

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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Ancoats Mobility Hub

Acoustic planning report

London, Manchester, Edinburgh, Birmingham, Belfast

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A	31 Mar 21		Jessica Wright	Mark Howarth
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Summary

Sandy Brown has been commissioned by Manchester Life Strategic Development Company to provide acoustic advice in relation to the proposed development at Ancoats Mobility Hub, Manchester. The Applicant for this site is Manchester Life Strategic Development Company Limited.

An environmental noise survey has been carried out to determine the existing sound levels in the area. The noise survey was carried out on 6 and 10 August 2020. Due the current restrictions due to the Covid-19 pandemic, measured noise levels have been compared to historic noise data in the vicinity of the site.

The assessment undertaken provides a robust estimate of the environmental noise climate and is in line with the *“Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments”* produced by the Association of Noise Consultants and the Institute of Acoustics.

Data from the survey will be used to inform the design of the development with respect to atmospheric noise emissions from building services plant and environmental noise ingress through the building envelope.

Based on the requirements of the Local Authority, the relevant plant noise limits at the worst affected existing noise sensitive premises are set out below.

Table 1 Plant noise limits at 1 m from the nearest noise sensitive premises

NSP ref from Section 2.2	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB)	
	Daytime (07:00-23:00)	Night-time (23:00-07:00)
2, 4-7	43	35 ^[1]
1	42	31
3	44	38

^[1] Only considered applicable to residential receiver NSP 2. The commercial units (NSP ref 4-7) are only considered to be noise sensitive during the daytime.

If plant items contain tonal or attention catching features, a penalty based on the type and impact of those features will be applied, and the limits will be more stringent than those set.

Noise limits for emergency plant noise and amplified sound have been recommended.

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1 Introduction

Sandy Brown has been commissioned to provide acoustic advice in relation to the proposed development at Ancoats Mobility Hub. The Applicant for this site is Manchester Life Strategic Development Company Limited.

As part of this, an environmental noise survey is required, the purpose of which is to establish the existing sound levels on and around the site.

A noise survey has been undertaken by Sandy Brown and the results used alongside historic noise data to establish representative background noise levels in the vicinity of the nearby noise sensitive receptors.

This report presents the survey method and results, and a discussion of acceptable limits for noise emissions from building services plant.

2 Site description

2.1 The site and its surrounding

The Site is bounded by Poland Street to the west, the City Court Trading Estate to the south, Crown Industrial Estate to the north and Ancoats Green to the east. The Site can be accessed by pedestrians and vehicles via Poland Street. The Site is currently occupied by low-rise, multi-tenanted industrial estate units and hardstanding. The Site can be accessed by pedestrians and vehicles via Poland Street. Security fencing runs along the eastern boundary where the Site meets Ancoats Green.

Modern industrial units lie to the north and south of the Site with the residential neighbourhood of Miles Platting further beyond to the east. The Rochdale Canal is located 0.2km south of the Site.

The site is highlighted is circled in red in Figure 1. The adjacent premises are highlighted in the figure with descriptions provided in Section 2.2.



Figure 1 Aerial view of site (courtesy of Google Earth Pro)

A site plan is set out in Figure 2.

