (NPSE) was published by the Department for Environment Food and Rural Affairs in March 2010.

The NPSE does not give suggested external noise criteria for commercial Developments. In the absence of specific criteria, reference shall be made in this document to established guidance and principles, as established in British Standards and the local Planning policy.

National Planning Practice Guidance – Noise

‘Planning Practice Guidance – Noise’ is a web-based resource provided by the Ministry of Housing, Communities and Local Government (last revision date 22 July 2019) which gives guidance on Planning considerations in relation to noise.

The document identifies the subjective grading of noise and the recommended actions and different effect levels. Again, as ‘Planning Practice Guidance – Noise’ does not refer to objective criteria, reference shall be made in this document to established guidance and principles, as established in British Standards and the local Planning policy.

LOCAL PLANNING POLICY

Manchester City Council’s Core Strategy was adopted on 11th July 2012 and is the key Development Plan Document in the Local Development Framework (LDF).

Section 13.6 ‘Development Management’ of the Core Strategy states that ‘all new developments should follow the ‘Development Principles’ and accord with the design guidance set out in the Supplementary Planning Documents.

Policy DM 1, ‘Development Management’ of the Core Strategy states that:

- All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:-Effects on amenity, including noise, vibration.... This could also include proposals which would be sensitive to existing environmental conditions, such as noise.

‘Planning & Noise, Technical Guidance’, dated December 2015 has been issued by the Environmental Protection, Environmental Health and The Neighbourhoods Service sections of Manchester City Council. The document provides guidance to applicants and consultants concerning the assessment and prediction of environmental noise associated with a particular development. Reference is also made in the document to the relevant supporting information and guidance documents that Developers are expected to refer to when submitting a planning application.

Internal noise criteria

Internal noise levels within the proposed living accommodation must be appropriate for the intended use.

With regard to noise ingress to residential dwellings, section 3.5 'National & International Standards' of the 'Planning & Noise, Technical Guidance' advises that Manchester City Council has adopted the internal noise limits for residential properties identified in Table 1.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB LAeq, 16 hours	-
Dining	Dining room / area	40 dB LAeq, 16 hours	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq, 16 hours	30 dB LAeq, 8 hours 45dB LAmix (fifteen excesses over 45dB LAmix allowed per night)

Table 1: Intrusive noise criteria

Building Services Noise

With regard to external noise due to building services plant, Section 3.6.1.5.1 of 'Planning & Noise, Technical Guidance' states:

- 'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location'

Figure 3 identifies the nearest noise sensitive premises to the proposed development site.

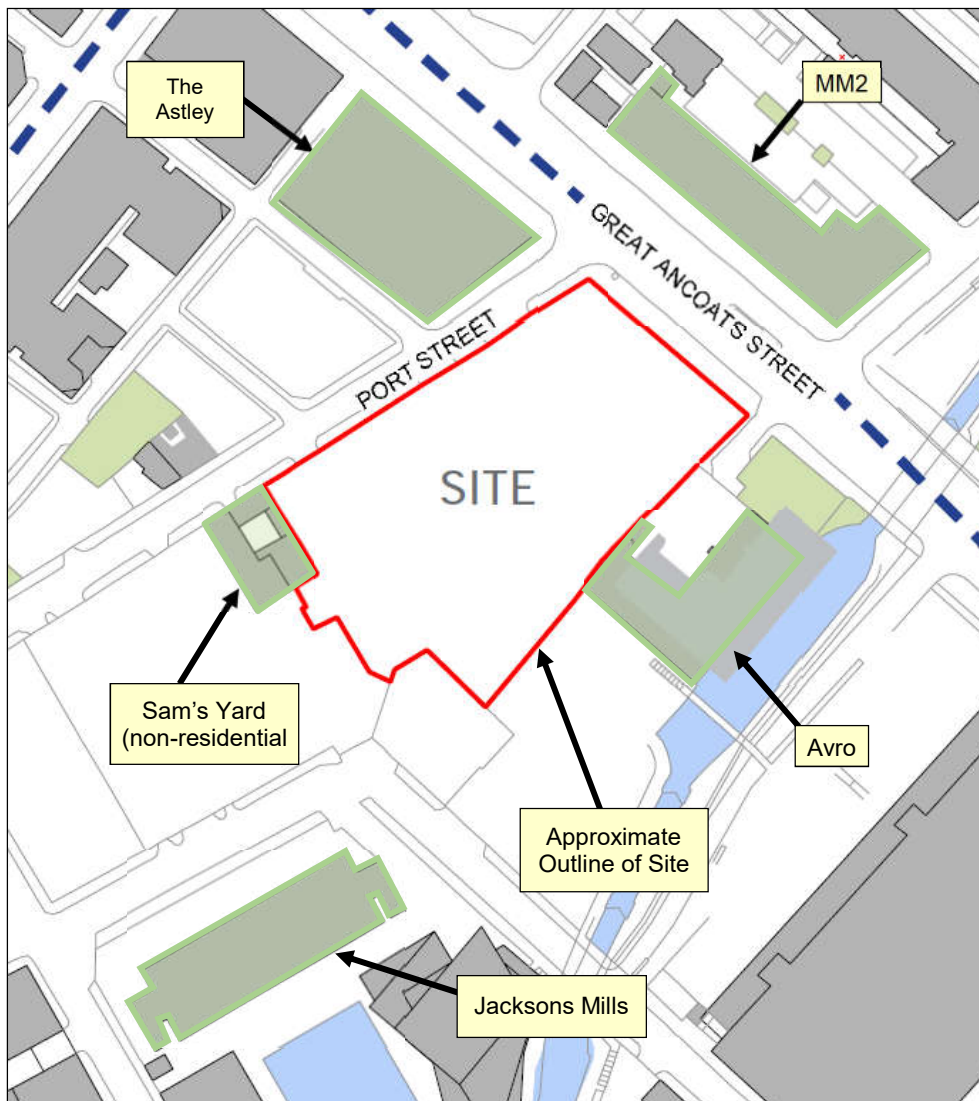


Figure 3: Nearest noise sensitive premises to Proposed Development

Noise from Commercial Operations and Amenity Areas

Noise egress from the proposed commercial units and amenity areas at the proposed development must be controlled to appropriate levels so as to avoid noise nuisance to existing sensitive receptors.

With regard to entertainment venues, 'Planning & Noise, Technical Guidance' states:

- 'When considering the potential impact of a proposal for an entertainment venue, consultants should consider the overall noise level (LAeq) and the 63 Hz and 125 Hz octave band noise levels (Leq). Music noise in the 63 Hz and 125 Hz octave bands, which is often described as "bass noise", is particularly difficult to contain and the impulsive character of this low frequency music noise is particularly disturbing for local residents exposed to it'.
- 'A planning application for a new entertainment venue that is structurally detached from other building uses should demonstrate that music noise from the proposal will not be 'audible' in nearby residential properties, assuming that the residential properties in question have their windows open. The criterion here is:

Entertainment noise (LAeq) should be controlled to 10dB below the background noise level (LA90) without the entertainment noise present, in each octave band at the nearest noise sensitive location'.

As the proposed commercial spaces and amenity spaces may employ music replay, it would be appropriate to establish external environmental noise limits for music noise to ensure that during design development, the building incorporates any required mitigation measures to maintain residential amenity at and around the site.

6.0 ENVIRONMENTAL NOISE SURVEY

In order to determine the prevailing ambient noise levels at and around the site, manned surveys of the existing noise environment at the Site were carried out by Fisher Acoustics Ltd from 2:00 pm to 5:30 pm on Wednesday 6th October 2021 and from 10:45 pm, Thursday 7th October 2021 to 1:00 am, Friday 8th October 2021.

The measurement locations used for the surveys are identified on Figure 4 and are representative of the positions of the façades of the proposed Development and of the nearest existing residential properties. The measured noise levels can therefore be used to assess the expected internal noise levels within the proposed buildings and also to determine acceptable levels of noise at the existing sensitive properties around the site due to noise from the Development.

The measurement locations were as follows:

- Location 1: At proposed location of façade of the Proposed Development to Great Ancoats Street 5.7m from the kerb, at a microphone height of 1.5 metres above street level
- Location 2: At proposed location of closest façade of Proposed Development to Port Street, at 2.7 metres from the kerb, 20 m from Great Ancoats Street, at a microphone height of 1.5 metres above street level
- Location 3: At proposed location of closest façade of Proposed Development to Avro, at 10 metres from the corner of the Avro building, at a microphone height of 6 metres above site ground level
- Location 4: At proposed location of closest façade of Proposed Development to Port Street, at 4 metres from the kerb, 50 m from Great Ancoats Street, at a microphone height of 1.5 metres above street level
- Location 5: At the corner of Tariff Street adjacent to Jacksons Mills at a microphone height of 1.5 metres above street level.
- Location 6: Dean Street, 5m from the façade of the Wentwood residential building, at a microphone height of 1.5 metres above street level.

Full survey details are given in Appendix A. Appendix A also contains a summary of the results obtained from the surveys.

