

# Humber Low Carbon Pipelines

Preliminary Environmental Information Report  
Volume III Appendix 12.1 Noise and Vibration  
October 2022

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# Humber Low Carbon Pipelines - Baseline Noise Survey

Report: 298356-RSK-RP-001-(01)

National Grid

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Revision	Description	Date	Prepared	Approved
0	First issue	20 July 2022	Mark Underhill	Matthew Thomson
1	Final issue	27 July 2022	Mark Underhill	Matthew Thomson

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## Humber Low Carbon Pipelines - Baseline Noise Survey

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### Attachments

### Glossary of Acoustic Terms

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# Humber Low Carbon Pipelines - Baseline Noise Survey

## 1 Introduction

This document provides a summary of the baseline noise survey that has been undertaken to establish the prevailing acoustic environment at noise sensitive receptors situated in the vicinity of the Pumping Facility associated with the Humber Low Carbon Pipelines (HLCP) (the Project).

The results of the noise survey will be used to inform the noise impact assessment for the Pumping Facility.

The specific location and extent of the Pumping Facility has yet to be finalised, however, it is currently expected to be located at the eastern section of the HLCP route corridor, to the north of Easington. At this stage, two potential site locations are being considered, as defined by the blue areas presented in Figure 1.1.



Figure 1.1 – Pumping Facility site locations

A glossary of acoustic terminology relevant to the information presented below is appended to this document.



## Humber Low Carbon Pipelines - Baseline Noise Survey

### 2 Survey Methodology

#### 2.1 Monitoring Locations

The baseline noise survey comprised unattended noise monitoring at five locations, which accounted for the surrounding noise sensitive receptors in the vicinity of the expected Pumping Facility site. The noise survey was undertaken between 9 June 2022 and 17 June 2022.

The measurement locations are summarised in Table 2.1 and are presented in Figure 2.1 below. Photographs of the measurement positions are provided in Section 3.

Reference	Approx. NGR Location	Description
P1	538124E, 421490N	Spring Farm Bungalow to the north-west of the Pumping Facility
P2	537970E, 420970N	Southfield Farm to the west of the Pumping Facility
P3	538277E, 419448N	Sunnybank to the south of the Pumping Facility
P4	539311E, 419479N	Two Hoots to the south of the Pumping Facility
P5	539598E, 420901N	Coastal path to the east of the Pumping Facility

Table 2.1 - Baseline measurement locations







## Humber Low Carbon Pipelines - Baseline Noise Survey

Equipment	Manufacturer	Model	Serial No.	Calibration Date
Sound level meter	Rion	NL-52	0976247	28/06/2021
	Rion	NL-52	00464742	04/11/2021
	Rion	NL-52	01265456	29/09/2021
	Rion	NL-52	01265455	29/09/2021
	01dB	Fusion	14177	19/10/2021
Calibrator	Rion	NC-74	34625642	28/04/2022

Table 2.2 - Survey equipment

The sound level meters used conform to the Class 1 requirements of BS EN 61672-1:2013 '*Electroacoustics. Sound level meter, Specifications*'. The calibrator used conforms to the Class 1 requirements of BS EN IEC 60942:2018 '*Electroacoustics, Sound calibrators*'.

The equipment used had a calibration history that is traceable to a certified calibration institution. The calibration of the sound level meters was checked before and after the measurements, with no significant calibration drift noted i.e. within a +/- 0.5 dB tolerance.

### 2.3 Weather Conditions

Weather information has been obtained for the duration of the baseline survey via a local weather station (IKINGS200). The weather data for the survey period is summarised below. The conditions are considered suitable for the purpose of environmental noise measurements. Detailed hourly weather information can be provided upon request.





## Humber Low Carbon Pipelines - Baseline Noise Survey

Date	Temperature range (°C)	Average wind speed (m/s)	Prevailing wind direction	Accumulated precipitation (mm)
09.06.2022	11 - 21	1.3	SW	0.0
10.06.2022	13 - 22	1.6	SW	0.0
11.06.2022	13 - 22	1.9	SW	0.25*
12.06.2022	12 - 19	1.6	WSW	0.0
13.06.2022	9 - 20	0.9	NW	0.0
14.06.2022	12 - 18	0.5	NE	0.0
15.06.2022	11 - 20	0.6	SE	0.0
16.06.2022	11 - 20	0.8	ENE	0.0
17.06.2022	17 - 31	1.0	SSW	0.0

\* Constitutes a very low level rainfall intensity, therefore not significant

Table 2.3 - Weather conditions



## Humber Low Carbon Pipelines - Baseline Noise Survey

### 3 Survey Results

#### 3.1 Noise Measurements – Position P1: Spring Farm Bungalow

A summary of the measured noise levels at Position P1 are presented below.

Date	Period	dB L <sub>Aeq,T</sub>	dB L <sub>A90,T</sub>	dB L <sub>Amax</sub> (Range)
09/06/2022 (Thursday)	Day	53.5	39.2	43.1 - 93.9
	Night	41.3	37.4	40.9 - 65.4
10/06/2022 (Friday)	Day	46.1	39.7	48.5 - 73.9
	Night	42.0	37.9	40.1 - 68.5
11/06/2022 (Saturday)	Day	48.8	42.3	46.4 - 72.0
	Night	39.7	35.4	38.3 - 69.2
12/06/2022 (Sunday)	Day	59.6	42.2	46.2 - 92.2
	Night	40.5	35.9	38.2 - 70.4
13/06/2022 (Monday)	Day	55.4	35.8	42.6 - 88.2
	Night	40.5	30.6	30.7 - 72.1
14/06/2022 (Tuesday)	Day	49.2	34.4	40.2 - 88.1
	Night	41.0	33.0	31.0 - 72.6
15/06/2022 (Wednesday)	Day	55.7	36.5	35.9 - 89.3
	Night	40.0	32.5	33.6 - 73.6
16/06/2022 (Thursday)	Day	53.9	35.9	44.0 - 86.2
	Night	41.1	36.0	38.4 - 71.2
17/06/2022	Day	45.5	38.6	56.4 - 78.9

**Notes:**

- Daytime period: 07:00 – 23:00 hrs, night-time: 23:00 – 07:00 hrs
- Daytime measurements taken on the 09/06/2022 and 17/06/2022 were not taken throughout full 16hr daytime period.
- L<sub>Aeq,T</sub> values are the logarithmic average of L<sub>Aeq,15min</sub> samples, and the L<sub>A90,T</sub> values are the arithmetic average of L<sub>A90,15min</sub> samples.

