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PROJECT TECHNICAL MEMORANDUM

JOB TITLE : Snell Street, Manchester

REF : HT: 28744/PTM4/R0

DATE : 29 September 2023

FROM : James Hardacre

ISSUED TO : Alex Farmer (Artal)

RE: SNELL STREET, MANCHESTER CONDITION 16b DISCHARGE NOTE

A residential scheme on Snell Street in Manchester has been granted planning permission subject to several conditions. One of these conditions, Condition 16, relates to plant noise egress to nearby receptors. The wording of the condition is provided below for clarity:

16) (a) Prior to the first occupation of the development, details of any externally mounted ancillary plant, equipment and servicing shall be submitted for approval in writing by the City Council, as Local Planning Authority. For the avoidance of doubt, externally mounted 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.

(b) Prior to the first occupation of the development, a verification report will be required to validate that the work undertaken conforms to the recommendations and requirements approved as part of part (a) of this planning condition. The verification report shall include post completion testing to confirm the noise criteria has been met. In instances of non-conformity, these shall be detailed along with mitigation measures required to ensure compliance with the noise criteria. A verification report and measures shall be agreed until such a time as the development complies with part (a) of this planning condition.

Any mitigation measures shall be implemented in accordance with a timescale to be agreed with the City Council, as Local Planning Authority. Any measures shall thereafter retained and maintained in situ.

Reason - To minimise the impact of plant on the occupants of the development pursuant to policies SP1 and DM1 of the Manchester Core Strategy (2012) and saved policy DC26 of the Unitary Development Plan for the City of Manchester (1995).

Each residential unit is to have an Air Source Heat Pump (ASHP) located in the store area of the roof terrace. As such, this technical note assesses the noise egress from each ASHP with reference to the wording of Condition 16b.



1.0 Environmental Noise Survey and Plant Noise Limits

An environmental noise survey was carried out on site between 10:00 hours on Friday 19 March 2021 and 12:00 hours on Monday 22 March 2021 to establish typical noise levels over a typical weekday and weekend period.

For full details relating to the noise survey carried out please refer to Hann Tucker Report 28744-NIA1-JH-Rev1 dated 13 April 2021. However, based on the results of the noise survey, and the wording of Condition 16, the following plant noise emission should be achieved at 1m from residential windows. These limits are 5 dBA below the measured background noise levels and are presented as façade limits.

Period	Plant Noise Limit (BS 4142 Rating Level)
Daytime (07:00-23:00)	38 dB
Night-time (23:00-07:00)	31 dB

Noise shall be assessed in accordance with BS 4142:2014 with corrections applied for any plant emitting noise of a tonal or irregular quality.

2.0 Commissioning Survey

Hann Tucker Associates visited site on Tuesday 26 September 2023 to carry out commissioning measurements of the installed Air Source Heat Pumps. The following table provides a summary of each of the measurements and measurement positions.

Plot	Position	Measurement No.	Description
1	1	01	The microphone was positioned approximately 1m from the unit during typical operation to obtain as close to a source measurement as possible
		02	The microphone was positioned approximately 1m from the unit while not in operation to obtain a representative measurement of the background noise conditions
2	2	03	The microphone was positioned approximately 1m from the unit during typical operation to obtain as close to a source measurement as possible
		04	The microphone was positioned approximately 1m from the unit while not in operation to obtain a representative measurement of the background noise conditions



Plot	Position	Measurement No.	Description
3	3	05	The microphone was positioned approximately 1m from the unit during typical operation to obtain as close to a source measurement as possible
		06	The microphone was positioned approximately 1m from the unit while not in operation to obtain a representative measurement of the background noise conditions
4	4	07	The microphone was positioned approximately 1m from the unit during typical operation to obtain as close to a source measurement as possible
		08	The microphone was positioned approximately 1m from the unit while not in operation to obtain a representative measurement of the background noise conditions
5	5	09	The microphone was positioned approximately 1m from the unit during typical operation to obtain as close to a source measurement as possible
		10	The microphone was positioned approximately 1m from the unit while not in operation to obtain a representative measurement of the background noise conditions
	6	11	The microphone was positioned approximately 1m above the openable roof light with all units running to obtain a representative measurement of a 'worst case' scenario
		12	The microphone was positioned approximately 1m above the openable roof light with all influential units operational, i.e. all units but plot 5, to obtain a representative measurement of the
		13	The microphone was positioned approximately 1m above the openable roof light with all units switched off in order to obtain a representative measurement of the prevailing background noise climate.
6	7	14	The microphone was positioned approximately 1m from the unit during typical operation to obtain as close to a source measurement as possible
		15	The microphone was positioned approximately 1m from the unit while not in operation to obtain a representative measurement of the background noise conditions
7	8	16	The microphone was positioned approximately 1m from the unit during typical operation to obtain as close to a source measurement as possible
		17	The microphone was positioned approximately 1m from the unit while not in operation to obtain a representative measurement of the background noise conditions



Plot	Position	Measurement No.	Description
8	9	18	The microphone was positioned approximately 1m from the unit during typical operation to obtain as close to a source measurement as possible
		19	The microphone was positioned approximately 1m from the unit while not in operation to obtain a representative measurement of the background noise conditions
9	10	20	The microphone was positioned approximately 1m from the unit during typical operation to obtain as close to a source measurement as possible
		21	The microphone was positioned approximately 1m from the unit while not in operation to obtain a representative measurement of the background noise conditions

3.0 Results

On the basis of the above measurement descriptions, the following table outlines the results obtained during our site visit.