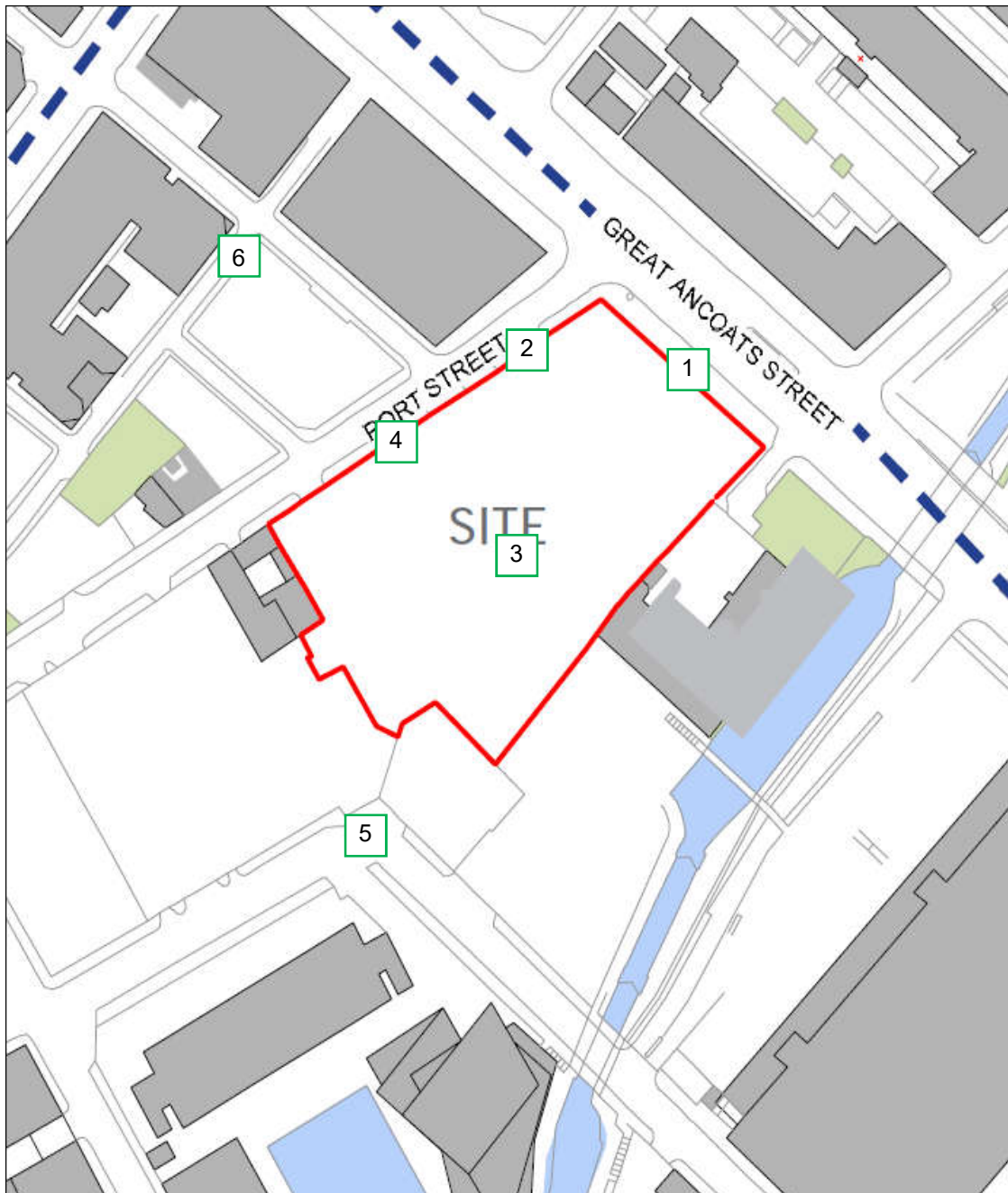


Figure 4: Noise survey measurement locations

The long-term noise environment around the Application Site is currently determined by road traffic on Great Ancoats Street, with a lesser contribution from road traffic on Port Street.

The noise levels measured during the noise surveys are summarised in Table 2.

Measurement Location	Measured Noise Level					
	Daytime (defined as 7 am to 11 pm)			Night time (defined as 11 pm to 7 am)		
	dB, LAeq	dB, LAmax	dB, LA90	dB, LAeq	dB, LAmax	dB, LA90
1	65	75 to 85	57 to 61	64	68 to 81	45 to 61
2	62	69 to 89	54 to 60	59	62 to 72	45 to 57
3	54	59 to 81	49 to 52	54	58 to 77	45 to 50
4	61	70 to 87	50 to 59	55	58 to 70	44 to 53
5	59	69 to 75	48 to 49	46	51 to 61	44 to 44
6	55	69 to 71	49 to 50	52	61 to 63	46 to 47

Table 2: Summary of measured environmental noise levels

The statistical noise levels ('LAmax' and 'LA90') given in Table 2 show the range of noise levels measured over the sample periods. The quoted average (LAeq) noise levels are the average noise levels measured over the full measurement periods in question at each measurement position.

With reference to noise survey data gathered for the planning application relating to The Astley residential development on Port Street (planning reference 109287/FO/2015/C2), the free field noise level measured on Great Ancoats Street is approximately 5dB lower than was the case in 2015. During the October 2021 survey, there was heavy but slow moving road traffic on Great Ancoats Street during the full duration of the daytime noise survey. Since 2015, improvement works have been carried out to Great Ancoats Street. These works have included new crossing points, both controlled and uncontrolled, for pedestrians and people on bikes and a new road surface that is designed to reduce from road vehicles. The improvement works may have reduced traffic speeds which would explain the slow-moving traffic that was encountered during the 2021 noise survey.

Figure 5 shows the external daytime average (LAeq) free field noise levels expected to be incident upon the lower residential levels of the various façades of the proposed building.

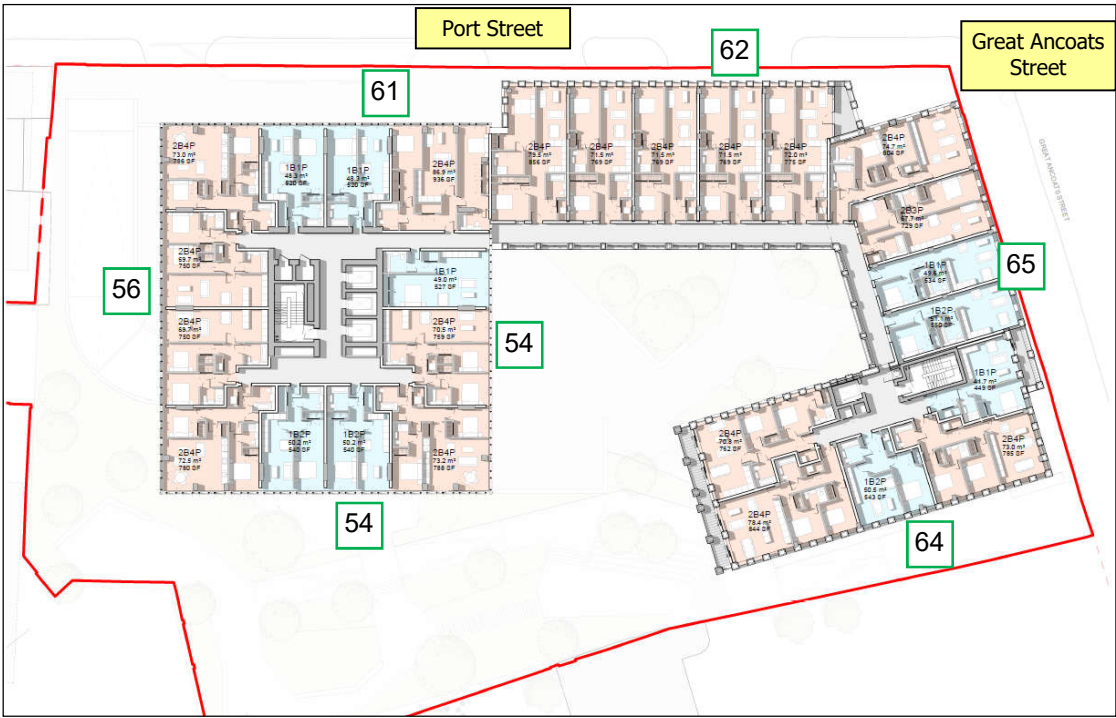


Figure 5: Summary external daytime noise levels at lower floor levels at each façade (dB LAeq)

7.0 NOISE INGRESS

The external noise survey data have been used to calculate the required sound insulation performance of façade elements to achieve the internal noise criteria within apartment rooms due to external noise. The calculations are based on the 'more rigorous' calculation method identified in Annex G.2.1 of BS8233:2014 'Guidance on sound insulation and noise reduction for buildings'.

The calculations take into account the measured levels of noise at the site, the areas of individual façade elements, (e.g. glazing, curtain wall framing and openable purge vent panels) identified in the drawings submitted for planning purposes and the expected reverberation time of the apartment rooms.

The apartments of the proposed development are to be provided with continuously running supply and extract ventilation in order to achieve the background ventilation requirements of Approved Document F of the Building Regulations. Therefore, no passive trickle ventilators are required within the façade of the proposed habitable rooms. Purge ventilation is to be achieved through via opening purge vents.

Windows and Vision Panels

It has been determined that a range of acoustic specifications for the windows and vision panels to the proposed apartment rooms will be required to achieve the internal noise criteria detailed in Section 5 of this report. Figures 6 to 11 identify the locations of the various recommended specification types. Table 3 identifies the minimum recommended sound reduction index of the window and vision panel types. The performance values in Table 3 relate to the composite performance of the full window or vision panel assembly including glazing, frames and seals.

Vision panel/purge panel type	Sound Reduction Index (dB) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
TYPE A	25	28	35	40	44	46	53
TYPE B	25	28	31	38	41	44	53
TYPE C	22	26	27	35	38	38	45
TYPE D	20	24	24	31	37	37	37

Table 3: Minimum Recommended Sound Reduction Index of vision panels and windows, including frame

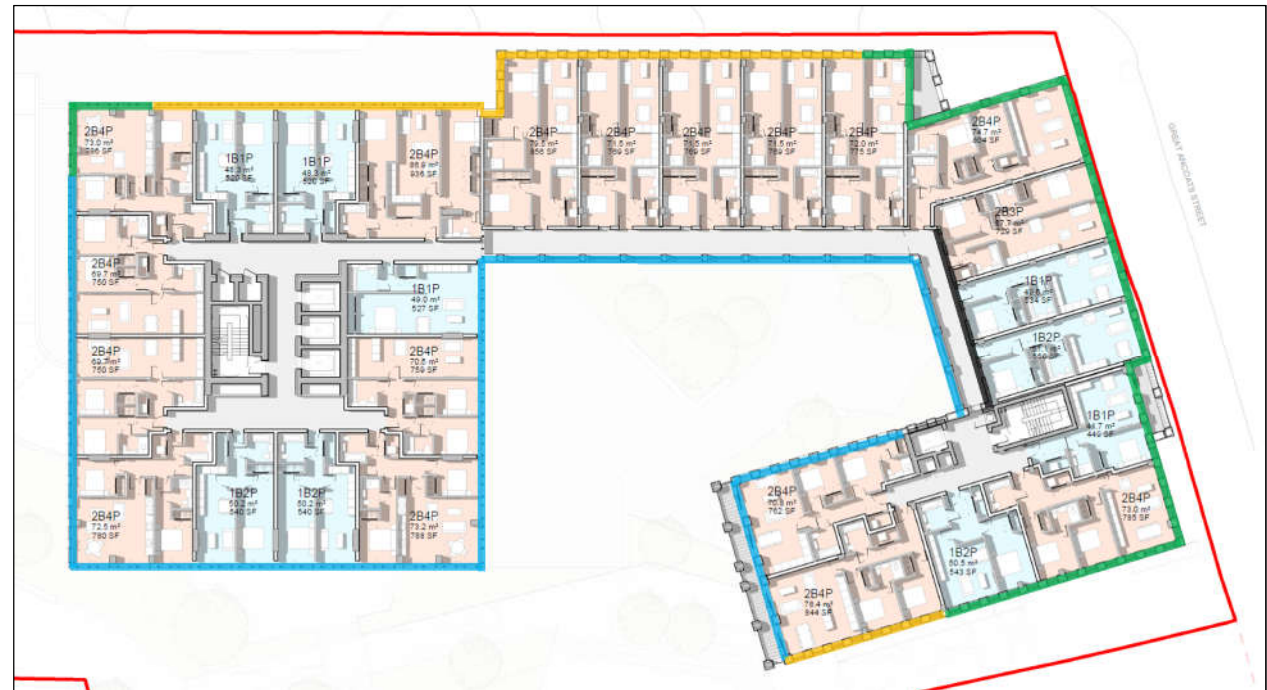


Figure 6: Acoustic specification location plan, Ground Floor Level 01 to Level 06