Table 3.1 - Measured noise levels at Position P1

During the daytime installation and collection of the noise monitoring equipment at Position P1, the acoustic environment was dominated by natural sounds including wind-blown foliage and bird song, in addition to intermittent traffic on Out Newton Road. Noise from the distant wind turbines was perceptible when the more dominant natural sounds reduced.



## Humber Low Carbon Pipelines - Baseline Noise Survey

Upon collection of the sound level meter, the resident advised the surveyor that the grass was cut in the large field to the rear of the property on Wednesday 15/06/2022 and Thursday 16/06/2022.

The source of the individual high noise events that occurred during the daytime on several days is not apparent, however, given the high  $L_{A_{Fmax}}$  noise levels, it is expected that these were attributable to activities taking place in the garden.



Figure 3.1 – Noise monitoring installations at Position P1 – view facing east



Figure 3.2 – Noise monitoring installations at Position P1 – view facing south (sound level meter circled)



## Humber Low Carbon Pipelines - Baseline Noise Survey

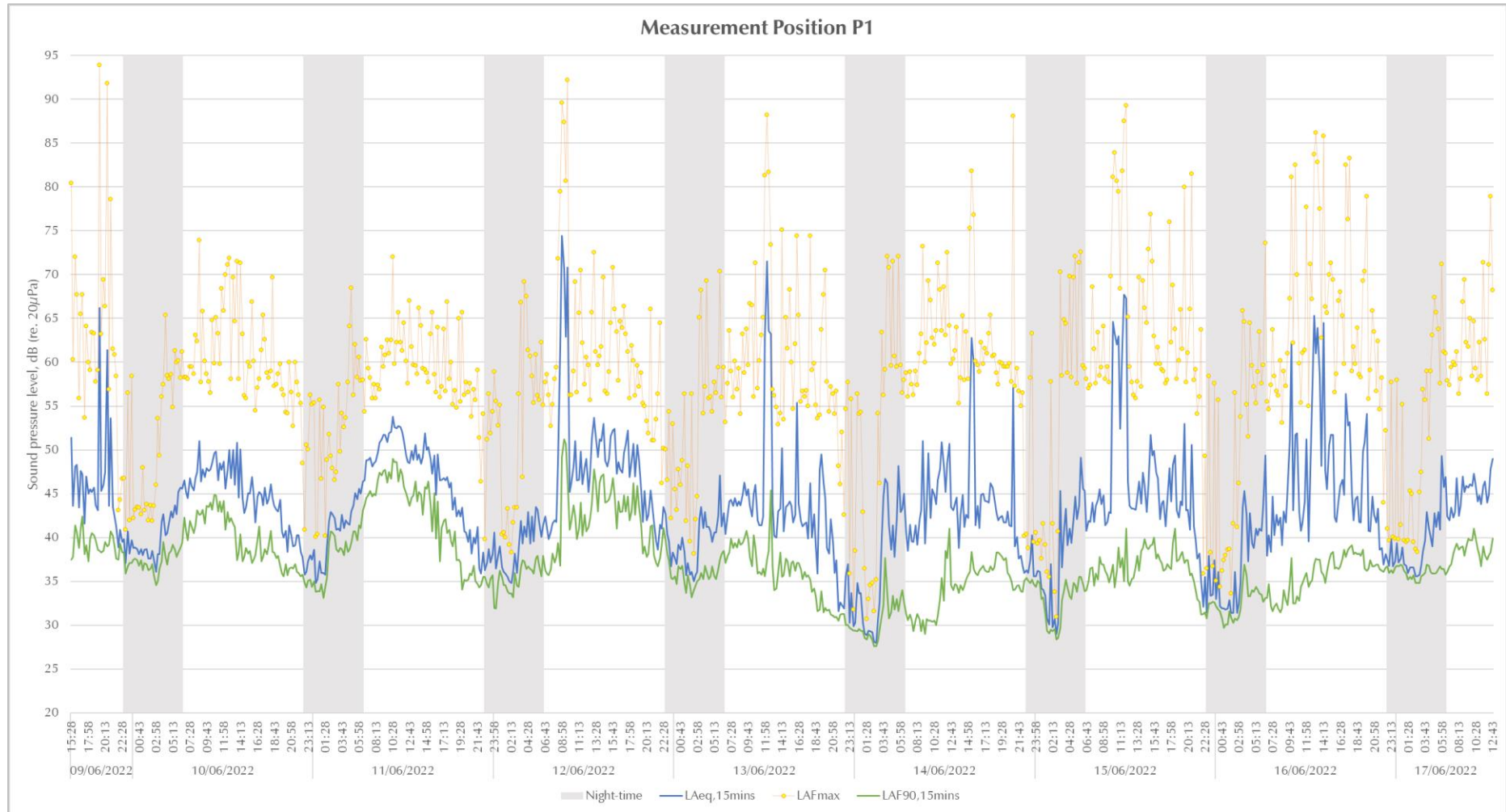


Figure 3.3 – Measured noise levels at Position P1





## Humber Low Carbon Pipelines - Baseline Noise Survey

### 3.2 Representative Background Sound Levels – Position P1

The statistical analysis that has been used to determine a representative background sound level during the daytime and night-time periods are presented in Figure 3.4 and 3.5 respectively. These levels will be used to inform the operational phase assessment for the Pumping Facility undertaken in accordance with BS 4142:2014+A1:2019: 'Methods for rating and assessing industrial and commercial sound'.

For this distribution of data, a daytime  $L_{A90,1hr}$  of 35 dB and a night-time  $L_{A90,15min}$  of 33 dB are considered to be representative of the prevailing background sound level at Position P1.

