CAHILL DESIGN CONSULTANTS
FIRE ENGINEERING | ACOUSTIC DESIGN

Coram QEII Centre, Mechlenburgh Square, London, WC1N 1NZ.

Plant Noise Assessment Report

Client: Thomas Sinden Ltd.

January 2018

Notice

This document and its contents have been prepared and are intended solely for Thomas Sinden Ltd information in relation to proposed development at Coram QEII Centre, Mechlenburgh Square, London, WC1N 1NZ.

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Executive Summary

CDC has been engaged by Thomas Sinden Ltd to undertake a desktop plant noise assessment relating to the proposed development at Coram QEII Centre, Mechlenburgh Square, London, WC1N 1NZ.

This study is in support of an amendment to the existing planning application for the project.

A noise survey has been undertaken by others to establish representative background noise for the area. These measurements form the basis of the assessment undertaken.

The assessment demonstrates that the prescribed requirements of BS4142 and London Borough of Camden Local Plan relating to noise emissions can be met.

1. Introduction & Overview

1.1. CDC has been commissioned by Thomas Sinden Ltd, to undertake a plant noise assessment, relating to the proposed development at Coram QEII Centre, Mechlenburgh Square, London, WC1N 1NZ.

1.2. A noise survey was undertaken at the site, by others, as part of this assessment. For further information on the survey, please refer to report: *No.Coram.R2.Rev1*, undertaken by Gillieron Scott Acoustic Design, on behalf of Philip Meadow Croft Architects. The results of the survey have been referenced within this report, however, the full details of the survey are not included here. Additional source measurements have been undertaken by Cahill Design Consultants.

1.3. The following figure outlines the approximate site location (in red). The nearest noise sensitive receptor (NSR) is highlighted (in yellow). It is understood this receiver is residential in nature.

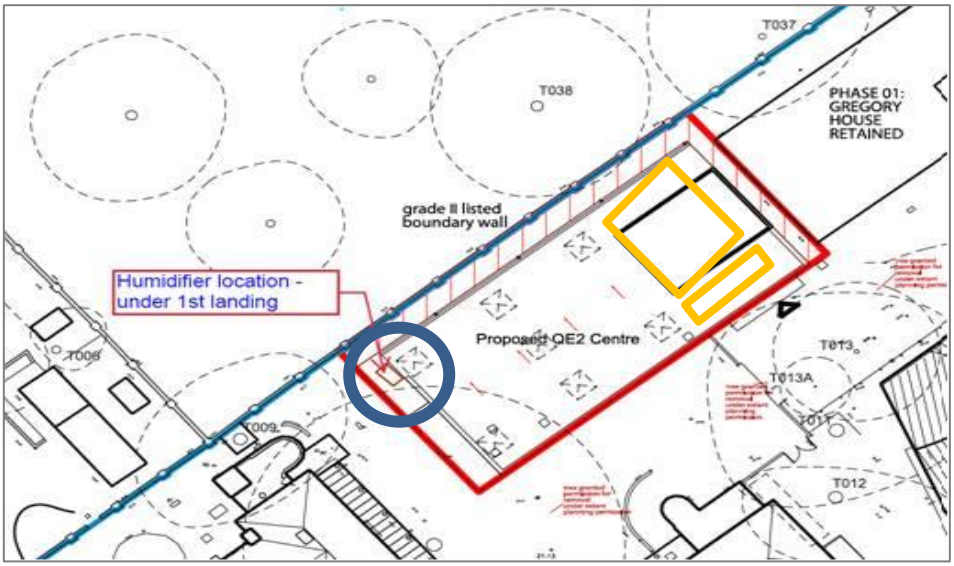
1.4. In addition to plant, a new EDF transformer has also been assessed, with the nearest sensitive receptor (NSR) is highlighted (in blue).

1.5. It is understood currently a swimming pool exists on the proposed site, this is due for demolition with the proposed Coram QEII Centre to be built in its place.

Figure 1: Approximate site location

1.6. An indicative layout of the proposed site has been provided in Figure 2 below showing new proposed dehumidifier location (in blue). It is proposed to install a new humidifier unit in this location, to serve the reading room. Additionally, new roof top plant will be installed (in orange).

Figure 2: Proposed plant location(s)



1.7. It is proposed to install a new humidifier unit in this location, to serve the Reading Room (blue location)

1.8. The humidifier unit is to be located externally underneath the stairwell at ground level and is external to the building.

