THE EYE, PROCTER HOUSE, HOLBORN

Plant Noise Assessment

February 2007

CONSULTANTS IN ACOUSTICS

Cole Jarman Associates

THE EYE, PROCTER HOUSE, HOLBORN

Plant Noise Assessment

Report 2006/3791/R1

BPP Professional Education
The Eye, Procter House
1 Procter Street, Holborn
London WC1V 6DW

February 2007

Cole Jarman Associates
John Cree House
24a High Street
Addlestone
Surrey KT15 1TN
United Kingdom

Telephone 01932 829 007
Facsimile 01932 829 003
Email: info@colejarman.com
Web www.colejarman.com

THE EYE, PROCTER HOUSE, HOLBORN

Plant Noise Assessment

Report 2006/3791/R1

	1st Draft	revision1	revision 2	revision 3
date	23/02/2007	27/02/2007		
prepared by	Peter Davies	Peter Davies		
checked by	Tom Zarebski	Philip Hankin		

Table of Contents

1. INTRODUCTION 1

2. SITE CONDITIONS 1

3. NOISE SURVEY 1

4. PLANT NOISE LIMITS AND PLANNING CONDITIONS 2

5. PLANT NOISE ASSESSMENT 2

6. CONCLUSIONS 3

Appendix A: Noise Units

Appendix B: Plant Noise Data

Appendix C: Calculations

Appendix D: 2006/3790/R2 Plant Noise Assessment

1. INTRODUCTION

1.1. As part of a development scheme at Procter House, 1 Procter Street, Holborn, London WC1V 6DW, additional air conditioning plant is to be installed at roof level of the building.

1.2. Cole Jarman Associates were instructed to undertake an assessment of noise emissions from the proposed plant.

1.3. This report sets out the current plant design. An assessment of noise from the proposed plant is also presented and compared against criteria set by the London Borough of Camden.

2. SITE CONDITIONS

2.1. The site is located at The Eye, Procter House, 1 Procter Street, Holborn, London WC1V 6DW.

2.2. The proposed plant is to consist of a Daikin REYQ-M8 40 condenser unit which is a combination of three smaller condensers (a Daikin REYQ10M8, a Daikin REYQ14M8 and a Daikin REYQ16M8). This plant is proposed to be set back on the north eastern corner of the building at sixth floor roof level, contained within an existing mechanical services plant area designated by a roof mounted air conditioning duct.

2.3. The closest residential receptors to the proposed location of the new plant are above the Square Pig Public House to the north east of the site, on the opposite side of Procter Street. The location of the closest residential accommodation and the new plant are indicated in the attached figure 2006-3791-SP1.

2.4. Other properties in the area surrounding the building were checked during a site visit and observed to be commercial in nature.

3. NOISE SURVEY

3.1. This plant noise assessment refers to a recently conducted 24 hour unattended noise survey which was undertaken at 1300 hours on Thursday 26th October 2006.

3.2. For details of the aforementioned survey including results, please see report 2006/3790/R2 in attached Appendix D.

3.3. The current planning application is for additional plant to that specified in report 2006/3790/R2.

3.4. As a consequence of 3.3, the additional plant has been appended to the original calculation to ensure that the noise level at the nearest residential premises does not exceed the limits set out in Section 4 of this report when all current plant and additional plant is operational.

4. PLANT NOISE LIMITS AND PLANNING CONDITIONS

4.1. Guidance contained within Appendix 1 of the Camden Replacement Unitary Development Plan requires that where existing minimum background L_{A90} levels exceed 60dB, new plant must not generate noise levels greater than L_{Aeq} 55dB at 1m from the residential window of concern.

4.2. In addition there should be no audible tonality to noise emissions from the proposed plant. Noise limits for new plant are to apply at a position 1m from the closest affected window of the relevant noise sensitive property.

4.3. Based on these requirements and the results of the survey, plant noise limits for nearby residential properties at Procter House are listed in Table 2006/3791/T1. These noise limits apply to the combined effect of all items of proposed mechanical services plant that run during the relevant time period, at a position 1m from the closest window of the relevant property. They correspond to a level of 55dB(A), as during the proposed operational period, the existing L_{A90} background noise levels remain above 60dB.

Position	Plant Operating Between 0830-1700 Hours dB(A)
Façade of residential properties (Above The Square Pig Public House)	55

2006/3791/T1 Plant Noise Limits

5. PLANT NOISE ASSESSMENT

5.1. The proposed plant layout can be seen in the TTSP drawing 2251 AL(7)02 dated 10th October 2006. The attached figure 2006/3791/SP1 indicates where the plant area is located on the existing Procter House building.

5.2. The assessment is based upon the understanding that the plant will be operational during the period 0830-1700 hours on weekdays only.

5.3. It is proposed to install a Daikin type REYQ-M8 40 air cooled condensing unit. This model consists of three smaller modules which are a single REYQ10M8, a single REYQ14M8 and a single REYQ16M8. Manufacturer's noise level data for this equipment as utilised in our assessment can be found in plant noise schedule 2006/3791/PN1. This is presented in the attached Appendix B.

5.4. Calculations utilised in the plant noise assessment are presented in the attached Appendix C. The calculations take into account the effects of distance attenuation upon the plant noise levels and also allow for the presence of a reflecting façade at the receiver position. In its proposed location the plant will be unscreened from the closest residential window at Procter House.