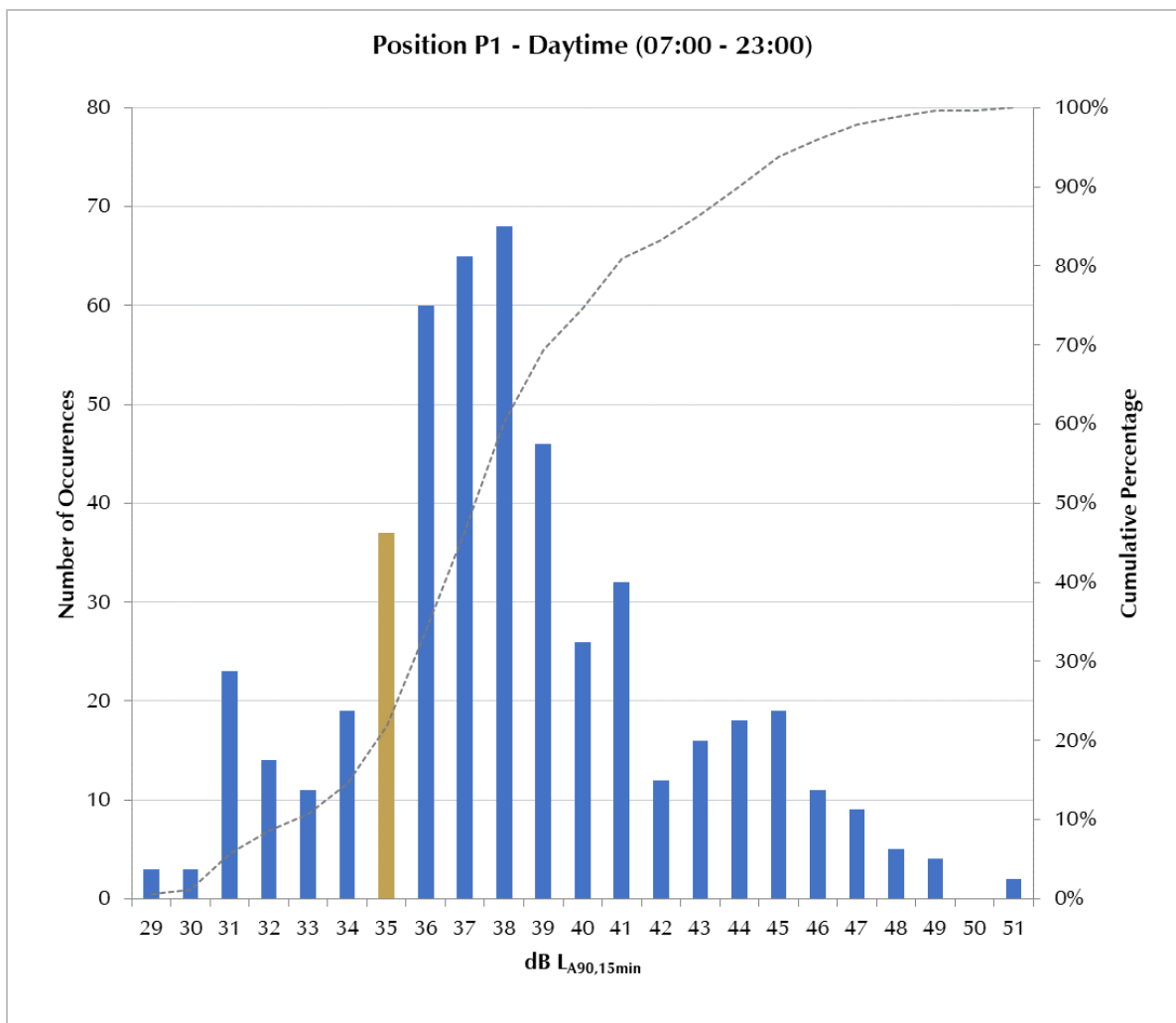


Figure 3.4 – Statistical analysis of measured background sound levels at Position P1 – Daytime



