REPORT

Boston Alternative Energy Facility

Appendix 10.1: Baseline Noise Survey

Client: Alternative Use Boston Projects Ltd

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DNV·GL
ISO 9001 = ISO 14001
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Disclaimer

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A10 Appendix 10.1: Baseline Noise Survey

A10.1 Introduction

A10.1.1 A baseline sound survey was undertaken to characterise the existing soundscape within the Boston Alternative Energy Facility (the Facility) Study Area at sensitive receptor locations close to the Application Site boundary (agreed with Boston Borough Council (BBC) at a consultation meeting 7th November 2018) between 23rd and 28th November 2018.

A10.1.2 The surveys were conducted in accordance with current guidance including BS4142:2014 method for rating and assessing industrial and commercial sound and BS7445:2003 description and measurement of environmental noise. This data will be used within the assessment for the Facility.

A10.2 Measured Baseline Sound Data

A10.2.1 Baseline noise measurements were conducted at the nearest identified sensitive receptors and adjacent corresponding site boundary locations, detailed in **Table A10.1** and **Figure 10.2**.

Table A10.1 Baseline Noise Monitoring Locations

Usage	Location	Baseline Measurement Location ID	Receptor Identifier
Residential	Ivy House, Slippery Gowt Lane	ST R1	R1
Residential	Anacary, Marsh Lane	ST R2	R2
Residential	Beeston Farm, Nursery Road	ST R3	R3
Residential	Lodge/ Bank View, Powell Street	ST R4	R4
Residential	No. 21, River Way	ST R5	R5
Residential	No. 35 and 37 Rectory Road	ST R6	R6

A10.2.2 The noise measurements were conducted with Sound Level Meters (SLMs) mounted on tripods at a height of between 1.2 m and 1.5 m above ground level and 3.5 m away from any reflecting surface other than the ground, i.e. in free-field conditions. The instruments were calibrated before and after the survey using a portable calibrator. No significant deviation in the calibration level was observed.

A10.2.3 Portable weather stations were deployed alongside noise monitoring equipment during both survey periods at ST R2. In general surveys were conducted during

periods of weather favourable for noise measurements, i.e. no rainfall and wind speeds below 5 m/s.

A10.2.4 The equivalent continuous sound pressure level (L$_{Aeq}$) is the conventional descriptor of environmental noise and is defined below:

$$L_{eq,T} = 10 \times \log\left[\frac{1}{T}\int \frac{\rho^2(t)\partial t}{\rho_0^2}\right] dB$$

A10.2.5 Noise measurements are normally taken with an A-weighting (denoted by a subscript 'A') to approximate the frequency response of the human ear.

A10.2.6 For all measurement locations during the noise survey SLMs were set to record the following:

- L$_{Aeq}$ – the equivalent continuous sound pressure level over the measurement period. This parameter was standardised as pertinent for land use within BS 7445;

- L$_{Amax}$ – the maximum sound pressure level occurring within the defined measurement period;

- L$_{A90}$ – the sound pressure level exceeded for 90% of the measurement period and is indicative of the background noise level; and

- L$_{A10}$ - the sound pressure level exceeded for 10% of the measurement period. The L$_{A10}$ index is used within the Calculation of Road Traffic Noise (CRTN) as an appropriate descriptor of traffic noise.

Data Analysis

A10.2.7 Samples of L$_{A90}$ were cross-referenced against weather data recorded on site during the measurement period. Representative environmental noise measurements should be undertaken during favourable weather conditions, i.e. with windspeed <5 m/s and no precipitation.

A10.2.8 All samples influenced by adverse weather conditions (and therefore 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.

A10.2.9 Statistical analysis methods have been applied to the resulting data sets to assess the background noise levels with a greater degree of scrutiny.

A10.2.10 **Table A10.2** to **Table A10.13** contain a summary of the long term measured baseline noise data (L_{Aeq}, L_{A10}, L_{AFmax}) at the receptor locations and a summary of the prevailing L_{A90} background analysis.

Table A10.2 Baseline Noise Data Analysis – ST R1 (LONG TERM)

Period and Date	Duration (hh:mm)	L_{Aeq} (dB)	L_{A10} (dB)	L_{AFmax} (dB)
Day 23/11/18	04:35	44.2	38.7	88.4
Night 23/11/18	08:00	36.8	34.6	66.7
Day 24/11/18	16:00	39.4	37.8	75.9
Night 24/11/18	08:00	35.3	32.6	65.6
Day 25/11/18	16:00	39.8	38.2	76.8
Night 25/11/18	08:00	40.2	39.7	67.7
Day 26/11/18	16:00	49.0	46.3	82.4
Night 26/11/18	08:00	40.6	38.5	67.9
Day 27/11/18	16:00	49.7	50.3	81.5
Night 27/11/18	08:00	41.2	41.2	69.0
Day 28/11/18	07:05	51.2	54.4	79.1

Table A10.3 Baseline L_{A90} Noise Data Analysis – ST R1 (LONG TERM)

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Day 23/11/18 to 28/11/18	81	79	98	30	35.7	29.0	42.3
Night 23/11/18 to 28/11/18	160	154	96	39	37.3	31.8	42.9

Table A10.4 Baseline Noise Data Analysis – ST R2 (LONG TERM)

Period and Date	Duration (hh:mm)	L_{Aeq} (dB)	L_{A10} (dB)	L_{AFmax} (dB)
Day 23/11/18	04:35	45.9	40.4	78.1
Night 23/11/18	08:00	34.7	35.1	60.4
Day 24/11/18	16:00	45.6	39.9	77.9
Night 24/11/18	08:00	33.6	33.5	59.0
Day 25/11/18	16:00	42.9	40.8	83.2
Night 25/11/18	08:00	38.6	38.8	58.0
Day 26/11/18	16:00	48.0	46.5	80.6
Night 26/11/18	08:00	38.9	40.1	56.8
Day 27/11/18	16:00	49.6	50.3	77.9
Night 27/11/18	08:00	38.3	39.2	60.8
Day 28/11/18	07:05	49.9	53.1	77.8

Table A10.5 Baseline L_{A90} Noise Data Analysis – ST R2 (LONG TERM)

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Day 23/11/18 to 28/11/18	80	77	96	32	37.3	32.3	42.3
Night 23/11/18 to 28/11/18	154	148	96	40	37.3	33.2	41.4

Table A10.6 Baseline Noise Data Analysis – ST R3 (LONG TERM)

Period and Date	Duration (hh:mm)	L_{Aeq} (dB)	L_{A10} (dB)	L_{AFmax} (dB)
Day 23/11/18	06:05	46.2	43.5	84.4
Night 23/11/18	08:00	40.0	40.2	64.6
Day 24/11/18	16:00	42.6	41.6	74.1
Night 24/11/18	08:00	38.1	36.6	69.9
Day 25/11/18	16:00	45.4	44.5	81.2
Night 25/11/18	08:00	43.0	42.1	71.5
Day 26/11/18	16:00	49.9	48.3	80.9
Night 26/11/18	08:00	42.8	43.3	63.8
Day 27/11/18	16:00	51.9	53.1	87.5
Night 27/11/18	08:00	44.1	45.2	69.0
Day 28/11/18	07:05	53.0	55.5	75.8

Table A10.7 Baseline L_{A90} Noise Data Analysis – ST R3 (LONG TERM)

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Day 23/11/18 to 28/11/18	78	76	97	40	41.3	35.9	46.7
Night 23/11/18 to 28/11/18	160	154	96	43	41.4	37.2	45.7

