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AAD
applied
acoustic
design

CHINESE EMBASSY – CULTURAL OFFICE

WEST HEATH ROAD

HAMPSTEAD

LONDON NW3

PLANT NOISE ASSESSMENT

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1.0 Introduction

1.1 To undertake an environmental noise level survey to establish the noise climate at and around the existing site of Chinese Embassy Cultural Office at West Heath Road, Hampstead, London NW3

1.2 To assess the mechanical services noise level limits for the proposed scheme with regard to the planning policy requirements stipulated by London Borough of Camden - Camden Development Polices section DP28. Noise & Vibration.

1.3 To assess likely noise levels from the plant and provide guidance regarding suitable noise control measures if required.

1.4 To prepare a planning report to support a planning application to London Borough of Camden for the proposed plant scheme.

2.0 Site Description

2.1 The site is a residential dwelling for the Chinese Embassy Culture Office which has a mixture of offices, function rooms and residential rooms which is all proposed to be refurbished. Part of this extension works includes provision of new items of mechanical services plant.

2.2 The site is bound by West Heath Road to the north, Redington Road to the west, 74 Redington Road residential dwelling to the south and 9 West Heath Road residential dwelling to the east. Nearest noise sensitive buildings are identified to be the residential dwellings 74 Redington Road and 9 West Heath Road. Refer to Appendix 1 for site plan and survey location.

3.0 Noise Survey Details

3.1 Instrumentation: NTi Audio type XL2 sound level meter (Serial No. 10216). The instrument was powered by an external battery and stored in a weather proof case. The instrument was checked for calibration prior and subsequent to use with a Larson Davis type CA 250 calibrator whereupon no calibration drift was recorded. The instrument was used in accordance with manufacturer's instructions.

3.2 Location: The noise monitor was located at a position to record representative noise levels at and around the nearest noise sensitive receiver, which is the adjacent residential building. The microphone was fixed to a tripod. The microphone was approximately 2m above local ground level. Refer to Appendix 1 for the measurement location.

3.3 Periods: Noise level monitoring was continuous from approximately 13:45 hours on Friday 17th February 2017 until approximately 15:15 hours Tuesday 21st February 2017. The meter was set up to monitor noise levels continuously in fifteen minute intervals.

3.4 Weather: The prevailing weather condition over the survey periods were generally calm and dry. Wind speed, although not recorded, was considered to be less than 5 m/s throughout the survey period.

3.5 Site Noise Characteristics: The background noise levels are controlled by road traffic flow from West Heath Road located to the north and Redington Road located to the west. It is considered that no unusual events occurred during the survey period, and the data includes a fair representation of the noise levels in the area.

3.6 Surveyor: Hasan Akil MIoA

3.7 Results: The results of the measurements are presented below showing the recorded values of the lowest typical background noise level (L_{A90} dB). Refer to Appendix 1 for measurement location and Appendix 2 for the measurement data in graph form.

Table 1 : Lowest Background Noise Level Measurements $L_{A90,T}$ dB

Date	Daytime $L_{A90\ (15min)}$ (07:00-23:00)	Night-time $L_{A90\ (15min)}$ (23:00-07:00)
17/02/2017 to 18/02/2017	36 dB	28 dB
18/02/2017 to 19/02/2017	33 dB	31 dB
19/02/2017 to 20/02/2017	36 dB	29 dB
20/02/2017 to 21/02/2017	41 dB	32 dB
21/02/2017	43 dB	-
Overall Lowest Background Noise Level	**33 dB**	**28 dB**

4.0 Planning Criteria

4.1 In permitting (re)development including new plant, London Borough of Camden (LBC) generally impose a planning condition in respect of limiting noise from plant and equipment affecting noise sensitive properties. Details of the relevant policy to be adopted when determining this condition are set out in Camden Development Planning Policies, DP28 Noise & Vibration document states in Table E the following;

Table E: Noise levels from plant and machinery at which planning permission will not be granted

Noise description & location of measurement	*Period*	*Time*	*Noise level*
Noise at 1 metre external to a sensitive façade	*Day, evening and night*	*0000-2400*	*5dB(A) <LA90*
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade.	*Day, evening and night*	*0000-2400*	*10dB(A) <LA90*
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade.	*Day, evening and night*	*0000-2400*	*10dB(A) <LA90*
Noise at 1 metre external to sensitive façade where LA90>60dB	*Day, evening and night*	*0000-2400*	*55dBLAeq'*

