ANNEXURE A: Curriculum Vitae

STEVEN E. COOPER. - DIRECTOR

DATE OF BIRTH: 15 June 1952

QUALIFICATIONS:

Bachelor of Science Engineering (Electrical) 1978, University of NSW

Master of Science (Architecture) 1990, University of Sydney

MEMBERSHIPS:

Member, Australian Acoustical Society

Fellow, Institution of Engineers, Australia
Chartered Professional Engineer

Member, Institute of Noise Control Engineering

Member of Committee AV/10 – Whole Body Vibration (1986 to present), Committee EV/11 – Aircraft & Helicopter Noise (1986 to present), AV/4 – Architectural Acoustics (1996 – 1999), and Committee EV/10/4 – Railway Noise (1998 to 2007)

NSW Division, Australian Acoustical Society
Membership Committee since 1978 to 1997

EXPERIENCE:

The Acoustic Group Pty Ltd
Incorporated in 2003

Steven Cooper Acoustics Pty Ltd
Incorporated in 1995

James Madden Cooper Atkins Pty Ltd
Incorporated in 1981

James A. Madden Associates Pty Ltd
Appointed Associate Director 1980
Appointed Associate 1979
Appointed Engineer 1978

THE ACOUSTIC GROUP

20-22 FRED STREET, LILYFIELD, 2040, NSW, AUSTRALIA
ph: (612) 9555 4444 fx: (612) 9555 4442 tag1@acoustics.com.au
A.B.N. 73 082 704 701

The Acoustic Group was formed to provide specialised services and research in Acoustics and Vibration and draws on the considerable experience of Mr Cooper from his position from 1982-1995 as Principal and Partner of James Madden Cooper Atkins and from 1995-2003 as Principal of Steven Cooper Acoustics. His particular areas of acoustical expertise include machine and vibration monitoring, acoustical design of auditoria, studios and entertainment venues, traffic and helicopter noise, laboratory instrumentation, precision analysis system, legal assignments and expert witness.

He has considerable experience in vibration measurement and assessment in industry for both Machinery Operating Condition and Occupational Exposure Levels.

His experience in the measurement and assessment of noise emission from industry and licensed premises is extensive having produced numerous assessment reports and noise control designs for clients, statutory bodies and courts. He has been an invited Guest Lecturer on Noise Assessment to NSW Policy Academy for their Noise Familiarisation Course run by the State Pollution Control Commission, a guest lecturer for the Faculty of Architecture at the University of NSW, and a lecturer on noise issues for seminars/workshops run by the Australian Industries Group, the Australian Environment Network and NEERG Seminars.

He is the acknowledged leader in the measurement, assessment and design of helipad/heliport operations, military aircraft noise assessments, and is a major contributor to various Australian Standards. Mr Cooper is the recipient of an Engineering Excellence Award in the Environment Category from the Institution of Engineers in 1997 for the TRW No. 2 Forge Project.

Projects in which he has been involved include the ICI Botany Complex (Noise and Vibration), APM Matraville Paper Mill (Site noise control), Manildra Flour Mill, Sydney CBD, Granville & Gosford Heliports, ANEF Validation and NPD testing for F111, FA-18, JSF aircraft, Iroquois, Squirrel, Sea King, Sea Hawk, Blackhawk, Super Seasprite, Tiger and MRH90 helicopters, acoustical assessments for Licensed Premises, Studios, Auditorias etc.

PAPERS & PUBLICATIONS

"Design for Noise Reduction – Dual Occupancies" 5th Annual Conference, Local Government Planners Association of NSW, November 1979

"Is Exposure to High Levels of 'Rock' Music a Major Health Hazard to Patrons and Staff" 10th International Congress on Acoustics – Sydney, July, 1980

"Hornsby Shire's General Sound Insulation Code for Residential Flat Buildings" 10th International Congress on Acoustics – Sydney, July, 1980

"Archiving Reproducing Piano Rolls" 10th International Congress on Acoustics – Sydney, July, 1980

"Road Traffic Noise and Local Government Controls", Graduate School of the Built Environment, University of NSW, February, 1981

"Noise Levels of Rock Music and Possible Effects on Young People's Hearing" Scientific Meeting NSW Division, Australian Acoustical Society, April, 1981

"Noise Assessment of Licensed Premises" NSW Police Noise Familiarisation Course, Policy Academy Sydney, July, 1981

"Noise Effects on Staff in Entertainment Venues" Australian Live Theatre Council, May, 1983

"Noise Pollution" Shout – August 1987, Journal of the Registered Clubs Association of NSW

"The Roles and Needs of Expert Witnesses", Development, Local Government and Environmental Seminar for Sly & Russell, Sydney, November, 1987

"Noise Limits for Helicopters", "Helicopters Noise and the Community", "Flight Techniques to Reduce Noise", Helicopter Noise Seminar – NSW Branch of the Helicopter Association of Australia, April, 1988

"Intensity Measurements of the Ampico/Duo Arts Parts 1 & 2" The AMICA News Bulletin (USA), Vol 25 No. 4, July, 1988

"Community Perceptions, Case Studies and Control of Noise" – Australian Conservation Foundation – Sydney Branch, September, 1988

"Helicopter Noise Assessment", Australian Acoustical Society Conference, Victor Harbour, South Australia, November, 1988

"Noise Considerations for the Establishment of Helipads/Heliports", Rotortech '89, Sydney, October, 1989

"An Investigation of the Alternatives to Sabine's Equation in the Determination of Absorption Coefficients using the Room Method", Master of Science Thesis, University of Sydney, March, 1990

"Noise Control – Decibels per dollars. A Practical Approach", The Stock Feed Manufacturers', Association of Australia Conference, Canberra, March, 1990

"Community Response to Aircraft & Helicopter Noise – Proposed PhD Research", Technical Meeting of the Australian Acoustical Society, NSW Division being a Review of Acoustics Research at Sydney University, May, 1991

"A Practical Method for the Assessment of Noise Controls for Aircraft Noise Intrusion", Second Sydney Airport Coalition Public Meeting, Petersham Town Hall, Sydney, September, 1991

"Are Regulatory Noise Limits in Australia Exterminating the Helicopter Industry?", Inter-Noise 91, Sydney, December, 1991

"Consideration of Alternative Acoustic Criteria for Assessment of Aircraft Noise in Wilderness & National Park Areas", Progress Report of Noise Criteria Working Group, Blue Mountains Fly Neighbourly Advice, July, 1994

"Are Regulatory Noise Limits in Australia Exterminating the Helicopter Industry?", Second Pacific International Conference on Aerospace Science & Technology, Melbourne, March, 1995

"Sound Proofing of a Forge", Acoustics Australia, Vol 26 (1998), No 2

"AS2021 – What Does it Mean Now?", Australian Mayoral Aviation Council Conference 1998

"Upgraded Plants and Retrospective Application of Modified Noise Criteria – Case Studies", Australian Industry Group, January, 1999

"Revision of Australian Standard AS2021", Airport Operators Conference, Melbourne, May, 1999

"Living with Your Neighbour's Noise", Neighbourhood Disputes Seminar, LAAMS, Sydney, May, 2000

"What Triggers the New EPA Noise Policies – Tips & Traps", Australian Environment Business Network Noise Pollution Seminar, June, 2001

"Practical Environment Management – Noise Issues", Australian Environment Business Network Environment Management Practitioners Workshop, August 2002, November 2002, February 2003, May 2003, August 2003

"Environmental Issues Management – Noise", Australian Industries Group Practical Methods and Technologies Seminar, October, 2002

"The INM Program is a much better program than HNM for helicopter modelling, but ….", SAE A-21 Helicopter Noise Working Group Meeting, Las Vegas, March, 2004

"Noise Certification, is the Helicopter Industry selling itself short?", HeliExpo 2004, Las Vegas, March, 2004

"Derivation & Use of NPD Curves for the INM", Helicopter Noise Workshop, American Helicopter Society Conference, June, 2005

"Problems with the INM: Part 1 – Lateral Attenuation", Noise of Progress Acoustics Conference 2006, New Zealand

"Problems with the INM: Part 2 – Atmospheric Attenuation", Noise of Progress Acoustics Conference 2006, New Zealand

"Problems with the INM: Part 3 – Derivation of NPD Curves", Noise of Progress Acoustics Conference 2006, New Zealand

"Problems with the INM: Part 4 – INM Inaccuracies", Noise of Progress Acoustics Conference, 2006, New Zealand

"Reviewing the Role of the Expert in Land & Environment Court Cases", NEERG Seminars, Sydney, August 2007

"JSF Aircraft Noise Issues for Australia", F35 ESOH Working Group Meeting, Washington, September 2007

"Acoustic Experts - Noise Under Pressure?" Getting it Together in the Land & Environment Court: Compiling Joint Expert Reports, NEERG Seminars, Sydney, October 2007

"What can go wrong acoustically", NEERG Seminar Dealing with DAs in 2009, Sydney, May 2009

"Community Response to Impulse Noise & Vibration", Training Area Noise & Vibration Workshop, Department of Defence, Canberra, June 2009

"Acoustics & Noise". Regulations & Implementation of DAs & SEPP65, NEERG Seminars, Sydney, March 2010

"INM Getting it to work Acoustically", 20th International Congress on Acoustics, Sydney, August 2010.

"Military Aircraft Noise in the Community", 20th International Congress on Acoustics, Sydney, August 2010.

"Sound Therapy Restores hearing – Fact or fiction? A personal experience of an acoustician", 20th International Congress on Acoustics, Sydney, August 2010.

"Alternative Aircraft Metrics – Useful or like moving the deck chairs on the Titanic", 20th International Congress on Acoustics, Sydney, August 2010.

"Issues arising from Incorrect Acoustic Conditions", Getting it Just Right, NEERG Seminars, Sydney, September 2010

"Avoiding/repairing acoustic disasters in DAs", Managing the DA Process from Go to Whoa, NEERG Seminars, Sydney, March 2011

"Aircraft Noise Measurements can be fun", Australian Acoustical Society NSW Division, August 2011

"INM Problems, Military Operations and AS2021 and the JSF", Australian Acoustical Society Victorian Division, September 2011

"Wind Farm Noise – An ethical dilemma for the Australian Acoustical Society?", Acoustics Australia –Vol 40, No2, August 2012

SPONSORED TECHNICAL REPORTS (Brief Selection only):

Noise Radiation and Reduction on a Fibreglass Minesweeper – HMAS Rushcutter for Carrington Slipways P/L, JMCA Report 16.1650.R1

Occupational Vibration Exposure Levels on Euclid Dump Trucks and Coal Haulers at Utah Blackall Mine Queensland, JMCA Report 16.1648.R1-R3

Thermal Expansion and Misalignment on a Gas Turbine Alternator at Shell Clyde Refinery, JMCA Report 17.1716.R1-R3

Acoustic Appraisal and Control – ABC Perth TV & Radio Studio Complex, JMCA Report 17.1607.R3

Southern Arterial Route – Pyrmont to St. Peters for NSW Department of Main Roads, JMCA Report 16.1647.R1

Building Structure Vibration Department of Social Security, East Point Centre Computer Installation, JMCA Report 15.1542.R2

Blower House Acoustic Controls (Building and Silencer Designs) St. Marys, Quakers Hill, Glenfield, Macquarie Fields and Hornsby Heights Pollution Control Plants, JMCA Reports 10.1014 & 14.1416

The Application and Use of ANEF Contours for Aircraft Noise Control, SCA Report 25.3127.R3 for Submission to the Senate Inquiry into Aircraft Noise at KSA

An Acoustical & Vibration Investigation into Freight Rail Operations in the Hunter Valley, SCA Report 26.3387.R1-R41

TRW No 2 Forge Noise Minimisation Study, SCA Reports 26.3314.R12-R19

Acoustical Assessment, Proposed Extension of Dock Hours, Westfield Shoppingtown, Parramatta SCA Reports 28.3766.R8-R12

Noise Impact Assessment, Proposed Service Centre, Cnr Cowpasture Road & Hoxton Park Road, Hoxton Park, SCA Report 30.3934.R1

Acoustical Assessment, Proposed Extension of Operating Hours, Westfield Shoppingtown Hornsby, SCA Report 30.3928.R3

Acoustical Assessment Aircraft Operations, RAAF Williamtown and Salt Ash Weapons Range, SCA Report 32.4190.R6

Acoustical Assessment Pollution Reduction Program No. 7, Shoalhaven Starches Plant, Bombaderry, SCA Report 32.3849.R17

HMAS ALBATROSS 2013 ANEF, Derivation of NPD Curves, SCA Report 33.4185.R11

Acoustical Assessment, Proposed Residential Development, Glenning Valley, Wyong, SCA Report 33.4303.R1

Acoustic Assessment, Proposed Groundwater Cleanup Project, Botany Industrial Park, TAG Report 34.4372.R3

Acoustic Design Report, Stage 1 Development Application for Bathurst Hospital, TAG Report 35.4477.R2

Acoustic Assessment, SCT Freight Complex - Stage 1, Brolgan Road, Parkes, TAG Report 36.4523.R1

Noise Disturbance in Residential Apartments as a Result of Building Expansion/Contraction, Bluewater Point Apartment Complex, Minyma, Queensland, TAG Report 36.4578.R1

Acoustic Design Report, Westfield Centrepoint Refurbishment, TAG Report 37.4472.R5

Construction Noise and Vibration Impact Assessment, Westfield Sydney City Refurbishment, TAG Report 37.4472.R6

Proposed Shao Lin Temple Development Site Near HMAS Albatross: Noise Assessment Report, TAG Report 37.4586.R1

TIGER ARH NPD Curves, TAG Report 37.4510.R15

Acoustical Assessment, Point Piper Marina, TAG Report 38.4705.R9

Rail Traffic Noise Impacts, Residential Sub-division, Isedale Road, Braemar, TAG Report 40.4865.R1

Acoustic Compliance Testing, New Buildings, RMAF BASE Butterworth, TAG Report 40.4386.R3

Acoustic Compliance Assessment, RAAF Base Williamtown – Off Base NMT Calibration, TAG Report 40.4421.R18

APPENDIX B: **Australian Acoustical Society CODE OF ETHICS**

1. Responsibility

The welfare, health and safety of the community shall at all times take precedence over sectional, professional and private interests.

2. Advance the Objects of the Society

Members shall act in such a way as to promote the objects of the Society.

3. Work within Areas of Competence

Members shall perform work only in their areas of competence.

