



Air | Noise | Water | Soil | Environmental Consultancy
www.axisenv.ie

Unit 5 Caherdavin Business Centre,
Ennis Road,
Limerick
info@axisenv.ie
061-324587

SSE Generation Ireland Limited

Great Island Generating Station, Campile, New Ross, Co. Wexford.

Environmental Noise Report Noise Survey 2019

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Report Compiled by: David Coffey

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Report Date	30-10-2019	Site Contact:	Jonathan Storey
Report Issued By	Mark McGarry	Version No:	1
Signed:		Client:	SSE Great Island
Notes:			

1. Executive Summary

SSE Generation Ireland Ltd. is required as part of licence P0606-03; Conditions 4 and 6 to carry out a noise survey of the installation on an annual basis. AXIS environmental services were commissioned to complete the survey after proposal acknowledgment and acceptance by SSE Great Island personnel. Noise monitoring was undertaken on the 24th and 25th of October 2019.

The purpose of the survey was to monitor daytime and night-time noise at two predetermined locations and assess the sites compliance against Schedule B.4 limits. The two monitoring locations represent the nearest residential areas in the immediate surrounding area of the installation.

The survey was carried out in strict accordance with the standard ISO 1996 Parts 1 – 3, Acoustics – description, measurement and assessment of environmental noise. Reference was also made to the EPA guidelines NG4 *"Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities"* January 2016.

This installation is operational 24 hours a day, seven days a week, however occasionally the facility comes off line during which time it is shut down. All operations at SSE Great Island were running as normal throughout the survey. At NSL1, the predominant sources of noise included road traffic movements on local roads as well as on the distant N25. Other noise sources included faint operational noise from the SSE site as well as birds chirping, dogs barking and a light breeze causing vegetation to rustle. At NSL 2, the main noise sources included local vehicle activity, noise from residential activity, birds chirping, and at light operational noise could be heard from the SSE site. There were other sources of noise at each individual location which are summarised in the report.

NSL 1 and NSL 2 which are both off site and located on opposites side of the River Suir. Under the aforementioned EPA guidelines noise sensitive locations have to be within the limits set out in the installations EPA licence, the limits are as follows: Daytime 55dB L_{Aeq} [30minutes] and Night-time 45dB L_{Aeq} [30 minutes].

All monitoring points were determined to comply in full with licence requirements. There was no tonal or impulsive noise observed at either location for the duration of the assessment.

2. Introduction

As part of compliance monitoring at SSE Generation Ireland (Great Island), an annual noise survey is to be carried out at noise sensitive receptors near the vicinity of the plant. The Agency and SSE Generation Ireland have agreed on two noise sensitive monitoring points to be assessed.

The IE Licence outlines SSE’s requirements under Conditions 4 and 6, which have been documented as follows:

2.1 Condition 4:

4.5: Noise from the installation shall not give rise to sound pressure levels (Leq, T) measured at noise sensitive locations within the vicinity of the installation which exceed the limit value(s).

2.2 Condition 6:

6.15: The licensee shall carry out a noise survey of the site operations annually. The survey programme shall be undertaken in accordance with the methodology specified in the 'Environmental Noise Survey Guidance Document' as published by the Agency.

2.3 Schedule B: Emissions Limits

Table 1: B.4 Noise Emissions

Daytime dB(A) _{L_{Aeq}} (30minutes)	Night-time dB(A) _{L_{Aeq}} (30minutes)
55 ^{Note1}	45 ^{Note 1}

Note 1: There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise-sensitive location.

Table 2: Schedule D4.1: Noise Monitoring

Location	Measurement	Frequency
NSL 1	3*30 minute Day & 2*30 minutes Night survey to include 1/3 rd octave measurements	Annually
NSL 2	3*30 minute Day & 2*30 minutes Night survey to include 1/3 rd octave measurements	Annually

3. Methods

Monitoring was carried out in strict accordance with ISO 1996 Parts 1 – 3, Description and Measurement of Environmental Noise. Reference was also made to the EPA guidelines NG4 "Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities" January 2016.

