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PROJECT TECHNICAL MEMORANDUM

JOB TITLE : Snell Street, Manchester

REF : HT: 28744/PTM1/R1

DATE : 6 July 2022

FROM : Jake Howarth

ISSUED TO : Alex Farmer (Artal)

RE: SNELL STREET, MANCHESTER CONDITION 16 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 16.



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

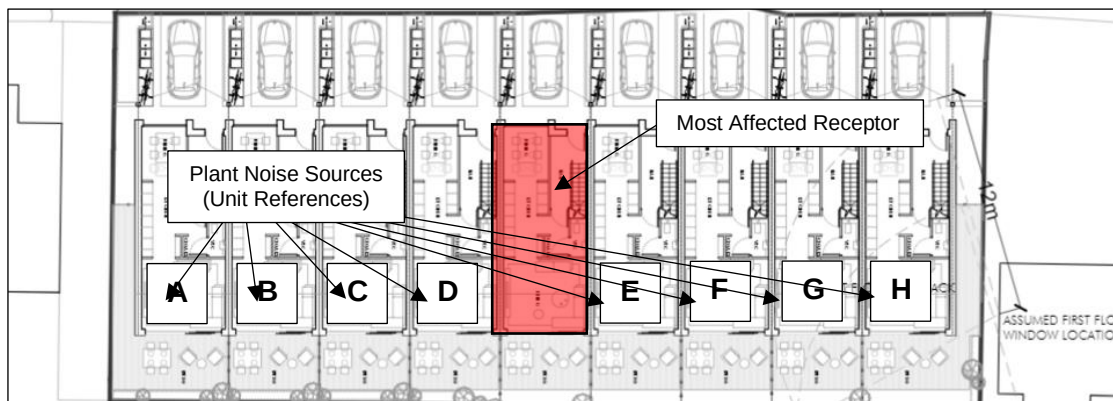
Noise shall be assessed in accordance with BS 4142:2014 with corrections applied for any plant emitting noise of a tonal or irregular quality.

At the time the noise survey was undertaken, the UK was exiting a nationwide lockdown due to the COVID-19 pandemic. It should be noted that the lockdown had been significantly relaxed at the time the survey was completed with most commercial operations in the UK operational and advice to work from home where possible still in effect. As such, the noise levels measured could have been affected by low traffic/activity levels in the area resulting in low background noise levels being measured.

2.0 Most Affected Noise Sensitive Premises

As each unit will have an ASHP, the neighbouring properties within the development itself will be the most affected noise sensitive receptors to the units. The apartments to the south west of the site have also been considered, however, due to the increased distances these are not considered to be the worst case receptors.

As such, the worst-case assessment location would be the unit located in the middle of the terraces with 4 No other units either side. The plan below shows the location of the most affected receptor with each remaining unit labelled A to H. These unit references will be referred to when the plant noise assessment is carried out in Section 4.0.



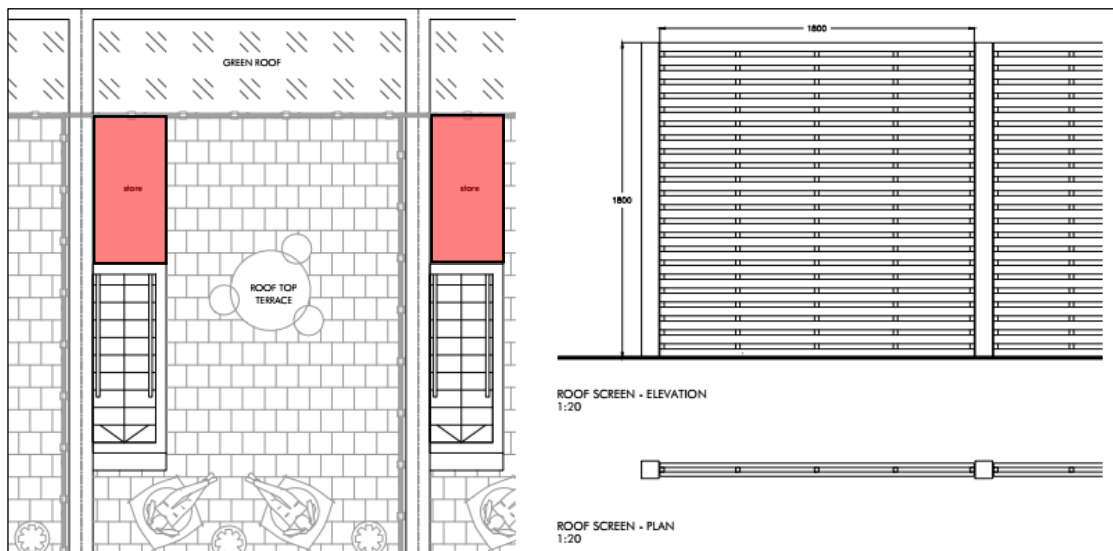
Proposed Site Plan Showing Most Affected Receptor

3.0 Proposed Plant

It is understood that each residential unit will have an ASHP located within the store area of the roof terraces. The units will be adjacent 1.1m solid wall on 2No sides which will largely screen the units from the adjacent residential windows.