4. Application of Knowledge

Members shall apply their skill and knowledge in the interest of their employer or client, for whom they shall act in professional matters as faithful agents or trustees.

5. Reputation

Members shall develop their professional reputation on merit and shall act at all times in a fair and honest manner.

6. Professional Development

Members shall continue their professional development throughout their careers and shall assist and encourage others to do so.

EXPLANATORY NOTES

1. Responsibility

In fulfilment of this requirement members of the Society shall:

1. avoid assignments that may create conflict between the interests of their clients, employers, or employees and the public interest.
2. conform to acceptable professional standard and procedures, and not act in any manner that may knowingly jeopardise the public welfare, health, or safety.
3. endeavour to promote the well-being of the community, and, if over-ruled in their judgement on this, inform their clients or employers of the possible consequences.
4. contribute to public discussion on matters within their competence when by so doing the well-being of the community can be advanced.

2. Advance the Objects of the Society

Appropriate objects of the Society as listed in the Memorandum of Association are:

Object (a)
To promote and advance acoustics in all its branches and to facilitate the exchange of information and ideas in relation thereto.

Object (e)
To encourage the study of acoustics, highlight excellence in acoustics and to improve and elevate the general and technical knowledge in any manner considered appropriate by the Society.

Object (g)
To encourage research and the publication of new developments relating to acoustics.

3. Work within Areas of Competence

In all circumstances members shall:

1. inform their employers or clients if any assignment requires qualifications and/or experience outside their fields of competence, and where possible make appropriate recommendations in regard to the need for further advice.
2. report, make statements, give evidence or advice in an objective and truthful manner and only on the basis of adequate knowledge.
3. reveal the existence of any interest, pecuniary or otherwise, that could be taken to affect their judgement in technical matters.

4. Application of Knowledge

Members shall at all times act equitably and fairly in dealing with others. Specifically they shall:

1. Strive to avoid all known or potential conflicts of interest, and keep employers or clients fully informed on all matters, financial or technical, that could lead to such conflicts.
2. refuse compensation, financial or otherwise, from more than one party for services on the same project, unless the circumstances are fully disclosed and agreed to by all interested parties.
3. neither solicit nor accept financial or other valuable considerations from material or equipment suppliers in return for specification or recommendation of their products, or from contractors or other parties dealing with their employer or client.

5. Reputation

No member shall act improperly to gain a benefit and, accordingly, shall not:

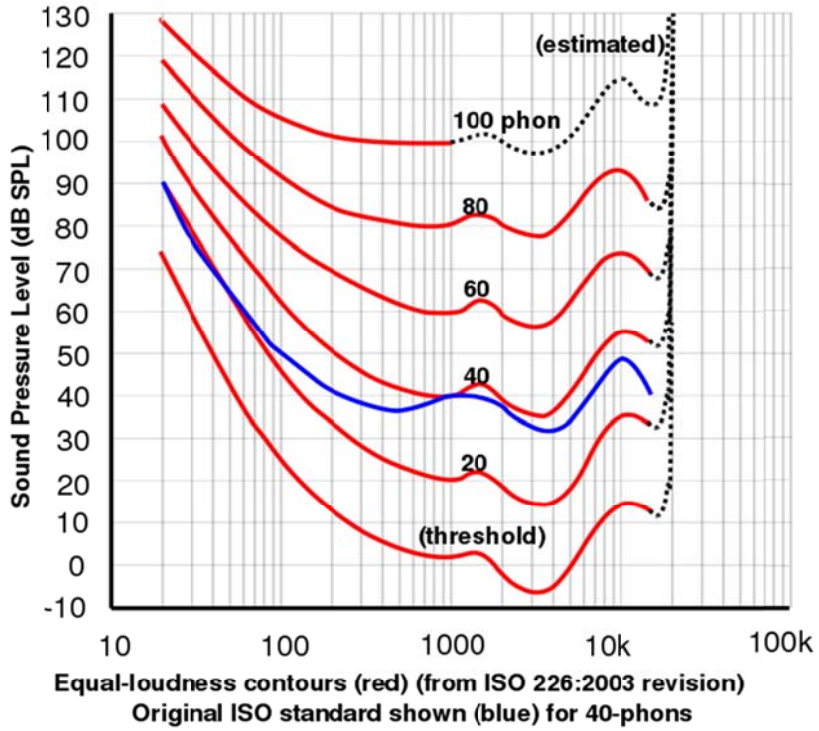
1. pay nor offer inducements, either directly or indirectly, to secure employment or engagement.
2. falsify or misrepresent their qualifications, or experience, or prior responsibilities nor maliciously or carelessly do anything to injure the reputation, prospects, or business of others.
3. use the advantages of privileged positions to compete unfairly.
4. fail to give proper credit for work of others to whom credit is due nor to acknowledge the contribution of others.

6. Professional Development

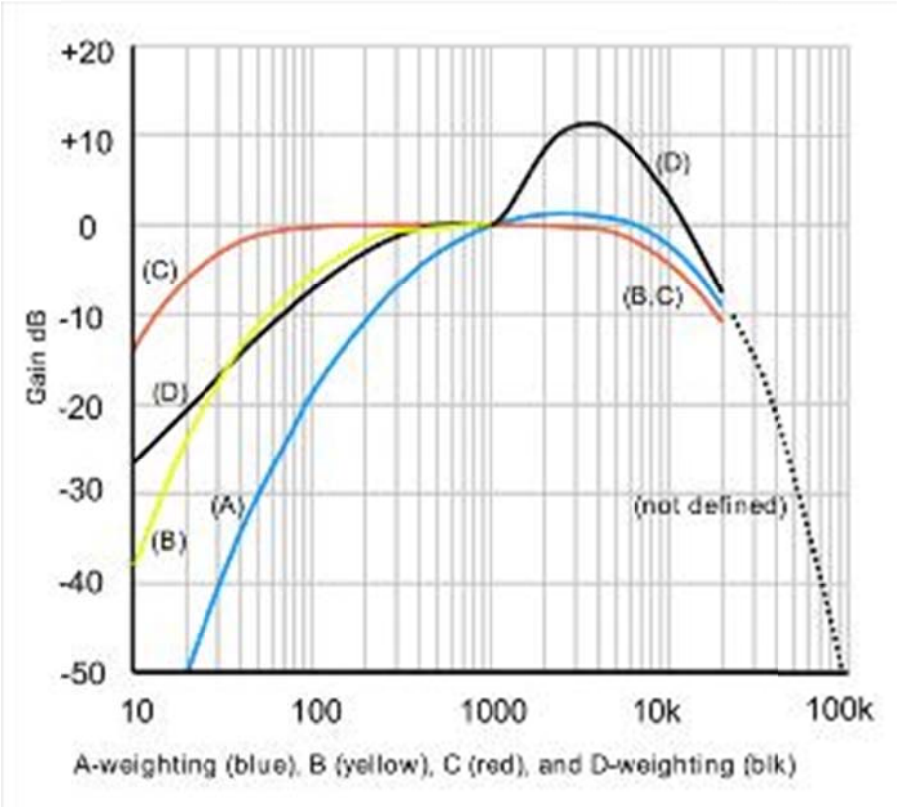
Members shall:

1. strive to extend their knowledge and skills in order to achieve continuous improvement in the science and practice of acoustics.
2. actively assist and encourage those under their direction or with whom they are associated to advance their knowledge and skills.

APPENDIX C: Hearing Response & Weighting Curves

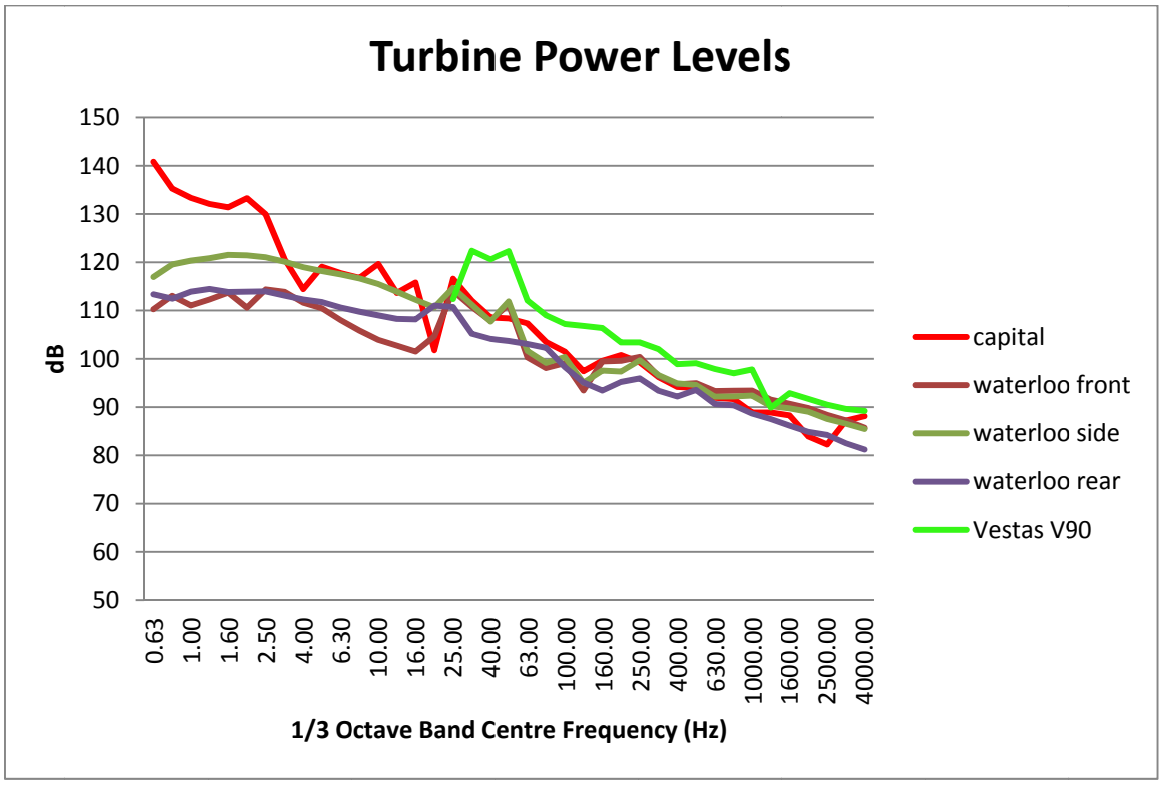


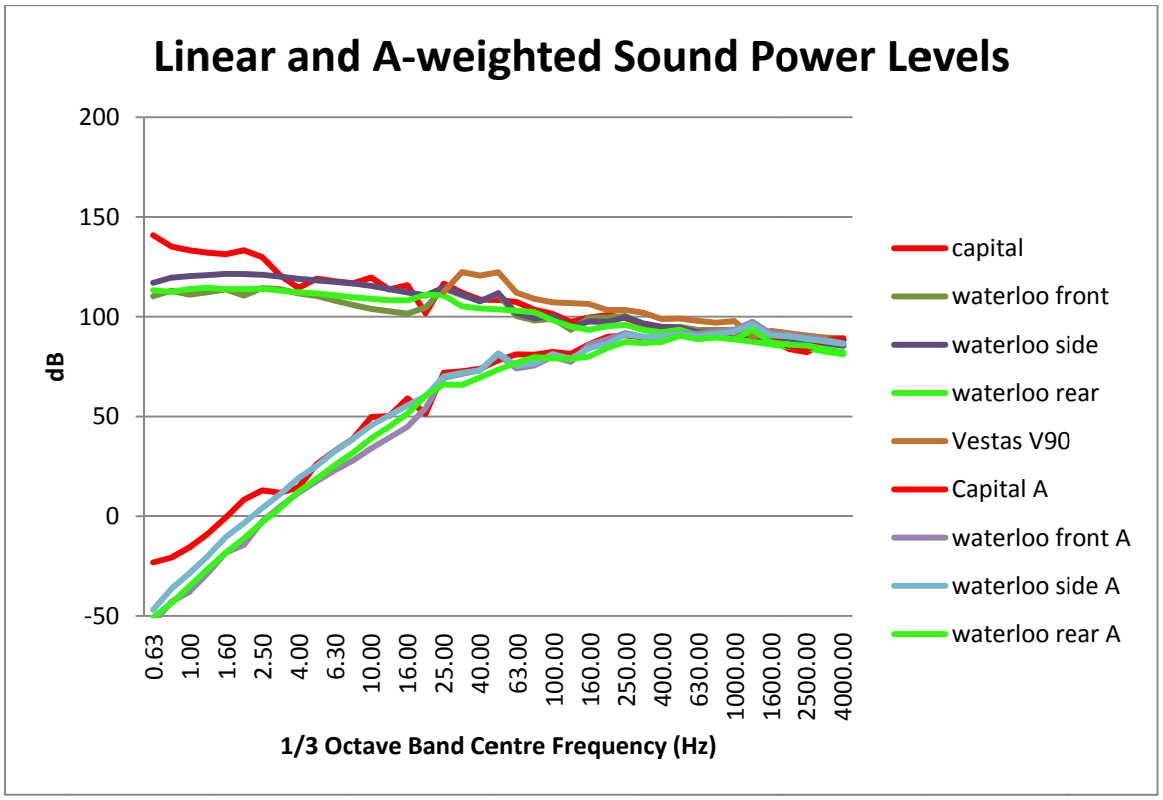
Equal-loudness contours (red) (from ISO 226:2003 revision)
Original ISO standard shown (blue) for 40-phons



