Marie Curie Hospice, Hampstead

Noise Assessment for Planning Condition 5

7577.3

10th September 2021

Revision B

Marie Curie Hospice, Hampstead

Noise Assessment for Planning Condition 4

Revision	Description	Issued by	Date
A	First issue	TL	27th July 2021
B	Condition reference changed to 5	NC	10th Sept 2021

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1 Contents

2 Summary

2.1 This report has been prepared to support the discharge of planning condition number 5 of application reference 2019/1285/P, relating to the installation of 4 no. air conditioning condenser units and associated acoustic screen on the southern side of the roof.

2.2 In-situ measurements of the installed and operating plant have been carried out.

2.3 Background sound levels have been measured previously at positions considered representative of the identified noise-sensitive receptors.

2.4 The potential noise impact is calculated and rated in accordance with BS 4142.

2.5 Based on the measurement results and details contained within this report it is considered that the requirements of planning condition 4 are achieved and planning condition 5 can be discharged.

3 Introduction

3.1 Apex Acoustics has been commissioned to undertake measurements of the installed air conditioning plant associated with the development, and to subsequently calculate and assess the plant noise impact at the identified noise sensitive receptor (NSR) locations.

3.2 This report is specifically produced for discharging of planning condition 5 relating to planning application reference 2019/1285/P.

3.3 The NSRs are shown in Figure 1 and have been identified as residential properties along Wedderburn Road and Lyndhurst Gardens, to the north, north-west and south of the site.

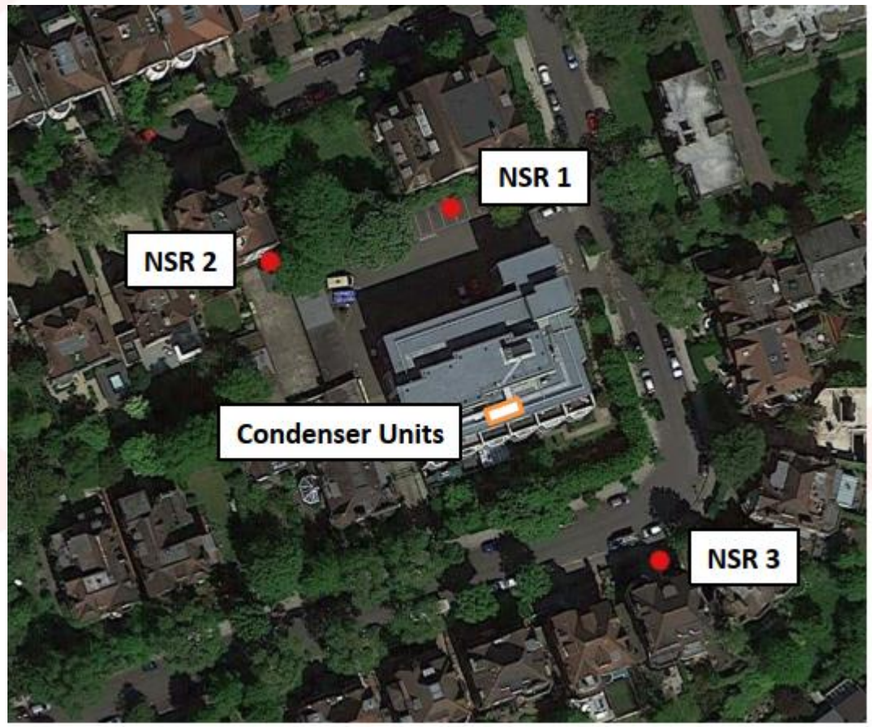

Figure 1: Plant location and identified NSRs

3.4 The potential noise impact is calculated and rated in accordance with BS 4142, Reference 1.

4 Planning Condition Requirements

4.1 Planning condition 4 states the following:

Prior to use of the development, all details shall be implemented as shown on the approved drawings and information, and as set out in the accompanying noise assessment (Noise Impact Assessment from Apex Acoustics (ref. 7577.1 rev A) dated 31/05/2019), including any additional steps identified to mitigate noise, and shall thereafter be permanently retained. The measures shall ensure that the cumulative sound level from the proposed external building services and fixed plant shall be 10dB below (15dB if tonal) the typical background sound level as assessed according to BS4142:2014 at the nearest and/or most affected noise sensitive premises, with all machinery operating at maximum capacity.

