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Hammond Lane Metal Company
4 Pigeon House Road, Ringsend, Dublin 4

Noise Assessment

September 2014
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1.0 INTRODUCTION

SLR Consulting Ireland (SLR) was requested by the Hammond Lane Metal Company to prepare an Industrial Emissions Licence Application for the company's metal recycling facility located at Pigeon House Road, Ringsend, Dublin 4 to be submitted to the EPA. The Industrial Emissions Licence includes a Noise Assessment in support of the Application to establish ambient noise baseline.

The Industrial Emissions Licence application requires that a baseline report is submitted which will contain the information necessary to determine ambient noise at the time the report is drawn up in order that a quantified comparison may be made to the state of the site upon the permanent cessation of the industrial emissions directive activity.

Full details of the proposed operations are provided in attachments to the Licence Application, an overview of the relevant activities for this chapter are as follows:

- Ferrous metal recycling, non-ferrous metal recycling;
- end-of-life vehicle de-pollution.

Ferrous metal recycling uses two processes:

- Fragmentation is the process whereby metals derived principally from the de-pollution of vehicles (often involving crushing for presentation at recycling facilities) pass through a fragmentation shredding mill which reduces the material to an essentially homogeneous mixture of metal particles and the other materials such as plastics and rubbers making up the constituents of the raw scrap. Other ferrous metal scrap of light structure capable of passing through the fragmentation plant will form a small percentage of the material treated in this way.
- Metal shearing is the second process used in the preparation of ferrous metal for onward disposal. This process is reserved for ferrous metal presented in larger sizes and heavier sections. These are processed through a metal shears which effectively chops the product into manageable sizes for stockpiling, loading and transport.

Ferrous metal fragmentation is carried out at the site and shipped to Belfast for further fragmentising. Material deriving from the shearing process does not contain any non-metallic component and is suitable for direct shipping to steel smelting mills. Currently this product is shipped direct to Spain as feedstock for the steel industry.

This report, prepared by SLR Consulting Ireland, addresses the potential impact of noise emissions associated with the operation of the facilities at the Pigeon House Road site.

1.1 Scope of Work

The scope of the assessment is therefore to assess the potential for noise emissions from the project site to impact upon amenity and local sound levels. .

The chapter describes and assesses the existing noise baseline characteristics of the local area. The site activities are then applied to these baseline conditions and the resulting noise impacts assessed. Mitigation measures are identified, where required, to, insofar as practical, eliminate and reduce these impacts.

The following sections of this report describe the potential noise impacts associated with the facility operation. The following issues are addressed separately:

- baseline conditions pertaining to the measured existing noise levels around the site;
- methodology and criteria used to assess the potential impacts of the activities at the site on sound levels at sensitive receptors;
- assessment of the potential impacts;
- description of mitigation measures that are / will be incorporated into the design and operation of the facility to eliminate or reduce the potential for noise impacts;
- monitoring proposals.

In essence, operations will comprise:

- importation of ferrous and nonferrous materials from external sources;
- stockpiling, placement and shredding;
- stockpiling of shredded bulk pending dispatch;
- dispatch placement.

The principal noise impact associated with the continued operation of the recovery facility has a potential increase in noise nuisance during daytime (07:00 to 19:00 hrs). No evening time (19:00 to 23:00 hrs) and night-time (23:00 to 07:00 hrs) operations will be carried out at the recovery facility.

Noise is likely to be generated at the recovery facility by:

- traffic movements along the existing access road to the facility and internally across the landholding;
- end-tipping, placement and compaction of imported material;
- excavation, placement and shredding of stockpiled material;
- operation of plant and equipment within the application site (principally excavators/ grabbers/ shredder and/or forklifts).

With respect to the potential for noise impacts, the key objective at the application site is to manage activities in order to ensure that any discernible increase in noise levels is prevented and the effect of any increase in noise emissions is minimised.

A description of the receiving environment around the recovery facility, where noise nuisance could potentially arise is provided in Section 2. The potential impacts of noise emissions on sensitive locations around the facility have been assessed and are presented and discussed in Section 3.

2.0 RECEIVING ENVIRONMENT

2.1 Outline of the Baseline Study

The existing background noise environment is characterised by undertaking a baseline noise measurement survey at a number of locations at the project site and around the project site. The objectives of the baseline study are to:

- determine ambient noise levels at the site;
- identify sources of noise;
- determine impacts on the nearest noise sensitive receptors / residents;

- use the data collected to predict noise levels associated with future activity at the site;
- identify suitable and effective mitigation measures.

2.2 Baseline Study Methodology

Noise surveys as part of the noise monitoring was undertaken by Fitz Scientific on the 13 December 2012. The monitoring locations are described below and are shown on a site plan in Figure 1.

A follow-up noise survey was undertaken on 19 August 2014 by SLR Consulting to update the baseline measurements. Noise measurements were obtained using Larson Davis 831 Sound Level Meters, which was calibrated using Larson Davis CAL200. The monitoring locations, designated are described below and are shown on a site plan in Figure 1. Summary of noise monitoring results (2012/2014) is provided in Table 2-1.

- N1 at the south-eastern corner of the site,
- N2 at the south-western corner of the site,
- N3 at the car park of the Hammond Lane and Irish Cement,
- N4 at the north-eastern corner of the site
- N5 at the north-western corner of the site
- N6 at the entrance to the Old Glass Bottle Factory
- N7 at the residential houses on Sean Moore Road
- N8 at the residential apartments on Poolbeg Quay

Table 2-1 Daytime Baseline Noise Monitoring Survey (2012/2014)

Station	Date	Monitoring Period	$L_{Aeq(T)}$	$L_{A90(T)}$	$L_{A10(T)}$	L_{Max}
N1	22/11/2012	12:05 -12:35	64	57	65	-
N2	22/11/2012	12:40 -13:10	62	54	63	-
N3	22/11/2012	11:34 -12:04	69	59	72	-
N4	22/11/2012	11:59 -12:29	58	55	59	-
N4	22/11/2012	13:13 -13:43	61	53	62	-
N5	22/11/2012	11:27-11:57	71	66	74	-
N5	22/11/2012	13:46 -14:16	72	59	71	-
N6	22/11/2012	14:28 -14:58	70	54	74	-
N7	22/11/2012	15:01-15:31	66	58	68	-
N1	19/08/2014	8:17 - 8:37	60	63	70	84
N2	19/08/2014	8:51 - 9:12	73	59	76	92
N3	19/08/2014	7:42 - 8:12	62	54	64	84
N5	19/08/2014	9:25 – 9:55	76	51	71	85
N7	19/08/2014	10:08 - 10:22	63	53	65	83
N7	19/08/2014	10:44 - 10:59	64	54	64	87
N7	19/08/2014	11:20 -11:35	60	54	62	81
N8	19/08/2014	10:27 - 10:42	62	53	66	82
N8	19/08/2014	11:02 -11:17	61	55	64	83
N8	19/08/2014	11:39-11:54	62	53	61	85

2.3 Results of Baseline Monitoring

Noise surveys as part of the noise monitoring was undertaken by Fitz Scientific on the 13 December 2012. The results of December 2012 Monitoring Survey Report is provided in Appendix A, glossary of terminology is provided in Appendix C.

Below are presented results of noise survey carried out in August 2014. Weather Conditions at the time of survey: Sunny, wind up to 2.6 m/s NW, Temperature 11^{0}C.

Location N1

At the time of the baseline survey, noise levels at location N1 were predominantly influenced by traffic movements on Pigeon House Road and equipment operating at Hammond Lane, coal

yard and the Irish Cement site. Noise generated at Hammond Lane site included HGV entering and exiting site, grab hooks and front loader.
Noise monitoring data indicates that average noise levels at this location typically range between 60 dBA L_{Aeq} and 64 dBA L_{Aeq}.

Location N2

At the time of the baseline survey, noise levels at location N2 were predominantly influenced by traffic movements on Pigeon House Road and equipment operating at Hammond Lane, coal yard and the Irish Cement site. Noise generated at Hammond Lane site included HGV entering and the exiting site, grab hooks and shredding operations noise monitoring data indicates that the average ambient noise levels at this location typically range between 62 dBA L_{Aeq} and 73 dBA L_{Aeq}.

Location N3

At the time of the baseline survey, noise levels at location N3 were predominantly influenced by traffic movements to Irish Cement site and equipment operating at Hammond Lane and Containers Storage Site located to the east of the monitoring location. Noise generated at Hammond Lane site included HGV entering and the exiting site, grab hooks and shredding operations. Noise monitoring data indicates that the average ambient noise levels at this location typically range between 62 dBA L_{Aeq} and 69 dBA L_{Aeq}.

Location N5

At the time of the baseline survey, noise levels at location N5 were predominantly influenced by equipment operating at Hammond Lane and coal yard located to the east of the monitoring location. Noise generated at Hammond Lane site included grab hooks and shredding operations. Noise monitoring data indicates that the average ambient noise levels at this location typically range between 71 dBA L_{Aeq} and 76 dBA L_{Aeq}.

Location N7

At the time of the baseline survey, noise levels at location N7 were predominantly influenced by traffic movements along the East Link Road and HGV entering the South Bank Quay - Container Storage Site and gantry crane working at this site. Noise monitoring data indicates that the average ambient noise levels at this location typically range between 60 dBA L_{Aeq} and 66 dBA L_{Aeq}.

Location N8

At the time of the baseline survey, noise levels at location N7 were predominantly influenced by traffic movements along the East Link Road. Noise monitoring data indicates that the average ambient noise levels at this location typically range between 61 dBA L_{Aeq} and 62 dBA L_{Aeq}.

3.0 IMPACT OF THE SCHEME

3.1 Impact Assessment

Potential noise impacts during the operational phase of the development have been undertaken in accordance with the Environmental Protection Agency's (EPA) '*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)*'.

In accordance with the NG4 guidance it is necessary to designate the noise environment at each sensitive receptor location as a '*Quiet Area*', a '*Low Background Noise Area*' or '*Not an Area of Low Background Noise*'.

To be categorised as a '*Quiet Area*' the following criteria must be met:

- at least 3km from urban areas with a population > 1,000 people;
- at least 10km from any urban areas with a population >5,000 people;
- at least 15km from any urban areas with a population >10,000 people;
- at least 3km from any local industry;
- at least 10km from any major industry centre;
- at least 5km from any National Primary Route; and
- at least 7.5km from any motorway or dual carriageway.

If any of the above criteria are not met then it is necessary to undertake a baseline noise survey of the existing daytime, evening, and night-time noise environments in order to establish whether the receptor is located in a '*Low Background Noise Area*' or '*Not an Area of Low Background Noise*'.

The noise criteria for these designations are shown in Table 3-1 below. For an area to be designated as being an area of low background noise, the daytime, evening, and night-time noise limits must all be met.

Table 3-1 Noise Criteria for Area Designation

Designation	Day $L_{AF\,90}$ dB	Evening $L_{AF\,90}$ dB	Night $L_{AF\,90}$ dB
Low Background Noise Area	≤40	≤35	≤30
Not an Area of Low Background Noise	≥41	≥35	≥31

The procedure outlined in the NG4 Guidance document then sets out a methodology to determine an acceptable noise limit at a receptor location. This noise limit is termed the noise rating level, or $L_{Ar,T}$, and includes, if necessary, a plus 5dB tonal penalty, or a plus 5dB impulsive penalty. If a noise source is both tonal and impulsive however, only one adjustment should be made.

In order to determine whether or not a 5dB tonal penalty should be applied, it is necessary to obtain third octave frequency data of the noise source in question. The NG4 guidance states that

'... the time average sound pressure level in the one-third-octave band of interest should exceed the time-average sound pressure levels of both adjacent one-third-octave bands by some constant level difference'. 'The appropriate level differences vary with frequency. They should be greater than or equal to the following values in both adjacent one-third-octave bands:

15dB in low-frequency one-third-octave bands (25Hz to 125Hz);

8dB in middle-frequency bands (160Hz to 400Hz); and

5dB in high-frequency bands (500Hz to 10,000Hz).'

In order to determine whether or not a 5dB impulsive penalty should be applied to a noise source it is necessary to establish whether or not the noise in question may be '*described as something with a thumping, banging or impact noise that is clearly audible above everything else.'*

The permitted rating noise level in each designated area is shown in Table 3-2 below.