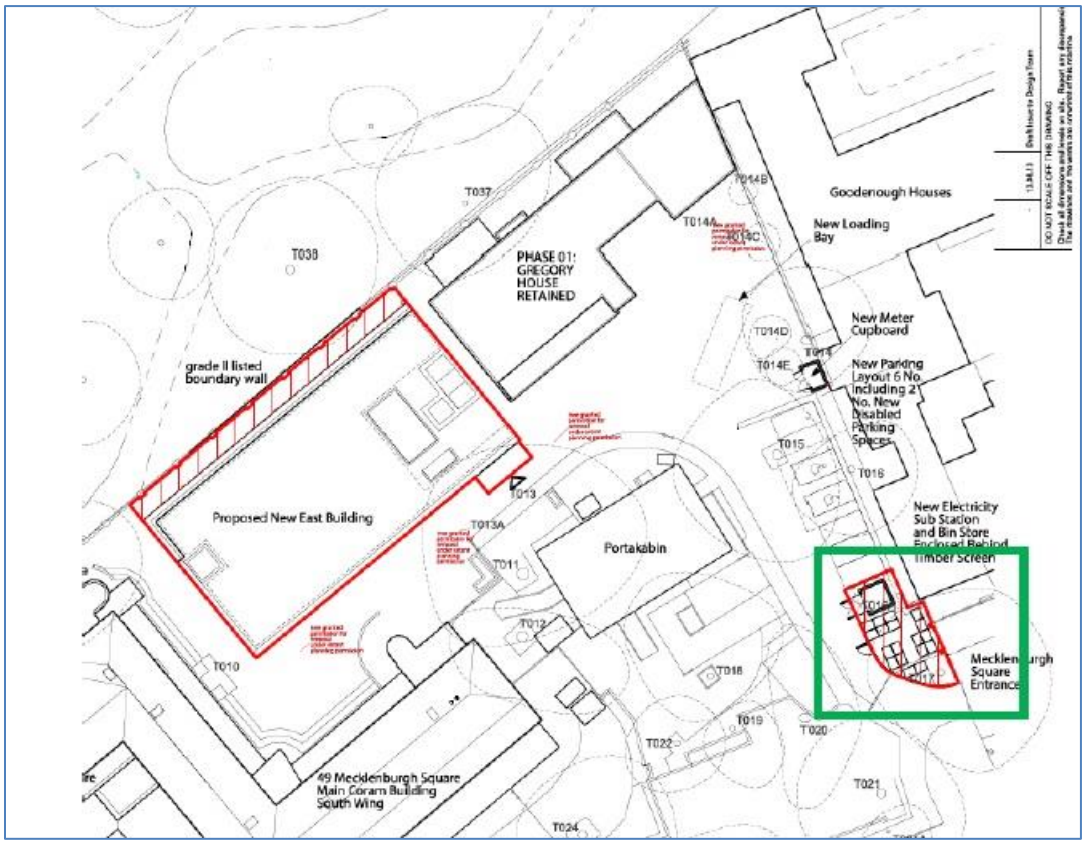
1.9. Additionally, the proposed roof top plant (orange location) will serve the proposed new QEII centre. It has been assumed the hours of operation for this plant shall be operational during the hours of 7am to 7pm daily.

1.10. The following figure illustrates the proposed plant location is elevation.

Figure 3: Proposed plant locations (elevation)

1.11. Further to the plant items shown above, it has been requested to undertake a noise level assessment of the EDF electrical transformer, as located below.

Figure 4: Proposed electrical transformer location (in green)



1.12. Sample acoustic measurements were undertaken of the new EDF transformer, as presented onsite, on 5th November 2018.

2. Assessment Methodology

2.1. The following British Standard and planning document has been referred to and used as part of the assessment:

- BS4142:2014 “Method for rating and assessing industrial and commercial sound”.
- Camden Local Plan 2017 – Appendix 3.
- Camden Local Plan 2017 – Policy A4 Noise and vibration.

2.2. At the time of writing, no details regarding any planning conditions relating to the project in terms of noise was known.

2.3. Further detail of the above documents is provided below.

BS 4142: 2014 ‘*Method for and assessing industrial and commercial sound’*

2.4. BS 4142:2014 describes methods for determining and assessing noise levels from noise sources with a view to determining the likelihood of adverse impact.