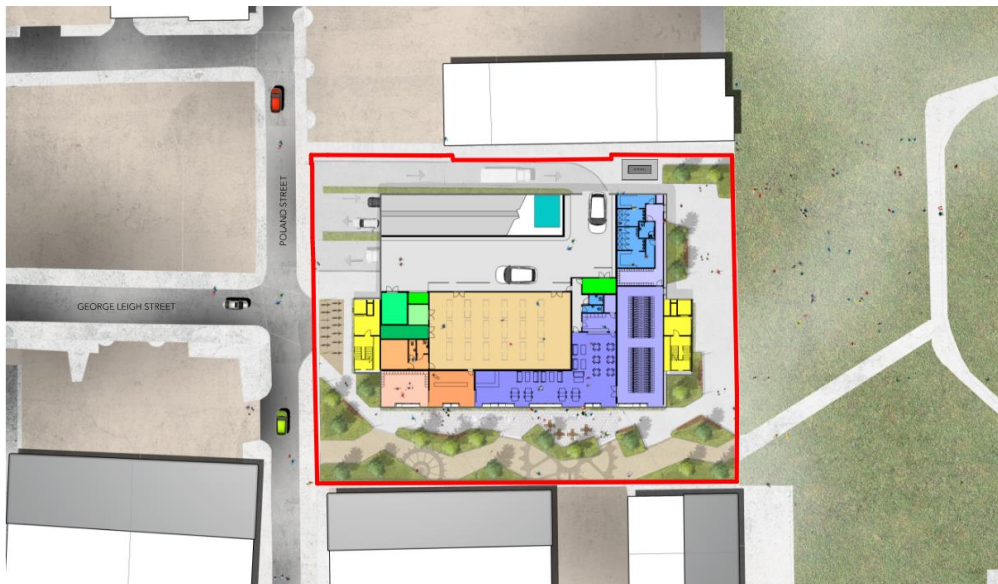


Figure 2 Screenshot of drawing 9032-BA-XX-XX-DR-A-(04)010 - Proposed Site Plan

2.2 Adjacent premises

The nearby premises are mixed use with residential and commercial units. A summary of the nearby premises are set out below in reference to Figure 1:

1. Residential premises at 11 Radium Street (highlighted in yellow)
2. Residential premises at 2 Poland Street (highlighted in brown)
3. Residential premises at Tribe Ancoats (highlighted in navy blue)
4. Trading estate at City Court (highlighted in orange)
5. Crown industrial estate (highlighted in green)
6. Commercial area including site offices and depot (highlighted in pink)
7. Factories on George Leigh St and Naval St (highlighted in purple).

3 Development proposals

3.1 Uses

The Ancoats Mobility Hub is proposed to have the following uses:

- Car park
- Ground floor cafe
- Cycle storage and cycle hub
- Central delivery hub for parcel deliveries in the area, with a route for delivery off Oldham Road.

3.2 Potential noise sources

The potential noise sources associated with the scheme can be broadly divided into two categories:

- Building services plant
- Internal activity in commercial units.

The potential impact of these sources has been assessed and mitigation measures have been proposed to minimise impact on existing noise sensitive premises around the development.

4 Building services noise egress criteria

4.1 Standard guidance

BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* (BS 4142) provides a method for assessing noise from items such as building services plant against the existing background sound levels at nearby noise sensitive premises.

BS 4142 suggests that if the noise level is 10 dB or more higher than the existing background

sound level, it is likely to be an indication of a significant adverse impact. If the level is 5 dB above the existing background sound level, it is likely to be an indication of an adverse impact. If the level does not exceed the background level, it is an indication of having a low impact.

If the noise contains 'attention catching features' such as tones, bangs etc, a penalty, based on the type and impact of those features, is applied.

4.2 Local Authority criteria

Manchester City Council (MCC) provides guidance in relation to plant noise emissions in *Planning and Noise Technical Guidance* document dated December 2015 states the following in relation to plant noise egress:

'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 5 dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.'

Appropriate corrections will need to be made for any attention catching features in line with BS 4142: 2014.

For emergency plant items, Manchester City Council (MCC) typically allow for noise egress limits to be set at 10 dB above the typical background levels at the nearest noise sensitive premises. This will need to be confirmed.

5 Noise survey method

5.1 Attended measurements

Attended sample measurements were taken by Jessica Wright on 6 August 2020 during the night time and Jessica Wright and Daniel Shaw on 10 August 2020 during the daytime at 3 locations around the site. These are indicated in Figure 1 as positions 1 to 3. The measurement positions were chosen as being representative of the nearby existing noise sensitive premises.

At each position the microphone was mounted on a tripod approximately 1.2 m above the ground level and at least 3 m from any other reflective surface. Details of the equipment used and the noise indices measured are provided in Appendix A.

Dominant noise sources occurring during the measurements were noted.

Photographs of the measurement positions are set out in Figure 3 to Figure 5.

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Figure 3 Photograph of Position 1



Figure 4 Photograph of Position 2



Figure 5 Photograph of Position 3

5.2 Weather conditions

Weather conditions during the survey are described in Appendix A.

