East Anglia TWO Offshore Windfarm

Appendix 25.3

Baseline Noise Survey

Environmental Statement
Volume 3

Applicant: East Anglia TWO Limited
Document Reference: 6.3.25.3
SPR Reference: EA2-DWF-ENV-REP-IBR-000917_003 Rev 01
Pursuant to APFP Regulation: 5(2)(a)

Author: Royal HaskoningDHV
Date: October 2019
Revision: Version 1

Revision Summary				
Rev	**Date**	**Prepared by**	**Checked by**	**Approved by**
01	08/10/2019	Paolo Pizzolla	Julia Bolton	Helen Walker

Description of Revisions			
Rev	**Page**	**Section**	**Description**
01	n/a	n/a	Final for Submission

Table of Contents

Appendix 25.3 is supported by the following tables.

Table Number	Title
Table A25.3.1	Baseline Noise Monitoring Locations – Landfall Study Area
Table A25.3.2	Baseline Noise Data – Landfall Study Area DAYTIME
Table A25.3.3	Baseline noise data – Landfall Study Area NIGHT TIME
Table A25.3.4	Baseline Noise Monitoring Locations – Onshore Cable Route Study Area
Table A25.3.5	Baseline Noise Data – Onshore Cable Route Study Area DAYTIME
Table A25.3.6	Baseline Noise Data – Onshore Cable Route Study Area NIGHT TIME
Table A25.3.7	Baseline Noise Monitoring Locations – Onshore Project Substation Study Area
Table A25.3.8	Baseline Noise Data Analysis – SSR1 (LONG TERM) 5-minute period
Table A25.3.9	Baseline Noise Data Analysis – SSR2 (LONG TERM) 5-minute period
Table A25.3.10	Baseline Noise Data Analysis – SSR3 (LONG TERM) 5-minute period
Table A25.3.11	Baseline Noise Data Analysis – SSR5 (LONG TERM) 5-minute period
Table A25.3.12	Baseline Noise Data Analysis – SSR7 (LONG TERM) 5-minute period
Table A25.3.13	Baseline Noise Data Analysis – SSR9 (LONG TERM) 5-minute period
Table A25.3.14	Baseline Noise Data Analysis – SSR10 (LONG TERM) 5-minute period
Table A25.3.15	Baseline Noise Data Analysis – SSR11 (LONG TERM) 5-minute period
Table A25.3.16	Baseline Noise Data Analysis – SSR12 (LONG TERM) 5-minute period

Glossary of Acronyms

BS	British Standard
ETG	Expert Topic Group
eVDV	Estimated Vibration Dose Value
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
ISO	International Standards Organisation

Glossary of Terminology

Applicant	East Anglia TWO Limited.
Cable sealing end compound	A compound which allows the safe transition of cables between the overhead lines and underground cables which connect to the National Grid substation.
Cable sealing end (with circuit breaker) compound	A compound (which includes a circuit breaker) which allows the safe transition of cables between the overhead lines and underground cables which connect to the National Grid substation.
Construction consolidation sites	Compounds associated with the onshore works which may include elements such as hard standings, lay down and storage areas for construction materials and equipment, areas for vehicular parking, welfare facilities, wheel washing facilities, workshop facilities and temporary fencing or other means of enclosure.
dB(A)	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
dB(Z) (or previously Lleq)	Decibels measured on a sound level meter incorporating a flat frequency weighting (Z weighting) across the frequency range.
Decibel (dB)	A unit of noise level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 µPa, the threshold of normal hearing is 0dB, and 140dB is the threshold of pain. A change of 1dB is only perceptible under controlled conditions. Under normal conditions a change in noise level of 3dB(A) is the smallest perceptible change.
Development area	The area comprising the onshore development area and the offshore development area (described as the 'order limits' within the Development Consent Order).
East Anglia TWO project	The proposed project consisting of up to 75 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia TWO windfarm site	The offshore area within which wind turbines and offshore platforms will be located.
National electricity grid	The high voltage electricity transmission network in England and Wales owned and maintained by National Grid Electricity Transmission
European site	Sites designated for nature conservation under the Habitats Directive and Birds Directive, as defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017 and regulation 18 of the Conservation of Offshore Marine Habitats and Species Regulations 2017. These include candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.

Horizontal directional drilling (HDD)	A method of cable installation where the cable is drilled beneath a feature without the need for trenching.
HDD temporary working area	Temporary compounds which will contain laydown, storage and work areas for HDD drilling works.
Jointing bay	Underground structures constructed at intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
$L_{A10, T}$	The A weighted noise level exceeded for 10% of the specified measurement period (T). L_{A10} is the index generally adopted to assess traffic noise.
$L_{A90, T}$	The A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142:2014+A1:2019 it is used to define the 'background' noise level.
$L_{Aeq, T}$	The equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). $L_{Aeq,T}$ is used to describe many types of noise and can be measured directly with an integrating sound level meter.
L_{Amax}	The maximum A-weighted sound pressure level recorded during a measurement.
Landfall	The area (from Mean Low Water Springs) where the offshore export cables would make contact with land and connect to the onshore cables.
Link boxes	Underground chambers within the onshore cable route housing electrical earthing links.
Mitigation areas	Areas captured within the onshore development area specifically for mitigating expected or anticipated impacts.
National Grid infrastructure	A National Grid substation, cable sealing end compounds, cable sealing end (with circuit breaker) compound, underground cabling and National Grid overhead line realignment works to facilitate connection to the national electricity grid, all of which will be consented as part of the proposed East Anglia TWO project Development Consent Order but will be National Grid owned assets.
National Grid overhead line realignment works	Works required to upgrade the existing electricity pylons and overhead lines (including cable sealing end compounds and cable sealing end (with circuit breaker) compound) to transport electricity from the National Grid substation to the national electricity grid.
National Grid overhead line realignment works area	The proposed area for National Grid overhead line realignment works.
National Grid substation	The substation (including all of the electrical equipment within it) necessary to connect the electricity generated by the proposed East Anglia TWO project to the national electricity grid which will be owned by National Grid but is being consented as part of the proposed East Anglia TWO project Development Consent Order.
National Grid substation location	The proposed location of the National Grid substation.
Natura 2000 site	A site forming part of the network of sites made up of Special Areas of Conservation and Special Protection Areas designated respectively under the Habitats Directive and Birds Directive.

Onshore cable corridor	The corridor within which the onshore cable route will be located.
Onshore cable route	This is the construction swathe within the onshore cable corridor which would contain onshore cables as well as temporary ground required for construction which includes cable trenches, haul road and spoil storage areas.
Onshore cables	The cables which would bring electricity from landfall to the onshore substation. The onshore cable is comprised of up to six power cables (which may be laid directly within a trench, or laid in cable ducts or protective covers), up to two fibre optic cables and up to two distributed temperature sensing cables.
Onshore development area	The area in which the landfall, onshore cable corridor, onshore substation, landscaping and ecological mitigation areas, temporary construction facilities (such as access roads and construction consolidation sites), and the National Grid Infrastructure will be located.
Onshore infrastructure	The combined name for all of the onshore infrastructure associated with the proposed East Anglia TWO project from landfall to the connection to the national electricity grid.
Onshore preparation works	Activities to be undertaken prior to formal commencement of onshore construction such as pre–planting of landscaping works, archaeological investigations, environmental and engineering surveys, diversion and laying of services, and highway alterations.
Onshore substation	The East Anglia TWO substation and all of the electrical equipment within the onshore substation and connecting to the National Grid infrastructure.
Onshore substation location	The proposed location of the onshore substation for the proposed East Anglia TWO project.
Transition bay	Underground structures at the landfall that house the joints between the offshore export cables and the onshore cables.

25.3 Baseline Noise Survey

25.3.1 Introduction

1. In order to characterise the existing noise climate within the onshore development area, a baseline noise survey was undertaken. At the time of surveying, the onshore development area had not been refined. Therefore, sensitive receptor locations in the vicinity of the onshore development area were agreed. ***Figure 25.2*** shows the onshore development area and the survey locations. Survey were undertaken between 27th June and 12th July 2018.

2. A total of 35 sensitive receptor locations were agreed as part of consultation at the Expert Topic Group (ETG) meetings held for the proposed East Anglia TWO and proposed East Anglia ONE North projects. Some amendments to the agreed sensitive receptor locations were required due to access restrictions, this amendment is detailed further in ***section 25.3.5***. This appendix to ***Chapter 25 Noise and Vibration*** details the baseline noise survey approach (***section 25.5*** of ***Chapter 25 Noise and Vibration***) as well as quantifying the existing acoustic environment within the onshore development area.

3. Baseline survey measurements were conducted in accordance with current guidance, including British Standards (BS) 4142:2014+A1:2019 Method for Rating and Assessing Industrial and Commercial Sound[1] and BS 7445:2003 Description and measurement of environmental noise and the methodology used was agreed with relevant stakeholders during ETG meetings.

4. Sound level meters (SLM) were fully calibrated, traceable to UKAS standards and satisfied the requirements of BS EN 61672-1:2013 for a 'Class 1' Sound Level Meter (SLM).

5. Measurements were undertaken during favourable weather conditions, i.e. with windspeed <5m/s and no precipitation.

25.3.2 Baseline Noise Scope

6. Baseline noise measurements were conducted at agreed identified sensitive noise receptors (***section 25.5*** of ***Chapter 25 Noise and Vibration***). The receptor locations were divided into the three Study Areas detailed below:

    - Landfall study area;
        - Four receptor locations.

[1] Baseline survey undertaken in 2018 before amendments to latest BS4142 in 2019. A review confirmed compliance with BS4142:2014+A1:2019 requirements.

