

Acoustic South East



Discharge of Condition 12

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Project: J4143

Issue 1

Site: **Land Adjacent to East Street, Rusper. RH12 4RE**

Client: **Divine Homes PLC**

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1 Introduction and Executive Summary

Acoustic South East have been appointed to undertake an acoustic assessment to support a planning application for a discharge of condition. Specifically, condition 12 has been placed by Horsham District Council as follows

- 12. Pre-Commencement Condition:** The development hereby approved shall not commence until the locations of the air source heat pumps have been submitted to and been approved in writing by the Local Planning Authority. . The development shall be implemented and retained in accordance with the approved details.

Reason: As this matter is fundamental in the interests of residential amenities by ensuring an acceptable noise level for the occupants of the development in accordance with Policy 33 of the Horsham District Planning Framework (2015)

A noise modelling approach has been applied using the client's proposed ASHP model (Daikin EDLA04EV3 PPC). This has a low noise emission with a sound power level of 58dB(A) and a sound pressure level of 44dB $L_{Aeq,T}$ measured at 1m. The noise model used two reflecting planes to account for the proximity to walls and fence lines.

The noise model predictions were considered against the revised MCS020 as well as a revised BS8233:2014 value for the overnight period which used 25dB $L_{Aeq,T}$ internally. To ensure a robust case, an open window was considered.

The outcome of the assessment is that the ASHPs pass the MCS020 and revised Table 4 BS8233:2014 criterion approach.

Horsham District Council may therefore discharge condition 12.

2 Context, Noise Criteria & Noise Assessment Methodology

2.1 Context

Horsham District Council consented 18 dwellings on the site at East Street Rusper. Condition 12 has been placed as follows:

- 12. Pre-Commencement Condition:** The development hereby approved shall not commence until the locations of the air source heat pumps have been submitted to and been approved in writing by the Local Planning Authority. . The development shall be implemented and retained in accordance with the approved details.

Reason: As this matter is fundamental in the interests of residential amenities by ensuring an acceptable noise level for the occupants of the development in accordance with Policy 33 of the Horsham District Planning Framework (2015)

There is little detail within condition 12 about what standards should be achieved or where. Due to specific standards not being included within the condition, MCS020 and a revised BS8233:2014 night time value has been applied.

2.2 Location of ASHPs

The location of the ASHPs has been denoted with a red cross for each of the properties. These are shown in Figure 1 below.



Figure 1. Location of ASHPs

2.3 Make and Model of ASHPs

The Client, Devine Homes, proposes a Daikin EDLA04EV3 PPC. This has a sound power level of 58dB(A) and a sound pressure level of 44dB(A) at 1m.

For the avoidance of doubt, this is a single air source heat pump per dwelling. These are relatively small units with figure 2 below indicating the dimensions as 0.77m in height, 1.25m wide and 0.36m deep.

It is assumed that the models will operate 24/7, therefore the night time will be the most sensitive scenario for consideration.



Specifications Table for EDLA04-08EV3				
EDLA04E2V3				
Heating capacity	Nom.		kW	4.30 (1), 4.60 (2)
Power input	Heating	Nom.	kW	0.840 (1), 1.26 (2)
COP				5.10 (1), 3.65 (2)
Dimensions	Unit	Height	mm	770
		Width	mm	1250
		Depth	mm	362
Weight	Unit		kg	88
Operation range	Heating	Water side	Min.	°C 9 (3)
			Max.	°C 65 (3)
	Domestic hot water	Ambient	Min.	°CDB -27
			Max.	°CDB 35
		Water side	Min.	°C 25
			Max.	°C 55 (3)
Sound power level	Heating	Nom.	dBA	58.0 (1)

Figure 2. Manufacturers Data

2.4 Relevant Criteria/Guidance

The condition 12 lacks any specific standards to be applied or achieved. It is therefore relevant to consider MCS020(a) dated 2025, or the CIEH/ANC guide to assessing ASHPs.

- MCS 020 a) dated 20 March 2025 provides for a pass/fail limit of equal or less than 37dBA at the receptor location.
- BS8233:2014 - Guidance on Sound Insulation and Noise Reduction for Buildings
- CIEH/ANC Guidelines

2.4.1 MCS020 (A-April 2025)

The guidance indicates whether or not the pass/fail criterion of 37dBA at 1m from the nearest window will be achieved.

2.4.2 BS8233:2014 - Guidance on Sound Insulation and Noise Reduction for Buildings

Table 4 of BS8233:2014 provides the following guideline values:

Activity	Location	Time period of day	
		07:00-23:00	23:00-07:00
Resting	Living Rooms	35dB $L_{Aeq,16hour}$	-
Dining	Dining Room/Area	40dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16hour}$	30dB $L_{Aeq,8hour}$

Table 1. BS8233:2014 Criteria

It is relevant to note that Table 4 criteria in BS8233:2014 relates to continuous and anonymous sound. Where there might be sounds which may attract a listener's attention, it would be mindful to consider a 5dB reduction in internal noise criterion applied. In this instance for ASHPs, the worst-case scenario would be the night time period. Therefore, 25dB $L_{Aeq,T}$ has been used for the overnight period assessment.