6 Noise survey results

6.1 Observations

The dominant noise sources observed at the site during the survey were from occasional road traffic noise and constant plant noise from the commercial unit site to the north (reference 4 in Figure 1).

Less significant noise sources included construction noise and distant plant noise from other locations.

6.2 Noise measurement results

6.2.1 Daytime attended measurement results – 10 August 2020

Noise levels and key sources recorded during the attended measurements are summarised in Table 2.

Table 2 Daytime noise levels and key noise sources from attended measurements – 10 August 2020

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{A90,15min}$	
1	16:55	55	78	45	Road traffic from Oldham Road, distant construction noise, car idling on Poland St.
1	18:10	53	72	46	Constant road traffic on Oldham Road is distant, some distant plant noise from the commercial unit on Poland Street, some helicopter noise
2	16:55	49	70	44	General commercial noise from adjacent units on George Leigh Street, some road traffic noise, some noise from pedestrians, distant construction noise
2	18:10	52	72	44	Similar noise sources, with more car activity at commercial units. Helicopter noise noted.
3	17:20	49	64	46	Road traffic noise from Oldham Road is dominant with occasional construction noise

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{A90,15min}$	
3	18:30	49	63	46	Road traffic noise from Oldham Road is dominant

6.2.2 Night time attended measurement results – 6 August 2020

Noise levels and key sources recorded during the attended measurements are summarised in Table 3.

Table 3 Night time noise levels and key noise sources from attended measurements – 6 August 2020

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{A90,15min}$	
1	00:10	49	81	40	Distant road traffic noise on Oldham Road, very distant alarm noise and plant noise, max likely caused by squeaky brakes of car turning onto George Leigh Street.
1	02:05	45	71	37	Distant road traffic noise on Oldham Road, very distant alarm noise and plant noise, max likely caused by car pass by on Poland Street.
2	00:25	40	68	35	Distant road traffic on Oldham Road, distant siren.
2	02:25	40	60	33	Distant road traffic on Oldham Road, distant siren, very distant plant noise, pedestrian talking, max likely caused by car on George Leigh Street.

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{A90,15min}$	
3	00:50	44	61	41	Intermittent road traffic from Oldham Road, distant plant noise
3	02:45	44	58	40	Intermittent road traffic from Oldham Road, distant plant noise, cars having to brake and accelerate from traffic lights. Max likely caused by speeding car braking on Oldham Road.

7 Historic noise climate estimation

The survey has been carried out during a period of restricted movements due to the Covid-19 pandemic and consequently background noise levels are lower than they would be under usual conditions.

A robust estimate of the environmental noise climate is therefore required, in line with the “Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments” produced by the Association of Noise Consultants and the Institute of Acoustics.

Historic noise data from other surveys in the vicinity of the site has therefore been reviewed. This is from acoustic reports available of the Manchester City Council planning portal.

The details of these surveys are summarised below.

7.1 Survey details

A) New Little Mill (Arup)	8 and 21 October 2014 and 11 November and 1 December 2016
B) 162-166 Oldham Street (Hoare Lea)	11 to 15 August 2016
C) Bengal Street (ADT)	2 to 7 February 2017
D) Blossom Street (Arup)	14 to 21 July 2015

The approximate measurement location and for each survey are shown in Figure 6.

