Preliminary Environmental Information Report Volume 2

Appendix 15.1 Environmental Sound Survey

LLK1-ARU-REP-ENV-000015_AP15.1

Version 0.0

January 2026

Contents

1 Baseline sound survey

1.1 Project description

1.1.1 LionLink is a proposed electricity interconnector between Great Britain and the Netherlands that will supply up to 2.0 gigawatts (GW) of electricity and will connect to Dutch offshore wind via an offshore converter platform in Dutch waters (hereafter 'the Project').

1.1.2 The Proposed Scheme (defined as the part of the Project within the British jurisdiction) would involve the construction of a proposed Converter Station and the installation of offshore and onshore Underground High Voltage Direct Current (HVDC) Cables to the proposed Converter Station and Underground High Voltage Alternating Current (HVAC) Cables between the proposed Converter Station and Kiln Lane Substation.

1.2 Purpose and scope of this report

1.2.1 An environmental baseline sound survey has been undertaken to determine the existing sound environment around the Draft Order Limits (DOL). Attended measurements were made at two locations and ten unattended noise logging sound level meters were installed.

1.2.2 The survey was carried out by between Tuesday 18 and Monday 31 March 2025.

1.3 Site description

1.3.1 The onshore elements of the Proposed Scheme (the Proposed Onshore Scheme) comprises a proposed Landfall at Walberswick, a proposed Converter Station near Saxmundham, Kiln Lane Substation (**see Chapter 5 EIA Approach and Methodology** for the assessment scenarios), and a proposed Underground Cable Corridor connecting these three components of the Proposed Onshore Scheme. An overview of the Draft Order Limits for the Proposed Onshore Scheme relevant to the survey locations is presented **Figure 15.2 Environmental sound survey locations** of the PEIR. An overview of the entire Draft Order Limits of the Proposed Onshore Scheme is presented in **Figure 2.2 Proposed Onshore Scheme – Overview** of the PEIR.

1.3.2 Survey locations have been selected with consideration of areas of the Proposed Onshore Scheme where noise sensitive receptors (NSR) are most likely to be subject to adverse impacts e.g. the proposed Landfall, or elements of the Proposed Onshore Scheme which could produce operational noise, namely the proposed Converter Station and Kiln Lane Substation.

1.4 Measurement locations

Inset 1.1: Measurement locations: proposed Landfall – Walberswick

Table 1.1: Measurement locations: proposed Landfall – Walberswick

Location name	Type of measurement	Description
L1	Unattended	Representative of receptors on Stocks Lane
L2	Unattended	Representative of residential receptors north east of the landfall and Walberswick Caravan Park
A1	Attended	Receptors on The Street
A2	Attended	Ecological receptors at Suffolk Coast National Nature Reserve

Inset 1.2: Measurement locations: proposed Converter Station – Saxmundham

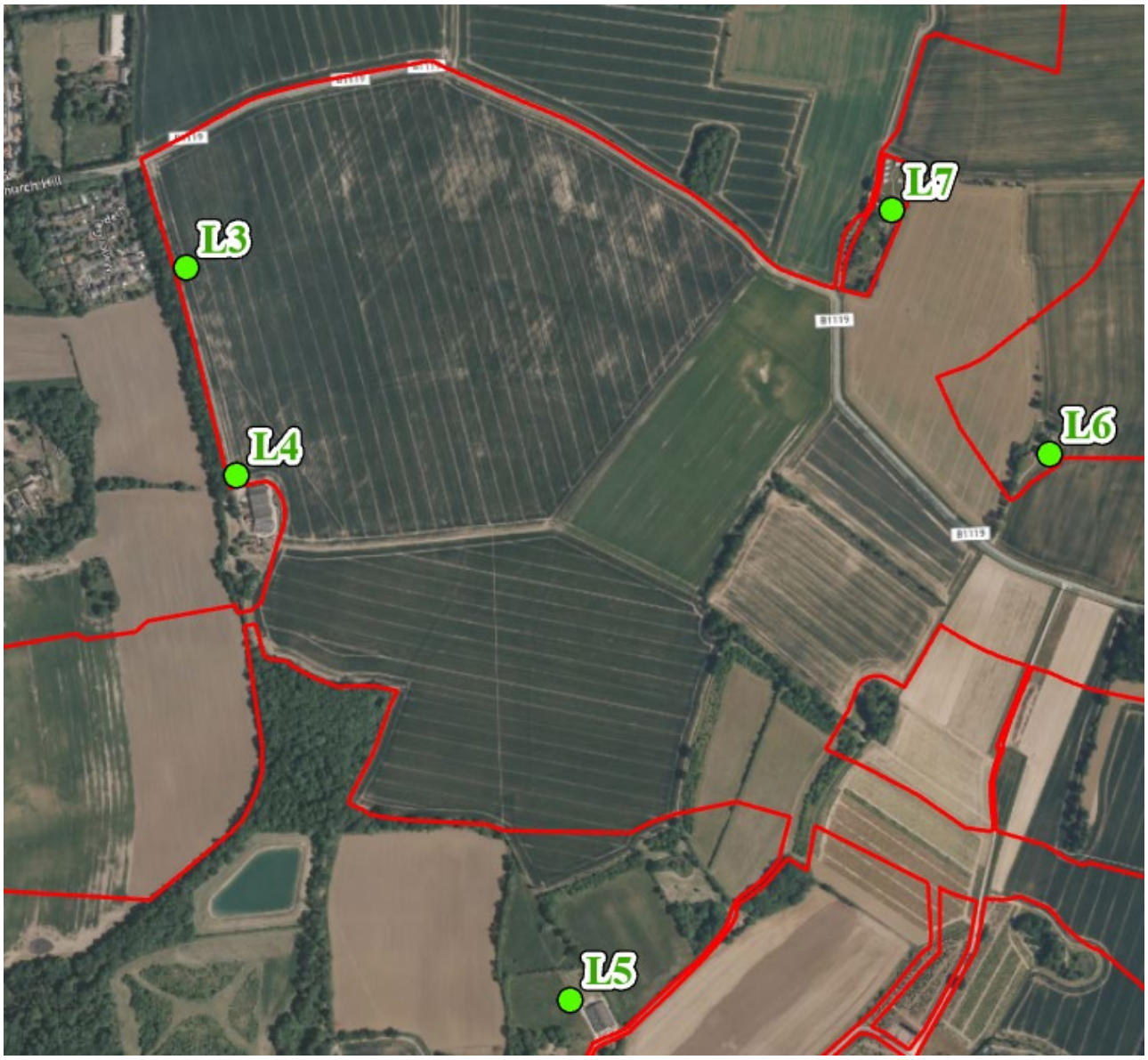


Table 1.2: Measurement locations: proposed Converter Station – Saxmundham

Location name	Type of measurement	Description
L3	Unattended	Representative of receptors on Manor Gardens
L4	Unattended	Representative of Wood Farm
L5	Unattended	Representative of Hill Farm
L6	Unattended	Representative of Trust Farm
L7	Unattended	Representative of Wardspring Farm

Inset 1.3: Measurement locations: Kiln Lane Substation – Friston

Table 1.3: Measurement locations: Kiln Lane Substation – Friston

Location name	Type of measurement	Description
L8	Unattended	Representative of Little Moor Farm
L9	Unattended	Representative of Fareacre Campsite and residential property
L10	Unattended	Representative of Woodside Barn Cottages

1.5 Instrumentation

1.5.1 The sound level meters (SLMs), microphones and sound pressure level calibrators used are Class 1 instruments, conforming to BS EN 61672-1:2013. All instrumentation is calibrated annually and has full traceable calibration to national and international standards, which are undertaken by an accredited calibration laboratory. Calibration certificates can be provided upon request.

1.5.2 The SLMs were checked for correct calibration before and after each series of measurements. No substantial fluctuation in level was noted.

Table 1.4: Measurement instrumentation

Equipment	Location/s used	Description	Manufacturer	Model number	Serial number
Norsonic 140 kit D	A1, A2	Sound level meter	Norsonic	140	1405203
		Microphone	Norsonic	4189	3087165
		Calibrator	Norsonic	1251	33555
		Preamplifier	Norsonic	1209	15390
Rion NL52 kit A	L1	Sound level meter	RION	NL-52	00120480
		Microphone	RION	UC-59	03152
		Calibrator	RION	NC-74	35015346
		Preamplifier	RION	NH-25	10479
Rion NL32 kit F	L2	Sound level meter	RION	NL-52	00493038
		Microphone	RION	UC-53A	03152
		Calibrator	RION	NC-74	35173566
		Preamplifier	RION	NH-21	29980
Rion NL32 kit D	L3	Sound level meter	RION	NL-52	00282490
		Microphone	RION	UC-53A	313776
		Calibrator	RION	NC-74	35173547
		Preamplifier	RION	NH-21	26689
Rion NL52 kit C	L4	Sound level meter	RION	NL-52	00231670
		Microphone	RION	UC-59	12921
		Calibrator	RION	NC-74	34336007
		Preamplifier	RION	NH-25	21614

Equipment	Location/s used	Description	Manufacturer	Model number	Serial number
Rion NL52 kit H	L5	Sound level meter	RION	NL-52	00721057
		Microphone	RION	UC-59	22045
		Calibrator	RION	NC-74	34824366
		Preamplifier	RION	NH-25	22163
Rion NL32 kit B	L6	Sound level meter	RION	NL-52	00661738
		Microphone	RION	UC-53A	312914
		Calibrator	RION	NC-74	34662222
		Preamplifier	RION	NH-21	26688
Rion NL62 kit A	L7	Sound level meter	RION	NL-52	00930483
		Microphone	RION	UC-59L	00440
		Calibrator	RION	NC-74	34246494
		Preamplifier	RION	NH-26	00525
Rion NL32 kit G	L8	Sound level meter	RION	NL-52	01182976
		Microphone	RION	UC-53A	318798
		Calibrator	RION	NC-74	35173565
		Preamplifier	RION	NH-21	28589
Rion NL52 kit F	L9	Sound level meter	RION	NL-52	00520913
		Microphone	RION	UC-59	21301
		Calibrator	RION	NC-74	34824364
		Preamplifier	RION	NH-25	11760
Rion NL32 kit A	L10	Sound level meter	RION	NL-52	00451285
		Microphone	RION	UC-53A	308532
		Calibrator	RION	NC-74	34773051
		Preamplifier	RION	NH-21	15278
Kestrel Weather Station (Kit C)	L2 (18th – 19th March) L5 19th - 27th March	Anemometer	Kestrel	5500L	2119013

1.6 Measurement methodology

1.6.1 At each location, the L_{Aeq}, L_{A90}, L_{A10} and L_{Amax} metric parameters were measured and recorded. All broadband measurements were A-weighted and used a fast time constant.