- Onshore cable route study area; and
  - 19 receptor locations.
- Onshore substation / National Grid infrastructure study area.
  - 12 receptor locations (nine surveyed due to access restrictions).

7. These three study areas and receptor locations are shown on ***Figure 25.2.***

25.3.3 Landfall Study Area

8. The landfall study area encompasses the proposed landfall location, within an area to the north of Thorpeness and south of Sizewell.

9. Measurements were conducted at four receptor locations, details of which are shown in ***Table A25.3.1*** and on ***Figure 25.2***. Short-term attended measurements were taken at various times throughout the daytime (up to 30 minutes) and night time (up to 15 minutes) reference periods.

Table A25.3.1 Baseline Noise Monitoring Locations – Landfall Study Area

Receptor identifier	Address (NEAREST)	X	Y	Nearest postcode
LFR1	6 North End Ave, Thorpeness, Leiston IP16 4PD, UK	647541	260181	IP16 4PD
LFR2	7 Pilgrims Way, Thorpeness, Leiston IP16 4LZ, UK	647232	260055	IP16 4LZ
LFR3	Gate Cottage, Thorpeness, Leiston IP16 4LX, UK	646514	260274	IP16 4LX
LFR4	7 Shellpit Cottages, Thorpeness, Leiston IP16 4PG, UK	646692	260894	IP16 4PG

10. ***Table A25.3.2*** and ***Table A25.3.3*** contains a summary of the measured baseline noise data at the sensitive receptor locations within the landfall study area during both daytime and night time respectively.

Table A25.3.2 Baseline Noise Data – Landfall Study Area DAYTIME

Receptor identifier	Date	Start time	End Time	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
LFR1	03/07/2018	10:17:50	10:47:50	48.1	63.2	49.7	45.9
LFR2	03/07/2018	10:58:00	11:28:00	45.6	61.1	48.4	40.6
LFR3	03/07/2018	11:33:10	12:03:10	60.7	82.6	62.4	43.3
LFR4	03/07/2018	12:14:52	12:44:52	45.8	65.6	48.2	41.0

Table A25.3.3 Baseline noise data – Landfall Study Area NIGHT TIME

Receptor identifier	Date	Start time	End Time	L_{Aeq}	L_{AMax}	L_{A10}	L_{A90}
LFR1	03/07/2018	23:00:27	23:15:27	45.3	57.0	46.7	43.3
LFR2	03/07/2018	23:21:59	23:36:59	39.0	56.6	41.1	35.6
LFR3	03/07/2018	23:43:27	23:58:27	47.6	74.1	40.3	31.6
LFR4	04/07/2018	00:03:07	00:18:07	35.4	49.4	37.5	32.5

25.3.4 Onshore Cable Route Study Area

11. Measurements were conducted at 19 receptor locations in the onshore cable route study area are detailed within ***Table A25.3.4*** and on ***Figure 25.2.***

Table A25.3.4 Baseline Noise Monitoring Locations – Onshore Cable Route Study Area

Receptor identifier	Address (NEAREST)	X	Y	Nearest postcode
CRR1	The Court Yard Cottage, Sizewell, Leiston IP16 4UB, UK	647543	261202	IP16 4UB
CRR2	Caroline Cottage, Sizewell, Leiston IP16 4TY, UK	647105	261997	IP16 4TY
CRR3	Sizewell Gap, Leiston IP16, UK	647163	262434	IP16 4TT
CRR4	Sizewell Gap, Leiston IP16, UK	646246	262320	IP16 4TS
CRR5	Grimsey's Ln, Leiston IP16, UK	645472	261777	IP16 4LS
CRR6	Grimsey's Ln, Leiston IP16, UK	645359	262023	IP16 4LS
CRR7	5 The Follies, Aldringham, Leiston IP16 4LU, UK	645725	261244	IP16 4LU
CRR8	Ogilvie Houses, Church Ln, Leiston IP16 4QU, UK	645330	260584	IP16 4QU
CRR9	Gypsy Ln, Leiston IP16 4GL, UK	644739	260394	IP16 4GL
CRR10	Fitches Ln, Leiston IP16 4QQ, UK	644486	260353	IP16 4QQ
CRR11	Ivywood Cottage, 17 Aldeburgh Rd, Aldringham, Leiston IP16 4QH, UK	644560	260595	IP16 4QH
CRR12	Old Blacksmiths, Thorpe Rd, Aldringham, Leiston IP16 4QX, UK	644886	260920	IP16 4QX
CRR13	37 Hawthorn Cl, Saxmundham IP17 1XW, UK	643882	260544	IP17 1XW
CRR14	Sloe Ln, Saxmundham IP17 1UU, UK	643324	260245	IP17 1UU
CRR15	4 Snape Rd, Knodishall, Saxmundham IP17 1UT, UK	643034	260588	IP17 1UT
CRR16	12 The Fitches, Knodishall, Saxmundham IP17 1UX, UK	643389	260620	IP17 1UX

Receptor identifier	Address (NEAREST)	X	Y	Nearest postcode
CRR17	4 Snape Rd, Knodishall, Saxmundham IP17 1UT, UK	642668	260422	IP17 1UT
CRR18	Grove Rd, Saxmundham IP17 1TL, UK	642090	261299	IP17 1TL
CRR19	10 School Rd, Saxmundham IP17, UK	642557	261558	IP17 1TR

12. For the onshore cable route receptor locations, all receptor locations that were consulted upon and agreed as part of the survey methodology were sampled. Short-term attended measurements were taken at various times throughout the daytime (up to 30 minutes) and night time (up to 15 minutes) reference periods.

13. ***Table A25.3.5*** and ***Table A25.3.6*** summarises the measured baseline noise data within the onshore cable route study area for daytime and night time measurements respectively. Receptor and measurement locations are shown on ***Figure 25.2***

Table A25.3.5 Baseline Noise Data – Onshore Cable Route Study Area DAYTIME

Receptor identifier	Date	Start time	End time	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
CRR1	03/07/2018	13:06:40	13:36:40	50.4	79.7	48.9	46.2
CRR2	03/07/2018	13:43:04	14:13:04	51.8	76.8	50.9	43.0
CRR3	03/07/2018	14:17:25	14:47:25	50.4	70.8	50.4	40.9
CRR4	03/07/2018	14:52:29	15:22:29	50.0	67.2	53.8	40.3
CRR5	03/07/2018	16:10:11	16:40:11	47.0	66.7	49.1	40.8
CRR6	03/07/2018	15:33:49	16:03:49	49.0	71.7	51.2	42.1
CRR7	04/07/2018	12:20:38	12:50:38	49.1	70.8	47.9	33.5
CRR8	04/07/2018	12:54:50	13:24:50	45.3	68.4	45.7	34.7
CRR9	04/07/2018	12:28:30	12:59:47	70.7	105.8	52.2	37.2
CRR10	04/07/2018	13:41:24	14:14:00	50.5	72.8	53.8	37.5
CRR11	04/07/2018	14:26:44	14:56:44	42.1	58.6	45.9	35.3
CRR12	04/07/2018	13:38:20	14:08:20	60.1	80.5	63.5	36.8
CRR13	04/07/2018	14:18:01	14:48:01	46.8	69.2	48.9	32.7
CRR14	04/07/2018	15:27:16	15:57:16	42.6	59.3	44.8	37.0
CRR15	04/07/2018	15:12:17	15:42:17	50.2	68.0	53.8	40.3
CRR16	04/07/2018	14:51:55	15:21:55	48.4	70.9	50.0	36.7

Receptor identifier	Date	Start time	End time	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
CRR17	04/07/2018	15:54:26	16:24:26	44.0	56.6	47.0	39.3

Table A25.3.6 Baseline Noise Data – Onshore Cable Route Study Area NIGHT TIME

Receptor identifier	Date	Start time	End time	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
CRR1	04/07/2018	00:23:22	00:45:29	46.9	56.8	48.7	44.8
	05/07/2018	01:34:05	01:49:05	41.2	62.4	43.4	37.8
CRR2	04/07/2018	00:49:13	01:04:13	40.1	45.5	41.6	38.5
	05/07/2018	01:16:34	01:31:34	47.2	76.9	44.0	34.9
CRR3	04/07/2018	01:06:56	01:21:56	38.2	47.0	39.5	36.6
	05/07/2018	00:59:00	01:14:00	37.1	55.2	38.9	34.2
CRR4	04/07/2018	01:26:55	01:41:55	41.5	63.1	43.2	33.5
	05/07/2018	00:39:47	00:54:47	37.0	57.4	37.4	29.6
CRR5	04/07/2018	02:06:19	02:21:19	39.0	63.4	37.6	27.7
	05/07/2018	00:17:40	00:32:40	36.3	59.0	39.3	29.5
CRR6	04/07/2018	01:48:34	02:03:34	41.2	64.3	43.6	30.9
	05/07/2018	00:00:00	00:15:00	35.0	67.3	35.1	26.7
CRR7	04/07/2018	02:29:03	02:44:03	39.5	62.6	41.4	26.5
	04/07/2018	23:38:11	23:53:11	36.0	59.9	40.2	23.9
CRR8	04/07/2018	02:48:04	03:03:04	39.3	65.9	42.1	26.5
	04/07/2018	23:19:18	23:34:18	43.5	59.9	47.1	26.4
CRR9	04/07/2018	03:05:57	03:20:57	28.7	47.7	29.6	22.8
	04/07/2018	23:00:38	23:15:38	53.0	78.1	50.5	22.0
CRR10	04/07/2018	02:44:44	03:05:39	49.2	83.9	43.6	23.2
	04/07/2018	23:20:12	23:35:12	43.0	65.9	45	21.4
CRR11	04/07/2018	02:23:32	02:38:32	31.8	53.2	33.1	24.8
	04/07/2018	23:41:08	23:56:08	57.8	86.6	41.5	23.6
CRR12	04/07/2018	02:02:53	02:17:53	48.9	77.7	32.5	26.3
	04/07/2018	23:19:18	23:34:18	43.5	59.9	47.1	26.4
CRR13	04/07/2018	01:40:18	01:55:18	45.7	69.8	49	27.4