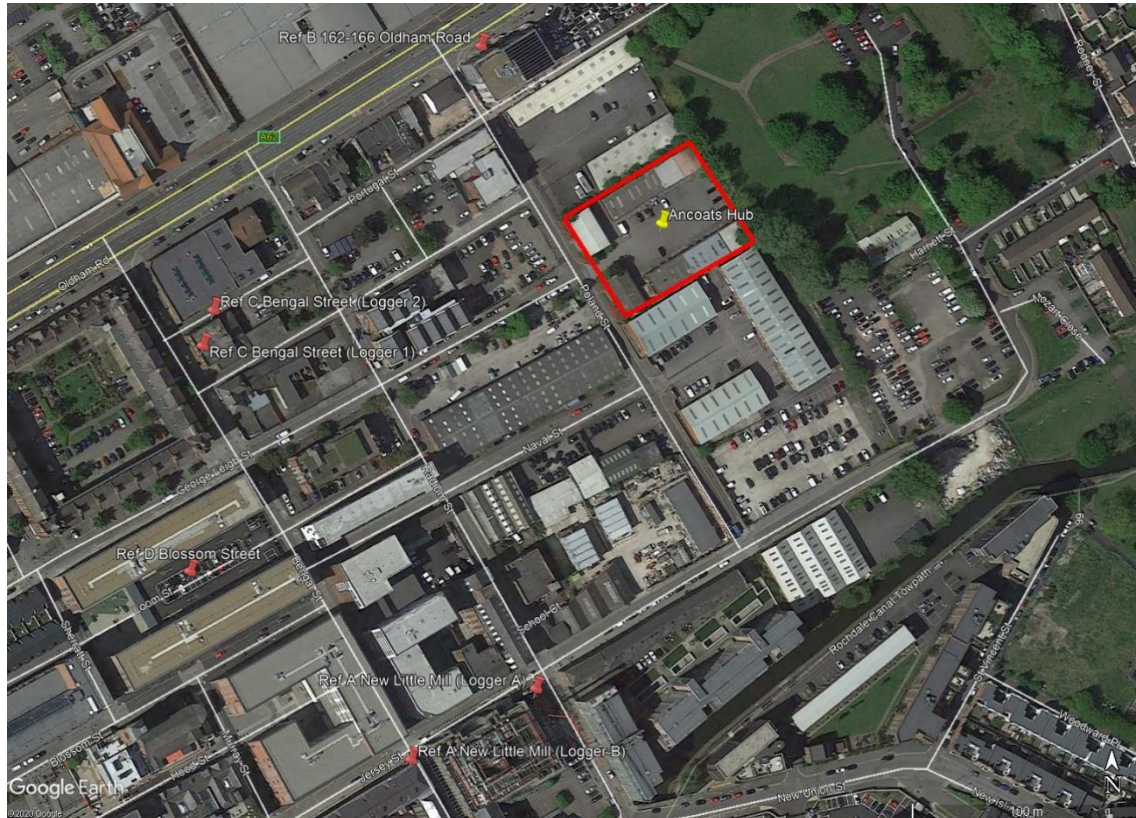


Figure 6 Historical noise survey measurement locations

7.2 Minimum background noise levels

The minimum background noise levels recorded during each survey are summarised in Table 4.

Table 4 Minimum background noise levels

Location	Daytime	Night
	(07:00 – 19:00)	(23:00 – 07:00)
	(dB)	(dB)
A) New Little Mill (Arup) Logger A	$L_{A90,T}$ 45	$L_{A90,T}$ 38
A) New Little Mill (Arup) Logger B	$L_{A90,T}$ 44	$L_{A90,T}$ 41
B) 162-166 Oldham Street (Hoare Lea)	$L_{A90,1hr}$ 49	$L_{A90,15min}$ 47
C) Bengal Street (ADT) Logger 1	$L_{A90,16 hr}$ 50-59	$L_{A90,8 hr}$ 43-47
C) Bengal Street (ADT) Logger 2	$L_{A90,16 hr}$ 49-57	$L_{A90,8 hr}$ 42-46
D) Blossom Street (Arup)	$L_{A90,15min}$ 42	$L_{A90,15min}$ 37

7.3 Discussion

Based on the results summarised in Table 4, the background noise levels measured during the survey at mostly in line with previous measurements in the vicinity.

8 Noise from road traffic

8.1 Road traffic noise

A review of road traffic data received from Hydrock on 26 January 2021, document *16857 - Hydrock Traffic Flow Calculations*, has been carried out to determine the change in road traffic noise due to the development.

The predicted change in noise level from road traffic near to residences in the vicinity of the site is set out in Table 5. This is based on 'Base 2025' road traffic count in comparison to '2025 Base + DEV (CP+P)' road traffic count.