Table A10.8 Baseline Noise Data Analysis – ST R4 (LONG TERM)

Period and Date	Duration (hh:mm)	L_{Aeq} (dB)	L_{A10} (dB)	L_{AFmax} (dB)
Day 23/11/18	04:35	53.4	48.3	88.8
Night 23/11/18	08:00	47.2	39.0	81.7
Day 24/11/18	16:00	53.4	47.7	88.3
Night 24/11/18	08:00	42.7	38.3	76.1
Day 25/11/18	16:00	48.8	47.1	78.8
Night 25/11/18	08:00	54.7	49.8	81.3
Day 26/11/18	16:00	57.4	55.2	84.6
Night 26/11/18	08:00	54.1	49.2	80.1
Day 27/11/18	16:00	57.0	56.0	90.8
Night 27/11/18	08:00	54.8	49.7	82.5
Day 28/11/18	07:05	57.7	57.4	89.9

Table A10.9 Baseline L_{A90} Noise Data Analysis – ST R4 (LONG TERM)

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Day 23/11/18 to 28/11/18	77	72	94	48	43.9	39.2	48.7
Night 23/11/18 to 28/11/18	160	154	96	46	45.1	37.4	52.8

Table A10.10 Baseline Noise Data Analysis – ST R5 (LONG TERM)

Period and Date	Duration (hh:mm)	L_{Aeq} (dB)	L_{A10} (dB)	L_{AFmax} (dB)
Day 23/11/18	04:35	54.8	47.5	87.9
Night 23/11/18	08:00	50.7	43.6	85.0
Day 24/11/18	16:00	55.9	49.5	88.8
Night 24/11/18	08:00	44.9	42.4	77.1
Day 25/11/18	16:00	51.4	47.8	79.6
Night 25/11/18	08:00	57.5	51.8	85.1
Day 26/11/18	16:00	61.1	56.8	88.5
Night 26/11/18	08:00	57.6	50.0	88.1
Day 27/11/18	16:00	60.0	57.1	91.9
Night 27/11/18	08:00	57.3	49.8	88.4
Day 28/11/18	07:05	63.2	60.8	90.3

Table A10.11 Baseline L_{A90} Noise Data Analysis – ST R5 (LONG TERM)

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Day 23/11/18 to 28/11/18	78	76	97	43	44.1	41.6	46.7
Night 23/11/18 to 28/11/18	160	154	96	42	47.5	41.1	53.9

Table A10.12 Baseline Noise Data Analysis – ST R6 (LONG TERM)

Period and Date	Duration (hh:mm)	L_{Aeq} (dB)	L_{A10} (dB)	L_{AFmax} (dB)
Day 23/11/18	04:35	41.9	43.3	64.7
Night 23/11/18	08:00	39.4	39.8	67.3
Day 24/11/18	16:00	65.6	45.5	102.5
Night 24/11/18	08:00	51.8	36.8	96.8
Day 25/11/18	16:00	56.9	45.4	110.5
Night 25/11/18	08:00	41.6	40.6	79.7
Day 26/11/18	16:00	50.5	46.7	94.7
Night 26/11/18	08:00	43.0	43.7	72.4
Day 27/11/18	16:00	52.5	51.7	89.7
Night 27/11/18	08:00	44.4	45.3	73.6
Day 28/11/18	07:05	55.9	57.3	90.1

Table A10.13 Baseline L_{A90} Noise Data Analysis – ST R6 (LONG TERM)

Period	Total possible samples	Samples collected	% of potential samples	L_{A90} analytics (dB)			
				Mode	Average	Average – 1 standard deviation	Average + 1 standard deviation
Day 23/11/18 to 28/11/18	76	74	97	40	42.4	38.0	46.8
Night 23/11/18 to 28/11/18	160	155	97	44	41.2	36.8	45.6

A10.3 Summary

A10.3.1 A baseline noise survey was undertaken to characterise the existing noise climate within the Boston Alternative Energy Facility Study Area at agreed sensitive receptor locations in the vicinity of the site.

A10.3.2 The baseline noise survey is considered representative of the Facility Study Area and was undertaken at the nearest (agreed with BBC) sensitive receptors.

A10.3.3 Measured data were collated for each 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.

A10.3.4 Assessment values for receptor locations at the facility have been derived from long term measurements.

A10.4 Graphical Analysis

A10.4.1 The baseline noise survey graphical analysis figures can be seen in the plates below.