Receptor identifier	Date	Start time	End time	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
	05/07/2018	00:04:14	00:19:14	31.7	64.5	31.5	23.7
CRR14	04/07/2018	01:12:15	01:27:15	28.3	43.5	30.9	22.6
	05/07/2018	01:26:41	01:41:41	30.4	62	30.7	23.1
CRR15	04/07/2018	00:49:35	01:04:35	53.8	82.5	35.2	26.5
	05/07/2018	00:44:48	00:59:48	56.7	83.1	40	23.8
CRR16	04/07/2018	00:26:11	00:48:56	56.2	86.2	60.9	24.8
	05/07/2018	00:23:15	00:38:15	28.5	52.1	31.7	22.8
CRR17	04/07/2018	00:04:25	00:19:25	55.4	79.7	36.7	26.0
	05/07/2018	01:05:35	01:20:35	43.3	64.3	39.8	29.3
CRR18	03/07/2018	23:31:59	23:48:25	30.2	53.9	29.6	26.4
	04/07/2018	02:18:17	02:33:17	31.8	44	32.6	30.5
CRR19	03/07/2018	23:06:26	23:21:26	32.6	59.9	31.8	27.4
	04/07/2018	01:56:04	02:11:04	34.5	58.3	34.8	33.2

25.3.5 Onshore Substation / National Grid Infrastructure Study Area

14. A total of 12 receptor locations for the onshore substation/national grid infrastructure study area were agreed via ETG consultation and are detailed within ***Table A25.3.7***.

15. There have, however, been amendments to the agreed receptor locations compared the actual surveyed receptor locations within the onshore substation/national grid infrastructure study area. This is shown in ***Table A25.3.7***. This is due to receptor locations SSR4, SSR6 and SSR8 being unavailable due to issues with land access. Therefore, measurements were not taken at these locations. Access was also not granted at receptor SSR9; therefore, an alternative survey location was used which is discussed further below.

Table A25.3.7 Baseline Noise Monitoring Locations – Onshore Project Substation Study Area

Receptor identifier	Parish/ location	X	Y	Nearest postcode	Measurements Taken
SSR1	Grove Rd, Saxmundham IP17 1TN, UK	641720	261614	IP17 1TN	Yes
SSR2	New Haven, Friston Rd, Saxmundham IP17 1TL, UK	641841	261176	IP17 1TL	Yes

Receptor identifier	Parish/ location	X	Y	Nearest postcode	Measurements Taken
SSR3	Unnamed Road, Saxmundham IP17, UK	641231	261673	IP17 1XA	Yes
SSR4	Saxmundham Rd, Saxmundham IP17 1NJ, UK	640930	260737	IP17 1NJ	No Access
SSR5	Saxmundham Rd, Saxmundham IP17, UK	641157	260802	IP17 1PU	Yes
SSR5 NEW*	Woodside Farm, Saxmundham Road, Saxmundham IP17, UK	641220	260648	IP17 1PU	No (data taken from SSR5)
SSR6	3 Church Rd, Friston, Church Path, Saxmundham IP17 1PX, UK	641413	260559	IP17 1PX	No Access
SSR7	School Rd, Saxmundham IP17 1TN, UK	641808	261655	IP17 1TN	Yes
SSR8	Saxmundham Rd, Saxmundham IP17 1NH, UK	640338	260994	IP17 1NH	No Access
SSR9	Fristonmoor Ln, Saxmundham IP17, UK	640980	261693	IP17 1XD	Yes
SSR10	1 Friston Hall Cottages, Friston, Saxmundham IP17 1NQ, UK	639927	260384	IP17 1NQ	Yes
SSR11	77 Friston Hall Cottages, Friston, Saxmundham IP17 1NL, UK	640518	260309	IP17 1NL	Yes
SSR12	Unnamed Road, Saxmundham IP17 1NF, UK	640377	261580	IP17 1NF	Yes

*SSR5 and SSR5 NEW represent different buildings at the same receptor location. SSR5 NEW represents the closest residential building at the location, SSR5 is an uninhabited agricultural barn building.

16. At the nine substation receptor locations where access was granted, or in the case of SSR9 an alternative survey location (***Table A25.3.7***), continuous logging equipment was installed for up to one week and unattended measurements were taken in five minute reference interval periods. This approach ensured representative, repeatable background noise measurements were obtained of the existing soundscape and followed best practice in accordance with guidance contained within BS4142:2014+A1:2019.

17. Samples of L_{A90} were cross referenced against weather data recorded on site during the corresponding measurement period. All samples influenced by adverse weather conditions (representative environmental noise measurements should be undertaken during favourable weather conditions, i.e. with windspeed <5m/s and no precipitation) were considered unsuitable for noise monitoring due to noise interference) have been removed from the final results. This is evident

in the disparity between samples collected against total possible samples within the measurement analysis tables (***Table A25.3.8*** to ***Table A25.3.16***).

18. Statistical analysis (following guidance in BS4142:2014+A1:2019) methods have been applied to the resulting data sets in order to assess the background noise levels with a greater degree of scrutiny.

19. ***Table A25.3.8*** to ***Table A25.3.16*** contain a summary of the long term measured baseline noise data within the onshore substation/national grid infrastructure study area at the nine receptor locations.

20. Graphical outputs of the statistical analysis used for determining repeatable L_{A90} (background) noise levels and also detailing the period noise profile at each long term measurement location are included in ***section 25.3.7*** of this appendix.

Table A25.3.8 Baseline Noise Data Analysis – SSR1 (LONG TERM) 5-minute period

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Day 03/07/18 to 12/07/18	1761	1761	100	>32.5, <33.5	33.3	29.5	37.1
Night 03/07/18 to 12/07/18	864	864	100	>32.5, <33.5	29.5	23.7	35.4

21. Receptor SSR2 is the closest in proximity to the proposed East Anglia TWO onshore infrastructure. Baseline measurements were obtained during the survey over a continuous 5-minute averaging period, with subsequent background sound levels L_{90} analysis determined in accordance with BS4142:2014+A1:2019.

22. The operational noise requirement of the draft DCO uses a reference 5-minute period. ***Table A25.3.9*** provides the 5-minute period baseline data sets obtained from the L_{90} statistical analysis.

23. Graphical outputs of the statistical analysis used for determining repeatable L_{A90} (background) noise levels and also detailing the period noise profile at each long term measurement location are included in ***section 25.3.7*** of this appendix.

24. Statistical analysis (shown as a graphical output) of the 5-minute averaging periods for the night time L_{A90} (background) noise levels obtained at SSR2 details 2 peaks, evident at an upper 36.5dBA and lower 28.5dBA with the 5-minute

dataset. Therefore, in the assessment, provided in ***Appendix 25.5 and Chapter 25 Noise and Vibration,*** the average value (5-minute period) is utilised for the BS4142:2014+A1:2019 operational noise assessment.

Table A25.3.9 Baseline Noise Data Analysis – SSR2 (LONG TERM) 5-minute period

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Day 26/06/18 to 02/07/18	1122	1032	92	>36.5, <37.5	37.1	33.5	40.7
Night 26/06/18 to 02/07/18	576	576	100	>26.5, <27.5	31.5	27.2	35.8

Table A25.3.10 Baseline Noise Data Analysis – SSR3 (LONG TERM) 5-minute period

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Day 04/07/18 to 12/07/18	1485	1485	100	>29.5, <30.5	32.2	27.8	36.5
Night 04/07/18 to 12/07/18	768	768	100	>23.5, <24.5	26.1	21.7	30.5

25. Receptor SSR5 is the closest in proximity to the proposed East Anglia ONE North onshore infrastructure. Baseline measurements were obtained during the survey over a continuous 5-minute averaging period, with subsequent background sound levels L_{90} analysis determined in accordance with BS4142:2014+A1:2019.

26. The operational noise requirement of the draft DCO uses a reference 5-minute period. ***Table A25.3.11*** provides 5-minute period baseline data sets obtained from the L_{90} statistical analysis.

27. Graphical outputs of the statistical analysis used for determining repeatable L_{A90} (background) noise levels and also detailing the period noise profile at each long term measurement location are included in ***section 25.3.7*** of this appendix.

28. Statistical analysis (shown as a graphical output) of the 5-minute averaging period for the night time L_{A90} (background) noise levels obtained at SSR5 highlights more samples around the modal value of >28.5 to <29.5 category. Therefore, in the assessment, provided in ***Appendix 25.5 and Chapter 25 Noise and Vibration,*** the modal value (5-minute period) is utilised for the BS4142:2014+A1:2019 operational noise assessment.