The noise emission limits as outlined in P0606-03 are as follows:

- Daytime Noise Criterion, dB $L_{Aeq,T}$ (07:00 to 19:00hrs): 55dB
- Night-time Noise Criterion, dB $L_{Aeq,T}$ (23:00 to 07:00hrs): 45dB

The measurements were taken using Cirrus Optimus Green noise meters, details in table 3 below. At each monitoring location the noise meter was placed on a tripod at 1.5m above ground level and >3.5m away from any sound reflecting surfaces. Additionally, the meter was positioned in the direction of the facility. The noise meters used during the assessment were calibrated before and after the monitoring periods.

Table 3: Equipment Details

	Meter No 2
Manufacturer	Cirrus Optimus Green
Model	CR:171B
Serial Number	G061082
Firmware	V2.4.1569 (1529)
Calibrator	CR:511E Acoustic Calibrator
Microphone	MK:224 209359D
Preamplifier	MV:200F 1206F
Windshield Type	UA:237 90mm Foam Windshield
Noise Meter	22 nd October 2018 - 2019
Certificate Number	264733
Microphone	18 th October 2018 - 2019
Certificate Number	123050
Calibrator	3 rd April 2018 – 2019
Certificate Number	258722

4. Monitoring Locations

4.1 NSL 1 Daytime Survey

Noise monitoring point 1 was located North/ North-Westerly of the SSE Facility, alongside the route used as the main entrance to the site. The predominant noise source at this location came from intermittent traffic passing on the road nearby. Distant traffic noise could also be heard coming from the N25. There was very faint operational noise emanating from SSE Great Island. Other sources of noise included birds chirping, dogs barking, a light breeze causing vegetation to rustle and a power tool being operated intermittently some distance north of the location.

4.1.1 NSL 1 Night-Time Survey

The only continuous noise sources audible during the night noise survey included a light breeze that caused nearby vegetation to rustle as well as a faint humming emanating from SSE Great Island. No vehicles were observed passing during the survey.

4.2 NSL 2 Daytime Survey

This monitoring location was situated south of the SSE Great Island site, at the opposite side of the River Suir. The SSE facility at Great Island emitted very faint operational noise during the daytime monitoring period. Birds were also heard chirping and there was a light breeze blowing throughout the survey.

Other sources of noise heard included some traffic passing through the village, dogs barking and various residential activities such as people chatting and walking within range of the noise monitor.

4.2.1 NSL 2 Night-Time Survey

During the night time noise survey, very faint operational noise was audible emanating from SSE Great Island. A light breeze was observed throughout, causing nearby vegetation to rustle.

Other sources of noise included periodic passing traffic and some people walking within range of the monitor.

5. Summary of Daytime Noise Measurements

Noise Monitoring Location: NSL 1 (Noise Sensitive Location) 24-09-2019					
Period:	Time	Measured Noise Levels (dB re. 2 x 10 ⁻⁵ Pa)			Comments
		L _{Aeq}	L _{AFMAX}	L _{A90}	
Daytime:	16:21	48	71	40	The predominant noise source at this location came from intermittent traffic passing on the road nearby. Distant traffic noise could also be heard. There was very faint operational noise coming from SSE Great Island. Other sources of noise included birds chirping, dogs barking, a light breeze causing vegetation to rustle and a power tool being operated some distance away.
	16:51	52	80	40	
	17:21	54	81	39	
Arithmetic Average (dB):		52	77	42	
Daytime Criterion, dB L _{Ar,T} :		55	-	-	
Evening:	-	-	-	-	
Arithmetic Average (dB):		-	-	-	This site is not required to monitor noise emissions during the evening period. The site is not defined as a new or revised licence.
Evening Criterion, dB L _{Ar,T} :		-	-	-	
Night Time:	01:21	34	57	29	
	01:51	32	51	29	
Arithmetic Average (dB):		33	54	28	The only continuous noise sources audible during the night noise survey included a light breeze that caused nearby vegetation to rustle as well as a faint humming emanating from SSE Great Island. No vehicles passed during the survey.
Night time Criterion, dB L _{Ar,T} :		45	-	-	
Weather Conditions:					
	Daytime:	Evening:	Night Time:		
Temperature (°C)	15	-	10		
Wind Speed (m/s)	2-3	-	1-2		
Wind Direction:	W	-	S		
Precipitation (mm):	0	-	0		
Tonal Noise Assessment					
Daytime:	Run 1: None	Run 2: None	Run 3: None		
Evening:	-	-	-		
Night Time:	Run 1: None	Run 2: None	-		
Compliance Status - this site would be considered a noise sensitive location therefore limits outlined in the licence would apply. The site complies with both day and night time criteria.					