Key

- Acoustic Specification A
- Acoustic Specification B
- Acoustic Specification C
- Acoustic Specification D

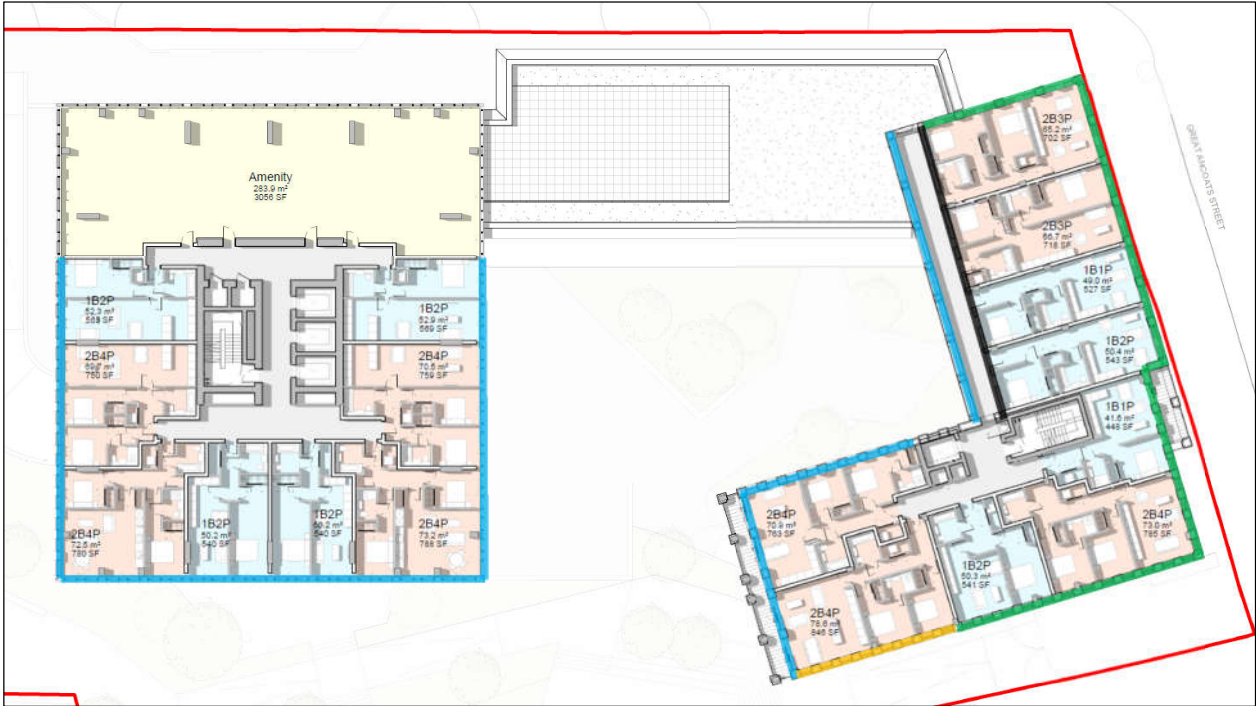


Figure 7: Acoustic specification location plan, Ground Floor Level 07 and Level 08

Key

- Acoustic Specification A
- Acoustic Specification B
- Acoustic Specification C
- Acoustic Specification D

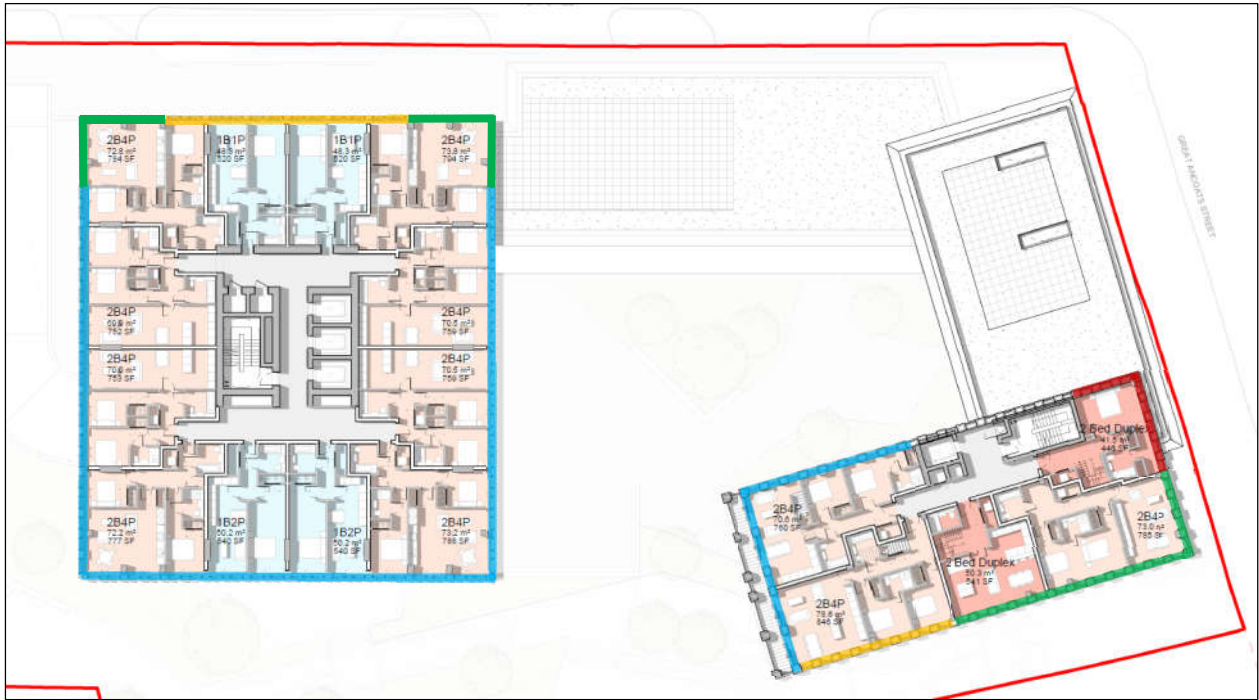


Figure 8: Acoustic specification location plan, Ground Floor Level 09

Key

- Acoustic Specification A
- Acoustic Specification B
- Acoustic Specification C
- Acoustic Specification D

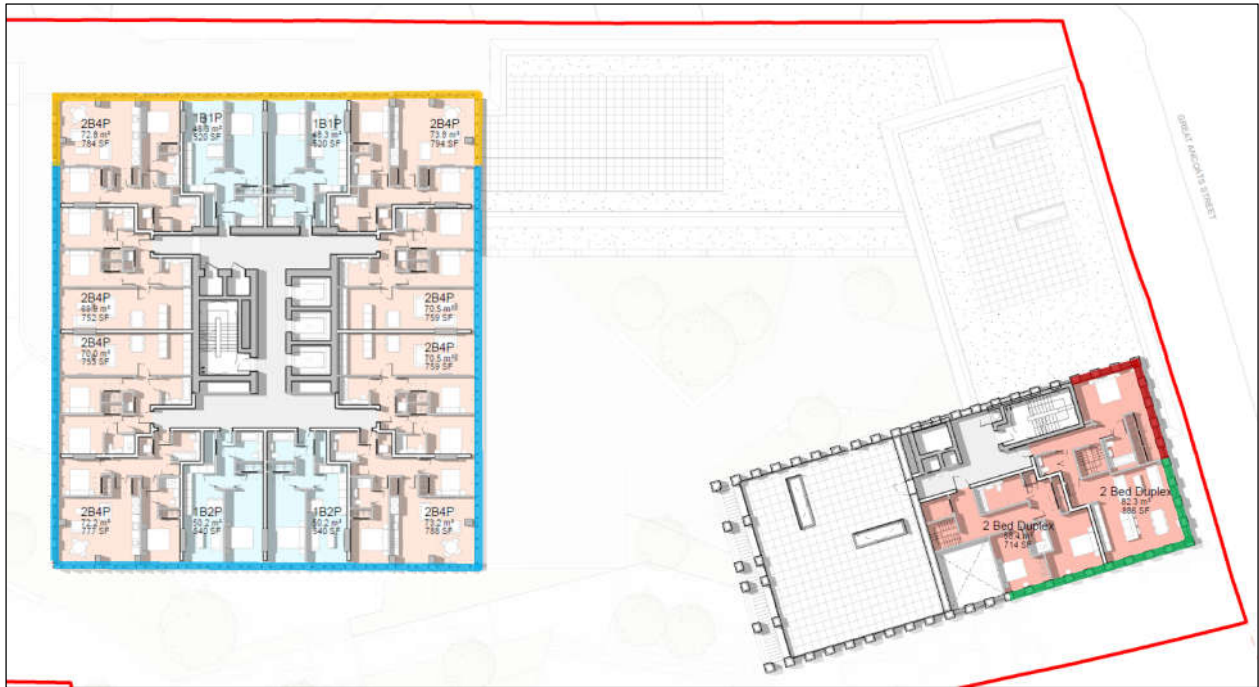


Figure 9: Acoustic specification location plan, Ground Floor Level 10

Key

- Acoustic Specification A
- Acoustic Specification B
- Acoustic Specification C
- Acoustic Specification D