4.2 Based on the measured background noise levels established in Table 1, the proposed mechanical services plant cannot exceed the noise limits in the table below;

Table 2 : Maximum Permissible Noise Limits

Period	Maximum Noise Limit	Maximum Noise Limit if the plant has a distinguishable discrete continuous note
Daytime (07:00 – 23:00)	28 dB $L_{Aeq\ (16\ hour)}$	23 dB $L_{Aeq\ (16\ hour)}$
Night-time (23:00 – 07:00)	23 dB $L_{Aeq\ (8\ hour)}$	18 dB $L_{Aeq\ (8\ hour)}$

5.0 Plant Noise Assessment

5.1 The proposed plant scheme is set to comprise of nine small extract fan units, two kitchen extract fans and a condenser. The plant will be located at various locations as identified in ME7 Ltd drawings which have the following reference numbers;

609 M14 Rev P2 609 M21 Rev P2 609 M22 Rev P2
609 M23 Rev P2 609 M24 Rev P2 609 M30 Rev P2

5.2 The list of installed plant items and their relationship to the nearest noise sensitive properties are as follows;

Table 3 : Proposed Plant Location

Ref.	Floor	Room Location & Unit	Atmospheric Termination Grille Location	Distance & Disposition from Nearest Receiver
1	Second Floor	206 WC: Extract Fan	Southern area of the roof	No line of sight to 9 West Heath Road. Approx. 15m. Partial line of sight to 74 Redington Road. Approx. 30m
2		207 Control Room: Extract Fan		
3		204 Ensuite Bathroom: Extract Fan	East façade at the centre of the roof	Partial line of sight to 9 West Heath Road. Approx. 10m
4	First Floor	112 WC: Extract Fan	North facade	No line of sight to 9 West Heath Road. Approx. 20m
5		106 Print Room: Extract Fan	East façade at the centre of the roof	Partial line of sight to 9 West Heath Road. Approx. 10m
6	Ground Floor	G02 WC: Extract Fan	North facade	No line of sight to 9 West Heath Road. Approx. 15m
7		G03 WC: Extract Fan		
8		G05 Staff Kitchen/ Dining: Extract Fan	East façade	Direct line of sight to 9 West Heath Road. Approx. 6m
9		G07 Catering Kitchen: Extract Fan	South east area of the roof	Direct line of sight to 9 West Heath Road. Approx. 10m
10		G08 Teapoint: Extract Fan		
11		G07 Catering Kitchen (make-up air louvre): Extract Fan	East façade	Direct line of sight to 9 West Heath Road. Approx. 6m
12	Basement	B07 Storage: Supply Fan		
13		B07 Storage: Extract Fan		
14	Muse	MG06 Kitchen: Extract Fan	South Facade	Direct line of sight to 74 Redington Road. Approx. 3m
15		MG07 WC: Extract Fan		
16		M103 Bathroom: Extract Fan	Roof	Direct line of sight to 74 Redington Road. Approx. 5m
17		Outdoors: Condenser	South Facade	Direct line of sight to 74 Redington Road. Approx. 3m

5.2 It is understood that only the condenser has been selected. The identified extract and supply fans have yet to be selected. The unselected units will have a plant noise limit imposed at 1m from each unit's termination grille. The table below is the manufacturers published noise data for the proposed condenser:

Table 4 : Plant Noise Limits for Supply & Extract Fans

Location	Unit Type & Room Type	Distance from Nearest Receiver	Noise Level
Muse South Facade	Mitsubishi PUMY-P112VKM	3m	49 dB L_{pA} at 1m

5.3 It is understood that the majority of the proposed plant could potentially operate at any given time and the kitchen extract fans will only operate during the daytime period only i.e. between 07:00 and 23:00.

5.4 We have assumed that when selecting units they will not have any distinguishable discrete continuous note (whine, hiss, screech, hum) at 1m from the nearest noise sensitive façade and therefore the proposed plant scheme must achieve 5 dB below the lowest background noise levels as set out in the middle column of Table 2.

