NORDOFF-ROBBINS MUSIC THERAPY CENTRE
2 LISSENDEN GARDENS, LONDON NW5
ASSESSMENT OF NOISE
EXTERNAL A/C INSTALLATION

Douglas Binnie - Architect
36 Woldham Road
Bromley
Kent
BR2 9LA

CONTENTS

1.00 INTRODUCTION

1.01 Following the Architect's initial discussions with the *London Borough of Camden* in respect of a planning application for the installation of external a/c condenser units at the *Nordoff-Robbins Music Therapy Centre* in *Lissenden Gardens*, the *Council Planners* require, with the planning documentation, a *Noise Assessment Report*.

1.02 To enable this requirement to be met, *W A Hines & Partners* have been instructed by *The Centre*, through their *Architect Douglas Binnie*, to investigate and report on the proposed external condenser installation, to measure the prevailing background noise levels, to assess the noise impact and to recommend, as necessary, noise mitigation measures.

1.03 As part of the *Council's* requirement, the *Council* have set a series of limiting noise levels on the installation of plant and machinery. Should these noise limits be exceeded planning permission will not be granted. Based on the prevailing background levels, as established by survey therefore, and the relative positions of the proposed a/c condenser units to the nearest noise sensitive facades, calculations have been made and noise mitigation measures put forward, to ensure that these limits are not exceeded.

2.00 THE PREMISES & THE PROPOSALS

The Premises

2.01 The existing premises was converted in *1990* to a *Music Therapy Centre*. The building is set back from the main road, *Highgate Road*, and is within a relatively quiet residential area. The premises relative to the surrounding area and roads is shown on the ***LOCATION PLAN***.

The Proposals

2.02 In order to provide necessary air conditioning to a number of *Offices* and *Study Rooms* within the *Centre* the proposal is to locate *2 No a/c condenser units* on the top floor of the building within an enclosed louvered plant room at the rear and a *single a/c condenser unit* at the front of the *Centre* fixed to an external wall. The positions of the proposed units are shown on the ***LAYOUT PLAN***.

2.03 ***PHOTOGRAPHS*** of the *Centre* have been taken from the respective positions of the proposed a/c condenser units and show the nearest residential properties. From the ***PHOTOGRAPHS***, it will be seen that the nearest noise sensitive facades at the rear will be across the rear gardens of the flats in *Lissenden Gardens* and at the front over the boundary wall across the rear gardens of the houses in *Glenhurst Avenue*. The respective distances of the units to the facades will be approximately *12M* and *8M*.

2.04 Considering the proximity and sensitivity of adjoining residential properties, *Daikin* a/c condenser units have been selected, as they are capable of providing the airconditioning demand at low noise output. Typical noise levels for an external unit, as provided by the manufacturers (See ***A/C DETAILS***), are shown in ***TABLE 1***. The noise levels shown are the *maximum produced in heating mode*. *Cooling mode* noise levels are generally *2 dB* lower.

TABLE 1

External Condenser Unit	63	125	250	500	1K	2K	4K	8K	LpA
Typical Highest @ 1M	58	56	53	50	48	42	38	32	52

2.05 The *Offices* and *Study Rooms* in question will be in use at most from *08:30 - 18.00 hours Monday* to *Friday* and from *09:00 - 17:00* on *Saturdays*. The exception is the *Directors Office*, which might be in use till *19:30 Monday* to *Friday*. The proposed airconditioning units could operate at any time during these hours depending on requirement and ambient air temperatures.

3.00 PLANNING CONSIDERATIONS, SURVEY & RESULTS

3.01 Prior to the submission of a planning application to *Camden Council* notice from the *Council* was given that an *Acoustic Report* would be required to demonstrate compliance with the set of limiting noise levels on the installation of plant and machinery based on the prevailing background conditions.

3.02 To establish the prevailing background conditions therefore a survey of the premises was carried out on *Friday 29 June 2007*. As the proposed *Condenser Units* are to be installed in two separate positions, measurements were made both at the rear and front of the *Centre*. The positions of measurement are shown on the ***LAYOUT PLAN***.