Humber Low Carbon Pipelines - Baseline Noise Survey

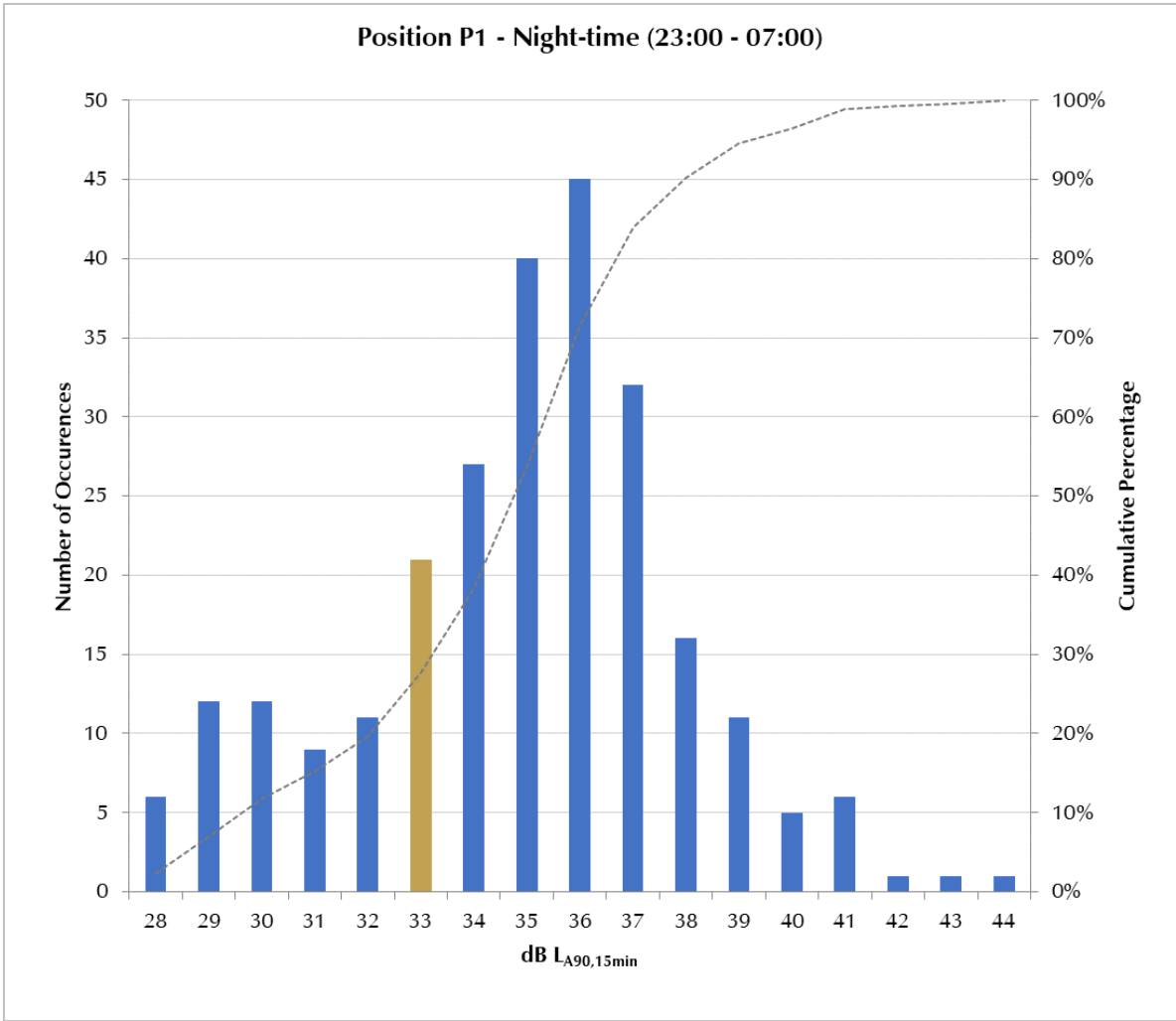


Figure 3.5 – Statistical analysis of measured background sound levels at Position P1 – Night-time



## Humber Low Carbon Pipelines - Baseline Noise Survey

### 3.3 Noise Measurements – Position P2: Southfield Farm

A summary of the measured noise levels at Position P2 are presented below.

Date	Period	dB $L_{Aeq,T}$	dB $L_{A90,T}$	dB $L_{Amax}$ (Range)
09/06/2022 (Thursday)	Day	46.4	40.7	46.9 – 88.3
	Night	43.2	39.1	43.1 – 76.1
10/06/2022 (Friday)	Day	45.7	40.4	42.2 – 77.6
	Night	43.4	38.7	40.9 – 78.9
11/06/2022 (Saturday)	Day	48.1	43.0	44.4 – 76.3
	Night	42.4	38.1	44.3 – 77.1
12/06/2022 (Sunday)	Day	47.1	42.4	48.4 – 77.0
	Night	44.9	39.2	45.2 – 80.5
13/06/2022 (Monday)	Day	44.6	36.9	43.3 – 76.9
	Night	43.4	33.9	37.6 – 75.6
14/06/2022 (Tuesday)	Day	44.8	36.0	38.9 – 82.3
	Night	43.1	34.4	34.4 – 76.7
15/06/2022 (Wednesday)	Day	50.9	41.0	49.8 – 79.9
	Night	43.4	34.3	48.8 – 76.0
16/06/2022 (Thursday)	Day	59.6	37.5	51.2 – 90.1
	Night	44.0	36.6	46.5 – 78.4
17/06/2022	Day	50.7	40.4	55.0 – 80.3

**Notes:**

- Daytime period: 07:00 – 23:00 hrs, night-time: 23:00 – 07:00 hrs
- Daytime measurements taken on the 09/06/2022 and 17/06/2022 were not taken throughout full 16hr daytime period.
- $L_{Aeq,T}$  values are the logarithmic average of  $L_{Aeq,15min}$  samples, and the  $L_{A90,T}$  values are the arithmetic average of  $L_{A90,15min}$  samples.

Table 3.2 - Measured noise levels at Position P2

During the daytime installation and collection of the noise monitoring equipment at Position P2, the acoustic environment was dominated by natural sounds including wind-blown foliage and bird song, in addition to intermittent traffic on Out Newton Road. Wind turbine noise was perceptible when the more dominant natural sounds reduced.





## Humber Low Carbon Pipelines - Baseline Noise Survey

It is expected that the elevated ambient noise levels measured on Wednesday 15/06/2022 and Thursday 16/06/2022 was attributable to grass cutting activities in nearby fields, as advised by the occupant of Spring Farm Bungalow (Position P1).



Figure 3.6 – Noise monitoring installations at Position P2 – view facing north-west



Figure 3.7 – Noise monitoring installations at Position P2 – view facing south-east





# Humber Low Carbon Pipelines - Baseline Noise Survey

## 3.4 Representative Background Sound Levels – Position P2

The statistical analysis that has been used to determine a representative background sound level during the daytime and night-time periods is presented in Figure 3.9 and 3.10 respectively. These levels will be used to inform the operational phase assessment for the Pumping Facility undertaken in accordance with BS 4142:2014+A1:2019: *‘Methods for rating and assessing industrial and commercial sound’*.

For this distribution of data, a daytime  $L_{A90,1hr}$  of 37 dB and a night-time  $L_{A90,15min}$  of 34 dB are considered to be representative of the prevailing background sound level at Position P2.