1.6.2 At each measurement location, the SLM was mounted on a tripod with the microphone set between 1.2m and 1.5m above local ground level. All measurements were taken under acoustically free-field conditions. The appropriate windshield for the SLM was fitted to the microphone throughout to minimise wind-induced noise.

1.6.3 Measurements of 15-minute duration were made at each location, which was deemed appropriate to provide a good representation of the sound environment.

1.7 Attended measurement results

Location A1

Location description

1.7.1 The measurement was taken next to The Street in Walberswick, around 1m from the kerb.

Inset 1.4: Measurement location A1 – Walberswick

Environment and observations

1.7.2 The sound environment consisted of road traffic noise on The Street, seagulls overhead, more distant bleating from livestock and light building work further along the road. During the measurement, there was a light aircraft overflight, clanging from some building work to a house and a bird scarer sounding in the distance.

Measurement duration

1.7.3 The measurement was completed between 13:30 and 13:45 on Tuesday 18 March 2025.

Weather conditions

1.7.4 The weather was dry and sunny, with little cloud cover and windspeeds of less than 5ms^{-1}.

Table 1.5: Measured sound pressure levels at Location A1

Measurement period	Sound pressure level, dB(A) (re 20 µPa), 15 mins			
	L_{90}	L_{eq}	L_{10}	L_{max}
13:30 – 13:45	37	59	63	78

Inset 1.5: Measurement photo A1 – Walberswick

Location A2

Location description

1.7.5 The measurement was taken next to the B1387 to the West of Walberswick, around 1m from the kerb. The layby boarders the Suffolk Coast National Nature Reserve.

Inset 1.6: Measurement location A2 – Walberswick

Environment and observations

1.7.6 The sound environment consisted of road traffic noise on The B1387, dog walkers chatting on the trail, birds flying between the trees, and a plane flying overhead.

Measurement duration

1.7.7 The measurement was completed between 15:15 and 15:30 on Tuesday 18 March 2025.

Weather conditions

1.7.8 The weather was dry and sunny, with little cloud cover and windspeeds of less than 5ms^{-1}.

Table 1.6: Measured sound pressure levels at Location A2

Measurement period	Sound pressure level, dB(A) (re 20 µPa), 15mins			
	L_{90}	L_{eq}	L_{10}	L_{max}
15:15 – 15:30	40	65	68	83

Inset 1.7: Measurement photo A2 – Walberswick

1.8 Unattended measurement results

1.8.1 The summary tables for each unattended measurement location provide a logarithmic average of the measurements during each time period for L_{Aeq} and the range of values are presented for L_{Amax}.

1.8.2 Statistical analysis of the L_{A90} data, consistent with BS4142:2014+A1:2019, was conducted to determine a representative L_{A90} value for each time period.

Location L1

Location description

1.8.3 The sound level meter was set up in the field associated with the proposed Landfall, to the west of the proposed Landfall Site, and to the south of residences on Stocks Lane. The logger was placed at the edge of the field, to avoid farming operations.

Inset 1.8: Measurement location L1 – Walberswick

Environment and observations

1.8.4 During the set up and decommissioning, the sound environment consisted of road traffic noise on The Street, birds cawing, various livestock in the distance and light building work on a house on The Street. The waves and the sea were audible.

Measurement duration

1.8.5 The sound level meter was logging between 13:15 18 March 2025 and 12:00 31 March 2025.

Inset 1.9: Measurement photo L1 – Walberswick

Inset 1.10: Measurement results graph L1 – Walberswick

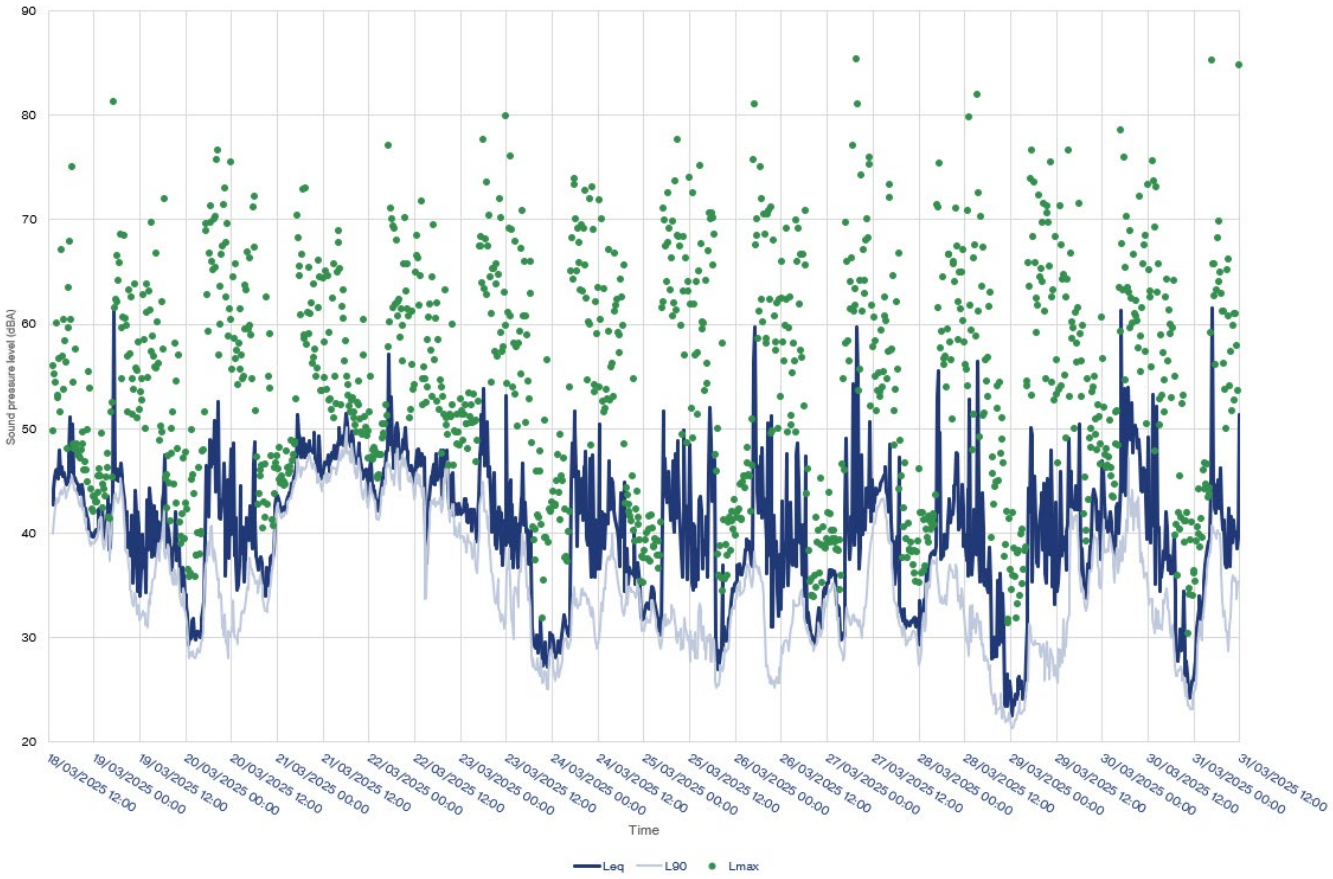
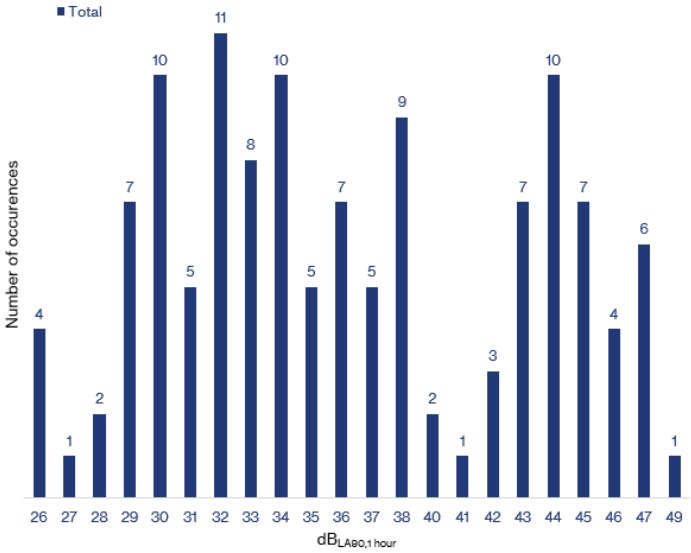


Table 1.7: Measured sound pressure levels at Location L1

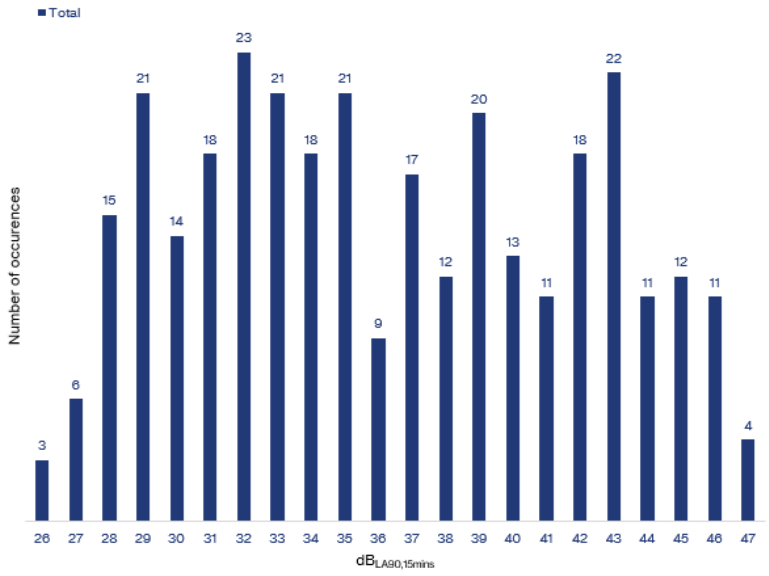
Measurement period	Sound pressure level, dB(A) (re 20 µPa)		
	L_{90}	L_{eq}	L_{max}
Day (07:00 – 23:00)	31	44	34 - 80
Day (07:00 – 19:00)	31	45	44 - 85
Evening (19:00 – 23:00)	27	41	30 - 63
Night (23:00 – 07:00)	31	45	31 - 85

Inset 1.11: Histograms for LA90 day and night L1 – Walberswick

Daytime noise level statistics



Night-time noise level statistics



Location L2

Location description

1.8.6 The sound level meter was set up at Walberswick Caravan Park, to the east of the proposed Landfall Site, and to the south of residences on Millfield Road.