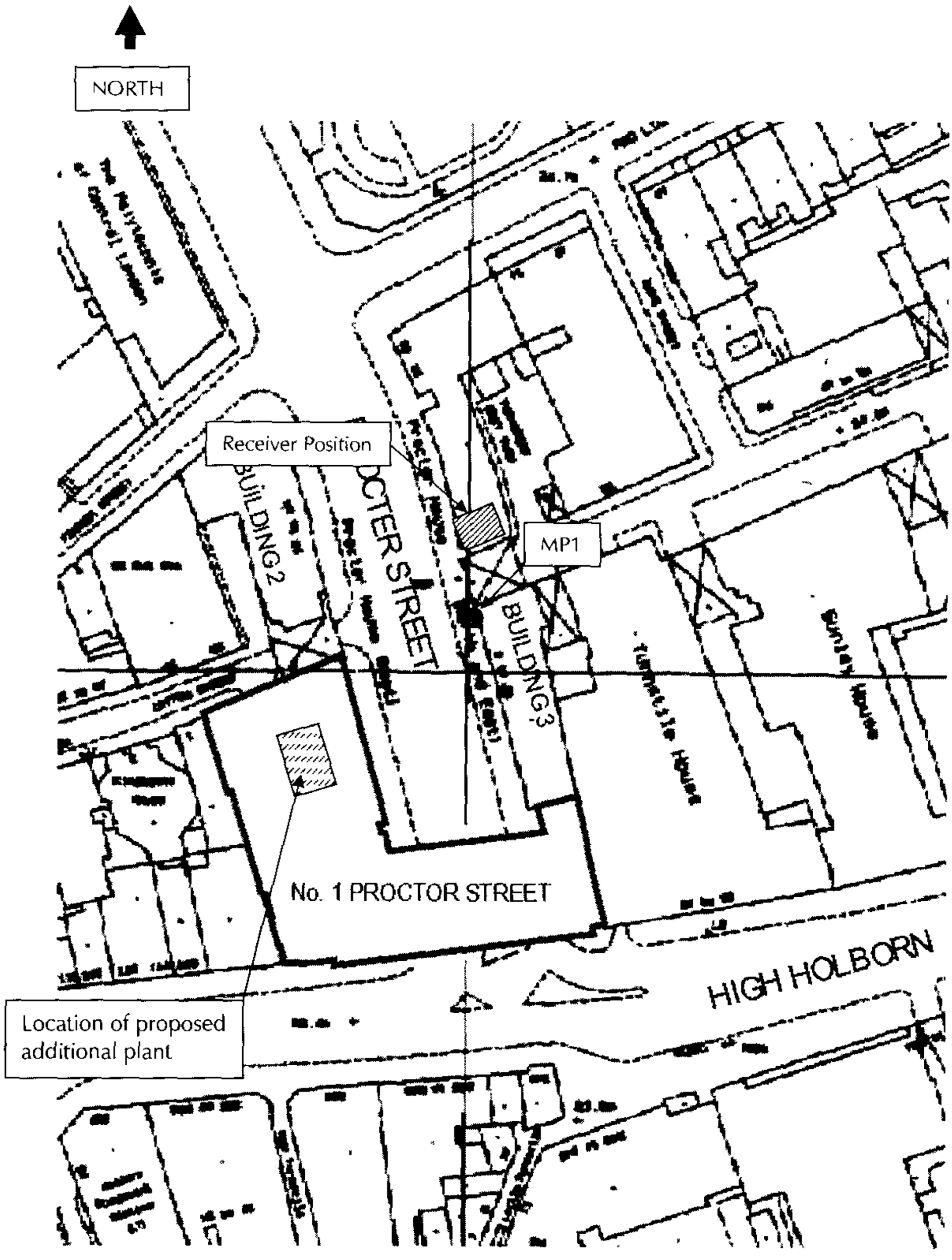
5.5. On this basis, we assess a noise level of 51dB(A) at 1m from the closest residential window at Procter House. This noise level is 4dB(A) below the plant noise limit set in table 2006/3791/T1, and therefore in line with the requirements of Camden Council.

6. CONCLUSIONS

6.1. Using the results of a recently conducted survey, suitable plant noise emission limits have been determined at the closest noise sensitive premises, so as to meet the requirements of Camden Council.

6.2. An assessment has been undertaken for the proposed plant installation. The results of the assessment indicate that with the equipment selected and the proposed plant location, the plant noise limits are achieved, and the proposed design is acceptable.

Cole Jarman Associates
February 2007



Cole Jarman Associates

SITE PLAN SHOWING THE PROPOSED PLANT LOCATION, NOISE SURVEY MEASUREMENT POSITION AND CLOSEST RESIDENTIAL RECEIVER

THE EYE, PROCTER HOUSE | NTS | FEB 2007

FIGURE 2006-3791-SP1

John Cree House, 24B High Street, Addlestone, Surrey KT15 1TN Tel: 01932 829007 email: info@colejarman.com

Appendix A

NOISE UNITS

L_{Aeq}: The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq}.

L_{Amax}: The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, measured using the "fast" sound level meter response.

L_{A10} & L_{A90}: If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly L_{A90} gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

L_{A10} is commonly used to describe traffic noise. Values of dBL_{An} are sometimes written using the alternative expression $dB(A)L_n$.

L_{AX} (or SEL): The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. L_{AX} values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of L_{Aeq} for the total noise.