Table 3-2 Permitted Rating Noise Levels

Designation	Daytime Noise Criterion, dB $L_{Ar,T}$	Evening Noise Criterion, dB $L_{Ar,T}$	Night-Time Noise Criterion, dB $L_{Ar,T}$
Quiet Area	Noise from the licensed site to be at least 10dB below the average daytime background noise level measured during the baseline noise survey	Noise from the licensed site to be at least 10dB below the average evening background noise level measured during the baseline noise survey	Noise from the licensed site to be at least 10dB below the average night-time background noise level measured during the baseline noise survey
Areas of Low Background Noise	45.0	40.0	35.0
All other Areas	55.0	50.0	45.0

The draft '*Guidelines for Noise Impact Assessment*' produced by the Institute of Acoustics / Institute of Environmental Management and Assessment Working Party have been referenced in relation to the potential impact of changes in the ambient noise levels during the operation of the facility at Hammond Lane.

Although the findings of the Working Party are draft at present, they are of assistance in this assessment. The draft guidelines state that for any assessment, the noise level threshold and significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise.

The draft *'Guidelines for Noise Impact Assessment'* impact scale adopted in this assessment is shown in Table 3-3 below. The corresponding significance of impact presented in the *'Advice Note on Current Practice (in the preparation of Environmental Impact Assessments) (2003)'* is also presented.

Table 3-3 Noise Impact Scale

Noise Level Change dB(A)	Subjective Response	Impact *Guidelines for Noise Impact Assessment Significance*	Impact *Advice Note on Current Practice (in the preparation of EIAs)*
0	No change	None	Imperceptible
0.1 – 2.9	Barely perceptible	Minor	Slight
3.0 – 4.9	Noticeable	Moderate	Moderate
5.0 – 9.9	Up to a doubling or halving of loudness	Substantial	Significant
10.0 or more	More than a doubling or halving of loudness	Major	Profound

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

It is considered that the criteria specified in the above table provide a good indication as to the likely significance of changes in noise levels in this case and as such, they have been used to assess the impact of construction and operational noise.

3.2 Predicted Noise Impacts

When the waste recovery facility is operational, the principal sources of noise emanating from the site are generally from site equipment and HGV movements to and from the site. Some noise may also be generated on an occasional basis by mechanical excavators.

To determine the noise impact at the site, SLR Consulting Ireland carried out a noise prediction assessment, whereby the levels of noise were calculated at the nearest noise sensitive receptors (residences) and South Dublin Bay & River SPA (designated under EU Habitats Directive (92/43/EEC), and plants included in the Flora Protection Order 1999) which lies within 430 m of the application area boundary.

Locations of the closest receptors are shown on Figure 1. Due to the nature of the site and surrounding area the noise levels recorded at the site were used in predicted noise assessment, maximum recorded level on site was used and attenuated over distance.

The noise assessment methodology used was based on BS5228: Part 1 (2009) "Code of Practice for Noise and Vibration Control on Construction and Open Sites"

On the basis of the NG4 Guidelines the area around noise sensitive locations R1, R2 and R3 is designated as normal noise environment with a recommended daytime noise llimit of 55$L_{Aeq,\ T}$ dB(A).

For the purposes of this assessment, a reduction of -5 dB(A) has been adopted for partial noise screening (by fences and buildings), it is assumed that all of the noise sources are active for 100% of the time, at the distances stated during the working hours of the development.
The maximum noise level recorded on site of 92 dB(A) was used in the assessment and it was attenuated over the distance to the sensitive receptors. On this basis it is considered that the noise assessment is very conservative and represents a worst case scenario.

A noise prediction assessment has been undertaken, whereby the levels of noise arising from the development were calculated at the nearest sensitive receptors R1, R2 and R3 shown on Figure 1. Detailed noise assessment calculations are provided in Appendix B.

Predicted Noise Levels from site operations at the boundary Worst Case:

(Refer to Appendix B – Table (i)):

Noise Level at R1 = **49 dB L_{Aeq}**

Noise Level at R2 = **49 dB L_{Aeq}**

Noise Level at R3 = **54 dB L_{Aeq}**

Table 3-4 Assessment of Noise Levels at Boundary Worst Case

Location	Existing Baseline $L_{A90,15min}$ dB(A)	Predicted Worst Case Scenario $L_{Aeq,T}$ dB(A)	Recommended Noise Limit Criteria Daytime $L_{Aeq,\ T}$ dB(A)	Difference	Impact
R1	54	49	55	-5	Imperceptible
R2	53	49	55	-4	Imperceptible
R3	n/a	54	55	-1	Imperceptible

Table 3-4 shows that the predicted noise levels for normal operations would meet the derived criterion at all receptors assessed.

Dublin City Council has produced Maps of noise from major industry and transport for the Dublin city centre as instructed by the Environmental Noise Regulations 2006. Noise mapping is the measurement of noise levels at a number of receiver\receptor points. These values are then used to draw colour contour noise maps. Dublin City Council produced noise maps in July 2004 and again in November 2007. The revised Noise Maps released in 2012 show colour coded areas in Dublin based on noise levels in up to 10 bands, ranging from a low of 40 dB(A) to a high of 85 dB(A).

The Noise Map produced by Dublin City Council shows that 24 Hour Sound Levels at the recovery site range between 75 dB(A) to 85 dB(A) along the haulage roads and 60 dB(A) to 65 dB(A) within the site area. Thus the permitted rating for Daytime Noise Criterion of 55 dB $L_{Ar,T}$

for the site operations shall not be used when determining future permitted criterion for the recovery site as existing levels of background noise levels in the area are high and influenced by noise emissions from traffic and operations of neighbouring industrial sites, thus it is impossible to monitor sound levels exclusively associated with site operations .

3.3 Impacts on the SPA

An assessment has been carried out to determine whether the noise generated by operations during the three phases of the project would have an impact on the adjacent SPA, receptor R3.

Table 3-5 below shows the predicted daytime noise levels predicted at the boundaries of the SPA compared to the guidance noise levels contained in AQTAG09.

Table 3-5AQTAG09 Noise Assessment

Location	Period	Predicted Noise Level $L_{Aeq,1hr}$	AQTAG09 Noise Limit	Difference
R3	Daytime	54	55	-1

It can be seen from Table 3-5 that predicted noise levels during normal operation of the site, the predicted noise levels do not exceed the, AQTAG09 noise guidance limits and there will be no noise impact on the SAC.

4.0 MITIGATION MEASURES

4.1 Good Site Practice

In addition to the noise mitigation measures already incorporated into the site design, good site management practices and other specific measures will also provide additional noise mitigation. These measures will include:

- Activities within the site are undertaken in locations where noise attenuation from existing buildings and walls will maximise the benefit to the noise-sensitive properties.
- Haul roads will be kept clean and maintained in a good state of repair to avoid unwanted rattle and "body slap" from vehicles.
- Mobile plant used at the site have noise emission levels that comply with the limiting levels defined in EC Directive 86/662/EEC and any subsequent amendments.
- Mobile plant and heavy goods vehicles entering the site move in a circular pattern to minimise, as far as is practical and safe, noise from reverse warning systems.
- Plant is operated in a proper manner with respect to minimising noise emissions, for example, minimisation of drop heights and no un-necessary engine revving.
- Plant is subject to regular maintenance. All plant at the site is maintained in good working order to meet manufacturers' noise rating levels.
- Plant that is used intermittently is shut down when not in use.

5.0 RESIDUAL IMPACT ASSESSMENT

In the absence of mitigation measures, noise assessment of risk identified that Receptors 1, 2 and 3 do not require mitigation measure to be adopted at the site during works. The implementation of the mitigation measures further reduces noise levels emanating from the site.

6.0 MONITORING REQUIREMENTS

Ongoing noise monitoring will be undertaken as required by EPA.

7.0 SUMMARY AND CONCLUSIONS

The potential noise impacts of the project have been assessed terms of its implications for noise impact. This included the activities associated with the proposed works and as a result the overall impact of the project.

Noise aspects of the project have been considered at the nearest noise-sensitive locations around the project site.

The noise impact assessment identifies 'imperceptible' impacts for all receptors during the normal site operations which will be limited to daytime hours.

Mitigation measures have been incorporated into the site operations will further minimise any potential noise impacts on sensitive receptors. Overall, it is considered that the project would have no impact in terms of noise on noise sensitive receptors when mitigation measures are implemented.

8.0 CLOSURE

This report has been prepared by SLR Consulting (Ireland) with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Hammond Lane; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

9.0 REFERENCES

British Standards Institute (2009): Part 1 Noise "Code of practice for noise and vibration control on construction and open sites."

EPA (2012):*"Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)".*

IEMA (2003) draft *"Guidelines for Noise Impact Assessment"* and *"Advice Note on Current Practice (in the preparation of Environmental Impact Assessments) "*

AQTAG09 – UK Guidance on the Effects of Industrial Noise on Wildlife

Figure 1 Noise Monitoring and Receptor Locations

NOTES

1. EXTRACT FROM www.bing.com/maps

2. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000714 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

- SITE BOUNDARY
- N6 NOISE MONITORING LOCATIONS
- R3 NOISE RECEPTOR LOCATIONS

Point ID	Easting (ITM)	Northing (ITM)
R1	719019.010	733947.295
R2	718928.510	733934.399
R3	720084.792	733333.358
N1	719893.092	733799.261
N2	719726.549	733856.526
N3	719670.788	733905.500
N4	719893.911	733886.395
N5	719757.058	733904.267
N6	719090.280	733733.505
N7	719045.319	733911.074
N8	718946.338	733911.253

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NOISE MONITORING / RECEPTOR LOCATIONS

FIGURE 1

Scale: 1:10,000 @ A3

Date: SEPTEMBER 2014

Appendix A Noise Survey December 2012 Report

Fitz scientific

Monitoring and Testing Services

Hammond Lane Metal Co Ltd.

Pigeon House Road, Ringsend, Dublin 4

Annual Environmental Noise Survey

Report Date:
13th December 2012

Fitz Scientific

Unit 35A Boyne Business Park, Drogheda, Co. Louth

Report No. 2720/M07

1.0 Introduction

Fitz Scientific were commissioned by Hammond Lane Metal Co. Ltd, Pigeon House Road, Ringsend, Dublin 4 to carry out a day and night time noise survey at predetermined noise monitoring locations around the metal waste recovery facility. This monitoring was to be carried out as required under Waste Facility Permit No. WFP-DC-0013-01.

The EPA normally specify that licensed activities shall not give rise to noise levels off site, at noise sensitive locations, which exceed the sound pressure limits of 55 dB(A) during the day and 45 dB(A) during the night measured over 30 minute periods.

The metal waste recovery facility operates only during day time hours and is closed at night. The main activities in the plant that give rise to noise are operated during these hours. Noise is produced on site from activities such as unloading and loading operations, metal banging, shearing, baling, and Crane movements.

2.0 Duration and Measurements of Surveying

The daytime noise survey was carried out between 11:34 and 15:31 on Thursday 22nd November 2012 and between 11:27 and 12:29 on Wednesday 12th December 2012. The night time noise survey was carried out between 22:00 on the 22nd November 2012 and 01:49 on the 23rd November 2012. The following measurements were carried out at each monitoring location:

- Broadband measurements $L_{(A)eq}$, $L_{(A)10}$, $L_{(A)90}$, $L_{(A)peak}$ over a 30 minute period of time.
- 1/3rd Octave measurements.

2.1 Description of Measurement Parameters

2.1.1 **L_{eq} Values**: L_{eq} (t) values represent the continuous equivalent sound level over a specified time (t). This value expresses the average levels over time and is a linear integral.

2.1.2 **L_{90} and L_{10} Values**: The L_{90} and L_{10} are statistical values which represent the sound levels exceeded for a percentage of the measurement time. L_{10} indicates the sound levels exceeded for the 10% of the monitoring period while L_{90} indicates the sound levels exceeded for 90% of the monitoring period. The L_{90} value is a good indication of background noise levels.

2.1.3 **Tonal and Impulsive Characteristics**: Sounds which cover a range of only a few Hz which contains a clearly audible tone, i.e. distinguishable, discrete or continuous noise (whine, hiss, screech, or hum etc.) are referred to as being 'tonal'.

The simplified methodology for the objective identification of tones that is advocated in Annex D of ISO 1996-2:2007(E) is adopted. This methodology requires that for a prominent, discrete tone to be identified as present, the time-average sound pressure level in the one-third-octave band of interest should

exceed the time-average sound pressure levels of both adjacent one-third-octave bands by some constant level difference.
The appropriate level differences vary with frequency. They should be greater than or equal to the following values in both adjacent one-third-octave bands:

- 15dB in low-frequency one-third-octave bands (25Hz to 125Hz);
- 8dB in middle-frequency bands (160Hz to 400Hz), and;
- 5dB in high-frequency bands (500Hz to 10,000Hz).