Table 5 Predicted change in noise level from road traffic

Location	Change in noise level during observed weekday peak hour		Comment
	AM 08:30-09:30	PM 17:00-18:00	
Poland Street (near to NSP 2)	+6 dB	+5 dB	The predicted change in noise level from road traffic will likely be noticeable at peak hours
George Leigh Street (near to NSP 1)	0	0	No change in noise level is predicted during peak hours
Jersey Street (near to apartments at Flint Glass Wharf)	+1 dB	+1 dB	The predicted change in noise level from road traffic noise is unlikely to be discernible during peak hours

8.2 Construction road traffic noise

When the site is in construction, it is likely that there will be an increase in road traffic noise due to construction vehicles. It is expected that this will be managed by controlling operation hours of the construction and with a construction management plan. This will need to be developed by the contractor.

8.3 Operational activities

For the operation of the development, the following design strategies have been implemented to minimise noise egress:

- Internalised delivery route
 - This will allow delivery vehicles to enter and unload within a covered area at ground level.
 - The route is circular, reducing the need for vehicles to reverse and therefore reducing the noise level from potential vehicle reversing alarms.
 - The noise from engines starting up will be controlled as this will be within the covered area
 - Last mile deliveries from the hub to the local area are proposed to be by electric vehicles.
- Noise from cars driving within the car park is not expected to be significantly different from the existing open car park on the site.

9 Plant noise

9.1 Basic limits

Based on the above criteria and the measurement results, the cumulative noise level from the operation of all new plant should not exceed the limits set out in Table 6.

The limits apply at 1 m from the worst affected windows of the nearest noise sensitive premises and are presented as facade levels. These have been corrected relative to the measured free-field background noise levels by the addition of 3 dB where necessary. In this case these limits would apply at locations set out in Section 2.2.

Table 6 Plant noise limits at 1 m from the nearest noise sensitive premises

NSP ref from Section 2.2	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB)	
	Daytime (07:00-23:00)	Night-time (07:00-23:00)
2, 4-7	43	35 ^[1]
1	42	31
3	44	38

^[1] Only considered applicable to residential receiver NSP 2. The commercial units (NSP ref 4-7) are only considered to be noise sensitive during the daytime.

The limits set out in Table 6 do not include any attention catching features. Penalty corrections for attention catching features may be significant and will need to be considered as the building services design progresses. This is discussed in Appendix B.

9.2 Emergency plant noise egress limits

On the basis that this criterion is adopted as set out in Section 4.2 the emergency plant noise limits applicable at 1 m from the worst affected windows of the nearest noise sensitive are set out in Table 7. These have been corrected relative to the measured free-field background noise levels by the addition of 3 dB where necessary.

Table 7 Emergency plant noise limits at 1 m from the nearest noise sensitive premises

NSP ref from Section 2.2	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB)	
	Daytime (07:00-23:00)	Night-time (07:00-23:00)
2, 4-7	58	50 ^[1]
1	57	46
3	59	53

^[2] Only considered applicable to residential receiver NSP 2. The commercial units (NSP ref 4-7) are only considered to be noise sensitive during the daytime.

9.3 Plant noise assessment

All building services plant will be designed to achieve the noise limits set out above, including any corrections for attention catching features.

There are two main areas for plant proposed at the development:

- Rooftop plant area and plant terminations to roof
- Ground floor plant rooms.

It is proposed that most plant will be located within ground floor plant rooms with an emergency generator and two smoke extract fans located at roof level.

The proposed rooftop plant locations and terminations are shown in Figure 7. The generator is proposed to be housed in an acoustic enclosure with a noise levels of 77 dB(A) at 1 m. It is considered only for life safety so would only run in an emergency or during daytime testing.

Two smoke extract fans, one to each core, are proposed which terminate on to the roof. Typical noise data for the smoke extracts fans is set out in Table 8, as received from the building services engineer, Buro Happold.