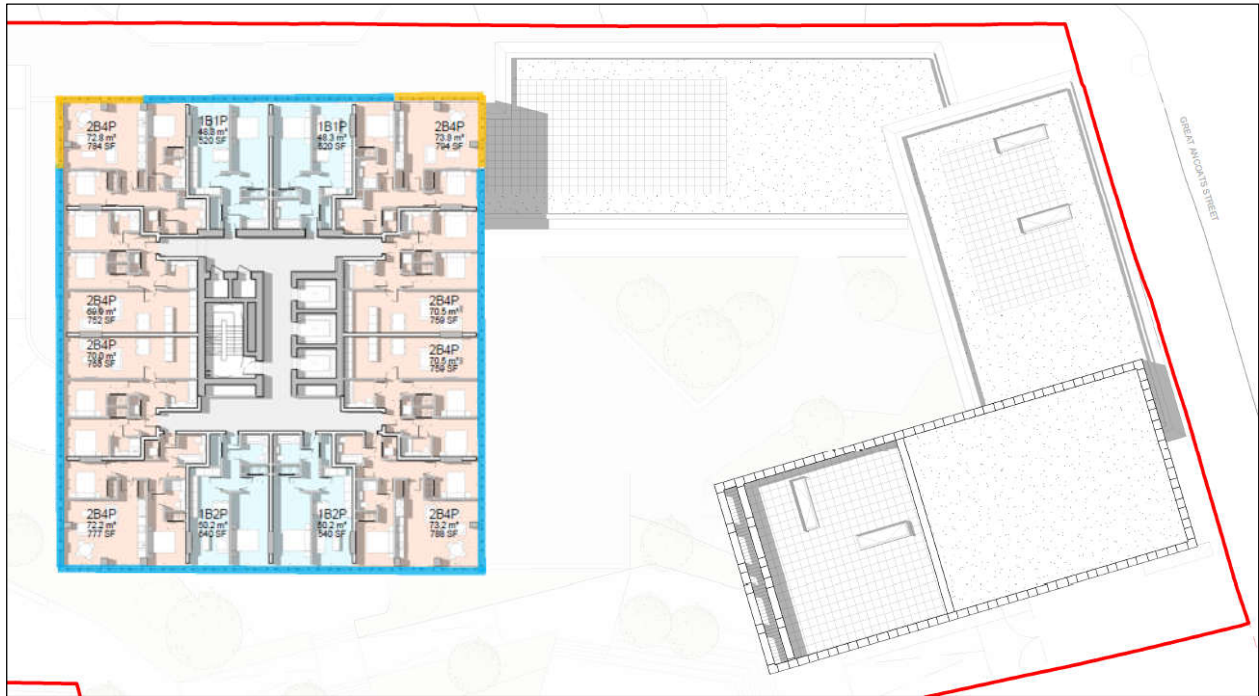


Figure 10: Acoustic specification location plan, Ground Floor Level 11 to Level 20

Key

- Acoustic Specification A
- Acoustic Specification B
- Acoustic Specification C
- Acoustic Specification D

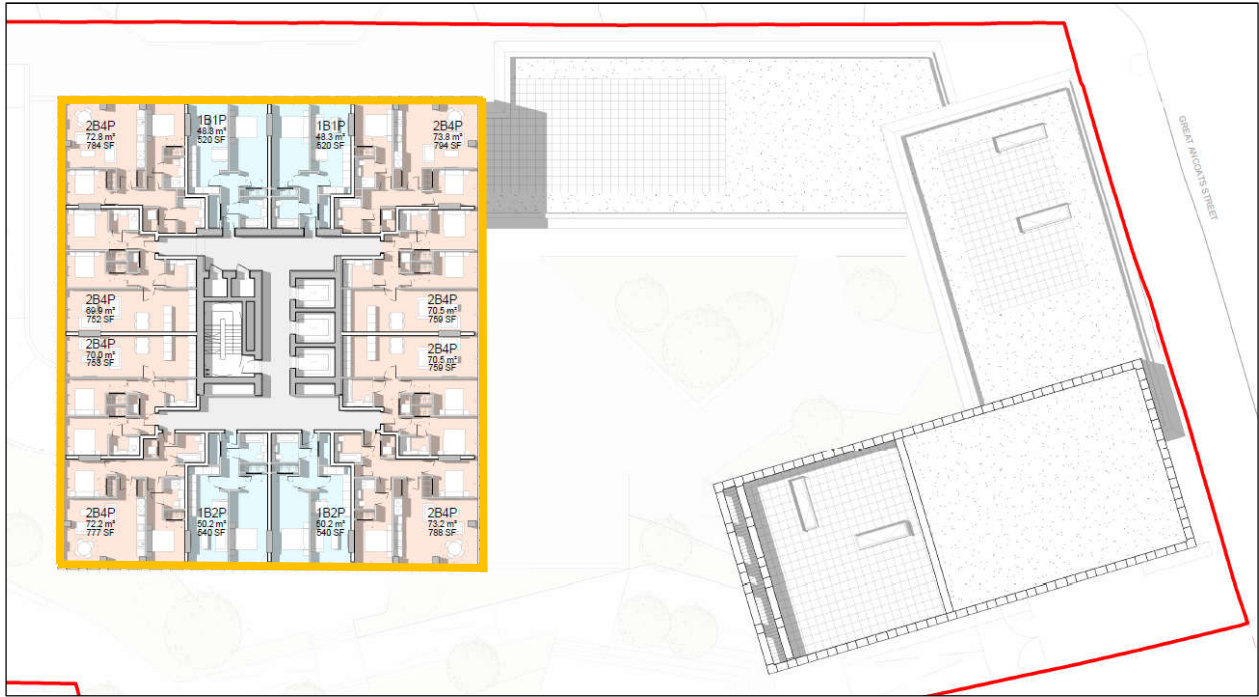


Figure 11: Acoustic specification location plan, Ground Floor Level 21 to Level 30

Key

- Acoustic Specification A
- Acoustic Specification B
- Acoustic Specification C
- Acoustic Specification D

Purge panels

In order to provide rapid (purge) natural ventilation, the curtain wall of the Tower includes inward-opening solid doors within apartment bedrooms and living rooms. The door is to be an insulated aluminium panel. A fixed perforated panel will be positioned on the outer frame that incorporates the opening door.

Table 4 identifies the minimum recommended sound insulation performance of the purge panels to the proposed apartment rooms to achieve the recommended internal noise levels. The recommended performance values in Table 4 relate to the composite performance of the purge panel, the panel frame and the acoustic seals around the perimeter of the opening panel.

Purge Vent Type	Sound Reduction Index (dB) @ Octave Band Centre Frequency (Hz)						
	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4kHz
Standard purge vent	17	20	30	37	42	45	45

Table 4: Minimum sound reduction index of purge vents to habitable rooms

External Wall (Podium)

It is understood that the external wall of the proposed podium apartments is to comprise areas of brickwork and metal panels fixed to an SFS frame drylined internally.

Table 5 identifies the minimum recommended sound reduction index of the external wall to the podium apartments.

External Wall Construction	Sound Reduction Index (dB) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Brickwork, SFS system drylined internally	25	32	39	48	50	50	50
Insulated metal panel, SFS system drylined internally	20	30	39	48	50	50	50

Table 5: Minimum recommended Sound Reduction Index of external wall construction (podium)

Non-vision panels of curtain wall (Tower)

Table 6 identifies the minimum recommended sound insulation performance of the non-vision panels of the curtain wall to the proposed apartment rooms within the Tower to achieve the recommended internal noise levels. The recommended performance values in Table 6 relate to the composite performance of the non-vision panels and the panel frame and include the benefit of the internal drylining.

Element Type	Sound Reduction Index (dB) @ Octave Band Centre Frequency (Hz)						
	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4kHz
Non-vision panel, drylined	17	28	38	45	50	50	50

Table 6: Minimum sound reduction index of purge vents to habitable rooms

Roof

The principle acoustic elements of the proposed roof of the development are a concrete slab and a ceiling that comprises a single layer of 12.5 mm wallboard fixed to a suspended metal frame. The expected minimum weighted sound reduction index of the roof construction is 60dB Rw. This performance is fully commensurate with the achievement of the target internal noise levels within the proposed apartments.

External noise ingress via MVHR ductwork

It is possible that in-line ductwork silencers would need to be introduced to some of the proposed apartment MVHR systems to reduce external noise ingress via the atmosphere terminations of the MVHR systems (i.e. the intake and exhaust of the MVHR fans) and to achieve the recommended internal noise.

As the detailed design progresses, the acoustic requirements of any in-line ductwork silencers will need to be assessed.

Conclusion

Compliance with the recommended sound insulation performances of the façade and roof elements is expected to allow full compliance with the daytime and night time 'average' noise level criteria identified in Section 5 above.

Given the recommended sound insulation performances given above for the façade and roof, compliance with the recommendations of the World Health Organisation in relation to maximum (LA_{max}) internal noise events is expected.

8.0 EXTERNAL NOISE LEVELS DUE TO BUILDING SERVICES

The measured background noise levels around the site can be used to establish the acceptable level of noise from plant serving the development. Final plant selections have not been made at this early design stage. In the absence of specific selection of plant items, overall plant noise limits can be provided.

With reference to the discussion in Section 5, the cumulative rating level due to all simultaneously operating non-emergency plant must be at least 5dB lower than the typical pre-existing background noise level at the nearest residential receptors to the site.

Table 7 identifies the allowable combined free-field noise level at the nearest residential receptors to the development, due to all simultaneously-operating non-emergency building services plant and equipment.

Location	Rating noise level (dB LAeq)	
	Daytime (07:00 hrs to 23:00 hrs)	Night time (23:00 hrs to 07:00 hrs)
Proposed Development, Great Ancoats Street Elevation	53	42
Proposed Development, Port Street Elevation	46	40
Proposed Development, internal elevation	44	40
The Astley, Port Street	49	42
MM2, Great Ancoats Street	53	42
Jacksons Mills, Tariff Street	43	39
Avro, Great Ancoats Street	44	40

Table 7: Environmental noise limits for non-emergency building services plant

Emergency plant

If any emergency plant is required at the Development, it is expected that such plant would only operate during emergencies and during periodical test runs (perhaps test runs of thirty minutes every two months).