Table A25.3.11 Baseline Noise Data Analysis – SSR5 (LONG TERM) 5-minute period

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Day 26/06/18 to 03/07/18	1267	1119	88	>33.5, <34.5	33.6	30.1	37.0
Night 26/06/18 to 03/07/18	672	669	99.5	>28.5, <29.5	27.9	24.7	31.0

Table A25.3.12 Baseline Noise Data Analysis – SSR7 (LONG TERM) 5-minute period

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Day 26/06/18 to 03/07/18	1345	1185	88	>36.5, <37.5	36.7	34.2	39.3
Night 26/06/18 to 03/07/18	672	669	99.5	>34.5, <35.5	35.6	32.4	38.8

Table A25.3.13 Baseline Noise Data Analysis – SSR9 (LONG TERM) 5-minute period

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Day 03/07/18 to 12/07/18	1755	1755	100	>32.5, <33.5	33.1	28.4	37.8

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Night 03/07/18 to 12/07/18	864	864	100	>17.5, <18.5	24.2	19.5	28.9

29. A review of the measurement location chosen to represent SSR9 (as land access was not available) during the June to July 2018 baseline noise survey was undertaken. It was concluded that the measurement position was not representative of the soundscape at the residential dwelling(s) at SSR9 intended as the noise sensitive receptor. The following points were considered to justify this conclusion:

- The survey measurement location is approximately 350m further north than the most exposed façade of the residential receptor at SSR9 to the proposed onshore substation infrastructure;
- The survey equipment was installed on the opposite side of the residential receptor at SSR9 to the proposed onshore substation infrastructure; therefore, the amenity space and most exposed façade at SSR9 is located on the opposite side of the building to the measurement position; and
- The survey location does not take into account the total effect from any at receptor background noise emanating from the existing overhead lines.

30. Therefore, a review of the other noise survey measurement locations was undertaken which established that:

- SSR3 and SSR12 are considered to be a suitable proxy location for SSR9;
- The vegetation surrounding SSR3 is similar in density and type as found at the amenity space and building to the left-hand side at SSR9;
- The vegetation surrounding SSR12 is similar in density and type as found at the amenity space and building to the right-hand side at SSR9;
- All locations are surrounded by agricultural land use;
- SSR3 and SSR12 are accessed by low use tracks similar to SSR9; and
- SSR3 is a similar set back distance from the existing overhead lines to SSR9.

31. Survey measurement positions at SSR12 and SSR3 are both considered representative as a proxy location for the background (L_{90}) at SSR9 for inclusion in the operational phase noise assessment. In order to provide a conservative approach, the lower background (L_{90}), (determined as the modal value of 29dBA) measured at SSR12 was deemed appropriate and used in the operational phase noise assessment provided in ***Appendix 25.5 and Chapter 25 Noise and Vibration***.

Table A25.3.14 Baseline Noise Data Analysis – SSR10 (LONG TERM) 5-minute period

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Day 03/07/18 to 12/07/18	1755	1755	100	>32.5, <33.5	34.0	30.0	38.1
Night 03/07/18 to 12/07/18	864	864	100	>36.5, <37.5	31.3	25.6	37.0

Table A25.3.15 Baseline Noise Data Analysis – SSR11 (LONG TERM) 5-minute period

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Day 26/06/18 to 03/07/18	1338	1338	100	>37.5, <38.5	35.9	32.3	39.5
Night 26/06/18 to 03/07/18	672	672	100	>32.5, <33.5	29.8	25.5	34.1

Table A25.3.16 Baseline Noise Data Analysis – SSR12 (LONG TERM) 5-minute period

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Day 26/06/18 to 03/07/18	1332	1173	88	>32.5, <33.5	32.3	29.1	35.5

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Night 26/06/18 to 03/07/18	672	669	99.6	>28.5, <29.5	25.9	22.1	29.8

25.3.6 Conclusion

32. In order to characterise the existing noise climate within the onshore development area, a baseline noise survey was undertaken at 35 agreed sensitive receptor locations in the vicinity of the onshore development area, encompassing landfall, onshore cable route and onshore substation/National Grid infrastructure study areas.

33. Amendments to the agreed methodology were made at the onshore substation/National Grid infrastructure study area due to access restrictions. Therefore, baseline noise surveys were undertaken at 32 receptor locations.

34. Measured data were collated for each receptor location with L_{Aeq}, L_{A90}, L_{A10}, L_{AFmax} levels determined from each specific measurement period. Background noise levels used in the assessment were obtained from the baseline measurements. The background noise levels for the unattended measurement periods were assessed using statistical analysis of the measured L_{A90} values.

35. Representative and repeatable background noise levels useable in the assessment at each receptor location within the onshore substation/national grid infrastructure study area have been derived from long term and short-term measurements based on the methodology of BS4142:2014+A1:2019.

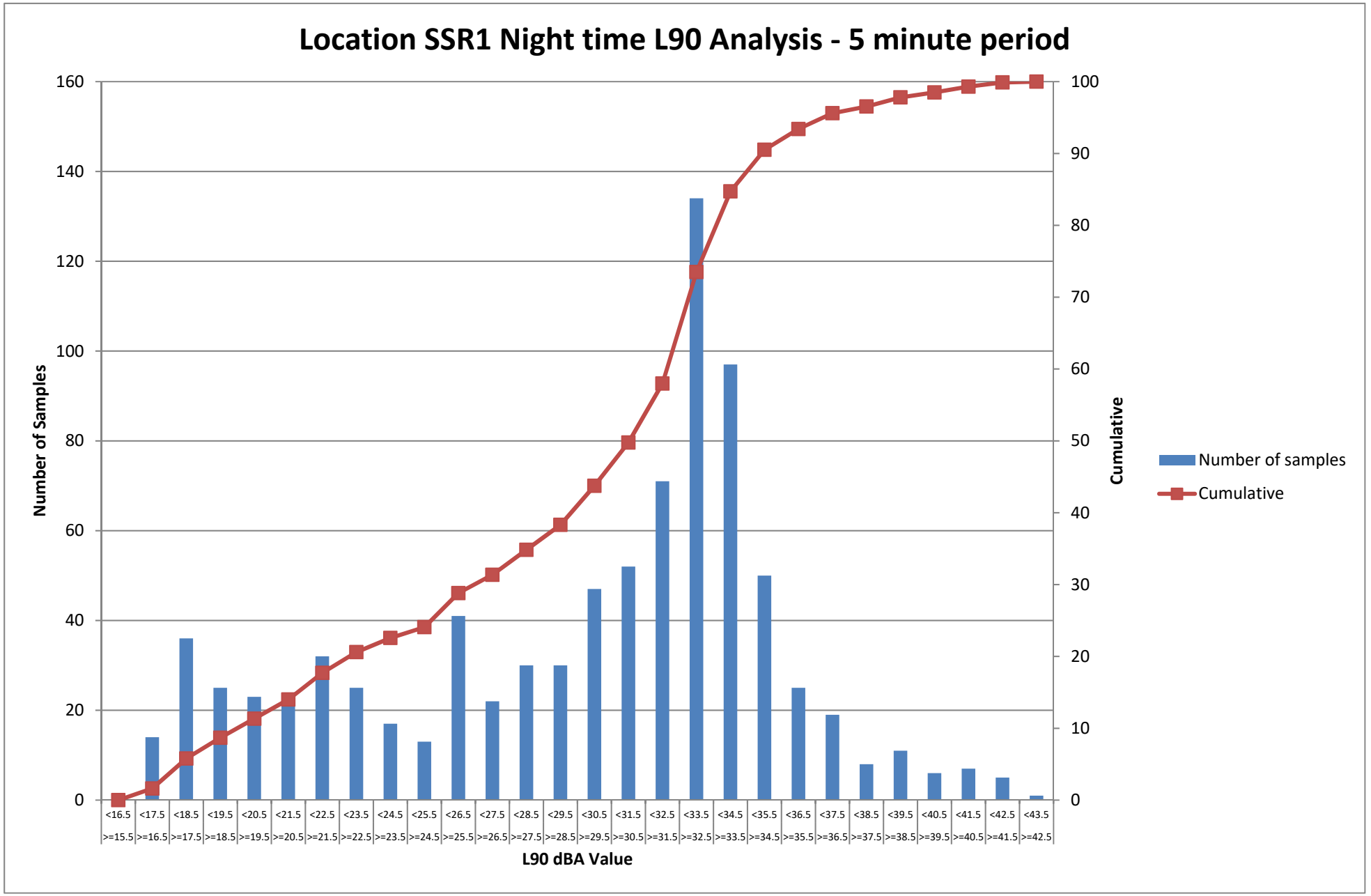
36. Analysis of the measured baseline data obtained at receptors SSR2 and SSR5 was undertaken to correlate with the 5-minute reference period of the operational noise requirement of the draft DCO. This analysis of the data demonstrated that the L_{90} at each of these receptors when using the 5-minute period would represent a robust approach for inclusion in the operational phase assessment.