5.5 In order to comply with LBC planning requirements, each of the identified unselected units must achieve the plant noise limit at 1m from the atmospheric termination grille (ATG) as follows;

Table 5 : Proposed Plant Noise Limit at 1m from ATG

Ref.	Unit Type & Room Location	Maximum Noise Level at 1m from ATG
1	206 WC: Extract Fan	25 dB L_{pA}
2	207 Control Room: Extract Fan	25 dB L_{pA}
3	204 Ensuite Bathroom: Extract Fan	25 dB L_{pA}
4	112 WC: Extract Fan	25 dB L_{pA}
5	106 Print Room: Extract Fan	25 dB L_{pA}
6	G02 WC: Extract Fan	25 dB L_{pA}
7	G03 WC: Extract Fan	25 dB L_{pA}
8	G05 Staff Kitchen/ Dining: Extract Fan	35 dB L_{pA}
9	G07 Catering Kitchen: Extract Fan	35 dB L_{pA}
10	G08 Teapoint: Extract Fan	25 dB L_{pA}
11	G07 Catering Kitchen (make-up air louvre): Extract Fan	30 dB L_{pA}
12	B07 Storage: Supply Fan	25 dB L_{pA}
13	B07 Storage: Extract Fan	25 dB L_{pA}
14	MG06 Kitchen: Extract Fan	20 dB L_{pA}
15	MG07 WC: Extract Fan	20 dB L_{pA}
16	M103 Bathroom: Extract Fan	20 dB L_{pA}
17	Outdoors: Condenser	22 dB L_{pA} at 1m from unit *

* The proposed condenser must be located within an acoustic enclosure

5.6 With reference to the proposed condenser, this must be located in an acoustic enclosure which can provide a minimum 27 dB L_{pA} noise reduction in order to comply with LBC planning requirements. It is recommended that this is relocated to the north façade of the Muse building to benefit from screening of the building and require, if any, a less onerous acoustic enclosure.

5.7 Calculations have been performed to determine noise levels likely to arise at the site boundary with residential properties due to the operation of the proposed plant. This uses the imposed plant noise limits and manufacturer's noise data for the condenser with corrections for directivity, distance, screening and façade reflections. The results are summarised in the table below:

Table 6 : Noise Assessment to 9 West Heath Road

Ref.	Unit Type & Room Location	Predicted Noise Level at 1m from the Residential Dwelling	
		Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
1	206 WC: Extract Fan	0 dB L_{pA}	0 dB L_{pA}
2	207 Control Room: Extract Fan	0 dB L_{pA}	0 dB L_{pA}
3	204 Ensuite Bathroom: Extract Fan	5 dB L_{pA}	5 dB L_{pA}
4	112 WC: Extract Fan	0 dB L_{pA}	0 dB L_{pA}
5	106 Print Room: Extract Fan	5 dB L_{pA}	5 dB L_{pA}
6	G02 WC: Extract Fan	0 dB L_{pA}	0 dB L_{pA}
7	G03 WC: Extract Fan	0 dB L_{pA}	0 dB L_{pA}
8	G05 Staff Kitchen/ Dining: Extract Fan	24 dB L_{pA}	-
9	G07 Catering Kitchen: Extract Fan	20 dB L_{pA}	-
10	G08 Teapoint: Extract Fan	10 dB L_{pA}	10 dB L_{pA}
11	G07 Catering Kitchen (make-up air louvre): Extract Fan	19 dB L_{pA}	-
12	B07 Storage: Supply Fan	14 dB L_{pA}	14 dB L_{pA}
13	B07 Storage: Extract Fan	14 dB L_{pA}	14 dB L_{pA}
Total L_p at 1m from the Receiver		**27 dB L_{pA}**	**19 dB L_{pA}**

Table 7 : Noise Assessment to 74 Redington Road

Ref.	Unit Type & Room Location	Predicted Noise Level at 1m from the Residential Dwelling
		Any Period (00:00 – 24:00)
1	206 WC: Extract Fan	0 dB L_{pA}
2	207 Control Room: Extract Fan	0 dB L_{pA}
14	MG06 Kitchen: Extract Fan	16 dB L_{pA}
15	MG07 WC: Extract Fan	16 dB L_{pA}
16	M103 Bathroom: Extract Fan	16 dB L_{pA}
17	Outdoors: Condenser	20 dB L_{pA}
Total L_p at 1m from the Receiver		**23 dB L_{pA}**

5.8 The predicted noise level at both residential dwellings meets the daytime plant noise limit of 28 dB L_{Aeq} and night-time plant noise limit of 23 dB L_{Aeq} providing the plant noise level is met at each atmospheric termination grille and the condenser is put in an enclosure which provides