Care should be taken to ensure that any tones identified in the low frequency range of 25Hz to 125Hz are of a magnitude greater than the threshold of hearing at that frequency.

3.0 Weather Conditions

Weather conditions were suitable for noise monitoring during the daytime survey. It was cold and calm day with occasional drizzle during the survey. Wind speeds were <5 m/sec.

Weather conditions during the night time survey were cold, calm and dry. Wind speeds were <5 m/sec.

4.0 Location of Monitoring Points

Hammond Lane Metal Co. is located on the Pigeon House Road in Dublin 4. Pigeon House Road is densely populated with industrial type sites. There are No residential properties in the immediate vicinity of Pigeon House Road. The closest noise sensitive receptors are approximately 0.5 miles away from the site and are currently under development (Irish Glass Bottle site). There are several industrial facilities between Hammond Lane and this site. The nearest residential properties are adjacent to the roundabout on the Sean Moore Road.

A number of noise monitoring points were identified around the boundary of the site. Additional noise sensitive locations were chosen based on their proximity to the Pigeon House Road area. These locations were either residential or sites where future residential properties may be built.

Site ID	Description	Classification
N1	South East Corner of Hammond Lane site	Boundary on a public road
N2	South West Corner of Hammond Lane site	Boundary on a public road
N3	Car Park of the Hammond Lane and Irish Cement site	Boundary close to the public road
N4	North East corner of the Hammond Lane site	Internal boundary fence beside the Ecocem site

N5	North West corner of the Hammond Lane site	Internal boundary fence beside the Irish Cement site
N6	Entrance to the old Glass bottle factory	Development site with possibility of future residential properties
N7	Beside residential houses close to the roundabout on Sean Moore road	Residential beside a public road

5.0 Sources of noise

The main sources of noise during the survey were from road traffic from the surrounding main roads, HGV movement to and from the Irish Cement site, noise from the Ecocem silos and noise from the shearing and shredding processes at the Hammond Lane Metal Co. site.

6.0 Methodology

The noise survey was carried out in accordance with ISO 1996/1/2/3 – Acoustics – Description and Measurement of Environmental Noise.

Reference was also made to the guidance note issued by the Environmental Protection Agency for the assessment of noise from licensed facilities and BS 4142.

Broadband measurements were 30 minute intervals, in the set range 30 – 90dB.

The meter was calibrated before and after the survey.

7.0 Equipment

The monitoring equipment used was a B&K 2250 Type 1 integrating averaging sound level meter with Serial No. 2463166 and selective 1:1 or 1:3 octave band measurements.

The meter was fixed to a tripod 1.3 meters above the ground level and the microphone was protected using a windshield. The microphone cartridge type was a BK4189, Serial No. 2643699 with open circuit sensitivity level of 45.9 and 46.4 mV per Pa (daytime) and 44.4 mV per Pa (night time).

7.1 Calibration

Calibration was carried out on site using an acoustic calibrator at 94dBA. The meter was calibrated before and after the monitoring round.

8.0 Day Time Monitoring

Monitoring Point	Date / Time	Sampling Interval (Minutes)	L_{Aeq}	L_{A10}	L_{A90}	Comments
N1	22/11/2012 12:05	30	**64**	65	57	Main source of noise was from the frequent passage of traffic on the Pigeon House Road, and from the coal yard in the adjacent site with plant operating very loudly. Noise generated from activities at the Hammond Lane site included HGVs entering and exiting the site, other plant and vehicles operating on site (grab hooks and loaders), reverse beeping sirens.
N2	22/11/2012 12:40	30	**62**	63	54	Main source of noise was from the frequent passage of traffic on the Pigeon House Road and noise from adjacent facility activities. Noise generated from activities at the Hammond Lane site involved HGVs entering and exiting the site and at the weighbridge, and the hum of plant operating on-site. Reversing HGVs created a beeping noise during the survey.
N3	22/11/2012 11:34	30	**69**	72	59	Outside source of noise was from the passage of several HGV's and other vehicles from the adjacent facility. Noise from the Hammond Lane facility included plant and vehicles operating (loader, HGVs and cars entering/exiting or idling in the car park area of the facility, and reverse beeping sirens of plant on site).
N4 (Shredder ON)	12/12/2012 11:59	30	**58**	59	55	Main source of noise was from the production stack/silo at the Ecocem site. There was also noise audible from Dublin Port activities. Noise was also generated from the metal recycling activities at the Hammond Lane site from grab claws, shredding operations and reverse beeping sirens of plant on site.
N4 (Shredder OFF	22/11/2012 13:13	30	**61**	62	53	The shredding unit was turned off during the monitoring to establish if the increase in overall noise, if any, on the surrounding environment when the plant is in full operation and to try and establish if the increase in Daytime background noise to Night time background noise. Audible noise on-site was generated from plant operating which included the mini-digger and pneumatic rock breaker with metal digging on ground and being dragged by the clawhook. An angle grinder was also operating and audible from this monitoring point.
N5 (Shredder ON)	12/12/2012 11:27	30	**71**	74	66	Main source of noise was from the production stack/silo at the Ecocem site. There was also noise audible from Dublin Port activities. Noise was also generated from the metal recycling activities at the Hammond Lane site from grab claws, shredding operations and reverse beeping sirens of plant on site.

						Interference noise was generated from construction activities at adjacent premises.
N5 (Shredder OFF	22/11/2012 13:46	30	**72**	71	59	The shredding unit was turned off during the monitoring to establish if the increase in overall noise, if any, on the surrounding environment when the plant is in full operation and to try and establish if the increase in Daytime background noise to Night time background noise. However, during the survey, interference noise from a grab crane operating on-site, and impact banging noise from construction activities at an adjacent premises caused elevated noise levels at this monitoring location.
N6	22/11/2012 14:28	30	**70**	74	54	Main source of noise at this monitoring location was generated by frequent passing of road traffic. There was no audible noise from the Hammond Land site at this monitoring location.
N7	22/11/2012 15:01	30	**66**	68	58	Main source of noise at this monitoring location was generated by the frequent passage of vehicles on the Sean Moore Road and the East Link Bridge. There was no audible noise from the Hammond Lane site at this monitoring location.

9.0 Night Time Monitoring

Monitoring Point	Date / Time	Sampling Interval (Minutes)	L_{Aeq}	L_{A10}	L_{A90}	Comments
N1	22/11/2012 22:33	30	**63**	64	62	Hammond Lane site not in operation.Main source of noise was generated by road traffic, humming noise from the ESB power plant, and noise from the tidal bore across from the site.
N2	22/11/2012 23:06	30	**60**	58	53	Hammond Lane site not in operation.Main source of noise was generated by road traffic, humming noise from the ESB power plant, activities at Dublin Port and noise from the production stack/silo at the Ecocem site.
N3	22/11/2012 22:00	30	**56**	54	52	Hammond Lane site not in operation.Main source of noise was generated by intermittent traffic, humming noise from the ESB power plant and Ecocem facility and general activities at the Dublin Port.
N4	22/11/2012 23:39	30	**57**	57	55	Hammond Lane site not in operation.Main source of noise was generated by the production stack/silo at the Ecocem site, passage of HGVs, general activities at the Dublin Port.
N5	23/11/2012 00:12	30	**55**	56	53	Hammond Lane site not in operation.Main source of noise was generated by activities at the Dublin Port, a humming sound from the operation of the ESB power plant and noise from the production stack/silo at the Ecocem site.
N6	23/11/2012 00:45	30	**52**	51	44	Hammond Lane site not in operation.Main source of noise was generated by intermittent road traffic.
N7	23/11/2012 01:19	30	**48**	49	42	Hammond Lane site not in operation.Main source of noise was generated by intermittent road traffic along Sean Moore Rd. and Pigeon House Rd.

10.0 Third Octave Noise Measurements

Third octave noise monitoring results are used to identify prominent tonal components in noise. There were no audible tonal noise components detected during the survey period.

11.0 Interferences

The main sources of interference during monitoring at the Hammond Lane Metal Co. facility included passing traffic on the surrounding main roads, activities at Dublin Port, noise from the ESB Power Plant, and noise from the operational activities at the Irish Cement facility and Ecocem facility.

12.0 Conclusion

On examining the results of both the Daytime and Night time measurements, a few obvious conclusions can be drawn. Firstly in relation to the night time noise, the Hammond Lane Metal Co. site does not operate night. However, on reviewing the data it can be clearly seen that the overall background noise in the vicinity of the site is quite elevated (L_{A90} values). According to EPA Guidance Note for Noise (NG4) the typical allowable Night time noise limit for industrial operations is 45 dB. In the case of Hammond lane, the average L_{Aeq} (30mins) appears to be somewhere in the region of 58 dB. The analyst noted several external noise sources during the course of the measurements taken and they are as follows:-

- Continuous broadband noise being emitted from a stack/silo on the neighbouring Cemex site.
- Continuous broadband noise being emitted from the batch processing plant on the Irish Cement site.
- Intermittent noise impact from HGV's passing through the Irish Cement site. It should be noted that during the day the entrance route and car park to Irish Cement site is shared with Hammond Lane Metal processors. At night however there was no movement of traffic onto the Hammond Lane site as it was closed.
- Frequent noise impact from passing traffic on Pigeon House Road and Sean Moore Road.
- Intermittent noise impact from general activities at the Dublin Port.

According to EPA Guidance Note for Noise (NG4) the typical allowable Night time noise limit for industrial operations is 45dB. The measurements taken at each of the locations clearly show that the various L_{Aeq} (30 mins) measured are well above this. However, the L_{A90} which is generally accepted as a measurement of the overall background noise are also generally above 45dB L_{Aeq} (30 mins), except at monitoring locations N6 and N7.

Daytime noise measurements exceeded the 55 dB limit at all monitoring locations. However, the L_{A90} which is generally accepted as a measurement of the overall background noise are also generally above 55dB L_{Aeq} (30 mins), except at monitoring locations N2, N4 and N6. Therefore the overall background ambient noise in the vicinity of Hammond Lane Metal processors is clearly well above normal Daytime background noise levels. This is not surprising given the location of the site. Hammond Lane Metal

Processors is located on the Pigeon House Road in Dublin 4. Pigeon House Road is densely populated with industrial type sites. In addition to this it should also be noted that there are no residential properties in close proximity to the site.

The closest Noise Sensitive Location is approximately 0.5 miles from the Hammond Lane Metal Co. site and is currently under development (Glass Bottle Factory). There are several industrial facilities between Hammond Lane and this site. The next nearest residential properties are adjacent to the roundabout on the Sean Moore Road.

The L_{A10} measurements offer further clarification and agreement with the subjective description of the Environmental Technician that the intermittent road traffic and other noise sources in the area a contributing to the elevated L_{Aeq} (30 mins) both at night and during the day.

The overall conclusion of the Environmental Technician is that Hammond Lane Metal Co. site is not contributing significantly to the overall noise levels recorded on Pigeon House Road. Furthermore any noise emitting from the site has to be viewed in the context of the overall noise levels recorded in the area and the absence of any residential or Noise Sensitive neighbours.