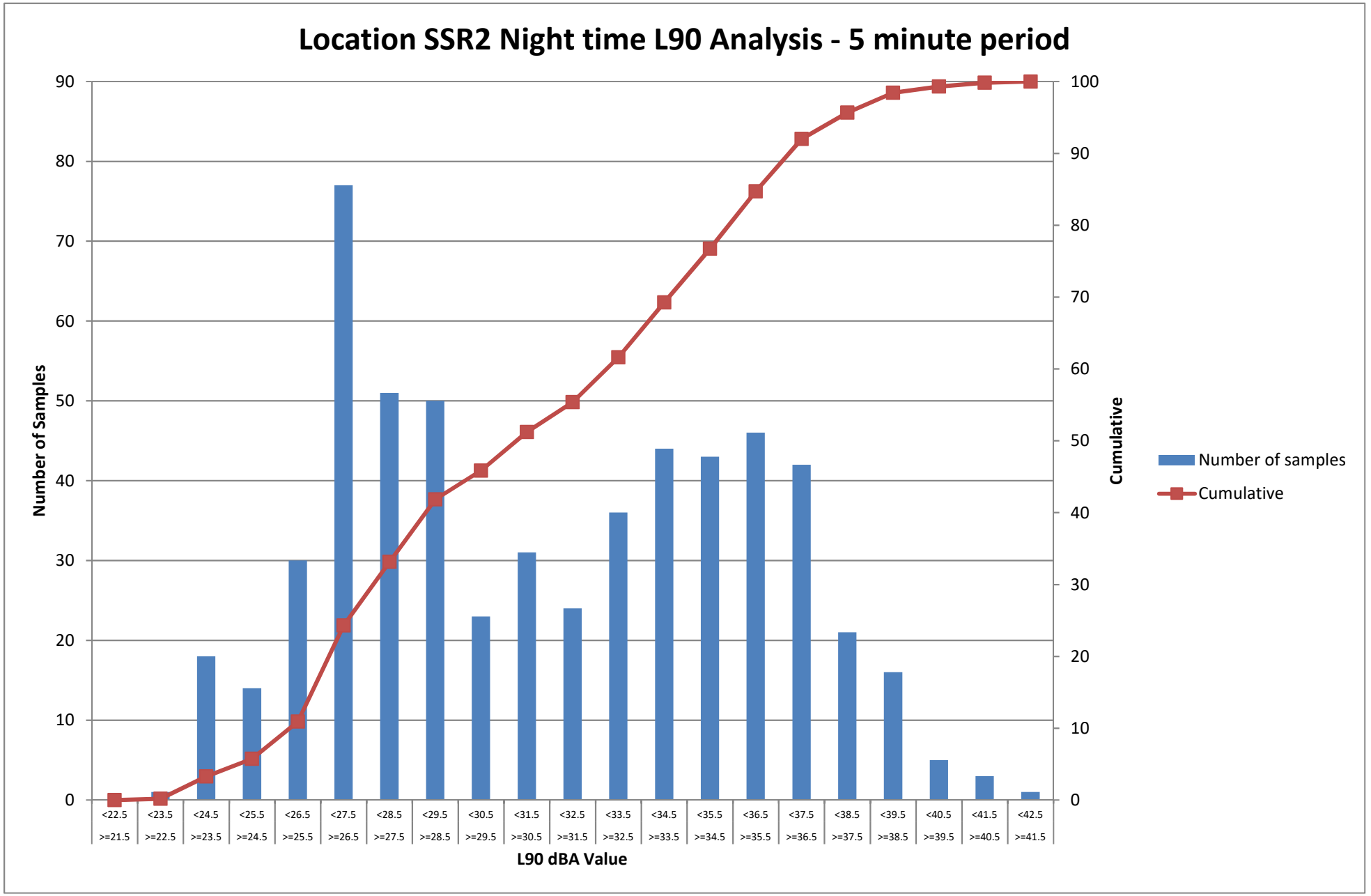
37. The baseline noise surveys conducted across the three study areas were considered representative of the onshore development area as a whole.

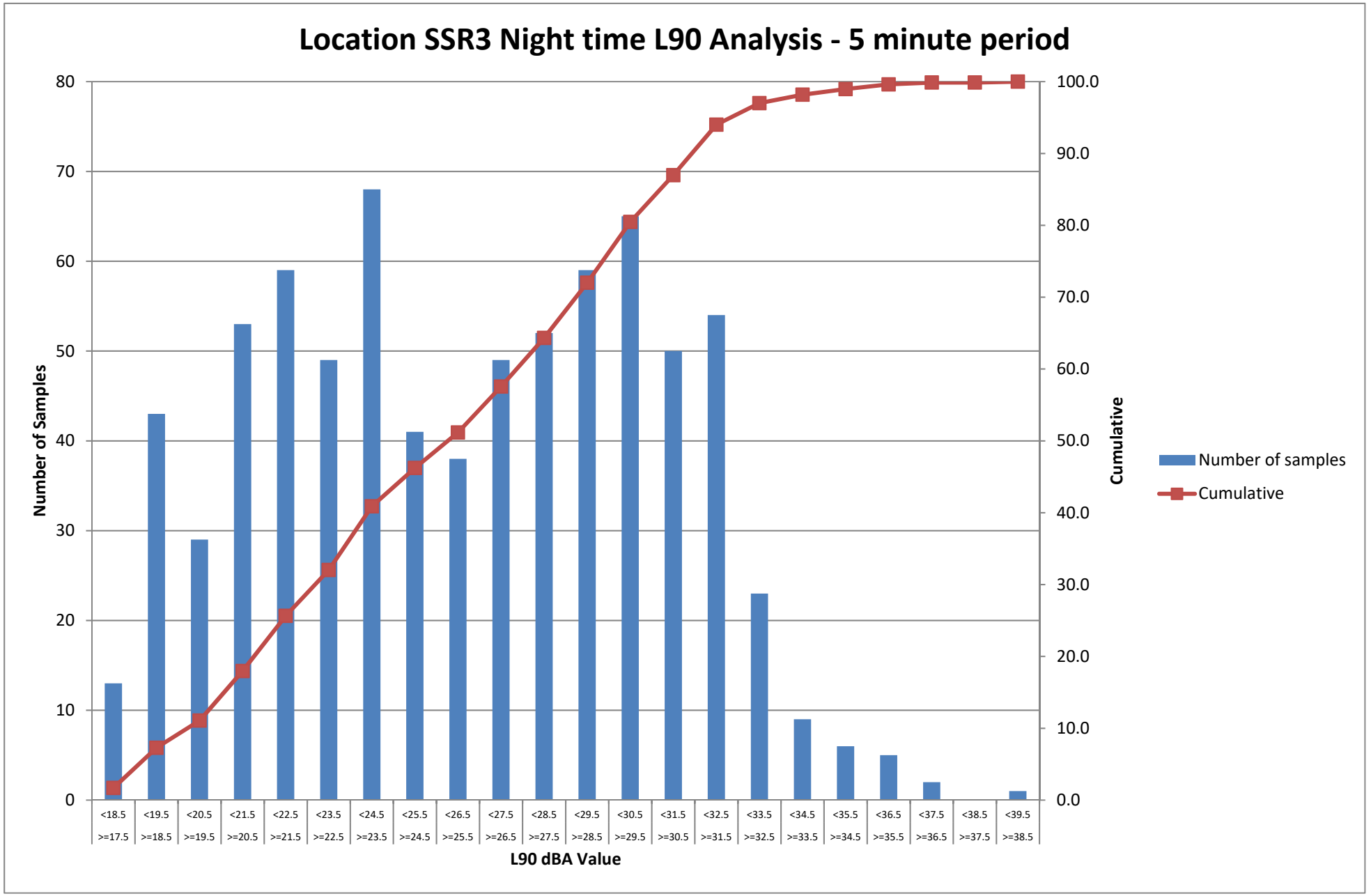
38. The attended measurements at the landfall and along the cable route were used to determine the ABC threshold category (in accordance with BS5228:2009+A1:2014) for the construction phase in the ES Noise and Vibration

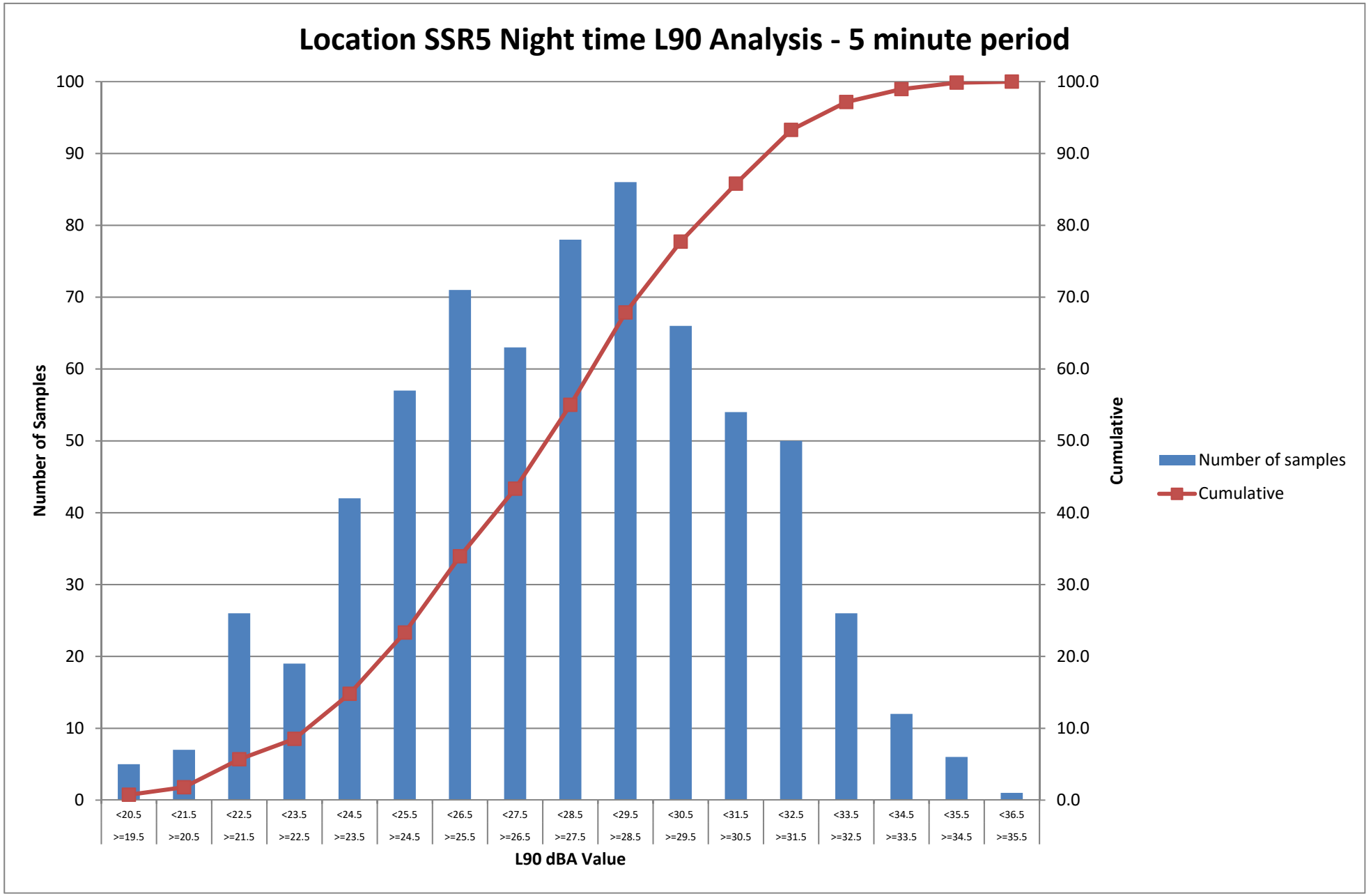
chapter. The attended and unattended measurements obtained at the onshore substation study area were used in assessing operational noise from the onshore substation infrastructure for the proposed East Anglia TWO project and proposed East Anglia ONE North project in accordance with the methodology detailed in BS4142:2014+A1:2019.