6.0 Conclusion

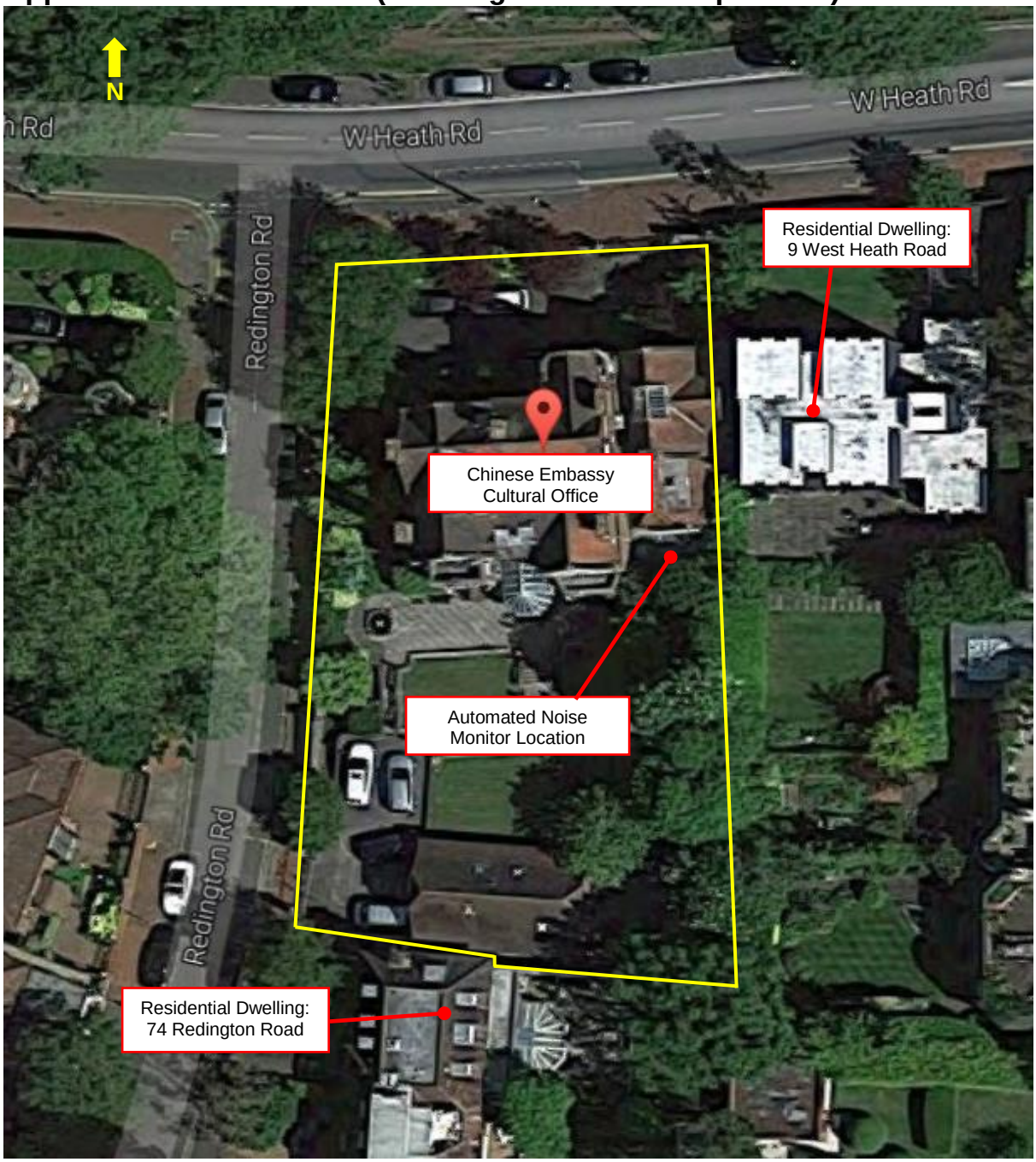
6.1 A noise survey at the Chinese Embassy Cultural Office – West Heath Road, Hampstead, London NW3 has been undertaken to establish prevailing levels of ambient and background noise levels.

6.2 Noise level limits for proposed plant associated with the development have been derived based upon the London Borough of Camden - Development Planning Policies, DP28 Noise & Vibration.