3.03 The typical average noise levels at the two positions, shown in terms of *LA90, LAeq, LAMax & LAMin* with corresponding *octave spectra,* are shown in ***TABLES 2 & 3***. Levels were measured using weather protected *Rion NL18 & Rion NA27* integrating sound level meters both calibrated before and after the measurements. The weather was warm, overcast with a light wind.

TABLE 2

LA90, LAeq, LAMax & LAMin Noise Levels

Typical Background Levels	LAeq	LA90	LAMax	LAMin
At Rear	50	45	74	44
	53	45	67	43
	50	45	72	43
	51	45	67	43
	49	44	60	43
At Front	57	47	74	43
	50	46	66	44
	53	47	67	43
	53	47	67	44
	52	47	67	44

TABLE 3
Corresponding Octave Spectra

Typical Background Levels	63	125	250	500	1K	2K	4K	8K	LA90
At Rear	54	47	45	43	41	37	31	23	45
At Front	59	49	48	47	44	41	34	24	47

3.04 The daytime background levels measured at the rear of the premises typically average *45 dB LA90* and *47 dB LA90* at the front. Generally the background levels were influenced by the distant noise of traffic and the occasional aircraft fly over.

3.05 As the *Condenser Units* could, on occasions, be operating up to *19.30 hours,* that is in the case of the *Directors Office (front condenser),* evening background noise levels also need to be known. It has been found however, from the many surveys conducted in *Central London* and its *Suburbs*, that there is little fluctuation in the condition between *0700* and *2300* hours week days and Saturdays, where the measurement positions are close to but not directly effected by road traffic noise, as in this case. Background conditions experienced at the nearest residential properties to the proposed *Condenser Units* therefore, at the times the units would be operating in the evening, would be expected to be the same as during the day.

4.00 NOISE ASSESSMENT PROCEDURES & COUNCIL REQUIREMENTS

4.01 *Planning Policy Guidance PPG24 "Planning & Noise"* was published in *1994* to give guidance to Local Authorities on the use of their planning powers to control environmental noise.

4.02 The aim of *PPG24* is to provide advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business.

4.03 It outlines some of the main considerations which Local Planning Authorities should take into account in drawing up development plan policies and when determining planning applications for development which will either generate noise or be exposed to existing noise sources.

4.04 The impact of noise can be a material consideration in the determination of planning applications and the planning system has the task of guiding development to the most appropriate locations.

4.05 Mindful of these requirements and to protect the prevailing noise environment *Camden Council* in *Table E to Appendix 1 - Noise & Vibration Thresholds* set a series of limiting noise levels on the installation of plant and machinery. Considering the type of noise that would be produced by the proposed Condenser Units (*Distinguishable note*) the limiting noise level would be:-

<u>10 dB lower</u> than the prevailing background conditions (LA90) at 1M from the nearest noise sensitive facade.

5.00 NOISE ASSESSMENT

5.01 The operation of the *2 No Daikin* units at the rear and the *1 No Daikin* unit at the front will fluctuate due to demand and prevailing ambient air temperatures. At *best* no units will operate at all and at *worst* the two units at the rear and the single unit at the front would operate at the same time.

5.02 Taking the *"worst case"* therefore, that is with the *units* operating in *heating mode*, from the data supplied by the unit manufacturer for a single unit, calculations have been made to establish the overall maximum noise levels that would exist at *1M from the unit/units at 1M from the nearest noise sensitive facade.* These are shown in ***TABLE 4***.

TABLE 4

Condenser Units	Position	63	125	250	500	1K	2K	4K	8K	LpA
1 No Unit @ 1M	@ front Outside	58	56	53	50	48	42	38	32	52
@ Nearest Window due to distance (8M)		49	47	44	41	39	33	29	23	43
@ Nearest Window due to distance & wall screening		39	37	34	31	29	23	19	-	33
2 No Units @ 1M	@ rear In Enclosure	61	59	56	53	51	45	41	35	55
@ Nearest Window due to distance (12M)		49	47	44	41	39	33	29	23	43