On this basis, it is not considered appropriate to require emergency plant to comply with the noise limits for continuously operating non-emergency plant. It is therefore suggested that the noise level from any emergency plant is no more than 10 dB(A) greater than the ambient noise level (measured as an LAeq) at any residential receptor.

It is therefore recommended that the noise level at any residential façade during operation of any emergency plant does not exceed the daytime noise levels given in Table 8.

Location	Daytime noise level (dB LAeq)
Proposed Development, Great Ancoats Street Elevation	75
Proposed Development, Port Street Elevation	72
Proposed Development, internal elevation	64
The Astley, Port Street	72
MM2, Great Ancoats Street	75
Jacksons Mills, Tariff Street	69
Avro, Great Ancoats Street	64

Table 8: Environmental noise limits for emergency building services plant

The above noise limits for non-emergency and emergency plant must be forwarded to the project's Mechanical Engineer to allow the selection of appropriate equipment and any associated noise control hardware. Building services equipment must also be provided with appropriate vibration isolation to minimise the risk of disturbance to the building occupants by structureborne noise.

9.0 NOISE EGRESS FROM COMMERCIAL UNITS AND AMENITY SPACES

In order to avoid potential noise nuisance to the existing and proposed noise-sensitive buildings around the site, activity noise egress from the proposed commercial units and amenity spaces must be controlled. As the proposed Planning Class for the commercial units includes food & beverage, it is recommended that environmental noise limits relating to music noise are established.

As detailed in Section 5 above, Manchester City Council suggests that external music noise levels (measured as an L_{eq} noise level) external to a residential property due to an entertainment venue should be 10 dB lower than the prevailing background noise level in each octave band.

Octave band noise limits at the nearest noise sensitive receptors have been determined by reference to the results of the noise survey.

Table 9 identifies the recommended maximum allowable cumulative daytime and night time free-field noise levels at the closest residential façades due to music noise from the commercial units and amenity spaces within the proposed development to comply with the guidance of Manchester City Council.

Location/period	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Proposed Development, Great Ancoats Street Elevation (0700 to 2300)	56	50	46	44	42	40	35
Proposed Development, Great Ancoats Street Elevation (2300 to 0700)	49	42	37	34	33	27	17
Proposed Development, Port Street Elevation (0700 to 2300)	54	48	43	40	38	36	30
Proposed Development, Port Street Elevation (2300 to 0700)	49	43	38	34	32	27	17
Proposed Development, Internal elevations (0700 to 2300)	49	40	38	36	35	30	22
Proposed Development, Internal elevations (2300 to 0700)	49	38	35	32	32	26	15
The Astley (07:00 to 23:00)	54	48	43	40	38	36	30
The Astley (23:00 to 07:00)	49	43	38	34	32	27	17
MM2 (07:00 to 23:00)	56	50	46	44	42	40	35
MM2 (23:00 to 07:00)	49	42	37	34	33	27	17
Jacksons Mills (07:00 to 23:00)	49	40	36	35	33	27	19
Jacksons Mills (23:00 to 07:00)	49	39	34	32	28	21	11
Avro (07:00 to 23:00)	49	40	38	36	35	30	22
Avro (23:00 to 07:00)	49	38	35	32	32	26	15

Table 9: Maximum allowable external music noise levels due to proposed commercial units

Internal Noise transfer- amenity areas to apartments

There are residential apartments directly above the proposed amenity areas and commercial units. There is therefore the possibility of internal noise transfer between these areas and the apartments above via the party floor structures. In order to avoid potential noise nuisance, it is recommended that the internal noise levels within an apartment due solely to music replay in the amenity areas and commercial units do not exceed the values given in Table 10.

Room	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Apartment Unit 3B	40	30	23	20	17	15	12

Table 10: Maximum recommended noise levels in apartments due to music replay in amenity areas

During the detailed design stages, the sound insulation requirements of the party floor to comply with the above noise limits will be determined.

APPENDIX A: NOISE SURVEY DETAILS AND SUMMARY RESULTS

LOCATION

Port Street, Manchester

DATES AND TIMES

2:20am to 5:30pm, Wednesday 6 October 2021

10:50 pm to 0:50am, Thursday 7 October 2021 to Friday 8 October 2021

WEATHER DURING SURVEYS

Wednesday 6 October 2021 (Day time) 1/8 cloud cover, 3 m/s wind, no rain, 17°C

Thursday 7 October 2021 (Night time) 1/8 cloud cover, 2 m/s wind, no rain, 15°C

PERSONNEL PRESENT DURING SURVEY

Matt Fisher – Fisher Acoustics

Lee Copley – Fisher Acoustics

INSTRUMENTATION

Norsonic Type 118 IEC 60651 Type 1 Integrating-Averaging Sound Level Meter (serial no. 31498)

Norsonic Type 140 IEC 60651 Type 1 Integrating-Averaging Sound Level Meters (serial no. 1406387)

Norsonic Type 140 IEC 60651 Type 1 Integrating-Averaging Sound Level Meters (serial no. 1403193)

Norsonic Type 1251 IEC 60942-1997 Class 1 Sound Calibrators (x2) (serial nos. 31971, 27878)

MEASUREMENT METHODOLOGY

Before and after the noise survey the sound level meters were checked calibrated to an accuracy of ± 0.3 dB using the Norsonic Type 1251 Calibrators - no drift in sensitivity was detected. The measurement microphones were installed at the locations identified in this report. All survey measurements were in 'free field' conditions.

Figure 12 to Figure 14 identify the free-field noise levels measured around the Site. Measurement locations are shown in Figure 4 and described below.

The measurement locations were as follows:

- Location 1: At proposed location of façade of the Proposed Development to Great Ancoats Street 5.7m from the kerb, at a microphone height of 1.5 metres above street level
- Location 2: At proposed location of closest façade of Proposed Development to Port Street, at 2.7 metres from the kerb, 20 m from Great Ancoats Street, at a microphone height of 1.5 metres above street level

- Location 3: At proposed location of closest façade of Proposed Development to Avro, at 10 metres from the corner of the Avro building, at a microphone height of 6 metres above site ground level
- Location 4: At proposed location of closest façade of Proposed Development to Port Street, at 4 metres from the kerb, 50 m from Great Ancoats Street, at a microphone height of 1.5 metres above street level
- Location 5: At the corner of Tariff Street adjacent to Jacksons Mills at a microphone height of 1.5 metres above street level.
- Location 6: Dean Street, 5m from the façade of the Wentwood residential building, at a microphone height of 1.5 metres above street level.

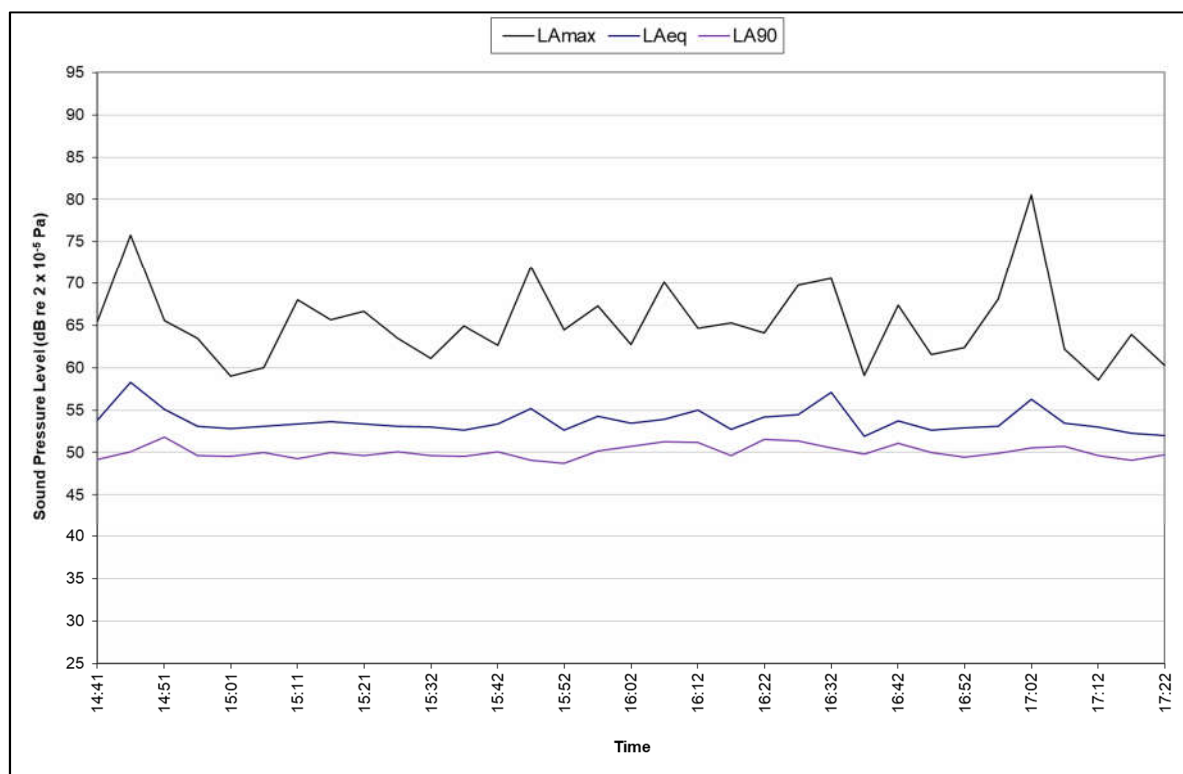


Figure 12: Position 3 daytime noise measurements, Wednesday 6 October 2021 - maximum (LMax), average (LAeq) and background (LA90) noise levels