Aadil Khan (Tech. IOA)
Environmental Technical Manager

Victor Olmos
Field Services Manager

13th December 2012

Appendix 1: Broadband & 1/3 Octave Monitoring Data

Hammond Lane Ringsend - N1 Daytime

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		11/22/2012 12:05:23
End Time:		11/22/2012 12:35:23
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.78

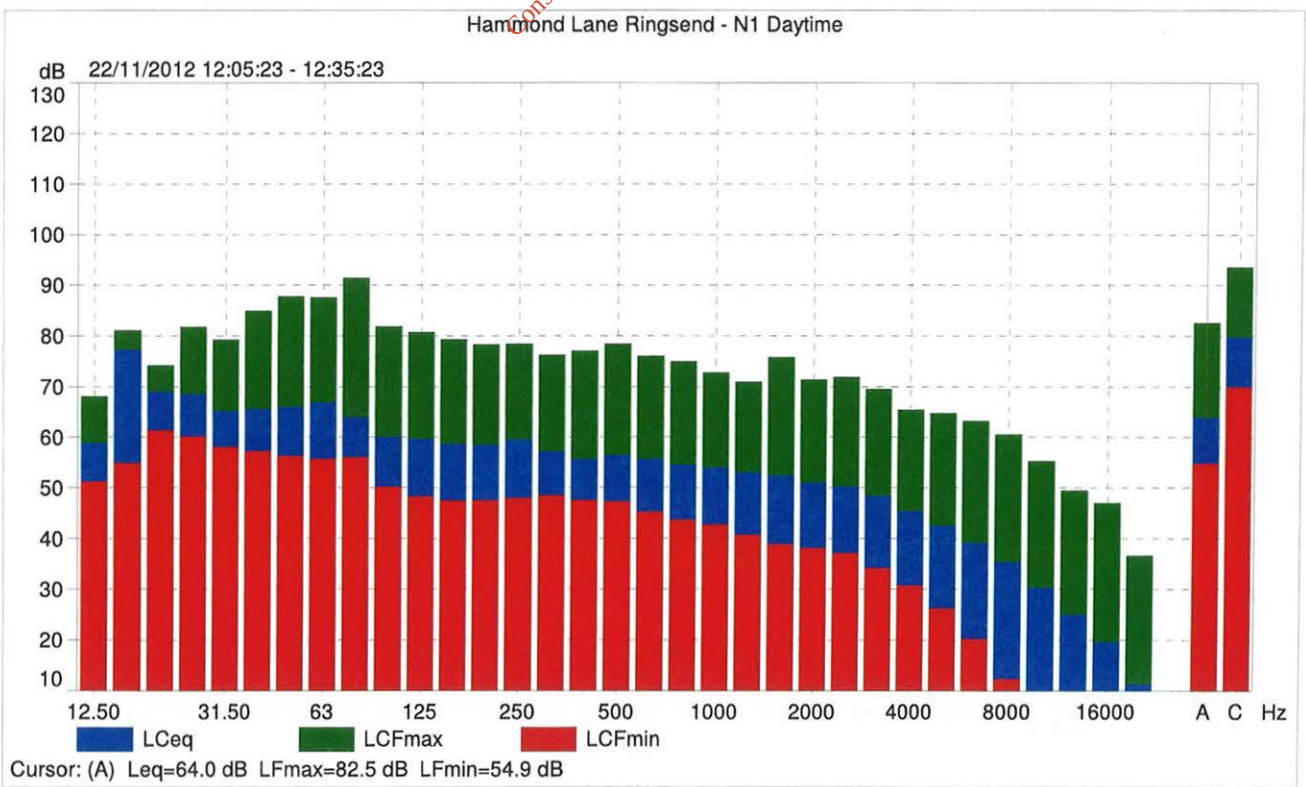
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		11/22/2012 11:31:00
Calibration Type:		External reference
Sensitivity:		45.4035699367523 mV/Pa

Hammond Lane Ringsend - N1 Daytime

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	82.5	54.9	64.0	65.4	56.7
Time	12:05:23	12:35:23						
Date	22/11/2012	22/11/2012						



Hammond Lane Ringsend - N2 Daytime

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		11/22/2012 12:40:02
End Time:		11/22/2012 13:10:02
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.77

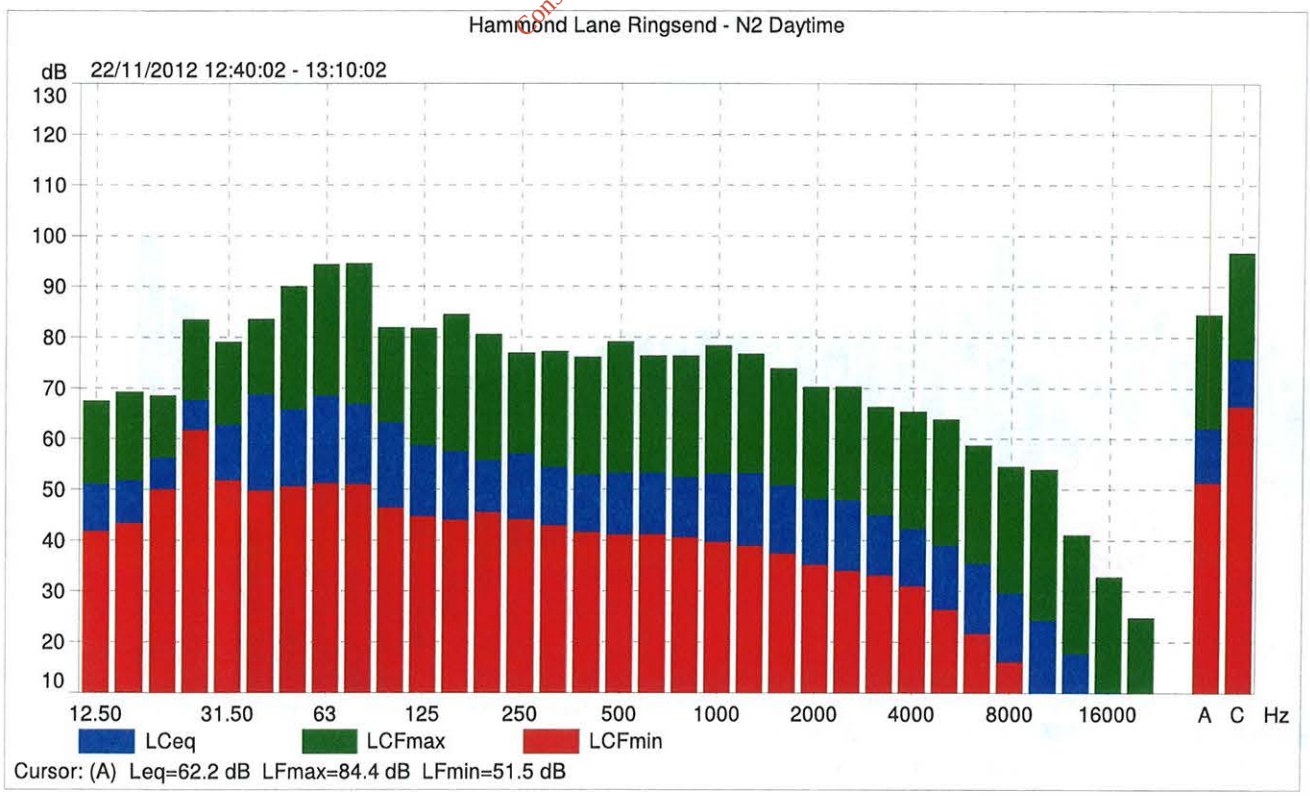
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		11/22/2012 11:31:00
Calibration Type:		External reference
Sensitivity:		45.4035699367523 mV/Pa

Hammond Lane Ringsend - N2 Daytime

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	84.4	51.5	62.2	63.2	54.1
Time	12:40:02	13:10:02						
Date	22/11/2012	22/11/2012						



Hammond Lane Ringsend - N3 Daytime

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		11/22/2012 11:34:03
End Time:		11/22/2012 12:04:03
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.78

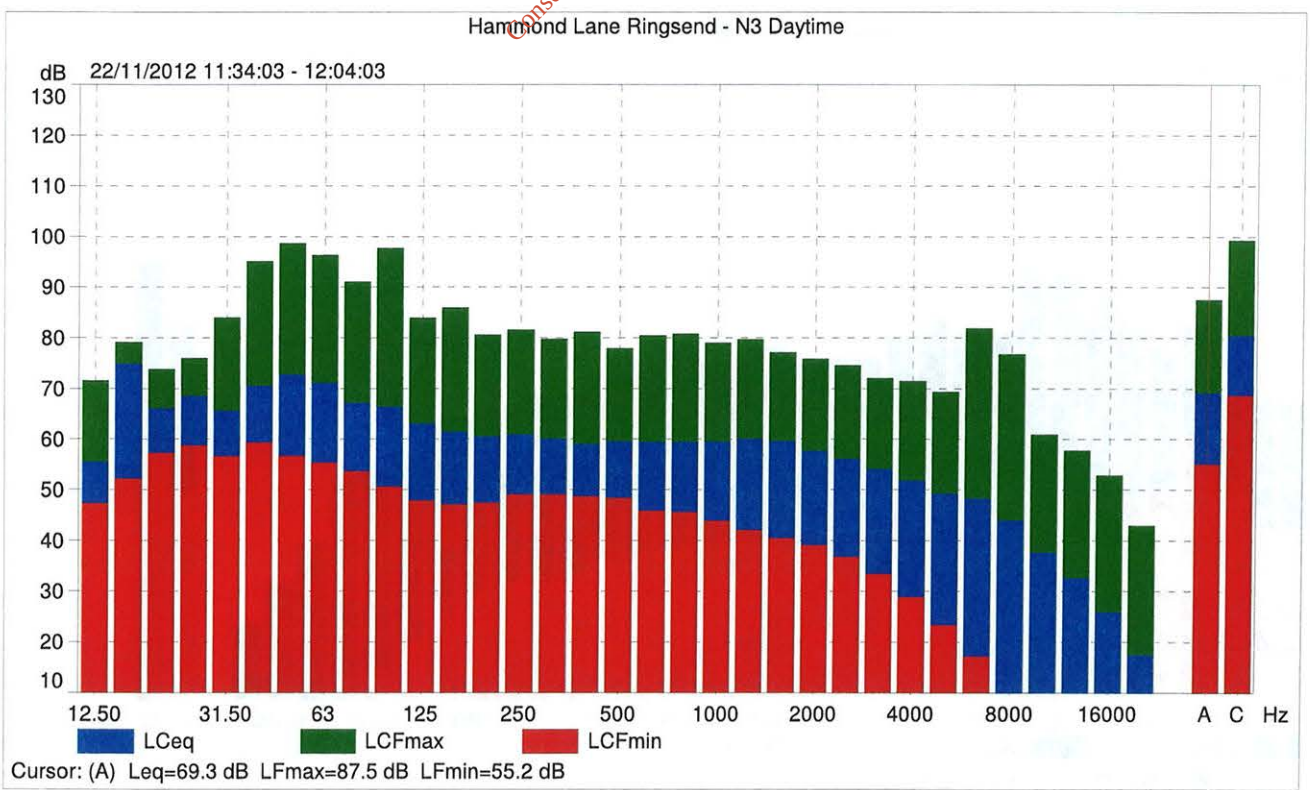
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		11/22/2012 11:31:00
Calibration Type:		External reference
Sensitivity:		45.4035699367523 mV/Pa

Hammond Lane Ringsend - N3 Daytime

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	87.5	55.2	69.3	71.9	59.1
Time	11:34:03	12:04:03						
Date	22/11/2012	22/11/2012						



Hammond Lane Ringsend - N4 Daytime (Shredder OFF)

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		11/22/2012 13:13:40
End Time:		11/22/2012 13:44:03
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.77

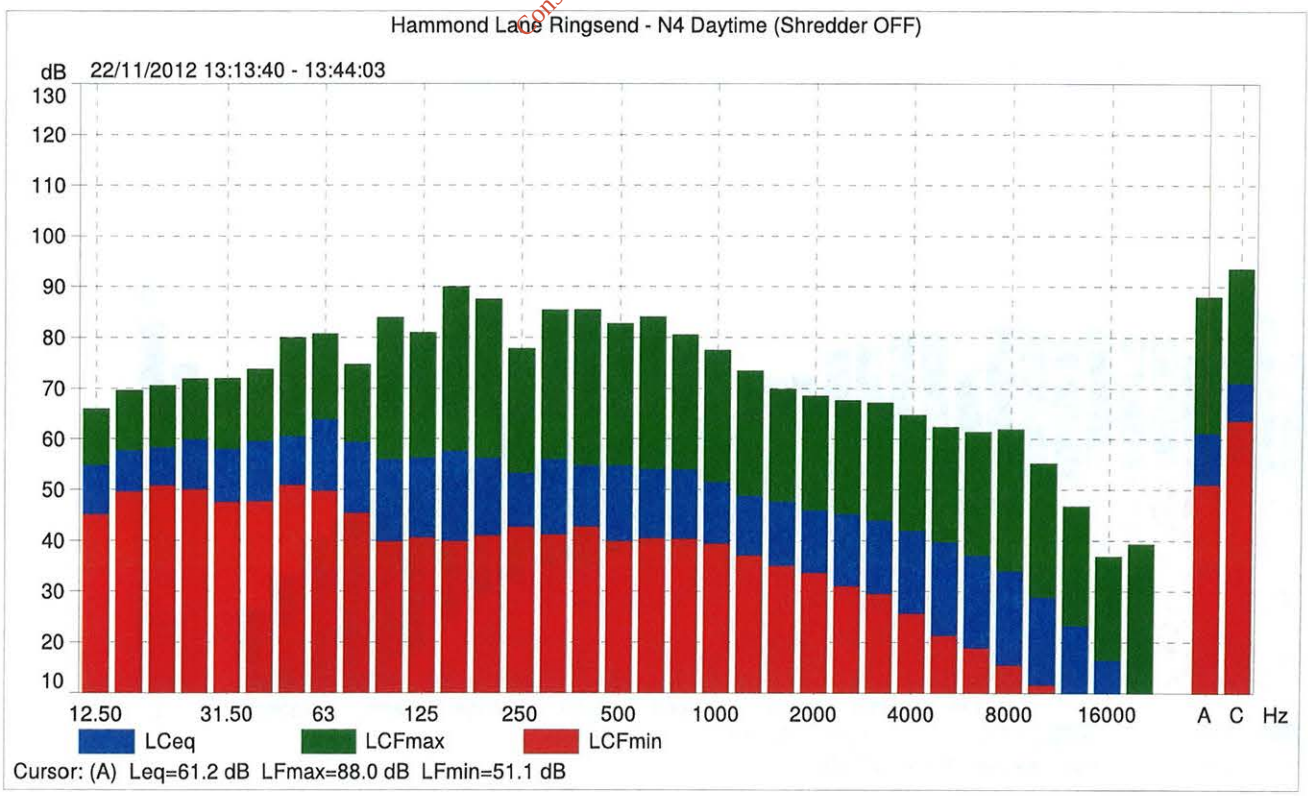
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		11/22/2012 11:31:00
Calibration Type:		External reference
Sensitivity:		45.4035699367523 mV/Pa