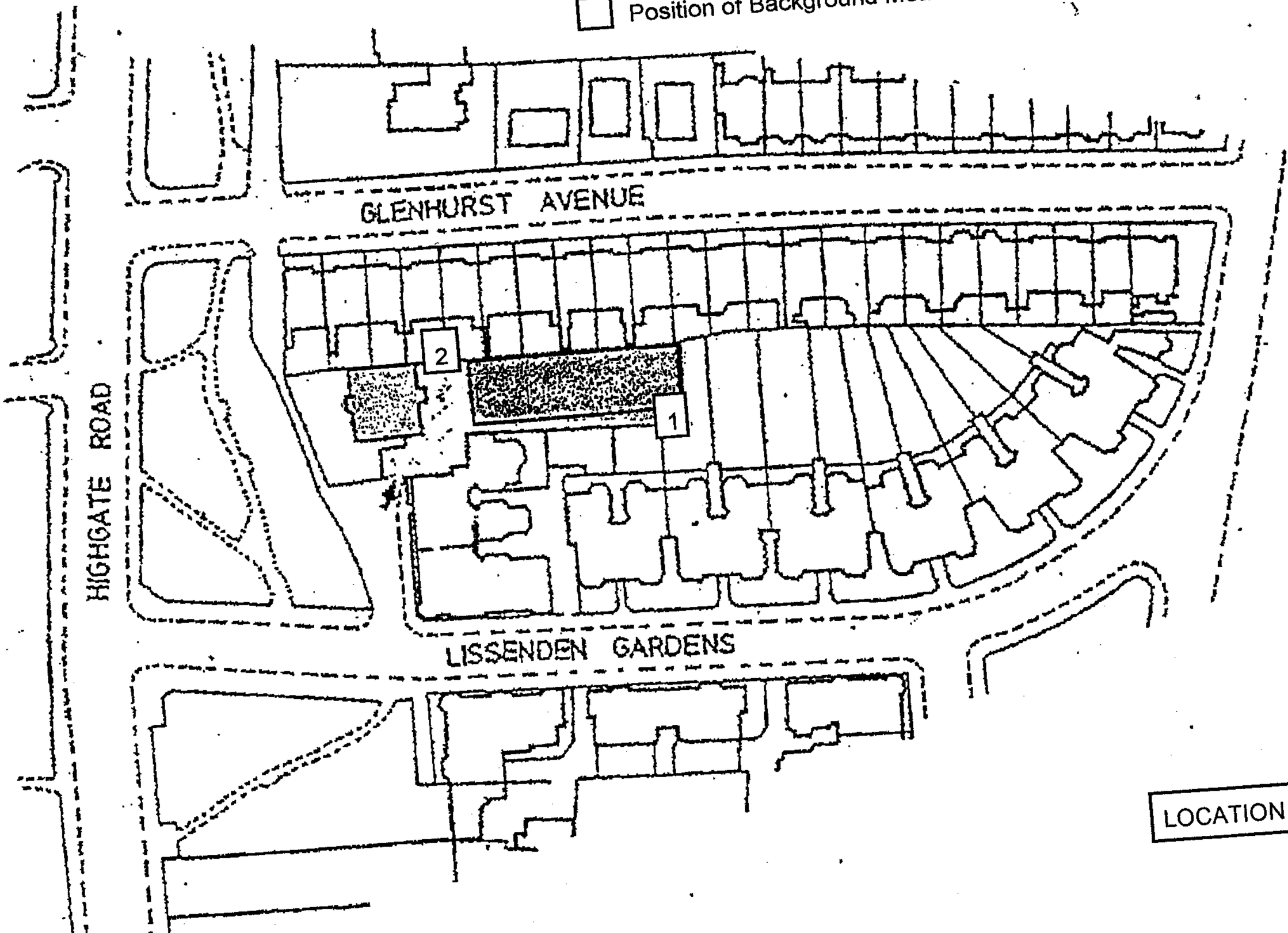
5.03 Referring to the noise levels, as shown in ***TABLE 4*** above, and comparing with the background levels measured, shown in ***TABLES 2 & 3***, it will be seen that the operational noise of the proposed *2 No Condenser Units* to be located at the rear of the premises at *43 dB LpA*, although *3 dB LpA below* the prevailing day and evening background noise level, would be above the limit level of *10 dB LpA below*. The overall noise produced by the *2 No Units* therefore requires to be reduced to meet the *Council* requirement. The noise from the single unit at the front of the premises at *33 dB LpA* however, would be well within the *Council* requirement at *14 dB LpA below* the *47 dB LA90* background.