2.5. The document has been developed for the purposes of:

- investigating complaints,
- Assessing sound from proposed new, modified or additional sources of sound of an industrial and / or commercial nature; and
- Assessing sound at proposed new dwellings or premises used for residential purposes.

2.6. The document is now suitable for the determination of noise nuisance. Furthermore, that standard is not intended to apply to the following sources of noise:

- recreational activities, including all forms of motorsport;
- music or other entertainment;
- shooting grounds;
- construction and demolition;
- domestic animals;
- people;
- public address systems for speech;
- other sources falling within the scopes of other standards or guidance.

2.7. The methodology requires the determination of the specific sound level, corrected for characteristic feature in order to produce a rating level. The rating level is then compared against the background noise level (expressed as $L_{A90,T}$), thereby producing an 'excess of Rating over background sound level' figure. This figure is then used for assessment of likelihood of adverse impact.

2.8. Where the noise contains a 'distinguishable, discreet, continuous note (whine, hiss screech, hum etc.) or if there are distinct impulses in the noise (bangs, clicks and clatters), or if the noise is irregular enough to attract attention' then a range of correction factors can be added to the specific sound level to obtain an appropriate rating level; this reads as follows:

- Tonality: potentially +6dB
- Impulsivity: potentially +9dB
- Intermittency: potentially +3dB

2.9. The standard places great emphasis on the context of the sound environment that is being assessed and the development overall. This is an essential part of the assessment process, particularly when predicting likelihood of adverse impact. However, for guidance the following is included in the standard:

- Typically, the greater the difference, the greater the magnitude of the impact;
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context;
- The lower the rating 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. When 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.

Camden Local Plan 2017 – Appendix 3

2.10. The Camden Local Plan 2017 seeks to achieve sustainable new development of the highest quality in the most suitable locations, while protecting and enhancing our built and natural environment.

2.11. It aims to improve the quality of life of the people who live in, work in and visit the Borough and support sustainable communities.

2.12. Appendix 3 of the document outlines the requirements for the control of noise, including from fixed building services equipment.

2.13. The Plan introduces the concept of NOEL (No Observed Adverse Level), LOAEL (Lowest Observed Adverse Effect Level) and SOAEL (Significant Observed Adverse Effect Level), with these elements being related to an assessment in accordance with relevant guidance.

2.14. In the case of building services plant, this guidance is BS4142:2014.

2.15. These descriptors are further developed into a traffic light system as follows:

- Green – where noise is considered to be at an acceptable level

- Amber – where noise is observed to have an adverse effect level, but which may be considered acceptable when assessed in the context of other merits of the development.

- Red – where noise is considered to have a significant adverse effect.

2.16. The following table is taken from Appendix 3 of the Camden Plan.

Table 1: Extract from Appendix 3, Camden Local Plan

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dB L_{Amax}	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L_{Amax}	'Rating level' greater than 5dB above background and/or events exceeding 88dB L_{Amax}

2.17. Based upon the above a Rating level of 10 dB below background has been considered for this assessment, for both day and night time periods.

Policy A4 Noise and vibration

2.18. The Council will seek to ensure that noise and vibration is controlled and managed.

2.19. Development should have regard to Camden's Noise and Vibration Thresholds (Appendix 3). We (*The Council*) will not grant planning permission for:

a. development likely to generate unacceptable noise and vibration impacts; or

b. development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses.

2.20. We (*The Council*) will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We (*The Council*) will also seek to minimise the impact on local amenity from deliveries and from demolition and construction phases of development.

3. Baseline Data Collection

3.1. Baseline sound measurements were undertaken, by others, between 5th and 6th May 2010. Please refer to report: *No.Coram.R2.Rev1*, undertaken by Gillieron Scott Acoustic Design, on behalf of Philip Meadow Croft Architects, for further details.

3.2. The following table outlines the lowest results of the background measurements for both day and night periods.

3.3. For the purposes of the assessment, day is defined as 07:00-23:00 and night 23:00-07:00.

Table 2: Lowest measured noise levels

Location	Day	Night
	$L_{A90,5mins}$ dB	$L_{A90,5mins}$ dB
Measurement Location : Please refer to report in section 3.1 above.	42dB	37dB

4. Assessment

4.1. The noise survey undertaken at the site demonstrates relatively low background noise levels across the site, for both day and night time. The lowest daytime L_{A90} was 42 dB and the lowest L_{A90} night time value was 37 dB.