4.2 Planning condition 5 states the following:

A post-installation noise assessment shall be carried out to confirm compliance with the noise criteria and to identify any necessary additional steps to mitigate noise. Details of the assessment and any mitigation measures shall be submitted to the Council and approved in writing, and all approved details shall be implemented prior to further use of the installation and thereafter be permanently retained.

4.3 Therefore, to discharge planning condition 5, this report demonstrates that the criteria included in condition 4 have been met.

5 Existing acoustic environment

5.1 The existing acoustic environment was measured between 14:00 on 1st May 2019 and 13:00 hours on 2nd May 2019. Full survey details can be found in Apex Acoustics report 7577.1A, dated 31st May 2019.

5.2 The measurement locations are shown in Figure 2.

Figure 2: Noise monitoring locations

5.3 Background sound levels

5.4 Statistical analysis was undertaken on the L_{A90} data following the guidance of BS 4142 to determine a background sound level considered to be representative of the assessment period.

5.5 Based on the statistical analysis results, the background sound level considered representative of the night time period is shown in Table 1. The statistical analysis undertaken is shown in Figure 3.

Assessment period	Representative Background Sound Level
Night-time (23:00 – 07:00 hrs)	30 dB $L_{A90,15\ mins}$

Table 1: Background sound levels representative of assessment periods

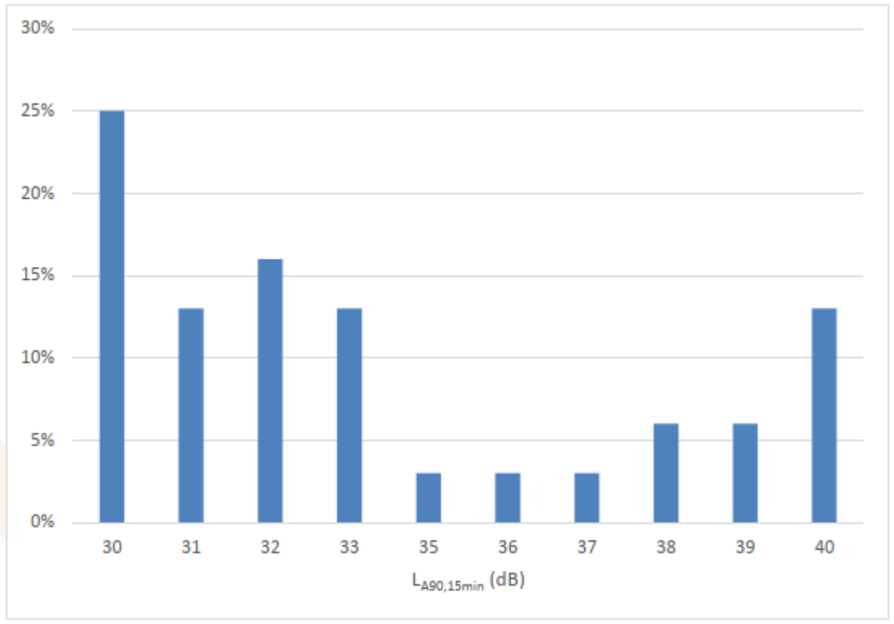

Figure 3: Analysis of night-time background levels, $L_{A90,15min}$

5.6 **Plant specific sound level limit**

5.7 Based on the established representative background sound level, the limit for the cumulative specific sound level, $L_{Aeq,Tr}$, from the proposed plant is detailed in Table 2.

