

**Appendix F:**  
**Noise and Vibration**



Ref:	Location	LA90	Date	Start Time	Run Time	LAeq	Comments
S1	Tomich Farm Cottages	52.5	6/2/08	16:39	00:59:59	66.9	Traffic dominant, some birds. Wind 1.2m/s avg, 1.8m/s max 5.1C
S1	Tomich Farm Cottages	39.8	7/2/08	01:15	00:04:59	59.9	Traffic on A9 dominant. Still.5C
S1	Tomich Farm Cottages	32.4	7/2/08	01:20	00:04:59	57.6	Traffic on A9 dominant. Still.5C
S1	Tomich Farm Cottages	34.2	7/2/08	01:25	00:04:59	57.4	Traffic on A9 dominant. Still.5C
S1	Tomich Farm Cottages	32.7	7/2/08	01:30	00:04:59	61.4	Traffic on A9 dominant. Still.5C
S1	Average (nighttime)	<b>34.8</b>				<b>59.1</b>	
S2	Castle Gardens	40.8	7/2/08	18:05	01:00:05	59.0	Distant traffic A9, distant chainsaw in woods intermittent.
S2	Castle Gardens	32.7	7/2/08	02:00	00:04:07	35.8	
S2	Castle Gardens	32.2	7/2/08	02:05	00:04:59	34.6	Wind 0.5m/s avg, 1.7m/s max 5.5C
S2	Castle Gardens	33.7	7/2/08	02:10	00:05:00	36.9	
S2	Castle Gardens	32.5	7/2/08	02:15	00:05:00	34.8	
S2	Castle Gardens	33.1	7/2/08	02:20	00:04:59	35.4	
S2	Castle Gardens	33.2	7/2/08	02:25	00:04:59	37.2	
S2	Average (nighttime)	<b>32.9</b>				<b>35.8</b>	
S3	Bungalow, Inverbreakie Estate	48.4	7/2/08	16:58	01:00:07	57.2	Traffic on estate, FLT activity in adjacent yard, distant steam vent. Wind 2m/s avg, 3.2m/s max 6.7C
S3	Bungalow, Inverbreakie Estate	38.5	7/2/08	02:45	00:05:00	41.1	Traffic on estate, birdsong, intermittent steam venting from unit opposite 150m distant . Wind 0.5m/s avg, 0.6m/s max 5.6C
S3	Bungalow, Inverbreakie Estate	37.4	7/2/08	02:50	00:04:59	40.4	
S3	Bungalow, Inverbreakie Estate	37.5	7/2/08	02:55	00:04:59	41.1	
S3	Bungalow, Inverbreakie Estate	37.9	7/2/08	03:00	00:05:00	41.1	
S3	Bungalow, Inverbreakie Estate	38.2	7/2/08	03:05	00:04:59	42.1	
S3	Average (nighttime)	<b>37.9</b>				<b>41.2</b>	
S4	Ord Farm Cottages	44.8	7/2/08	15:51	01:00:05	51.8	Reversing bleepers & metal bashin, skip handling g from Cromarty Industrial Estate. Wind 2.8m/s avg, 5.7m/s max 5.9C. Elevated view across site
S4	Ord Farm Cottages	34.5	7/2/08	03:45	00:04:59	41.7	Wind 0.5m/s avg, 1.7m/s max 4.2C
S4	Ord Farm Cottages	31.8	7/2/08	03:50	00:04:59	35.9	
S4	Ord Farm Cottages	34.0	7/2/08	03:55	00:05:02	41.9	
S4	Ord Farm Cottages	34.7	7/2/08	04:00	00:05:00	46.1	
S4	Ord Farm Cottages	33.4	7/2/08	04:05	00:04:59	42.2	
S4	Average (nighttime)	<b>33.7</b>				<b>41.6</b>	

# Certificate of Calibration



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## Equipment Details

Instrument Manufacturer	Cirrus Research plc
Instrument Type	Sound Level Meter
Model Number	CR:821B
Serial Number	C17796FE

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## Calibration Procedure

The instrument detailed above has been calibrated to the published test and calibration data as detailed in the instrument handbook, using the techniques recommended in the latest revisions of the International Standards IEC 61672-1:2002, IEC 60651:1979, IEC 60804:2001, IEC 61260:1995, IEC 60942:1997, IEC 61252:1993, ANSI S1.4-1983 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.

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## Calibration Traceability

The equipment detailed above was calibrated against the calibration laboratory standards held by Cirrus Research plc. Which are traceable to the appropriate International Standards.

The Cirrus Research plc calibration laboratory standards are:

Microphone Type	B&K4192	Serial Number	1920791	Calibration Ref.	S 5534
Pistonphone Type	B&K4220	Serial Number	613843	Calibration Ref.	S 5423

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Calibrated by

Calibration Date

23 May 2007

Calibration Certificate Number

151774

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

# Certificate of Calibration



## Equipment Details

Instrument Manufacturer Cirrus Research plc  
Instrument Type Acoustic Calibrator  
Model Number CR:511E  
Serial Number 038873

## 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, BS EN 60942:2003, IEC 60942:1997 and BS EN 60942:1998 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	B&K4192	Serial Number	1920791	Calibration Ref.	S 5534
Pistonphone Type	B&K4220	Serial Number	613843	Calibration Ref.	S 5423

## 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	94.04	dB	Permitted band	93.95 to 94.05 dB
104 dB Output	103.97	dB	Permitted band	103.80 to 104.30 dB
Frequency	994.0	Hz	Permitted band	990 to 1010 Hz

## Uncertainty

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

94 dB Output	$\pm 0.13$ dB	104 dB Output	$\pm 0.14$ dB
Frequency	$\pm 0.1$ Hz	Level Stability	$\pm 0.04$ dB

Calibrated by

Calibration Date 23 May 2007

Calibration Certificate Number 151775

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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