Noise Monitoring Location: NSL 2 (Noise Sensitive Location) 24-09-2019						
Period:	Time	Measured Noise Levels (dB re. 2 x 10 ⁻⁵ Pa)			Comments	
		L _{Aeq}	L _{AFMAX}	L _{A90}		
Daytime:	10:50	44	72	37	The SSE facility at Great Island emitted very faint operational noise during the daytime survey. Birds were also heard chirping and there was a light breeze blowing throughout the survey. Other sources of noise heard included passing traffic, dogs barking and various residential activities such as people chatting and walking nearby.	
	11:20	44	68	36		
	11:50	40	69	36		
Arithmetic Average (dB):		43	70	42		
Daytime Criterion, dB L_{Ar,T}:		55	-	-		
Evening:		-	-	-		
Arithmetic Average (dB):		-	-	-		
Evening Criterion, dB L_{Ar,T}:		-	-	-		
Night Time:	23:17	40	66	37	Very faint operational noise was audible emanating from SSE Great Island. A light breeze was observed throughout, causing nearby vegetation to rustle. Other sources of noise included periodic passing traffic and some people walking within range of the monitor.	
	23:47	38	57	37		
Arithmetic Average (dB):		39	66	36		
Night time Criterion, dB L_{Ar,T}:		45	-	-		
Weather Conditions:						
	Daytime:	Evening:		Night Time:		
Temperature (°C)	15	-		10		
Wind Speed (m/s)	2-3	-		1-2		
Wind Direction:	W	-		w		
Precipitation (mm):	0	-		0		
Tonal Noise Assessment						
Daytime:	Run 1: None	Run 2: None		Run 3: None		
Evening:	-	-		-		
Night Time:	Run 1: None	Run 2: None		-		
Compliance Status – this site would be considered a noise sensitive location therefore limits outlined in the licence would apply– the site complies with both day and night time criteria.						

6. Conclusions

Both noise sensitive locations were monitored for broadband and 1/3rd Octave frequency as part of this annual environmental noise survey at SSE Generation Ireland (Great Island).

Each monitoring point (NSL 1 & NSL 2) was monitored for three 30 minute periods during the day and two 30 minute periods for the night time survey. Both noise monitoring points are noise sensitive locations and must therefore comply with limits outlined in the License P0606-03. The findings of the survey would indicate that the noise sensitive locations were not significantly affected or impacted by sources of noise at SSE Great Island Power Station.

There was no tonal or impulsive noise determined at either monitoring location during the day or night periods; therefore, there are no requirements to apply penalties to the broadband measurement.

Appendix I: Graphical Display of Raw Data

Tonal Noise:

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)

This is the definition outlined by the EPA in the guidance note issued in 2016: NG4.



