

DDN-AC-026

DATE:	11 November 2022	CONFIDENTIALITY:	Public
SUBJECT:	Plot 2 & Plot 3 rooftop plant noise verification measurements		
PROJECT:	70051606 Angel Meadowside	AUTHOR:	Chris Clayden
CHECKED:	Robert Marriner	APPROVED:	Robert Marriner

Background

This technical memo has been prepared in response to comments in an e-mail from MCC dated 21/09/2022 in relation to the discharge of planning condition 30 part (b), which reads as follows:

“Part b) – Verification

No verification survey has been undertaken and so this part of the condition can [not] be discharged. [sic]”

In order to discharge the planning condition, WSP have carried out verification measurements and compared the measured values against the manufacturer’s data that was used in the assessment presented in ‘70051606 RP AC 02 Plant noise assessment’.

In-situ verification measurements of rooftop plant

On Monday 7th November 2022, measurements of a sample of the rooftop condenser units at Angel Meadowside plots 2 & 3 were taken by Chris Clayden and Robert Marriner, WSP.

Measurements were taken in accordance with BS 7445: Description and measurement of environmental noise.

Meteorological conditions were noted to be overcast with a slight period of rain prior to commencing the measurements. Wind speed was below 5 m/s throughout.

Table 1 presents the details of the equipment used for these measurements:

Table 1: Equipment details

Equipment	Manufacturer & Type	Serial Number	Last Calibration date
Sound Level Meter	Brüel & Kjær 2250	3023998	04/02/2022
Pre-amplifier	Brüel & Kjær ZC 0032	26900	
Microphone	Brüel & Kjær 4189	3130582	
Calibrator	Brüel & Kjær 4231	2524534	03/02/2022

It was not possible to measure every item of plant as the units are controlled by the occupants, and many were not operational at the time of the survey. As such only condenser units servicing vacant flats were measured. It is noted that the loudest units according to the manufacturer’s data were measured. Smoke extract fans are for emergency use only and have therefore not been measured.

Condensing units were switched on within the flats by turning the climate controls to their maximum settings to produce the highest noise output.



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Measurements were taken either at 0.5m or 1m on-axis from the condenser unit fan. This variation was because in some instances noise levels produced by the condensers were low compared to the residual sound level.

Further residual sound level measurements were made with the condenser units switched off in order to correct the measured plant levels.

Table 2 presents the results of the verification measurements, and the calculation steps taken to enable a comparison against the manufacturer's sound power level data.



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Table 2: Summary of sound level measurements and verification against manufacturer's data

Ref.	Model	Meas. distance (m)	SPL with condenser on, dB L _{Aeq}	SPL with condenser off, dB L _{Aeq}	Background corrected SPL (dB L _{Aeq} , T)	SWL from man mfr's data sheet (dB L _{WA})	Predicted SPL at measurement distance based on mfr's SWL (dB L _{Aeq}) ¹	Difference between measured level and level used in plant noise assessment (dBA)
16.01	MCY-MHP0506HT-E	0.5	61	52	61	74	72	-11
16.02	MCY-MHP0406HT-E	0.5	62	52	52	73	71	-19
19.09	MCY-MHP0406HT-E	1	60	53	60	73	65	-5
21.02	MCY-MHP0406HT-E	1	58	53	56	73	65	-9
21.04	MCY-MHP0406HT-E	1	60	50	60	73	65	-5

¹Equivalent sound pressure level derived from sound power level quoted in manufacturer's datasheet

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Discussion

It can be seen that the measured sound pressure levels are lower than the equivalent levels derived from the manufacturer's published data. Therefore, this demonstrates that the noise impact assessment for plant noise previously carried out is representative of the worst-case scenario and the noise levels produced by the rooftop plant meet the noise level limits and the requirements of the planning condition.

In addition to the verification measurements, the condenser unit types were checked against the referenced units in plant noise assessment. The following changes were found:

- 14.04 unit previously referenced as a Toshiba RAS-3AM18U2AVG-E with a sound power level of 63 dB L_{WA} is now a Toshiba RAS-3AM26U2AVG-E with a sound power level of 64 dB L_{WA} .
- 15.05 unit previously referenced as a Toshiba RAS-3AM18U2AVG-E with a sound power level of 63 dB L_{WA} is now a Toshiba RAS-3AM26U2AVG-E with a sound power level of 64 dB L_{WA} .

Due to the verification measurements consistently being lower than the levels used in the original plant noise assessment, it is not anticipated that these two changes would affect the outcome of the assessment.

Conclusion

WSP has undertaken verification sound level measurements for a sample of rooftop condenser units at plots 2 and 3, Meadowside, in order to verify the noise levels presented in a previous noise report submitted to discharge part (a) of planning condition 30.

The measurement results have been compared against the manufacturer's published sound power level data for the relevant equipment, and are found to be at least 5 dB lower than the published data.

The verification measurements therefore demonstrate that the plant noise assessment report submitted to discharge part (a) of the planning condition is robust.