Appendix B
PLANT NOISE DATA

Plant Noise Schedule 2006/3791/PN1

Plant Reference	Location	Duty m^3/s	Data: L_w/L_p	Octave Band Centre Frequency, Hz						
				125	250	500	1k	2k	4k	8k
Daikin REYQ10M8	Sixth floor roof level of Procter House, 1 Procter Street, Holborn, London WC1V 6DW	N/A	L_w	80	79	77	71	76	61	60
Daikin REYQ14M8	Sixth floor roof level of Procter House, 1 Procter Street, Holborn, London WC1V 6DW	N/A	L_w	85	84	80	74	69	63	61
Daikin REYQ16M8	Sixth floor roof level of Procter House, 1 Procter Street, Holborn, London WC1V 6DW	N/A	L_w	85	84	81	74	69	65	64

Appendix C
CALCULATIONS

ASSESSMENT POSITION 1 - RESIDENTIAL ACCOMMODATION ABOVE THE SQUARE PIG PUBLIC HOUSE ON THE EASTERN SIDE OF PROCTOR STREET TO THE NORTH-EAST OF THE SITE
OPERATION 0830-1700 HOURS

Item Ref	Operating (Y/N)	Sound power level (Lw) 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Daikin RXYQ10P (as part of RXYQ22M)	Y		84	80	77	73	68	58	54	78.5
Daikin RXYQ12P (as part of RXYQ22M)	Y		85	81	78	75	69	63	58	80.3
Daikin RXYQ12P	Y		85	81	78	75	69	63	58	80.3
Daikin REYQ10M8	Y		80	78	77	71	76	61	60	80.1
Daikin REYQ14M8	Y		85	84	80	74	69	63	51	81.1
Daikin REYQ16M8	Y		85	84	81	74	69	65	54	81.6
										0.0
										0.0
										0.0
										0.0
										0.0
										0.0
										0.0
										0.0
										0.0

Horizontal Distance Source to Receiver	Vertical Distance Source to Receiver	Horizontal Distance Source to Barrier	Vertical Distance Source to Barrier
40	0	0	0
40	0	0	0
40	0	0	0
40	0	0	0
40	0	0	0
40	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

Item Ref	Description	Other Losses 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Daikin RXYQ10P (as part of RXYQ22M)									
Daikin RXYQ12P (as part of RXYQ22M)									
Daikin RXYQ12P									
Daikin REYQ10M8									
Daikin REYQ14M8									
Daikin REYQ16M8									
0									
0									
0									
0									
0									
0									
0									
0									
0									

	Description	Silencer insertion loss 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Daikin RXYQ10P (as part of RXYQ22M)									
Daikin RXYQ12P (as part of RXYQ22M)									
Daikin RXYQ12P									
Daikin REYQ10M8									
Daikin REYQ14M8									
Daikin REYQ16M8									
0									
0									
0									
0									
0									
0									
0									
0									
0									

Item Ref	Directivity 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Daikin RXYQ10P (as part of RXYQ22M)								
Daikin RXYQ12P (as part of RXYQ22M)								
Daikin RXYQ12P								
Daikin REYQ10M8								
Daikin REYQ14M8								
Daikin REYQ16M8								
0								
0								
0								
0								
0								
0								
0								
0								
0								

Velocity of sound (m/s) [illegible]

Frequency	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Wavelength	5.46	2.75	1.38	0.69	0.34	0.17	0.08	0.04

	Distance Attenuation	Barrier Attenuation 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Daikin RXYQ10P (as part of RXYQ22M)	-40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Daikin RXYQ12P (as part of RXYQ22M)	-40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Daikin RXYQ12P	-40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Daikin REYQ10M8	-40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Daikin REYQ14M8	-40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Daikin REYQ16M8	-40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Item ref	Resultant LP 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Daikin RXYQ10P (as part of RXYQ22M)	40.0	44.0	40.0	37.0	33.0	28.0	18.0	14.0	38.4
Daikin RXYQ12P (as part of RXYQ22M)	40.0	45.0	41.0	38.0	35.0	29.0	23.0	18.0	40.3
Daikin RXYQ12P	40.0	45.0	41.0	39.0	35.0	29.0	23.0	18.0	40.3
Daikin REYQ10M8	40.0	40.0	38.0	37.0	31.0	36.0	21.0	20.0	40.1
Daikin REYQ14M8	40.0	45.0	44.0	40.0	34.0	29.0	23.0	21.0	41.0
Daikin REYQ16M8	40.0	45.0	44.0	41.0	34.0	29.0	25.0	24.0	41.5
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lowest existing L90 spectrum	66	64	61	59	56	54	47	37	62

TOTAL 46

FAÇADE INCIDENT LEVEL 61

PLANT NOISE LIMIT 55

Appendix D
2006/3790/R2 PLANT NOISE ASSESSMENT

THE EYE, PROCTER HOUSE, HOLBORN

Plant Noise Assessment

October 2006

CONSULTANTS IN ACOUSTICS

Cole Jarman Associates

THE EYE, PROCTER HOUSE, HOLBORN

Plant Noise Assessment

Report 2006/3790/ R2

BPP Professional Education
The Eye, Procter House
1 Procter Street, Holborn
London WC1V 6DW

October 2006

Cole Jarman Associates
John Cree House
24a High Street
Addlestone
Surrey KT15 1TN
United Kingdom

Telephone. 01932 829 007
Facsimile. 01932 829 003
Email: info@colejarman.com
Web: www.colejarman.com

THE EYE, PROCTER HOUSE, HOLBORN

Plant Noise Assessment

Report 2006/3790/ R2

	1st issue	revision1	revision 2	revision 3
date	31/10/2006	31/11/2006		
prepared by	Philip Hankin	Philip Hankin		
checked by	Peter Davies	Peter Davies		

Table of Contents

1. INTRODUCTION 1

2. SITE CONDITIONS 1

3. NOISE SURVEY METHODOLOGY AND INSTRUMENTATION 1

4. NOISE SURVEY RESULTS 2

5. PLANT NOISE LIMITS AND PLANNING CONDITIONS 2

6. PLANT NOISE ASSESSMENT 3

7. CONCLUSIONS 3

Appendix A: Noise Units

Appendix B: Plant Noise Data

Appendix C: Calculations

1. INTRODUCTION

1.1. As part of a development scheme at Procter House, 1 Procter Street, Holborn, London WC1V 6DW, additional air conditioning plant is to be installed at roof level of the building.