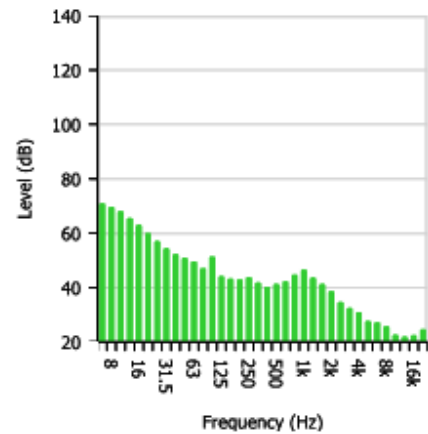
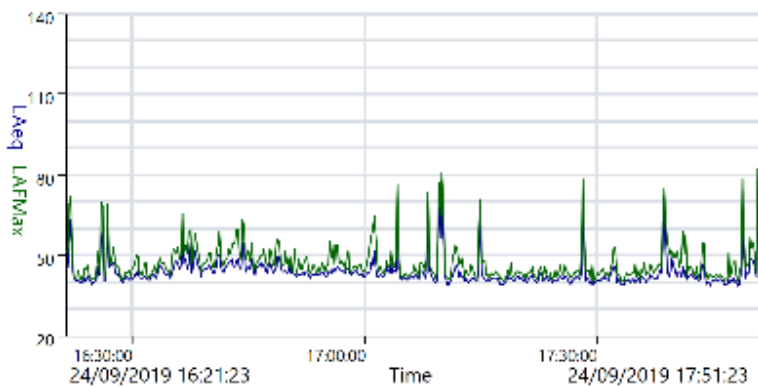
Measurement Summary Report

Name SSE Great isalnd NSL1 Daytime
Time 24/09/2019 16:21:23 **Person** **Place** **Project**
Duration 01:30:00 David Coffey. SSE Great island
Instrument G061082, CR:171B

Calibration

Before 24/09/2019 16:20 **Offset** 0.47 dB **After** 24/09/2019 23:16 **Offset** 0.38 dB

Basic Values		Statistical Levels (Ln)	
L _{Aeq}	52.3 dB	LAF1	62.7 dB
L _{AE}	89.6 dB	LAF5	49.0 dB
L _{AFMax}	81.9 dB	LAF10	46.5 dB
		LAF50	42.1 dB
		LAF90	39.7 dB
		LAF95	39.2 dB
		LAF99	38.5 dB



Start Time	End Time	Duration	Leq (L _{Aeq})	L90 (L _{Aeq})	Max (L _{AFMax})
24/09/2019 16:21:23	24/09/2019 16:51:23	00:30:00	48.3	40.4	71.5
24/09/2019 16:51:23	24/09/2019 17:21:23	00:30:00	52.6	40.0	80.3
24/09/2019 17:21:23	24/09/2019 17:51:23	00:30:00	54.2	39.3	81.8



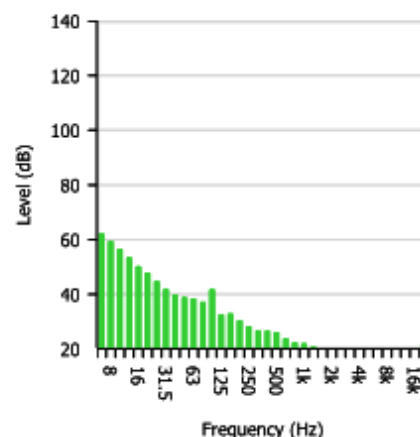
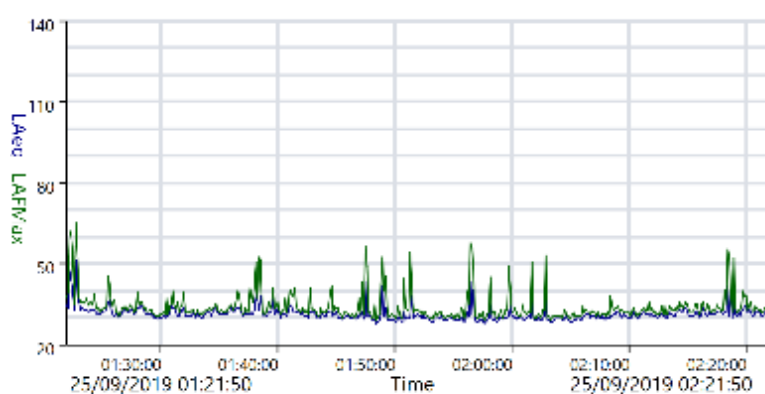
Measurement Summary Report