Inset 1.12: Measurement location L2 – Walberswick

Environment and observations

1.8.7 During the set up and decommissioning, the sound environment consisted of waves from the seafront, wind coming in from the sea, and seagulls overhead.

Measurement duration

1.8.8 The sound level meter was logging between 12:00 18 March 2025 and 00:00 25 March 2025.

Inset 1.13: Measurement photo L2 – Walberswick

Inset 1.14: Measurement results graph L2 – Walberswick

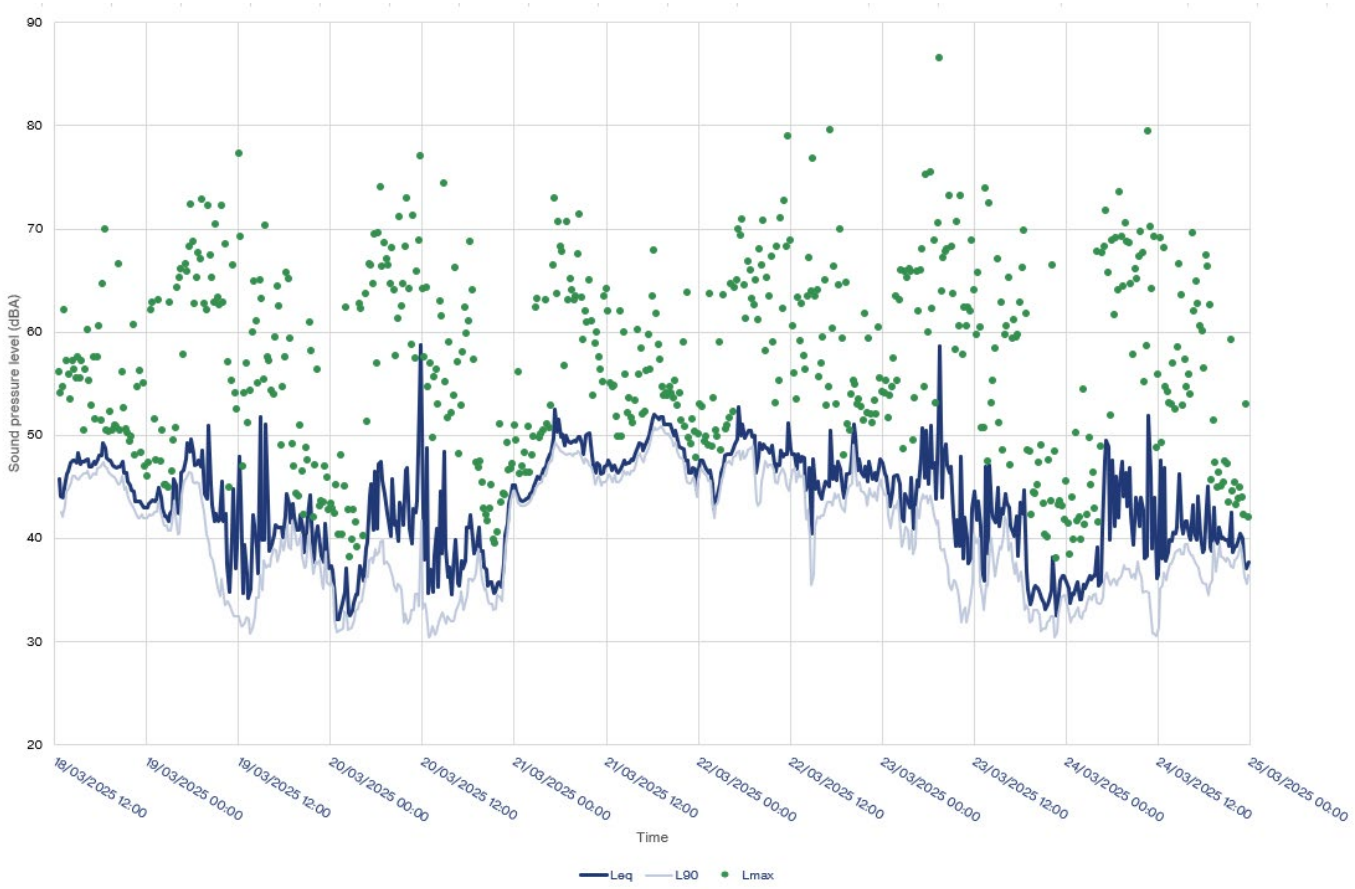
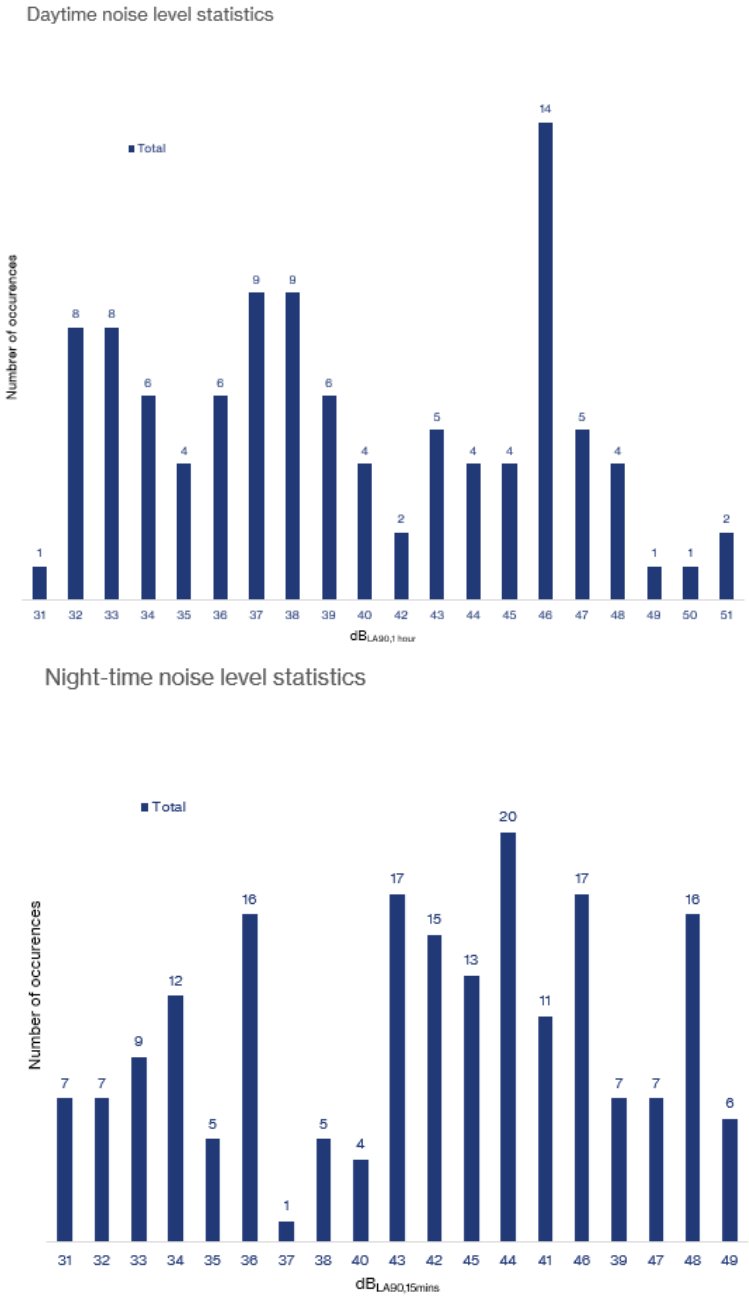


Table 1.8: Measured sound pressure levels at Location L2

Measurement period	Sound pressure level, dB(A) (re 20 µPa)		
	L_{90}	L_{eq}	L_{max}
Day (07:00 – 23:00)	35	46	38-87
Day (07:00 – 19:00)	35	46	45-87
Evening (19:00 – 23:00)	37	45	38-67
Night (23:00 – 07:00)	36	46	38-76

Inset 1.15: Histograms for L_{A90} day and night L2 – Walberswick



Location L3

1.8.9 The sound level meter experienced a technical failure during the measurement period, and no suitable data was logged. Location L4 data will be used for this location as proxy in the assessment.

Location L4

Location description

1.8.10 The sound level meter was set up at Wood Farm, to the west of the proposed Converter Station site, near to the grass verge alongside the drive.

Inset 1.16: Measurement location L4 – Saxmundham

Environment and observations

1.8.11 During the set up and decommissioning, the sound environment consisted of road traffic noise on the B1119, more distant road traffic noise in Saxmundham,

bird scarers sounding every 8 minutes, and farming operations in the adjacent fields.