Hammond Lane Ringsend - N4 Daytime (Shredder OFF)

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	88.0	51.1	61.2	61.6	53.0
Time	13:13:40	13:44:03						
Date	22/11/2012	22/11/2012						



Hammond Lane Ringsend - N4 Daytime (Shredder ON)

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		12/12/2012 11:59:04
End Time:		12/12/2012 12:29:04
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.59

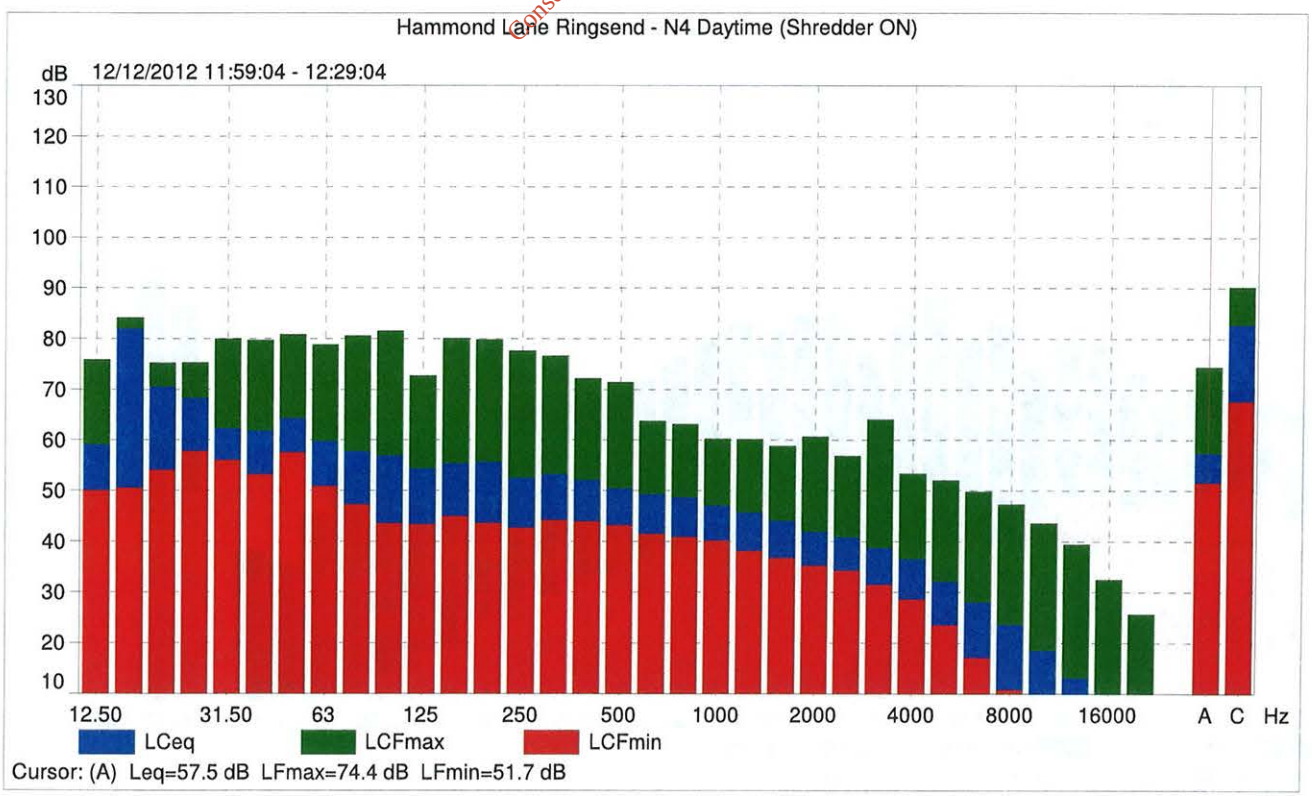
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		12/12/2012 11:20:06
Calibration Type:		External reference
Sensitivity:		46.4076958596706 mV/Pa

Hammond Lane Ringsend - N4 Daytime (Shredder ON)

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	74.4	51.7	57.5	59.4	54.6
Time	11:59:04	12:29:04						
Date	12/12/2012	12/12/2012						



Hammond Lane Ringsend - N5 Daytime (Shredder OFF

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		11/22/2012 13:46:14
End Time:		11/22/2012 14:16:14
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.77

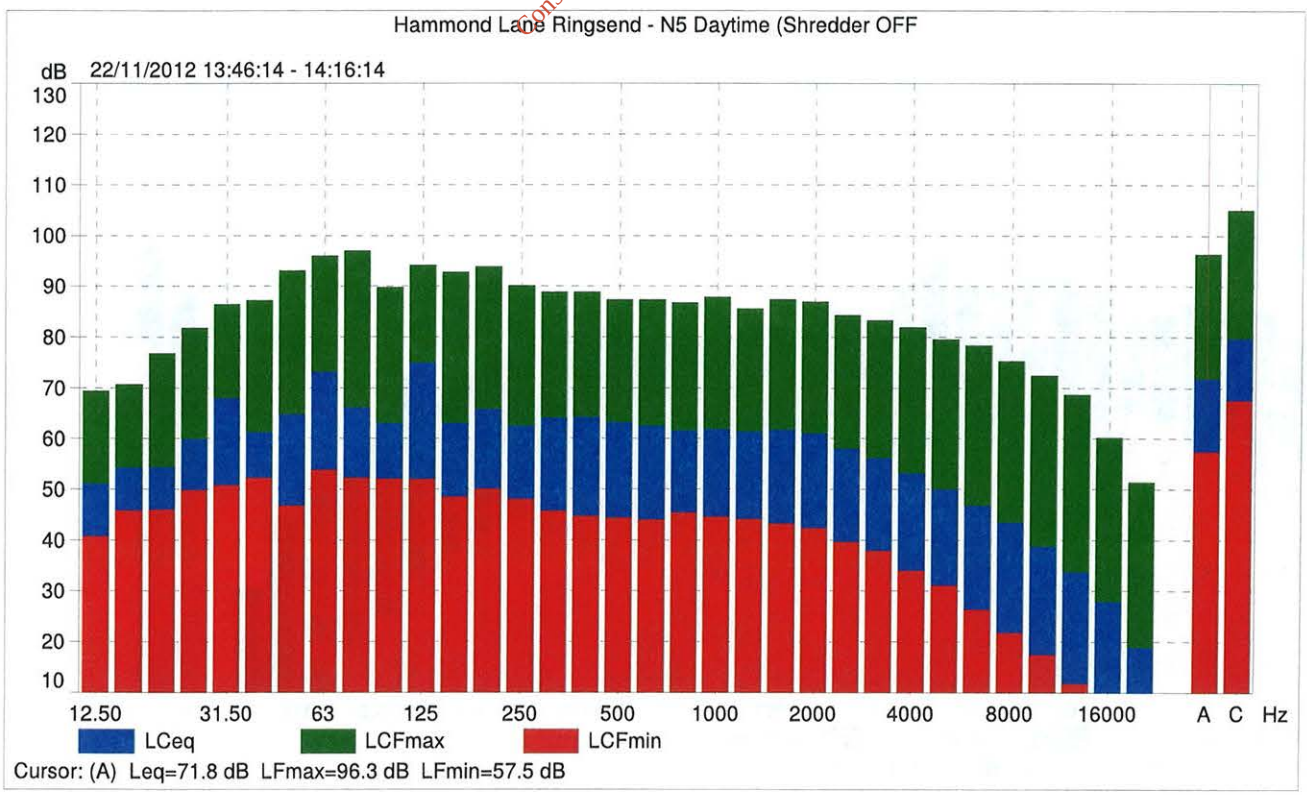
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		11/22/2012 11:31:00
Calibration Type:		External reference
Sensitivity:		45.4035699367523 mV/Pa

Hammond Lane Ringsend - N5 Daytime (Shredder OFF

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	96.3	57.5	71.8	71.0	59.0
Time	13:46:14	14:16:14						
Date	22/11/2012	22/11/2012						



Hammond Lane Ringsend - N5 Daytime (Shredder ON)

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		12/12/2012 11:27:03
End Time:		12/12/2012 11:57:03
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.59

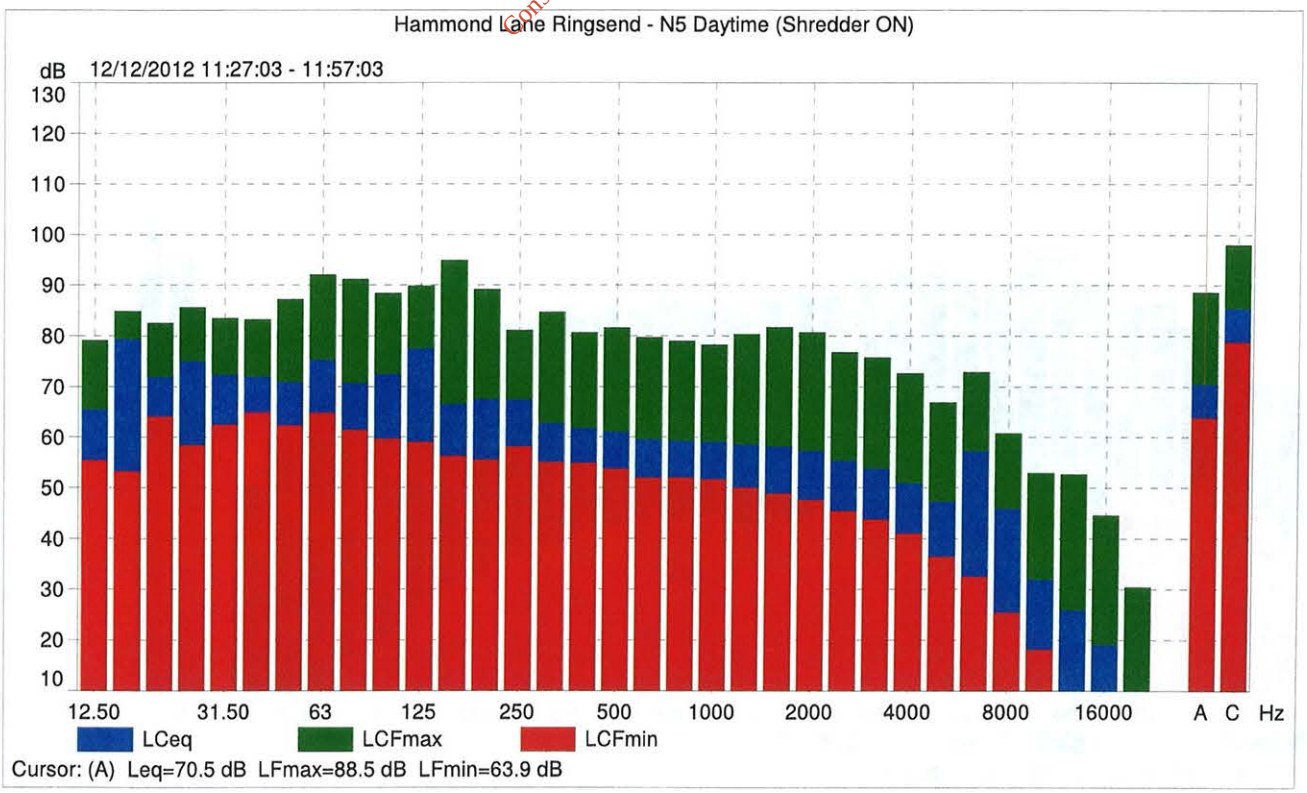
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		12/12/2012 11:20:06
Calibration Type:		External reference
Sensitivity:		46.4076958596706 mV/Pa