Table 8 Smoke extract fan noise levels

Smoke extract fan	Sound power level, L_w (dB)							
	Octave-band centre frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
Inlet	95	96	94	92	91	90	89	86
Outlet	95	96	94	91	91	90	89	86

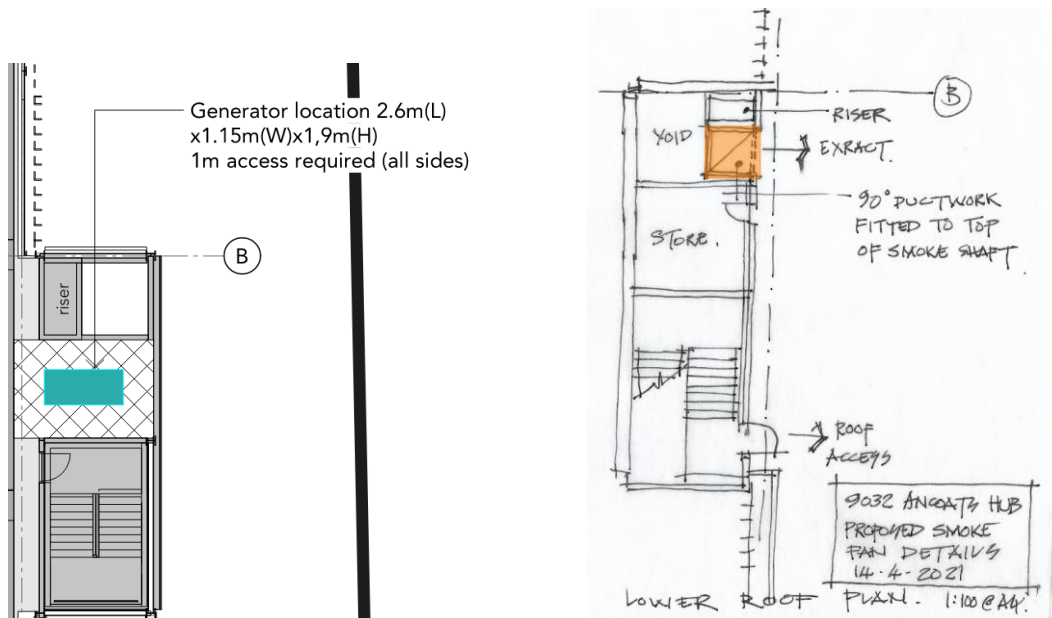


Figure 7 Screenshot of proposed rooftop plant locations (9032-BA-XX-07-DR-A-(04)007 Left and 9032-Ancoats Hub-Proposed Smoke Fan-Plans-14.04.2021 Right)

An initial plant noise egress assessment has been carried out for the emergency plant. It is recommended that the sound power level to each smoke extract fan louvre is limited to L_{WA} 90 dB. Acoustic attenuation is expected to be required to meet the proposed plant noise egress limits. This could be provided by a proprietary attenuator or one of the following options:

- Acoustic louvre (typically 150 mm depth) and lined bend within shaft (minimum 25 mm sound absorbent lining)
- Lined bend within shaft (minimum 50 mm sound absorbent lining)

A plant noise assessment for normally operating plant will need to be carried out, once the plant selections have been made, to ensure that the plant noise limits are met.

10 Amplified sound limits

The Cafe is understood to not be a bar type space, however guidance on amplified sound limits is given below.

10.1 Limits for amplified sound egress

The noise level resulting from any amplified sound egress from the commercial unit at 1 m from the most affected windows of the nearest noise sensitive premises should not exceed 10 dB below the existing representative background sound level in octave bands. These limits are set out in Table 9. The limits include a facade correction.

Table 9 Octave band amplified sound limits, 1 m from the nearest noise sensitive premises

NSP ref from Section 2.2	Time of day	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{eq,15min}$ (dB) Octave-band centre frequency (Hz)						
		63	125	250	500	1000	2000	4000
2, 4-7	Daytime (07:00-23:00)	51	44	39	34	33	27	21
	Night-time (07:00-23:00) ^[1]	42	39	31	25	23	18	13
1	Daytime (07:00-23:00)	49	39	35	33	33	26	20
	Night-time (07:00-23:00)	40	34	26	22	20	15	10
3	Daytime (07:00-23:00)	49	43	36	31	36	30	21
	Night-time (07:00-23:00)	46	42	31	27	28	22	14

^[1] Only considered applicable to residential receiver NSP 2. The commercial units (NSP ref 4-7) are only considered to be noise sensitive during the daytime.

11 Conclusion

The representative background sound levels from the noise survey were $L_{A90,15min}$ 44-46 dB during the day, and $L_{A90,15min}$ 33-40 dB during the night. The noise survey took place during travel restrictions during the Covid-19 pandemic, therefore further analysis of historic noise levels in the general area has been carried out to determine the background noise level during 'normal conditions'.