1.2. Cole Jarman Associates were instructed to undertake a suitable environmental noise survey around the site of the building, and undertake an assessment of noise emissions from the proposed plant.

1.3. This report sets out the current plant design and the results of a noise survey at the site. An assessment of noise from the proposed plant is also presented and compared against criteria set by the London Borough of Camden.

2. SITE CONDITIONS

2.1. The site is located at The Eye, Procter House, 1 Procter Street, Holborn, London WC1V 6DW.

2.2. The proposed plant is to consist of a Daikin RXYQ22M condenser unit which is a combination of two smaller condensers (a Daikin RXYQ10P and a Daikin RXYQ12P), along with another single Daikin RXYQ12P unit. This plant is proposed to be set back on the north eastern corner of the building at sixth floor roof level, contained within an existing mechanical services plant area designated by a roof mounted air conditioning duct.

2.3. The closest residential receptors to the proposed location of the new plant are above the Square Pig Public House to the north east of the site, on the opposite side of Procter Street. The location of the closest residential accommodation and the new plant are indicated in the attached figure 2006-3790-SP1.

2.4. Other properties in the area surrounding the building were checked during a site visit and observed to be commercial in nature.

3. NOISE SURVEY METHODOLOGY AND INSTRUMENTATION

3.1. In order to quantify the existing noise climate in the area, a 24 hour unattended noise survey was undertaken, commencing at 1300 hours on Thursday 26th October 2006.

3.2. One measurement position was utilised during the survey. The microphone was positioned on the roof of the property adjacent to The Square Pig and the accommodation above on the Eastern side of Procter Street, at a position overlooking Procter Street 1m from the façade of the building.

3.3. This position was selected so as to obtain representative measurements of existing noise levels at the façade of the residential accommodation, as access to the accommodation itself was not possible, it being a private property.

3.4. Measurements were made over continuous 15 minute periods throughout the 24 hour survey, in terms of the L_{Amax}, L_{Aeq}, L_{A10}, and L_{A90} (see attached Appendix

A for explanation of noise units used). In addition typical L_{90} octave band spectra were recorded during the survey.

3.5. Noise measurements were made using the following equipment:

Norsonic	Sound Level Analyser	Type 118
Norsonic	Weatherproof Microphone	Type 1212
Norsonic	Acoustic Calibrator	Type 1251

3.6. The measurement microphone was fitted with a windshield. The measurement system was calibrated before and after the survey and found not to have drifted by any significant amount.

3.7. General weather conditions observed at the start and end of the survey were cold and dry with variable skies and only light winds. No precipitation appeared to have fallen during the survey.

4. NOISE SURVEY RESULTS

4.1. The results of the measurements are presented in the attached time history plots figure 2006-3790-TH01 and TH02.

4.2. Typical octave band L_{90} background noise level spectra recorded during the survey are presented in the attached figure 2006-3790-OB1.

5. PLANT NOISE LIMITS AND PLANNING CONDITIONS

5.1. Guidance contained within Appendix 1 of the Camden Replacement Unitary Development Plan requires that where existing minimum background L_{A90} levels exceed 60dB, new plant must not generate noise levels greater than L_{Aeq} 55dB at 1m from the residential window of concern.

5.2. In addition there should be no audible tonality to noise emissions from the proposed plant. Noise limits for new plant are to apply at a position 1m from the closest affected window of the relevant noise sensitive property.

5.3. Based on these requirements and the results of the survey, plant noise limits for nearby residential properties on the opposite side of Procter Street are listed in Table 2006/3790/T1. These noise limits apply to the combined effect of all items of proposed mechanical services plant that run during the relevant time period, at a position 1m from the closest window of the relevant property. They correspond to a level of 55dB(A), as during the proposed operational period, the existing L_{A90} background noise levels remain above 60dB.

Position	Plant Operating Between 0830-1700 Hours dB(A)
Façade of residential properties (Above The Square Pig Public House)	55

2006/3790/T1 Plant Noise Limits

6. PLANT NOISE ASSESSMENT

6.1. The proposed plant layout can be seen in the TTSP drawing 2251 AL(7)02 dated 10th October 2006. The attached figure 2006/3790/SP1indicates where the plant area is located on the existing Procter House building. The plant will be operational during the period 0830-1700 hours on weekdays only.

6.2. It is proposed to install a Daikin type RXYQ22M air cooled condensing unit (which comprises a smaller Daikin RXYQ10P unit and a Daikin RXYQ12P unit) and a single Daikin RXYQ12P air cooled condensing unit. Manufacturers noise level data for this equipment as utilised in our assessment can be found in plant noise schedule 2006/3790/PN1, which itself can be found in the attached Appendix B.