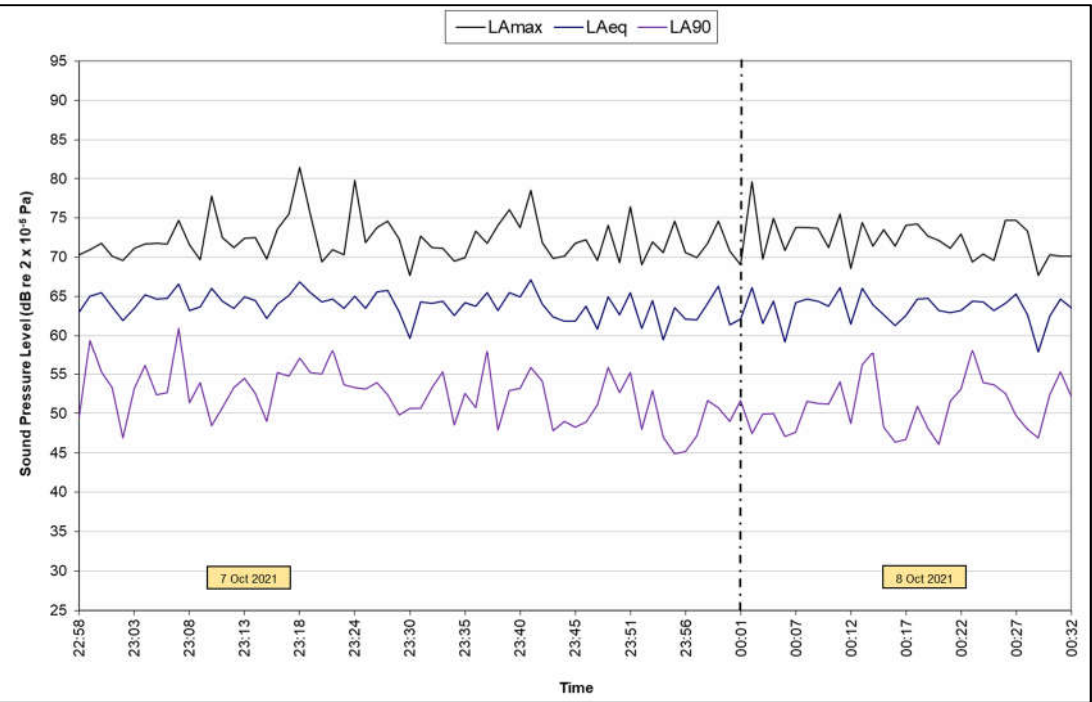


Figure 13: Position 1 night-time noise measurements, Thursday 7 October 2021 to Friday 8 October 2021 - maximum (LAmax), average (LAeq) and background (LA90) noise levels

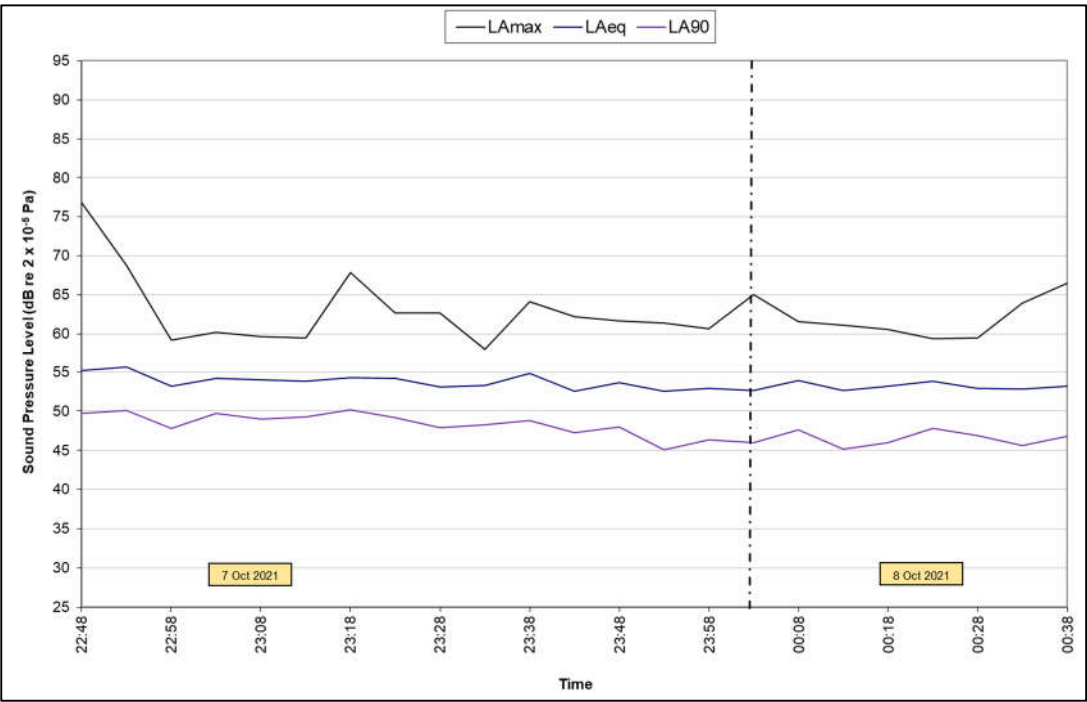


Figure 14: Position 3 night-time noise measurements, Thursday 7 October 2021 to Friday 8 October 2021 - maximum (LAmax), average (LAeq) and background (LA90) noise levels

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L _{Aeq}	L _{Amax}	L _{A90}	
1	14:23	65.0	82.2	58.5	Road traffic, Pedestrian crossing beeping
1	14:29	63.2	74.8	58.7	"
1	14:34	65.6	79.1	58.8	"
1	14:58	65.4	78.2	58.7	"
1	15:03	65.4	76.5	59.2	"
1	15:08	66.1	78.7	59.4	"
1	15:31	65.5	78.8	58.6	"
1	15:36	64.9	75.4	59.2	"
1	15:41	65.2	74.6	60.9	"
1	16:03	64.5	75.6	59.5	"
1	16:08	64.9	78.7	59.7	"
1	16:13	68.5	85.2	60.6	"
1	16:38	64.0	76.0	58.4	"
1	16:43	65.3	85.3	58.8	"
1	16:48	65.1	76.3	60.1	"
1	17:13	64.4	78.1	57.8	"
1	17:18	62.5	76.9	58.1	"
1	17:23	63.9	77.3	57.3	"

Table 11: Summary Statistical Noise Levels, Position 1 – Daytime, 6th October 2021

Measurement Position	Start Time	Noise Level, dB LAeq	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
1	14:23	65.0	73.4	66.4	64.1	61.8	60.7	56.3	51.4
1	14:29	63.2	72.5	65.4	61.9	59.5	58.4	55.3	51.3
1	14:34	65.6	74.0	67.1	64.1	62.1	60.8	57.6	53.5
1	14:58	65.4	72.8	67.0	63.8	60.8	60.5	58.6	53.2
1	15:03	65.4	73.3	66.4	62.6	61.7	60.7	58.1	52.6
1	15:08	66.1	72.1	66.4	64.5	62.0	61.1	58.4	55.3
1	15:31	65.5	72.6	66.8	62.9	61.3	60.1	57.9	56.1
1	15:36	64.9	73.0	67.6	64.6	61.2	59.8	57.2	52.8
1	15:41	65.2	74.0	67.6	63.7	60.9	59.9	57.8	54.7
1	16:03	64.5	73.1	68.1	64.9	60.9	58.9	55.8	50.9
1	16:08	64.9	72.3	68.0	63.4	61.3	59.4	56.7	53.6
1	16:13	68.5	74.0	66.7	65.0	64.8	63.6	61.2	56.4
1	16:38	64.0	72.0	67.0	60.7	60.6	58.8	55.7	52.5
1	16:43	65.3	73.3	67.2	63.2	61.0	59.6	58.9	50.8
1	16:48	65.1	76.2	72.2	66.3	61.8	59.4	55.7	50.2
1	17:13	64.4	73.0	68.1	62.9	59.7	59.7	56.5	51.9
1	17:18	62.5	71.3	65.6	61.5	58.7	57.3	54.2	50.3
1	17:23	63.9	72.1	64.5	61.3	60.3	59.6	56.1	50.4

Table 12: Measured Octave Band L_{eq} Noise Levels, Position 1 – Daytime, 6th October 2021

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L _{Aeq}	L _{Amax}	L _{A90}	
2	15:14	59.8	74.5	53.6	Road traffic, pedestrian crossing beeping
2	15:19	60.1	70.5	55.1	"
2	15:24	60.4	69.0	54.7	"
2	15:47	63.4	85.3	55.8	"
2	15:52	60.3	74.7	54.6	"
2	15:57	60.3	77.8	54.5	"
2	16:19	62.4	80.8	53.9	"
2	16:25	64.6	81.2	59.8	"
2	16:30	66.4	89.1	55.4	"
2	16:55	59.8	69.3	55.6	"
2	17:00	61.5	76.3	58.3	"
2	17:06	65.2	88.5	57.5	"
2	17:30	59.8	73.2	56.0	"

Table 13: Summary Statistical Noise Levels, Position 2 – Daytime, 6th October 2021

Measurement Position	Start Time	Noise Level, dB L _{Aeq}	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
2	15:14	59.8	70.7	64.5	60.3	55.8	54.3	50.8	44.9
2	15:19	60.1	71.4	64.5	58.6	56.3	55.3	52.4	47.1
2	15:24	60.4	70.6	64.2	59.0	57.2	55.5	52.4	47.3
2	15:47	63.4	70.3	63.3	57.8	60.8	59.2	54.2	49.4
2	15:52	60.3	74.2	63.5	60.2	57.1	54.9	51.6	48.1
2	15:57	60.3	69.9	62.3	57.9	56.4	56.3	52.6	46.5
2	16:19	62.4	70.1	62.8	59.1	59.3	57.5	55.1	49.1
2	16:25	64.6	71.9	66.6	66.7	60.5	58.4	55.9	52.2
2	16:30	66.4	72.3	66.1	61.4	60.9	61.8	61.0	54.3
2	16:55	59.8	74.5	64.5	58.7	55.8	54.8	51.9	47.0
2	17:00	61.5	71.1	65.0	59.9	58.2	55.9	53.7	50.8
2	17:06	65.2	70.8	64.9	63.4	62.7	60.7	56.6	54.0
2	17:30	59.8	71.1	64.5	58.6	57.5	54.2	50.7	46.5

Table 14: Measured Octave Band L_{eq} Noise Levels, Position 2 – Daytime, 6th October 2021