2.4.3 Planning Noise Advice Document Sussex, November 2023

The guidance with the document is outdated and refers to older MCS guidance which has since been updated. The historic value of 42dB $L_{Aeq,5minutes}$ is no longer valid.

2.4.4 CIEH/loA Guidance Note (November 2022)

The sound rating level of ASHP should not exceed 40dB(A).

3 Computer Noise Modelling

In order to see how noise varies at different positions around the proposed development it is possible to produce a noise contour map. A computer noise model has been completed using the computer package IMMI. Drawings of the area have been used to complete the noise models and the topography of the location recreated. IMMI faithfully implements the propagation method of ISO-9613:1996; Acoustics – Attenuation of sound during propagation outdoors.

The noise modelling software predicts free field and A weighted sound pressure levels dB values.

3.1 Noise Model Inputs

The following inputs were used in the construction of the noise model:

- Houses were erected as per the client/architect/approved plans in terms of building heights.
- ASHPs were added as per the clients' layouts at 0.8m above ground level.
- Only one ASHP per dwelling has been modelled.
- The ASHP pumps whilst having a sound power level of 58dB(A), had two reflective surfaces added, so 6dB was added, making a sound power level for each unit of 64dB(A). It is only relevant to consider sound power levels, not sound pressure levels.
- Garden fences were added at 1.8m above ground level.
- Receptor positions were added at first floor to present a worst-case scenario at 4.5m above ground level. To ensure compliance with MCS020, the receptor positions were applied at 1m from the façade.
- The model represents a worst case with each ASHP being operated.
- The model is capable of being reviewed to determine the impact of specific components at a specific receptor. For example, by reviewing the Plot 18 receptor position, there is a function to determine the exact contribution of the plot 17 ASHP. In this approach, each neighbour's heat pump is considered.
- Two iterations of the model were run, one with omni directional propagation and one with directionality applied to the ASHP units. With a sound pressure level of 44dBA at 1m and a sound power level of 58dBA, it is obvious that there is some directionality as inevitably the fan will propel air forwards as per the photographic image in Figure 2 above.

3.2 Noise Model Outputs

As stated above, the noise model was run with omnidirectional propagation as well as the more likely directional propagation. The model was run with all air source heat pumps running simultaneously.

3.3 Tabulated Outputs

By way of an example to interpret Figure 3 below, for the first column, the assessment considers Plot 18 as a receptor for the output of the closest ASHP, ie pump 17.

Assessment of ASHP's (Omnidirectional)				Assessment of ASHP's (Directionality Applied)			
Receptor Position	ASHP	Predicted External Sound Pressure Level-dB(A)	MSC020 Criterion of 37-Pass/Fail	Receptor Position	ASHP	Predicted External Sound Pressure Level-dB(A)	MSC020 Criterion of 37-Pass/Fail
18	17	37.1	Pass	18	17	28.1	Pass
17	18	37.5	Fail	17	18	28.4	Pass
16	15	37.2	Pass	16	15	37.2	Pass
15	16	34.9	Pass	15	16	25	Pass
15	14	37.6	Fail	15	14	28.9	Pass
14	15	37.2	Pass	14	15	28.2	Pass
14	13	30.6	Pass	14	13	25.4	Pass
10	12	28.1	Pass	10	12	28.1	Pass
10	11	26	Pass	10	11	20.7	Pass
11	10	29.1	Pass	11	10	29.1	Pass
12	10	29.3	Pass	12	10	24.1	Pass
12	11	35.7	Pass	12	11	26.3	Pass
7	8	35.3	Pass	7	8	25.6	Pass
8	7	36.9	Pass	8	7	27.9	Pass
8	9	22.9	Pass	8	9	22.9	Pass
9	8	20.9	Pass	9	8	20.9	Pass
6	1	32.2	Pass	6	1	32.2	Pass
1	6	32.4	Pass	1	6	32.4	Pass
6	5	8.9	Pass	6	5	8.9	Pass
5	6	7.4	Pass	5	6	7.4	Pass
1	2	22.4	Pass	1	2	22.4	Pass
2	1	23	Pass	2	1	23	Pass
2	3	35.9	Pass	2	3	26.7	Pass
3	2	35.8	Pass	3	2	25.9	Pass
3	4	24.3	Pass	3	4	24.3	Pass
4	3	24.5	Pass	4	3	24.5	Pass
7	11	24.6	Pass	7	11	24.6	Pass

Figure 3. Results of the Noise Modelling Predictions

4 Discussion

Given that the condition lacks specificity, both MCS and BS8233:2014 have been considered

4.1 MCS020 (A-April 2025)

Within the noise modelling assessment, it is noted that plots 17 and 15 exceed 37dB, albeit by 0.5 and 0.6dB respectively. This is shown using omnidirectional propagation. In reality, an ASHP with a fan will project sound forwards, and hence the rationale for the revised model which applied directionality to the units. The plots are seen to be significantly improved with this applied.