Plate A10.1.1 STR1 L90 Daytime Analysis

Location ST R1 Daytime L90 Analysis
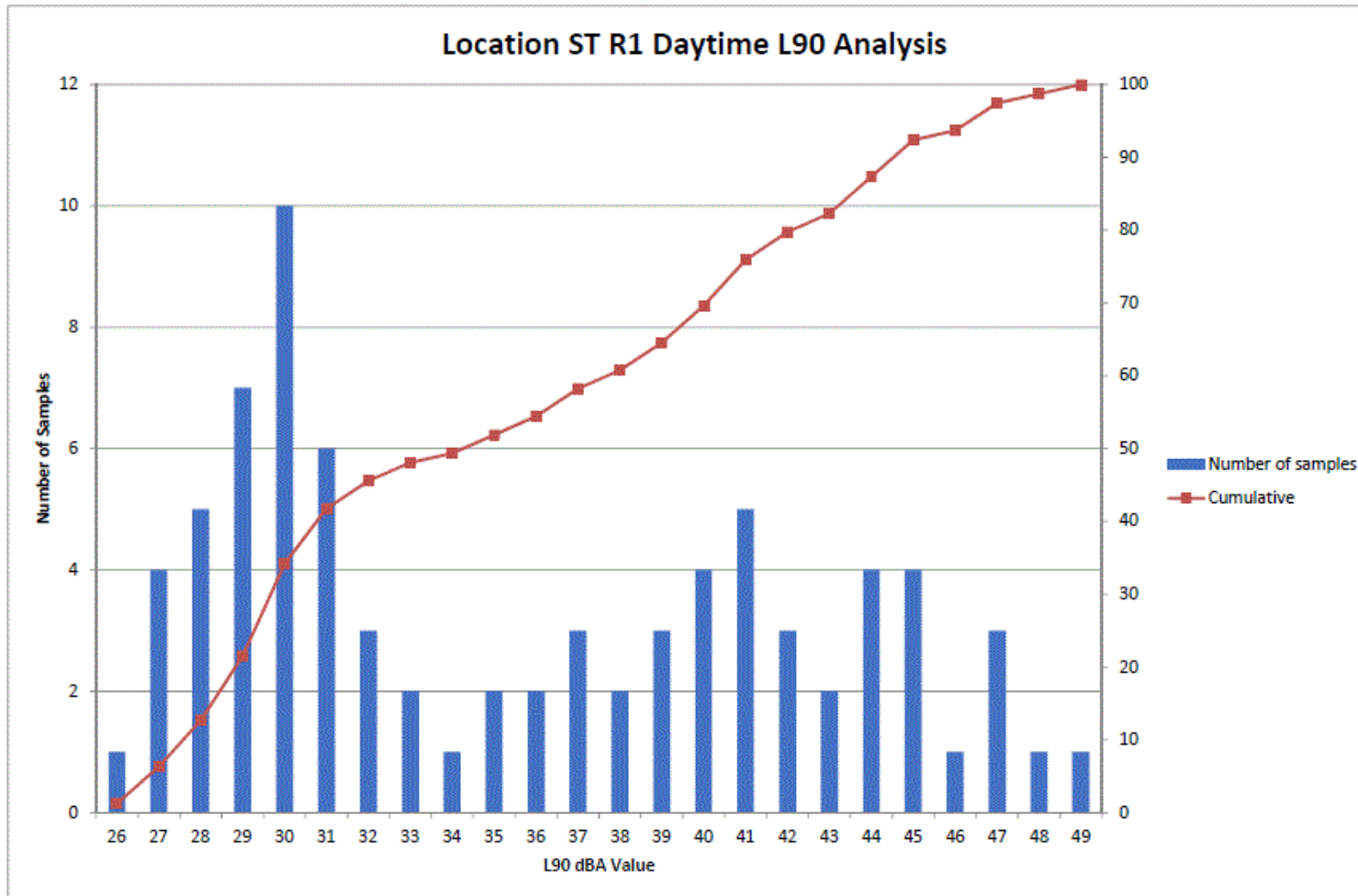
Plate A10.1.2 STR1 L90 Night-time Analysis
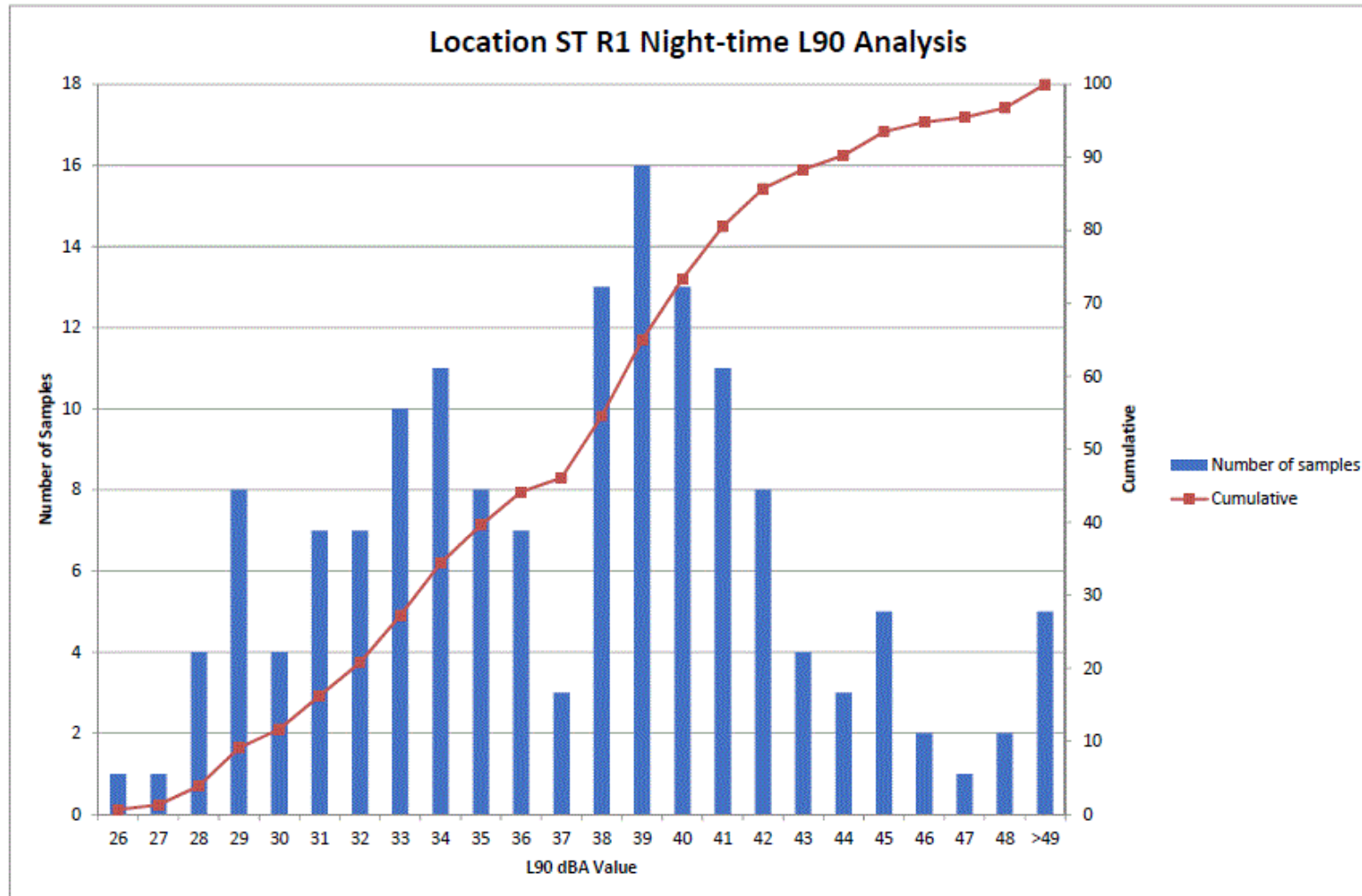
Plate A10.1.3 STR2 L90 Daytime Analysis