6.00 RECOMMENDATION

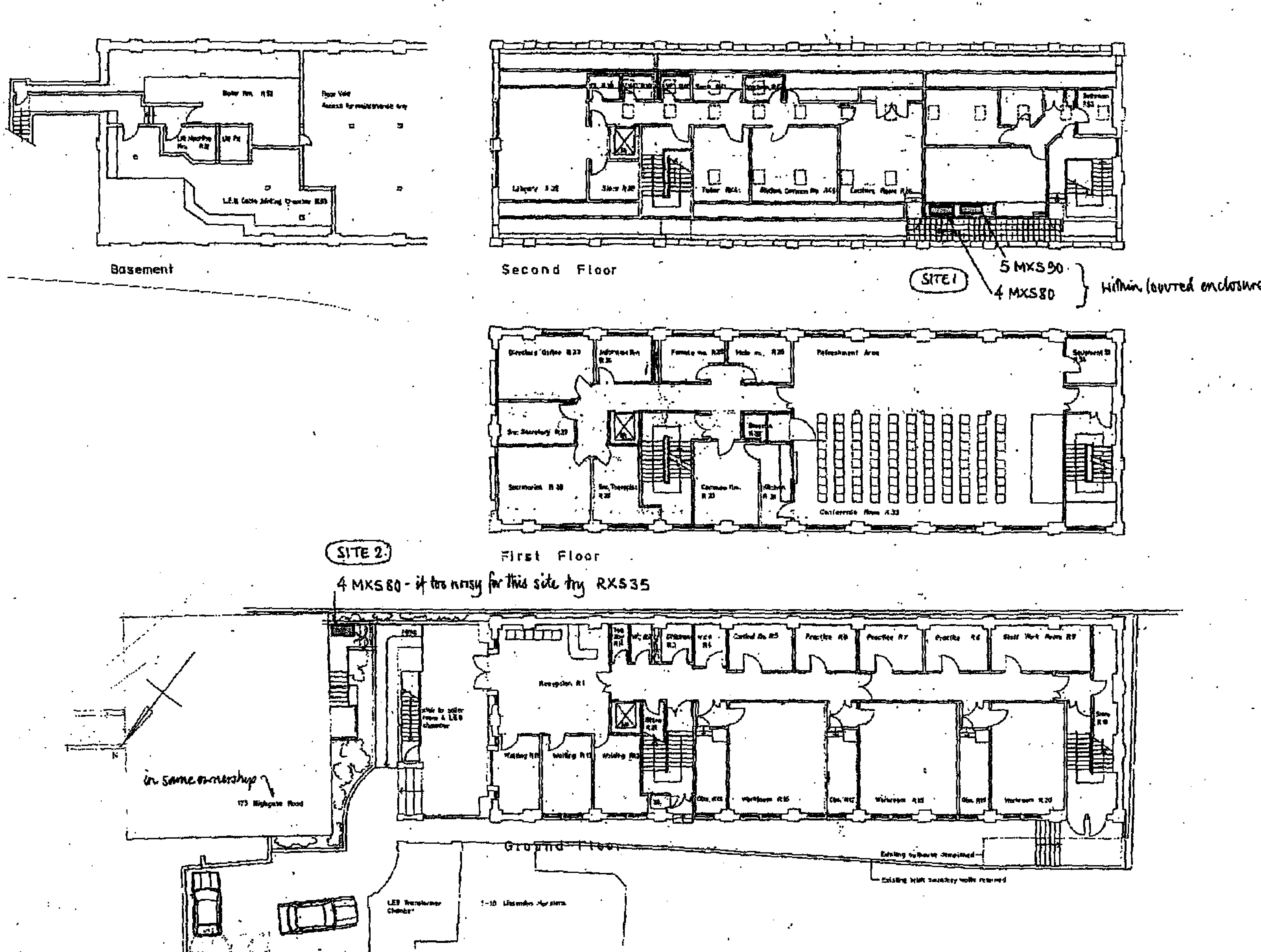
6.01 To meet the required noise limit level at the nearest noise sensitive facades at the rear, the *2 No Condenser Units* proposed to be positioned within the enclosed plantroom on the top floor of the premises, will require to have acoustic louvres rather than standard weather louvres to the front. Such louvres will easily provide the additional *7 dB LpA* reduction required. See ***ACOUSTIC LOUVRE DETAILS***.