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L _{Aeq}	L _{Amax}	L _{A90}	
4	14:50	60.1	73.8	52.7	Road traffic
4	14:55	61.4	76.6	53.4	"
4	15:00	60.4	80.7	50.5	"
4	15:05	57.4	70.2	52.1	"
4	15:10	57.7	70.7	51.3	"
4	15:15	59.9	77.4	52.8	"
4	15:23	59.4	73.1	52.8	"
4	15:44	59.0	69.9	52.7	"
4	15:49	59.4	82.8	54.9	"
4	15:54	59.4	72.2	50.6	"
4	15:59	61.8	80.7	52.5	"
4	16:04	61.3	75.3	53.9	"
4	16:24	63.4	79.8	59.0	"
4	16:29	61.8	76.4	52.2	"
4	16:34	60.0	73.2	50.9	"
4	16:40	60.3	76.3	52.2	"
4	16:45	60.4	78.2	53.5	"
4	16:58	62.3	87.1	53.9	"
4	17:03	60.9	76.1	53.5	"
4	17:08	61.6	78.9	56.4	"
4	17:14	58.6	72.9	50.3	"

Table 15: Summary Statistical Noise Levels, Position 4 – Daytime, 6th October 2021

Measurement Position	Start Time	Noise Level, dB L _{Aeq}	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
4	14:50	60.1	67.2	61.3	58.2	56.8	55.9	52.3	45.4
4	14:55	61.4	68.3	63.0	59.1	57.5	57.3	53.8	47.7
4	15:00	60.4	69.1	65.8	60.9	57.6	55.5	50.7	44.8
4	15:05	57.4	66.1	58.6	54.8	54.2	53.5	49.2	42.5
4	15:10	57.7	66.9	60.3	56.4	53.6	53.6	49.8	43.6
4	15:15	59.9	67.8	63.8	57.4	56.2	56.2	51.7	44.0
4	15:23	59.4	66.9	60.9	56.1	55.6	55.4	52.0	45.3
4	15:44	59.0	68.2	61.4	58.2	55.7	54.6	50.9	45.0
4	15:49	59.4	68.2	62.0	55.9	55.0	54.8	51.3	48.6
4	15:54	59.4	69.2	62.4	58.7	55.6	55.5	51.1	43.8
4	15:59	61.8	70.8	69.6	58.4	57.4	57.2	53.9	48.7
4	16:04	61.3	67.6	61.8	58.5	57.3	57.5	53.5	47.6
4	16:24	63.4	70.0	65.0	64.3	59.9	58.2	55.5	50.8
4	16:29	61.8	69.0	64.1	59.5	58.0	57.6	54.4	48.2
4	16:34	60.0	66.9	62.2	58.6	55.1	55.7	53.3	46.7
4	16:40	60.3	66.8	62.1	57.4	57.1	56.7	52.2	44.4
4	16:45	60.4	68.5	61.8	57.9	56.5	56.5	52.1	45.9
4	16:58	62.3	69.1	63.4	57.7	56.4	54.6	53.0	58.0

Measurement Position	Start Time	Noise Level, dB LAeq	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
4	17:03	60.9	67.1	61.8	58.9	57.6	56.9	52.7	45.9
4	17:08	61.6	69.4	66.3	62.0	58.2	56.6	53.1	48.1
4	17:14	58.6	66.1	60.5	56.2	54.4	55.0	50.7	43.6

Table 16: Measured Octave Band L_{eq} Noise Levels, Position 4 – Daytime, 6th October 2021

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L_{Aeq}	L_{Amax}	L_{A90}	
5	15:32	59.7	74.7	49.0	Road traffic
5	15:37	58.9	73.1	48.3	"
5	16:52	56.5	69.4	47.7	"

Table 17: Summary Statistical Noise Levels, Position 5 – Daytime, 6th October 2021

Measurement Position	Start Time	Noise Level, dB LAeq	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
5	15:32	59.7	65.9	61.7	56.1	55.4	55.6	52.4	47.0
5	15:37	58.9	66.2	59.0	56.8	55.7	55.0	50.5	45.1
5	16:52	56.5	65.0	59.2	56.7	53.1	52.4	47.9	41.1

Table 18: Measured Octave Band L_{eq} Noise Levels, Position 5 – Daytime, 6th October 2021

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L_{Aeq}	L_{Amax}	L_{A90}	
6	16:10	55.1	69.1	49.7	Road traffic
6	16:15	55.0	71.1	49.0	"

Table 19: Summary Statistical Noise Levels, Position 6 – Daytime, 6th October 2021

Measurement Position	Start Time	Noise Level, dB LAeq	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
6	16:10	55.1	64.3	58.0	54.5	52.0	51.0	46.3	38.9
6	16:15	55.0	62.5	55.9	54.3	51.9	50.9	46.7	39.0

Table 20: Measured Octave Band L_{eq} Noise Levels, Position 6 – Daytime, 6th October 2021

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L _{Aeq}	L _{Amax}	L _{A90}	
2	23:02	55.4	61.8	47.2	Road traffic
2	23:03	57.7	65.8	51.9	"
2	23:04	60.1	65.8	55.0	"
2	23:05	58.7	65.5	51.7	"
2	23:06	58.6	68.6	51.3	"
2	23:07	61.3	69.7	56.5	"
2	23:08	57.4	64.3	51.2	"
2	23:09	59.7	68.4	51.6	"
2	23:10	58.6	65.3	48.1	"
2	23:11	61.7	71.2	51.8	"
2	23:12	57.1	63.5	50.1	Loud music (bass) from car on Port St
2	23:13	58.3	66.2	52.2	Road traffic
2	23:14	59.8	67.9	49.4	"
2	23:15	58.9	71.6	53.2	"
2	23:18	59.8	66.9	52.4	"
2	23:37	59.2	65.8	51.9	"
2	23:38	59.2	65.9	48.3	"
2	23:39	60.7	69.7	48.4	"
2	23:40	58.6	67.2	49.5	"
2	23:41	62.1	72.0	51.5	"
2	23:42	59.4	65.9	52.2	"
2	23:43	56.0	62.6	48.0	"
2	23:44	56.7	62.2	47.9	"
2	23:45	57.6	66.2	49.6	"
2	23:46	57.2	63.3	47.8	"
2	23:47	58.4	69.6	48.2	"
2	23:48	59.0	67.9	48.7	"
2	23:49	60.6	70.1	55.2	"
2	23:50	56.5	62.7	51.0	"
2	23:51	59.2	67.0	48.7	"
2	23:52	57.1	62.8	50.5	"
2	00:10	60.1	66.7	50.7	"
2	00:12	58.6	66.8	47.3	"
2	00:13	59.4	66.9	51.0	"
2	00:14	57.2	63.7	52.5	"
2	00:15	59.2	69.7	49.8	"
2	00:16	54.4	62.2	45.2	"
2	00:17	54.9	64.1	45.6	"
2	00:18	59.7	67.7	50.1	"
2	00:19	58.0	64.9	46.4	"
2	00:20	56.4	64.8	45.2	"
2	00:21	57.1	63.8	48.6	"
2	00:22	57.6	64.0	49.4	"
2	00:23	60.1	72.0	52.1	"
2	00:24	59.0	69.6	49.0	"
2	00:25	60.1	67.0	53.2	"

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L _{Aeq}	L _{Amax}	L _{A90}	
2	00:26	60.3	69.8	51.6	"

Table 21: Summary Statistical Noise Levels, Position 2 – Night time, 7th & 8th October 2021

Measurement Position	Start Time	Noise Level, dB LAeq	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
2	23:02	55.4	61.7	57.2	52.9	51.2	52.6	46.6	36.7
2	23:03	57.7	66.0	58.3	55.6	53.5	54.6	49.3	41.5
2	23:04	60.1	66.0	57.8	57.2	56.5	57.2	51.6	42.7
2	23:05	58.7	64.6	58.2	55.6	54.3	55.4	50.7	45.4
2	23:06	58.6	65.6	59.9	57.3	54.5	55.8	49.2	39.3
2	23:07	61.3	66.6	61.3	60.7	57.5	58.4	51.8	41.6
2	23:08	57.4	64.0	57.8	54.5	53.0	54.2	49.7	39.9
2	23:09	59.7	63.5	58.0	56.2	55.4	57.1	51.0	40.2
2	23:10	58.6	62.9	59.2	57.1	54.6	55.4	49.9	41.2
2	23:11	61.7	68.2	64.5	61.9	58.5	57.8	51.5	45.3
2	23:12	57.1	63.9	59.5	55.8	53.6	53.8	48.0	38.0
2	23:13	58.3	64.4	59.8	56.5	54.6	55.2	49.2	40.0
2	23:14	59.8	64.4	59.1	56.5	55.9	57.0	51.3	41.3
2	23:15	58.9	67.3	58.5	56.0	56.0	55.7	50.0	40.8
2	23:18	59.8	63.5	58.3	56.7	55.5	57.0	51.5	40.4
2	23:37	59.2	60.1	55.8	55.6	52.7	51.8	46.1	35.2
2	23:38	59.2	60.8	56.2	55.0	53.2	53.9	48.4	39.9
2	23:39	60.7	61.8	55.7	51.6	51.1	51.1	45.2	34.4
2	23:40	58.6	61.1	55.7	53.6	53.0	54.1	47.8	39.3
2	23:41	62.1	64.3	56.3	53.1	51.9	52.9	46.9	36.7
2	23:42	59.4	61.5	55.1	52.1	51.2	52.1	47.0	37.3
2	23:43	56.0	61.4	54.9	52.3	50.7	51.5	45.5	34.9
2	23:44	56.7	64.2	56.4	53.2	52.3	51.8	47.5	39.6
2	23:45	57.6	71.1	59.6	57.7	54.7	52.8	47.1	38.8
2	23:46	57.2	60.8	54.3	50.7	49.8	49.4	43.1	33.4
2	23:47	58.4	62.3	56.3	52.7	51.9	53.1	47.9	40.2
2	23:48	59.0	62.2	55.8	54.2	53.9	54.6	48.8	39.0
2	23:49	60.6	61.6	55.3	54.5	52.1	53.0	47.2	38.8
2	23:50	56.5	60.6	54.7	51.7	51.3	50.8	44.7	34.3
2	23:51	59.2	61.9	54.7	50.7	49.1	49.3	43.6	34.7
2	23:52	57.1	60.7	56.8	54.3	52.7	52.6	46.6	38.6
2	00:10	60.1	66.9	60.0	58.0	55.1	55.9	51.0	42.4
2	00:12	58.6	63.3	58.9	57.3	55.0	56.2	50.6	41.5
2	00:13	59.4	64.8	61.9	61.6	57.8	56.6	51.7	41.3
2	00:14	57.2	66.2	58.9	55.7	55.8	55.3	49.6	39.9
2	00:15	59.2	65.1	66.4	65.7	57.6	57.8	51.9	42.7
2	00:16	54.4	63.9	58.9	56.7	54.9	56.5	50.8	41.5
2	00:17	54.9	60.8	55.8	52.1	51.7	53.2	47.6	38.5
2	00:18	59.7	66.7	59.1	55.0	52.4	53.4	48.4	40.4
2	00:19	58.0	62.3	57.0	54.0	53.4	54.8	49.4	38.1

