



DOWNING LIVING

PLOT 11, FIRST STREET SOUTH, MANCHESTER

DISCHARGE OF PLANNING CONDITION 15

28 July 2023

AEC REPORT: P3921/R9/PJK

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1.0 INTRODUCTION

1.1 Acoustic & Engineering Consultants Limited (AEC) has been instructed by Downing Living to provide a report presenting the necessary information to discharge Planning Condition 15 placed on the proposed development located at Plot 11, First Street South, Manchester.

1.2 The planning application number for the site is 125573/FO/2019 dated 09 March 2021.

1.3 Planning Condition 15 states:

“Prior to occupation of (a) The residential accommodation; and (b) Each of the ground floor commercial units a scheme for the acoustic insulation of any externally mounted ancillary equipment associated with the development to ensure that it achieves a background noise level of 5dB below the existing background (LA90) at the nearest noise sensitive location shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the equipment. The approved scheme shall be completed before the premises is occupied and a verification report submitted for approval by the City Council as local planning authority and any non-compliance suitably mitigated in accordance with an agreed scheme prior to occupation. The approved scheme shall remain operational thereafter.

Reason - To secure a reduction in noise in order to protect future residents from noise nuisance, pursuant to policies SP1, H1 and DM1 of the Core Strategy.”

1.4 This report includes a summary of the background noise levels measured on and around the development site and an assessment of the noise levels provided by others for the mechanical services plant to be installed on-site.

1.5 It is understood that Blocks A & B and D will be occupied prior to the construction of Block C. Therefore, this report only relates to the residential accommodation associated with Blocks A & B and D. The tenants of the commercial units have not yet been confirmed.

1.6 Acoustic terminology is discussed in brief in Appendix A.

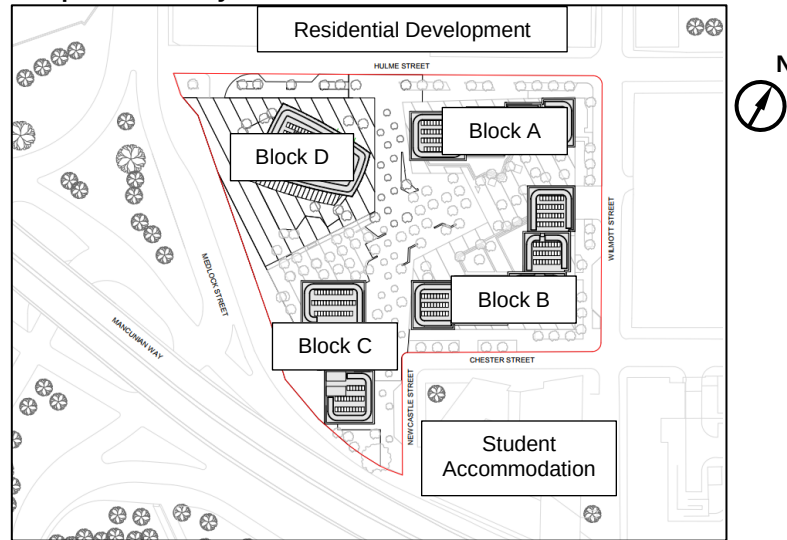
2.0 SITE AND PROPOSED DEVELOPMENT DESCRIPTION

2.1 The site is located within Manchester City Centre, as identified on Figure 2.1. The site is bound by a number of minor and major roads, such as a fly over section of the Mancunian Way (A57M) which is a two-lane part of Manchester's inner ring road.

2.2 The development is surrounded by various areas of unoccupied land as well as some student accommodation blocks located to the south-east. There is also a new residential development to the north. These two will form the nearest noise sensitive receptors to the proposed development and their location is identified on Figure 2.1.

2.3 The scheme includes four accommodation blocks. Blocks A and B will be built off a single podium level which will contain a café and gym. Block A will be 22 storeys high and Block B 26 storeys high. The remaining two blocks will not contain any commercial units, Block C will be 17 storeys high and Block D will be 44 storeys high. The site layout is presented in Figure 2.1, below.