Position	Measurement	Measured Sound Pressure Level (dBA)	
		L _{Aeq}	L _{A90}
1	01	52	51
	02	51	47
2	03	53	52
	04	49	46
3	05	53	51
	06	50	48
4	07	51	51
	08	50	46
5	09	51	50
	10	51	47
6	11	49	47
	12	50	47
	13	51	48
7	14	53	51
	15	49	46
8	16	55	54
	17	55	53
9	18	53	49
	19	51	48



Position	Measurement	Measured Sound Pressure Level (dBA)	
		L _{Aeq}	L _{A90}
10	20	52	49
	21	50	50

4.0 Plant Noise Impact Assessment

As the measured source and background levels are very similar, and in some cases the background exceeds the 'source' measurement. The measurements taken at position 6, i.e. worst case receptor, do not allow for a conclusive assessment of the plant noise at 1m from the nearest sensitive residential window. As such, the following section sets out the noise level at 1m from the nearest residential window calculated on the basis of the measurements obtained on site.

4.1 Specific Sound Levels

The following table outlines the specific noise level at 1m of each of the 9No. installed ASHPs, calculated in line with BS4142:2014

Plot	Specific Sound Level (dBA)
1	47
2	51
3	49
4	46
5	≤41
6	50
7	≤45
8	49
9	48

The above specific levels are quite varied despite all installed units being the same and duty being consistent. This is likely due to the quiet nature of the units, as such, it is likely that the measured 'source' and 'residual' levels are both dominated by the prevailing background noise climate and have varied depending on local sources rather than the operation of the ASHP.

4.2 Distance and Barrier Corrections

The worst affect receptor is considered to be Plot 5 in the middle of the development. The following barrier and distance calculations are to the roof light associated with Plot 5.

**Plot 1**

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
ASHP Specific Level	68	58	53	47	34	≤ 34	≤ 32	≤ 26	47
Distance Correction	-26	-26	-26	-26	-26	-26	-26	-26	
Barrier Correction	-9	-11	-13	-16	-19	-22	-25	-25	
Façade Correction	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Level at Receptor	36	24	17	8	≤ 0	≤ 0	≤ 0	≤ 0	14

Plot 2

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
ASHP Specific Level	69	57	50	49	43	40	34	22	51
Distance Correction	-24	-24	-24	-24	-24	-24	-24	-24	
Barrier Correction	-9	-11	-13	-16	-19	-22	-25	-25	
Façade Correction	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Level at Receptor	39	25	16	12	3	≤ 0	≤ 0	≤ 0	16

Plot 3

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
ASHP Specific Level	65	56	51	47	42	≤ 33	≤ 28	18	49
Distance Correction	-20	-20	-20	-20	-20	-20	-20	-20	
Barrier Correction	-9	-11	-13	-16	-19	-22	-25	-25	
Façade Correction	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Level at Receptor	39	29	20	14	4	≤ 0	≤ 0	≤ 0	18

Plot 4

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
ASHP Specific Level	64	57	50	47	40	≤ 34	≤ 29	≤ 22	46
Distance Correction	-14	-14	-14	-14	-14	-14	-14	-14	
Barrier Correction	-9	-12	-14	-17	-20	-23	-25	-25	
Façade Correction	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Level at Receptor	44	34	25	19	9	0	≤ 0	≤ 0	23



Plot 6

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
ASHP Specific Level	≤ 54	53	48	47	44	44	40	27	50
Distance Correction	-14	-14	-14	-14	-14	-14	-14	-14	
Barrier Correction	-10	-12	-15	-17	-20	-20	-20	-20	
Façade Correction	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Level at Receptor	33	30	22	19	13	13	9	≤ 0	22

Plot 7

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
ASHP Specific Level	≤ 57	49	43	44	≤ 41	≤ 34	20	30	≤ 45
Distance Correction	-19	-19	-19	-19	-19	-19	-19	-19	
Barrier Correction	-8	-10	-12	-15	-17	-20	-20	-20	
Façade Correction	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Level at Receptor	33	23	15	13	8	≤ 0	≤ 0	≤ 0	15

Plot 8

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
ASHP Specific Level	59	61	55	48	≤ 37	≤ 32	≤ 26	≤ 22	49
Distance Correction	-24	-24	-24	-24	-24	-24	-24	-24	
Barrier Correction	-7	-9	-11	-14	-16	-19	-20	-20	
Façade Correction	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Level at Receptor	31	31	23	13	≤ 0	≤ 0	≤ 0	≤ 0	19

Plot 9

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
ASHP Specific Level	64	57	43	44	39	42	39	36	48
Distance Correction	-26	-26	-26	-26	-26	-26	-26	-26	
Barrier Correction	-7	-9	-11	-13	-16	-19	-20	-20	
Façade Correction	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Level at Receptor	34	25	9	8	≤ 0	≤ 0	≤ 0	≤ 0	13

**Cumulative**

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Cumulative Level at Receptor	47	38	30	24	16	14	9	0	28
Worst Case Planning Condition Criteria									31
Difference									-3

4.3 Discussion

The above calculations indicate that the installed plant does not exceed the maximum permissible noise levels at the nearest sensitive receptor during both daytime and night-time periods.

Yours sincerely

James Hardacre
for HANN TUCKER ASSOCIATES