6.02 To protect the internal environment the units and the pipework must also be fully isolated to prevent vibration transmission to the building structures (*units on antivibration mounts and pipework fixed back by clips with rubber inserts*). In the case of the units inside the building the separating wall to the adjacent office will require to be capable of providing a sound reduction of *50 dB Rw* to protect the adjoining room environment.

Position of Background Measurement



LOCATION PLAN



NORDOFF ROBBINS
MUSIC THERAPY CENTRE

NORDOFF ROBBINS M.T.C.

LAYOUT PLAN

1:100 200

OCTOBER 1988

88.006 / C01

A, B, C, D, E, F, G

Sampson Associates
Architects & Quantity Surveyors

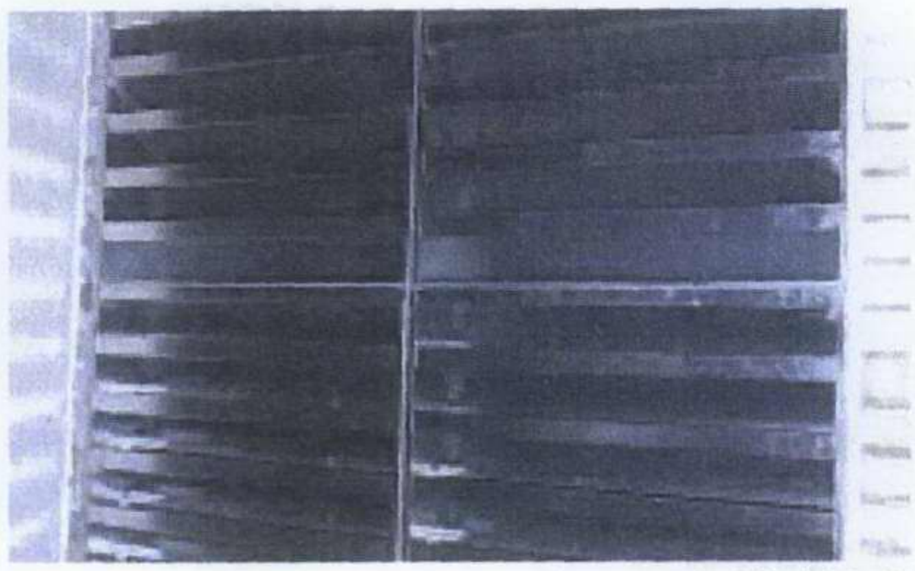
RESIDENTIAL FACADES NEAREST TO PLANT

L	Denotes Louvre
AS	Acoustic Single Bank
AD	Acoustic Double Bank
NA	Non-Acoustic
150	Louvre Depth
300	Louvre Depth
50	Louvre Pitch – Non-Acoustic Grille Louvre
75	Louvre Pitch – Non-Acoustic Weather Louvre
150	Louvre Pitch – Acoustic Louvre / Complementary Non-Acoustic Louvre
PG	Pre-Galvanised Sheet Steel construction
ALI	Aluminium Sheet construction
ALIEX	Extruded Aluminium construction (non-acoustic grille and weather louvre options only)
ST/ST	Stainless Steel construction (steel type i.e. 304 or 316 to be determined)
M	Melinex Hermetically sealed bag over acoustic media
GLW	Glass Cloth Wrap to all faces of acoustic media
BG	Bird-guard to rear of Louvre
IS	Insect screen to rear of Louvre
BP	Blanking plate to rear of Louvre for non-active areas
MF	Mounting Frame 50x50x5 RSA
PF	Picture Frame 1.6mm formed sheet-steel
WF	Bottom weather flashing (customised for each project)
MSW	Multi-Section Construction in the width – Specify No of sections i.e. MSW2 = 2 sections
MSH	Multi-Section Construction in the height – Specify No of sections i.e. MSH2 = 2 sections Combinations can be given by W/H, i.e. MSW4/MSH2 4 sections in width and 2 sections in height.
PP	Polyester Powder painted to required BS/RAL colour
SPF	Other paint finishes to be specified
SD	Single leaf door – acoustic option available only in single bank design either 150mm or 300mm
DD	Double leaf door – acoustic option available only in single bank design either 150mm or 300mm
PEHO	Penthouse design
FLD	Fine Line Design
NS	Non standard – refer to drawing, specification and schedule descriptions