Location ST R2 Daytime L90 Analysis
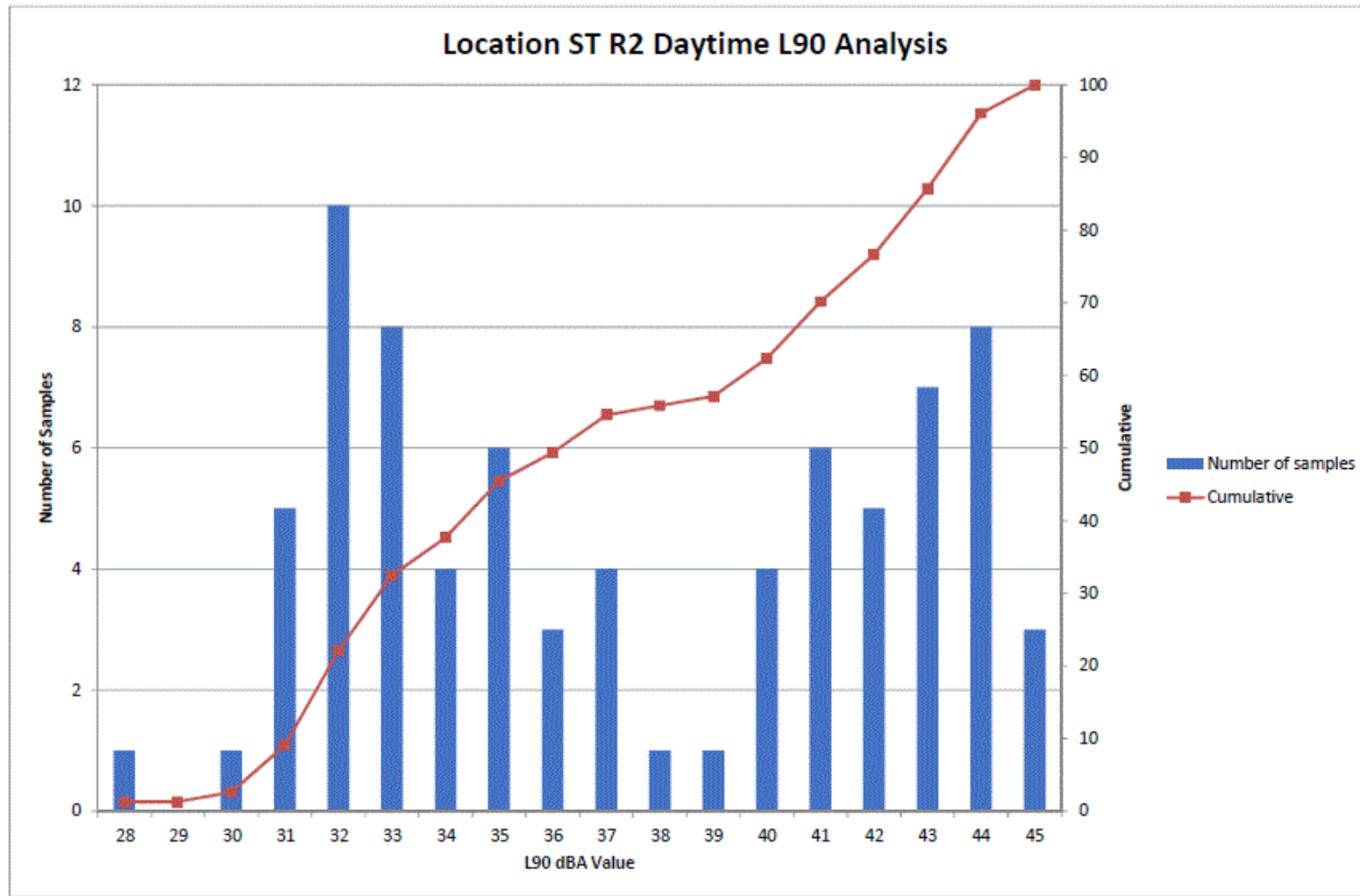
Plate A10.1.4 STR2 L90 Night-time Analysis
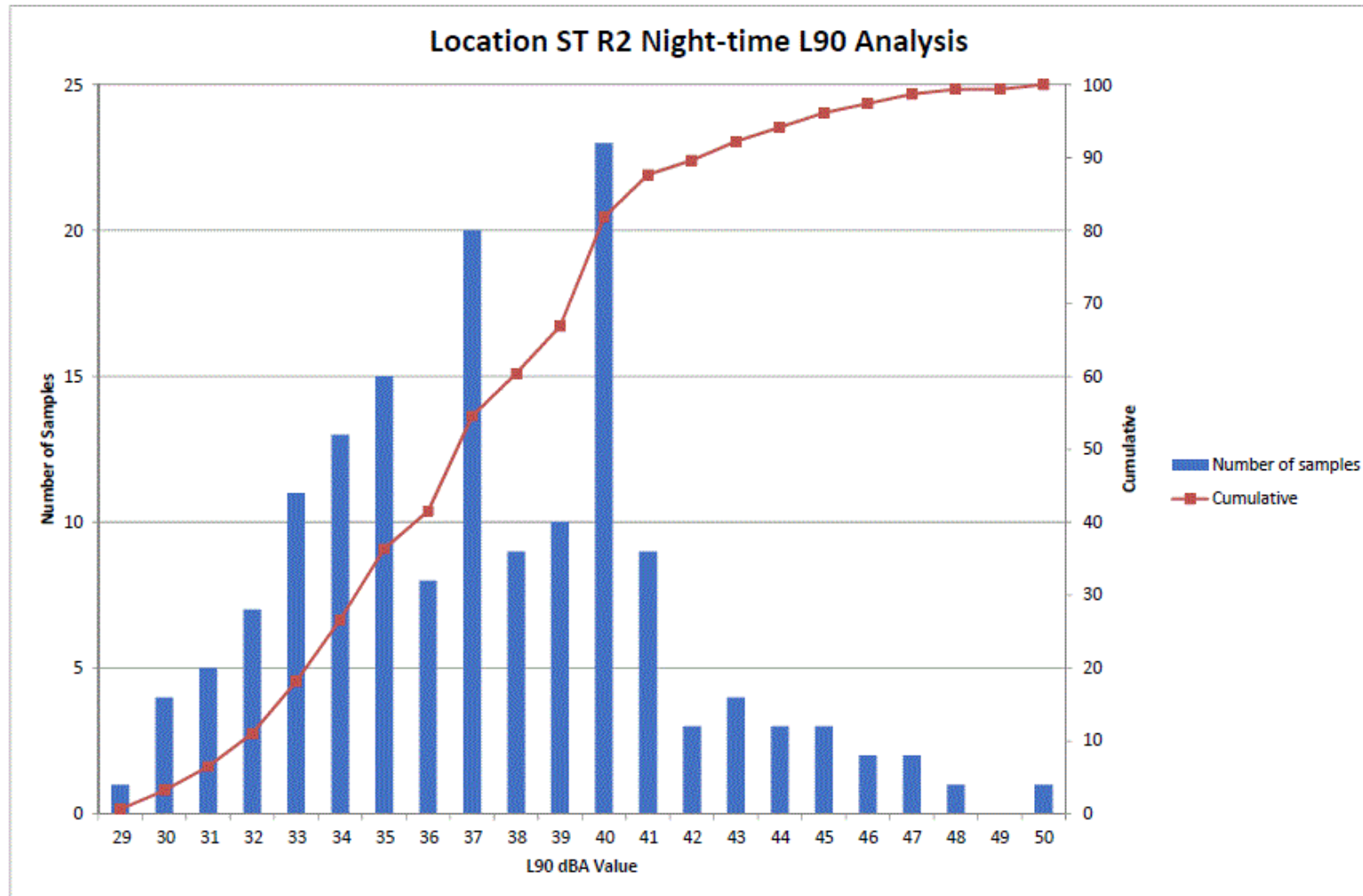
Plate A10.1.5 STR3 L90 Daytime Analysis