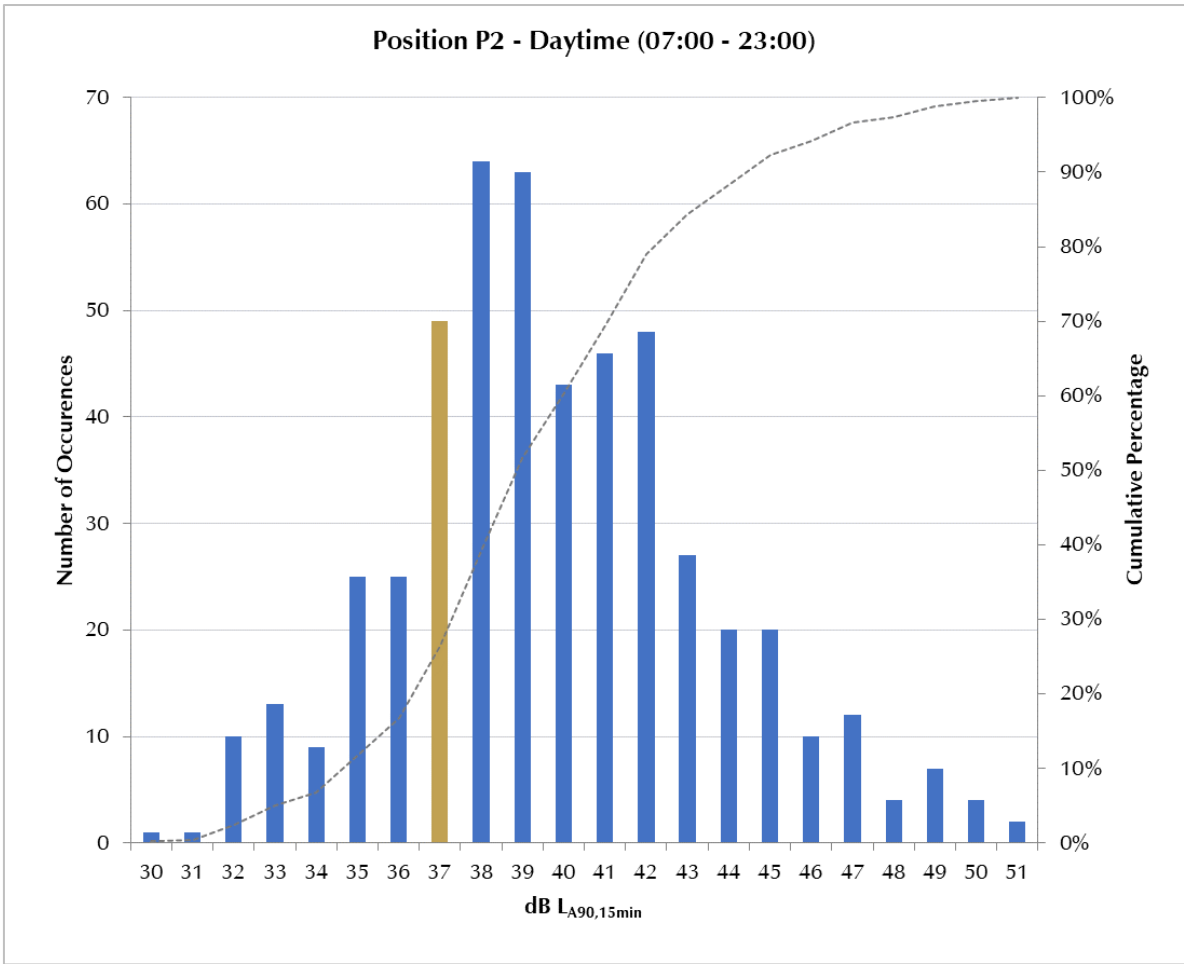


Figure 3.9 – Statistical analysis of measured background sound levels at Position P2 – Daytime



Humber Low Carbon Pipelines - Baseline Noise Survey

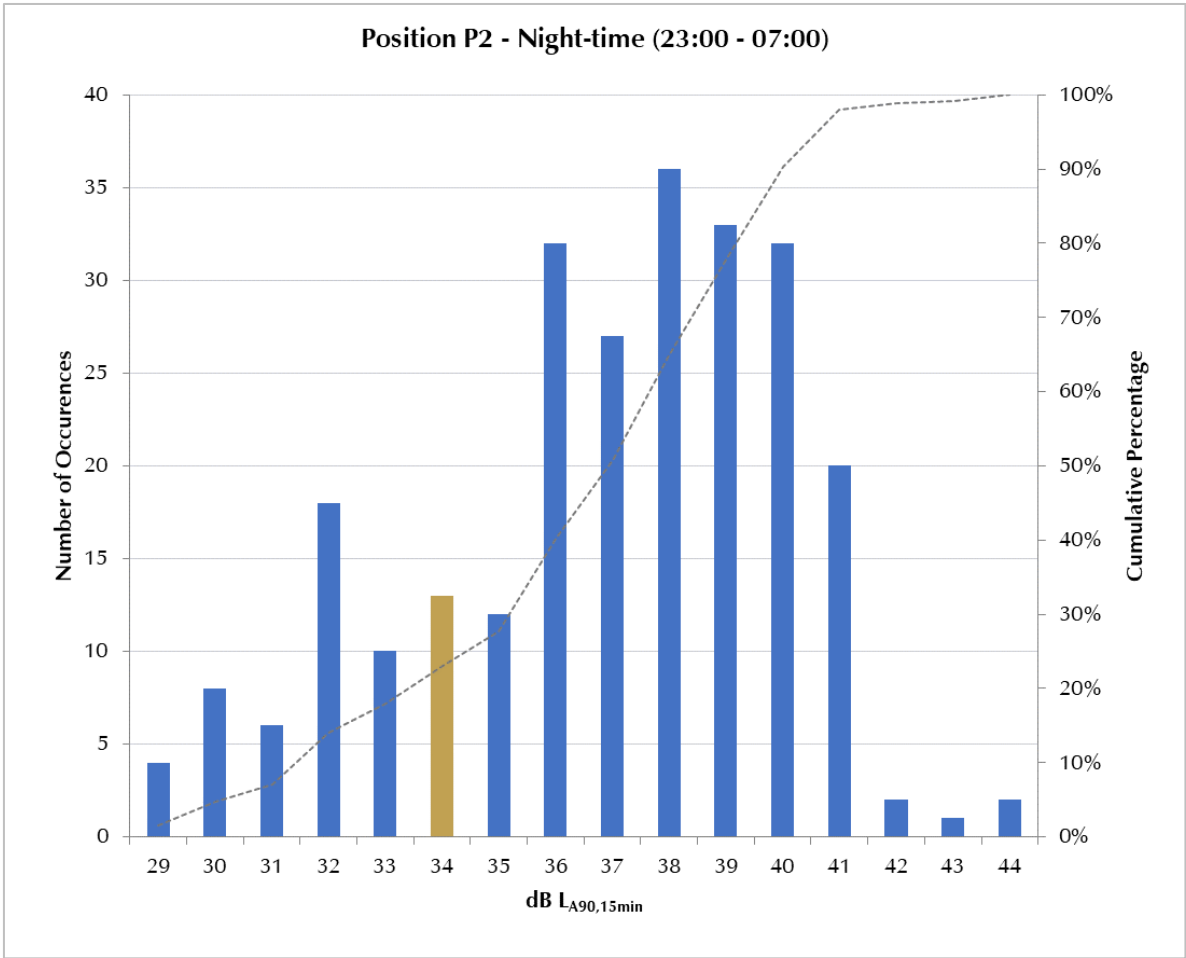


Figure 3.10 – Statistical analysis of measured background sound levels at Position P2 – Night-time





## Humber Low Carbon Pipelines - Baseline Noise Survey

### 3.5 Noise Measurements – Position P3: Sunnybank

A summary of the measured noise levels at Position P3 are presented below.