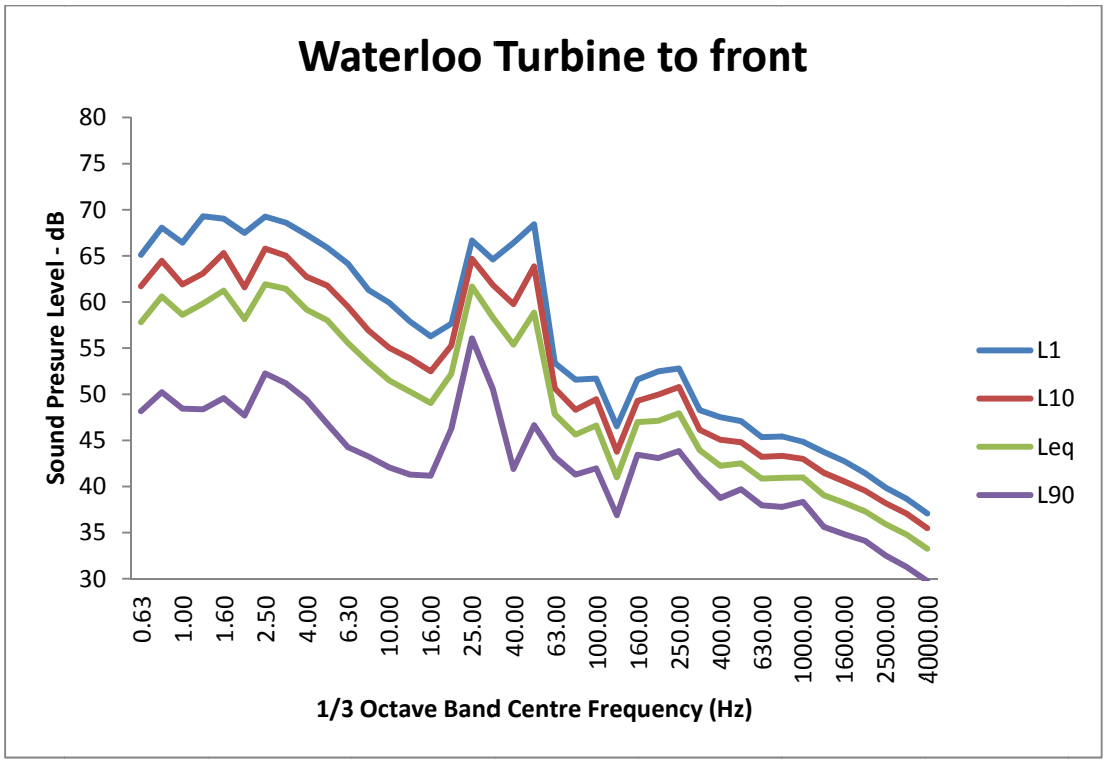
A-weighting (blue), B (yellow), C (red), and D-weighting (blk)