Location ST R3 Daytime L90 Analysis
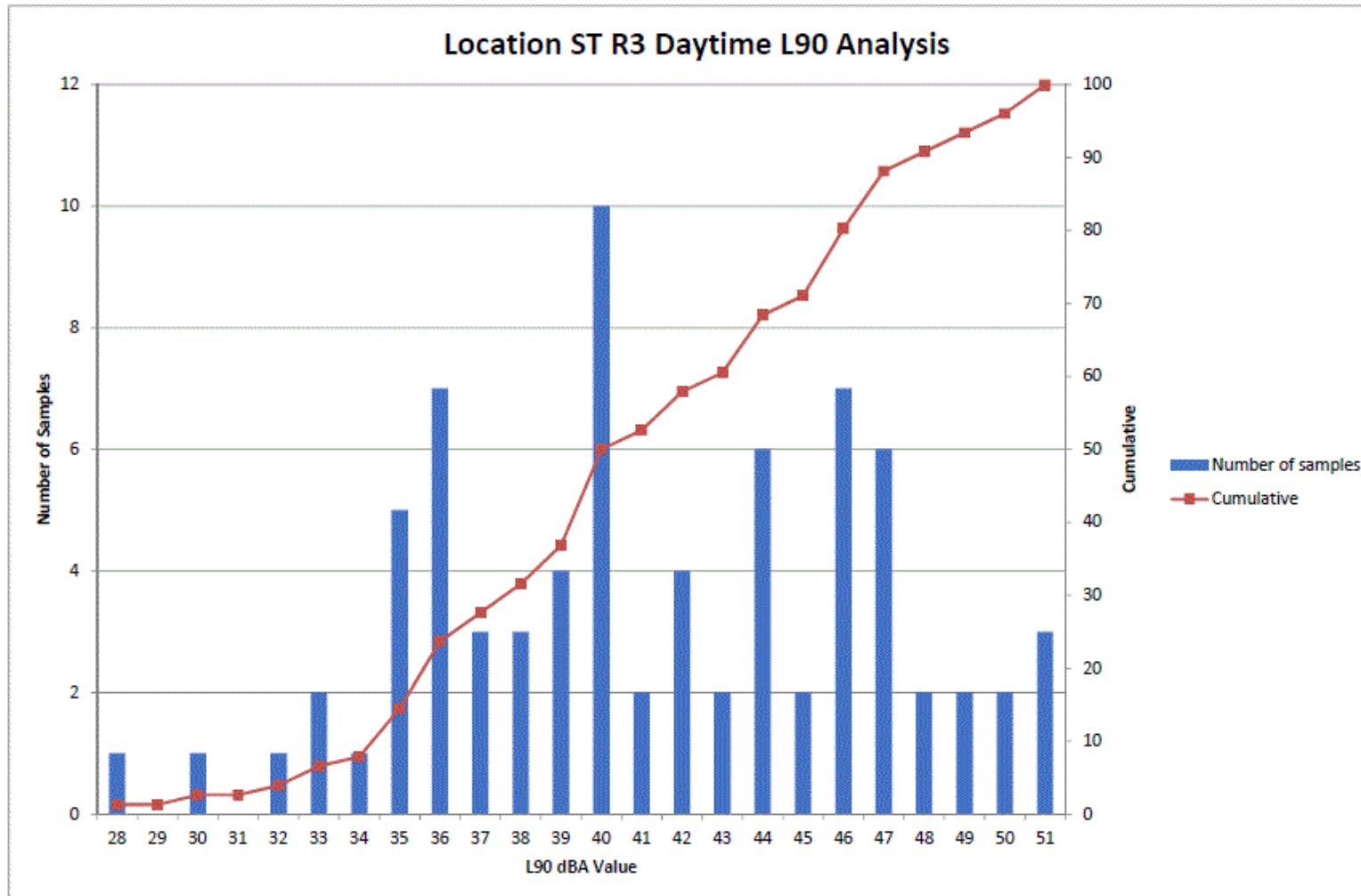
Plate A10.1.6 STR3 L90 Night-time Analysis
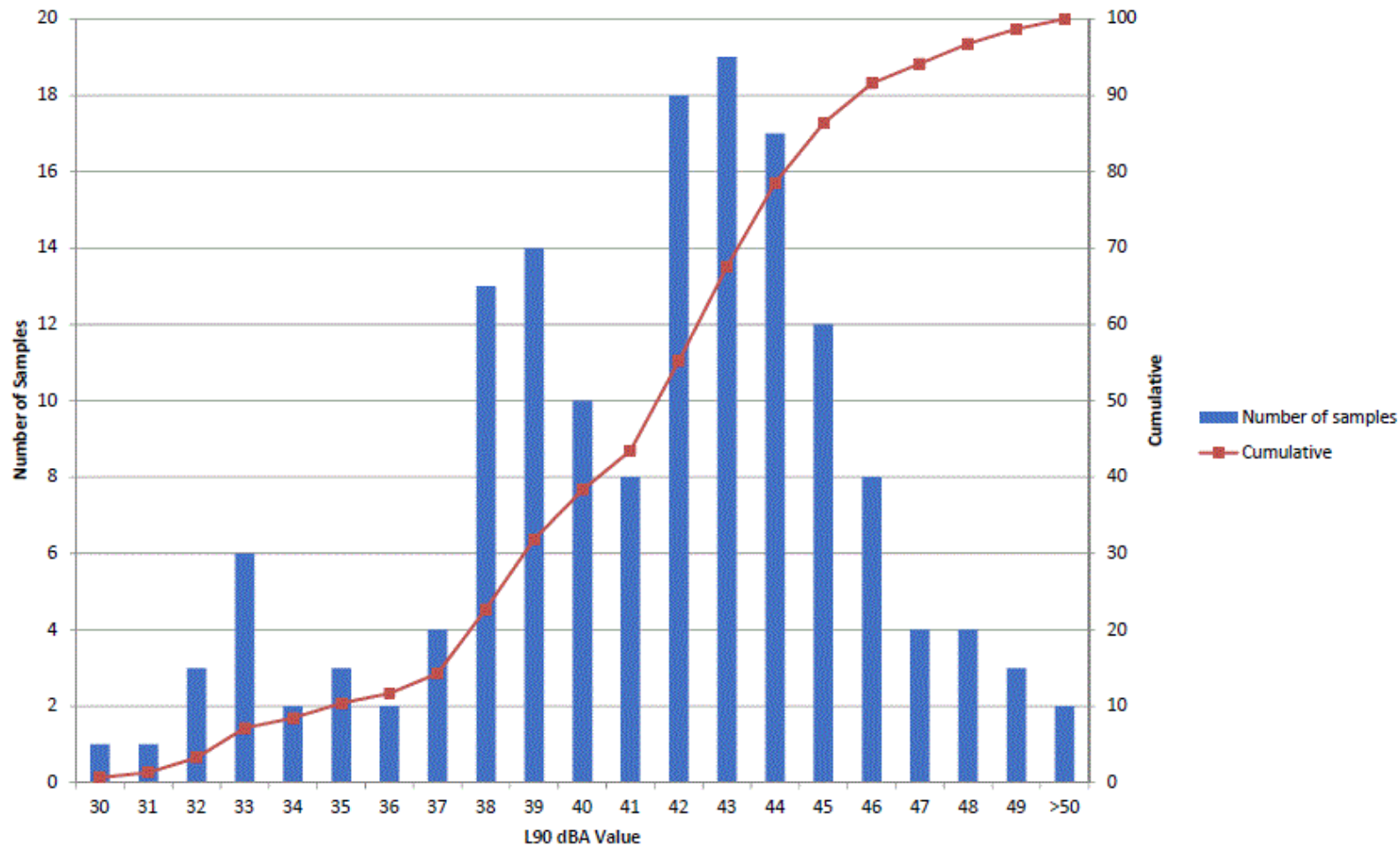