Date	Period	dB L <sub>Aeq,T</sub>	dB L <sub>A90,T</sub>	dB L <sub>Amax</sub> (Range)
09/06/2022 (Thursday)	Day	47.3	35.2	54.6 - 78.6
	Night	48.8	34.0	41.5 - 73.1
10/06/2022 (Friday)	Day	47.4	37.1	54.6 - 72.3
	Night	49.3	36.3	43.4 - 74.0
11/06/2022 (Saturday)	Day	50.0	40.0	51.3 - 70.5
	Night	50.2	32.8	42.5 - 79.5
12/06/2022 (Sunday)	Day	49.1	37.7	53.0 - 75.9
	Night	50.2	31.0	33.4 - 75.1
13/06/2022 (Monday)	Day	47.2	32.1	54.2 - 78.8
	Night	50.0	28.0	32.2 - 77.7
14/06/2022 (Tuesday)	Day	46.0	31.8	52.2 - 74.2
	Night	49.3	29.3	31.9 - 70.8
15/06/2022 (Wednesday)	Day	48.5	32.8	53.3 - 73.9
	Night	50.1	31.6	35.7 - 72.2
16/06/2022 (Thursday)	Day	56.9	34.5	49.1 - 89.2
	Night	49.3	29.4	31.2 - 72.7
17/06/2022	Day	48.5	35.3	58.2 - 74.1

**Notes:**

- Daytime period: 07:00 – 23:00 hrs, night-time: 23:00 – 07:00 hrs
- Daytime measurements taken on the 09/06/2022 and 17/06/2022 were not taken throughout full 16hr daytime period.
- L<sub>Aeq,T</sub> values are the logarithmic average of L<sub>Aeq,15min</sub> samples, and the L<sub>A90,T</sub> values are the arithmetic average of L<sub>A90,15min</sub> samples.

Table 3.3 - Measured noise levels at Position P3

During the daytime installation and collection of the noise monitoring equipment at Position P3, the acoustic environment was dominated by natural sounds including wind-blown foliage and bird song, in addition to intermittent traffic on Easington Road (B1445). The source of the individual high noise events that occurred during the afternoon period on 16/06/2022 is not apparent, however, given the measured L<sub>AFmax</sub> noise levels, it is expected that these were attributable to activities taking place relatively close to the measurement equipment, rather than a distant source.



## Humber Low Carbon Pipelines - Baseline Noise Survey



Figure 3.11 – Noise monitoring installations at Position P3 – view facing north



Figure 3.12 – Noise monitoring installations at Position P3 – view facing north-west (meter circled)