There will be a timber fence located around the perimeter of each terrace, however, this will be open boarded so will not provide any acoustic screening.

A roof plan showing the proposed ASHP locations is provided below for reference.



Proposed ASHP Location – Roof Terrace

The units themselves are understood to be Daikin EDLQ07CV3 and the sound pressure level data for the units on both cooling and heating modes is presented below. The sound pressure levels were measured in a semi anechoic chamber with a hard floor.



Mode	Sound Pressure Level at 1m (dB) at each Octave Band Centre Frequency (Hz)								A-weighted Level at 1m (dBA)
	63	125	250	500	1000	2000	4000	8000	
Cooling	48	55	49	46	47	40	36	34	50
Heating	52	51	48	46	45	39	35	35	49

We also understand that the units will run 24/7. However, they will not always be running at full capacity as the inverter driven compressor to ramp up/down according to the buildings heat demand.

We also understand that the units have 3No different “quiet” modes which, as confirmed via email by Ian Sharp at Daikin, each provide a noise reduction of 2 dBA. This means that the units could operate at a noise level 6 dBA lower than the noise levels presented above if the lowest setting was used. The excerpt below details the different quiet modes the unit has:

4.6.2 Using quiet mode
About quiet mode
You can use quiet mode to decrease the sound of the outdoor unit. However, this also decreases the heating/cooling capacity of the system. There are multiple quiet mode levels.

You can:

- Completely deactivate quiet mode
- Manually activate a quiet mode level until the next scheduled action
- Use and program a quiet mode schedule

Possible quiet mode levels

Level	Description
Level 1	Most quiet. Under all circumstances, performance will be reduced.
Level 2	Medium quiet. Under all circumstances, reduced performance is possible.
Level 3	Least quiet. At colder ambient conditions, reduced performance can be happen.

4.0 Assessment

It should be noted that the proposed plant is not anticipated to exhibit any tonal or impulsive characteristics provided it is well maintained. The units will be inverter driven and, therefore, will gently ramp up and down depending on the demands on the various systems. As such, to be robust, however, a +3 dB feature correction as advised in BS 4142:2014 has been applied for the possible present of “...characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment ...”.



The following table summarises our predictions of atmospheric noise emissions from each unit affecting the most sensitive receptor highlighted in Section 2.0.

	Sound Pressure Level from each Unit (dBA)							
	A	B	C	D	E	F	G	H
ASHP SPL @ 1m (dBA)	50	50	50	50	50	50	50	50
Radiation Mode Correction (Quarter Spherical)	+3	+3	+3	+3	+3	+3	+3	+3
Distance Correction (Conformal Area)	-15	-13	-10	-9	-11	-14	-15	-18
Barrier Correction	-25	-24	-24	-22	-21	-21	-21	-21
BS4142 Correction	+3	+3	+3	+3	+3	+3	+3	+3
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3
Calculated Noise Level at Receptor	19	22	25	28	27	24	23	20
Cumulative Façade Rating Level at Receptor, $L_{A_{rTr}}$	33							
Plant Noise Limits, $L_{A_{rTr}}$	Daytime: 38 Night-time: 31							
Difference	Daytime: -5 Night-time: +2							

Based on the above, calculations indicate that the day-time limits would likely be achieved at the most affected receptor. However, the night-time limits could be exceeded by 2 dB $L_{A_{rTr}}$ during normal operation.

However, the units could be run at a reduced duty during the night and a 2 dBA reduction in noise could be achieved (see Section 3.0). With the unit running on the Level 3 quiet mode, the requirements of Condition 16 should be achieved.

However, it is worth noting that a 2 dB exceedance of the Condition 16 requirements during normal operation would still result in the levels of plant noise egress being 3 dB below the background noise level on site. In this regard, BS4142:2014 states that *“the lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact.”*



“Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.”

Based on the above, the units should have a low impact on the receptor.

Additionally, the absolute level of plant noise egress should be considered. A façade rating level of 33 dB $L_{A_{Tr}}$ is a low external noise level. If we were to consider 15 dBA attenuation via an open window the rating level internally would be in the region of 15 dB $L_{A_{Tr}}$. This is 15 dBA below the MCC internal ambient noise level requirement during the night.

As such, although the night-time noise egress limits could be exceeded by 2 dB in the worst case, the actual levels of plant noise egress are unlikely to cause a significant impact on the receptors.

Yours sincerely

Jake Howarth
for HANN TUCKER ASSOCIATES