Based on the requirements of the Local Authority, the relevant plant noise limits at the worst affected existing noise sensitive premises are set out below.

Table 10 Plant noise limits at 1 m from the nearest noise sensitive premises

NSP ref from Section 2.2	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB)	
	Daytime (07:00-23:00)	Night-time (07:00-23:00)
2, 4-7	43	35 ^[1]
1	42	31
3	44	38

^[1] Only considered applicable to residential receiver NSP 2. The commercial units (NSP ref 4-7) are only considered to be noise sensitive during the daytime.

These limits are cumulative, and apply with all plant operating under normal conditions. If plant items contain tonal or attention catching features, the limits will be more stringent than those set out above. If plant items contain tonal or attention catching features, a penalty based on the type and impact of those features will be applied.

Noise limits for emergency plant noise and amplified sound have been recommended.

Appendix A

Survey details

Equipment

The attended noise measurements were taken using Rion NL-52 sound level meters.

Calibration details for the equipment used during the survey are provided in Table A1.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	NL-52/00932326	Rion	13 Mar 21	TCRT19/1179
Microphone	UC-59/05549	Rion	13 Mar 21	TCRT19/1179
Pre-amp	NH-25/32354	Rion	13 Mar 21	TCRT19/1179
Calibrator	NC-74/34125432	Rion	13 Mar 21	TCRT19/1178
Sound level meter	NL-52/01143564	Rion	19 Dec 20	TCRT18/1993
Microphone	UC-59/10153	Rion	19 Dec 20	TCRT18/1993
Pre-amp	NH-25/43581	Rion	19 Dec 20	TCRT18/1993
Calibrator	NC-74/34257023	Rion	19 Dec 20	TCRT18/1991

Calibration of the meters used for the measurements is traceable to national standards. Calibration certificates for the sound level meters used in this survey are available upon request.

Calibration checks were carried out on the meters and their measurement chains at the beginning and end of the survey. No significant calibration deviation occurred.

Noise indices

Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{AFmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period, T, with a fast time weighting.
- $L_{ASmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period, T, with a slow time weighting.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures*.

Weather conditions

During the attended noise measurements, the weather was generally clear and dry and no rain occurred. Wind speeds were less than 5 m/s.

These weather conditions are considered suitable for obtaining representative measurements.

Appendix B

BS 4142 corrections for attention catching features

The following applies where plant noise is assessed in accordance with BS 4142:2014+A1:2019.

If the proposed plant noise contains attention catching features (such as tonal elements, whines, whistles, bangs etc), penalty corrections should be applied based on the type and impact of the features.

If appropriate, a subjective assessment of the plant features can be adopted. Where the plant noise contains tonal elements, the following corrections can be made depending on how perceptible the tone is at the noise receptor:

- 0 dB where the tone is not perceptible
- 2 dB where the tone is just perceptible
- 4 dB where the tone is clearly perceptible
- 6 dB where the tone is highly perceptible.

Where the plant noise is impulsive, the following corrections can be made depending on how perceptible the impulsivity is at the noise receptor:

- 0 dB where the impulse is not perceptible
- 3 dB where the impulse is just perceptible
- 6 dB where the impulse is clearly perceptible
- 9 dB where the impulse is highly perceptible.

For noise which is equally both impulsive and tonal, then both features can be accounted for by linearly summing the corrections for both characteristics.

If the plant has other distinctive characteristics, such as intermittency, then a 3 dB correction can be made.

If a subjective assessment of tonality is not appropriate, an objective assessment can be made by analysis of time-averaged, third-octave band sound pressure levels. A noise source is deemed to be tonal if the level in a third-octave band exceeds the level in adjacent third-octave bands by the level differences given below:

- 15 dB in the low frequency third-octave bands (25 Hz to 125 Hz)
- 8 dB in the mid frequency third-octave bands (160 Hz to 400 Hz)
- 5 dB in the high frequency third-octave bands (500 Hz to 10000 Hz).

If an objective assessment identifies the plant noise to be tonal then a 6 dB correction must be made.