An example of how the coding system works is as follows: -

A single bank acoustic louvre manufactured from pre-galvanised sheet-steel with a 300mm depth, 150mm pitch complete with a bird guard, mounting frame, picture frame and polyester powder paint finish would be –

L-AS-300-150-PG-BG-MF-PF-PP



Louvres tested at Salford University

Acoustic Design

To select an acoustic louvre the required acoustic performance must be determined. If assistance is required to establish this information Galloway Acoustics can carryout full acoustic calculations which are ultimately (subject to a contract being placed by the contractor with Galloway Acoustics for the specified louvres) backed by our Professional Indemnity Insurance cover.

The acoustic performance figures for our standard range of acoustic louvres are shown opposite. These are based upon sound insulation (Sound Reduction Index) tests carried out by Salford University in a UKAS accredited test facility and procedure in accordance with BS EN ISO 140-3 1995.

Sound Reduction Index - Defined as 'A set of values measured by a specific test method to establish the actual amount of sound that will be stopped by the material, partition or panel when located between two rooms.'

Model	Fr	63	125	250	500	1k	2k	4k	8k
L-AS-150	dB	5	5	6	7	13	13	13	12
L-AD-150	dB	6	7	9	14	22	19	19	18
L-AS-300	dB	6	6	7	12	19	19	17	16
L-AD-300	dB	8	10	11	20	27	27	26	25

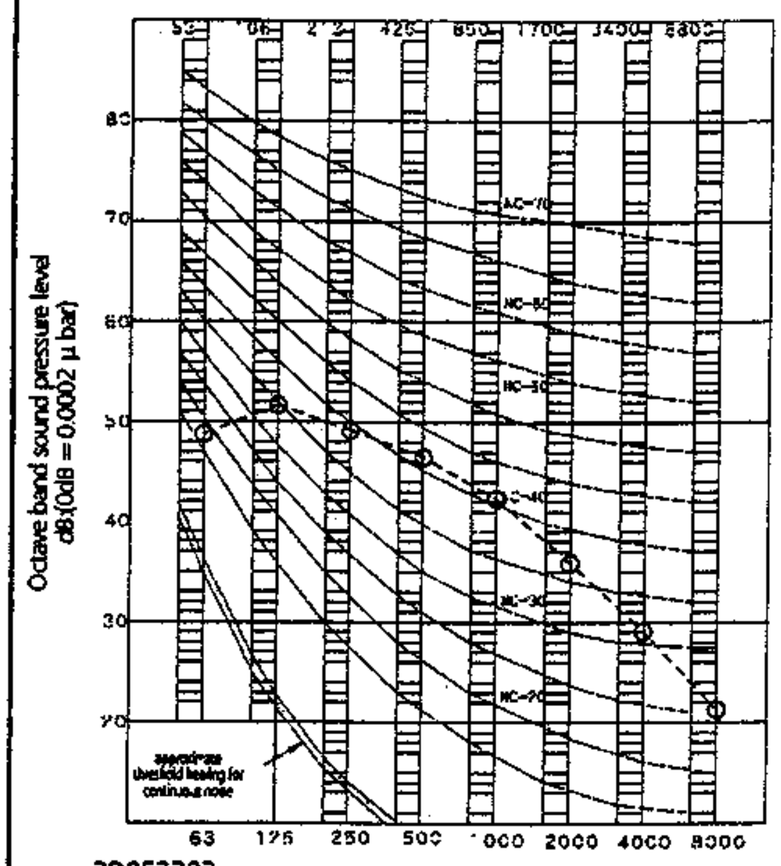
Noise Reduction - defined as 'used to define the performance of a noise barrier. Established by measuring the difference in sound pressure levels adjacent to each surface.'