Name SSE Great island Night time NSL 1
Time 25/09/2019 01:21:50 **Person** David Coffey **Place** SSE Great island **Project**
Duration 01:00:00 **Instrument** G061082, CR:171B

Calibration

Before 24/09/2019 23:16 **Offset** 0.38 dB **After** 25/09/2019 10:50 **Offset** 0.46 dB

Basic Values		Statistical Levels (Ln)	
LAeq	33.0 dB	LAF1	37.6 dB
LAE	68.6 dB	LAF5	33.7 dB
LAFMax	64.6 dB	LAF10	32.8 dB
		LAF50	30.6 dB
		LAF90	28.8 dB
		LAF95	28.4 dB
		LAF99	27.8 dB



Start Time	End Time	Duration	Leq (LAeq)	Max (LAFMax)	L90 (LAeq)
25/09/2019 01:21:50	25/09/2019 01:51:50	00:30:00	34.2	64.6	29.3
25/09/2019 01:51:50	25/09/2019 02:21:50	00:30:00	31.5	57.4	28.6



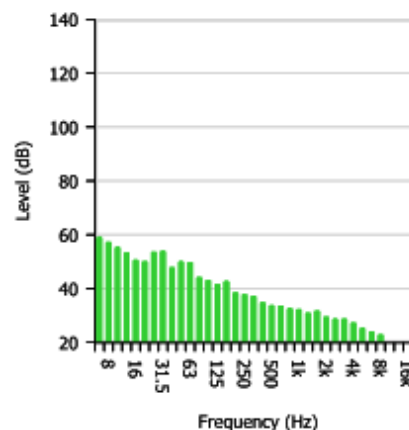
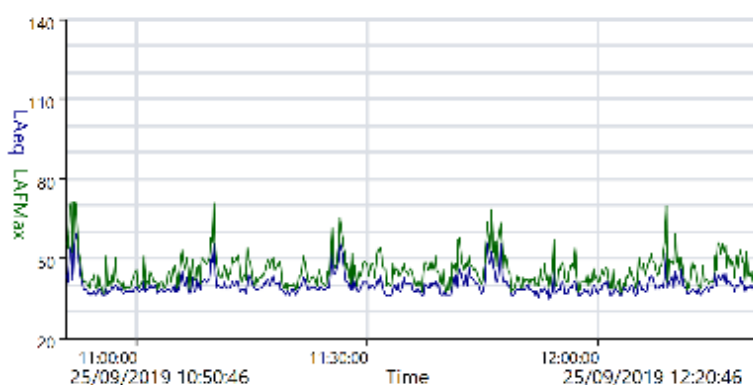
Measurement Summary Report

Name SSE Great island Daytime NSL 2
Time 25/09/2019 10:50:46 **Person** David Coffey **Place** SSE Great island **Project**
Duration 01:30:00 **Instrument** G061082, CR:171B

Calibration

Before 25/09/2019 10:50 **Offset** 0.46 dB **After** 25/09/2019 12:33 **Offset** 0.56 dB

Basic Values		Statistical Levels (Ln)	
LAeq	43.1 dB	LAF1	54.1 dB
LAE	80.4 dB	LAF5	46.2 dB
LAFMax	71.3 dB	LAF10	43.3 dB
		LAF50	38.1 dB
		LAF90	35.9 dB
		LAF95	35.3 dB
		LAF99	34.4 dB



Start Time	End Time	Duration	Leq (LAeq)	Max (LAFMax)	L90 (LAeq)
25/09/2019 10:50:46	25/09/2019 11:20:46	00:30:00	44.1	71.3	36.5
25/09/2019 11:20:46	25/09/2019 11:50:46	00:30:00	44.0	68.2	35.9
25/09/2019 11:50:46	25/09/2019 12:20:46	00:30:00	40.0	69.4	35.7