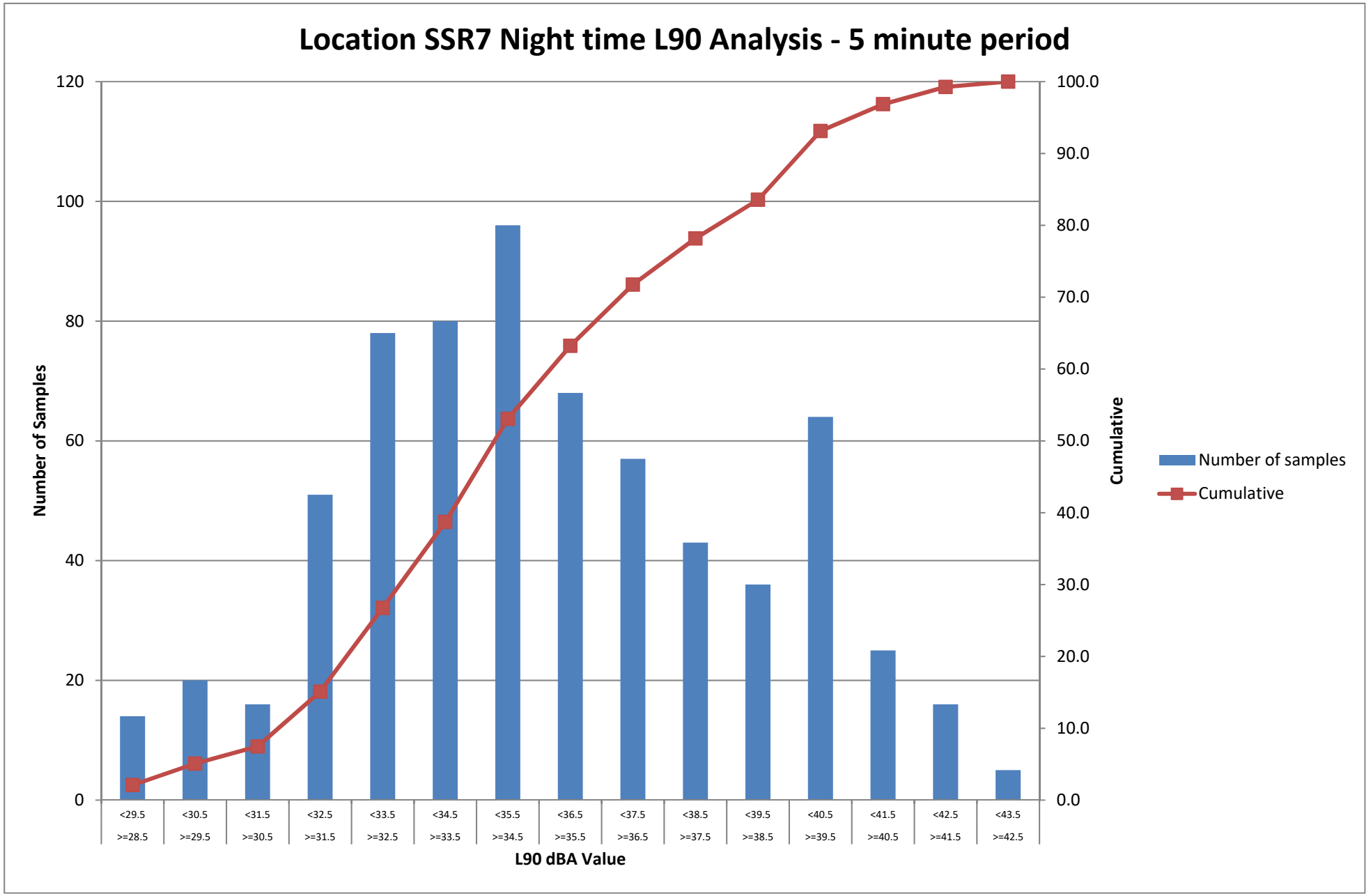
25.3.7 Graphs – Long Term Unattended Onshore Substation Receptor Measurement Locations

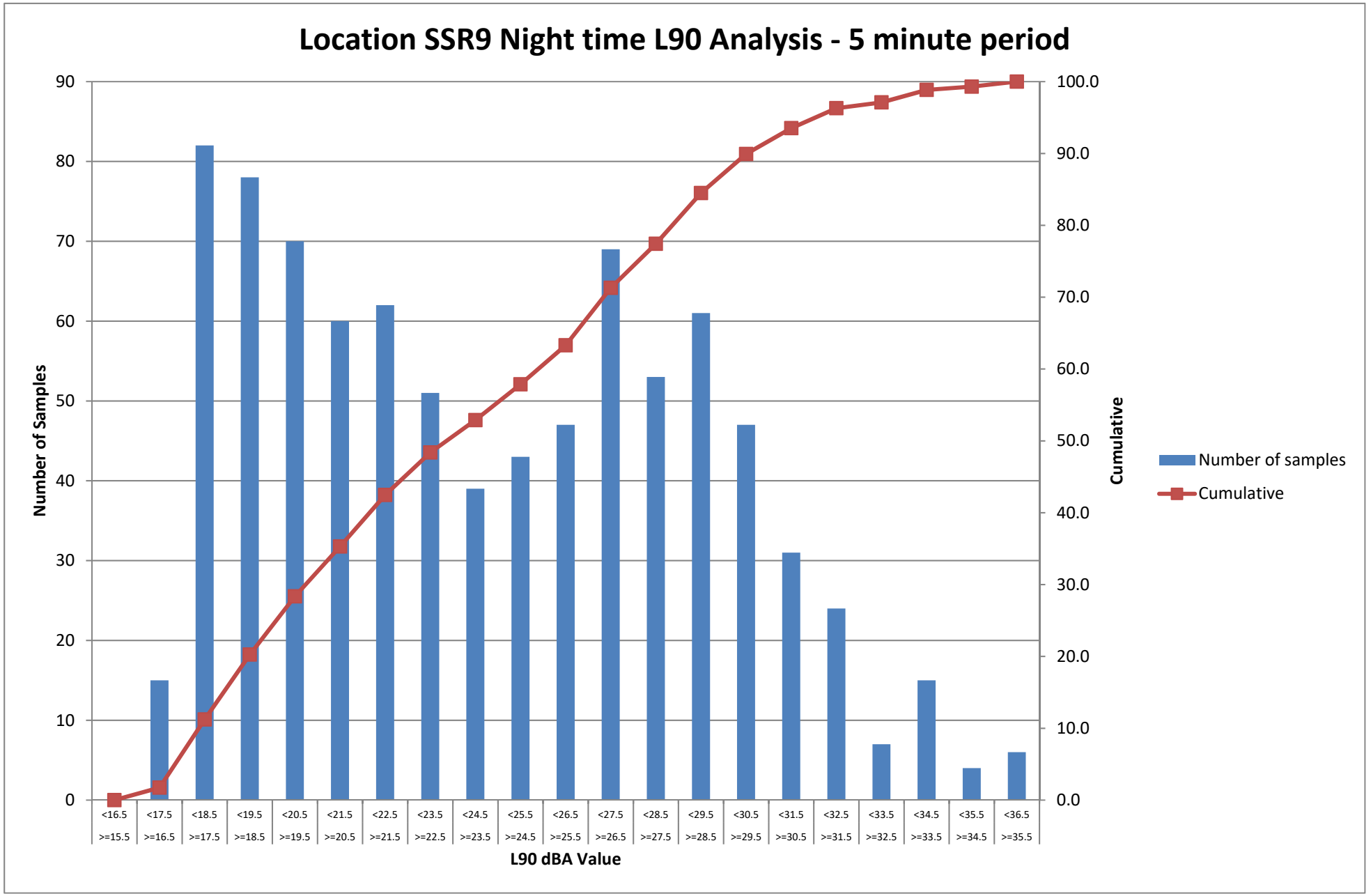

Location SSR1 Night time L90 Analysis - 5 minute period
Number of Samples
Cumulative
L90 dBA Value
Number of samples
Cumulative
0
20
40
60
80
100
120
140
160
0
10
20
30
40
50
60
70
80
90
100
<16.5 >=15.5
<17.5 >=16.5
<18.5 >=17.5
<19.5 >=18.5
<20.5 >=19.5
<21.5 >=20.5
<22.5 >=21.5
<23.5 >=22.5
<24.5 >=23.5
<25.5 >=24.5
<26.5 >=25.5
<27.5 >=26.5
<28.5 >=27.5
<29.5 >=28.5
<30.5 >=29.5
<31.5 >=30.5
<32.5 >=31.5
<33.5 >=32.5
<34.5 >=33.5
<35.5 >=34.5
<36.5 >=35.5
<37.5 >=36.5
<38.5 >=37.5
<39.5 >=38.5
<40.5 >=39.5
<41.5 >=40.5
<42.5 >=41.5
<43.5 >=42.5