Measurement duration

1.8.12 The sound level meter was logging between 16:00 18 March 2025 and 12:00 31 March 2025.

Inset 1.17: Measurement photo L4 – Saxmundham

Inset 1.18: Measurement results graph L4 – Saxmundham

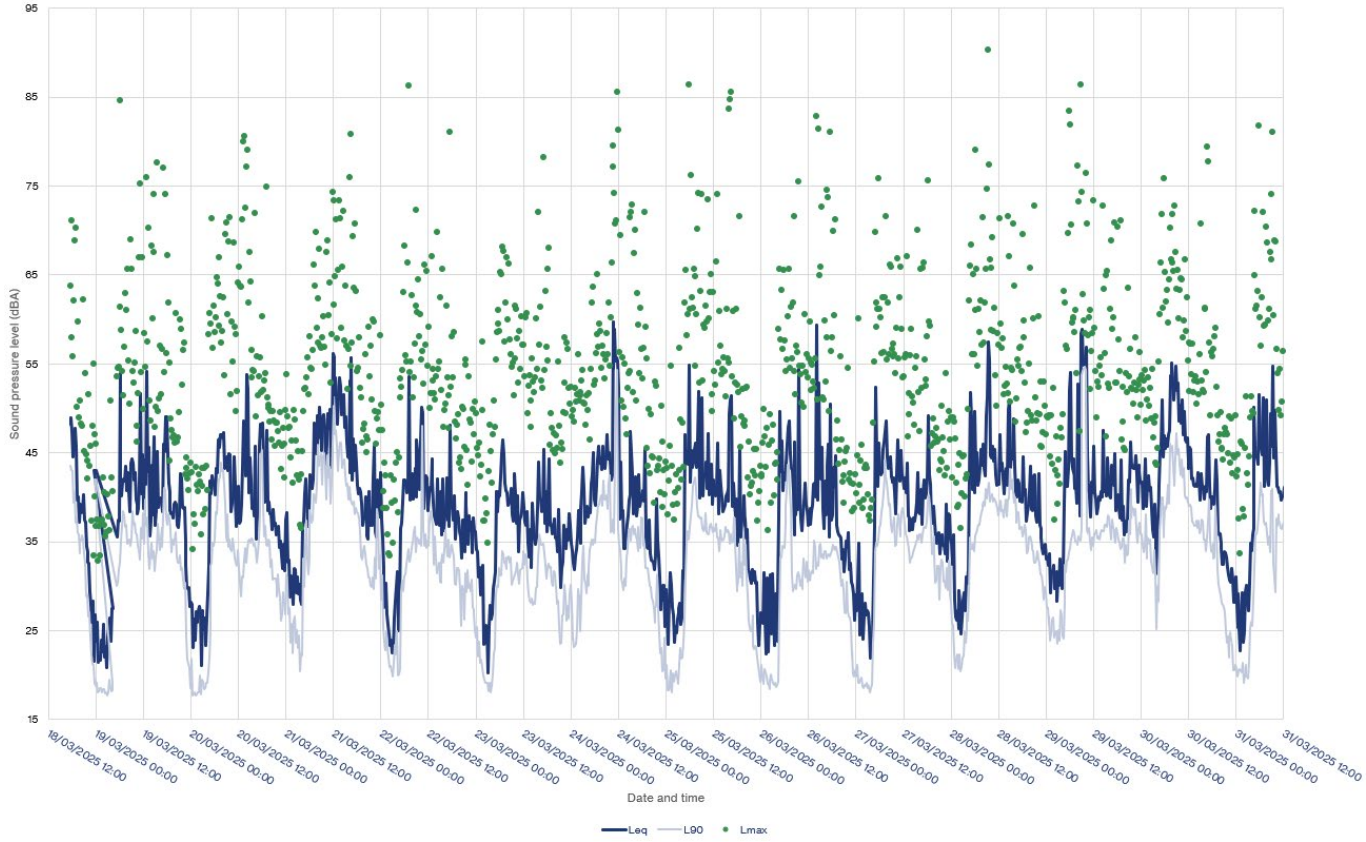
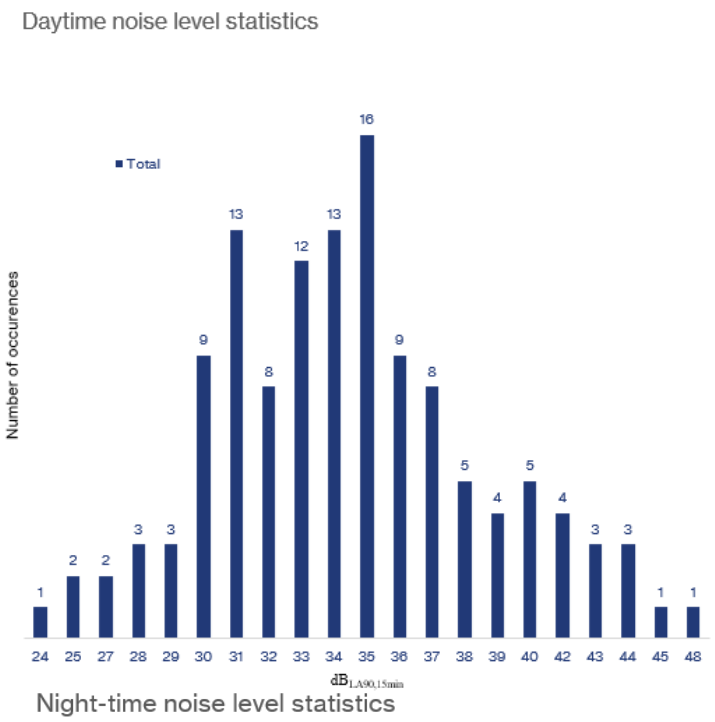


Table 1.9: Measured sound pressure levels at L4 – Saxmundham

Measurement period	Sound pressure level, dB(A) (re 20 µPa)		
	L_{90}	L_{eq}	L_{max}
Day (07:00 – 23:00)	32	46	39-90
Night (23:00 – 07:00)	21	33	33-86

Inset 1.19: Histograms for L_{A90} day and night L4 – Saxmundham



Location L5

Location description

1.8.13 The sound level meter was set up at Hill Farm, to the south of the proposed Converter Station Site, between the receptor and New Shoots Farm.

Inset 1.20: Measurement location L5 – Saxmundham

Environment and observations

1.8.14 During the set up and decommissioning, the sound environment consisted of road traffic noise on the B1121, more distant road traffic noise from the B1119, bird scarers sounding every eight minutes, and farming operations in the barn and yard near the measurement position.

Measurement duration

1.8.15 The sound level meter was logging between 14:45 19 March 2025 and 12:45 22 March 2025. The shorter duration at this location was due to a battery failure.

Inset 1.21: Measurement photo L5 – Saxmundham

Inset 1.22: Measurement results graph L5 – Saxmundham

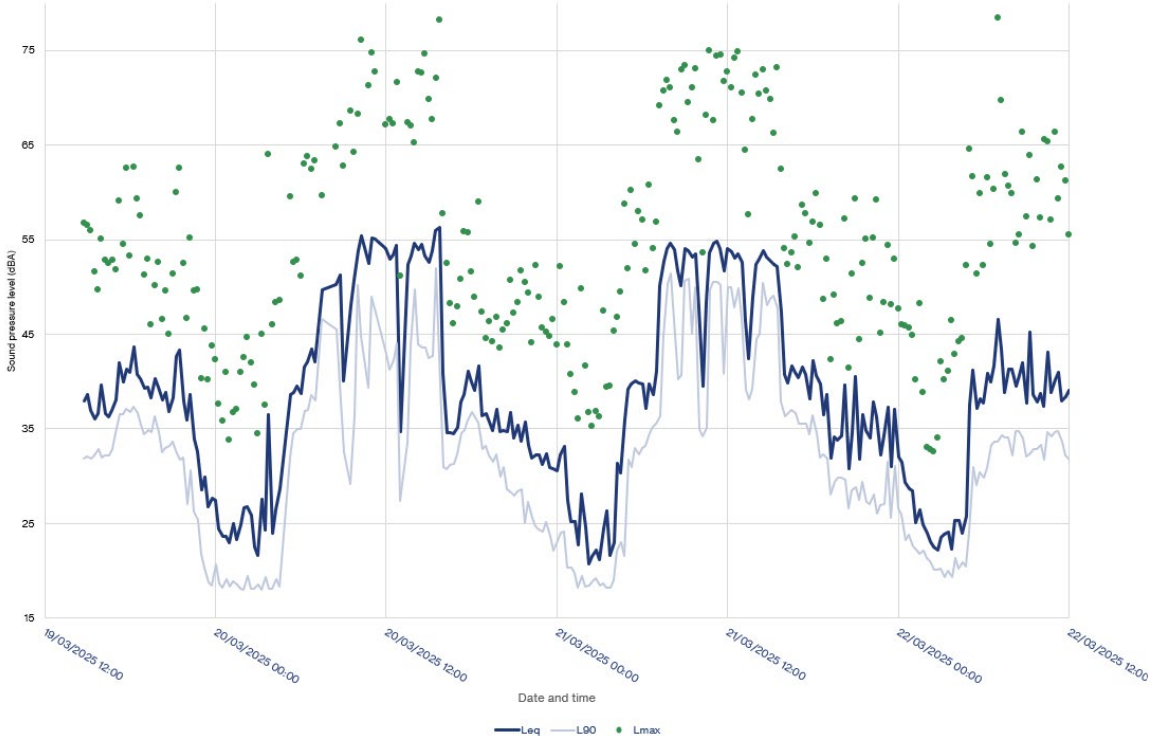
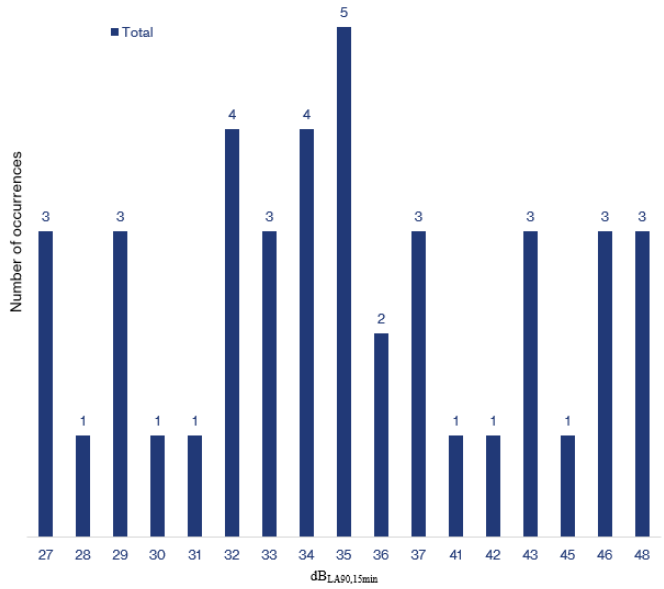