Figure 2.1 – Proposed Site Layout and Location of Nearest Noise Sensitive Receptors



3.0 NOISE MEASUREMENTS

- 3.1 A daytime attended noise level survey was undertaken by AEC between 1000 and 1430h on Wednesday 10 July 2019. An attended night-time survey was undertaken between 2300h on Friday 12 July and 0100h on Saturday 13 July 2019.
- 3.2 Unattended noise level measurements were also undertaken at a location on Rover Street (to the west of the site), which overlooks the Mancunian Way, between 1800h on Thursday 11 July and 1130h on Monday 15 July 2019.
- 3.3 All measurements were undertaken under free-field conditions in general accordance with BS7445-1: 2003 '*Description and measurement of environmental noise. Guide to quantities and procedures*'.
- 3.4 Full details of the noise surveys are presented in Appendix 8 of the Environmental Statement for the development. A summary of the typical daytime and night-time background noise levels measured are presented in Table 3.1, below.

Table 3.1 – Measured Noise Levels

Period	Typical Background Noise Levels, dBL _{A90,T}
Daytime (0700h to 2300h)	57
Night-time (2300h to 0700h)	54

4.0 DISCUSSION

- 4.1 Based on the typical background noise levels measured around the site and the requirements of Condition 15; which requires that noise from the atmospheric plant noise emissions is controlled to 5dB below the existing background noise level, the daytime and night-time noise levels limits for all plant operating simultaneously, is presented in Table 4.1, below.

Table 4.1 – Plant Noise Level Limits

Period	Plant Noise Limit, dBL _{Aeq,T}
Daytime (0700h to 2300h)	52
Night-time (2300h to 0700h)	49

- 4.2 The noise level limits presented above relate to both the residential development being constructed to the north of the site and the existing student accommodation to the south-east. As all the plant can operate during the daytime and night-time, this assessment is based on achieving the night-time noise level limit. Doing so would mean that the daytime noise level limit is inherently met.
- 4.3 Building services plant will be located on the roof of Blocks B and D and in plant rooms of all three blocks. Noise from each of these is discussed separately, below.

Roof Top Plant

- 4.4 There are four air source heat pumps proposed for the scheme; two Clade Oak 250kW units will be installed on the roof of Block B and two Clade Oak 100kW units will be installed on the roof of Block D. Each of these operate at a noise level of 66dB(A) and 60dB(A) at 1m, respectively.
- 4.5 The noise level from these units has been calculated external to the student accommodation to the south-east and the new residential scheme to the north based on the manufacturers test data and distance attenuation and is presented in Table 4.2 and 4.3, below, respectively.

Table 4.2 – Air Source Heat Pump Noise Level External to Student Accommodation

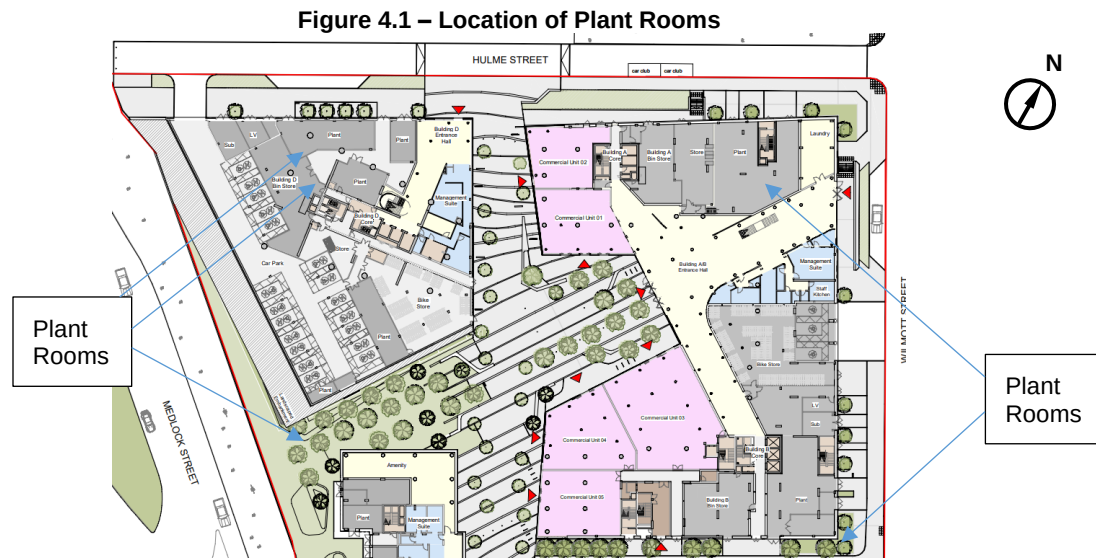
Location	Unit			Total Noise Level at 1m, dB	Distance to receptor		Resultant, dBA
	Model	No.	Units Correction, dB		meter	attenuation	
Block B	Oak 250kw	2	+3	69	25	-28	41
Block D	Oak 100kw	2	+3	63	90	-39	24
Total Noise Level, dBA							41