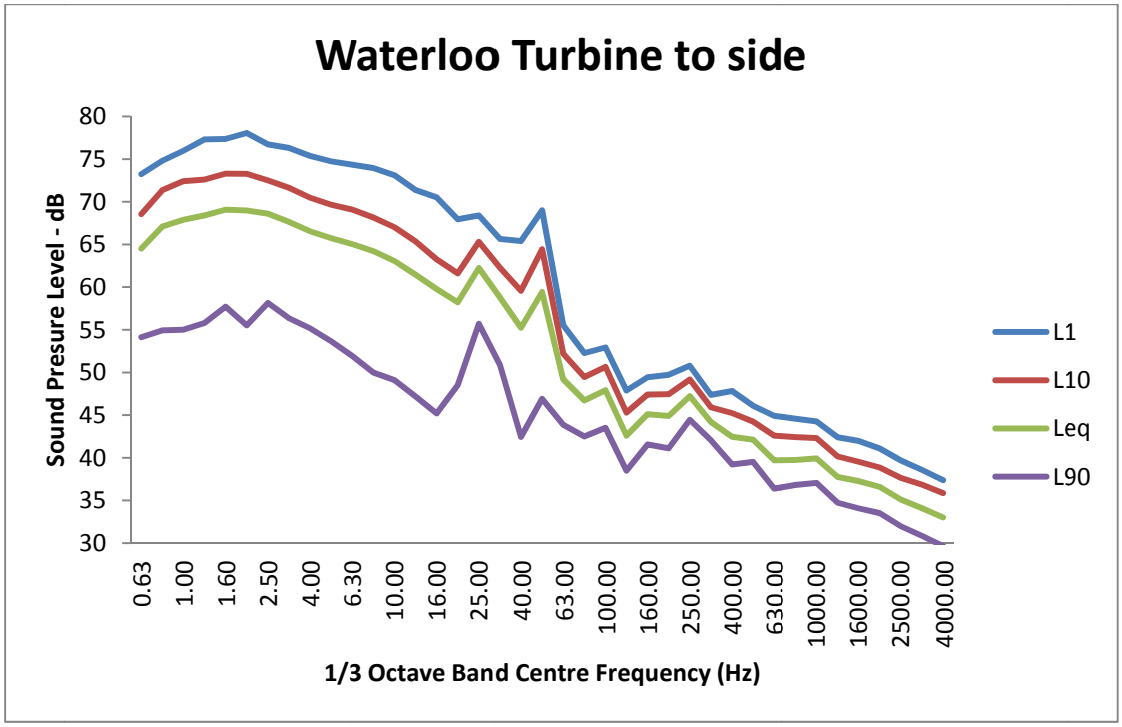
APPENDIX D: Turbine Sound Power Levels



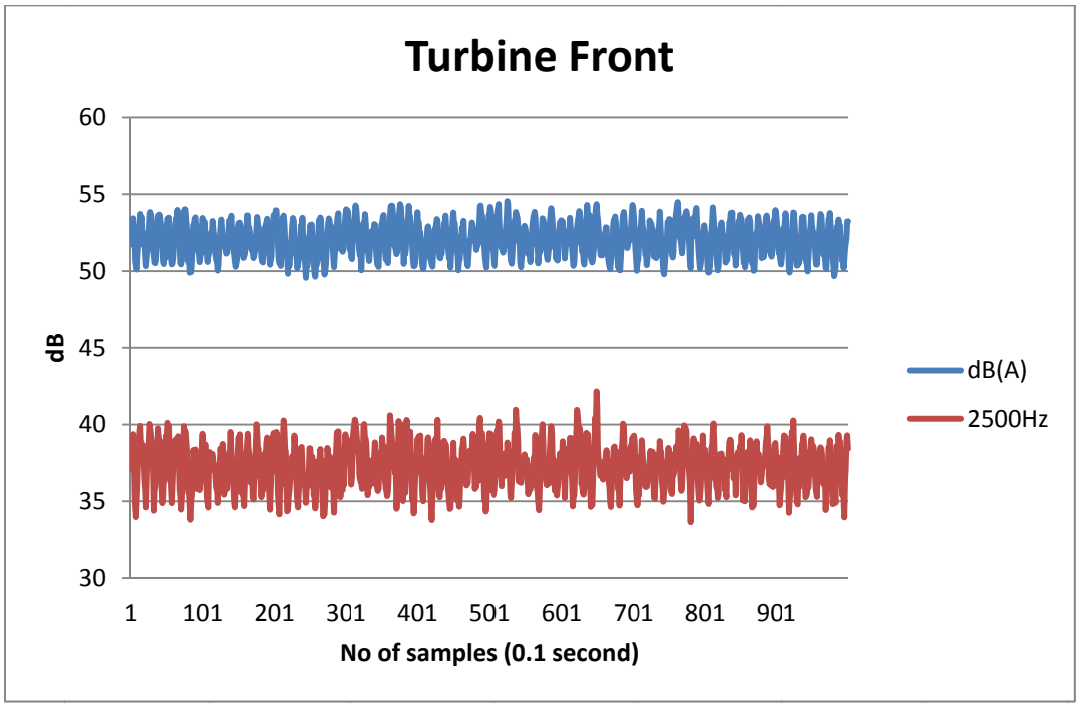


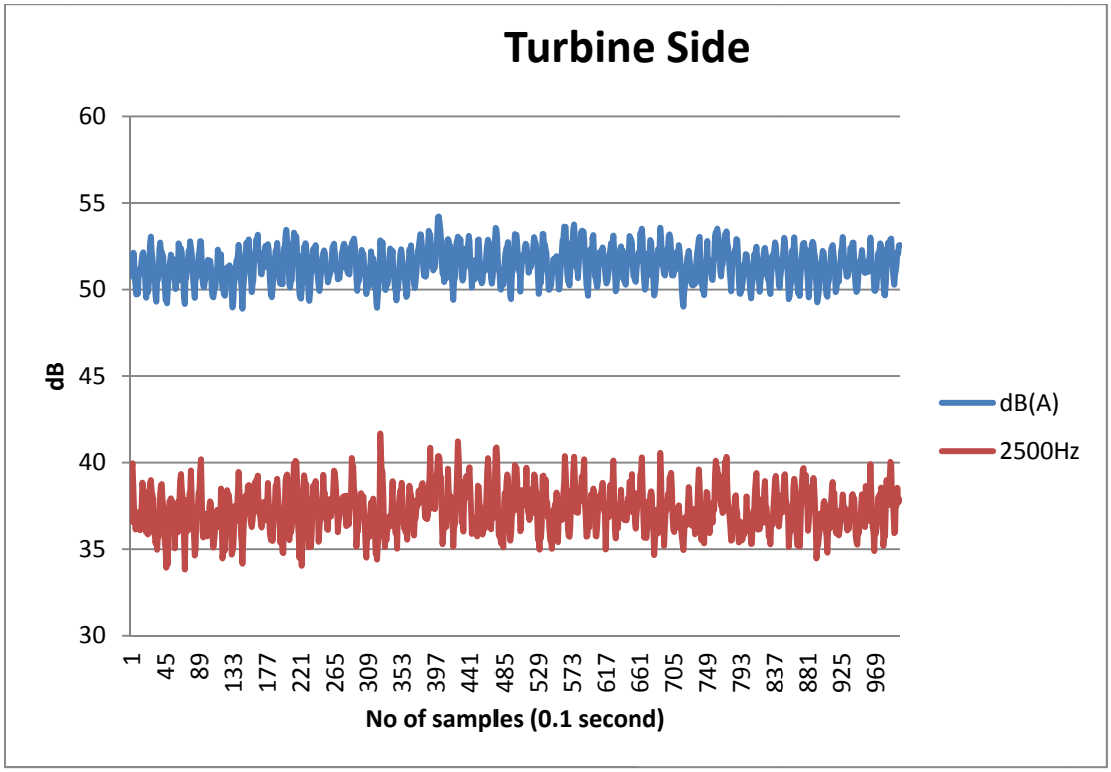
APPENDIX E: 1/3 Octave Band Results



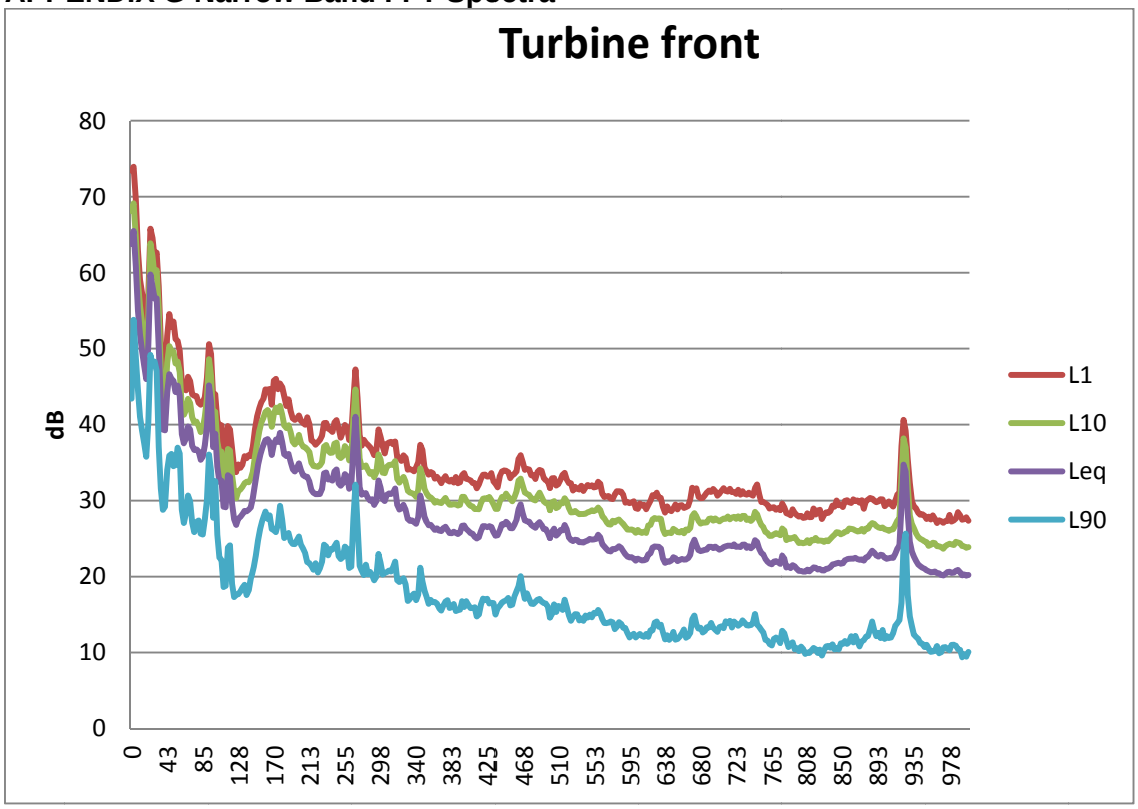


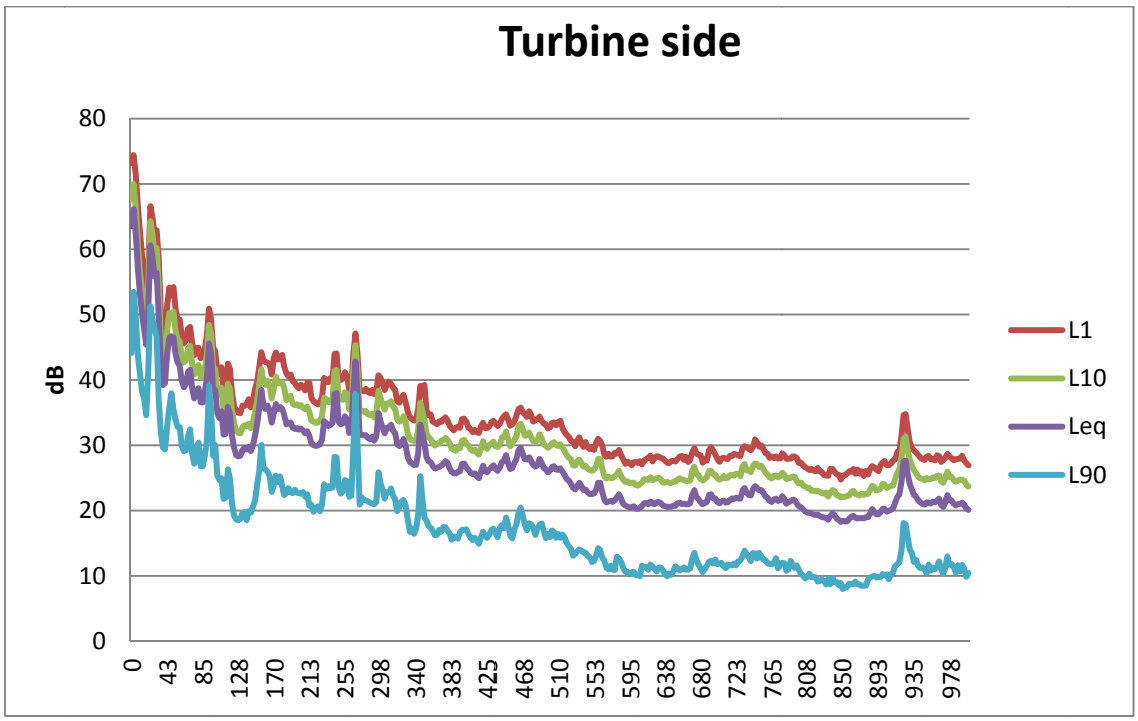
APPENDIX F: Turbine Modulation

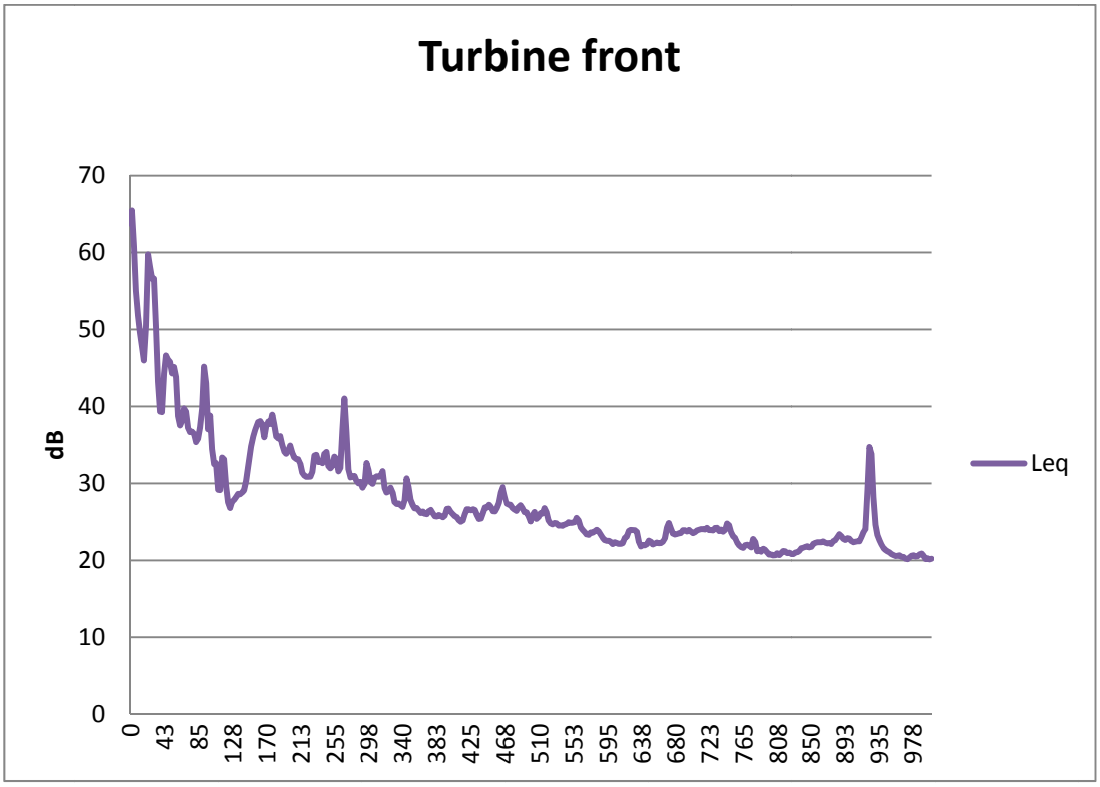


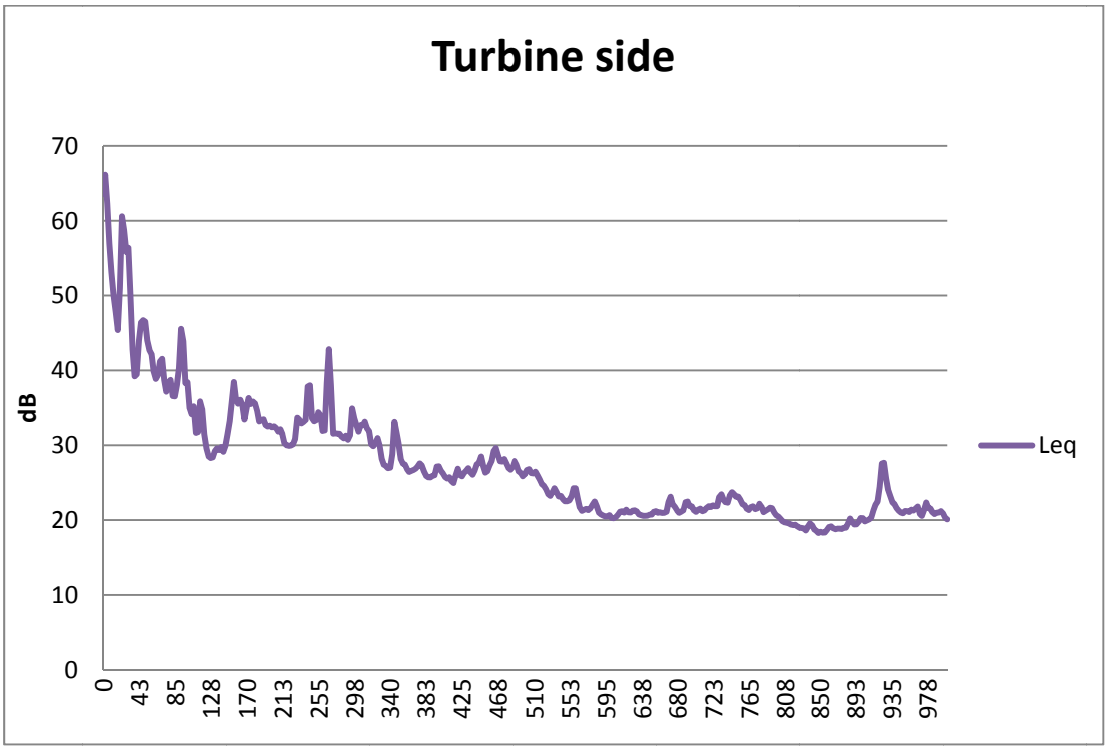


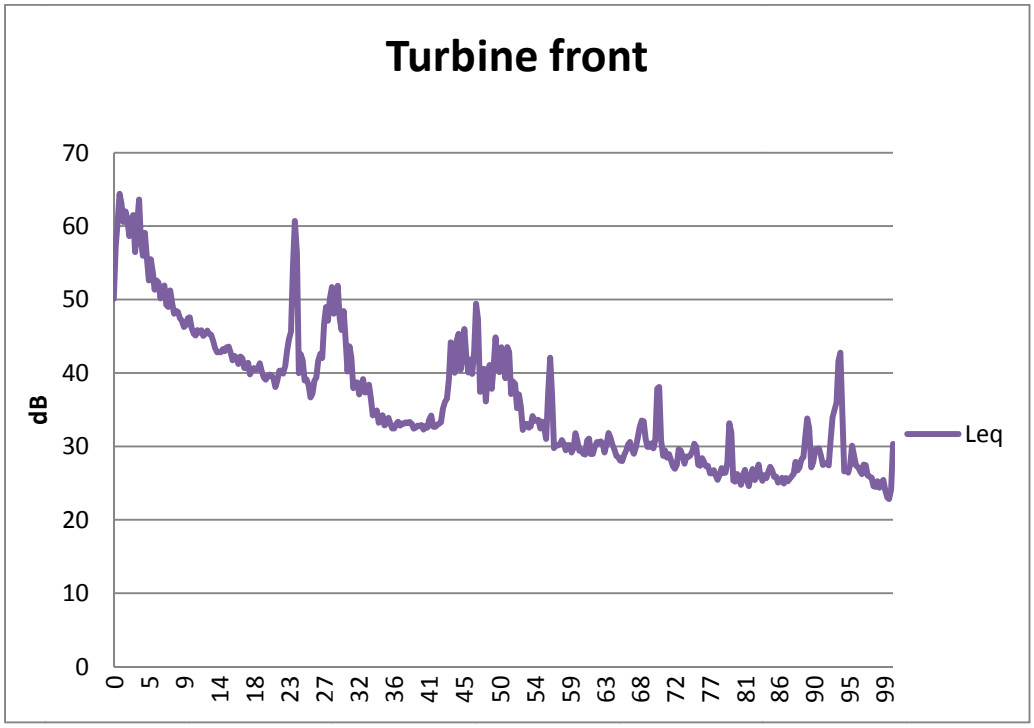
APPENDIX G Narrow Band FFT Spectra

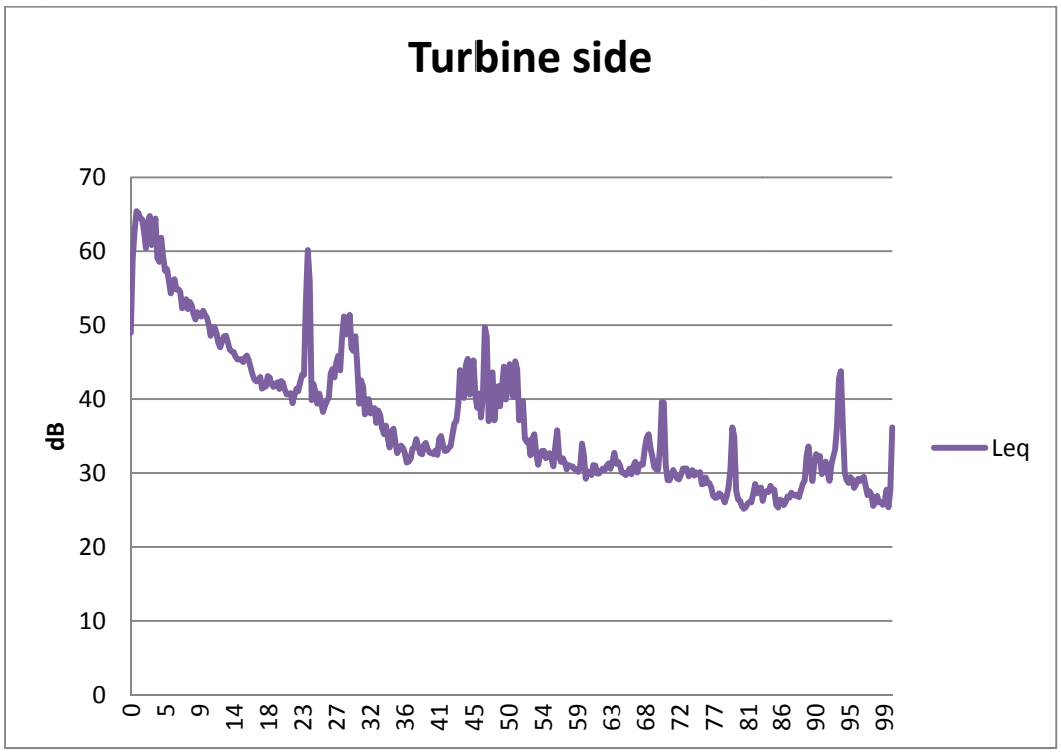


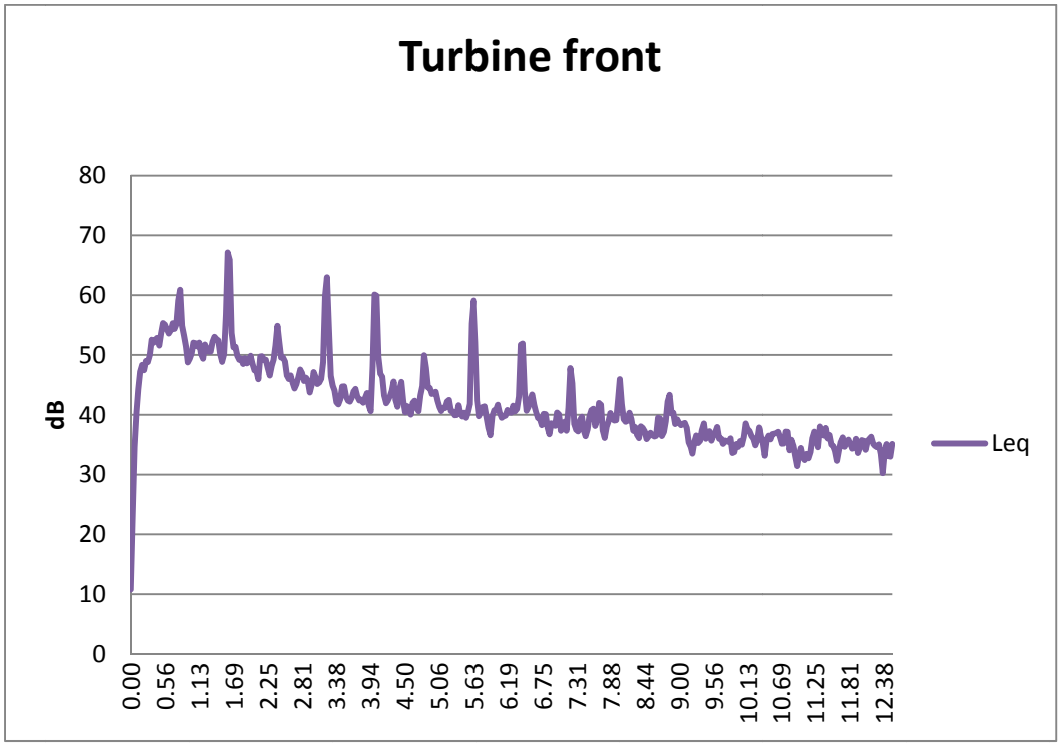


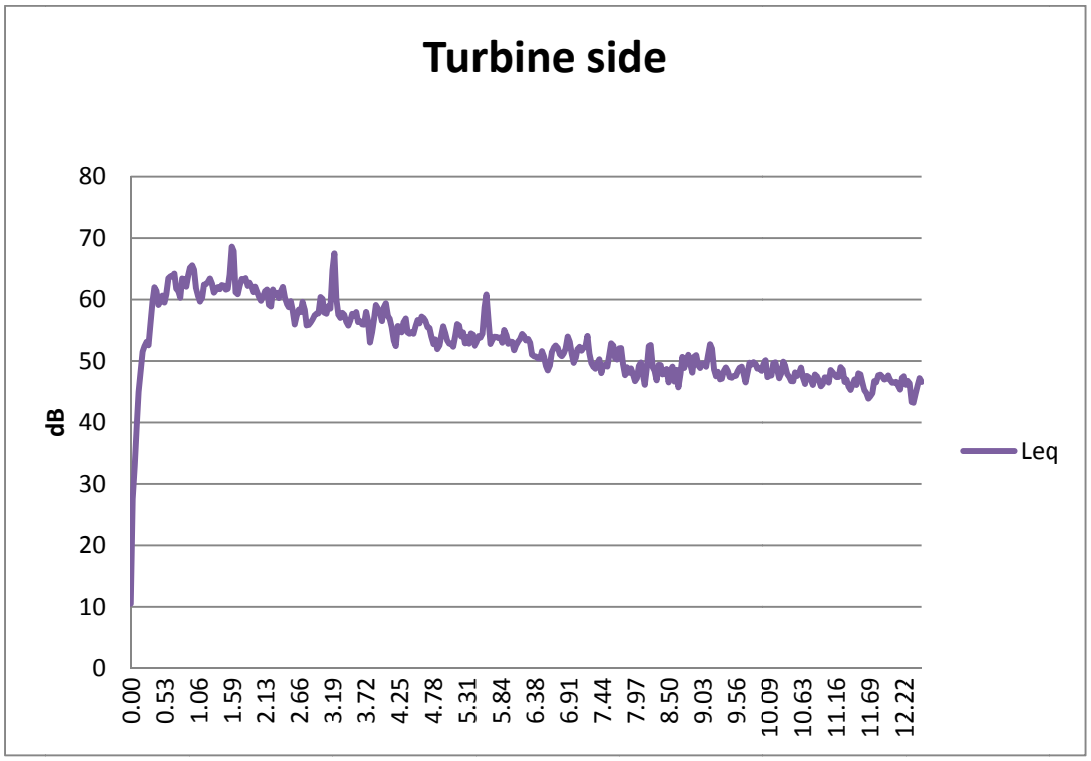

Turbine front
dB
70
60
50
40
30
20
10
0
0
43
85
128
170
213
255
298
340
383
425
468
510
553
595
638
680
723
765
808
850
893
935
978
Leq


Turbine side
dB
70
60
50
40
30
20
10
0
0
43
85
128
170
213