Table 1.10: Measured sound pressure levels at L5 – Saxmundham

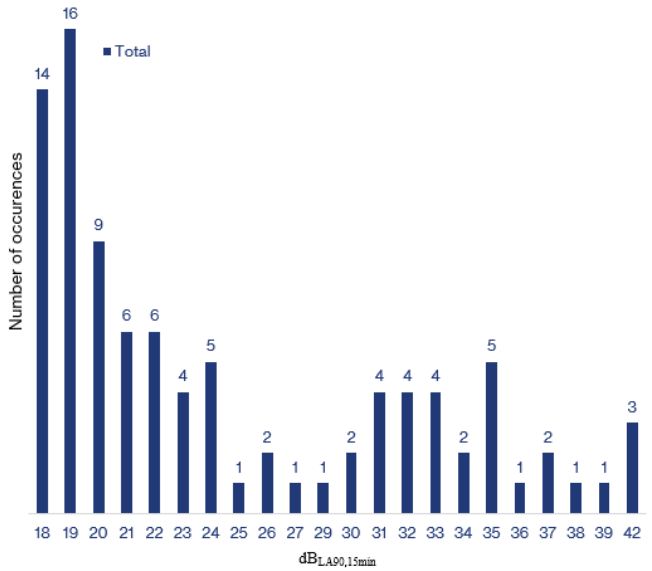
Measurement period	Sound pressure level, dB(A) (re 20 µPa)		
	L_{90}	L_{eq}	L_{max}
Day (07:00 – 23:00)	32	49	40-78
Night (23:00 – 07:00)	19	36	33-78

Inset 1.23: Histograms for L_{A90} day and night L5 – Saxmundham

Daytime



Night-time noise level statistics



Location L6

Location description

1.8.16 The sound level meter was set up at Trust Farm, to the east of the proposed Converter Station Site, on the boarder of the field closest to the receptor.

Inset 1.24: Measurement location L6 – Saxmundham

Environment and observations

1.8.17 During the set up and decommissioning, the sound environment consisted of road traffic noise from the B1119, bird scarers sounding every 8 minutes, and farming operations in the adjacent fields.

Measurement duration

1.8.18 The sound level meter was logging between 16:30 19 March 2025 and 13:30 31 March 2025.

Inset 1.25: Measurement photo L6 – Saxmundham

Inset 1.26: Measurement results graph L6 – Saxmundham

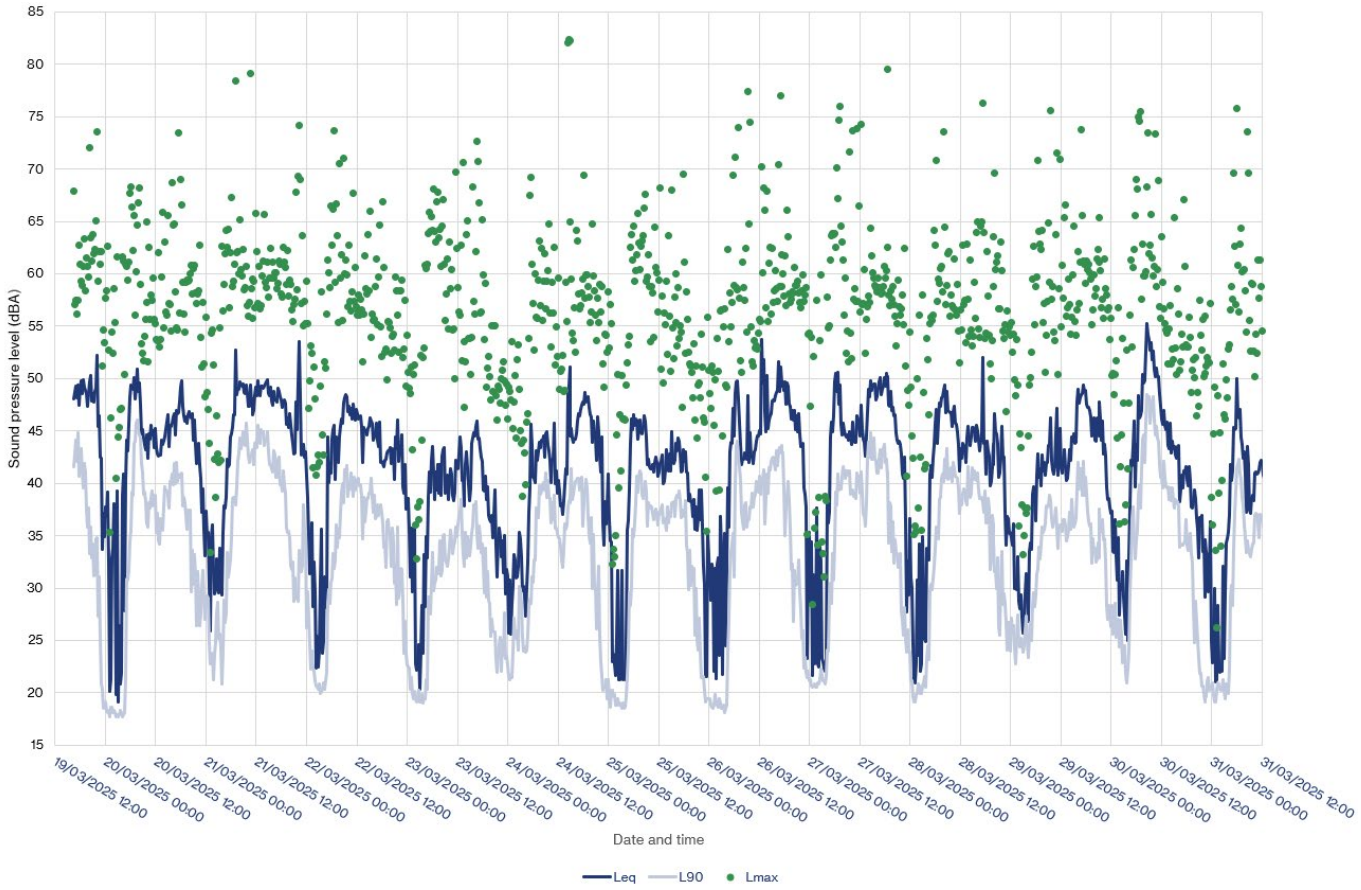
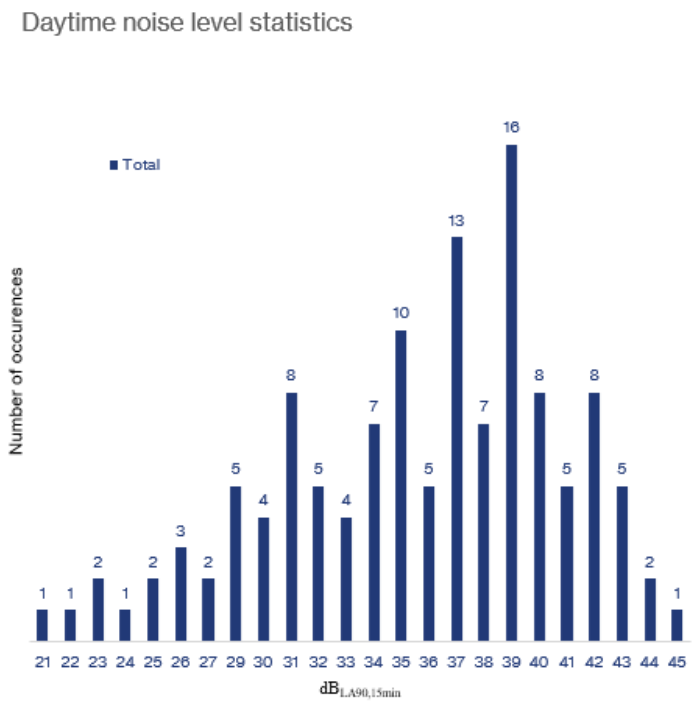
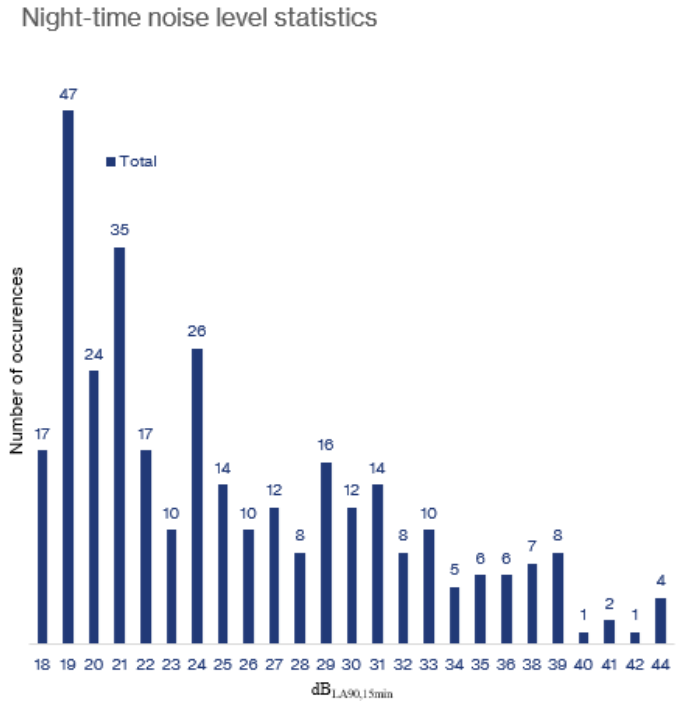


Table 1.11: Measured sound pressure levels at L6 – Saxmundham

Measurement period	Sound pressure level, dB(A) (re 20 µPa)		
	L_{90}	L_{eq}	L_{max}
Day (07:00 – 23:00)	32	46	41-82
Night (23:00 – 07:00)	20	41	26-78

Inset 1.27: Histograms for LA90 day and night L6 – Saxmundham





Location L7

Location description

1.8.19 The sound level meter was set up at Wardspring Farm, to the east of the proposed Converter Station Site, in the rear garden of the closest receptor.

Inset 1.28: Measurement location L7 – Saxmundham

Environment and observations

1.8.20 During the set up and decommissioning, the sound environment consisted of road traffic noise from the B1119, bird scarers sounding every 8 minutes, and farming operations in the adjacent fields.