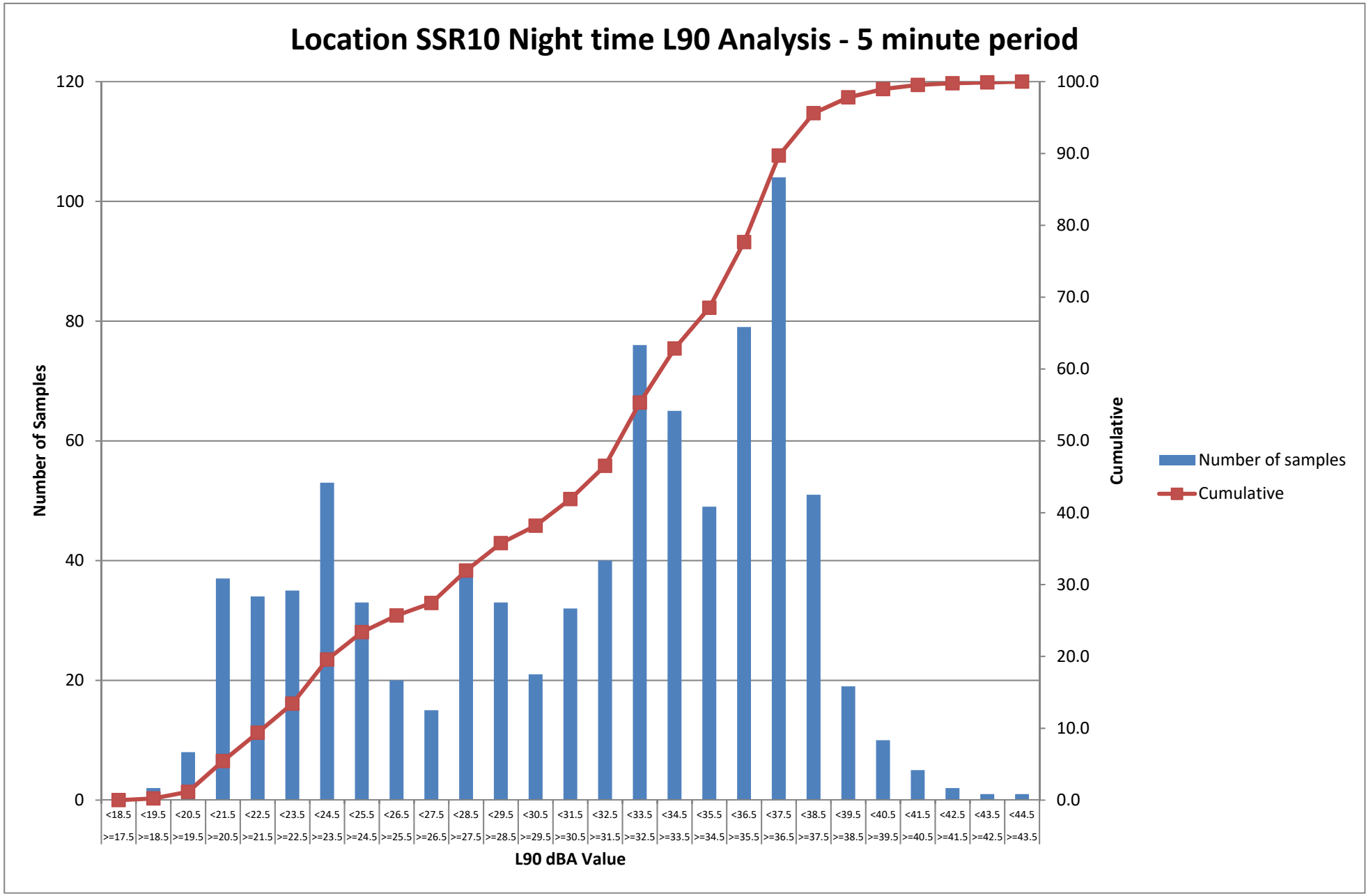

Location SSR2 Night time L90 Analysis - 5 minute period
Number of Samples
Cumulative
L90 dBA Value
Number of samples
Cumulative
0
10
20
30
40
50
60
70
80
90
100
<22.5 >=21.5
<23.5 >=22.5
<24.5 >=23.5
<25.5 >=24.5
<26.5 >=25.5
<27.5 >=26.5
<28.5 >=27.5
<29.5 >=28.5
<30.5 >=29.5
<31.5 >=30.5
<32.5 >=31.5
<33.5 >=32.5
<34.5 >=33.5
<35.5 >=34.5
<36.5 >=35.5
<37.5 >=36.5
<38.5 >=37.5
<39.5 >=38.5
<40.5 >=39.5
<41.5 >=40.5
<42.5 >=41.5

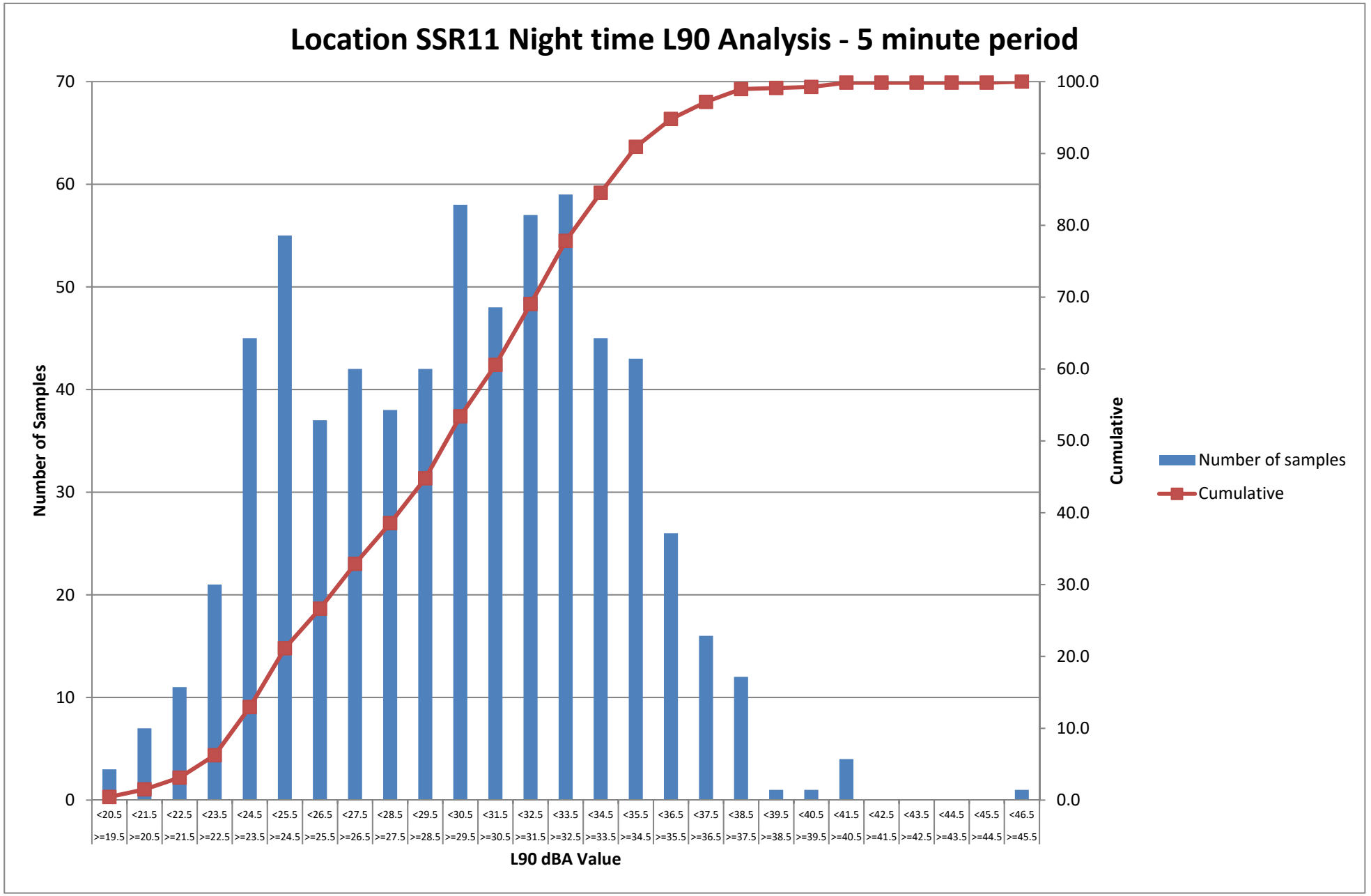

Location SSR3 Night time L90 Analysis - 5 minute period
Number of Samples
Cumulative
L90 dBA Value
Number of samples
Cumulative
0
10
20
30
40
50
60
70
80
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
<18.5 >=17.5
<19.5 >=18.5
<20.5 >=19.5
<21.5 >=20.5
<22.5 >=21.5
<23.5 >=22.5
<24.5 >=23.5
<25.5 >=24.5
<26.5 >=25.5
<27.5 >=26.5
<28.5 >=27.5
<29.5 >=28.5
<30.5 >=29.5
<31.5 >=30.5
<32.5 >=31.5
<33.5 >=32.5
<34.5 >=33.5
<35.5 >=34.5
<36.5 >=35.5
<37.5 >=36.5
<38.5 >=37.5
<39.5 >=38.5