255
298
340
383
425
468
510
553
595
638
680
723
765
808
850
893
935
978
Leq

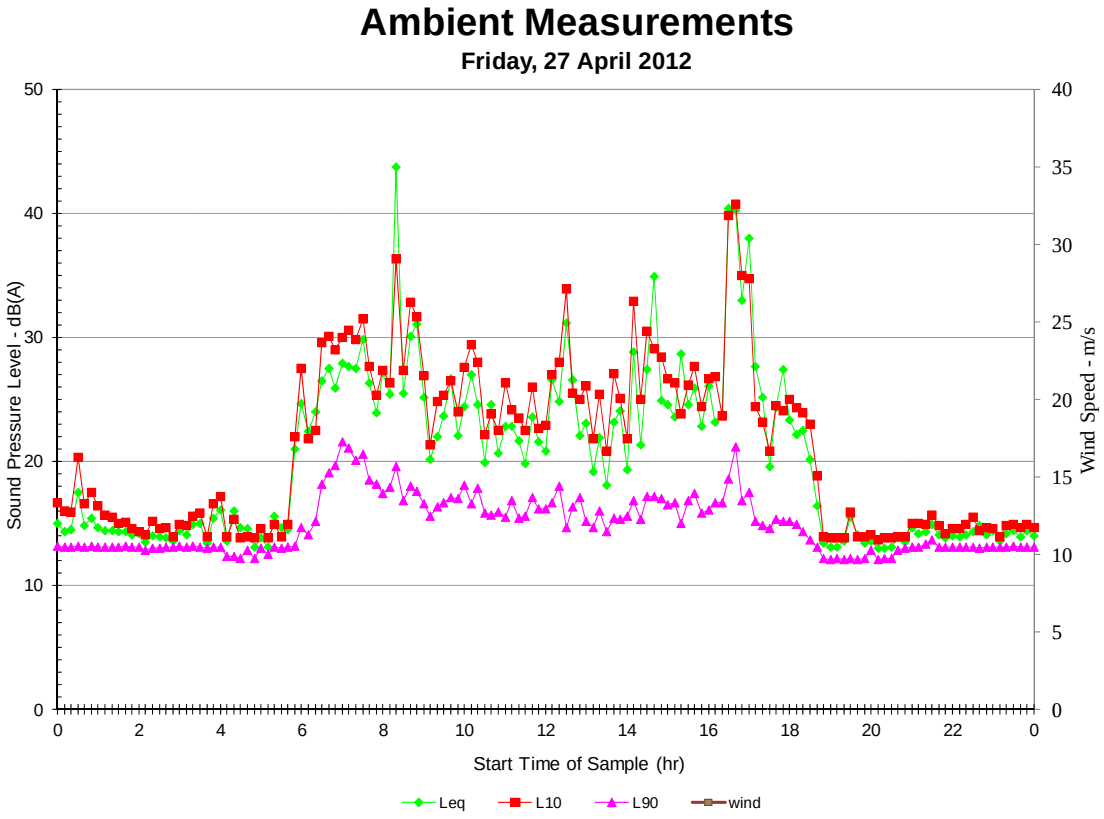

Turbine front
dB
70
60
50
40
30
20
10
0
0 5 9 14 18 23 27 32 36 41 45 50 54 59 63 68 72 77 81 86 90 95 99
Leq


Turbine side
dB
70
60
50
40
30
20
10
0
0 5 9 14 18 23 27 32 36 41 45 50 54 59 63 68 72 77 81 86 90 95 99
Leq

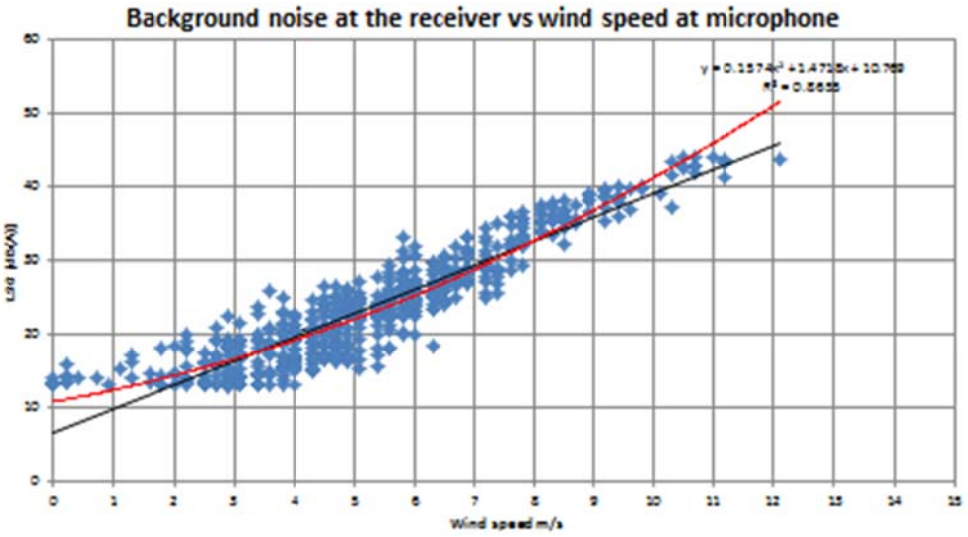

Turbine front
dB
80
70
60
50
40
30
20
10
0
0.00
0.56
1.13
1.69
2.25
2.81
3.38
3.94
4.50
5.06
5.63
6.19
6.75
7.31
7.88
8.44
9.00
9.56
10.13
10.69
11.25
11.81
12.38
Leq


Turbine side
dB
80
70
60
50
40
30
20
10
0
0.00
0.53
1.06
1.59
2.13
2.66
3.19
3.72
4.25
4.78
5.31
5.84
6.38
6.91
7.44
7.97
8.50
9.03
9.56
10.09
10.63
11.16
11.69
12.22
Leq

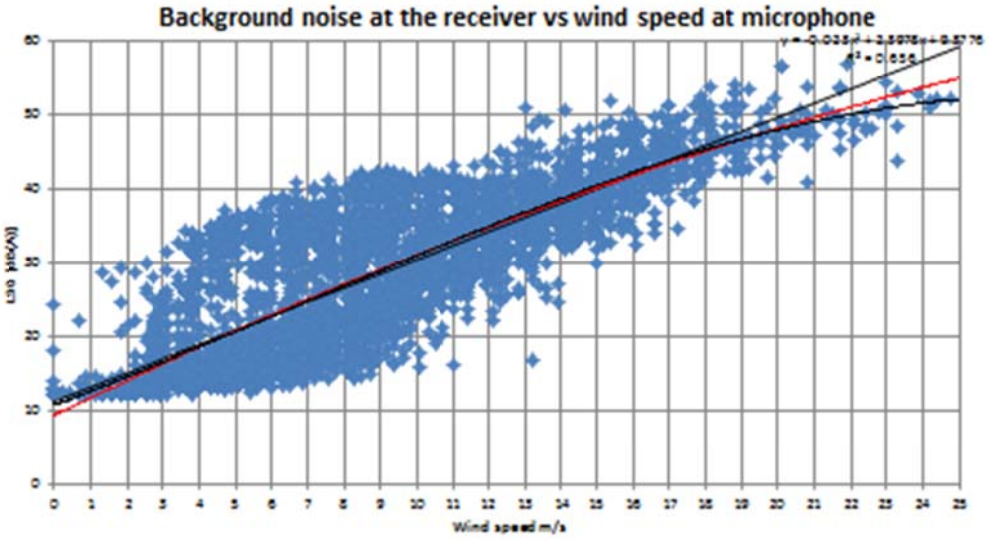
APPENDIX H: Ambient Measurements – Hallett 3