Model	Fr	63	125	250	500	1k	2k	4k	8k
L-AS-150	dB	11	11	12	13	19	19	19	18
L-AD-150	dB	12	13	15	20	28	25	25	24
L-AS-300	dB	12	12	13	18	25	25	23	22
L-AD-300	dB	14	16	17	26	33	33	29	28

9 Sound data

9 - 1 Sound pressure spectrum

4MXS80E (Cooling)



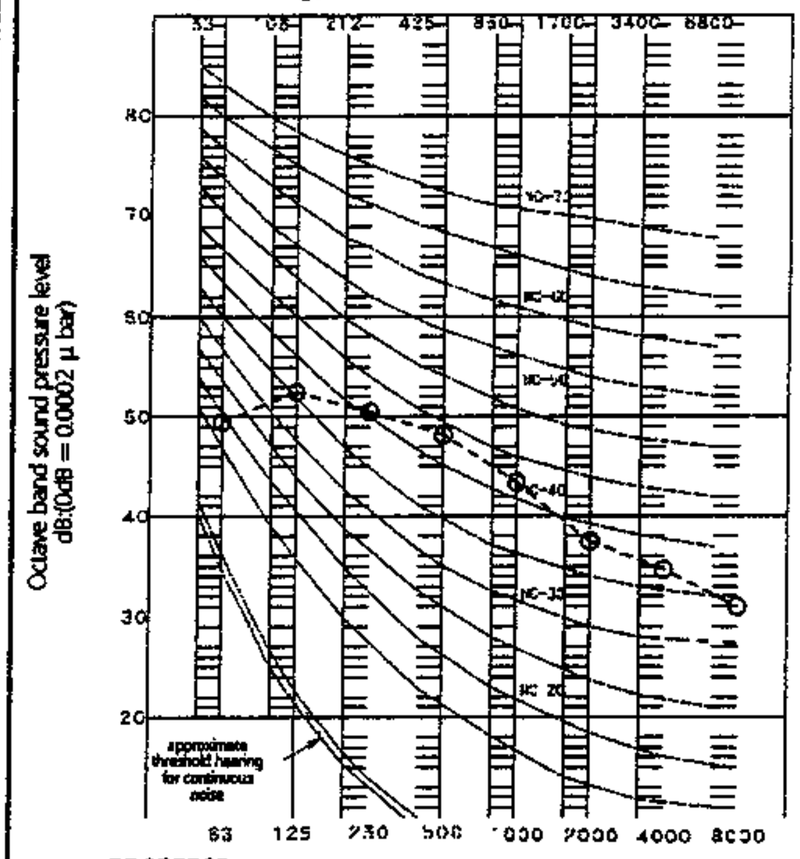
3D052303

Octave band center frequency (Hz)

NOTES

1 Operation sound is measured in an anechoic chamber.
2 Operation sound level differs with operation and ambient conditions.
3 The operation noise measuring method is in accordance with JISC9612

4MXS80E (Heating)



