GILLIERON SCOTT
ACOUSTIC DESIGN

Report No:
Shaftesbury Theatre Environmental Noise Impact Assessment 01122015

Date:
01/12/2015

For:
The Theatre of Comedy Company

Report Title:

SHAFTESBURY THEATRE

ENVIRONMENTAL NOISE IMPACT ASSESSMENT

By:
Gillieron Scott Acoustic Design
Office 20,
Wingate Business Exchange,
64-66 Wingate Square
Clapham SW4 0AF

t - 020 8671 2223
e - info@gsacoustics.org
w - www.gsacoustics.org

REVISION SCHEDULE

Document Revision	Date	Document Title	Details	Prepared by	Approved by
03	01/12/2015	Shaftesbury Theatre Environmental Noise Impact Assessment 01122015	FINAL ISSUE	Tim Scott 	Paul Gillieron 
02	18/11/2015	Shaftesbury Theatre Environmental Noise Impact Assessment 18112015	DRAFT	Tim Scott 	Paul Gillieron 
01	17/11/2015	Shaftesbury Theatre Environmental Noise Impact Assessment 17112015	DRAFT	Tim Scott 	Paul Gillieron 

TABLE OF CONTENTS

Introduction 4
1.0 Brief 4
2.0 Summary 4
3.0 Plant Noise Assessment Criteria 5
4.0 Survey Details 5
5.0 Survey Results 5
6.0 Plant Noise Design Criteria 5
7.0 Plant Assessment 6
APPENDICES 8
APPENDIX A: Aerial view of site and Measurement Location 9
APPENDIX B: Aerial view of Noise Sensitive Receptor 10
APPENDIX C: Roof Plan 11
APPENDIX D: Mark Up of Extract Fan Section 12
APPENDIX E: Equipment and Procedure 13
APPENDIX F: Survey Results 14
APPENDIX G: Glossary of Acoustic Terms 22

Introduction

Proposals are being submitted to the London Borough of Camden to install new items of external air conditioning plant and to relocate existing units on the roof of Shaftesbury Theatre.

Gillieron Scott Acoustic Design have previously undertaken a background noise survey at Shaftesbury Theatre and have been commissioned to assess the potential noise impact from newly proposed air conditioning units in accordance with BS4142:1997. It should be noted that this British Standard has since been superseded by BS4142:2014 which came in to effect on 31 October 2014; however, in accordance with the London Borough of Camden's adopted noise policy, this assessment has been conducted in line with the older BS4142:1997 British Standard.

It is proposed that two new condenser units, two new extract fans and one flue dilution fan are installed. Three existing Daikin air conditioning units will also be relocated.

Operating hours of all items of plant is assumed to be 24 hours.

The findings of the plant noise impact assessment are presented in the following sections of this report together with the supporting Appendices.

1.0 Brief

- Analyse site-acquired data from a previous background noise survey carried out in 2013.
- Using representative measured data from the survey, predict the likely impact of proposed external plant in the form of a plant assessment. This will give an indication of the likelihood of complaints and show compliance with the council's noise policy.
- Provide a technical report detailing findings of the noise survey to meet relevant noise criteria at the closest receptors.

2.0 Summary

An environmental noise survey was undertaken from 11:25 on Thursday 21st November to 13:35 Friday 22nd November 2013. The measurement position was subjectively judged to be representative of the immediate noise environment at the nearest noise sensitive receptor.

The London Borough of Camden requires that noise from new items of plant is at least 5 dB lower than the existing background noise level at the nearest noise sensitive dwelling.

The survey results show that the lowest measured background noise level over the hours which the plant will be operating was 53 dB $L_{A90,5min}$. The combined noise levels of new items of air conditioning plant should, therefore, not exceed 48 dB(A) at 1m from the nearest neighbouring window.

With the acoustic mitigation detailed in this report a cumulative noise level of 46 dB(A) at 1m from the nearest noise sensitive dwellings has been calculated from these new items.

Calculations have shown that noise levels from the newly proposed plant will not exceed 46 dB(A) at the nearest noise sensitive receptors and that London Borough of Camden noise policy has been met.

In acoustic terms, the relocation of existing air conditioning units will not increase their noise impact. Noise from units to be relocated have, therefore, not been considered further.

3.0 Plant Noise Assessment Criteria

The noise strategy implemented in Camden's Developing Policies 2010-2025 states that at 1 metre external to a sensitive façade, noise from machinery or plant should be:

- 5 dB below the lowest background level (L_{A90}) measured over 24 hours or;

- 10 dB below the lowest background level (L_{A90}) if the plant noise has a distinguishable discrete continuous note (whine, hiss, screech, hum) or impulses (bangs, clicks, clatters, thumps).

4.0 Survey Details

Background noise levels were measured in support of a previous noise survey conducted in 2013, over 26 hours, at a location that was subjectively judged to be representative of the nearest noise sensitive receptor. The measurement location is shown in Appendix A.

The equipment was set up to integrate sound levels over 5 minute intervals between 11:25 Thursday 21st November and 13:35 Friday 22nd November 2013, so that the lowest $L_{A90\ 5min}$ could be determined.

The weather during the survey was calm and clear throughout.

Details of equipment and procedure used are shown in Appendix D.

5.0 Survey Results

The table below shows the results from the noise survey.

Period	Lowest $L_{A90,\ 5min}$ (dB)
Day (7:00-19:00)	54
Evening (19:00-23:00)	54
Night (23:00-07:00)	53

The lowest measured $L_{A90,\ 5min}$ over the survey period was 52.8 dB. The full survey results (to one decimal place) are shown in the Appendix E.

6.0 Plant Noise Design Criteria

It is assumed that the plant will have the facility to operate 24 hours therefore based on the survey results summarised in the previous section, the cumulative noise from all new items of plant should not exceed 48 dB(A), 1m from the nearest noise sensitive residential window.

7.0 Plant Assessment

Newly proposed air conditioning units are presented in the table below, along with a calculation of their cumulative noise level at the nearest noise sensitive receptor. Receptor Location 1 is shown in Appendix B.

Cumulative Sound Pressure Level at Receptor Location 1		
Element	**Level**	**Comments**
Unit Sound Pressure Level	61 dB(A)	Sound pressure level 1m from 1xMitubishi PURY-P400YJM-A (HP1)
Reflective surfaces	67 dB(A)	Close proximity to two reflective surfaces +6 dB(A)
Barrier attenuation	48 dB(A)	Barrier attenuation calculated as -19 dB(A)
Distance attenuation to receiver	34 dB(A)	5m distance attenuation (from 1m) -14 dB(A)
Unit Sound Pressure Level	50 dB(A)	Sound pressure level 1m from 1xHP2
Reflective surfaces	56 dB(A)	Close proximity to two reflective surfaces +6 dB(A)
Barrier attenuation	37 dB(A)	Barrier attenuation calculated as -19 dB(A)
Distance attenuation to receiver	23 dB(A)	5m distance attenuation (from 1m) -14 dB(A)
Unit Sound Pressure Level	60 dB(A)	Sound Pressure 3m from Flue Dilution Fan
No. of Units	63 dB(A)	Two units +3 dB(A)
Reflective surfaces	66 dB(A)	Close proximity to one reflective surface +3 dB(A)
Barrier attenuation	52 dB(A)	Barrier attenuation calculated as -14 dB(A)
Distance attenuation to receiver	45 dB(A)	6.5m distance attenuation (from 3m) -7 dB(A)
Extract Fan 1	31 dB(A)	Sound Pressure 1m from Residential Façade with the attenuators installed with the minimum insertions losses as detailed below.
Extract Fan 2	34 dB(A)	Sound Pressure 1m from Residential Façade with the attenuators installed with the minimum insertions losses as detailed below.
Cumulative noise at Receptor 1	**46 dB(A)**	**Meets criteria of 48 dB(A)**

Minimum required insertion losses for Extract fans are shown below;

Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Comments
Room side insertion loss to meet NR30 on stage	15	15	12	13	23	11	7	7	Requires 1 x internally lined bend inside theatre
Atmosphere side insertion loss extract fan 1	8	6	1	3	11	1	2	9	Re-use existing room side attenuators on atmosphere side
Atmosphere side insertion loss extract fan 2	11	9	4	6	15	5	6	12	Re-use existing room side attenuators on atmosphere side

Cumulative noise levels have also been calculated to a second noise sensitive receptor. Receptor Location 2 is shown in Appendix A.