Proposed new plant (Humidifier)

4.2. The new plant will be located on the proposed site, as shown in figures 2 and 3 above.

4.3. It is understood the new humidifier system will be installed at ground floor level, external to the main building. It is understood that a single Nuaire DS2A-NES supply fan system will support the humidifier and will run continuously 24hours a day. Noise data provided to CDC for the unit, suggests that no noise tonal elements are present in the noise spectrum for the unit. Octave band sound power data provided by the manufacturer is illustrated below.

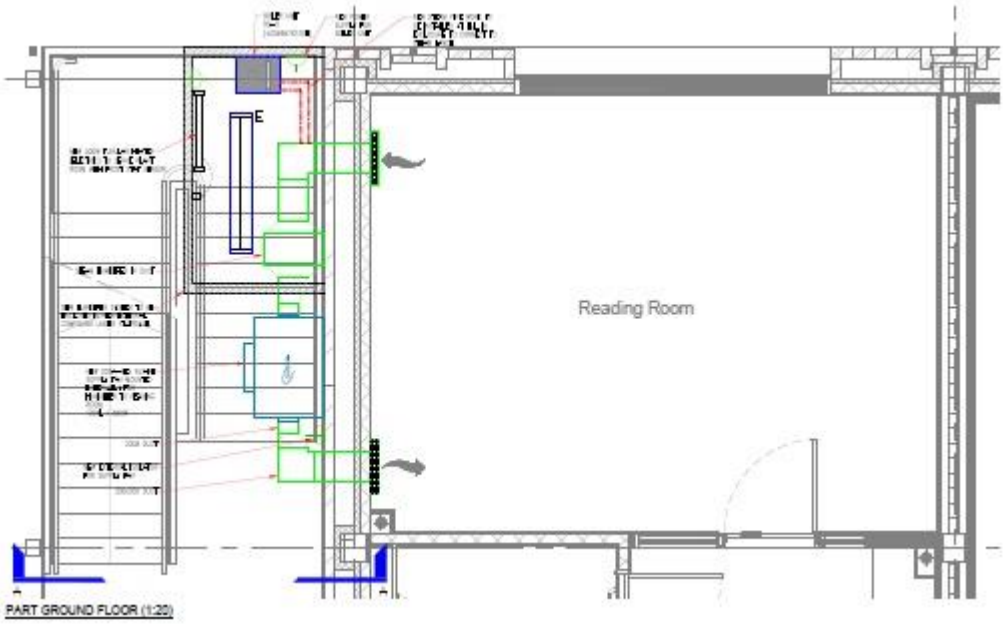
Table 3: Manufacturer Sound Power Data (Humidifier)

Period	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dB(A)
Breakout SWL	49	47	41	36	30	30	29	24	39
Total L_{WA} (at 3 metres)									39

4.4. The above data is hemispherical radiation, i.e. one reflecting surface.

4.5. It is understood under normal operation of the humidifier system will consist of supply air being provided to the room side to maintain required humidity within the room. It is understood that fresh air will be provided via a separate air system elsewhere in the building and assessed previously.

Figure 5: Humidifier system



4.6. It is understood the distance between the proposed plant and the nearest receiver is approximately 11 metres. The nearest receiver has been defined as Coram Life Education building, which is located directly adjacent to the proposed plant installation.

4.7. Shown in the table below is the calculated predicted level at the nearest receiver, taking into account break out noise from the fan casing. As the unit is not drawing air from atmosphere directly, the break out noise levels will be the dominant noise source for assessment. This assumes that the room side supply system will be installed with suitably sized sound attenuators to control room noise.

Table 4: Assessment summary (humidifier system)

Source level (S_{PL}) at 3 metres	Acoustic Penalty (tonal/ impulsivity etc..)	Distance to receiver (metres)	Night time Background (dB L_{A90})	Requirement (L_{A90}-10dB)	Resultant	Requirement versus Resultant
31dB(A)	0	11	37dB	27dB	20dB(A)	-7dB

4.8. The above assessment demonstrates that the requirements of Camden Borough Council will be complied with when assessed in accordance with BS4142:2014.

4.9. Although not a planning issue, it is further recommended that sound attenuators are installed onto the room side supply ducts of the system, in order to control duct borne mechanical services noise into the Reading Room.