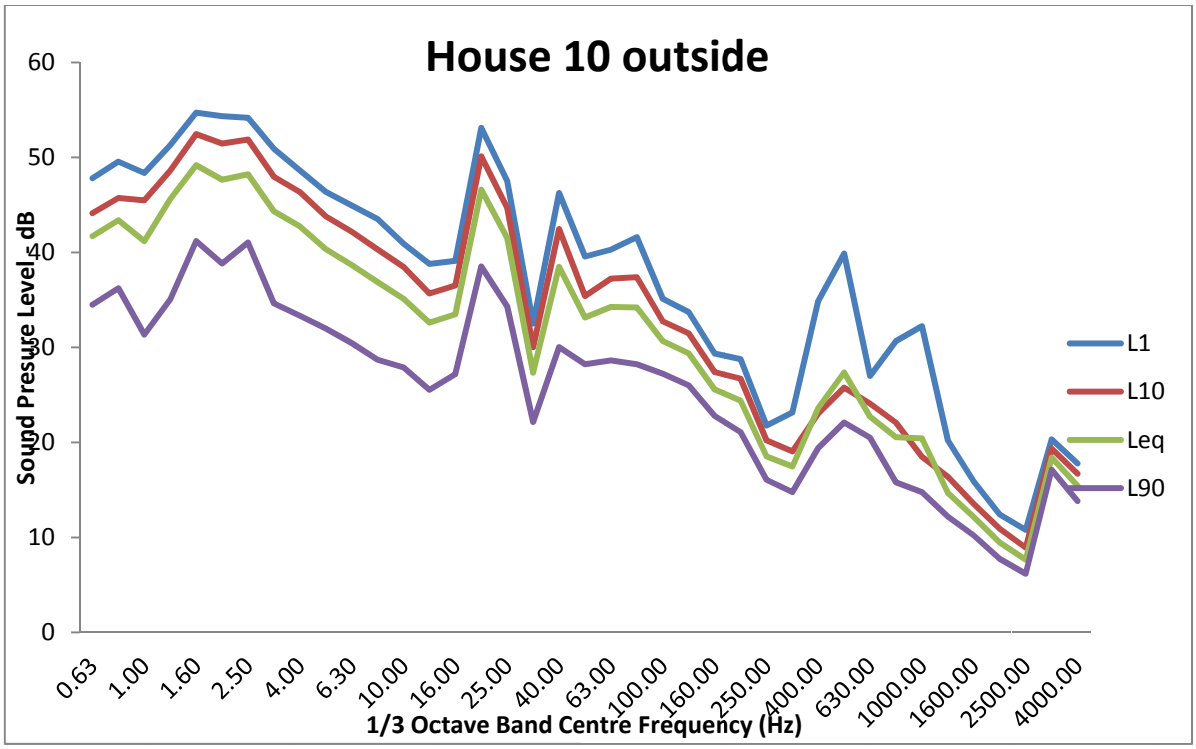
Grass +Tall Trees at 100 metres

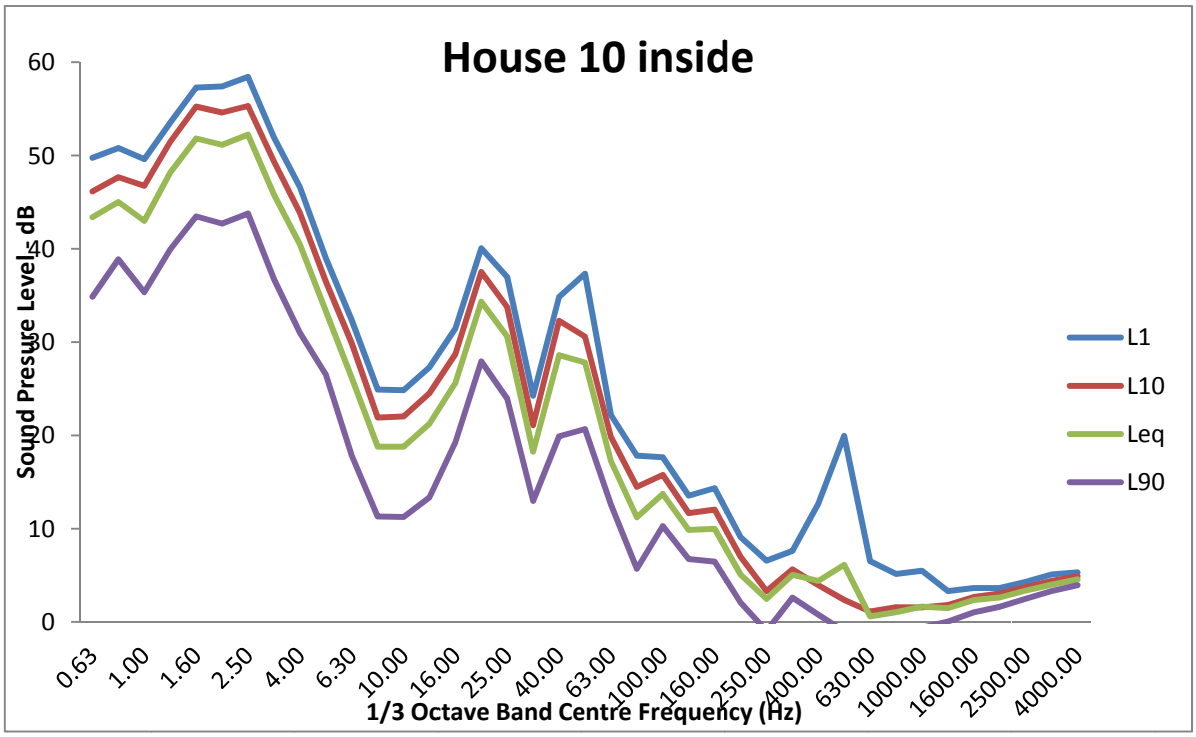


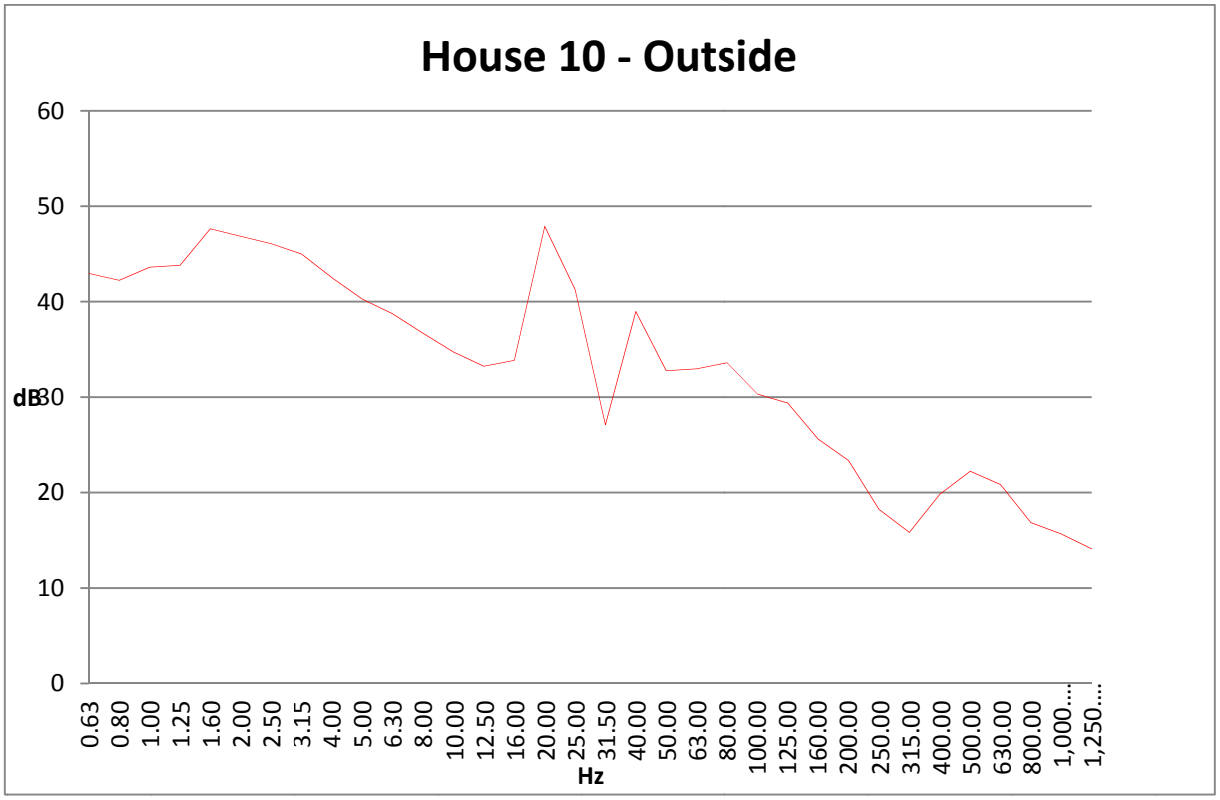
Exposed Hillside furrowed ground – No Turbines, Trees 500m +