Cumulative Sound Pressure Level at Receptor Location 2		
Element	**Level**	**Comments**
Unit Sound Pressure Level	61	Sound pressure level 1m from 1xMitubishi PURY-P400YJM-A (HP1)
Reflective surfaces	67	Close proximity to two reflective surfaces +6 dB(A)
Barrier attenuation	55	Barrier attenuation calculated as -12 dB(A)
Distance attenuation to receiver	36	9m distance attenuation (from 1m) -19 dB(A)
Unit Sound Pressure Level	50	Sound pressure level 1m from 1xHP2
Reflective surfaces	56	Close proximity to two reflective surfaces +6 dB(A)
Barrier attenuation	44	Barrier attenuation calculated as -12 dB(A)
Distance attenuation to receiver	26	8m distance attenuation (from 1m) -18 dB(A)
Unit Sound Pressure Level	60	Sound Pressure 3m from Flue Dilution Fan
No. of Units	63	Two Units +3 dB(A)
Reflective surfaces	66	Close proximity to one reflective surface +3 dB(A)
Barrier attenuation	59	Barrier attenuation calculated as -7 dB(A)
Distance attenuation to receiver	45	16m distance attenuation (from 3m) -14 dB(A)
Extract Fan 1	31	Sound Pressure 1m from Residential Façade with the attenuators installed with the minimum insertions losses as detailed below.
Extract Fan 2	34	Sound Pressure 1m from Residential Façade with the attenuators installed with the minimum insertions losses as detailed below.
Cumulative noise at Receptor 2	**46**	**Meets criteria of 48 dB(A)**

The air conditioning units are positioned on the roof of Shaftesbury Theatre, their locations are shown in Appendices A, B and C. The units benefit from acoustic screening in the form of a 3m high wall located adjacent to the proposed location.

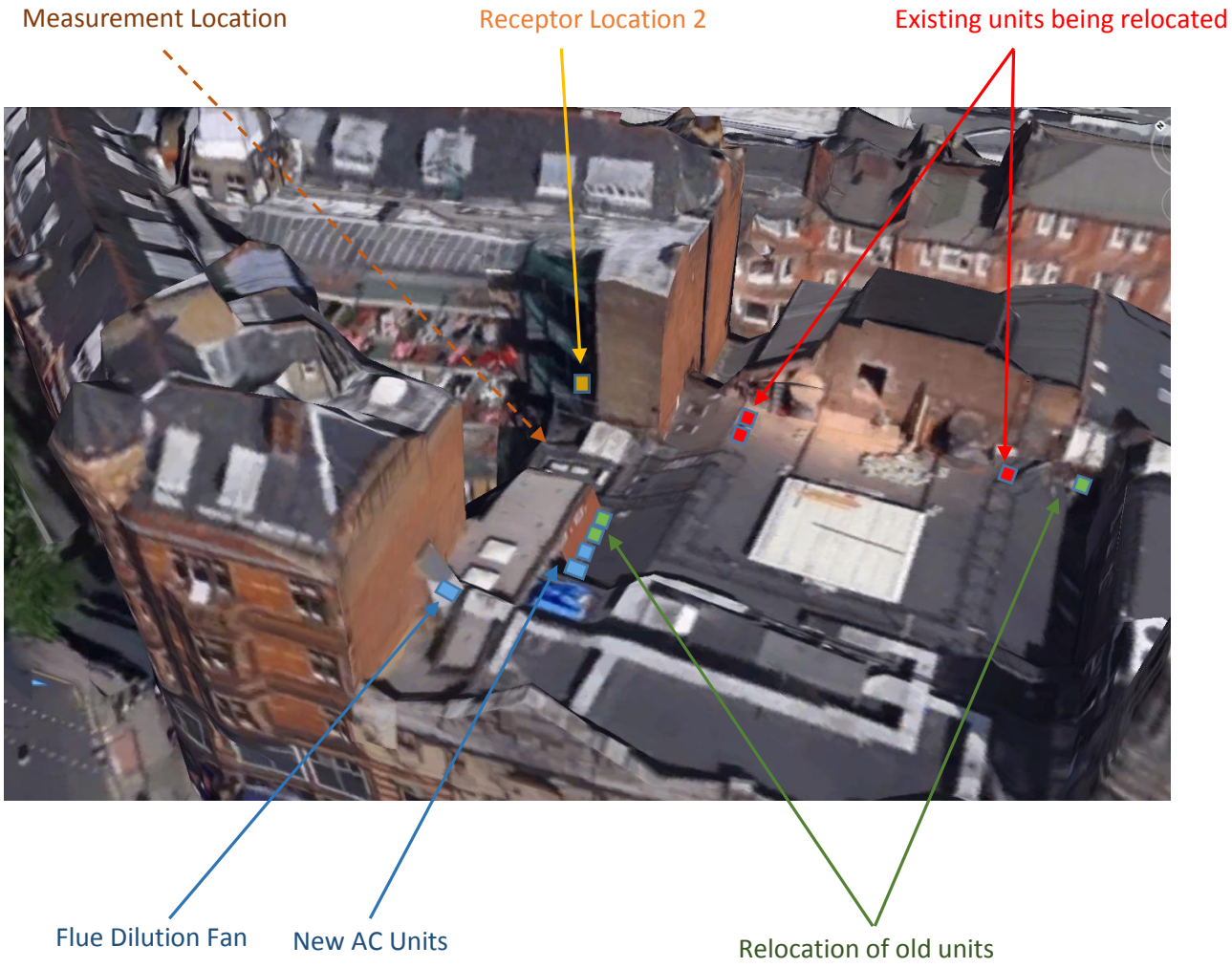
The nearest residential window is at least 5m away as shown in Appendix B. The lowest measured $L_{A90,\ 5min}$ was measured as 53 dB. The London Borough of Camden's noise policy requires the items of plant to remain -5 dB below the lowest measured background noise level.

The cumulative noise level at Receptor Location 1 has been calculated as 46 dB(A), which falls within the requirements of the London Borough of Camden's noise policy.

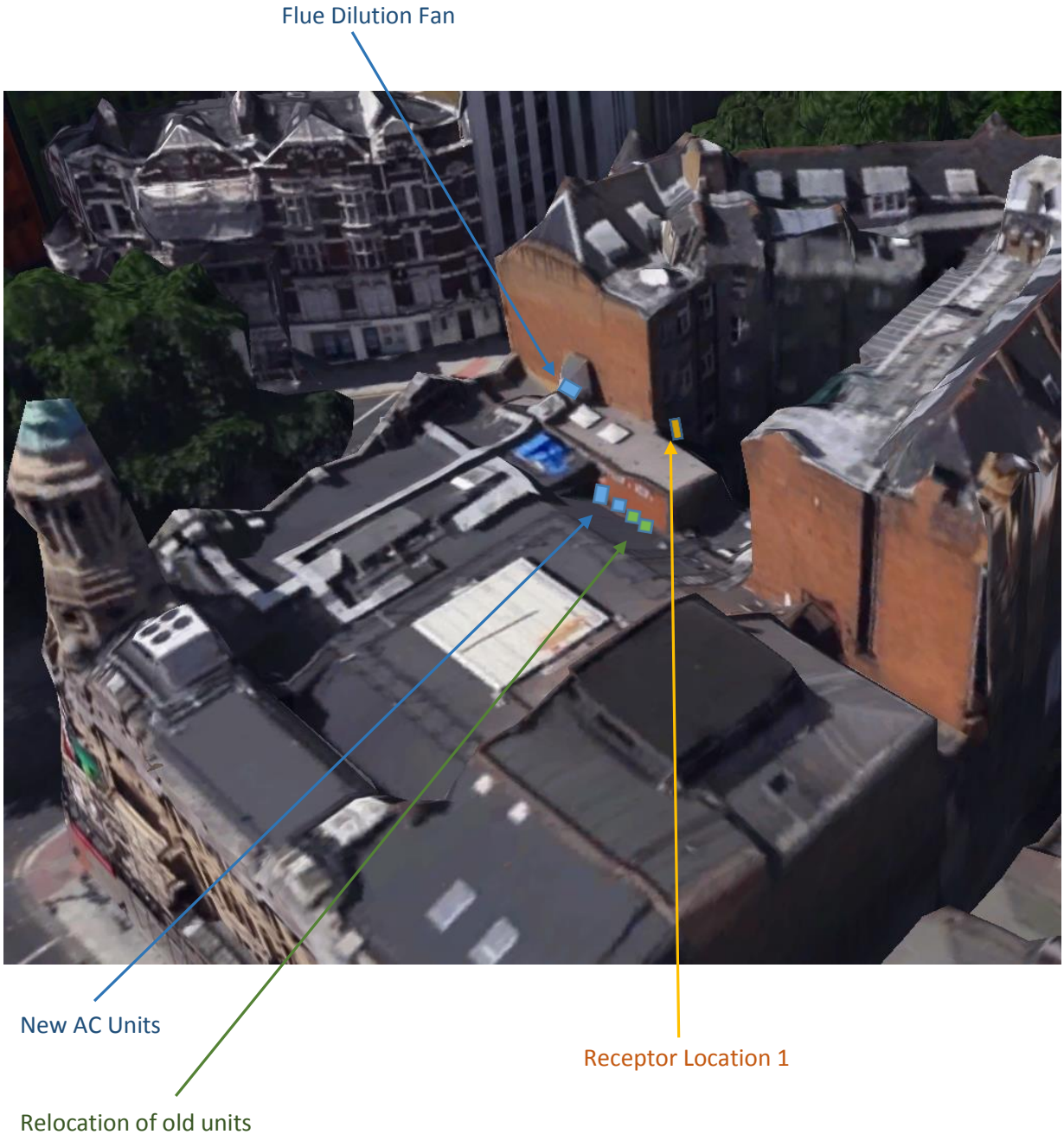
The cumulative noise level at Receptor Location 2 has been calculated as 46 dB(A), which also falls within the requirements of the London Borough of Camden's noise policy.