Location ST R3 Night-time L90 Analysis
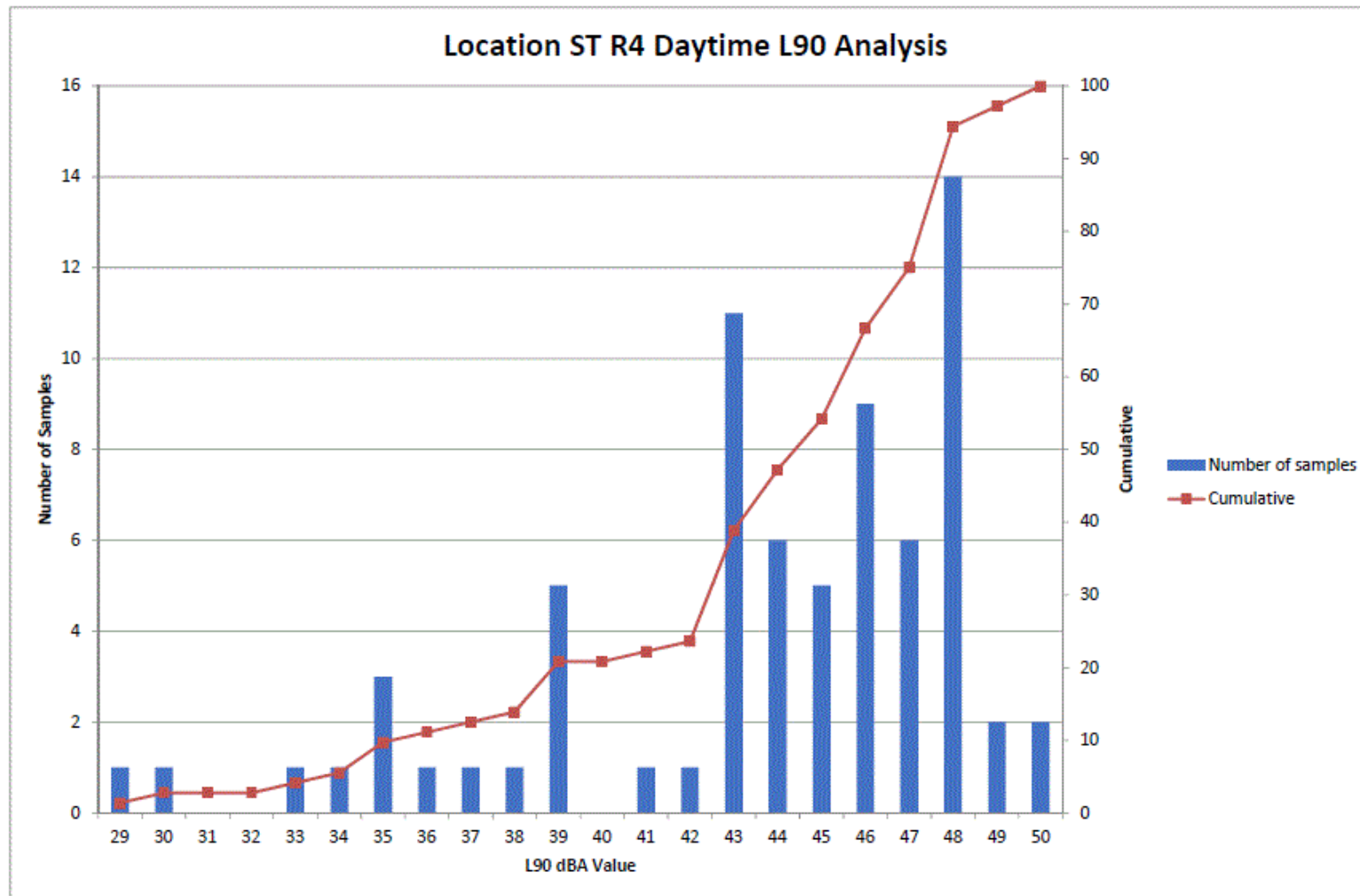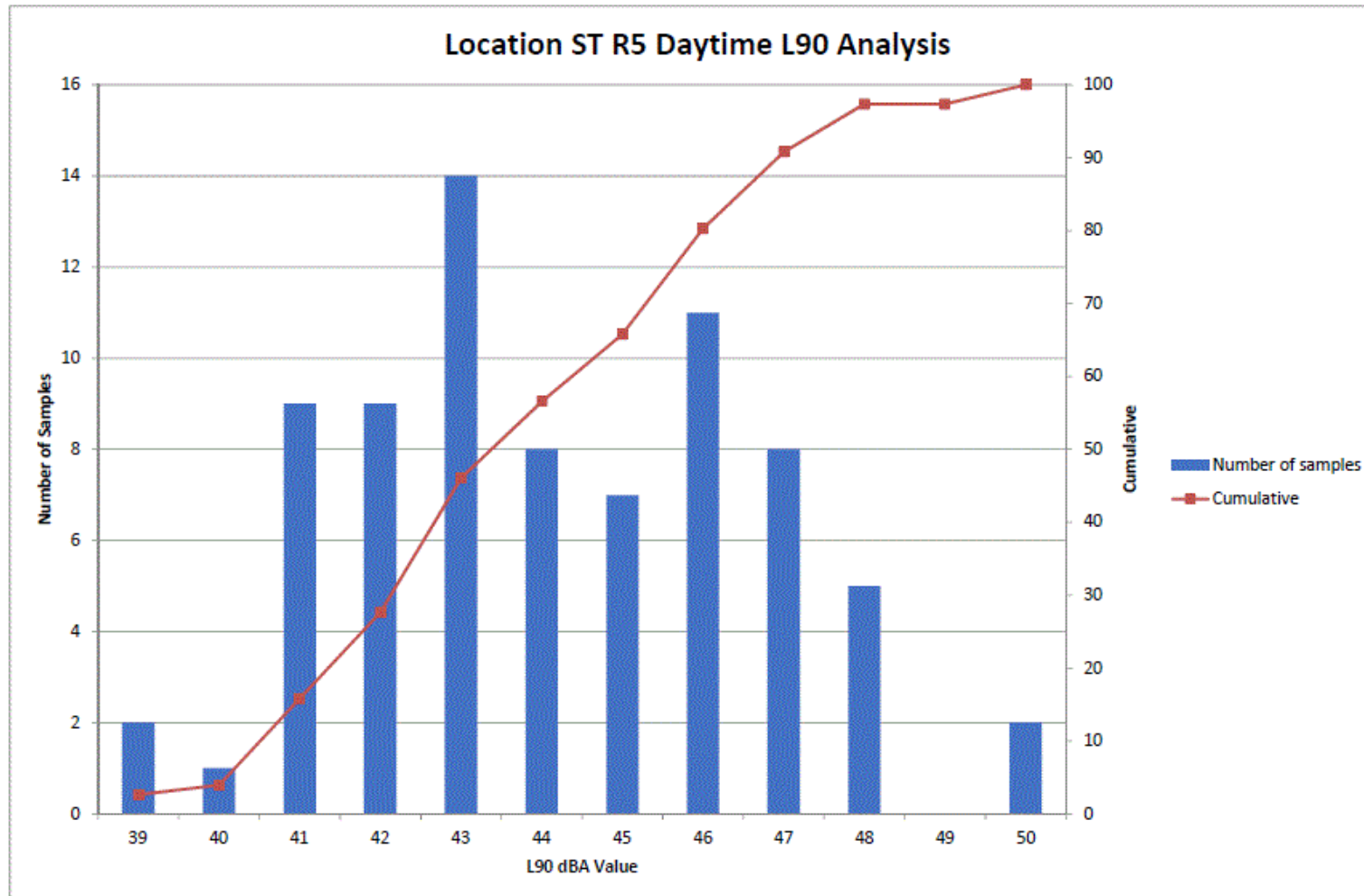
Plate A10.1.7 STR4 L90 Daytime Analysis