## Humber Low Carbon Pipelines - Baseline Noise Survey

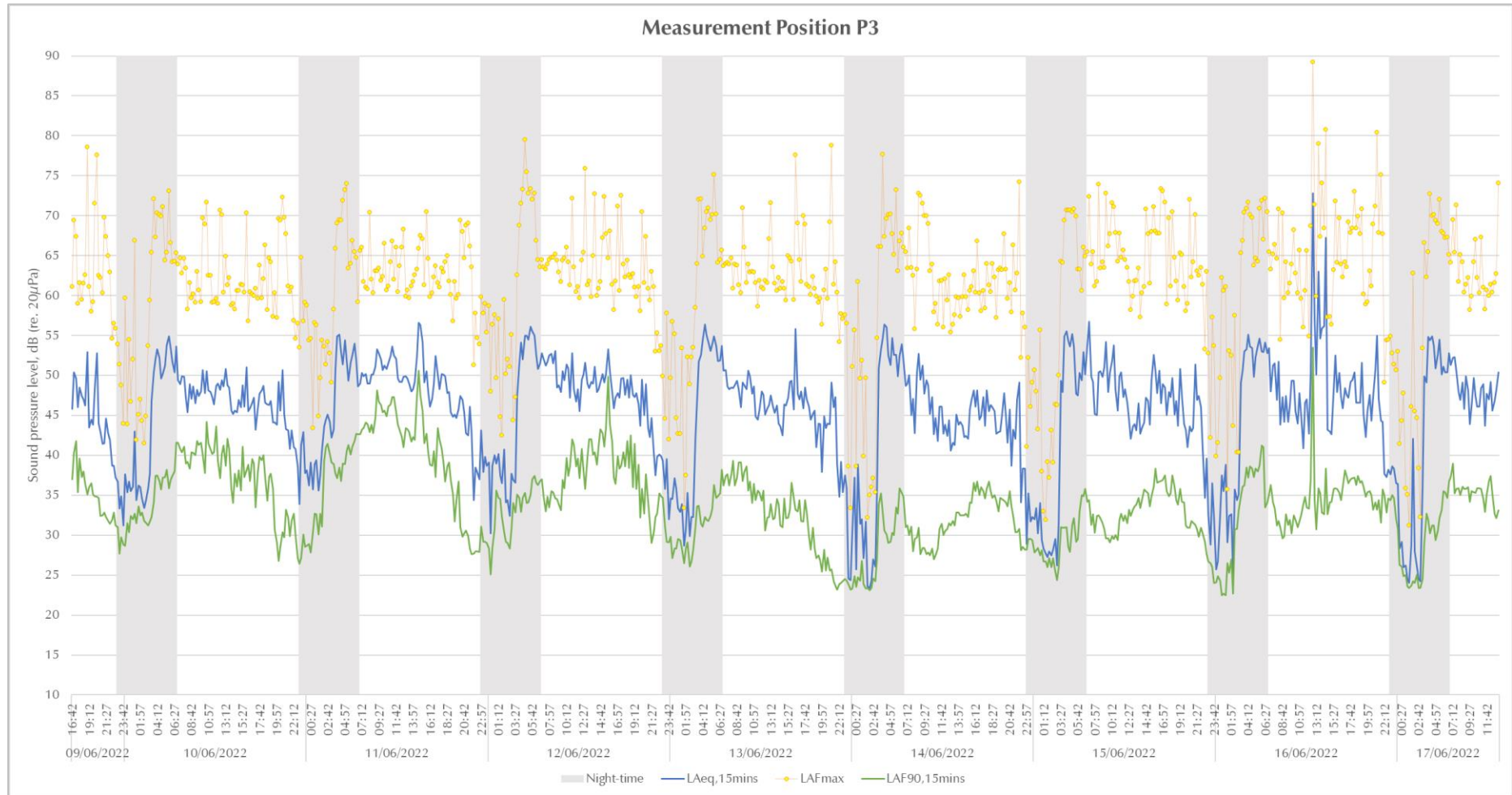


Figure 3.13 – Measured noise levels at Position P3





## Humber Low Carbon Pipelines - Baseline Noise Survey

### 3.6 Representative Background Sound Levels – Position P3

The statistical analysis that has been used to determine a representative background sound level during the daytime and night-time periods is presented in Figure 3.14 and 3.15 respectively. These levels will be used to inform the operational phase assessment for the Pumping Facility undertaken in accordance with BS 4142:2014+A1:2019: 'Methods for rating and assessing industrial and commercial sound'.

For this distribution of data, a daytime  $L_{A90,1hr}$  of 31 dB and a night-time  $L_{A90,15min}$  of 29 dB are considered to be representative of the prevailing background sound level at Position P3.

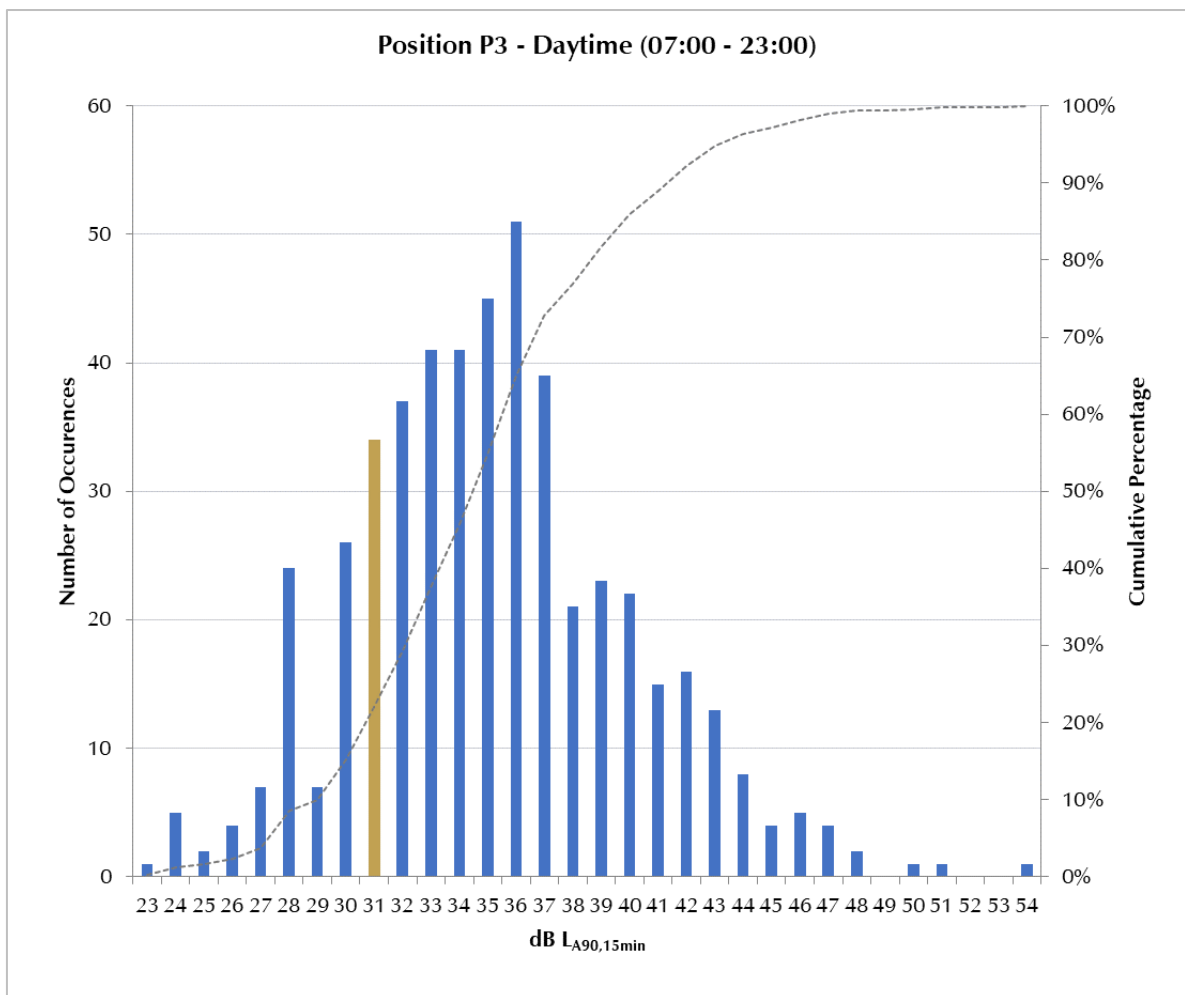


Figure 3.14 – Statistical analysis of measured background sound levels at Position P3 – Daytime