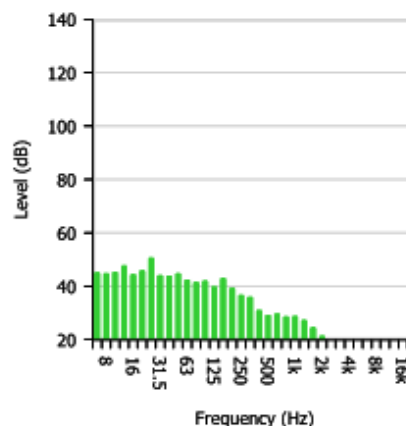
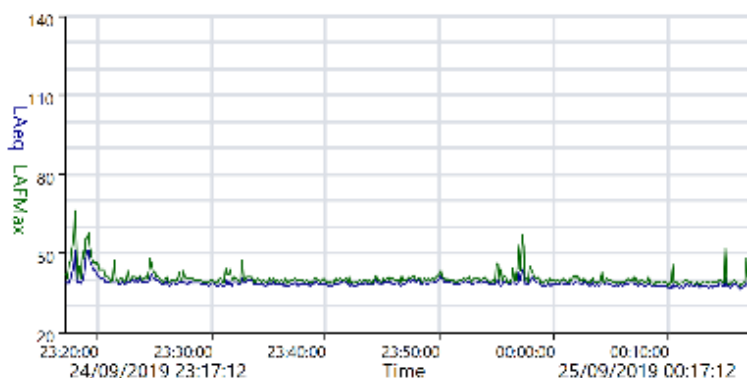
Measurement Summary Report

Name SSE Great island Night time NSL 2
Time 24/09/2019 23:17:12 **Person** David Coffey. **Place** SSE Great island **Project**
Duration 01:00:00 **Instrument** G061082, CR:171B

Calibration

Before 24/09/2019 23:16 **Offset** 0.38 dB **After** 25/09/2019 10:50 **Offset** 0.46 dB

Basic Values		Statistical Levels (Ln)	
L _{Aeq}	39.2 dB	LAF1	45.7 dB
L _{AE}	74.8 dB	LAF5	40.3 dB
L _{AFMax}	66.0 dB	LAF10	39.5 dB
		LAF50	38.2 dB
		LAF90	37.2 dB
		LAF95	36.9 dB
		LAF99	36.4 dB



Start Time	End Time	Duration	Leq (L _{Aeq})	L90 (L _{Aeq})	Max (L _{AFMax})
24/09/2019 23:17:12	24/09/2019 23:47:12	00:30:00	39.9	37.6	66.0
24/09/2019 23:47:12	25/09/2019 00:17:12	00:30:00	38.4	37.1	56.9

Appendix II: Site Map



Appendix III: Glossary of Terms

Note: Not all terms were used in the description of noise for this noise survey.

Ambient noise	The totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.
Acoustic shadow	An acoustic shadow is an area through which sound waves fail to propagate, due to topographical obstructions or disruption of the waves via phenomena such as wind currents.
Background noise	The steady existing noise level present without contribution from any intermittent sources. The A weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T (LAF90,T).
Broadband	Sounds that contain energy distributed across a wide range of frequencies.
Competent person	Individual possessing a combination of technical knowledge, experience and skills as outlined in Section 2.0 and who can demonstrate both practical and theoretical competence.
Criterion noise level	The long term mean value of the noise level that must not be exceeded. This is generally stipulated in the IPPC/Waste licence and it may be applied to a noise source, a boundary of the activity or to an NSL in the vicinity of the site.
dB	Decibel. The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and the reference pressure of 20 micro pascals (20 uPa).
Facade level	The noise level at a location 1m from the facade of a building is described by the term facade level, and is subject to a higher noise level than one in an open area (free-field conditions) due to reflection effects.
Free field	These are conditions in which the radiation from sound sources is unaffected by the presence of any reflecting boundaries or the source itself. In practice, it is a field in which the effects of the boundaries are negligible over the frequency range of interest. In environmental noise, true free-field measurement conditions are seldom achieved and generally the microphone will be positioned at a height between 1.2 and 1.5 metres above ground level. To minimise the influence of reflections, measurements are generally made at least 3.5 metres from any reflecting surface other than the ground.
Hertz (Hz)	The unit of sound frequency in cycles per second.
Impulsive	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}	This is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period (T). The closer the L _{Aeq} value is to either the LAF10 or LAF90 value indicates the relative impact of the intermittent sources and their contribution. The relative spread between the values determines the impact of intermittent sources, such as traffic, on the background.
LAFN	The A-weighted noise level exceeded for N% of the sampling interval. Measured using the "Fast" time weighting.
L_{Ar,T}	The Rated Noise Level, equal to the L _{Aeq} during a specified time interval (T), plus specified adjustments for tonal character and/or impulsiveness of the sound.
LAF10	Refers to those A-weighted noise levels in the top 10 percentile of the sampling interval; it is the level which is exceeded for 10% of the measurement period. It is