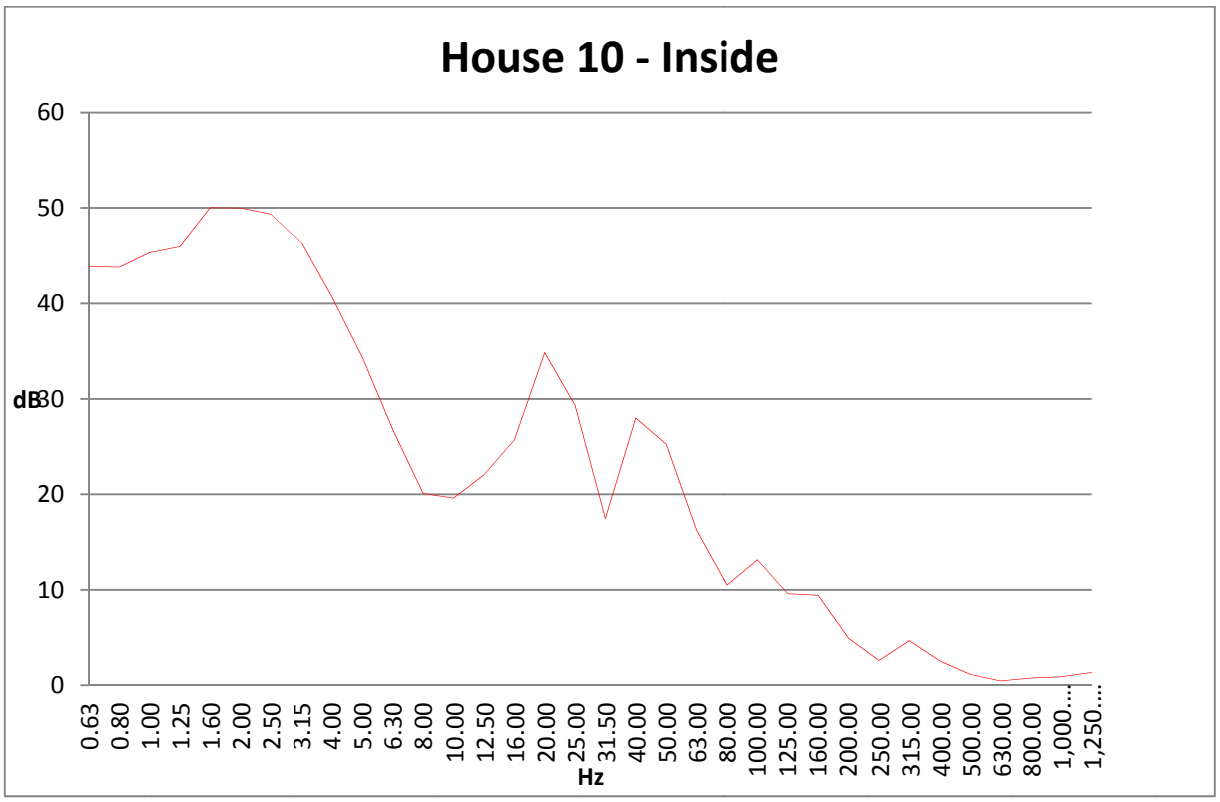


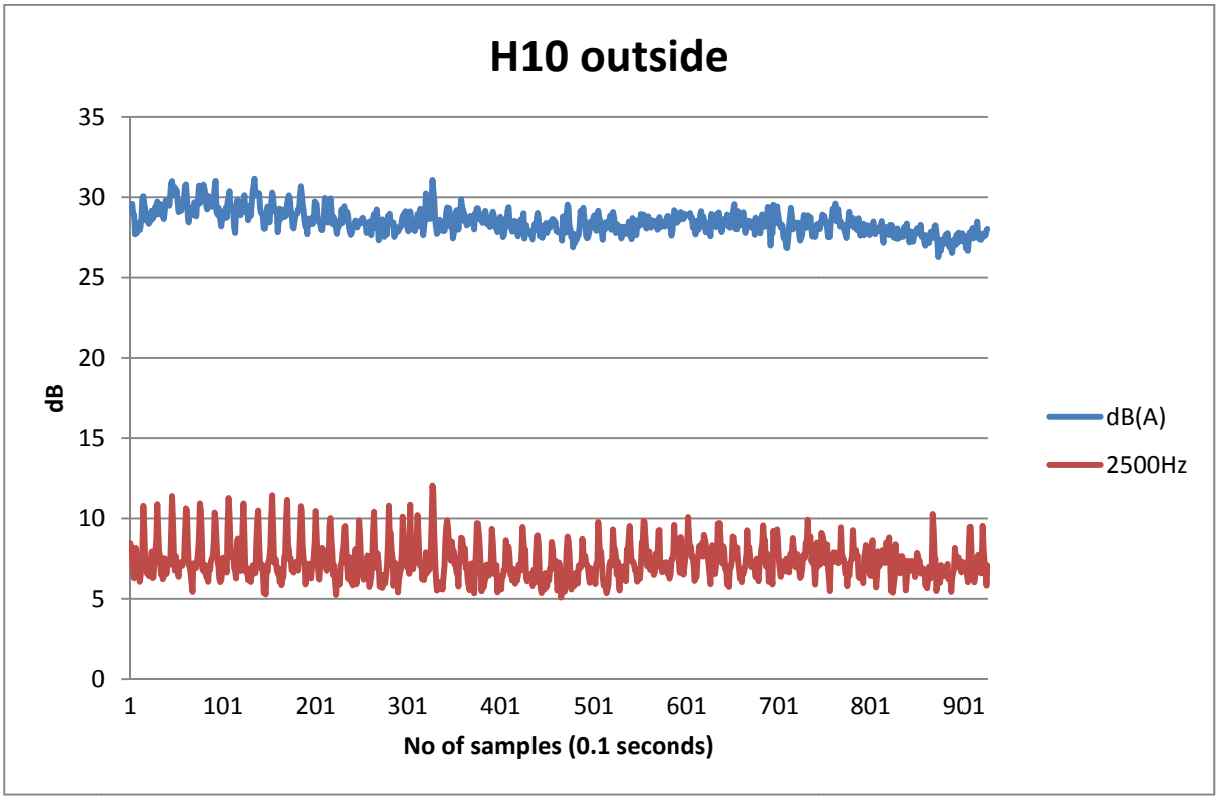
APPENDIX I: House 10 Measurements

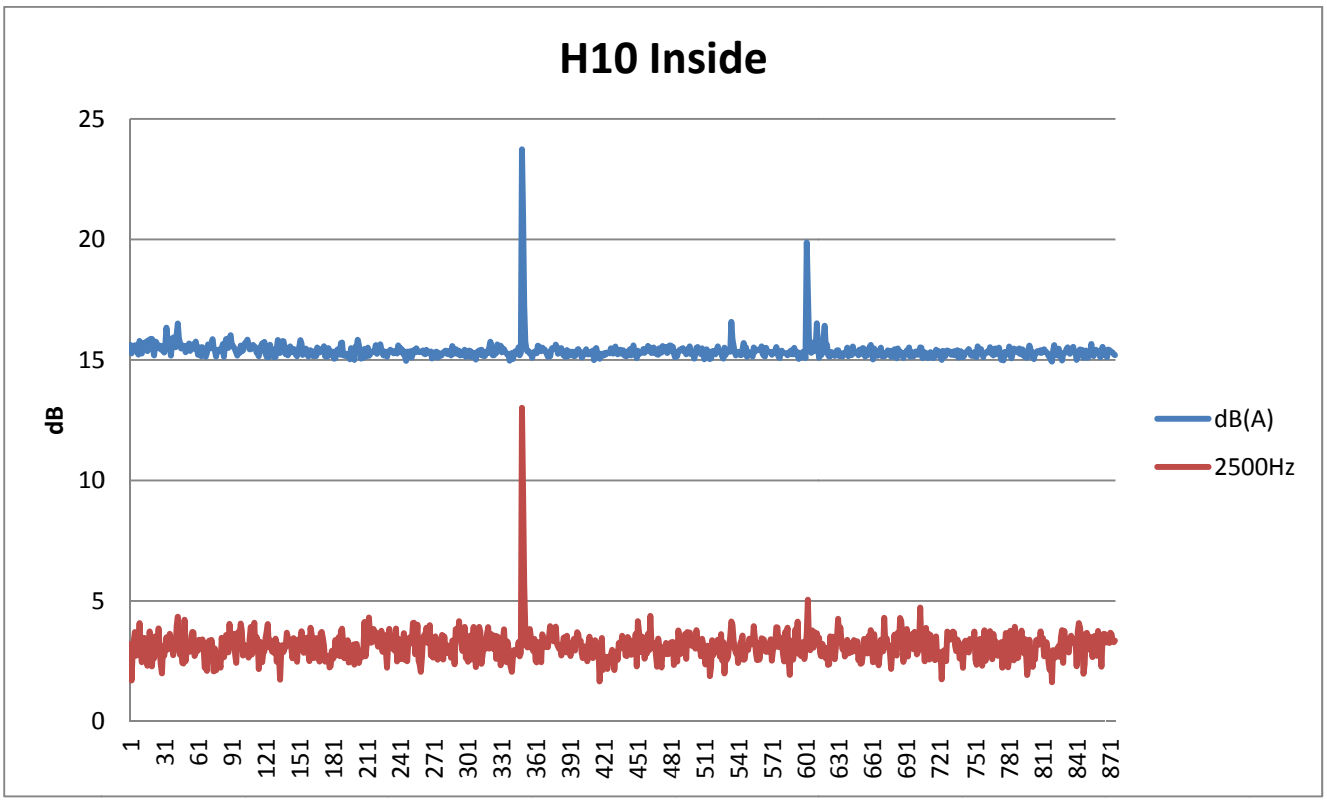


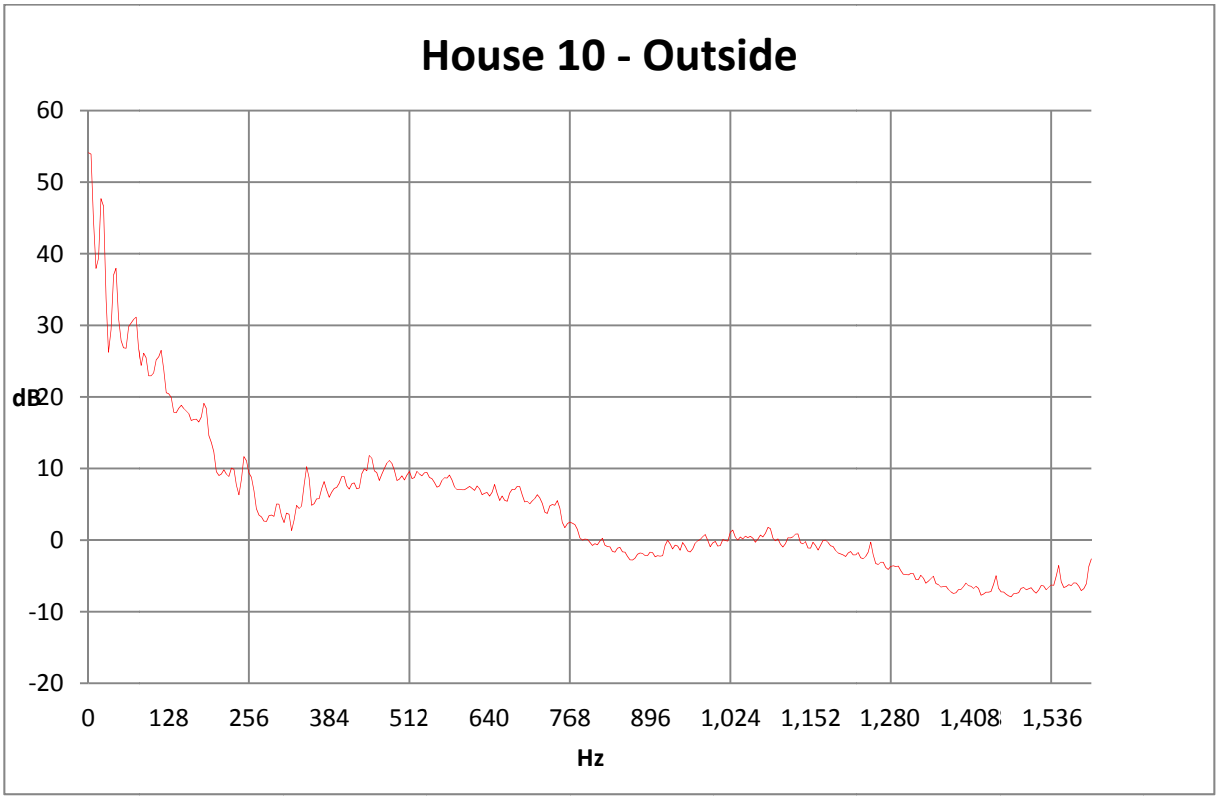


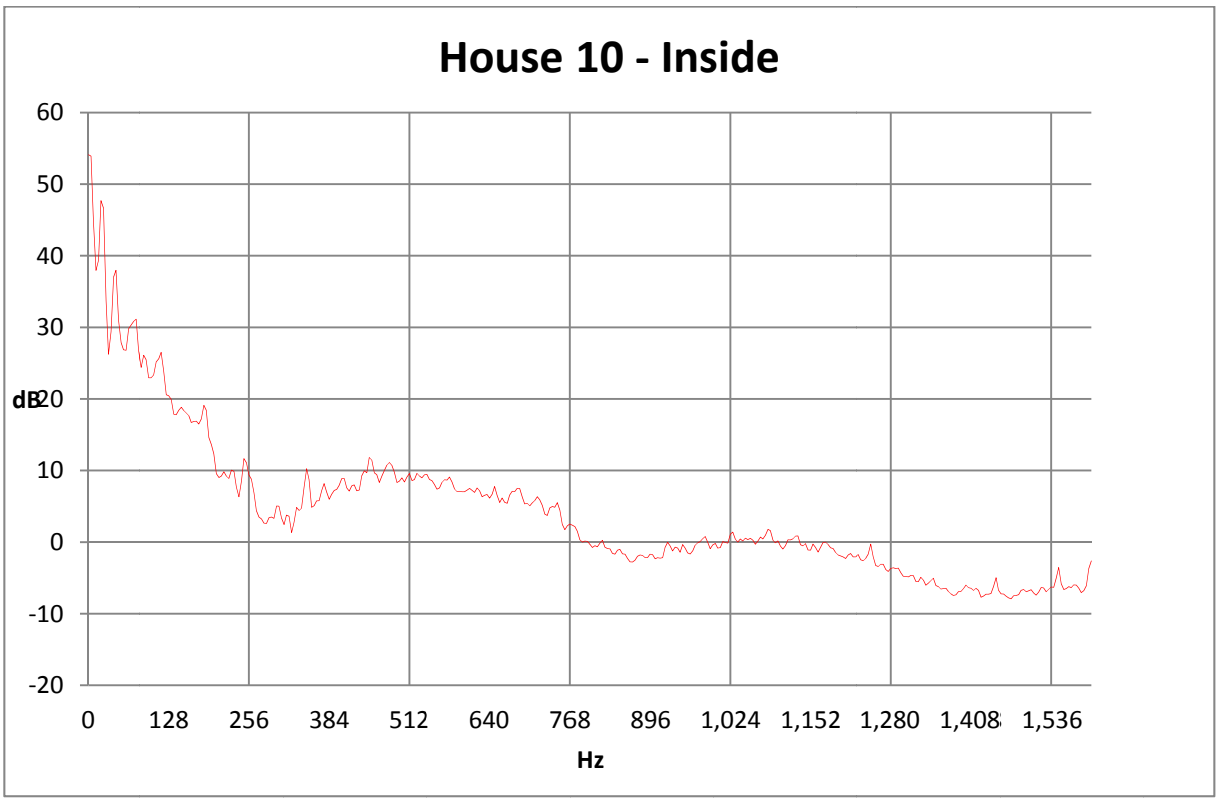

House 10 - Outside
60
50
40
dB30
20
10
0
0.63
0.80
1.00
1.25
1.60
2.00
2.50
3.15
4.00
5.00
6.30
8.00
10.00
12.50
16.00
20.00
25.00
31.50
40.00
50.00
63.00
80.00
100.00
125.00
160.00
200.00
250.00
315.00
400.00
500.00
630.00
800.00
1,000....
1,250....
Hz

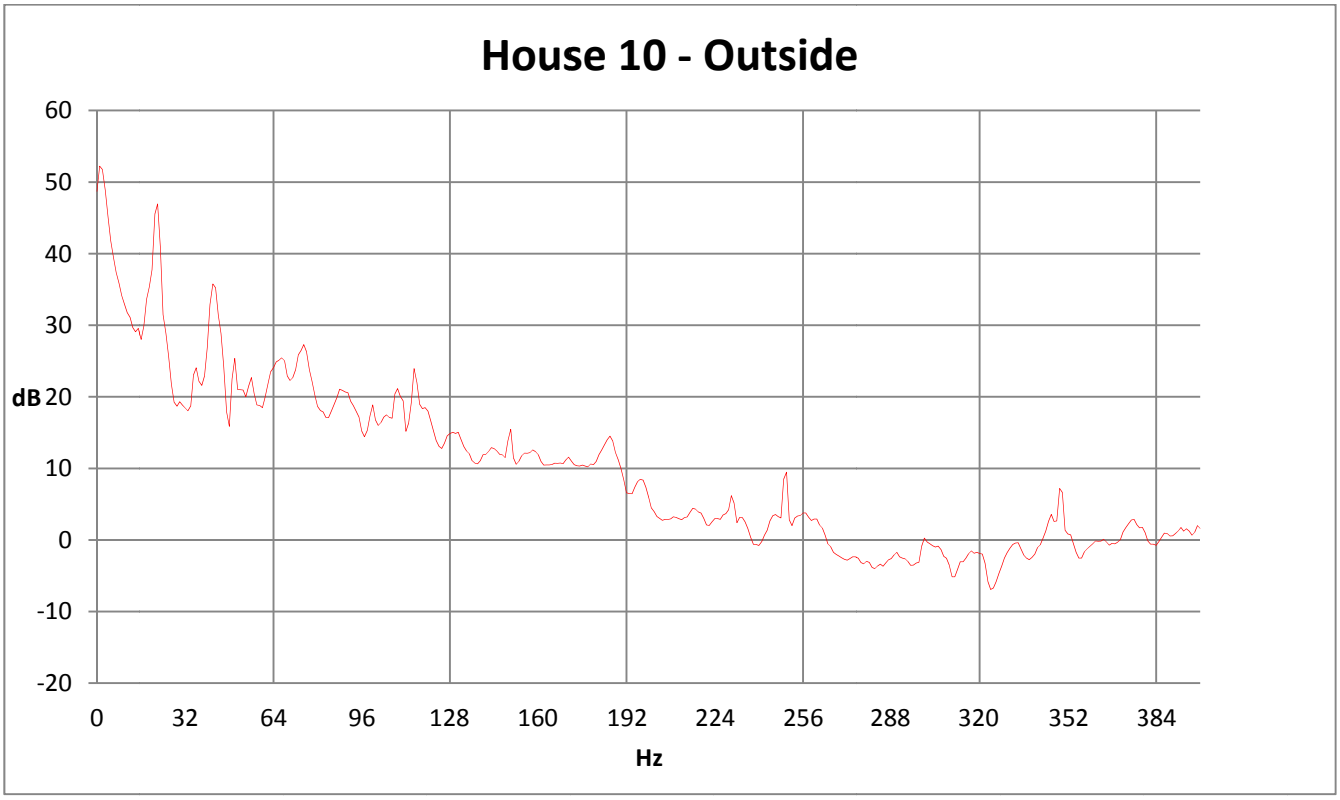

House 10 - Inside
60
50
40
dB30
20
10
0
0.63
0.80
1.00
1.25
1.60
2.00
2.50
3.15
4.00
5.00
6.30
8.00
10.00
12.50
16.00
20.00
25.00
31.50
40.00
50.00
63.00
80.00
100.00
125.00
160.00
200.00
250.00
315.00
400.00
500.00
630.00
800.00
1,000....
1,250....
Hz

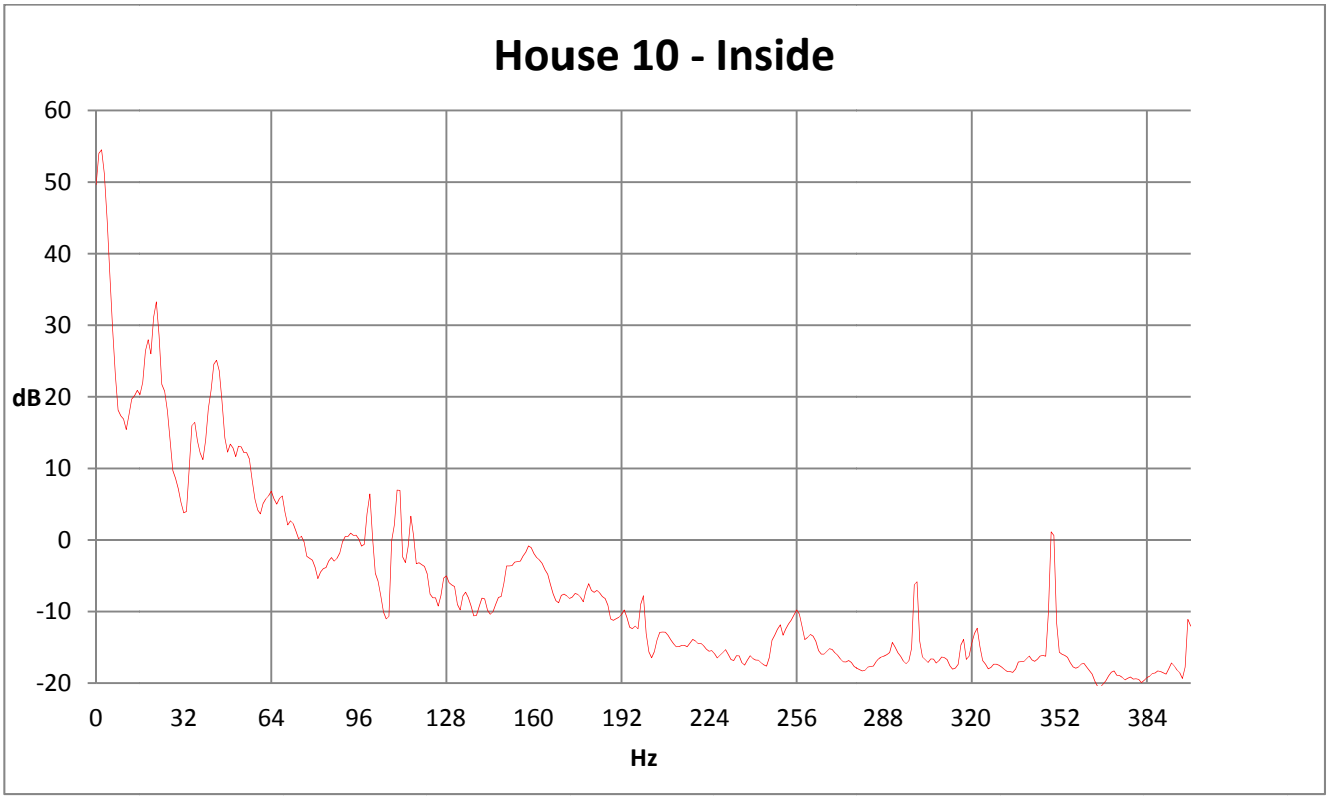

H10 outside
35
30
25
20
15
10
5
0
dB
1
101
201
301
401
501
601
701
801
901
No of samples (0.1 seconds)
dB(A)
2500Hz