Measurement duration

1.8.21 The sound level meter was logging between 16:00 19 March 2025 and 01:30 28 March 2025.

Inset 1.29: Measurement results graph L7 – Saxmundham

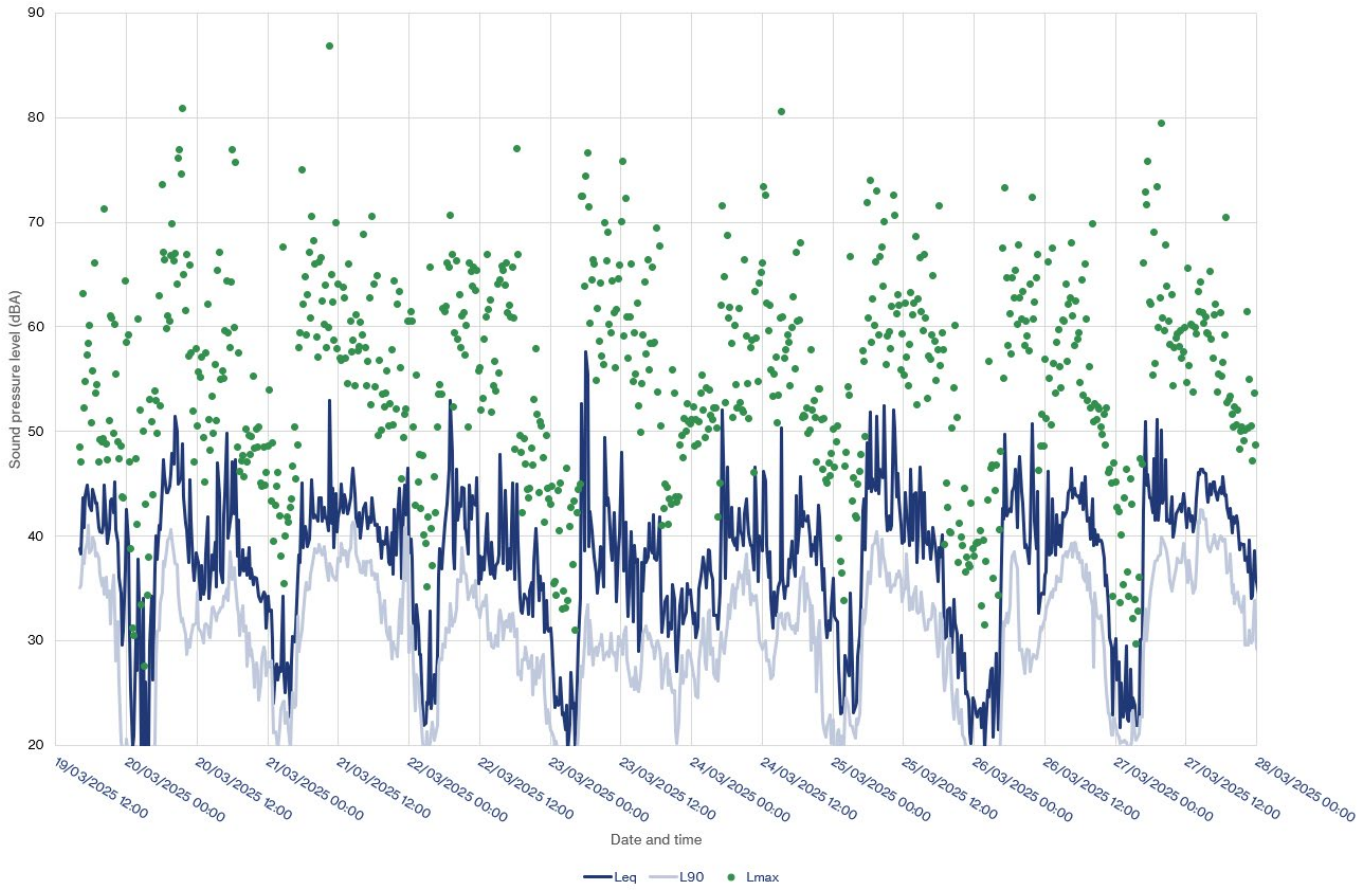
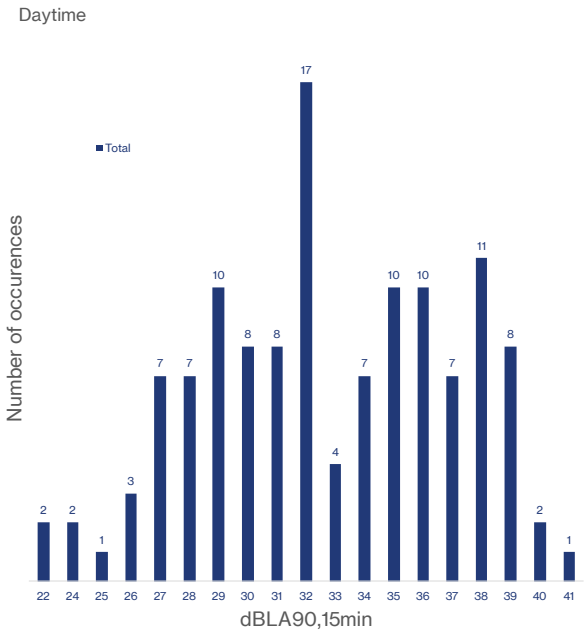


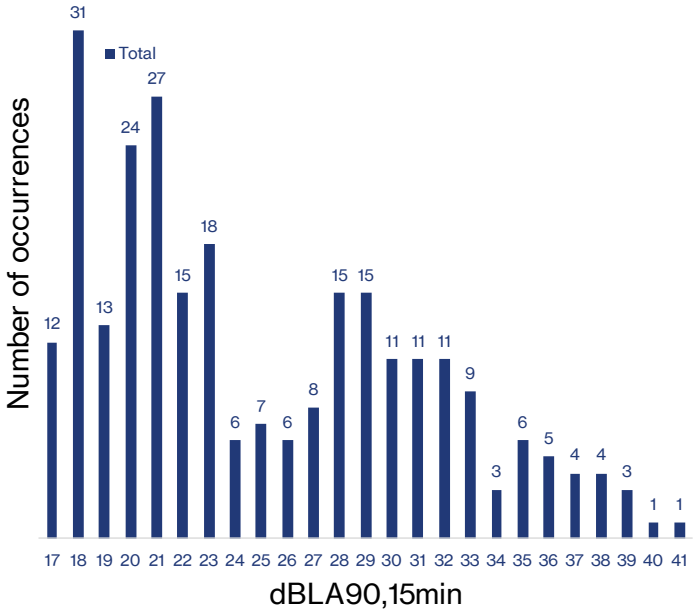
Table 1.12: Measured sound pressure levels at L7 – Saxmundham

Measurement period	Sound pressure level, dB(A) (re 20 µPa)		
	L_{90}	L_{eq}	L_{max}
Day (07:00 – 23:00)	30	42	37-87
Night (23:00 – 07:00)	20	41	28-77

Inset 1.30: Histograms for L_{A90} day and night L7 – Saxmundham



Night-time noise level statistics



Location L8

Location description

1.8.22 The sound level meter was set up at Little Moor Farm, to the north of the Kiln Lane Substation Site, on the border of the field and the rear garden of the closest receptor.

Inset 1.31: Measurement location L8 – Friston

Environment and observations

1.8.23 During the set up and decommissioning, the sound environment consisted of farming operations in the adjacent fields, some light site activity on the substation site, and road traffic noise from the B1119 and B1121.

Measurement duration

1.8.24 The sound level meter was logging between 11:15 19 March 2025 and 13:30 31 March 2025.

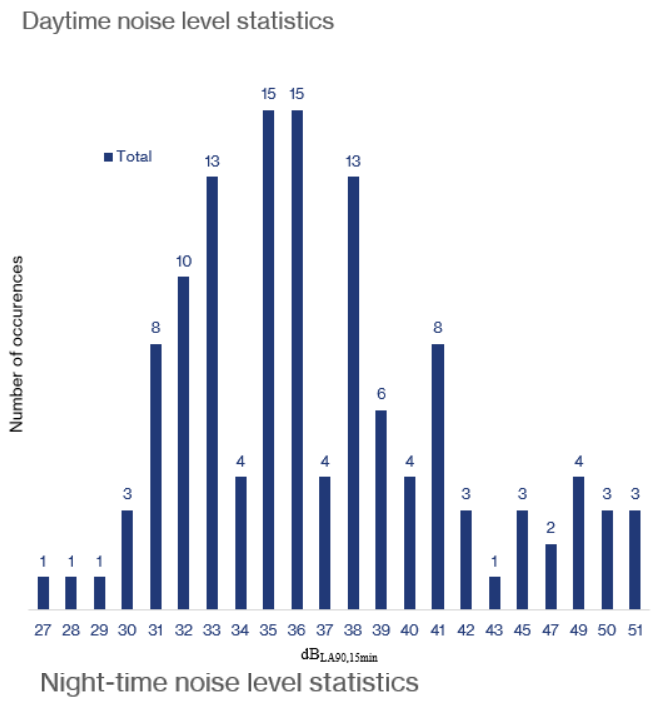
Inset 1.32: Measurement photo L8 – Friston

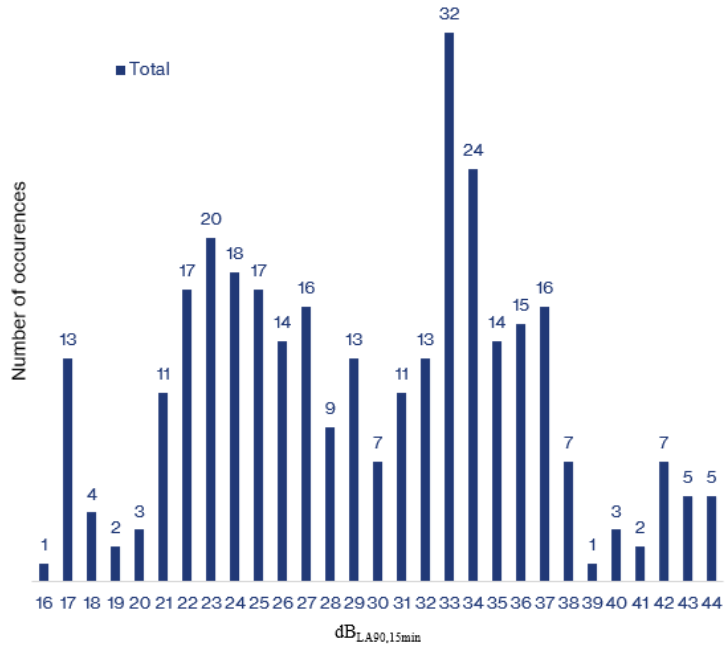
Inset 1.33: Measurement results graph L8 – Friston

Table 1.13: Measured sound pressure levels at L8 – Friston

Measurement period	Sound pressure level, dB (A) (re 20 µPa)		
	L_{90}	L_{eq}	L_{max}
Day (07:00 – 23:00)	33	49	50-96
Night (23:00 – 07:00)	24	44	31-96

Inset 1.34: Histograms for L_{A90} day and night L8 – Friston





Location L9

Location description

1.8.25 The sound level meter was set up at Fareacre campsite and residential property, to the north east of the Kiln Lane Substation Site, in the rear garden of the closest receptor.