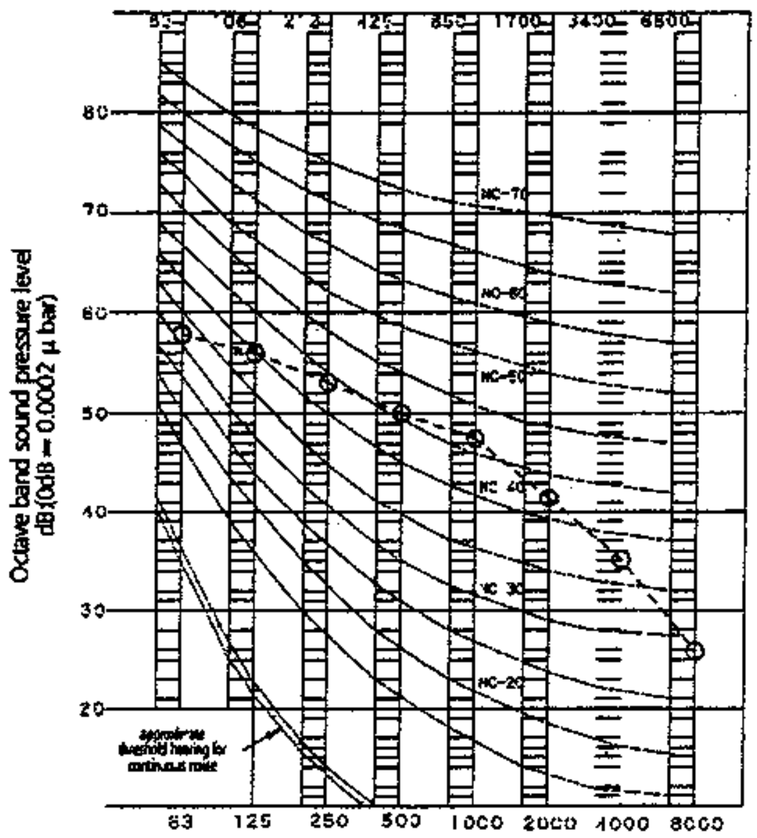
3D052303

Octave band center frequency (Hz)

NOTES

1 Operation sound is measured in an anechoic chamber.
2 Operation sound level differs with operation and ambient conditions.
3 The operation noise measuring method is in accordance with JISC9612

5MXS90E (Cooling)



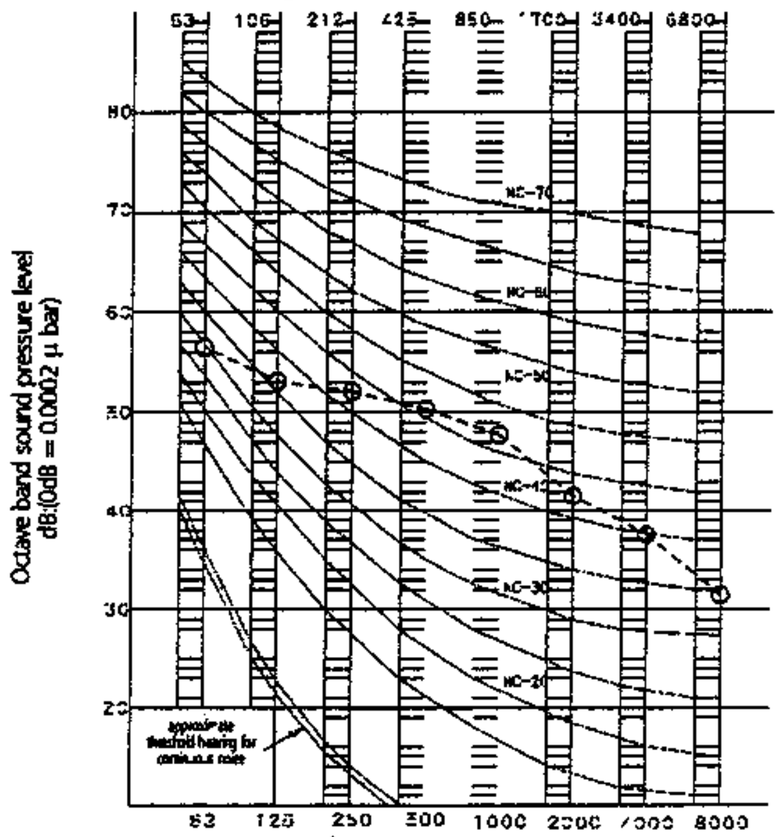
3D052302

Octave band center frequency (Hz)

NOTES

1 Operation sound is measured in an anechoic chamber.
2 Operation sound level differs with operation and ambient conditions.
3 The operation noise measuring method is in accordance with JISC9612

5MXS90E (Heating)



3D052302

Octave band center frequency (Hz)

NOTES

1 Operation sound is measured in an anechoic chamber.
2 Operation sound level differs with operation and ambient conditions.
3 The operation noise measuring method is in accordance with JISC9612