6.3. Calculations utilised in the plant noise assessment are presented in the attached Appendix C. The calculations take into account the effects of distance attenuation upon the plant noise levels and also allow for the presence of a reflecting façade at the receiver position. In its proposed location, the plant will be unscreened from the closest residential window at the receiver position.

6.4. On this basis, we assess a noise level of 48dB(A) at 1m from the closest residential window at on the opposite side of Procter Street. This noise level is 7dB(A) below the plant noise limit set in table 2006/3790/T1, and therefore in line with the requirements of Camden Council.

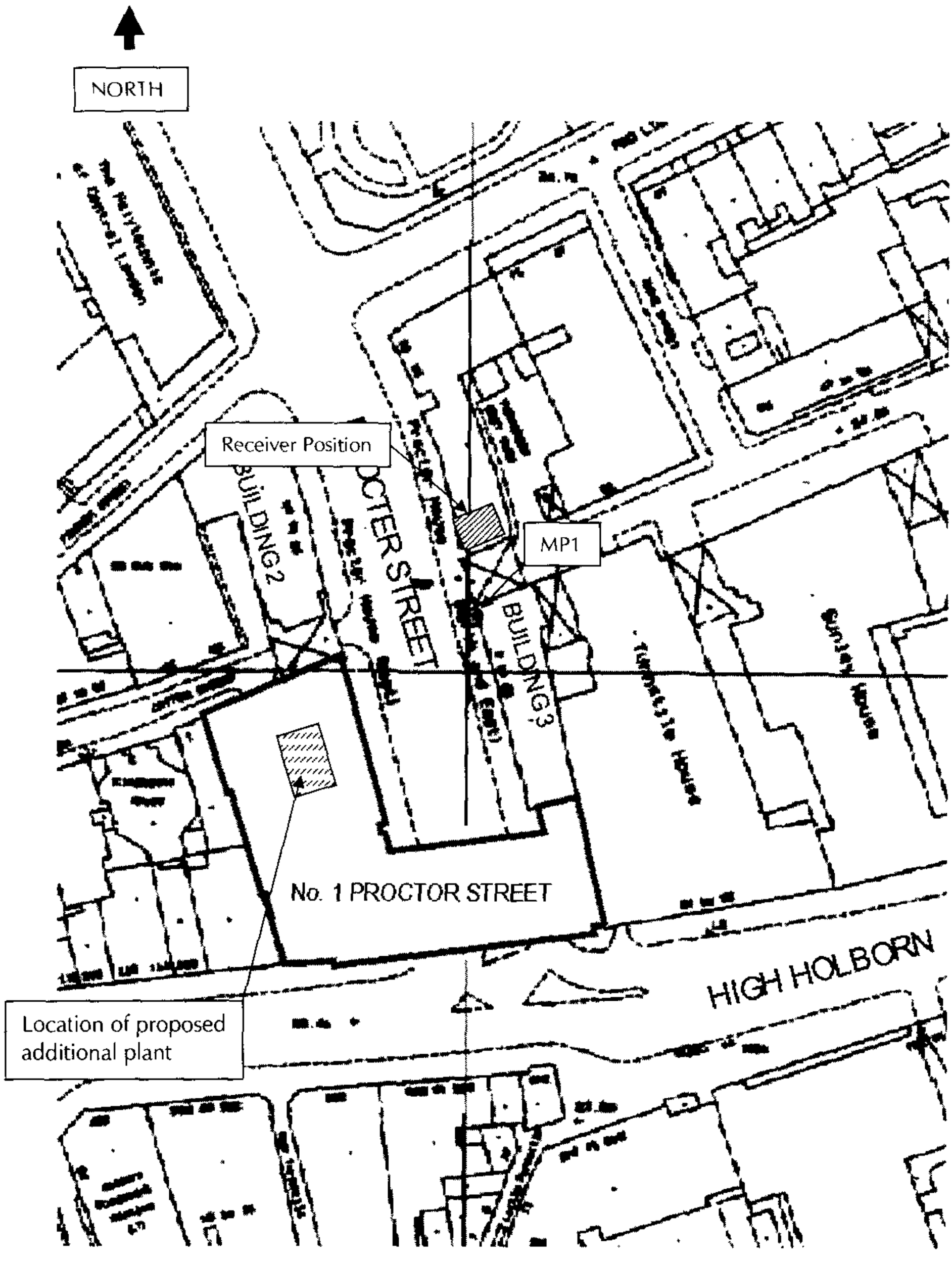
7. CONCLUSIONS

7.1. A 24 hour unattended environmental noise survey has been undertaken at The Eye, Procter House, 1 Procter Street, Holborn, London WC1V 6DW.

7.2. Using the results of the survey, suitable plant noise emission limits have been determined at the closest noise sensitive premises, so as to meet the requirements of Camden Council.

7.3. An assessment has been undertaken for the proposed plant installation. The results of the assessment indicate that with the equipment selected and the proposed plant location, the plant noise limits are achieved, and the proposed design is acceptable.