Assessment period	Upper limit for specific sound level, $L_{Aeq,Tr}$	
	Not tonal	Tonal
Night-time (23:00 – 07:00 hrs)	20 dB	15 dB

Table 2: Plant specific sound level limits

5.8 Condenser units such as those proposed generally emit broadband noise without tonal elements. Therefore, the applicable limit for the specific sound level would be $L_{Aeq,Tr}$ = 20 dB.

6 Noise sources

6.1 Plant and associated noise levels

6.2 The assessed plant consists of 4 no. Mitsubishi PUMY P200YKM2 condenser units.

6.3 The plant is assessed based on in-situ measurements taken by Apex Acoustics between 12:00 hours and 14:00 hours on 15th June 2021.

6.4 The equipment used for the survey is listed in Table 3.

Reference	Serial Number	Calibration date
NTi Sound level meter	A2A-18413-E0	27.11.20
Larson Davis calibrator	17894	26.11.20

Table 3: Equipment used for the survey

6.5 Measurements were taken at several locations around the condensers within the roof-top plant enclosure, as indicated in Figure 4.

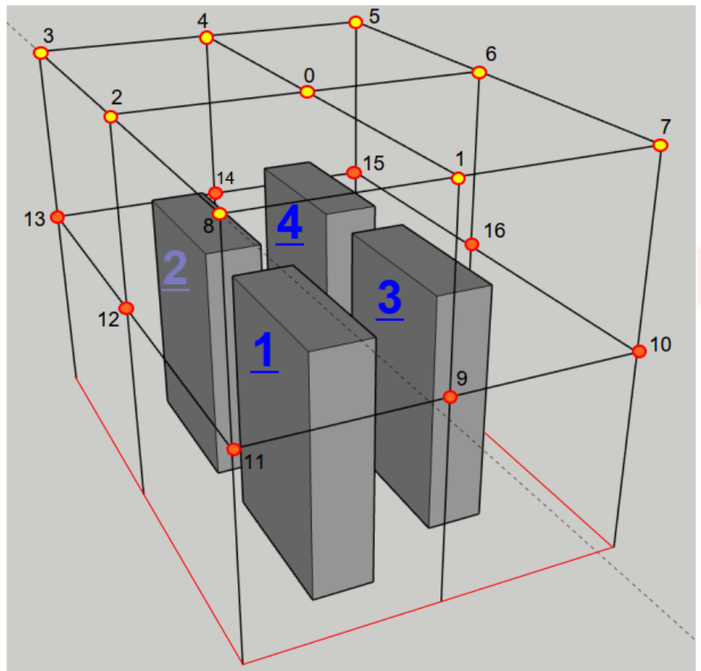

Figure 4: Measurement locations

6.6 During the measurements, three out of the four condensers were operational.

6.7 The measured noise levels are shown in Table 4.

Measurement number	$L_{Aeq,T}$ (dB)
0	56
1	57
2	56
3	55
4	56
5	54
6	54
7	53
8	52
9	56
10	55
11	54
12	57
13	57
14	55
15	59
16	55

Table 4: Measured noise levels

6.8 Operating times

6.9 The plant is understood to operate continuously 24 hours a day. It is therefore assessed for the night time period only.

7 BS 4142 assessment

7.1 Calculated specific noise impact

7.2 Sound propagation from the condensers has previously been modelled using proprietary software, CadnaA, Reference 2. This software models sound propagation outdoors according to ISO 9613, Reference 3.

7.3 The sound pressure levels from measurement numbers 13 & 15 have been used to calibrate the model, by adjusting the sound power level of the condenser units until the sound pressure level predicted by the model at positions 13 & 15 is equal to that measured.

7.4 The model has then been used to predict the resulting specific sound levels, $L_{Aeq,Tr}$, at the NSRs. These are shown in Figure 5.