APPENDICES

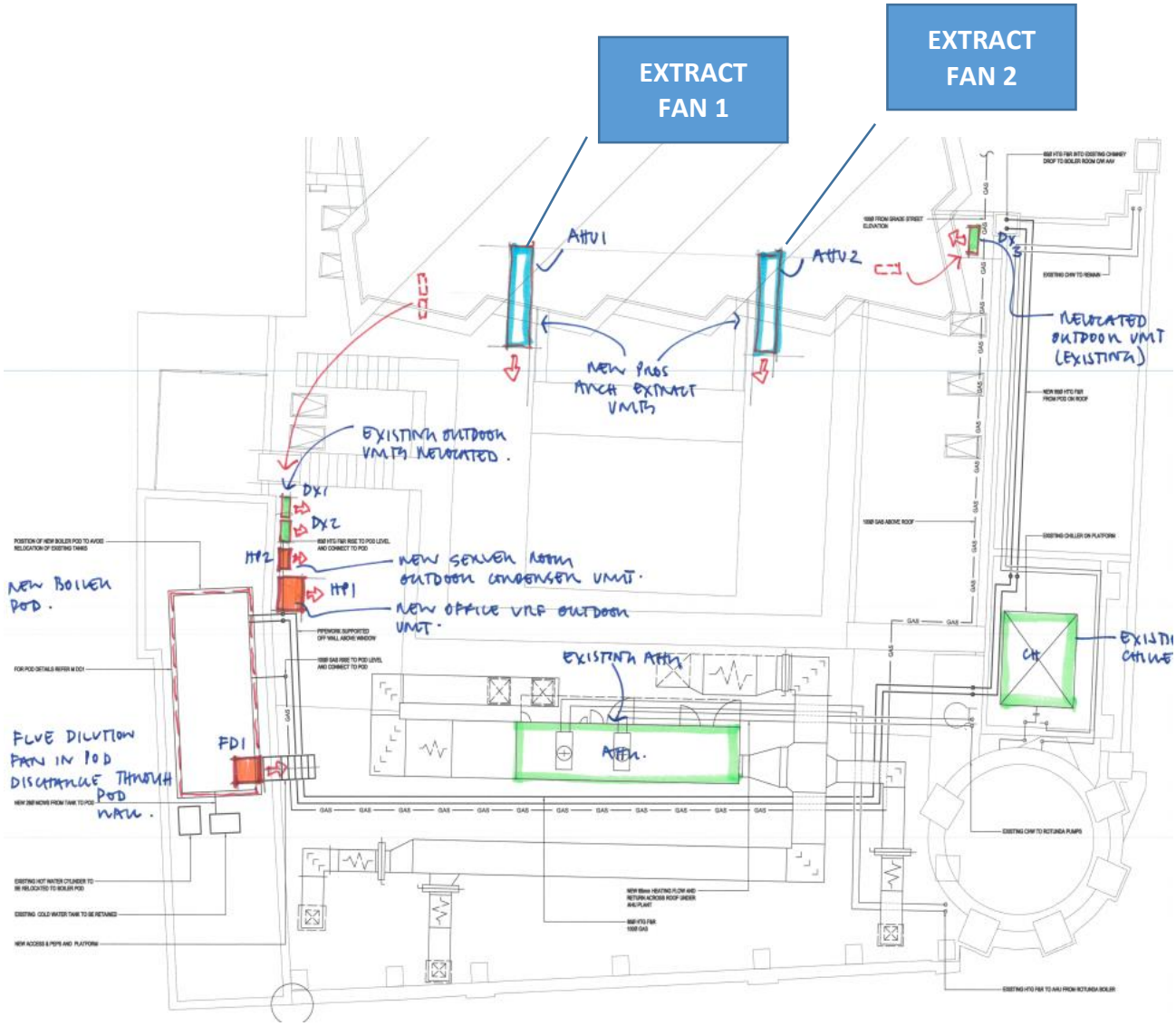
APPENDIX A: Aerial view of site and Measurement Location



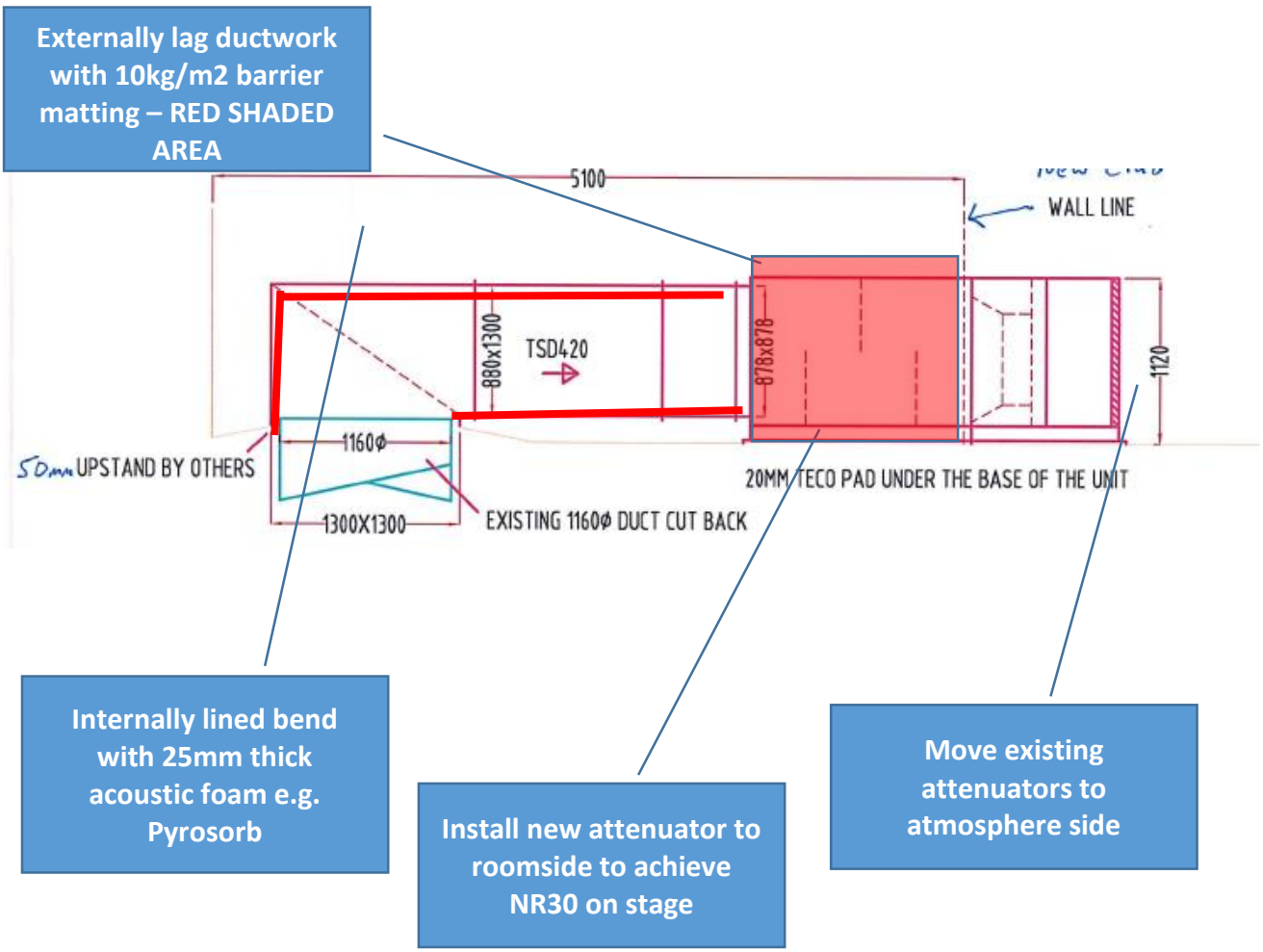
APPENDIX B: Aerial view of Noise Sensitive Receptor



APPENDIX C: Roof Plan



APPENDIX D: Mark Up of Extract Fan Section



APPENDIX E: Equipment and Procedure

Background noise levels have been measured over an extended period at a location that was subjectively judged to be representative of the noise environment at the nearest noise sensitive property.

The equipment was set up to integrate sound levels over 5 minute intervals between 11:25, Thursday 21st November and 13:35, Friday 22nd November 2013.

The levels were recorded as A-weighted and octave band L_{eq}, L_{max} and L_{90} using the following equipment.

Norsonics 118 Real Time Analyser
Norsonics 1251 Calibrator
GRAS Environmental Microphone
Tripod

The equipment was calibrated before and after the survey and no drift from calibration was found.