Hammond Lane Ringsend - N5 Daytime (Shredder ON)

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	88.5	63.9	70.5	73.7	65.6
Time	11:27:03	11:57:03						
Date	12/12/2012	12/12/2012						



Hammond Lane Ringsend - N6 Daytime

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		11/22/2012 14:28:21
End Time:		11/22/2012 14:58:21
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.77

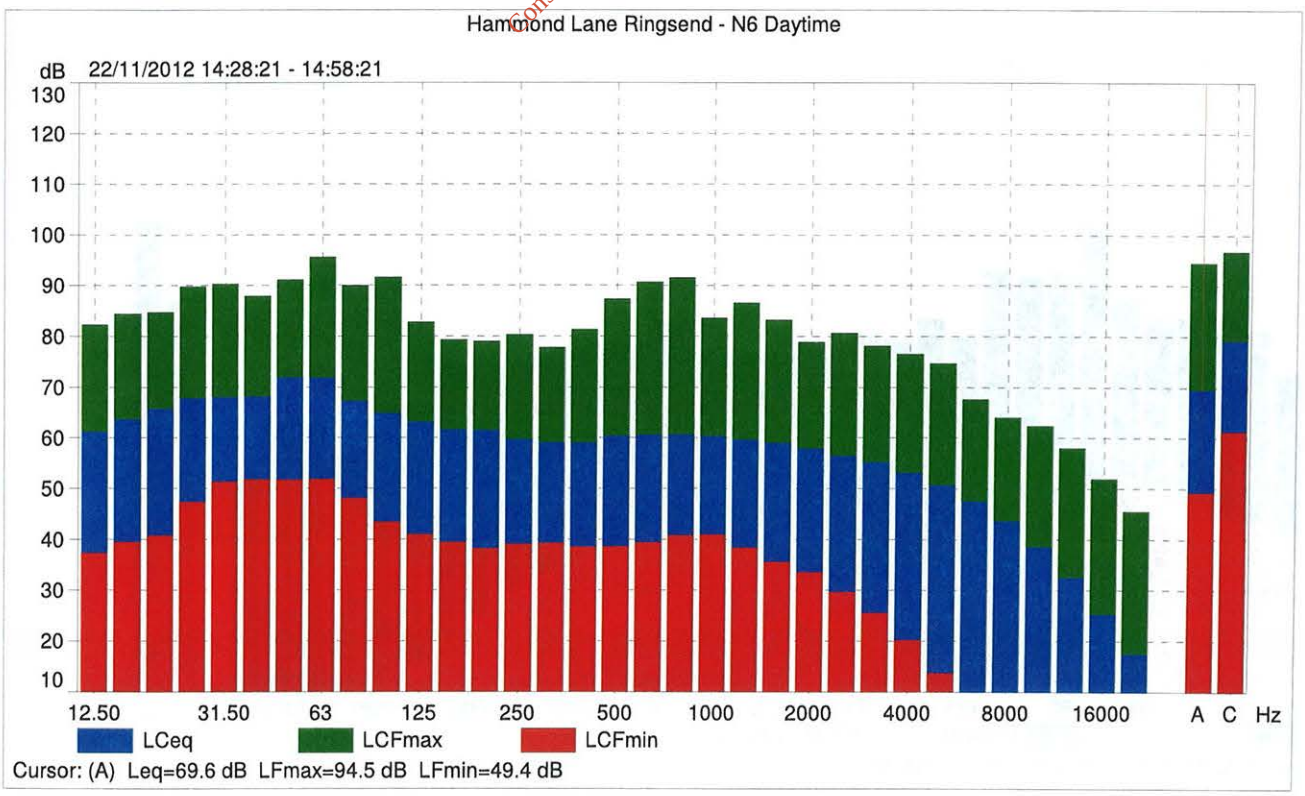
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		11/22/2012 11:31:00
Calibration Type:		External reference
Sensitivity:		45.4035699367523 mV/Pa

Hammond Lane Ringsend - N6 Daytime

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	94.5	49.4	69.6	73.6	53.6
Time	14:28:21	14:58:21						
Date	22/11/2012	22/11/2012						



Hammond lane Ringsend - N7 Daytime

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		11/22/2012 15:01:43
End Time:		11/22/2012 15:31:43
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.77

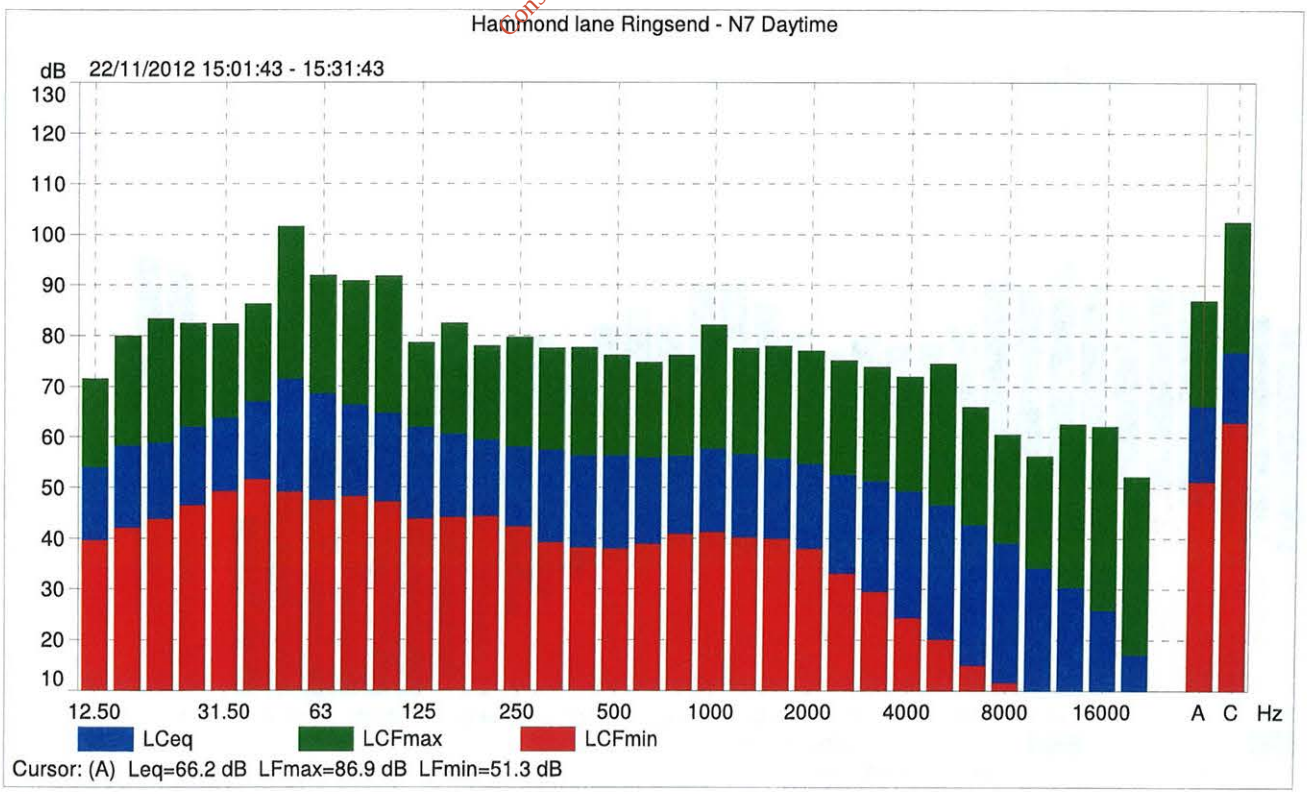
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		11/22/2012 11:31:00
Calibration Type:		External reference
Sensitivity:		45.4035699367523 mV/Pa

Hammond lane Ringsend - N7 Daytime

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	86.9	51.3	66.2	68.2	58.1
Time	15:01:43	15:31:43						
Date	22/11/2012	22/11/2012						



Hammond Lane Ringsend - N1 Night-time

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		11/22/2012 22:33:03
End Time:		11/22/2012 23:03:03
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.72

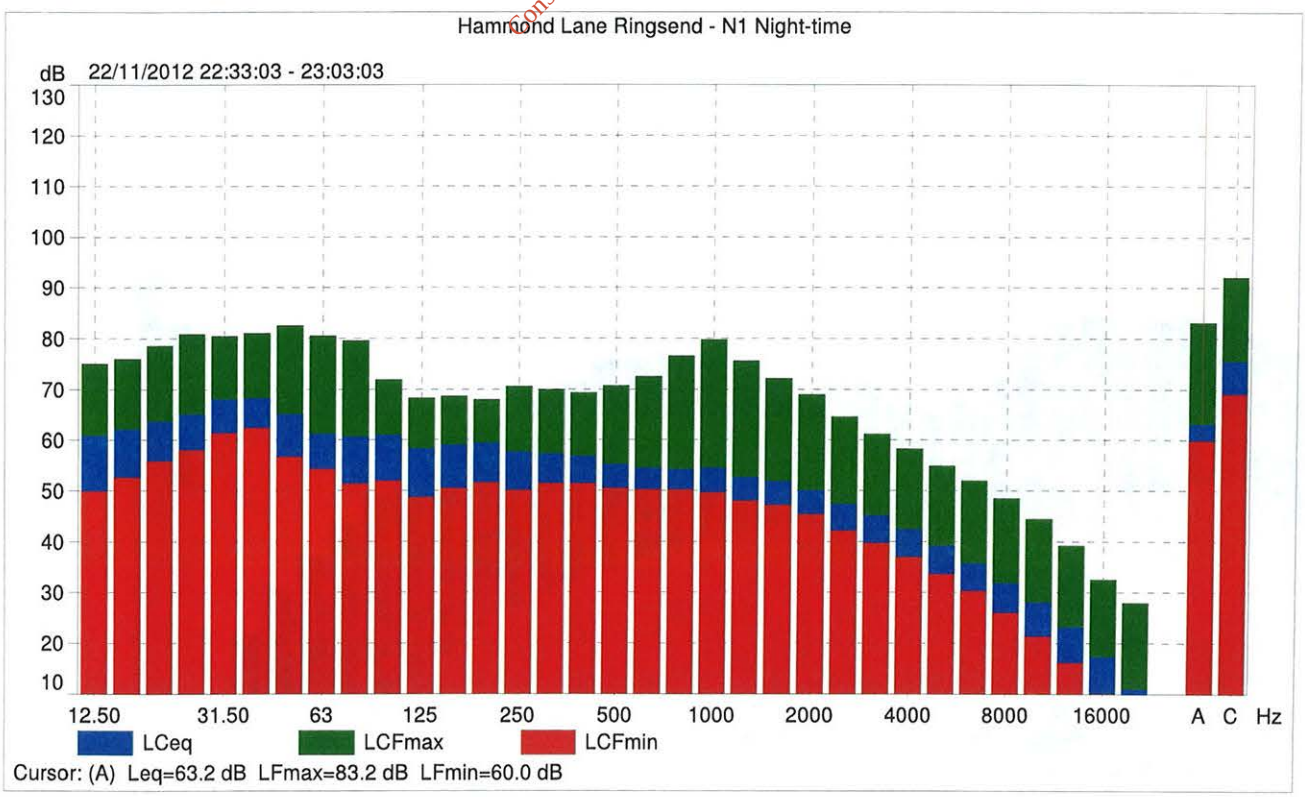
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		11/22/2012 21:51:14
Calibration Type:		External reference
Sensitivity:		45.7193441689014 mV/Pa

Hammond Lane Ringsend - N1 Night-time

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	83.2	60.0	63.2	63.8	61.8
Time	22:33:03	23:03:03						
Date	22/11/2012	22/11/2012						



Hammond Lane Ringsend - N2 Night-time

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		11/22/2012 23:06:02
End Time:		11/22/2012 23:36:02
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.72