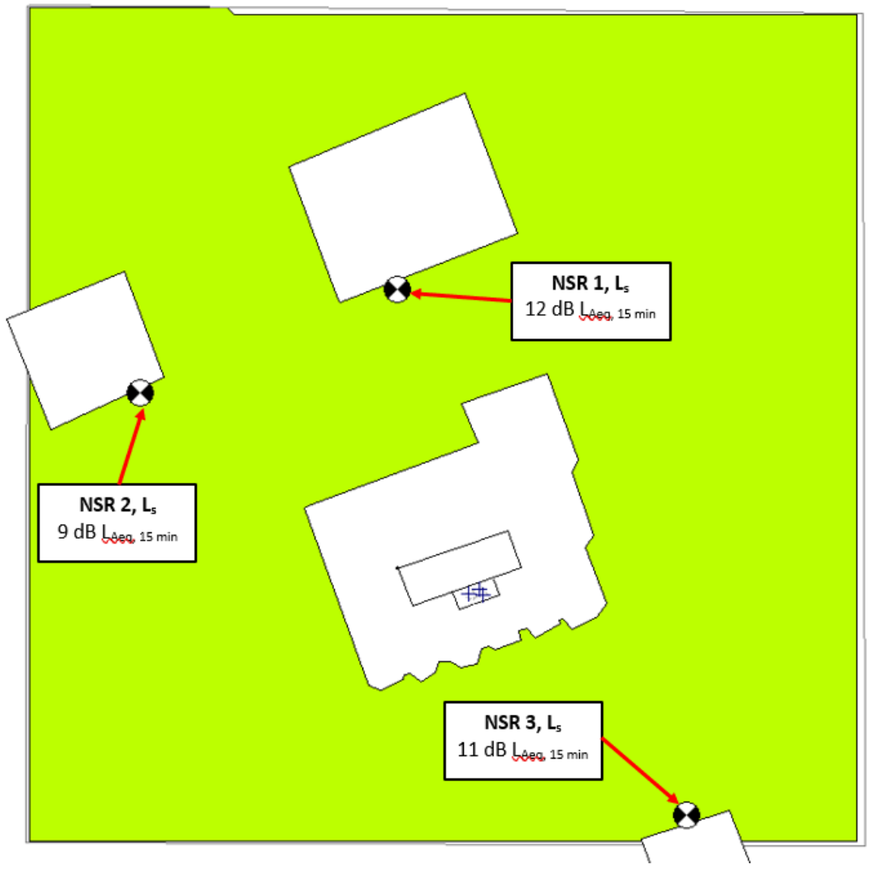

Figure 5: Sound contours at 12 m, showing the calculated specific sound level, $L_{Aeq,Tr}$

7.5 It is noted that three out of the four condensers were operating during the measurements. Were all four condensers to operate simultaneously, this would increase the specific sound level by 1 dB.

7.6 Applying the 1 dB correction, the assessment results are detailed in Table 5.

NSR	Calculated $L_{Aeq,Tr}$ (dB)	Planning Condition Limit, $L_{Aeq,Tr}$ (dB)
1	13	20
2	10	
3	12	

Table 5: BS 4142 assessment results

7.7 It can be seen from Table 5 that the worst case specific sound level is 7 dB below the upper limit, thereby satisfying the requirements of the planning condition.

7.8 Furthermore, the assessment is based on the highest measured sound levels. These measurements may have included contributions from other nearby plant items, such as air handling plant, which do not form part of the assessment.

8 Conclusion

8.1 Based on in-situ noise measurement of the fully commissioned and operating plant, the worst-case specific sound level at the NSRs is 17 dB below the representative background sound level during the night time period.

8.2 As the assessed plant is not tonal in nature, the requirement of planning condition 4 is for the specific sound level to be at least 10 dB below the background sound level and the post installation assessment demonstrates that planning condition 5 is satisfied.

9 References

1 BS 4142:2014+A1:2019, Method for rating and assessing industrial and commercial sound.

2 CadnaA environmental noise modelling software, version 2017, Datakustik GmbH

3 ISO 9613 : Acoustics – Attenuation of sound during propagation outdoors