Location ST R4 Daytime L90 Analysis

Plate A10.1.8 STR4 L90 Night-time Analysis
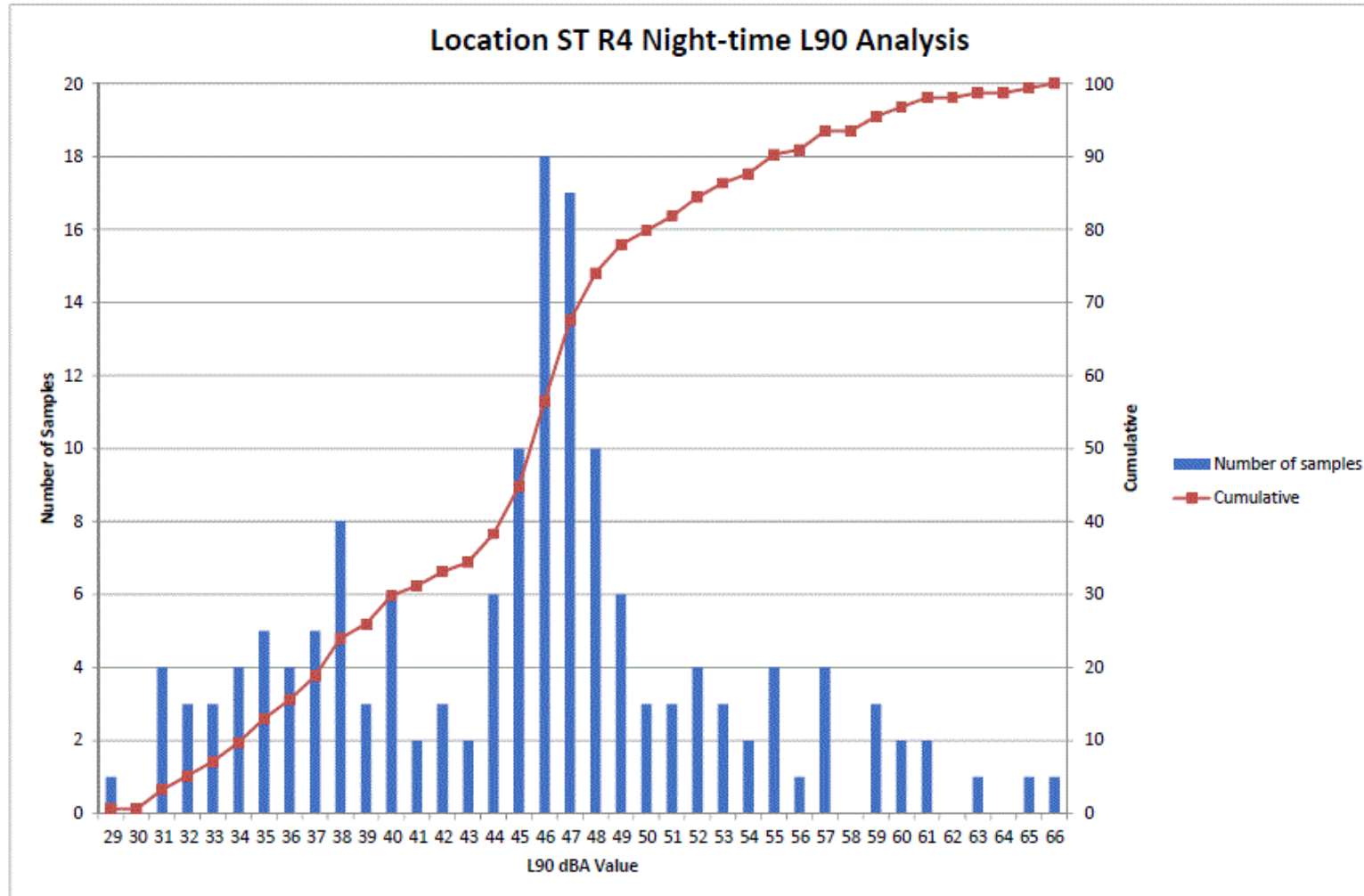
Plate A10.1.9 STR5 L90 Daytime Analysis