Table 4.3 – Air Source Heat Pump Noise Level External to New Residential Scheme

Location	Unit			Total Noise Level at 1m, dB	Distance to receptor		Resultant, dBA
	Model	No.	Units Correction, dB		meter	attenuation	
Block B	Oak 250kw	2	+3	69	100	-40	29
Block D	Oak 100kw	2	+3	63	40	-32	31
Total Noise Level, dBA							33

Plant Rooms

- 4.6 The location of the plant rooms serving Blocks A & B and D are shown on Figure 4.1, below.



Blocks A & B

- 4.7 The following items of plant are to be installed within the southern plant room of Blocks A & B:
- A Dutypoint VWV4-05-6V110D02 booster set.
 - As the booster sets to be installed are bespoke, Dutypoint has not provided any test data for the units. However, it has been assumed by Dutypoint that noise from these units would be no greater than 80dB(A) at 1m.
 - Four Arrow Valves DTMIDI-3 Cat 5 Tanks and boosters.
 - Based on the manufacturers test data, the units emit a sound pressure level of 64dB(A) at 0.5m.
 - Seven Grundfos pumps.
 - the model numbers and manufacturers' noise level data are provided in Table 4.5, below.

Table 4.4 – Grundfos Pump Noise Levels

Model	Noise Level at 1m, dB(A)
TPED2 - D 32-200*	53*
Magna 32-80F	39
Magna 32-80F	39
Magna 32-120F	45
Magna 32-120F	45
Magna 32-80F	39
Magna 32-80F	39

***operating at 1.1kW**

- 4.8 Four Arrow Valves DTMDI-3 Cat 5 Tanks and boosters are also to installed within the northern plant room of Blocks A & B.
- 4.9 Based on the above, internal noise levels within the northern and southern plant rooms of Blocks A & B should not typically exceed 70 and 80dB(A), respectively.
- 4.10 Noise levels external to the nearest noise sensitive receptors have been calculated based on the determined internal noise levels within the plant rooms, the area of the opening in the external envelope, distance attenuation and screening where applicable. The calculated noise levels are presented in Table 4.5, below.

Table 4.5 – Noise Breaking-out of Plant Rooms

Plant Room	Distance to Receptor	Screening	Resultant Noise Level, dB(A)
Student Accommodation			
North Plant Room	100	-15	27
South Plant Room	20	0	46
Resultant Noise Level			46
New Residential Scheme			
North Plant Room	20	0	39
South Plant Room	100	-15	17
Resultant Noise Level			39

Block D

- 4.11 A Dutypoint VWV4-05-6V110D02 booster set is to be installed within the central plant room of Block D.

- 4.12 As stated above, the booster sets to be installed within the developed are bespoke, therefore, Dutypoint has not provided any test data for the units. However, a level of 80dB(A) at 1m has been assumed.
- 4.13 Four Grundfos pumps are to be installed within the plant rooms of Block D, the model number and manufacturers noise levels are presented in Table 4.6, below.