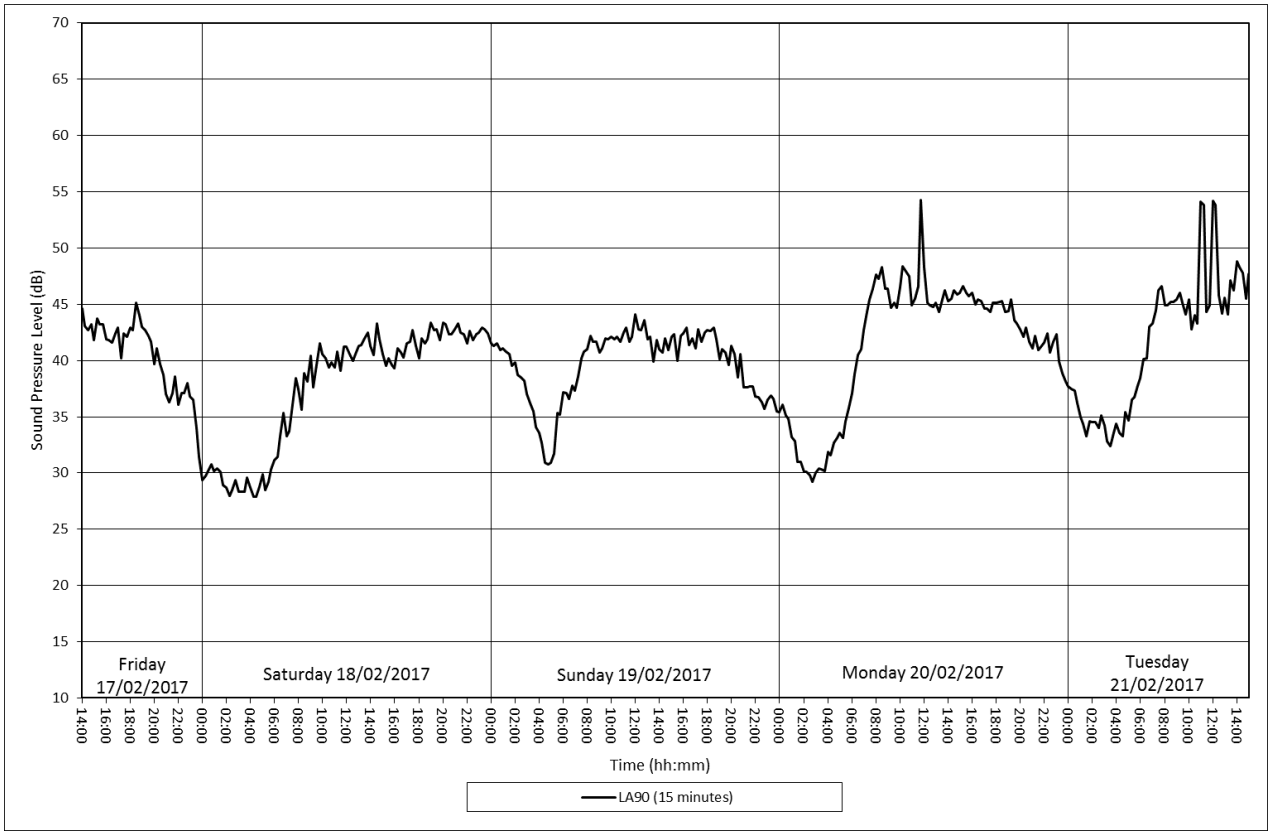
6.3 Calculations have been performed, based upon the information provided above, in order to determine the likely plant noise level at the nearest noise sensitive location.

6.4 Calculations predict the proposed mechanical services plant scheme will comply with London Borough of Camden planning requirements for 24 hour operation for all plant items except for the kitchen extract fans which shall operate during the daytime period only.

Appendix 1: Site Location (showing measurement position)



Appendix 2: Noise Survey Data



Appendix 3 : Glossary of Terms

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (Lp) the reference quantity is $2x10^{-5}$ N/m^2. The sound pressure level existing when microphone measured pressure is $2x10^{-5}$ N/m^2 is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (Lp).
Frequency	Is related to sound pitch; frequency equals the ratio between velocity of sound and wavelength.
A weighting	Arithmetic corrections applied to values of Lp according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq, T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of Lp actually measured.
$L_{Aeq, T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of Lp actually measured.
$L_{n, T}$	Lp which was exceeded for n% of time, T.
$L_{An, T}$	Level in dBA, which was exceeded for n% of time, T.
$L_{max, T}$	The instantaneous maximum sound pressure level, which occurred during time, T.
$L_{Amax, T}$	The instantaneous maximum A weighted sound pressure level which occurred during time, T.