Plate A10.1.10 STR5 L90 Night-time Analysis

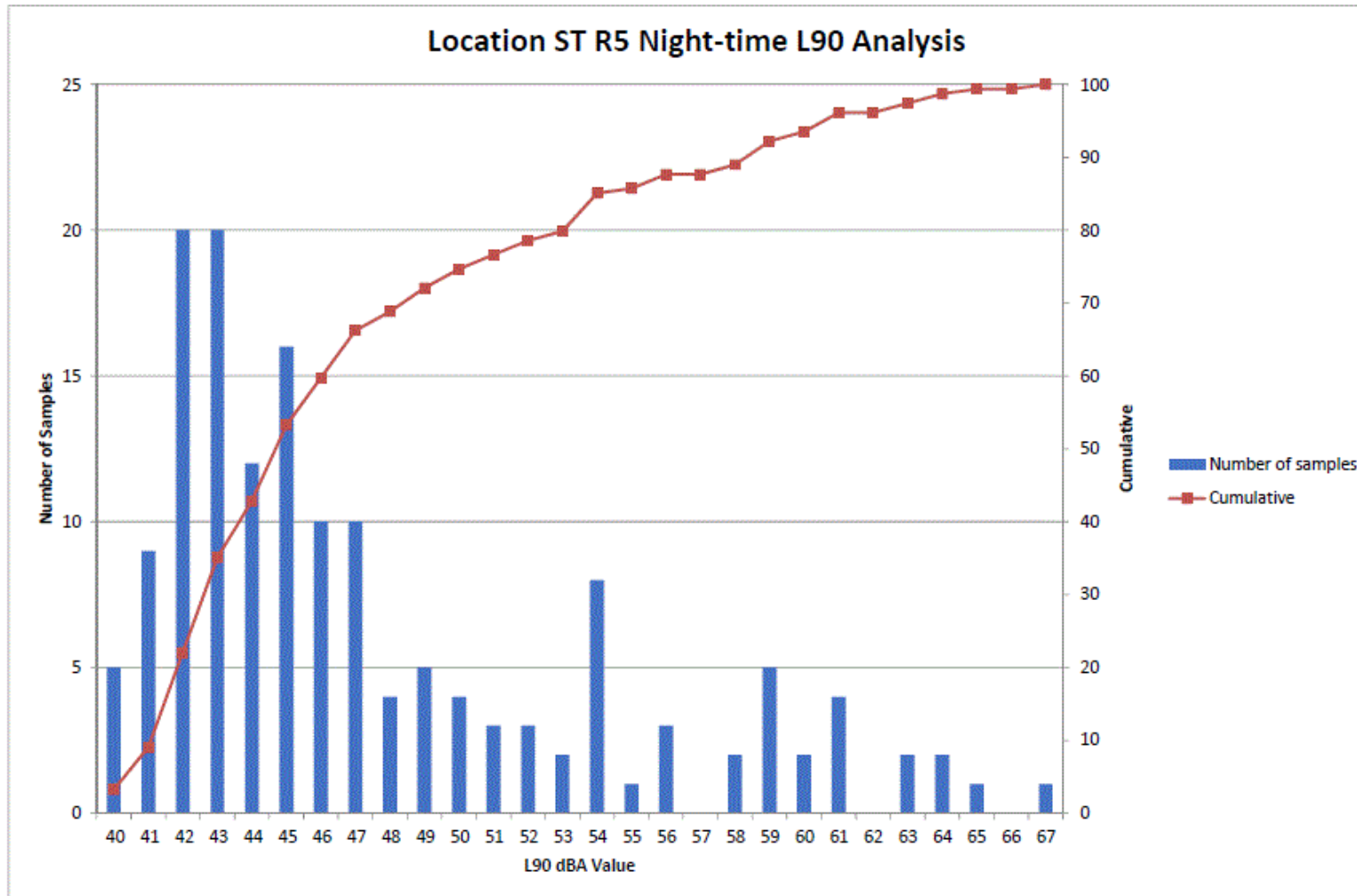Location ST R5 Night-time L90 Analysis

Plate A10.1.11 STR6 L90 Daytime Analysis

Location ST R6 Daytime L90 Analysis
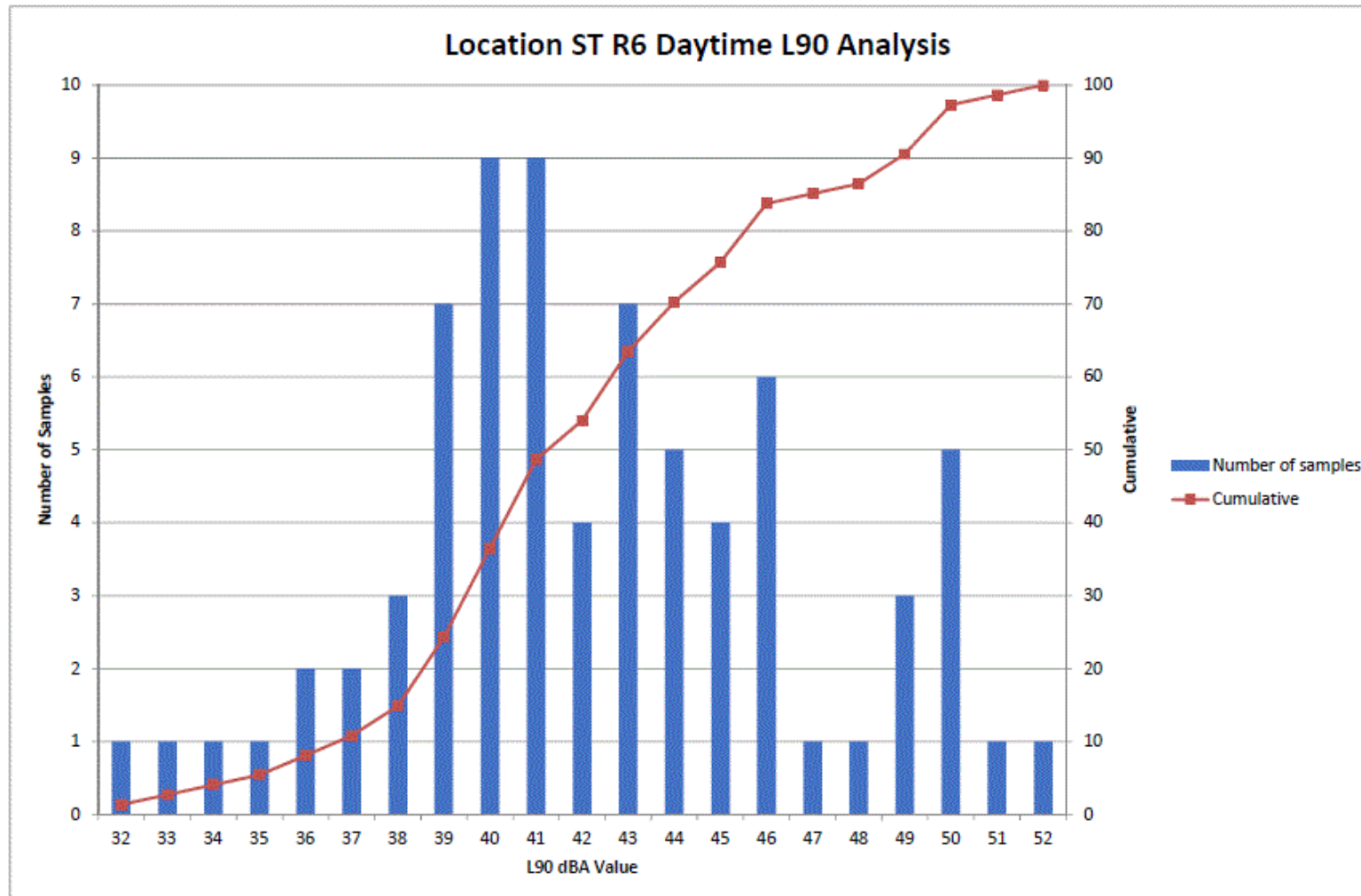
Plate A10.1.12 STR6 L90 Night-time Analysis

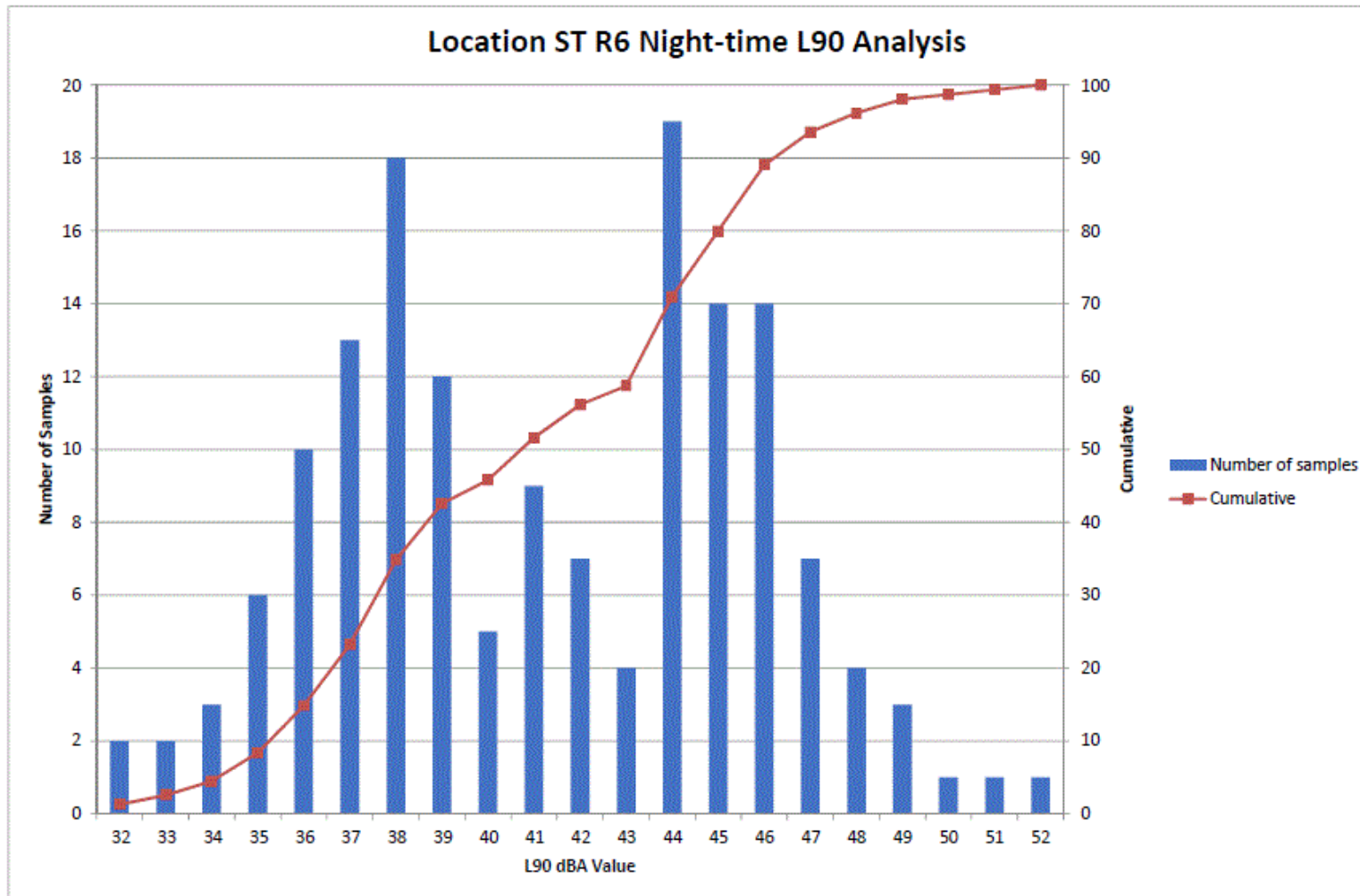Location ST R6 Night-time L90 Analysis

A10.5 References

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