used to determine the intermittent high noise level features of locally generated noise and usually gives an indicator of the level of road traffic. Measured using the "Fast" time weighting.

LAF90	Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval; it is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to describe a background level. Measured using the "Fast" time weighting.
LAFmax	The maximum RMS A-weighted sound pressure level occurring within a specified time period. Measured using the "Fast" time weighting.
LAFmin	The minimum RMS A-weighted sound pressure level occurring within a specified time period. Measured using the "Fast" time weighting.
Lden	Is the 24 hour noise rating level determined by the averaging of the Lday with the Levening plus a 5 dB penalty and the Lnight plus a 10 dB penalty.
Low background noise	An area of low background noise is one where the existing background noise levels measured during an environmental noise survey are as follows: <ul style="list-style-type: none"> o Average Daytime Background Noise Level ≤ 40dB LAF90, and; o Average Evening Background Noise Level ≤ 35dB LAF90, and; o Average Night-time Background Noise Level ≤ 30dB LAF90.
Low frequency noise	LFN - noise which is dominated by frequency components towards the lower end of the frequency spectrum; see Appendix VI for a more detailed discussion.
LpA (dB)	An 'A-weighted decibel' K a measure of the overall level of sound across the audible frequency range (20Hz – 20kHz) with A-frequency weighting (i.e. 'A-weighting') to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Noise	Any sound, that has the potential to cause disturbance, discomfort or psychological stress to a person exposed to it, or any sound that could cause actual physiological harm to a person exposed to it, or physical damage to any structure exposed to it, is known as noise.
Noise sensitive location	NSL – any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.
Octave band	A frequency interval, the upper limit of which is twice that of the lower limit. For example, the 1,000Hz octave band contains acoustical energy between 707Hz and 1,414Hz. The centre frequencies used for the designation of octave bands are defined in ISO and ANSI standards.
Rating level	See LAr,T.
RMS	The RMS (Root Mean Square) value of a set of numbers is the square root of the average of their squares.
SEL (LAX or LAE)	Sound exposure level – a measure of the A-weighted sound energy used to describe noise events such as the passing of a train or aircraft; it is the A-weighted sound pressure level if occurring over a period of 1 second, would contain the same amount of A-weighted sound energy as the event.
Sound pressure level	Sound pressure refers to the fluctuations in air pressure caused by the passage of a sound wave. It may be expressed in terms of sound pressure level at a point.

Specific noise level	A component of the ambient noise which can be specifically identified by acoustical means and may be associated with a specific source. In BS 4142, there is a more precise definition as follows: 'the equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval (LAeq, T)'.
Time weighting	One of the averaging times (Fast, Slow or Impulse) used for the measurement of RMS sound pressure level in sound level meters.
Tonal	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'.
1/3 octave analysis	Frequency analysis of sound such that the frequency spectrum is subdivided into bands of one-third of an octave each.