Cole Jarman Associates
October 2006



Cole Jarman Associates	SITE PLAN SHOWING THE PROPOSED PLANT LOCATION, NOISE SURVEY MEASUREMENT POSITION AND CLOSEST RESIDENTIAL RECEIVER		FIGURE 2006-3790-SP1
	THE EYE, PROCTER HOUSE	NTS	OCT 2006

John Cree House, 24B High Street, Addlestone, Surrey KT15 1TN Tel: 01932 829007 email: info@colejarman.com

Figure 2006/3790/TH01, The Eye, Procter House

Noise Level Time History at Position P1 (LAeq & LAmax), 26 to 27 October 2006

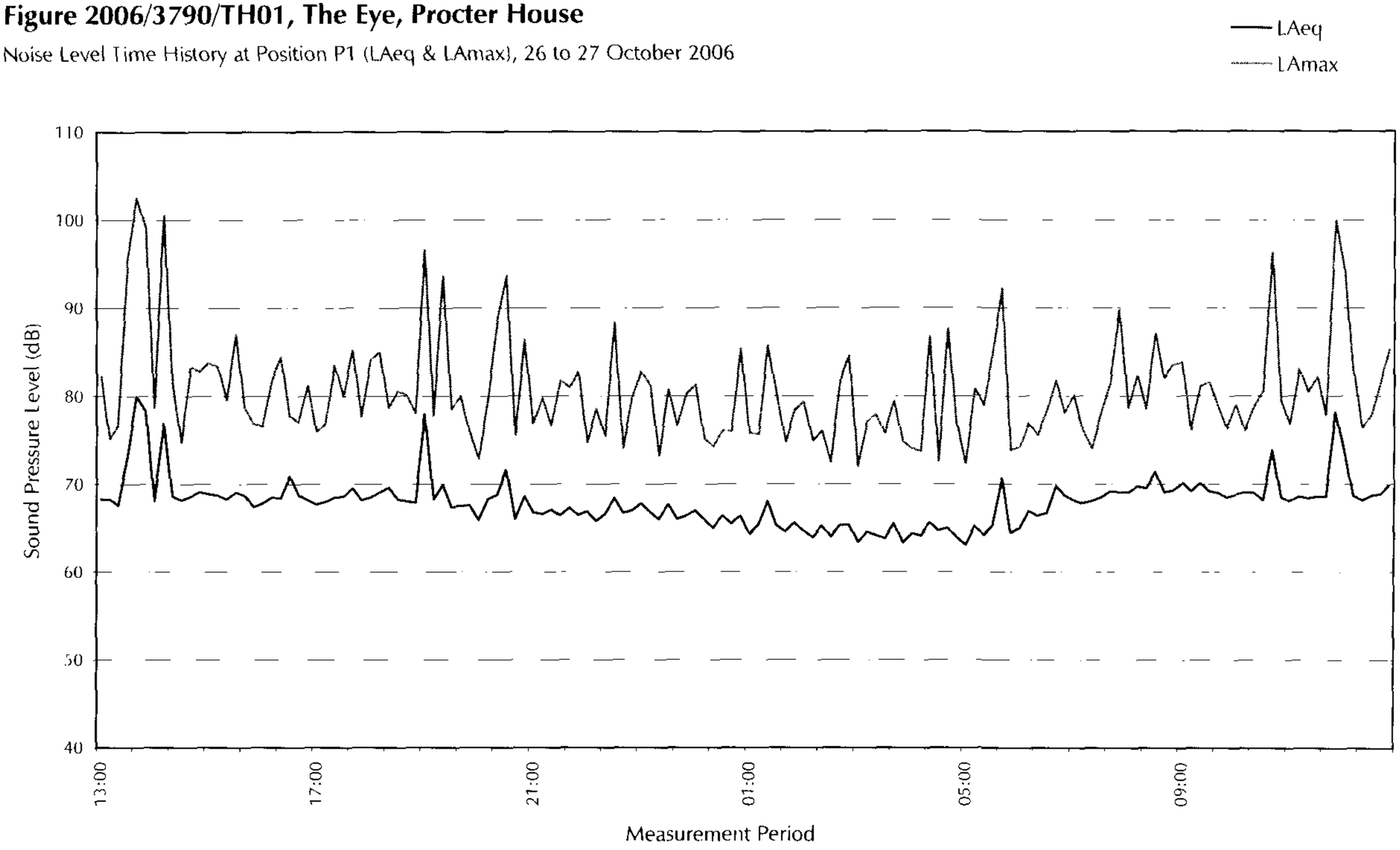


Figure 2006/3790/TH02, The Eye, Procter House

Noise Level Time History at Position P1 (LA10 & LA90), 26 to 27 October 2006

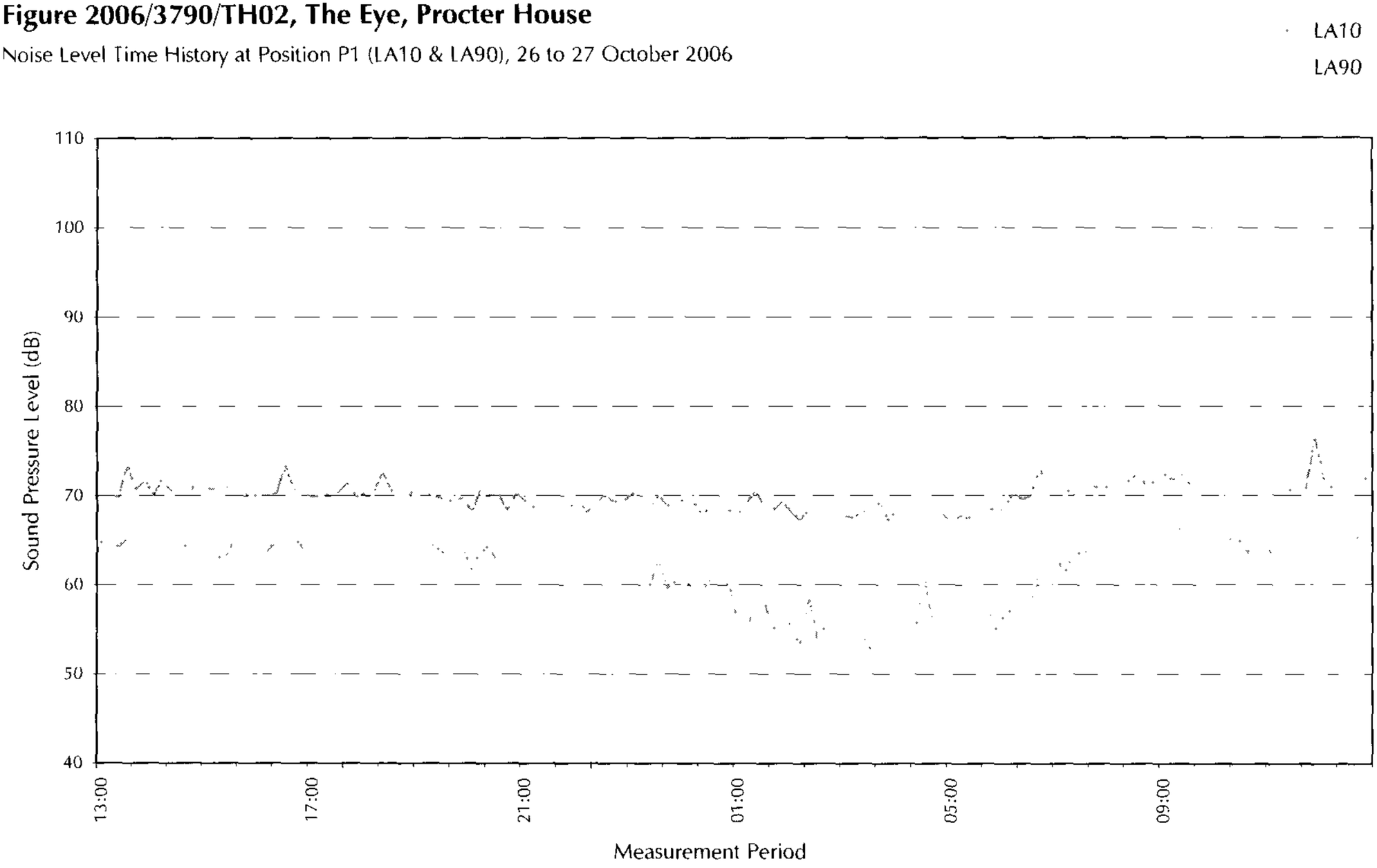
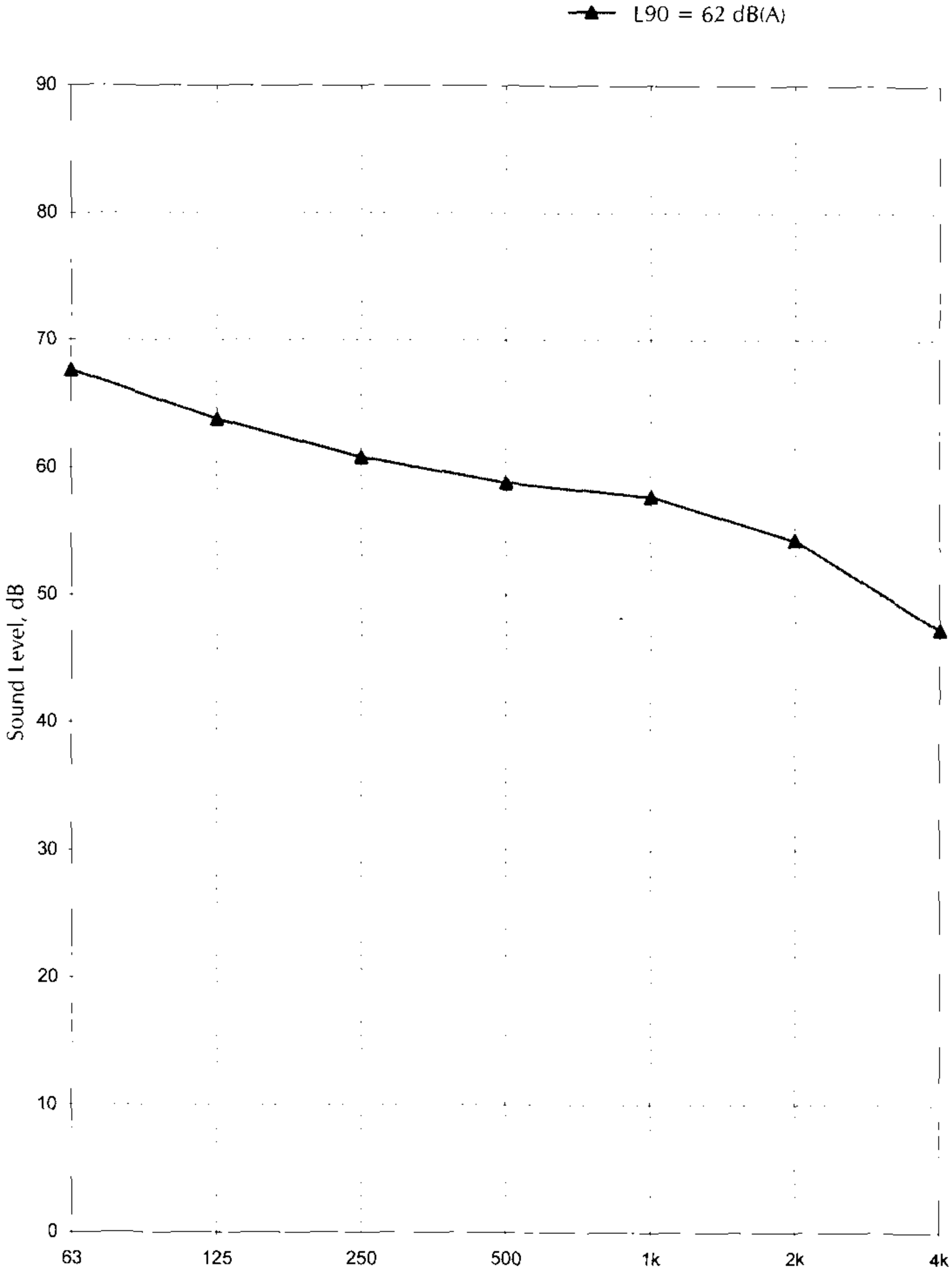