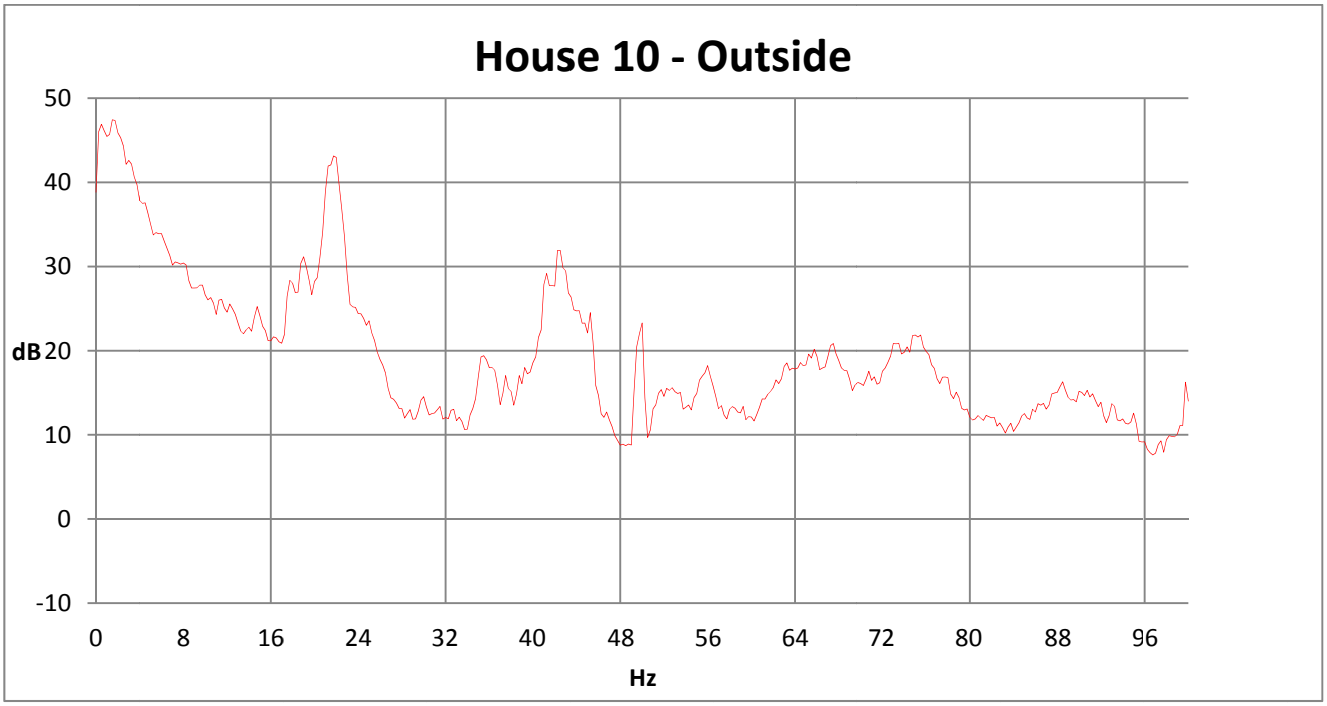

H10 Inside
25
20
15
10
5
0
dB
1
31
61
91
121
151
181
211
241
271
301
331
361
391
421
451
481
511
541
571
601
631
661
691
721
751
781
811
841
871
dB(A)
2500Hz

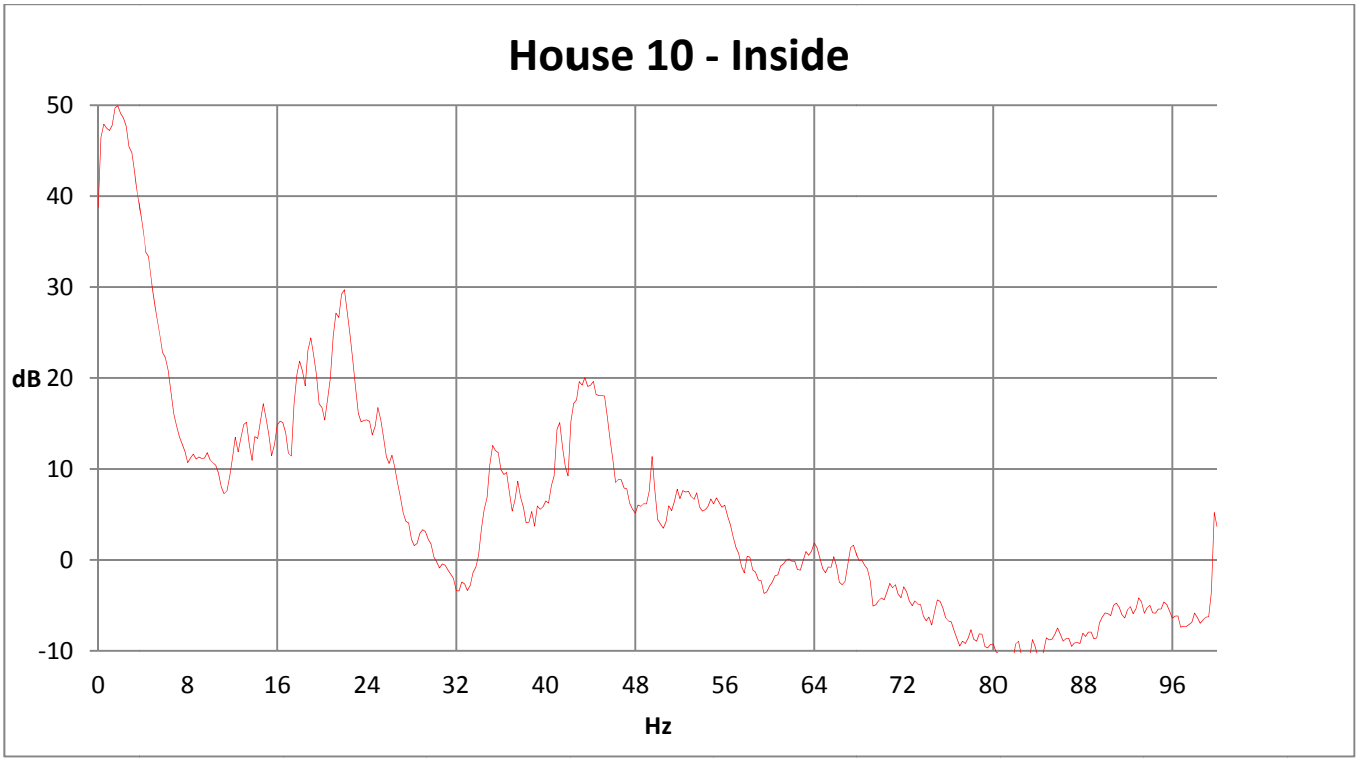

House 10 - Outside
60
50
40
30
dB 20
10
0
-10
-20
0
128
256
384
512
640
768
896
1,024
1,152
1,280
1,408
1,536
Hz

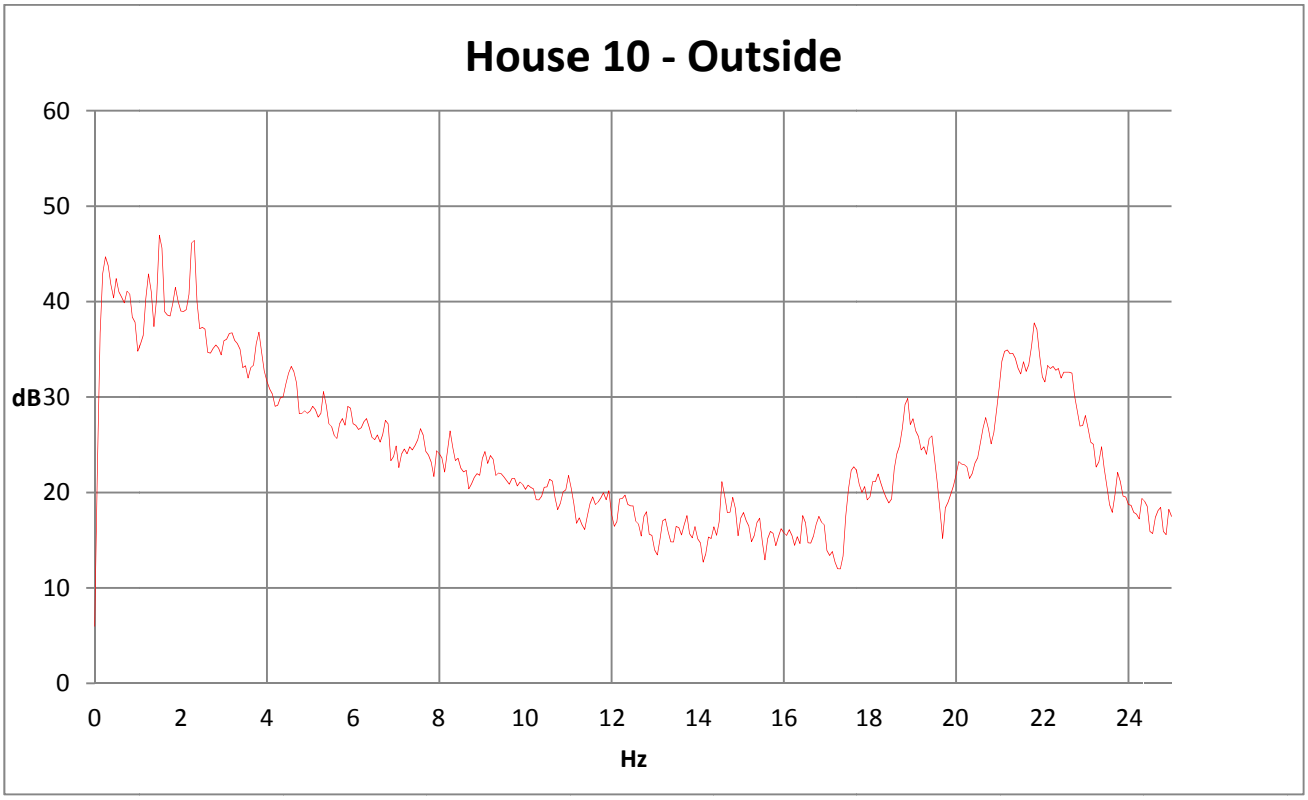

House 10 - Inside
60
50
40
30
dB 20
10
0
-10
-20
0
128
256
384
512
640
768
896
1,024
1,152
1,280
1,408
1,536
Hz

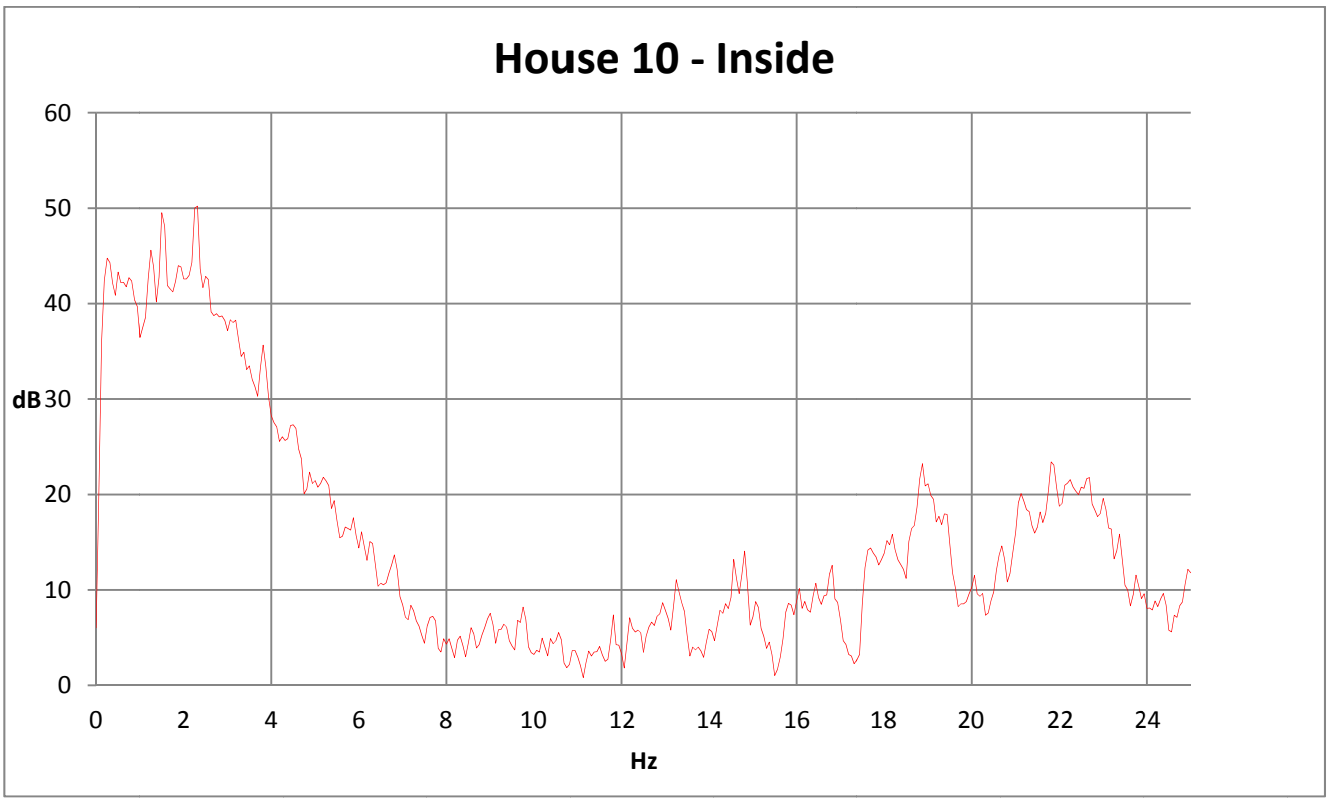

House 10 - Outside
60
50
40
30
dB 20
10
0
-10
-20
0
32
64
96
128
160
192
224
256
288
320
352
384
Hz


House 10 - Inside
60
50
40
30
dB 20
10
0
-10
-20
0
32
64
96
128
160
192
224
256
288
320
352
384
Hz


House 10 - Outside
50
40
30
dB 20
10
0
-10
0
8
16
24
32
40
48
56
64
72
80
88
96
Hz


House 10 - Inside
50
40
30
dB 20
10
0
-10
0
8
16
24
32
40
48
56
64
72
80
88
96
Hz


House 10 - Outside
60
50
40
dB 30
20
10
0
0 2 4 6 8 10 12 14 16 18 20 22 24
Hz


House 10 - Inside
60
50
40
dB 30
20
10
0
0 2 4 6 8 10 12 14 16 18 20 22 24
Hz