Appendix IV: Calibration Certificates

AX509. AX509

Certificate of Calibration



Equipment Details

Instrument Manufacturer Cirrus Research Plc
 Instrument Type CR:171B
 Description Sound Level Meter
 Serial Number G061082

Calibration Procedure

The instrument detailed above has been calibrated to the publish test and calibration data as detailed in the instrument hand book, using the techniques recommended in the latest revisions of the International Standards IEC 61672-1:2013, IEC 61672-1:2002, IEC 60651:1979, IEC 60804:2001, IEC 61260:1995, IEC 60942:2003, IEC 60942:1997, IEC 61252:1993, ANSI S1.4-1983, ANSI S1.11-1986 and ANSI S1.43-1997 where applicable.

Sound Level Meters: All Calibration procedures were carried out by substituting the microphone capsule with a suitable electrical signal, apart from the final acoustic calibration.

Calibration Traceability

The equipment detailed above was calibrated against the calibration laboratory standards held by Cirrus Research plc. These are traceable to International Standards {A.0.6}. The standards are:

Microphone Type	GRAS 40AP	Serial Number	173198	Calibration Ref.	0170
Calibrator Type	B&K 4231	Serial Number	2594796	Calibration Ref.	A1811

Calibrated by

Calibration Date

22 October 2018

Calibration Certificate Number

264733

This Calibration Certificate is valid for 12 months from the date above.

Cirrus Research plc, Acoustic House, Bridlington Road, Hunmanby, North Yorkshire, YO14 0PH
 Telephone: +44 (0) 1723 891655 Fax: +44 (0) 1723 891742
 Email: sales@cirrusresearch.co.uk

LX0 0529

Certificate of Calibration



Equipment Details

Instrument Manufacturer Cirrus Research Plc
 Instrument Type CR:511E
 Description Acoustic Calibrator
 Serial Number 41373

Calibration Procedure

The acoustic calibrator detailed above has been calibrated to the published data as described in the operating manual. The procedures and techniques used to follow the recommendations of the IEC standard Electroacoustics – Sound Calibrators IEC 60942:2003, IEC 60942:1997, BS EN 60942:1998 and BS EN 60942:2003 where applicable.. The calibrator’s main output is 94.00 dB (1 Pa) and this was set within the 0.01 dB resolution of the test system, i.e. one hundredth of a decibel. Numbers in {parenthesis} refer to the paragraph in IEC 60942.

Calibration Traceability

The calibrator above was calibrated against the calibration laboratory standards held by Cirrus Research plc. These are traceable to International Standards {A.0.6}. The standards are:

Microphone Type	GRAS 40AP	Serial Number	173198	Calibration Ref.	0170
Calibrator Type	B&K 4231	Serial Number	2594796	Calibration Ref.	A1811

Calibration Climate Conditions

The climatic test conditions were all maintained within the permitted limits of IEC 60942:1997.

Temperature	{B.3.2}	Permitted band 15°C to 25°C
Humidity	{B.3.2}	Permitted band 30% to 90% RH
Static Pressure	{B.3.2}	Permitted band 85 kPa to 105 kPa
Ambient Noise Level	{B.3.3.6}	Max permitted level 64 dB(Z)

Measurement Results

The figures below are the Calibration Laboratory test limits for this model calibrator and have a smaller tolerance than those permitted in IEC 60942.

94 dB Output	94.00 dB	Permitted band	93.95 to 94.05dB
104 dB Output	103.99 dB	Permitted band	103.80 to 104.30dB
Frequency	999 Hz	Permitted band	990 to 1010Hz

Uncertainty

With an uncertainty coefficient of k=2, i.e. a 95% confidence level, the uncertainty of each measure is

94 dB Output	± 0.13 dB	104 dB Output	± 0.14 dB
Frequency	± 0.1 Hz	Level Stability	± 0.04 dB

Calibrated by

Calibration Date

13 March 2019

Calibration Certificate Number

268931

This Calibration Certificate is valid for 12 months from the date above.