Inset 1.35: Measurement location L9 – Friston

Environment and observations

1.8.26 During the set up and decommissioning, the sound environment consisted of road traffic noise from Grove Road and the B1119, bird scarers sounding every 8 minutes, and farming operations in the adjacent fields.

Measurement duration

1.8.27 The sound level meter was logging between 10:30 19 March 2025 and 13:30 31 March 2025.

Inset 1.36: Measurement photo L9 – Friston

Inset 1.37: Measurement results graph L9 – Friston

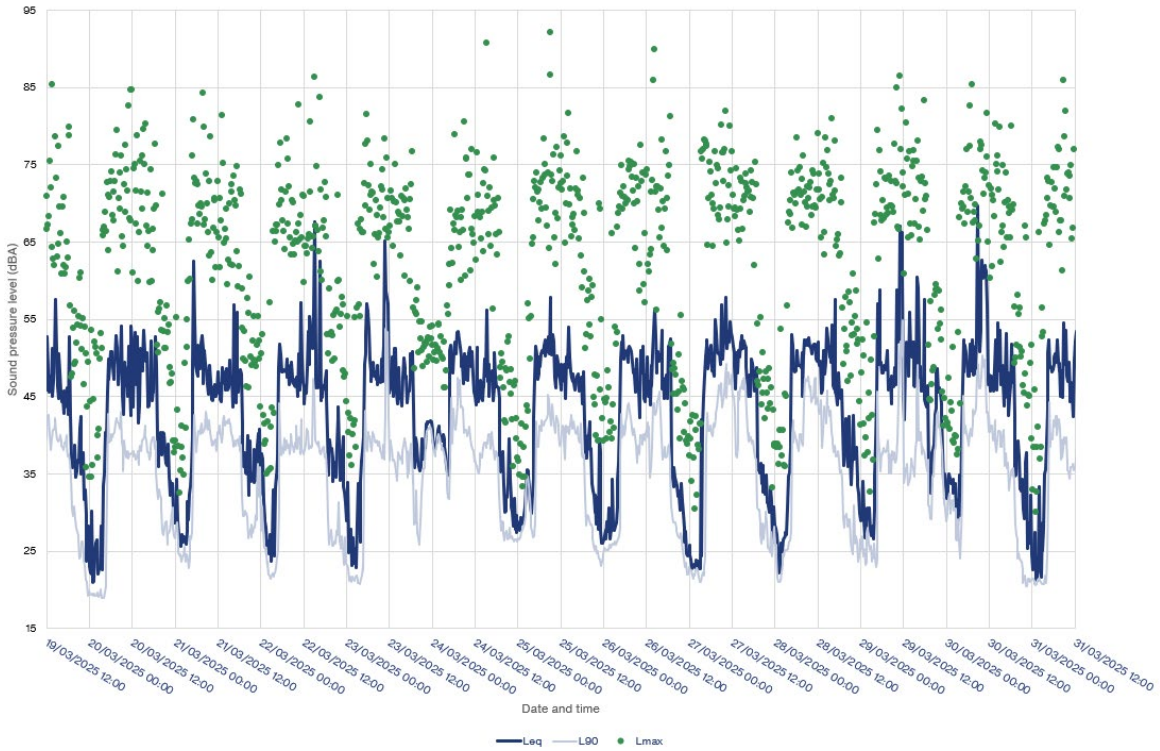
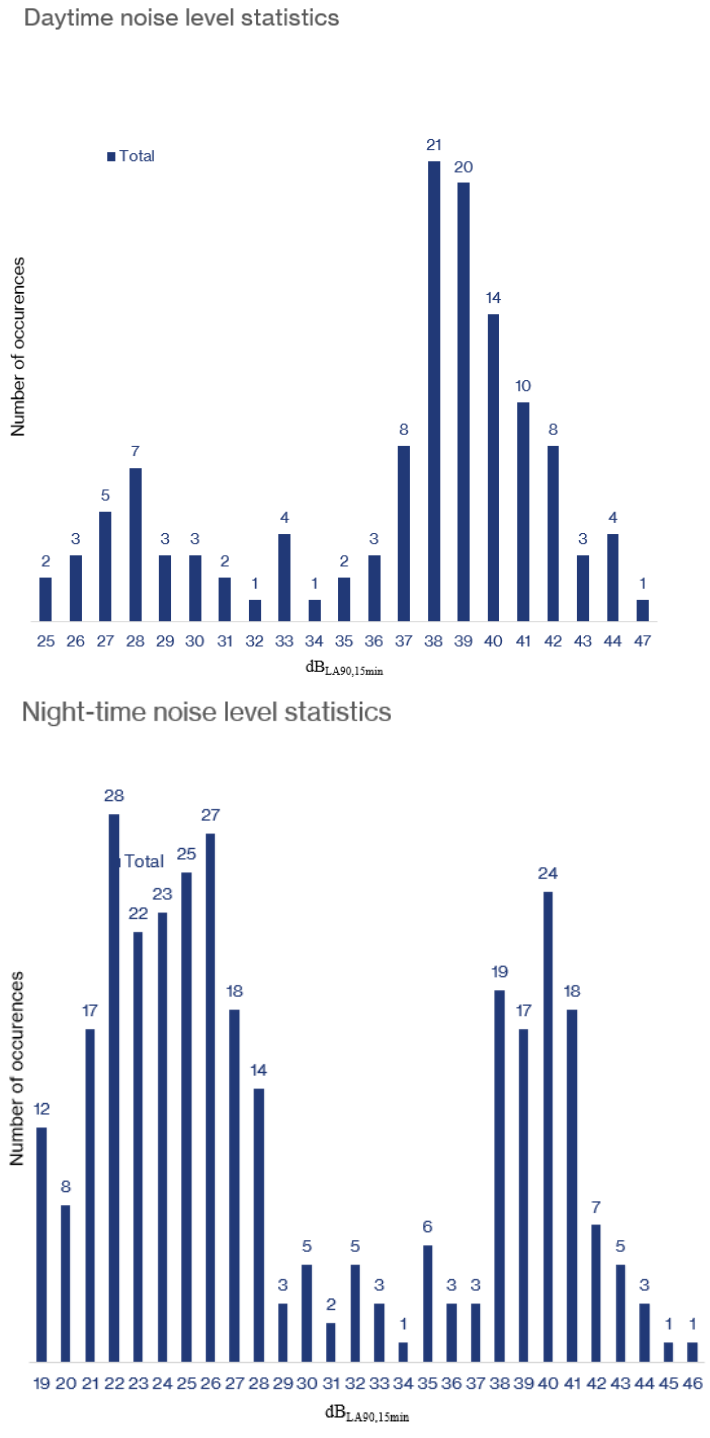


Table 1.14: Measured sound pressure levels at L9 – Friston

Measurement period	Sound pressure level, dB(A) (re 20 µPa)		
	L_{90}	L_{eq}	L_{max}
Day (07:00 – 23:00)	34	50	36-92
Night (23:00 – 07:00)	23	46	31-82