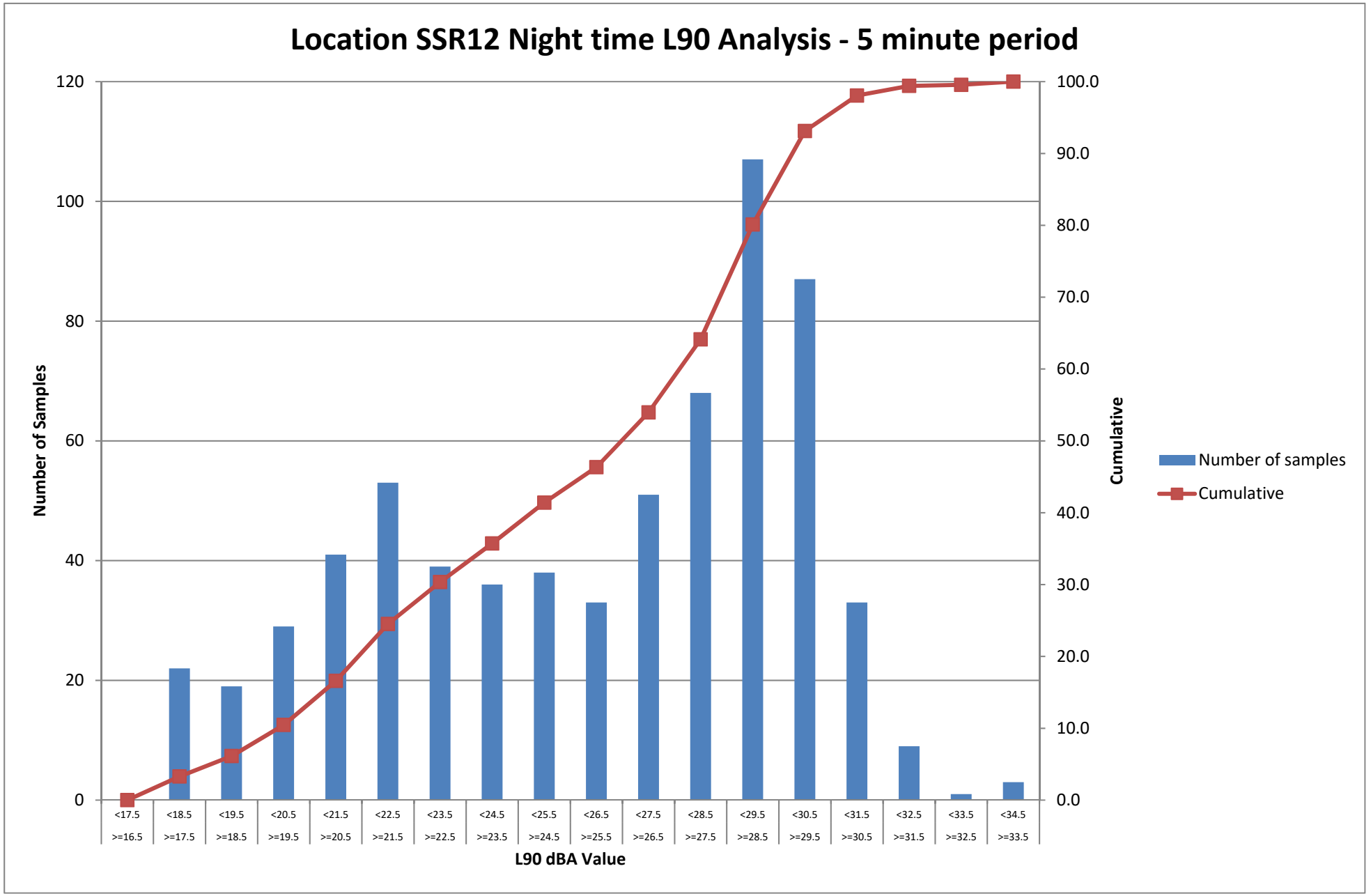

Location SSR5 Night time L90 Analysis - 5 minute period
Number of Samples
Cumulative
L90 dBA Value
Number of samples
Cumulative
100
90
80
70
60
50
40
30
20
10
0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
<20.5 >=19.5
<21.5 >=20.5
<22.5 >=21.5
<23.5 >=22.5
<24.5 >=23.5
<25.5 >=24.5
<26.5 >=25.5
<27.5 >=26.5
<28.5 >=27.5
<29.5 >=28.5
<30.5 >=29.5
<31.5 >=30.5
<32.5 >=31.5
<33.5 >=32.5
<34.5 >=33.5
<35.5 >=34.5
<36.5 >=35.5


Location SSR7 Night time L90 Analysis - 5 minute period
Number of Samples
Cumulative
L90 dBA Value
120
100
80
60
40
20
0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
<29.5 >=28.5
<30.5 >=29.5
<31.5 >=30.5
<32.5 >=31.5
<33.5 >=32.5
<34.5 >=33.5
<35.5 >=34.5
<36.5 >=35.5
<37.5 >=36.5
<38.5 >=37.5
<39.5 >=38.5
<40.5 >=39.5
<41.5 >=40.5
<42.5 >=41.5
<43.5 >=42.5
Number of samples
Cumulative


Location SSR9 Night time L90 Analysis - 5 minute period
Number of Samples
Cumulative
L90 dBA Value
Number of samples
Cumulative
0
10
20
30
40
50
60
70
80
90
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
<16.5 >=15.5
<17.5 >=16.5
<18.5 >=17.5
<19.5 >=18.5
<20.5 >=19.5
<21.5 >=20.5
<22.5 >=21.5
<23.5 >=22.5
<24.5 >=23.5
<25.5 >=24.5
<26.5 >=25.5
<27.5 >=26.5
<28.5 >=27.5
<29.5 >=28.5
<30.5 >=29.5
<31.5 >=30.5
<32.5 >=31.5
<33.5 >=32.5
<34.5 >=33.5
<35.5 >=34.5
<36.5 >=35.5


Location SSR10 Night time L90 Analysis - 5 minute period
Number of Samples
Cumulative
L90 dBA Value
Number of samples
Cumulative
120
100
80
60
40
20
0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
<18.5 >=17.5
<19.5 >=18.5
<20.5 >=19.5
<21.5 >=20.5
<22.5 >=21.5
<23.5 >=22.5
<24.5 >=23.5
<25.5 >=24.5
<26.5 >=25.5
<27.5 >=26.5
<28.5 >=27.5
<29.5 >=28.5
<30.5 >=29.5
<31.5 >=30.5
<32.5 >=31.5
<33.5 >=32.5
<34.5 >=33.5
<35.5 >=34.5
<36.5 >=35.5
<37.5 >=36.5
<38.5 >=37.5
<39.5 >=38.5
<40.5 >=39.5
<41.5 >=40.5
<42.5 >=41.5
<43.5 >=42.5
<44.5 >=43.5


Location SSR11 Night time L90 Analysis - 5 minute period
Number of Samples
Cumulative
L90 dBA Value
Number of samples
Cumulative
0
10
20
30
40
50
60
70
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
<20.5 >=19.5
<21.5 >=20.5
<22.5 >=21.5
<23.5 >=22.5
<24.5 >=23.5
<25.5 >=24.5
<26.5 >=25.5
<27.5 >=26.5
<28.5 >=27.5
<29.5 >=28.5
<30.5 >=29.5
<31.5 >=30.5
<32.5 >=31.5
<33.5 >=32.5
<34.5 >=33.5
<35.5 >=34.5
<36.5 >=35.5
<37.5 >=36.5
<38.5 >=37.5
<39.5 >=38.5
<40.5 >=39.5
<41.5 >=40.5
<42.5 >=41.5
<43.5 >=42.5
<44.5 >=43.5
<45.5 >=44.5
<46.5 >=45.5


Location SSR12 Night time L90 Analysis - 5 minute period
Number of Samples
Cumulative
L90 dBA Value
Number of samples
Cumulative
120
100
80
60
40
20
0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
<17.5 >=16.5
<18.5 >=17.5
<19.5 >=18.5
<20.5 >=19.5
<21.5 >=20.5
<22.5 >=21.5
<23.5 >=22.5
<24.5 >=23.5
<25.5 >=24.5
<26.5 >=25.5
<27.5 >=26.5
<28.5 >=27.5
<29.5 >=28.5
<30.5 >=29.5
<31.5 >=30.5
<32.5 >=31.5
<33.5 >=32.5
<34.5 >=33.5

25.3.8 References

BSI. (2003) British Standards Institution [BS] 7445-1:2003 - Description and measurement of environmental noise. Guide to quantities and procedures. BSI, London.

BSI. (2003) British Standards Institution [BS] EN 61672-1:2003 Electroacoustics. Sound level meters. Specifications. BSI, London.

BSI. (2019) British Standards Institution [BS] 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound, BSI, London.

BSI. (2014) British Standards Institution [BS] 5228-1:2009+A1:2014 “Code of practice for noise and vibration control on construction and open sites – Part 1: Noise”.

BSI. (2014) British Standards Institution [BS] 5228-2: 2009+A1:2014 “Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration”.

International Organization for Standardization. (1996). ISO9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation. ISO, Switzerland.

This page is intentionally blank