Calibration certificates are available on request.

.

APPENDIX F: Survey Results

Date	Time	L_{Aeq}	L_{A90}	L_{A90}							
				63	125	250	500	1k	2k	4k	8k
21/11/2013	11:25:00	57.7	56.0	65.5	58.1	56.8	53.1	50.0	47.1	41.0	31.2
21/11/2013	11:30:00	66.9	57.5	66.6	59.6	57.8	54.5	51.7	48.7	42.5	33.7
21/11/2013	11:35:00	59.0	56.9	65.9	58.8	58.0	54.2	51.2	47.9	42.3	33.8
21/11/2013	11:40:00	59.6	57.2	66.0	58.6	57.6	54.1	51.6	48.7	42.7	33.9
21/11/2013	11:45:00	60.6	57.3	66.1	58.3	57.7	54.3	51.8	48.6	42.6	33.1
21/11/2013	11:50:00	61.3	58.0	65.5	58.3	58.0	54.9	52.5	49.4	43.8	34.6
21/11/2013	11:55:00	64.6	57.7	65.9	58.3	57.9	54.6	52.0	49.2	44.0	35.1
21/11/2013	12:00:00	64.0	57.8	66.5	58.6	57.8	54.7	52.2	49.2	43.5	36.5
21/11/2013	12:05:00	64.7	57.9	66.5	58.8	58.1	54.9	52.3	49.2	43.5	34.4
21/11/2013	12:10:00	70.6	58.0	66.0	58.6	57.8	54.4	52.3	49.6	43.3	33.5
21/11/2013	12:15:00	58.9	56.4	65.7	58.3	57.1	53.6	50.8	47.5	41.7	31.8
21/11/2013	12:20:00	58.5	56.7	65.9	58.1	57.1	53.9	51.2	48.2	42.0	32.1
21/11/2013	12:25:00	58.8	57.0	67.0	59.1	57.2	53.9	51.5	48.3	42.1	32.2
21/11/2013	12:30:00	70.7	56.3	65.9	58.0	57.4	53.5	50.6	47.2	41.0	31.5
21/11/2013	12:35:00	59.4	57.3	65.9	58.8	57.7	54.5	51.7	48.4	42.0	32.0
21/11/2013	12:40:00	58.9	56.9	65.7	58.7	57.5	54.1	50.9	48.1	42.4	32.4
21/11/2013	12:45:00	58.7	56.6	66.1	58.4	57.3	53.6	51.0	48.0	41.8	31.4
21/11/2013	12:50:00	59.4	56.9	65.9	58.3	57.2	53.8	51.3	48.1	42.2	32.9
21/11/2013	12:55:00	58.5	57.0	65.4	58.4	57.5	54.1	51.6	48.3	42.1	32.1
21/11/2013	13:00:00	59.4	57.7	66.3	58.5	57.7	54.6	52.2	49.1	42.9	32.9
21/11/2013	13:05:00	64.1	57.2	65.3	58.5	57.5	54.2	51.6	48.6	42.4	32.9
21/11/2013	13:10:00	65.4	57.2	66.3	58.1	57.5	54.4	51.8	48.5	42.2	32.5
21/11/2013	13:15:00	59.2	57.5	65.9	58.2	57.8	54.7	52.1	48.5	42.4	32.4
21/11/2013	13:20:00	59.3	57.0	65.8	58.2	57.2	54.0	51.3	48.6	42.8	32.8
21/11/2013	13:25:00	59.0	56.9	65.3	58.3	57.6	54.2	51.3	48.2	42.0	32.6
21/11/2013	13:30:00	59.2	57.8	66.8	59.3	58.0	54.7	52.3	49.1	42.8	32.7
21/11/2013	13:35:00	62.1	57.7	65.1	58.6	58.0	55.4	52.1	48.7	42.1	32.3
21/11/2013	13:40:00	68.1	57.6	65.2	58.7	58.2	55.6	51.9	48.1	41.1	31.2
21/11/2013	13:45:00	58.7	57.2	65.5	58.5	57.6	54.5	51.4	48.3	42.1	32.4
21/11/2013	13:50:00	61.3	57.0	66.1	58.4	57.5	53.9	51.4	48.4	41.8	30.9
21/11/2013	13:55:00	59.2	57.1	66.7	58.2	57.6	54.5	51.1	48.0	41.8	31.9
21/11/2013	14:00:00	60.9	58.0	65.7	58.5	58.4	55.6	52.3	48.8	42.3	32.4
21/11/2013	14:05:00	60.5	57.8	65.8	58.4	58.6	55.8	51.9	48.2	41.9	32.5
21/11/2013	14:10:00	63.4	56.6	65.7	58.0	57.1	53.7	51.2	47.8	41.1	30.1
21/11/2013	14:15:00	58.6	56.9	65.6	58.8	57.3	54.2	51.4	48.0	41.5	31.8
21/11/2013	14:20:00	58.2	56.5	65.3	58.4	57.0	53.7	50.6	47.4	41.2	31.7
21/11/2013	14:25:00	58.5	56.6	66.3	58.8	57.1	54.0	51.0	47.6	40.9	30.3
21/11/2013	14:30:00	58.8	57.0	65.8	58.1	57.3	54.7	51.4	47.9	41.6	31.8
21/11/2013	14:35:00	60.0	57.2	67.3	58.8	57.6	54.3	51.3	48.1	41.6	31.9
21/11/2013	14:40:00	58.7	56.6	66.7	58.4	57.4	54.6	50.6	47.0	40.3	30.8
21/11/2013	14:45:00	57.9	56.0	65.5	57.3	56.9	53.7	50.2	46.8	40.0	29.9

Date	Time	L_{Aeq}	L_{A90}	L_{A90}							
				63	125	250	500	1k	2k	4k	8k
21/11/2013	14:50:00	57.7	56.0	65.7	57.8	56.9	53.6	50.2	46.5	40.5	31.1
21/11/2013	14:55:00	58.0	56.2	66.0	57.9	56.6	53.4	50.6	47.5	40.9	31.6
21/11/2013	15:00:00	57.7	56.0	66.1	58.3	56.8	53.3	50.3	47.1	40.8	31.1
21/11/2013	15:05:00	58.0	56.3	65.7	57.8	56.9	53.4	50.8	47.6	41.3	31.8
21/11/2013	15:10:00	58.9	56.3	66.1	58.2	57.0	53.6	50.7	47.5	41.2	30.8
21/11/2013	15:15:00	58.3	56.6	66.0	58.1	57.2	53.9	51.0	47.4	41.5	31.7
21/11/2013	15:20:00	58.8	56.6	66.1	58.2	57.4	53.9	50.9	47.5	41.5	31.1
21/11/2013	15:25:00	57.8	56.2	66.0	57.8	56.9	53.3	50.4	47.5	41.2	31.2
21/11/2013	15:30:00	59.7	56.7	66.8	58.7	57.5	54.0	51.0	48.0	41.8	31.9
21/11/2013	15:35:00	57.9	55.8	65.5	58.2	57.1	53.4	50.1	46.6	40.0	30.2
21/11/2013	15:40:00	57.8	55.9	65.4	57.4	57.1	53.4	50.1	46.4	39.9	30.0
21/11/2013	15:45:00	58.3	56.2	65.4	57.8	57.2	53.5	50.4	46.8	40.7	30.8
21/11/2013	15:50:00	58.3	55.5	64.9	57.2	56.9	53.1	49.8	46.0	39.4	29.7
21/11/2013	15:55:00	68.5	56.3	65.0	57.7	57.1	53.4	50.8	47.2	40.6	30.8
21/11/2013	16:00:00	58.9	56.1	65.9	58.2	57.2	53.4	50.5	46.6	40.1	30.7
21/11/2013	16:05:00	61.7	55.4	65.0	57.5	56.8	53.1	49.7	46.0	39.2	29.3
21/11/2013	16:10:00	60.9	57.5	65.1	57.7	58.0	55.3	51.4	47.5	41.0	31.0
21/11/2013	16:15:00	58.7	57.0	65.8	58.5	58.0	54.7	50.9	47.3	40.8	30.8
21/11/2013	16:20:00	58.2	56.4	65.3	57.7	57.5	54.1	50.5	46.6	39.5	29.7
21/11/2013	16:25:00	58.1	55.9	64.7	57.4	57.2	53.6	50.3	46.3	39.6	30.5
21/11/2013	16:30:00	58.3	56.1	64.9	57.6	57.3	53.9	50.4	46.4	40.0	30.5
21/11/2013	16:35:00	59.5	55.7	65.9	58.4	57.3	53.2	49.8	46.3	39.5	29.4
21/11/2013	16:40:00	58.6	56.0	64.5	57.6	57.3	53.5	50.3	46.6	40.2	30.8
21/11/2013	16:45:00	57.4	55.3	65.1	57.3	57.1	53.0	49.4	45.7	39.0	29.4
21/11/2013	16:50:00	57.7	55.6	64.9	57.2	57.1	53.1	49.9	45.9	39.3	29.7
21/11/2013	16:55:00	58.3	55.6	65.1	57.5	56.8	52.8	49.8	45.9	38.7	28.5
21/11/2013	17:00:00	56.3	54.0	64.2	56.5	54.1	51.9	48.4	44.7	38.2	28.8
21/11/2013	17:05:00	57.5	55.1	64.5	57.2	56.3	52.7	49.1	45.0	38.6	29.1
21/11/2013	17:10:00	58.4	55.7	65.4	58.2	57.3	52.9	49.6	46.2	39.3	29.6
21/11/2013	17:15:00	57.4	55.3	64.7	57.6	57.1	52.8	49.4	45.5	38.3	28.6
21/11/2013	17:20:00	57.3	55.1	64.3	57.7	56.9	52.8	49.1	45.3	38.6	28.9
21/11/2013	17:25:00	61.8	55.6	65.0	57.5	57.1	53.1	49.6	45.7	38.7	29.0
21/11/2013	17:30:00	57.8	55.5	65.0	58.1	57.4	53.0	49.5	45.9	38.8	28.9
21/11/2013	17:35:00	60.9	55.9	65.4	57.8	57.5	53.5	49.9	46.0	39.1	29.3
21/11/2013	17:40:00	66.4	57.8	65.8	59.2	57.9	53.9	52.4	48.8	41.3	31.1
21/11/2013	17:45:00	58.1	55.6	63.9	57.8	57.5	53.3	49.6	46.0	39.3	29.5
21/11/2013	17:50:00	58.2	55.3	64.3	56.8	57.4	53.1	49.3	45.5	38.9	29.0
21/11/2013	17:55:00	64.6	56.2	66.2	58.5	57.9	53.6	50.3	46.6	39.7	29.6
21/11/2013	18:00:00	59.3	55.9	66.1	59.3	57.8	53.5	49.9	46.0	39.3	29.5
21/11/2013	18:05:00	61.5	55.9	64.6	57.9	57.5	53.3	50.0	46.2	39.2	29.8
21/11/2013	18:10:00	62.8	57.4	66.2	59.6	59.1	55.3	51.5	47.3	41.0	32.7
21/11/2013	18:15:00	60.1	58.3	66.4	59.9	59.6	56.3	52.3	48.2	41.6	33.5
21/11/2013	18:20:00	60.1	58.0	66.7	59.7	59.2	56.2	52.1	48.2	41.9	33.9
21/11/2013	18:25:00	59.4	58.0	67.3	60.0	59.0	55.8	52.1	47.8	41.6	33.8