Figure 2006/3790/OB01

Octave Band L90 Spectra

Minimum L90 0830-1700



Appendix A

NOISE UNITS

L_{Aeq}: The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq}.

L_{Amax}: The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, measured using the "fast" sound level meter response.

L_{A10} & L_{A90}: *If non-steady noise is to be described, it is necessary to know* both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} *is the level exceeded* for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly L_{A90} gives an indication of the lower levels of fluctuating noise. *It is often used to define the* background noise.

L_{A10} is commonly used to describe traffic noise. Values of dBL_{An} are sometimes written using the alternative expression $dB(A)L_n$.

L_{AX} (or SEL): The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. L_{AX} values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of L_{Aeq} for the total noise.

Appendix B
PLANT NOISE DATA

Plant Noise Schedule 2006/3790/PN1

Plant Reference	Location	Duty m^3/s	Data: L_w/L_p	Octave Band Centre Frequency, Hz						
				125	250	500	1k	2k	4k	8k
Daikin RXYQ10P	Sixth floor roof level of Procter House, 1 Procter Street, Holborn, London WC1V 6DW	N/A	L_W	84	80	77	73	66	59	54
Daikin RXYQ12P				85	81	79	75	69	63	58

Appendix C
CALCULATIONS

ASSESSMENT POSITION 1, RESIDENTIAL ACCOMMODATION ABOVE THE SQUARE PIG PUBLIC HOUSE ON THE EASTERN SIDE OF PROCTOR STREET TO THE NORTH EAST OF THE SITE
OPERATION 0830-1700 HOURS

Item Ref	Operating (Y/N)	Sound power level (LW) 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)	Horizontal Distance Source to Receiver	Vertical Distance Source to Receiver	Horizontal Distance Source to Barrier	Vertical Distance Source to Barrier
Daikin RXYQ10P (as part of RXYQ22M)	Y		84	80	77	73	68	59	54	78.5	40	0	0	0
Daikin RXYQ12P (as part of RXYQ22M)	Y		85	81	79	75	69	63	58	80.3	40	0	0	0
Daikin RXYQ12P	Y		85	81	79	75	69	63	58	80.3	40	0	0	0
										0.0	0	0	0	0
										0.0	0	0	0	0
										0.0	0	0	0	0
										0.0	0	0	0	0
										0.0	0	0	0	0
										0.0	0	0	0	0
										0.0	0	0	0	0
										0.0	0	0	0	0
										0.0	0	0	0	0
										0.0	0	0	0	0
										0.0	0	0	0	0
										0.0	0	0	0	0
										0.0	0	0	0	0

Item Ref	Description	Other Losses 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Daikin RXYQ10P (as part of RXYQ22M)									
Daikin RXYQ12P (as part of RXYQ22M)									
Daikin RXYQ12P									
0									
0									
0									
0									
0									
0									
0									
0									
0									
0									
0									

Item Ref	Description	Silencer insertion loss 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Daikin RXYQ10P (as part of RXYQ22M)									
Daikin RXYQ12P (as part of RXYQ22M)									
Daikin RXYQ12P									
0									
0									
0									
0									
0									
0									
0									
0									
0									
0									
0									
0									

Item Ref	Directivity 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Daikin RXYQ10P (as part of RXYQ22M)								
Daikin RXYQ12P (as part of RXYQ22M)								
Daikin RXYQ12P								
0								
0								
0								
0								
0								
0								
0								
0								
0								
0								
0								
0								

Velocity of sound (m/s) 340

Frequency	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Wavelength	5.48	2.75	1.38	0.69	0.34	0.17	0.08	0.04

	Distance Attenuation	Barrier Attenuation 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Daikin RXYQ10P (as part of RXYQ22M)	-40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Daikin RXYQ12P (as part of RXYQ22M)	-40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Daikin RXYQ12P	-40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Item of	Resultant Lp 63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Daikin RXYQ10P (as part of RXYQ22M)	40.0	44.0	40.0	37.0	33.0	26.0	19.0	14.0	38.4
Daikin RXYQ12P (as part of RXYQ22M)	40.0	45.0	41.0	39.0	35.0	29.0	23.0	18.0	40.3
Daikin RXYQ12P	40.0	45.0	41.0	39.0	35.0	29.0	23.0	18.0	40.3
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lowest existing Lwa spectrum	86	84	84	58	56	54	47	37	62

TOTAL 46

FAÇADE INCIDENT LEVEL 46

PLANT NOISE LIMIT 55