Proposed new plant (Roof top plant)

4.10. In addition to the above, new plant shall be installed at roof level, shown in figures 2 and 3 above (orange).

4.11. Roof top plant details provided by the client are illustrated in the below:

Table 5: Sound Pressure Data (Roof top plant)

Unit	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dB(A)
RZAG140MV1	67	61	65	62	55	49	44	39	62
RZAG71MV1	65	64	58	55	48	43	38	36	56
RXM35M	52	54	51	49	45	40	36	28	51
RXM35M	52	54	51	49	45	40	36	28	51
RXM35M	52	54	51	49	45	40	36	28	51
PUHZ-ZRP200	68	60	57	56	55	50	42	38	59
PUHZ-ZRP200	68	60	57	56	55	50	42	38	59
Total SPL_A (at 1 metre)									66

4.12. The above data has been derived from the plant manufacturers technical information.

4.13. In addition to the data presented in the table above, it is understood a single AHU shall also be installed within the same location. Information provided to CDC from the client, is that this unit will produce a level of 45dB(A) at 3 metres. Octave data was not available at the time of writing for this plant item. This single level has not been included in the above table as it will not contribute to the overall, total sound level.

4.14. It is understood the distance between the proposed plant and the nearest receiver is approximately 43 metres. The nearest receiver has been defined as Coram Life Education building.

4.15. It is understood the roof top plant will operate from 7am to 7pm daily.

4.16. Also, the roof top plant shall have a screen around the perimeter to mitigate noise breakout.

Table 6: Assessment summary (Roof top plant)

Source level (S_{PL}) at 1 metre	Acoustic Penalty (tonal/ impulsivity etc..)	Distance to receiver (metres)	Screen	Day time Background (dB L_{A90})	Requirement (L_{A90}-10dB)	Resultant	Requirement versus Resultant
66dB(A)	0	43	-5dB	42dB	32dB	28dB(A)	-4dB

4.17. Furthermore, average day background levels were measured at around 47dB(A). As can be seen in the table above, resultant noise levels are expected to comply LPA requirements in a 'worst case scenario'.

Proposed new EDF transformer

4.18. Levels measured within the EDF transformer enclosure, as presented onsite, are illustrated below:

Table 7: Sound pressure levels (Measurement data)

Unit	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dB(A)
Inside transformer enclosure	70.9	49.9	41.3	36.6	36.5	35.4	35	29.2	47
	68.7	54	45.6	41.6	32.5	34	33.4	29.7	46
	67.2	45.6	38.4	34.1	32.4	33.2	31.1	27.1	43
	68.4	45.3	39.2	33.5	33	31.2	30.9	26.3	44
	Average								46

Table 8: Assessment summary (Transformer)

Source level (S_{PL}) at 1 metre	Acoustic Penalty (tonal/ impulsivity etc..)	Distance to receiver (metres)	Enclosure	Night time Background (dB L_{A90})	Requirement (L_{A90}-10dB)	Resultant	Requirement versus Resultant
46dB(A)	0	7	-8dB	37dB	27dB	21dB(A)	-6dB

4.19. It is understood the distance between the proposed transformer and the nearest receiver is approximately 7 metres. The nearest receiver has been defined as 47 Mecklenburgh Square (Marked in blue, Figure 1).

4.20. A conservative figure 8dB has been estimated for the sound insulation performance of the brick built enclosure. It should be noted to access door faces directly away from NSR and therefore onsite performance is likely to be higher.

5. Conclusions

5.1. This report outlines the findings of a desktop plant noise assessment undertaken in support of a minor amendment to the planned development at Coram QEII Centre, Mechlenburgh Square, London WC1N 1NZ.

5.2. Based upon background noise levels measured by others at the site, proposed break out plant equipment is anticipated to achieve the required levels, without additional mitigation.

5.3. This would comply with Camden Local Plan for noise levels to be a minimum of 10 dB below existing background levels, achieving the prescribed LOAEL and Green level descriptors.

5.4. The roof top plant and EDF transformer will also comply with LPA requirements, achieving 10dB below lowest measured background levels.

5.5. Cumulatively, noise levels for both the humidifier and roof top plant at the Coram Life Education building will be 20dB(A) and 28dB(A) during normal daytime operation. This will produce an overall level 29dB(A) which will not cause loss of amenity.

5.6. Although not a planning issue, it is further recommended that sound attenuators are installed onto the room side supply ducts of the system, in order to control duct borne mechanical services noise into the Reading Room.