Table 4.6 – Grundfos Pump Noise Levels

Model	Noise Level at 1m, dB
TPED2 - D 42-200*	53*
Magna 32-100F	39
Magna 32-100F	39
Magna 32-60F	45

*operating at 1.1kW

- 4.14 Two Parking Ventilation Equipment (PVE) 1DENP+LCS056N2-A9/13 carparking ventilation fans are to be installed in the plant room to the south of the basement level car park.
- 4.15 Based on the provided information, both fans will be fitted with a 1DENP attenuator. According to the manufacturers test data, with the fans operating at their highest duty, the sound pressure level would be around 65dBA at 3m.
- 4.16 Based on the above, it is expected that noise levels in the plant rooms on the external envelope of Block D would be expected to be around 75dB(A).
- 4.17 The resultant noise level due to noise breaking out of the plant rooms has been calculated based on the open area of the external envelope of the plant room, distance attenuation and screening where applicable.
- 4.18 The calculated noise levels are presented in Table 4.7, below.

Table 4.7 – Noise Breaking-out of Plant Rooms

Plant Room	Distance to Receptor	Screening	Resultant Noise Level, dB(A)
Student Accommodation			
North Plant Room	110	-15	17
Car Park Plant Room	70	0	30
Resultant Noise Level			30
New Residential Scheme			
North Plant Room	20	0	44
Car Park Plant Room	75	-15	12
Resultant Noise Level			44

Total Noise Levels

- 4.19 The total noise levels external to the nearest noise sensitive receptors due to the different noise sources presented above, have been determined and are presented in Tables 4.8 and 4.9, for the Student Accommodation and new residential scheme, respectively. The night-time noise level limit, has been provided for comparison purposes.

Table 4.8 – Resultant Noise Level External to the Student Accommodation

Source	Block	Noise Level at 1m, dB
Roof Top Plant	Blocks A & B	41
Plant Rooms		46
Roof Top Plant	Block D	24
Plant Rooms		30
	Resultant Noise Level	47
	Noise Level Limit	49

Table 4.9 – Resultant Noise Level External to the New Residential Block

Source	Block	Noise Level at 1m, dB
Roof Top Plant	Blocks A & B	29
Plant Rooms		31
Roof Top Plant	Block D	31
Plant Rooms		44
	Resultant Noise Level	46
	Noise Level Limit	49

- 4.20 Tables 4.8 and 4.9 demonstrate that Planning Condition 15 has been complied with. A verification report will be issued once the plant has been installed and balanced.

APPENDIX A – Acoustic Terminology in Brief

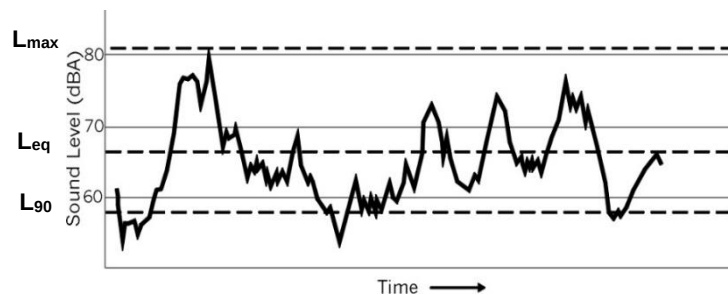
General

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air. The rate at which the pressure fluctuations occur determines the pitch or *frequency* of the sound. The frequency is expressed in Hertz (Hz), that is, cycles per second. The human ear is sensitive to sounds from about 20 Hertz to 20,000 Hertz. Although sound can be of one discrete frequency - a 'pure tone' - most noise is made up of many different frequencies.

The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same subjective way. This is the basis of the A-weighted sound pressure level *dBA*, normally used to assess the effect of noise on people. The dBA weighting emphasizes or reduces the importance of certain frequencies within the audible range

Sound / Noise Units

The figure below shows an example of sound level varying with time. Because of this variation over time the same period of noise can be described by several different levels. The most common of these are described below.



Commonly Used Descriptors for Sound / Noise

$L_{Aeq,T}$	The equivalent continuous (A-weighted) sound level. It may be thought of as the "average" sound level over a given time, T. It is used for assessing noise from various sources: industrial and commercial premises, construction sites, railways and other intermittent noises. It can be considered as the "ambient" noise level.
$L_{A90,T}$	The (A-weighted) sound level exceeded for 90% of a measurement period. It is the value often used to describe the "background" noise.
Free-field Level	This refers to the sound level measured outside, away from reflecting surfaces.
Façade Level	This refers to the sound level measured outside, at 1m from a hard reflecting surface, typically 3dB greater than the free-field level.