Inset 1.38: Histograms for LA90 day and night L9 – Friston



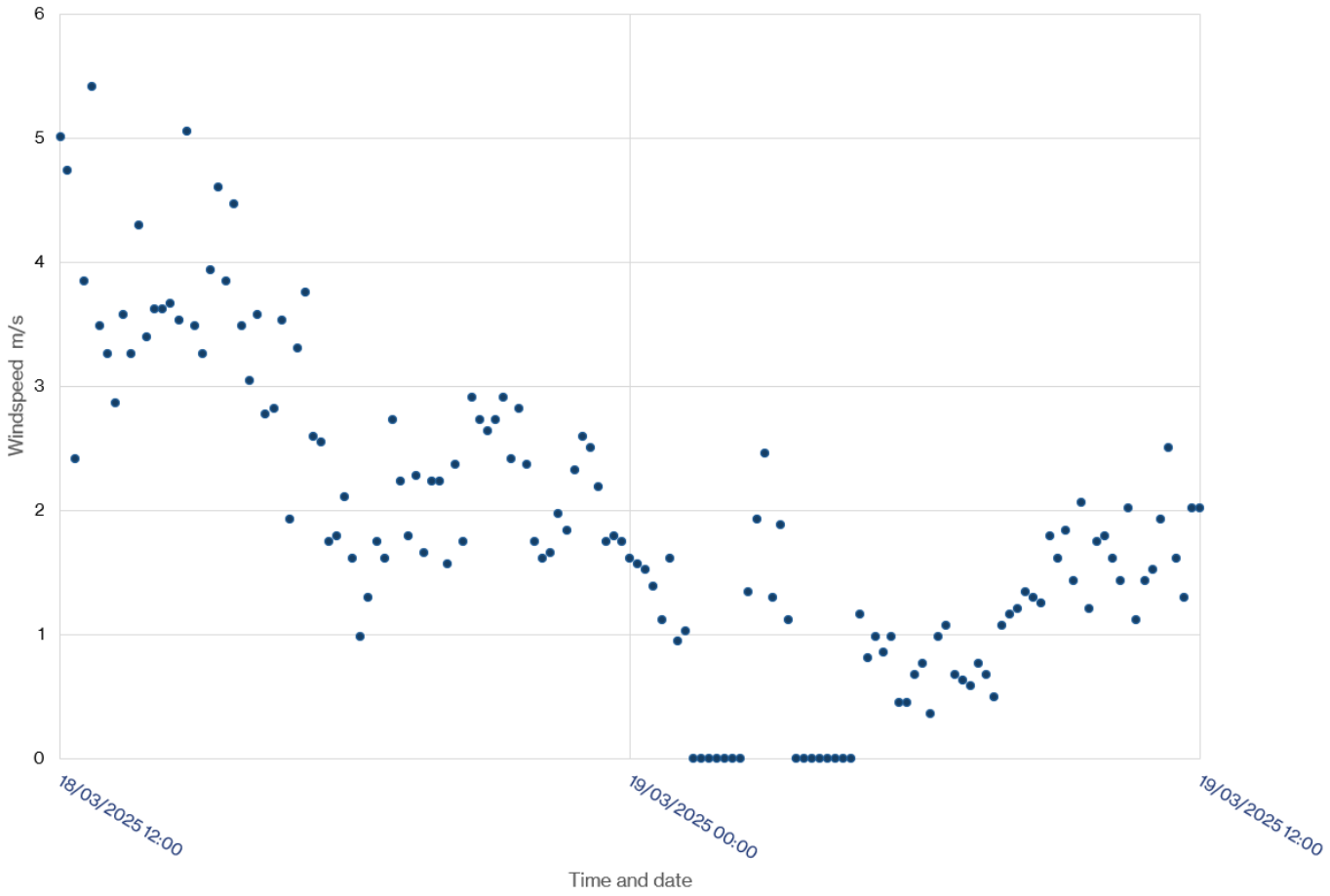
Location L10

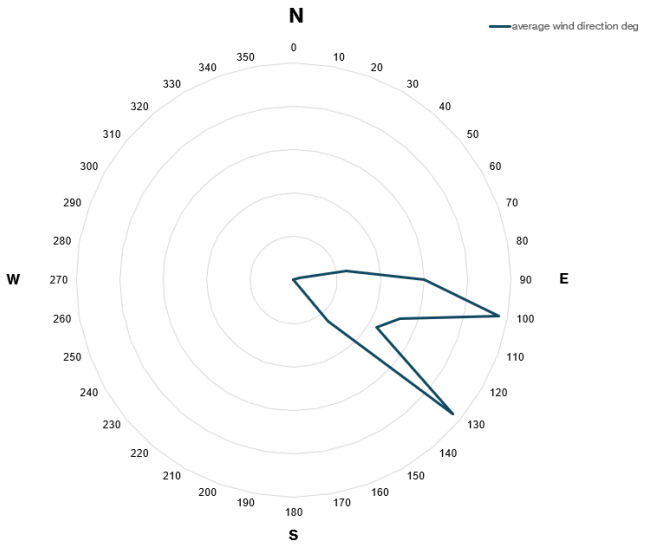
1.8.28 The sound level meter experienced a technical failure during the measurement period, and no suitable data was logged. The data from L8 will be used in the assessment as a proxy location.

1.9 Weather data

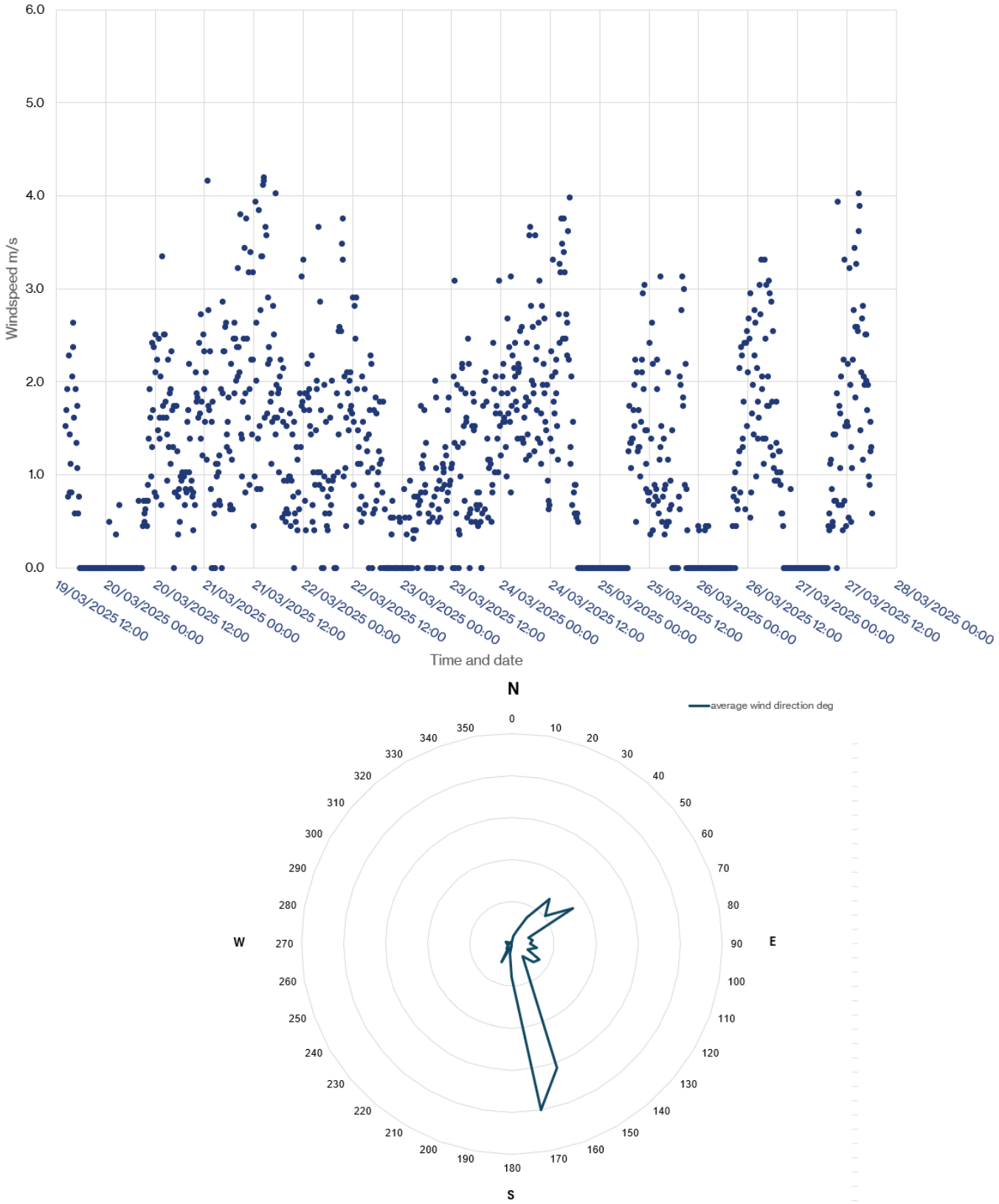
1.9.1 Weather data was collected from 12:00 18 March to 12:00 19 March at L2 in Walberswick; and from 14:30 19 March to 18:20 27 March at L5 (between Saxmundham and Friston).

Inset 1.39: Wind speed and direction - L2 Walberswick





Inset 1.40: Wind speed and direction – L5 Saxmundham



Topic Glossary and Abbreviations

Term	Definition
Decibel (dB)	The ratio of sound pressures which people can hear is a ratio of 10^6:1 (one million: one). For convenience, therefore, a logarithmic measurement scale is used. The resulting parameter is called the 'sound pressure level' (L) and the associated measurement unit is the decibel (dB). As the decibel is a logarithmic ratio, the laws of logarithmic addition and subtraction apply.
dB(A)	The unit used to define a weighted sound pressure level, which correlates well with the subjective response to sound. The 'A' weighting follows the frequency response of the human ear, which is less sensitive to low and very high frequencies than it is to those in the range 500Hz to 4kHz. In some statistical descriptors the 'A' weighting forms part of a subscript, such as L_{A10}, L_{A90}, and L_{Aeq} for the 'A' weighted equivalent continuous noise level.
Frequency	Frequency is the rate of repetition of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the hertz (Hz), which is identical to cycles per second. A 1000Hz is often denoted as 1kHz, e.g. 2kHz = 2000Hz. Human hearing ranges approximately from 20Hz to 20kHz. For design purposes, the octave bands between 63Hz to 8kHz are generally used. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For more detailed analysis, each octave band may be split into three one-third octave bands or narrow frequency bands.
Maximum noise level	The maximum noise level identified during a measurement period. Experimental data has shown that the human ear does not generally register the full loudness of transient sound events of less than 125ms duration and fast time weighting (F) has an exponential time constant of 125ms which reflects the ear's response. Slow time weighting (S) has an exponential time constant of 1s and is used to allow more accurate estimation of the average sound level on a visual display. The maximum level measured with fast time weighting is denoted as $L_{Amax,\,F}$. The maximum level measured with slow time weighting is denoted $L_{Amax,\,S}$.
Sound pressure level	The sound power emitted by a source results in pressure fluctuations in the air, which are heard as sound. The sound pressure level (L) is ten times the logarithm of the ratio of the measured sound pressure (detected by a microphone) to the reference level of 2×10^{-5}Pa (the threshold of hearing). Thus L (dB) = 10 log $(P_1/P_{ref})^2$ where Pref, the lowest pressure detectable by the ear, is 0.00002 pascals (i.e. 2x10-5 Pa). The threshold of hearing is 0dB, while the threshold of pain is approximately 120dB. Normal speech is approximately 60dBL_A and a change of 3dB is only just detectable. A change of 10dB is subjectively twice, or half, as loud.

Term	Definition
Statistical noise levels	For levels of noise that vary widely with time, for example road traffic noise, it is necessary to employ an index which allows for this variation. The L_{p10}, the level exceeded for 10% of the time period under consideration and can be used for the assessment of road traffic noise (note that LpAeq is used in BS 8233 for assessing traffic noise). The L90, the level exceeded for 90% of the time, has been adopted to represent the background noise level. The L1, the level exceeded for 1% of the time, is representative of the maximum levels recorded during the sample period. A weighted statistical noise levels are denoted L_{A10}, dBL_{A90} etc. The reference time period (T) is normally included, e.g. $dBL_{A10, 5min}$ or $dBL_{A90, 8hr}$.

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