From Figure 3 above and specifically, the directionality assessment, it is demonstrated that the placement of the ASHPs does not exceed 37dB and is therefore considered to pass the MCS020 guidelines.

4.2 BS8233:2014 Open Window Assessment

As a worst-case scenario, it is relevant to consider future occupants with an open window. Therefore, the industry standard (AVOG, 2020) for sound attenuation through a partially open window of 13dB has been applied to consider likely internal sound pressure levels inside a bedroom, during the night time period. This is the most robust and relevant assessment.

Given that BS8233:2014 relates to continuous and anonymous sounds, it is relevant to consider a reduction in the internal night time sound pressure value to 25dB $L_{Aeq,T}$. This has been considered in Figure 4 below and the values are comfortably below the revised BS8233:2014 Table 4 values.

Assessment of ASHP's (Directionality Applied)				Open Window Assessment		
Receptor Position	ASHP	Predicted External Sound Pressure Level-dB(A)	MCS020 Criterion of 37-Pass/Fail	Internal Sound Pressure Level- $L_{Aeq,T}$	Relevant BS8233:2014 Criterion	Difference
18	17	28.1	Pass	15.1	25dB $L_{Aeq,T}$	-9.9
17	18	28.4	Pass	15.4	25dB $L_{Aeq,T}$	-9.6
16	15	37.2	Pass	24.2	25dB $L_{Aeq,T}$	-0.8
15	16	25	Pass	12	25dB $L_{Aeq,T}$	-13
15	14	28.9	Pass	15.9	25dB $L_{Aeq,T}$	-9.1
14	15	28.2	Pass	15.2	25dB $L_{Aeq,T}$	-9.8
14	13	25.4	Pass	12.4	25dB $L_{Aeq,T}$	-12.6
10	12	28.1	Pass	15.1	25dB $L_{Aeq,T}$	-9.9
10	11	20.7	Pass	7.7	25dB $L_{Aeq,T}$	-17.3
11	10	29.1	Pass	16.1	25dB $L_{Aeq,T}$	-8.9
12	10	24.1	Pass	11.1	25dB $L_{Aeq,T}$	-13.9
12	11	26.3	Pass	13.3	25dB $L_{Aeq,T}$	-11.7
7	8	25.6	Pass	12.6	25dB $L_{Aeq,T}$	-12.4
8	7	27.9	Pass	14.9	25dB $L_{Aeq,T}$	-10.1
8	9	22.9	Pass	9.9	25dB $L_{Aeq,T}$	-15.1
9	8	20.9	Pass	7.9	25dB $L_{Aeq,T}$	-17.1
6	1	32.2	Pass	19.2	25dB $L_{Aeq,T}$	-5.8
1	6	32.4	Pass	19.4	25dB $L_{Aeq,T}$	-5.6
6	5	8.9	Pass	-4.1	25dB $L_{Aeq,T}$	-29.1
5	6	7.4	Pass	-5.6	25dB $L_{Aeq,T}$	-30.6
1	2	22.4	Pass	9.4	25dB $L_{Aeq,T}$	-15.6
2	1	23	Pass	10	25dB $L_{Aeq,T}$	-15
2	3	26.7	Pass	13.7	25dB $L_{Aeq,T}$	-11.3
3	2	25.9	Pass	12.9	25dB $L_{Aeq,T}$	-12.1
3	4	24.3	Pass	11.3	25dB $L_{Aeq,T}$	-13.7
4	3	24.5	Pass	11.5	25dB $L_{Aeq,T}$	-13.5
7	11	24.6	Pass	11.6	25dB $L_{Aeq,T}$	-13.4

Figure 4. Predicted Internal Sound Pressure Levels

4.3 Summary of Findings

A noise modelling approach was considered to assess the client's proposed model of ASHP and how these were likely to impact the neighbouring properties.

The MCS020 approach (A-April 2025) and a revised night time criterion for internal sound pressure levels with an open window have been considered. Both approaches pass the assessment.

5 Recommendations

It is strongly advised that the manufacturer's recommendations regarding fixing, maintenance and servicing are followed.

Specifically, all units must have vibration isolation and this applies not only to the freestanding units and the ground surface, but also to any cabling/pipework which is on an external wall or shared surface. If not correctly isolated, the fluid dynamics of material passing through the tubes/cables will resonate and this can be transferred into the building structure.

6 Conclusion

A noise modelling approach has been applied using the client's proposed ASHP model (Daikin EDLA04EV3 PPC). This has a low noise emission with a sound power level of 58dB(A) and a sound pressure level of 44dB $L_{Aeq,T}$ measured at 1m. The noise model used two reflecting planes to account for the proximity to walls and fence lines.

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The outcome of the assessment is that the ASHPs pass the MCS020 and revised Table 4 BS8233:2014 criterion approach.

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