Date	Time	L_{Aeq}	L_{A90}	L_{A90}							
				63	125	250	500	1k	2k	4k	8k
21/11/2013	18:30:00	60.2	57.5	66.5	59.3	58.9	55.6	51.7	47.4	41.0	33.5
21/11/2013	18:35:00	61.6	58.0	65.9	59.7	59.0	55.8	52.1	48.1	41.8	34.0
21/11/2013	18:40:00	63.1	58.0	66.7	60.4	59.1	55.8	52.2	48.3	41.9	34.0
21/11/2013	18:45:00	59.0	57.3	66.0	58.8	58.6	55.3	51.5	47.2	41.0	33.4
21/11/2013	18:50:00	58.6	57.5	66.3	58.8	58.6	55.5	51.6	47.6	41.3	33.6
21/11/2013	18:55:00	59.1	57.3	65.6	58.6	58.6	55.2	51.5	47.3	41.3	33.7
21/11/2013	19:00:00	58.6	57.6	65.7	59.0	59.0	55.6	51.7	47.5	41.3	33.7
21/11/2013	19:05:00	60.3	57.7	66.5	59.4	58.9	55.5	52.0	47.9	41.7	34.0
21/11/2013	19:10:00	59.6	57.8	66.6	59.2	59.0	55.6	51.9	48.2	42.6	34.6
21/11/2013	19:15:00	60.1	58.2	65.9	59.4	59.4	55.8	52.4	48.3	42.1	34.1
21/11/2013	19:20:00	59.9	57.6	65.9	59.2	58.9	55.4	51.8	47.7	41.3	33.7
21/11/2013	19:25:00	59.8	57.3	65.9	58.8	58.8	55.3	51.7	47.3	40.9	33.6
21/11/2013	19:30:00	59.0	57.6	65.8	59.2	59.0	55.5	51.7	47.6	41.4	33.9
21/11/2013	19:35:00	58.8	57.4	65.8	58.8	59.1	55.3	51.4	47.2	41.2	33.8
21/11/2013	19:40:00	59.0	57.8	66.0	58.8	59.2	55.6	52.0	48.0	42.2	34.5
21/11/2013	19:45:00	59.5	57.3	65.6	58.9	59.1	55.4	51.4	47.0	41.0	33.8
21/11/2013	19:50:00	57.7	56.0	65.8	57.6	57.8	53.8	49.7	46.0	39.9	32.5
21/11/2013	19:55:00	58.7	56.6	65.1	57.7	58.4	54.6	50.7	46.3	39.7	32.1
21/11/2013	20:00:00	58.5	56.6	64.7	57.9	58.5	54.7	50.8	45.7	39.2	32.0
21/11/2013	20:05:00	58.9	57.0	65.2	58.1	58.2	55.4	51.1	46.9	40.1	32.6
21/11/2013	20:10:00	58.1	56.6	65.1	58.1	58.2	54.8	50.8	46.0	39.4	32.5
21/11/2013	20:15:00	58.4	56.7	64.8	58.1	58.2	55.2	50.6	45.9	39.5	32.7
21/11/2013	20:20:00	59.8	57.3	65.1	58.3	58.7	55.2	51.5	46.9	40.3	33.0
21/11/2013	20:25:00	59.9	57.0	64.3	57.8	58.6	55.3	51.0	46.3	40.1	33.1
21/11/2013	20:30:00	58.6	56.5	64.1	57.9	58.2	54.9	50.4	45.6	39.2	32.3
21/11/2013	20:35:00	60.1	56.6	64.2	57.4	58.1	55.0	50.6	45.9	39.5	32.3
21/11/2013	20:40:00	58.3	56.6	64.3	57.5	58.1	55.2	50.5	45.8	39.5	32.5
21/11/2013	20:45:00	58.5	57.0	64.3	58.1	58.6	55.7	50.8	46.0	39.9	32.7
21/11/2013	20:50:00	59.3	57.2	64.2	58.2	58.6	55.5	51.1	46.6	40.4	33.0
21/11/2013	20:55:00	58.3	56.7	64.5	57.6	58.2	55.0	50.7	46.4	40.0	31.7
21/11/2013	21:00:00	58.5	55.6	64.2	57.0	57.6	53.9	49.4	45.1	38.5	30.2
21/11/2013	21:05:00	57.4	55.4	63.8	56.6	57.4	53.6	49.0	44.9	38.8	30.5
21/11/2013	21:10:00	64.6	55.7	63.5	56.8	57.8	54.1	49.2	44.9	38.6	30.3
21/11/2013	21:15:00	62.0	55.3	63.6	57.0	57.7	53.0	49.2	45.0	38.5	29.1
21/11/2013	21:20:00	57.2	55.3	64.1	57.1	57.4	53.2	49.3	45.3	38.9	29.5
21/11/2013	21:25:00	64.0	55.0	63.4	56.5	57.3	52.8	49.0	44.7	38.3	29.0
21/11/2013	21:30:00	56.8	54.9	63.0	56.1	57.0	52.3	49.0	45.1	38.3	29.3
21/11/2013	21:35:00	57.2	55.1	64.8	56.8	57.3	52.7	48.9	45.2	38.7	29.2
21/11/2013	21:40:00	57.0	55.1	63.5	56.2	57.2	52.7	49.1	45.1	38.3	29.0
21/11/2013	21:45:00	58.2	55.3	63.9	56.5	56.9	53.0	49.4	45.7	39.3	29.8
21/11/2013	21:50:00	59.0	55.6	65.3	57.2	56.9	53.2	49.7	46.3	39.1	29.7
21/11/2013	21:55:00	57.1	54.3	63.8	55.9	56.1	52.4	48.2	44.3	37.8	28.6
21/11/2013	22:00:00	57.1	55.0	64.3	56.9	57.1	52.6	48.9	45.1	38.8	29.2
21/11/2013	22:05:00	57.7	55.2	64.1	56.8	57.2	52.8	49.4	45.1	38.3	29.0