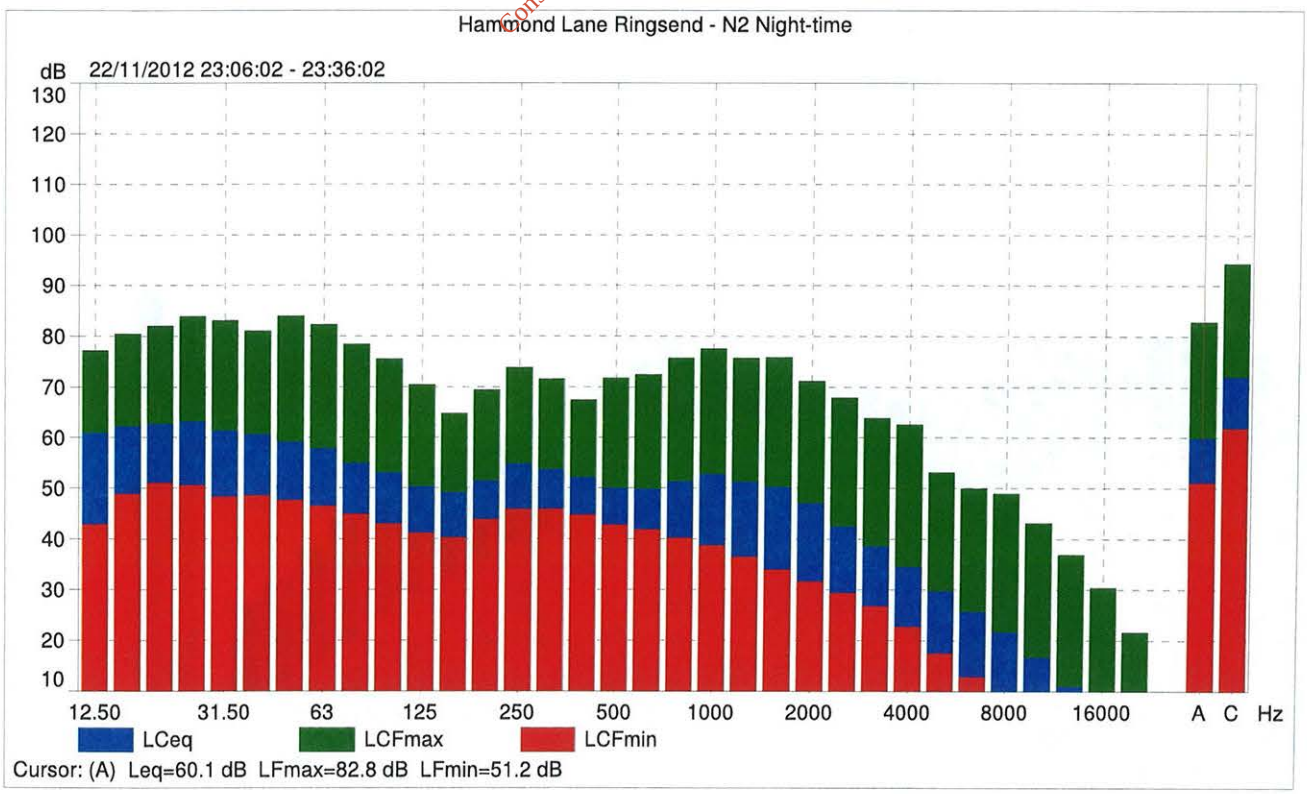
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		11/22/2012 21:51:14
Calibration Type:		External reference
Sensitivity:		45.7193441689014 mV/Pa

Hammond Lane Ringsend - N2 Night-time

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	82.8	51.2	60.1	58.4	53.1
Time	23:06:02	23:36:02						
Date	22/11/2012	22/11/2012						



Hammond Lane Ringsend - N3 Night-time

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		11/22/2012 22:00:03
End Time:		11/22/2012 22:30:03
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.72

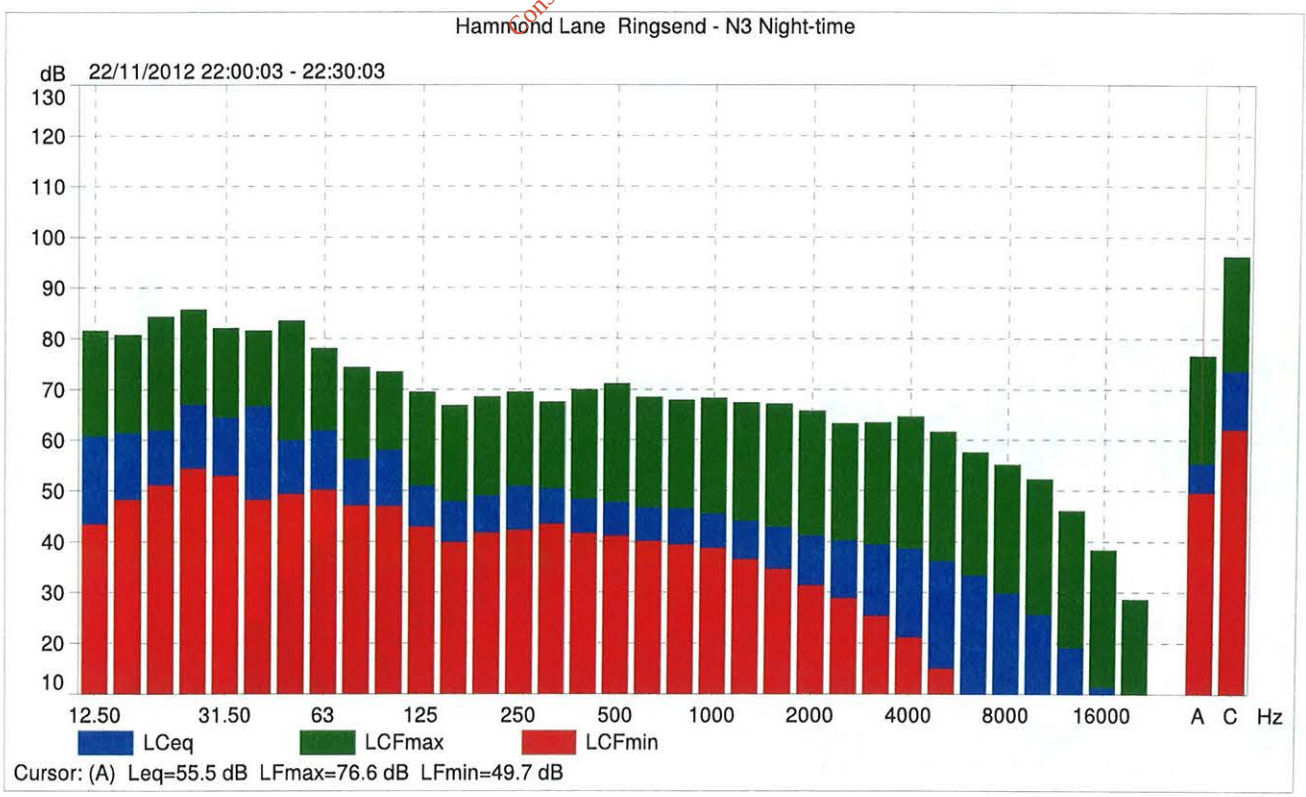
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		11/22/2012 21:51:14
Calibration Type:		External reference
Sensitivity:		45.7193441689014 mV/Pa

Hammond Lane Ringsend - N3 Night-time

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	76.6	49.7	55.5	54.3	51.8
Time	22:00:03	22:30:03						
Date	22/11/2012	22/11/2012						



Hammond Lane Ringsend - N4 Night-time

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		11/22/2012 23:39:19
End Time:		11/23/2012 00:09:19
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.72

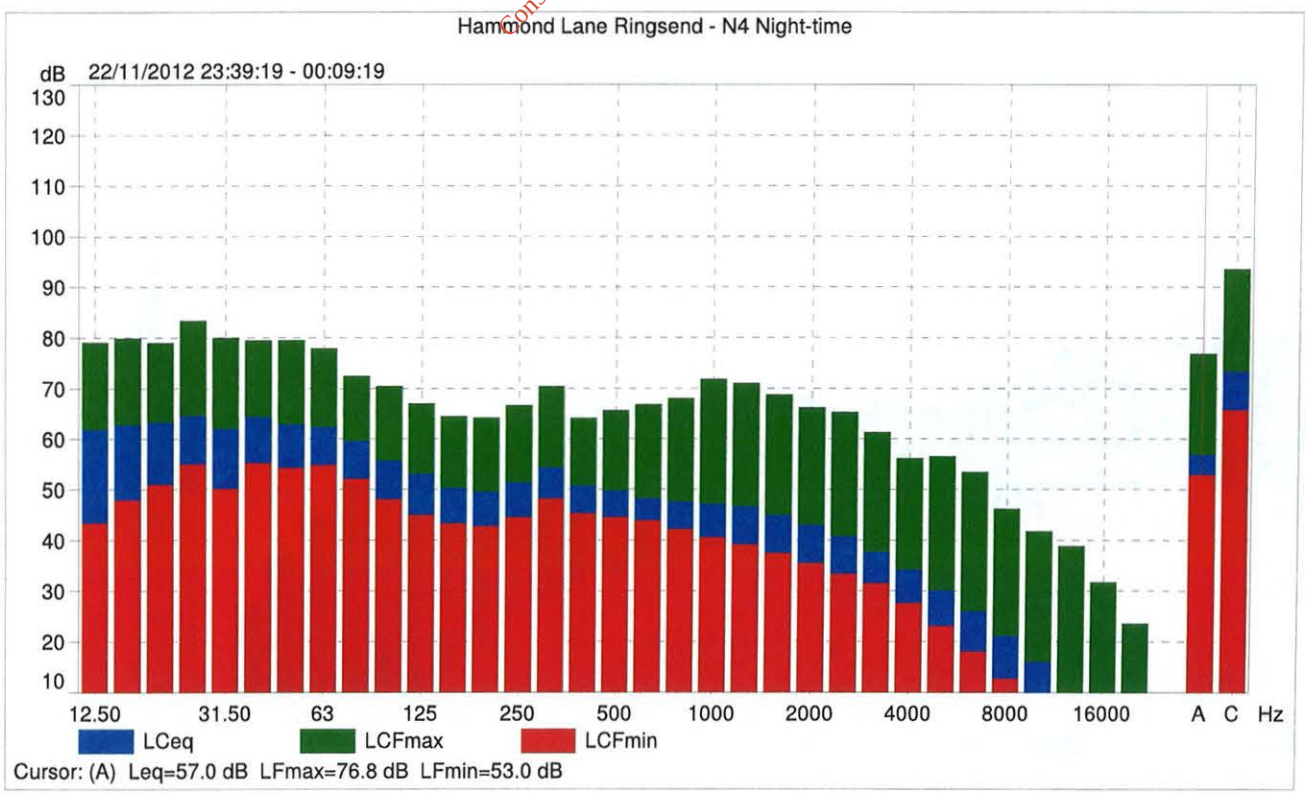
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		11/22/2012 21:51:14
Calibration Type:		External reference
Sensitivity:		45.7193441689014 mV/Pa

Hammond Lane Ringsend - N4 Night-time

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	76.8	53.0	57.0	56.6	54.6
Time	23:39:19	00:09:19						
Date	22/11/2012	23/11/2012						



Hammond Lane Ringsend - N5 Night-time

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		11/23/2012 00:12:02
End Time:		11/23/2012 00:42:02
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.72

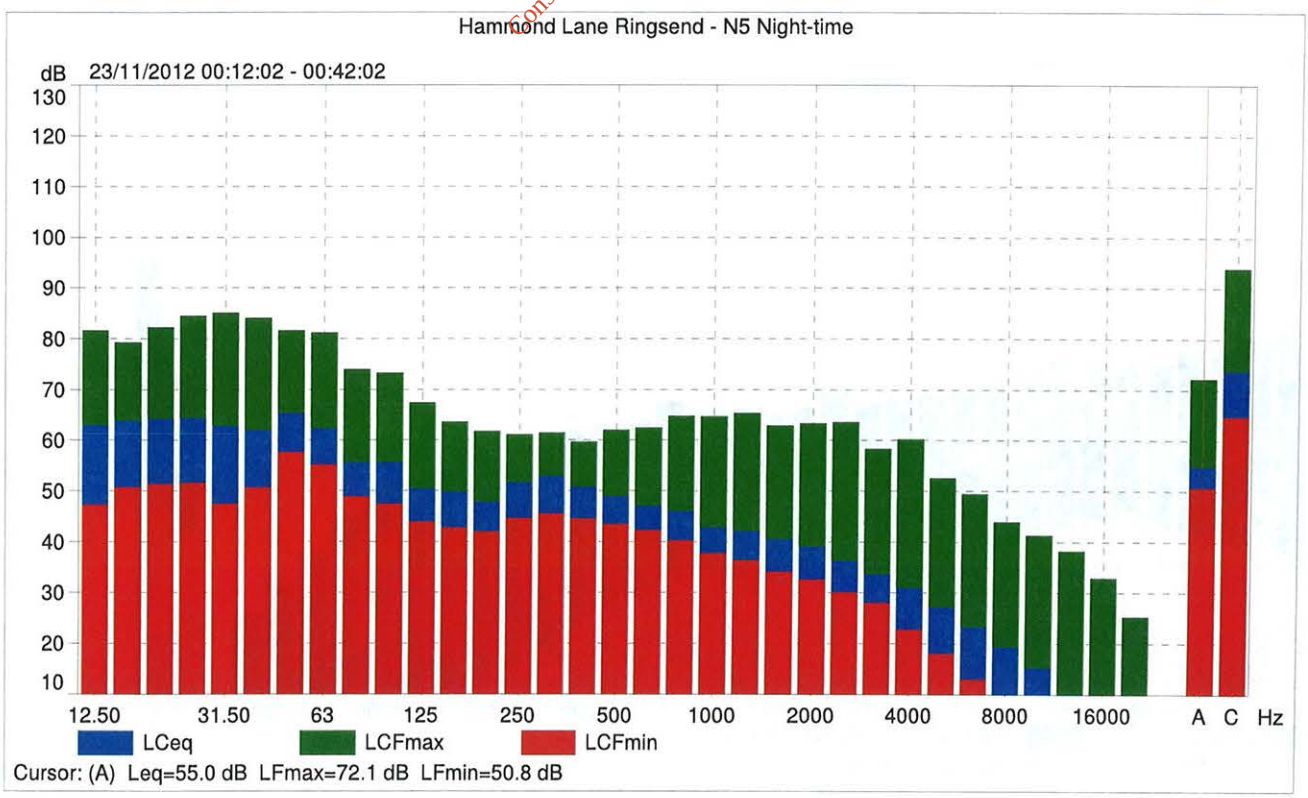
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		11/22/2012 21:51:14
Calibration Type:		External reference
Sensitivity:		45.7193441689014 mV/Pa