Measurement Position	Start Time	Noise Level, dB LAeq	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
2	00:20	56.4	61.9	56.2	53.8	52.8	54.6	48.6	37.3
2	00:21	57.1	67.1	59.7	55.3	53.9	55.3	50.5	41.3
2	00:22	57.6	64.7	62.4	56.4	54.8	55.8	50.3	42.3
2	00:23	60.1	71.7	61.7	57.6	55.6	56.4	54.3	44.3
2	00:24	59.0	64.0	57.2	54.2	52.3	53.1	48.6	39.6
2	00:25	60.1	64.7	60.2	58.5	55.0	56.1	50.3	42.3
2	00:26	60.3	62.5	57.6	55.7	52.8	54.0	49.0	39.1

Table 22: Measured Octave Band L_{eq} Noise Levels, Position 2 – Night time, 7th & 8th October 2021

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L_{Aeq}	L_{Amax}	L_{A90}	
4	23:20	57.0	65.5	49.5	Road traffic
4	23:21	54.2	58.1	49.6	"
4	23:22	56.8	67.0	49.8	"
4	23:23	55.8	65.0	48.1	"
4	23:24	55.2	65.2	48.8	"
4	23:25	54.5	62.1	47.2	"
4	23:26	55.6	65.0	48.0	"
4	23:27	57.2	65.5	48.5	"
4	23:28	52.7	58.1	47.5	"
4	23:29	56.1	64.2	49.5	"
4	23:30	57.5	69.5	49.1	"
4	23:31	56.0	62.2	47.0	"
4	23:32	54.1	60.9	48.2	"
4	23:34	52.6	59.1	48.4	"
4	23:35	56.0	64.7	47.1	"
4	23:54	51.8	59.1	46.1	"
4	23:55	53.7	60.9	44.8	"
4	23:56	55.7	66.5	44.4	"
4	23:57	56.0	64.1	46.1	"
4	23:58	54.5	63.6	50.1	"
4	23:59	56.5	62.1	49.2	"
4	00:00	52.5	61.7	45.6	"
4	00:01	54.9	62.6	47.1	"
4	00:02	52.6	58.7	45.6	"
4	00:03	54.8	64.4	46.1	"
4	00:04	55.2	62.4	46.8	"
4	00:05	56.8	65.0	48.4	"
4	00:06	54.6	63.0	45.4	"
4	00:07	53.5	63.4	46.2	"
4	00:08	55.4	62.7	47.0	"
4	00:28	54.6	63.4	45.5	"
4	00:29	54.4	67.3	44.4	"

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L _{Aeq}	L _{Amax}	L _{A90}	
4	00:30	55.6	65.1	47.5	"
4	00:31	54.4	60.5	48.3	"
4	00:32	58.0	64.4	53.0	"
4	00:33	53.2	61.0	43.8	"
4	00:34	52.0	61.0	44.9	"
4	00:35	52.5	61.1	45.7	"
4	00:36	58.2	68.0	47.2	"
4	00:37	52.2	58.5	45.4	"
4	00:38	52.0	59.7	44.8	"
4	00:39	53.5	60.6	46.1	"
4	00:40	57.0	67.5	45.9	"
4	00:41	54.8	64.2	46.0	"
4	00:42	55.2	67.2	44.3	"
4	00:43	57.0	67.7	45.4	"
4	00:44	54.5	64.7	44.9	"
4	00:45	53.4	59.3	47.1	"

Table 23: Summary Statistical Noise Levels, Position 4 – Night time, 7th & 8th October 2021

Measurement Position	Start Time	Noise Level, dB LAeq	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
4	23:20	57.0	60.8	56.2	55.0	53.2	53.9	48.4	39.9
4	23:21	54.2	61.8	55.7	51.6	51.1	51.1	45.2	34.4
4	23:22	56.8	61.1	55.7	53.6	53.0	54.1	47.8	39.3
4	23:23	55.8	64.3	56.3	53.1	51.9	52.9	46.9	36.7
4	23:24	55.2	61.5	55.1	52.1	51.2	52.1	47.0	37.3
4	23:25	54.5	61.4	54.9	52.3	50.7	51.5	45.5	34.9
4	23:26	55.6	64.2	56.4	53.2	52.3	51.8	47.5	39.6
4	23:27	57.2	71.1	59.6	57.7	54.7	52.8	47.1	38.8
4	23:28	52.7	60.8	54.3	50.7	49.8	49.4	43.1	33.4
4	23:29	56.1	62.3	56.3	52.7	51.9	53.1	47.9	40.2
4	23:30	57.5	62.2	55.8	54.2	53.9	54.6	48.8	39.0
4	23:31	56.0	61.6	55.3	54.5	52.1	53.0	47.2	38.8
4	23:32	54.1	60.6	54.7	51.7	51.3	50.8	44.7	34.3
4	23:34	52.6	61.9	54.7	50.7	49.1	49.3	43.6	34.7
4	23:35	56.0	60.7	56.8	54.3	52.7	52.6	46.6	38.6
4	23:54	51.8	61.7	54.1	49.3	48.2	48.7	43.2	32.1
4	23:55	53.7	61.9	55.3	51.0	50.1	50.6	45.1	35.4
4	23:56	55.7	61.8	56.5	53.3	50.4	53.3	46.8	35.2
4	23:57	56.0	63.8	56.0	54.7	52.3	52.8	47.0	36.5
4	23:58	54.5	65.5	57.3	55.5	51.8	50.2	45.0	35.5
4	23:59	56.5	66.3	57.4	56.2	53.1	52.9	47.3	38.5
4	00:00	52.5	61.7	55.3	51.7	49.0	48.9	43.6	36.1
4	00:01	54.9	62.4	54.5	53.0	51.2	51.4	47.1	37.3
4	00:02	52.6	62.4	53.2	49.5	48.7	49.6	44.3	33.7
4	00:03	54.8	62.0	55.7	52.5	51.2	51.8	45.8	36.1

Measurement Position	Start Time	Noise Level, dB LAeq	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
4	00:04	55.2	62.0	54.8	52.1	51.4	52.1	46.8	37.9
4	00:05	56.8	64.1	55.8	54.5	53.0	53.5	48.7	40.7
4	00:06	54.6	63.8	56.6	54.8	51.6	50.8	44.5	36.3
4	00:07	53.5	62.1	55.7	55.9	50.6	49.0	42.6	33.6
4	00:08	55.4	64.0	55.1	53.5	52.6	51.8	46.1	38.5
4	00:28	54.6	61.1	55.1	53.4	53.0	50.4	44.9	36.2
4	00:29	54.4	59.0	52.6	52.0	49.4	52.0	45.7	36.0
4	00:30	55.6	60.6	55.9	53.2	51.3	52.3	47.6	38.8
4	00:31	54.4	64.2	55.7	53.2	51.0	50.9	45.6	35.2
4	00:32	58.0	67.5	60.3	57.6	55.3	53.9	48.9	41.6
4	00:33	53.2	60.3	53.2	51.3	49.9	49.8	44.3	34.7
4	00:34	52.0	59.0	52.9	48.9	48.5	48.9	43.2	34.0
4	00:35	52.5	59.9	52.7	49.7	48.8	49.7	43.8	32.8
4	00:36	58.2	66.5	56.5	56.4	54.2	54.3	50.8	44.4
4	00:37	52.2	61.2	53.8	50.3	48.6	48.7	44.1	34.7
4	00:38	52.0	58.2	53.7	50.7	48.5	48.8	43.2	32.6
4	00:39	53.5	62.7	53.2	51.2	50.7	50.1	44.4	34.6
4	00:40	57.0	60.5	54.3	54.5	52.9	54.3	48.3	36.8
4	00:41	54.8	61.4	54.0	51.8	50.6	51.8	46.3	35.5
4	00:42	55.2	59.0	53.6	52.3	51.0	52.4	46.8	36.2
4	00:43	57.0	61.3	58.2	54.2	54.9	52.8	48.1	42.3
4	00:44	54.5	61.0	54.3	51.7	50.5	51.7	45.6	34.9
4	00:45	53.4	60.1	54.5	51.0	50.1	50.1	44.5	34.6

Table 24: Measured Octave Band L_{eq} Noise Levels, Position 4 – Night time, 7th & 8th October 2021

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L_{Aeq}	L_{Amax}	L_{A90}	
5	01:01	45.5	50.5	43.9	Road traffic
5	01:03	46.4	61.1	43.5	"

Table 25: Summary Statistical Noise Levels, Position 5 – Night-time, 7th & 8th October 2021

Measurement Position	Start Time	Noise Level, dB LAeq	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
5	01:01	45.5	57.5	50.9	46.1	43.4	40.8	34.9	26.0
5	01:03	46.4	57.7	52.3	46.6	43.7	42.2	36.4	27.0

Table 26: Measured Octave Band L_{eq} Noise Levels, Position 5 – Night-time, 7th & 8th October 2021

Measurement Position	Start Time	Measured Noise Levels, dB			Noise sources
		L _{Aeq}	L _{Amax}	L _{A90}	
6	00:47	53.0	62.9	46.5	Road traffic
6	00:51	51.7	61.4	46.1	"

Table 27: Summary Statistical Noise Levels, Position 6 – Night-time, 7th & 8th October 2021

Measurement Position	Start Time	Noise Level, dB L _{Aeq}	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
6	00:47	53.0	57.5	56.0	52.5	49.5	48.9	44.9	37.0
6	00:51	51.7	58.9	53.1	49.8	48.4	48.2	42.7	35.3

Table 28: Measured Octave Band L_{eq} Noise Levels, Position 6 – Night-time, 7th & 8th October 2021