Date	Time	L_{Aeq}	L_{A90}	L_{A90}							
				63	125	250	500	1k	2k	4k	8k
21/11/2013	22:10:00	61.1	55.9	65.2	56.9	57.3	53.2	50.2	46.3	38.6	29.2
21/11/2013	22:15:00	57.5	55.8	63.9	57.3	57.3	53.3	50.2	46.4	39.3	29.7
21/11/2013	22:20:00	58.9	56.1	64.6	57.5	57.7	53.5	49.9	46.5	39.8	30.0
21/11/2013	22:25:00	60.2	56.5	65.4	58.0	58.1	53.5	50.4	46.7	39.5	29.5
21/11/2013	22:30:00	57.5	55.4	64.6	57.1	57.2	52.9	49.4	45.3	38.7	29.4
21/11/2013	22:35:00	57.2	54.7	63.4	56.3	57.3	52.4	48.6	44.5	38.0	28.9
21/11/2013	22:40:00	59.2	55.2	64.0	56.7	57.1	52.8	49.2	45.3	38.1	28.8
21/11/2013	22:45:00	57.1	55.0	63.4	56.0	57.3	52.6	48.8	45.0	38.5	29.5
21/11/2013	22:50:00	56.6	54.5	63.4	56.0	56.7	52.2	48.7	44.4	37.8	29.2
21/11/2013	22:55:00	56.8	54.7	62.4	56.1	57.0	52.3	48.8	44.5	37.8	28.9
21/11/2013	23:00:00	57.7	54.9	63.5	56.6	57.5	52.3	48.8	45.1	38.6	29.5
21/11/2013	23:05:00	57.6	54.9	61.8	55.9	56.9	52.2	49.2	45.1	38.0	28.9
21/11/2013	23:10:00	56.9	54.6	62.8	55.9	56.9	52.1	48.8	44.8	38.3	28.9
21/11/2013	23:15:00	56.7	54.3	61.4	55.4	56.6	52.0	48.3	44.5	37.9	29.1
21/11/2013	23:20:00	63.7	55.3	63.5	56.5	57.5	52.8	49.6	45.9	38.9	30.2
21/11/2013	23:25:00	58.3	54.7	61.8	55.5	57.0	52.4	48.9	44.9	38.2	28.9
21/11/2013	23:30:00	66.7	54.4	61.8	55.9	56.7	51.9	48.4	44.2	37.5	28.3
21/11/2013	23:35:00	56.4	53.9	60.6	54.9	57.0	51.6	47.7	43.4	37.1	28.0
21/11/2013	23:40:00	57.7	54.2	61.6	55.7	57.3	51.9	48.0	43.7	37.1	28.1
21/11/2013	23:45:00	57.2	54.2	61.3	54.8	56.8	51.5	48.3	44.0	37.5	28.5
21/11/2013	23:50:00	61.3	54.0	61.9	54.9	56.8	51.6	47.8	43.7	37.3	28.5
21/11/2013	23:55:00	55.7	53.7	60.8	54.7	56.8	51.5	47.2	42.9	36.5	27.8
22/11/2013	00:00:00	57.0	54.3	62.1	55.6	56.9	52.2	48.1	43.9	37.2	28.4
22/11/2013	00:05:00	58.3	54.1	61.7	55.3	57.4	51.7	47.4	43.0	36.6	27.8
22/11/2013	00:10:00	58.1	54.0	60.4	54.9	57.0	51.7	47.5	43.3	37.4	28.2
22/11/2013	00:15:00	56.0	53.9	60.9	54.7	56.7	51.6	47.8	43.5	36.8	27.7
22/11/2013	00:20:00	56.4	54.3	61.6	55.1	57.1	51.7	48.2	43.8	36.9	27.8
22/11/2013	00:25:00	65.7	54.3	61.7	55.4	57.2	51.9	48.3	44.1	37.5	28.6
22/11/2013	00:30:00	56.3	54.2	61.6	55.0	57.0	51.6	48.1	44.0	37.2	28.1
22/11/2013	00:35:00	62.6	54.3	61.3	54.7	57.0	51.6	48.2	44.1	37.4	28.4
22/11/2013	00:40:00	56.2	53.9	60.3	54.5	56.7	51.5	47.6	43.4	37.0	27.9
22/11/2013	00:45:00	56.9	53.9	61.6	54.7	57.1	51.3	47.5	43.3	36.8	27.9
22/11/2013	00:50:00	56.5	53.9	60.6	54.6	56.7	51.5	47.6	43.4	36.7	28.0
22/11/2013	00:55:00	56.0	53.7	60.0	54.3	57.1	51.2	47.1	43.1	36.7	27.7
22/11/2013	01:00:00	56.4	53.9	60.5	54.3	56.8	51.6	47.8	43.7	36.8	27.8
22/11/2013	01:05:00	56.4	54.0	60.6	54.7	56.8	51.3	47.9	43.5	36.9	28.0
22/11/2013	01:10:00	56.0	53.7	60.5	54.6	56.6	51.4	47.5	43.1	36.5	27.7
22/11/2013	01:15:00	63.3	53.9	60.7	54.7	57.0	51.2	47.8	43.5	36.6	27.6
22/11/2013	01:20:00	57.0	53.8	60.6	54.5	56.6	51.5	47.7	43.6	37.5	28.5
22/11/2013	01:25:00	59.4	54.2	61.0	54.9	57.1	51.8	48.2	43.9	37.1	27.9
22/11/2013	01:30:00	57.0	54.1	59.8	54.3	56.6	51.6	48.3	43.8	36.4	27.5
22/11/2013	01:35:00	57.0	54.2	61.4	54.9	56.8	51.5	48.3	44.1	37.3	28.1
22/11/2013	01:40:00	56.2	53.8	59.4	53.9	56.5	51.4	47.8	43.2	36.3	27.6
22/11/2013	01:45:00	56.5	54.2	60.7	54.4	56.9	51.5	48.4	43.8	37.0	28.4

Date	Time	L_{Aeq}	L_{A90}	L_{A90}							
				63	125	250	500	1k	2k	4k	8k
22/11/2013	01:50:00	64.1	54.1	60.2	54.5	56.9	51.3	48.1	44.1	37.3	28.1
22/11/2013	01:55:00	56.0	53.7	59.7	54.2	56.9	51.1	47.5	43.5	36.4	27.3
22/11/2013	02:00:00	55.7	53.3	59.6	53.8	56.7	50.6	47.2	42.9	36.0	27.4
22/11/2013	02:05:00	56.3	53.9	60.7	54.3	56.9	51.4	47.8	43.7	36.7	27.7
22/11/2013	02:10:00	55.9	53.6	58.8	53.7	56.3	50.9	47.7	43.4	36.3	27.3
22/11/2013	02:15:00	69.7	54.1	60.2	54.0	56.6	51.4	48.1	44.0	36.9	28.0
22/11/2013	02:20:00	64.1	54.1	61.5	54.8	56.9	51.3	48.0	44.0	37.1	27.8
22/11/2013	02:25:00	55.4	53.1	58.9	53.7	56.5	50.7	46.5	42.4	36.1	27.4
22/11/2013	02:30:00	55.5	53.4	58.4	53.5	56.6	50.7	47.0	42.7	36.4	27.7
22/11/2013	02:35:00	56.8	54.0	60.9	54.1	57.2	51.4	47.7	43.5	36.8	28.0
22/11/2013	02:40:00	63.5	53.2	58.3	53.3	56.4	50.8	46.6	42.7	36.4	27.8
22/11/2013	02:45:00	55.8	53.4	58.8	53.7	56.6	50.7	47.1	43.1	36.8	28.2
22/11/2013	02:50:00	55.9	53.6	58.3	53.8	56.7	51.2	47.4	43.4	36.5	27.4
22/11/2013	02:55:00	56.1	53.1	58.2	53.6	56.6	50.5	46.6	42.5	35.9	27.3
22/11/2013	03:00:00	55.8	53.3	58.4	54.1	56.7	50.9	46.8	42.9	36.5	27.7
22/11/2013	03:05:00	55.1	53.0	58.1	53.7	56.6	50.5	46.3	42.5	36.2	27.7
22/11/2013	03:10:00	56.1	53.6	58.8	53.7	56.5	51.1	47.4	43.3	36.7	27.9
22/11/2013	03:15:00	55.9	53.5	59.1	53.9	56.7	50.8	47.2	43.1	36.5	27.8
22/11/2013	03:20:00	56.5	53.7	59.9	54.4	56.8	51.1	47.4	43.2	36.2	27.6
22/11/2013	03:25:00	55.7	53.4	58.9	53.8	56.5	50.8	46.9	43.2	36.4	27.6
22/11/2013	03:30:00	56.6	53.3	59.4	53.7	56.6	50.7	46.9	42.9	36.2	27.4
22/11/2013	03:35:00	55.4	53.2	59.5	53.5	56.5	50.8	46.7	42.6	36.5	27.8
22/11/2013	03:40:00	55.6	53.4	58.8	53.8	56.7	50.8	46.9	43.2	36.5	27.8
22/11/2013	03:45:00	55.4	53.2	58.8	53.5	56.4	50.8	46.5	42.5	36.1	27.6
22/11/2013	03:50:00	55.9	53.4	58.6	53.5	56.7	50.8	46.9	43.0	36.5	27.7
22/11/2013	03:55:00	56.0	53.5	58.9	53.9	56.5	51.1	47.3	43.2	36.4	27.5
22/11/2013	04:00:00	55.4	53.1	58.5	53.7	56.3	50.6	46.3	42.3	35.8	27.3
22/11/2013	04:05:00	55.2	53.2	57.6	53.7	56.5	50.8	46.3	42.3	36.3	27.6
22/11/2013	04:10:00	58.4	53.0	58.3	53.6	56.5	50.4	46.5	42.6	35.9	27.4
22/11/2013	04:15:00	56.3	53.5	59.3	53.7	56.7	50.9	47.3	43.3	36.2	27.5
22/11/2013	04:20:00	55.4	53.3	58.7	53.8	56.8	50.9	46.5	42.5	36.3	28.2
22/11/2013	04:25:00	56.0	53.3	58.0	53.8	56.8	50.4	46.8	42.9	36.9	28.3
22/11/2013	04:30:00	55.5	53.1	57.7	53.7	56.6	50.9	46.3	42.3	36.0	27.6
22/11/2013	04:35:00	55.6	53.1	58.4	53.7	56.4	50.6	46.7	42.7	36.3	27.7
22/11/2013	04:40:00	55.9	52.9	57.5	53.5	56.6	50.7	46.3	42.2	36.2	27.8
22/11/2013	04:45:00	68.1	52.8	57.4	53.4	56.4	50.4	45.9	41.9	35.8	27.4
22/11/2013	04:50:00	55.1	53.1	59.2	53.7	56.5	50.6	46.5	42.4	36.3	27.9
22/11/2013	04:55:00	68.2	53.0	58.7	53.9	56.6	50.6	46.2	42.0	35.8	27.4
22/11/2013	05:00:00	54.8	52.9	57.6	53.5	56.4	50.5	46.4	42.0	35.9	27.5
22/11/2013	05:05:00	55.2	52.8	57.9	53.4	56.3	50.4	45.8	42.0	36.4	28.1
22/11/2013	05:10:00	56.1	53.1	60.0	54.1	56.6	50.7	46.5	42.2	36.3	27.9
22/11/2013	05:15:00	67.1	53.3	58.2	54.3	56.7	51.0	46.6	42.9	36.9	28.7
22/11/2013	05:20:00	55.6	53.3	60.5	54.6	56.9	50.8	46.7	42.5	36.3	27.6
22/11/2013	05:25:00	55.6	53.1	58.6	54.2	56.4	50.7	46.0	42.3	36.5	28.1