Hammond Lane Ringsend - N5 Night-time

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	72.1	50.8	55.0	55.8	53.3
Time	00:12:02	00:42:02						
Date	23/11/2012	23/11/2012						



Hammond Lane Ringsend - N6 Night-time

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		11/23/2012 00:45:39
End Time:		11/23/2012 01:15:39
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.72

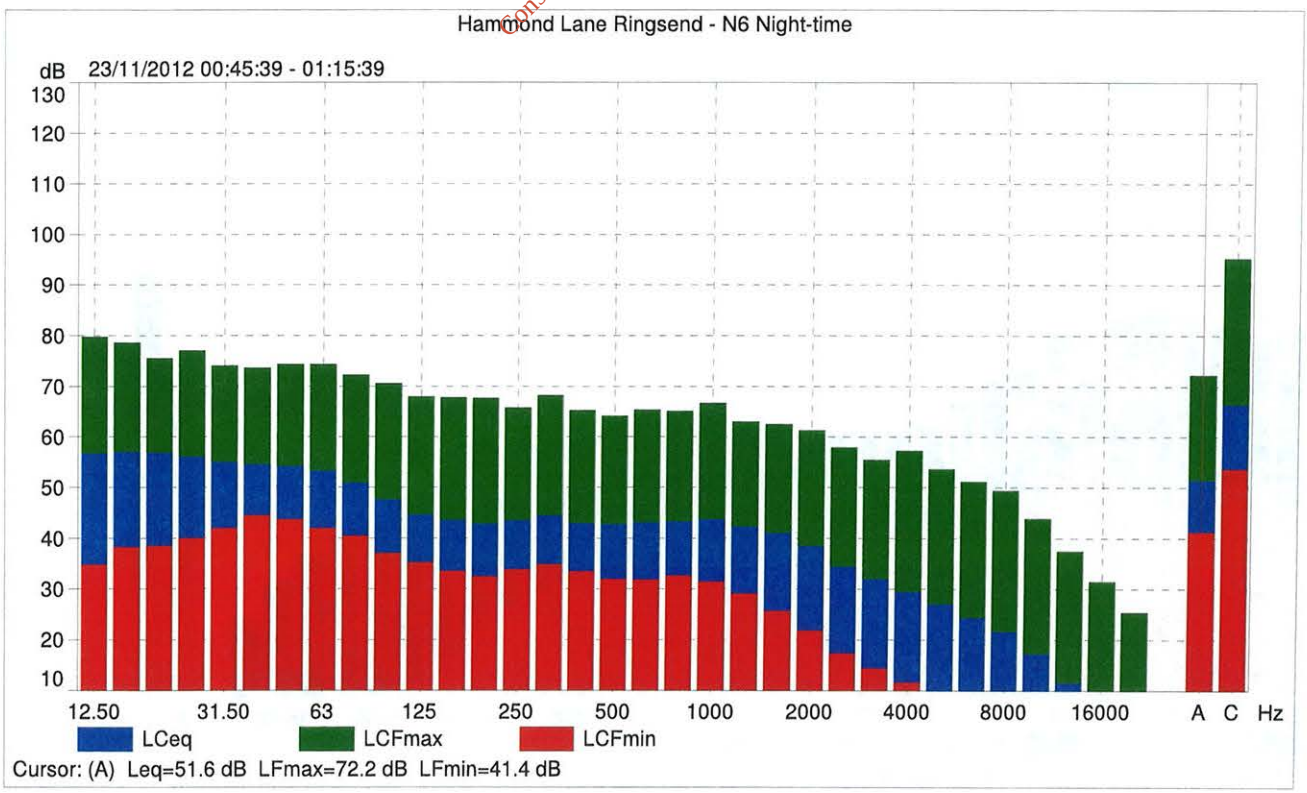
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		11/22/2012 21:51:14
Calibration Type:		External reference
Sensitivity:		45.7193441689014 mV/Pa

Hammond Lane Ringsend - N6 Night-time

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	72.2	41.4	51.6	50.9	43.8
Time	00:45:39	01:15:39						
Date	23/11/2012	23/11/2012						



Hammond Lane Ringsend - N7 Night-time

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		11/23/2012 01:19:06
End Time:		11/23/2012 01:49:06
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		141.72

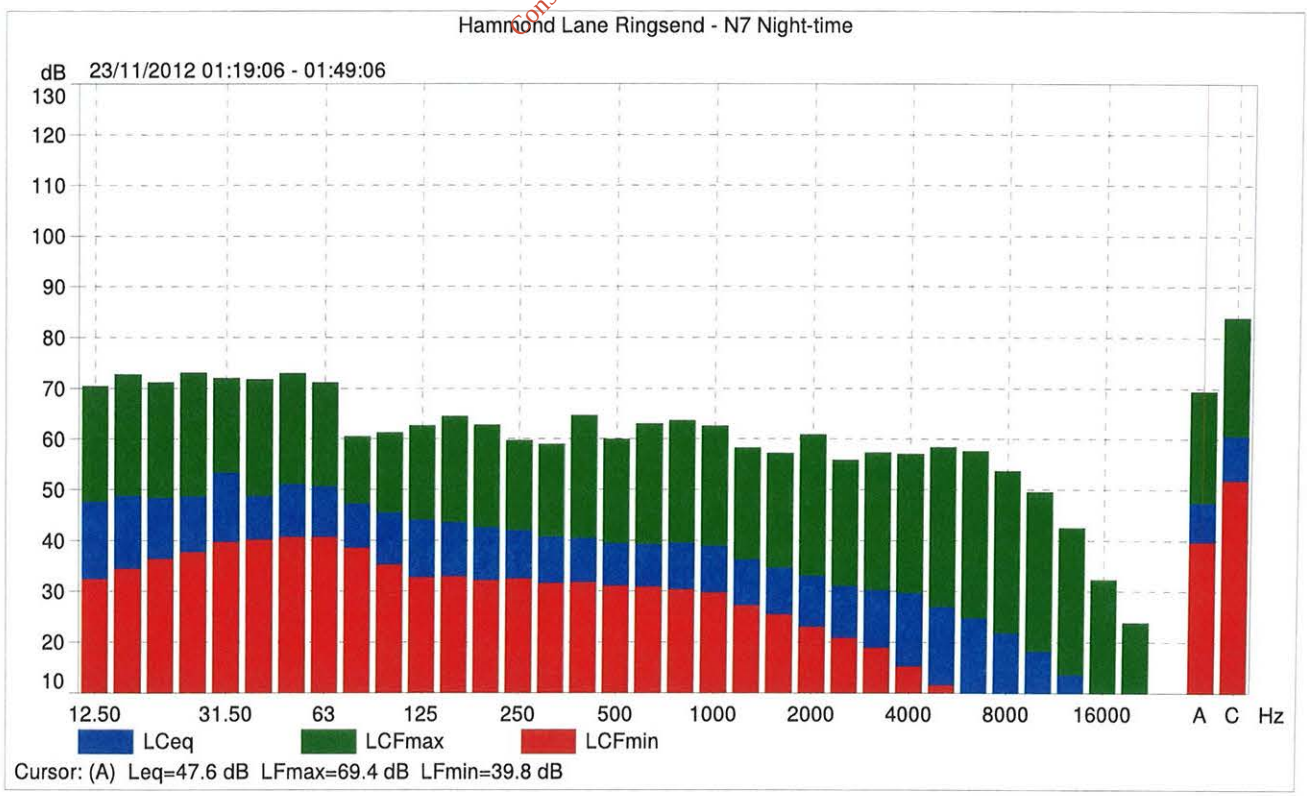
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	C

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		11/22/2012 21:51:14
Calibration Type:		External reference
Sensitivity:		45.7193441689014 mV/Pa

Hammond Lane Ringsend - N7 Night-time

	Start time	End time	Overload [%]	LAFmax [dB]	LAFmin [dB]	LAeq [dB]	LAF10 [dB]	LAF90 [dB]
Value			0.00	69.4	39.8	47.6	49.0	42.3
Time	01:19:06	01:49:06						
Date	23/11/2012	23/11/2012						



Appendix B Detailed Noise Assessment

Noise Assessment (Refer to Figure 1)

Table (i) Predicted Noise Levels from site operations at the boundary Worst Case:

Max L_{Aeq} (dB(A))	*Screening (dB(A))*			Activity Distance (m)			Attenuation with Distance (dB(A))			*Activity L_{Aeq} (dB(A))*		
	R1	*R2*	*R3*	*R1*	*R1*	*R2*	*R1*	*R2*	*R3*	*R3*	*R1*	*R2*
92	*-5*	*-5*	*-5*	*750*	800	450	38	38	33	49	49	54

Appendix C Glossary of Terminology

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided below.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale, is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in Table C-1.

Table C 1 Noise Levels Commonly Found In the Environment

Sound Level	Location
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside factory
100 to 110 dB(A)	Burglar alarm at one metre away
110 to 130 dB(A)	Jet aircraft on take off
140 dB(A)	Threshold of Pain

Acoustic Terminology

Background noise level, $L_{A90,T}$ The 'A'- weighted sound pressure level of the residual noise in decibels exceeded for 90 per cent of a given time and is the $L_{A90,T}$

dB (decibel) is the scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and the reference pressure (0.00002 N/m^2). 0 dB is the threshold of hearing, 140 dB is the threshold of pain. A change of 1 dB is detectable only under laboratory conditions. A change of 10 dB corresponds approximately to halving or doubling the loudness of sound.

dBA is a measure of the overall noise level of sound across the audible frequency range (20 Hz - 20,000 Hz) with a frequency weighting (i.e. 'A'- weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

Impulsive Noise: A noise that is of short duration (typically less than one second), the sound pressure level of which is significantly higher than the background.

$L_{Aeq,T}$ is the equivalent steady sound level in dB containing the same acoustic energy as the actual fluctuating sound level over the given period, T. The period T may be short as 1 second when used to describing a single event, or as long as 24 Hours when used to describe the noise climate at a specified location. $L_{Aeq,T}$ can be measured directly with an integrating sound level meter.

L_{10} & L_{90}: If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.

L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response. L_{Amax} F, or Fast, is averaged over 0.125 of a second and L_{Amax} S, or Slow, is averaged over 1 second.

Noise is unwanted sound. Any sound, that has the potential to cause disturbance, discomfort or psychological stress to a subject exposed to it, or any sound, that could to cause actual physiological harm to a subject exposed to it, or physical damage to any structure exposed to it, is known as noise.

A **noise-sensitive location** is: any dwelling, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity, which for its proper enjoyment requires the absence of noise at nuisance levels.

Residual noise is the noise level in the area in the absence of the noise source under investigation.

Sound absorption: When a sound wave encounters an obstacle some of its energy can be absorbed. This fact is important when considering how to attenuate noise. For example, the more porous a surface, the more sound is absorbed rather than reflected.

Sound power relates to the total acoustic energy that a machine, or piece of equipment, radiates to its environment. Sound power can more practically be expressed as a relation to the threshold of hearing in a logarithmic scale named Sound Power Level L_w.