Date	Time	L_{Aeq}	L_{A90}	L_{A90}							
				63	125	250	500	1k	2k	4k	8k
22/11/2013	05:30:00	56.3	53.4	59.5	54.5	57.0	51.0	46.8	42.6	36.3	27.7
22/11/2013	05:35:00	56.0	52.9	58.6	53.7	56.7	50.9	46.1	42.0	35.9	27.6
22/11/2013	05:40:00	55.9	53.2	59.8	54.4	56.6	50.7	46.4	42.5	36.3	27.6
22/11/2013	05:45:00	56.4	53.3	59.0	54.1	56.7	50.9	46.5	42.6	36.8	28.2
22/11/2013	05:50:00	55.9	53.3	60.8	54.4	56.8	51.0	46.5	42.5	36.2	27.6
22/11/2013	05:55:00	58.7	53.8	61.2	54.8	57.2	51.6	47.0	43.1	36.8	27.8
22/11/2013	06:00:00	61.7	55.1	62.3	56.2	58.3	53.0	48.5	43.6	36.6	27.6
22/11/2013	06:05:00	56.7	53.8	61.1	55.3	57.0	51.5	47.3	43.2	37.3	28.6
22/11/2013	06:10:00	56.5	53.8	60.7	54.8	57.2	51.6	47.0	43.1	36.8	27.9
22/11/2013	06:15:00	59.6	55.1	61.6	55.8	57.9	53.2	48.6	44.8	38.4	29.1
22/11/2013	06:20:00	57.6	54.5	62.0	55.8	57.4	52.6	47.9	43.7	37.4	28.2
22/11/2013	06:25:00	57.5	54.7	62.0	55.8	58.0	52.0	48.3	44.0	37.5	28.3
22/11/2013	06:30:00	58.6	54.7	61.6	55.5	57.5	52.1	48.4	44.6	38.0	28.7
22/11/2013	06:35:00	67.5	57.0	63.9	57.8	59.1	53.5	50.9	47.5	40.7	31.5
22/11/2013	06:40:00	58.4	55.3	63.8	56.9	57.5	52.7	49.7	45.6	38.4	28.8
22/11/2013	06:45:00	57.5	54.3	61.1	55.7	57.0	52.1	48.1	43.8	37.1	28.4
22/11/2013	06:50:00	61.1	55.6	63.9	57.0	57.8	53.0	49.7	46.2	39.4	29.5
22/11/2013	06:55:00	60.7	54.8	63.1	56.2	57.6	52.5	48.5	44.8	38.2	29.0
22/11/2013	07:00:00	57.7	54.0	63.1	56.0	57.0	51.6	48.0	44.0	37.3	28.3
22/11/2013	07:05:00	58.0	54.7	63.2	56.5	57.1	52.4	48.7	44.8	37.7	28.2
22/11/2013	07:10:00	56.9	54.3	62.5	56.0	56.8	52.0	48.2	44.3	37.9	28.5
22/11/2013	07:15:00	61.2	54.9	63.1	56.5	57.5	52.3	48.9	45.0	38.4	29.4
22/11/2013	07:20:00	58.9	54.7	63.8	56.8	57.1	52.5	48.6	44.7	38.3	30.1
22/11/2013	07:25:00	58.6	56.1	64.5	57.9	57.8	53.1	49.8	46.5	40.1	31.3
22/11/2013	07:30:00	60.1	56.1	63.5	57.3	57.5	53.1	50.0	47.1	40.9	32.1
22/11/2013	07:35:00	58.7	55.2	63.2	57.0	57.5	52.7	49.3	45.4	38.6	29.7
22/11/2013	07:40:00	57.8	55.5	65.2	57.5	57.7	52.6	49.4	46.2	39.3	29.7
22/11/2013	07:45:00	57.9	55.5	63.7	56.7	57.3	52.7	49.6	46.1	38.7	28.9
22/11/2013	07:50:00	58.1	55.9	64.3	58.1	57.6	53.3	49.9	46.5	40.0	29.6
22/11/2013	07:55:00	58.2	55.4	63.9	57.0	57.4	52.8	49.7	46.3	39.6	29.7
22/11/2013	08:00:00	58.9	55.5	64.3	57.0	57.4	53.0	49.6	46.2	39.8	30.1
22/11/2013	08:05:00	61.2	55.5	65.8	57.9	57.3	52.8	49.8	46.0	38.8	29.6
22/11/2013	08:10:00	59.0	56.1	66.0	58.3	57.7	53.4	50.0	46.8	40.3	30.2
22/11/2013	08:15:00	60.0	56.2	65.2	58.4	57.8	53.5	50.4	46.4	39.2	29.6
22/11/2013	08:20:00	58.0	55.6	64.6	57.6	57.5	53.5	49.6	45.8	38.7	29.3
22/11/2013	08:25:00	57.8	55.4	64.6	57.7	57.3	52.8	49.4	45.7	39.3	29.8
22/11/2013	08:30:00	58.6	56.5	65.4	58.0	57.9	53.5	50.5	47.3	40.3	29.5
22/11/2013	08:35:00	61.4	56.5	65.7	58.4	57.9	53.7	50.8	47.2	41.0	30.8
22/11/2013	08:40:00	59.7	57.3	66.3	58.4	57.8	54.2	52.0	49.0	42.6	32.4
22/11/2013	08:45:00	58.2	56.2	66.0	58.4	57.8	53.4	50.3	46.8	40.7	31.2
22/11/2013	08:50:00	58.9	56.9	65.6	58.3	57.6	54.2	51.1	47.8	41.1	31.5
22/11/2013	08:55:00	58.9	57.1	65.7	58.3	58.0	54.0	51.6	48.1	41.9	32.3
22/11/2013	09:00:00	58.6	56.7	65.8	58.6	57.5	53.8	50.9	48.0	41.7	31.8
22/11/2013	09:05:00	60.5	57.6	66.1	58.9	58.2	54.6	52.1	48.8	42.6	32.8

Date	Time	L_{Aeq}	L_{A90}	L_{A90}							
				63	125	250	500	1k	2k	4k	8k
22/11/2013	09:10:00	61.0	57.5	66.0	59.8	58.0	54.6	52.3	48.6	41.9	32.0
22/11/2013	09:15:00	59.0	57.7	67.8	59.6	58.4	54.4	52.3	49.0	42.7	32.8
22/11/2013	09:20:00	59.4	57.5	66.8	59.0	58.5	54.3	52.1	48.9	42.3	32.3
22/11/2013	09:25:00	59.5	57.6	65.9	59.1	57.8	54.4	52.2	48.9	42.5	32.4
22/11/2013	09:30:00	61.6	56.5	65.3	58.1	57.5	53.8	51.1	47.5	41.2	31.9
22/11/2013	09:35:00	58.1	55.8	64.9	57.9	55.5	52.9	50.4	47.3	41.3	31.1
22/11/2013	09:40:00	62.1	57.0	66.2	59.0	56.2	54.0	51.6	48.2	42.1	32.6
22/11/2013	09:45:00	59.2	56.2	65.1	57.6	56.0	53.6	50.8	47.5	41.4	32.5
22/11/2013	09:50:00	70.5	56.2	65.0	57.6	57.2	53.3	50.5	47.2	40.8	31.3
22/11/2013	09:55:00	63.2	57.3	65.4	58.3	57.7	54.3	51.9	48.3	41.7	32.1
22/11/2013	10:00:00	59.3	56.7	65.7	58.8	57.8	53.9	51.1	47.5	41.1	32.2
22/11/2013	10:05:00	59.1	55.9	64.7	57.7	57.2	53.2	50.2	46.7	40.5	31.6
22/11/2013	10:10:00	58.9	56.2	65.4	58.3	57.3	53.6	50.3	47.0	40.7	31.3
22/11/2013	10:15:00	59.4	56.7	65.4	58.6	57.6	54.0	51.0	47.3	40.6	31.1
22/11/2013	10:20:00	59.1	56.9	66.0	58.5	58.0	54.2	51.2	47.6	41.5	32.3
22/11/2013	10:25:00	59.7	57.4	66.0	59.4	58.2	54.9	51.7	47.7	42.1	33.7
22/11/2013	10:30:00	59.3	57.4	65.1	58.7	58.0	55.0	52.0	47.9	41.8	33.8
22/11/2013	10:35:00	59.5	57.4	65.8	58.9	58.1	55.1	52.0	48.0	41.9	33.9
22/11/2013	10:40:00	59.5	57.7	65.8	59.1	58.1	55.1	52.2	48.5	42.1	33.8
22/11/2013	10:45:00	59.4	57.8	65.6	58.9	58.3	55.8	52.3	48.2	42.1	33.8
22/11/2013	10:50:00	62.8	58.6	66.9	59.6	58.7	56.8	53.1	49.1	42.1	33.7
22/11/2013	10:55:00	59.5	57.6	65.8	58.7	58.0	56.1	51.8	48.0	41.9	33.9
22/11/2013	11:00:00	59.1	57.8	65.8	59.0	58.1	55.1	52.1	48.3	42.3	34.0
22/11/2013	11:05:00	60.9	57.9	65.8	59.4	58.2	55.2	52.6	48.6	42.2	34.0
22/11/2013	11:10:00	59.5	57.2	65.5	58.5	57.8	54.7	51.7	47.8	41.9	33.5
22/11/2013	11:15:00	59.0	56.6	65.3	58.3	57.5	54.4	51.0	47.0	41.1	33.2
22/11/2013	11:20:00	59.9	57.3	66.4	59.0	57.9	54.9	51.7	48.1	41.9	33.3
22/11/2013	11:25:00	59.5	57.4	66.3	59.2	57.9	54.9	51.9	47.9	41.8	33.3
22/11/2013	11:30:00	60.2	57.6	66.4	59.0	58.0	55.2	52.3	48.2	42.4	34.0
22/11/2013	11:35:00	61.2	57.5	65.6	58.8	57.7	55.3	52.2	48.1	42.2	33.7
22/11/2013	11:40:00	60.0	57.4	66.0	59.2	57.7	54.8	52.1	48.4	42.5	33.7
22/11/2013	11:45:00	63.7	57.7	65.6	58.7	58.3	55.4	52.5	48.1	42.7	35.2
22/11/2013	11:50:00	67.8	58.0	66.5	59.4	58.2	55.4	52.6	48.9	42.4	34.2
22/11/2013	11:55:00	60.9	57.5	66.0	59.3	58.4	55.3	51.8	48.0	42.2	34.0
22/11/2013	12:00:00	61.9	58.1	66.6	59.3	58.3	55.5	52.6	49.1	42.7	33.9
22/11/2013	12:05:00	61.7	58.1	66.5	59.0	58.1	55.3	52.6	49.1	42.4	33.4
22/11/2013	12:10:00	61.2	57.8	66.2	58.7	58.2	55.4	52.0	48.6	42.3	33.3
22/11/2013	12:15:00	59.9	58.1	66.3	59.3	58.7	55.7	52.5	48.7	42.5	34.2
22/11/2013	12:20:00	62.1	57.7	66.4	59.2	58.4	55.4	52.1	48.3	42.6	34.0
22/11/2013	12:25:00	59.1	57.4	65.8	59.3	58.4	54.8	51.8	47.7	42.1	33.4
22/11/2013	12:30:00	59.3	57.3	65.9	59.1	58.5	54.8	51.5	47.5	41.5	32.8
22/11/2013	12:35:00	58.8	57.0	66.1	59.1	56.9	54.6	51.5	47.9	41.7	33.0
22/11/2013	12:40:00	60.0	57.9	65.8	58.9	57.1	55.5	52.5	48.9	42.7	33.7
22/11/2013	12:45:00	59.7	57.8	66.1	58.9	57.3	55.3	52.4	48.8	42.5	33.5

Date	Time	L_{Aeq}	L_{A90}	L_{A90}							
				63	125	250	500	1k	2k	4k	8k
22/11/2013	12:50:00	59.5	57.9	66.7	59.8	58.2	55.3	52.4	48.7	42.9	34.2
22/11/2013	12:55:00	58.7	57.3	65.3	58.6	57.8	55.0	52.1	48.0	41.8	33.8
22/11/2013	13:00:00	58.9	57.2	65.7	58.6	57.7	54.8	51.5	47.6	41.3	32.6
22/11/2013	13:05:00	58.8	57.3	65.1	58.3	58.1	55.0	51.7	47.9	41.7	33.1
22/11/2013	13:10:00	60.5	57.9	65.7	58.9	58.1	55.4	52.4	48.9	42.8	33.8
22/11/2013	13:15:00	59.6	57.8	66.0	59.2	58.2	55.3	52.1	48.5	42.6	33.8
22/11/2013	13:20:00	59.3	57.4	65.7	59.0	57.9	55.0	51.7	48.2	41.8	32.7
22/11/2013	13:25:00	61.4	57.7	66.3	59.1	58.3	55.3	52.6	48.1	41.9	33.5
22/11/2013	13:30:00	59.8	57.3	65.4	58.8	57.9	54.9	51.7	47.8	41.8	33.8
22/11/2013	13:35:00	59.3	57.0	64.7	58.2	57.6	54.8	51.4	47.4	41.6	34.7

APPENDIX G: Glossary of Acoustic Terms

DECIBEL (dB) - A unit of sound pressure measurement
Sound Pressure Level in dB (Lp) = 20 log (Measured sound pressure/Reference sound pressure = 20 µPa)

dB(A) - The A -weighted sound pressure level, the weighting network reduces low frequency sound in a similar way to the human ear.

REVERBERATION TIME (RT or T) – decay of sound in rooms
The time taken for a sound, once terminated, to fall through 60dB i.e. to one millionth of its original sound intensity. T30 – RT for first 30dB of decay. RT_{500} - Mid frequency RT.
HERTZ (Hz) - a unit of frequency measurement. The normal range of hearing is from 20Hz to about 15kHz.

ABSORPTION COEFFICIENT – degree to which a material absorbs sound.
The ratio of absorbed to incident sound energy (perfect absorber = 1)

SOUND REDUCTION INDEX R – quantity which describes a material's ability to reduce the sound pressure level across it (e.g. a wall or floor)

$R = L1 - L2 + 10\log (S/A)$

L1 - Average sound pressure level in source room (averaged from 100 Hz – 3150 Hz)
L2 - Average sound pressure level in receiving room (averaged from 100 Hz – 3150 Hz)
S – Wall Area (m^2)
A – Total absorption in receiving room (m^2 units)

Rw – weighted sound reduction index

AVERAGE ROOM TO ROOM LEVEL DIFFERENCE – D, dB = L1 – L2, averaged 1/3 octave bands from 100Hz – 3150kHz.

Dw – weighted value of D (usually 2 - 3dB higher)

DnT, w – Dw corrected for reverberation time of receiving room

NOISE RATING CURVES (NR CURVES) – set of curves used to describe optimum background noise levels for different tasks.

L10/90 LEVEL (dB) - The level in dB of a time varying sound pressured level (e.g. traffic) exceeded for 10%/90% of the time of measurement.
L90 is usually called the BACKGROUND NOISE LEVEL.

Leq AVERAGE SOUND PRESSURE LEVEL – level dB of a time varying sound pressure level with equal amounts of energy above and below it, for the time of measurement.

TONAL NOISE – noise of a single frequency (or a narrow band of frequencies that can be perceived as a tone), audible above the broad band noise background. Noise which is at least 5dB above the average of the 1/3 octave band sound pressure levels immediately on either side of it.