Humber Low Carbon Pipelines - Baseline Noise Survey

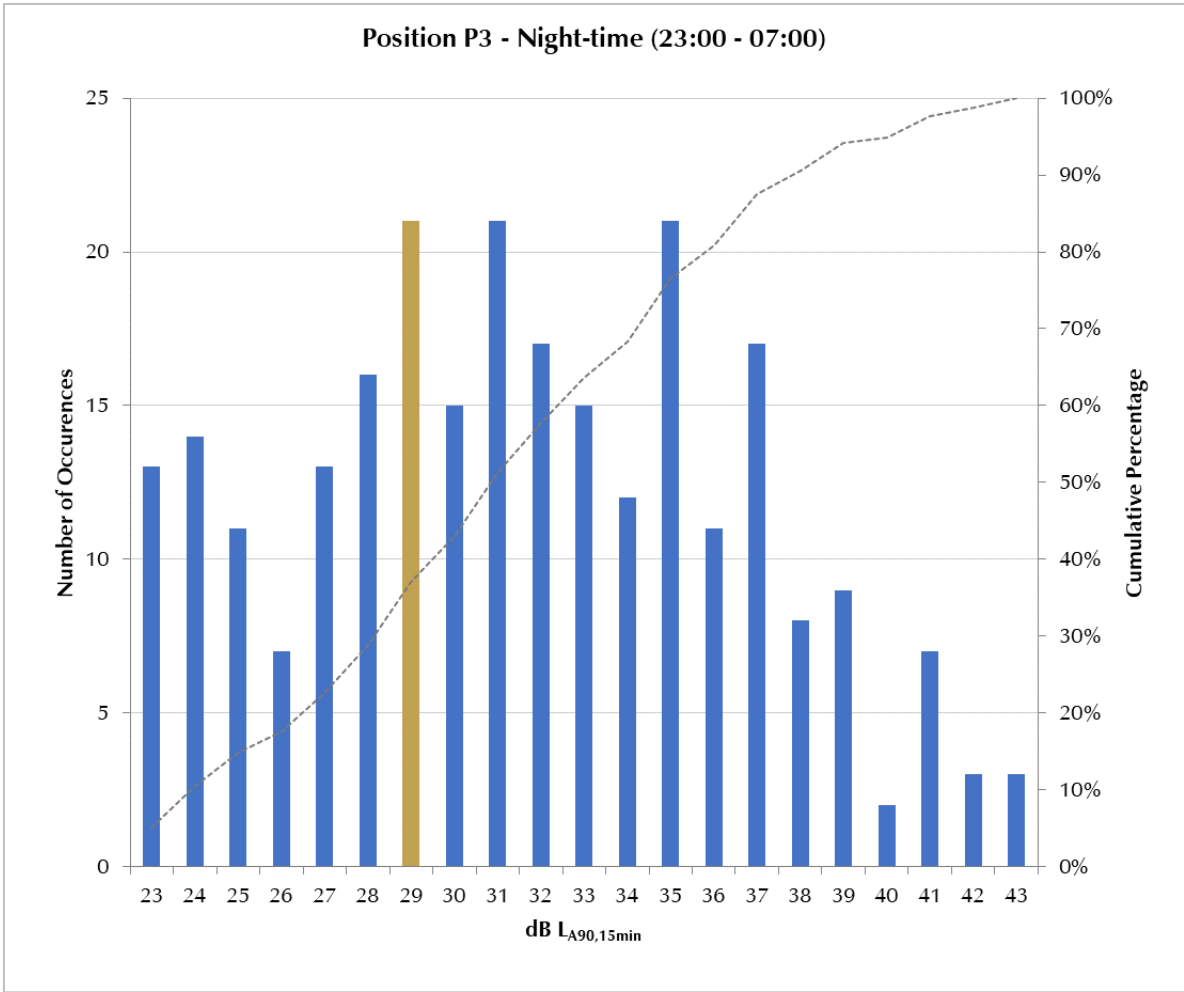


Figure 3.15 – Statistical analysis of measured background sound levels at Position P3 – Night-time



## Humber Low Carbon Pipelines - Baseline Noise Survey

### 3.8 Noise Measurements – Position P4: Two Hoots

A summary of the measured noise levels at Position P4 are presented below.

Date	Period	dB $L_{Aeq,T}$	dB $L_{A90,T}$	dB $L_{Amax}$ (Range)
09/06/2022 (Thursday)	Day	54.5	38.0	43.5 - 70.0
	Night	39.9	36.3	39.4 - 85.3
10/06/2022 (Friday)	Day	46.3	40.1	46.9 - 65.8
	Night	40.0	39.0	44.9 - 76.0
11/06/2022 (Saturday)	Day	49.0	42.9	48.7 - 72.0
	Night	38.8	36.9	40.2 - 63.8
12/06/2022 (Sunday)	Day	59.6	42.2	51.0 - 76.7
	Night	40.0	36.9	39.4 - 65.1
13/06/2022 (Monday)	Day	55.4	37.1	41.4 - 69.8
	Night	38.2	37.0	35.5 - 70.0
14/06/2022 (Tuesday)	Day	49.3	38.1	43.0 - 67.1
	Night	38.3	37.5	39.5 - 67.3
15/06/2022 (Wednesday)	Day	55.7	39.7	43.7 - 73.8
	Night	37.8	39.8	41.6 - 68.6
16/06/2022 (Thursday)	Day	54.0	39.4	38.7 - 69.3
	Night	38.9	31.7	31.6 - 70.2
17/06/2022	Day	45.2	36.6	48.7 - 64.3

**Notes:**

- Daytime period: 07:00 – 23:00 hrs, night-time: 23:00 – 07:00 hrs
- Daytime measurements taken on the 09/06/2022 and 17/06/2022 were not taken throughout full 16hr daytime period.
- $L_{Aeq,T}$  values are the logarithmic average of  $L_{Aeq,15min}$  samples, and the  $L_{A90,T}$  values are the arithmetic average of  $L_{A90,15min}$  samples.

Table 3.4 - Measured noise levels at Position P4

During the daytime installation and collection of the noise monitoring equipment at Position P4, the acoustic environment was dominated by natural sounds including wind-blown foliage and bird song, in addition to intermittent traffic on Hull Road (B1445).



Humber Low Carbon Pipelines - Baseline Noise Survey



Figure 3.16 – Noise monitoring installations at Position P4 – view facing north



Figure 3.17 – Noise monitoring installations at Position P4 – view facing south





## Humber Low Carbon Pipelines - Baseline Noise Survey

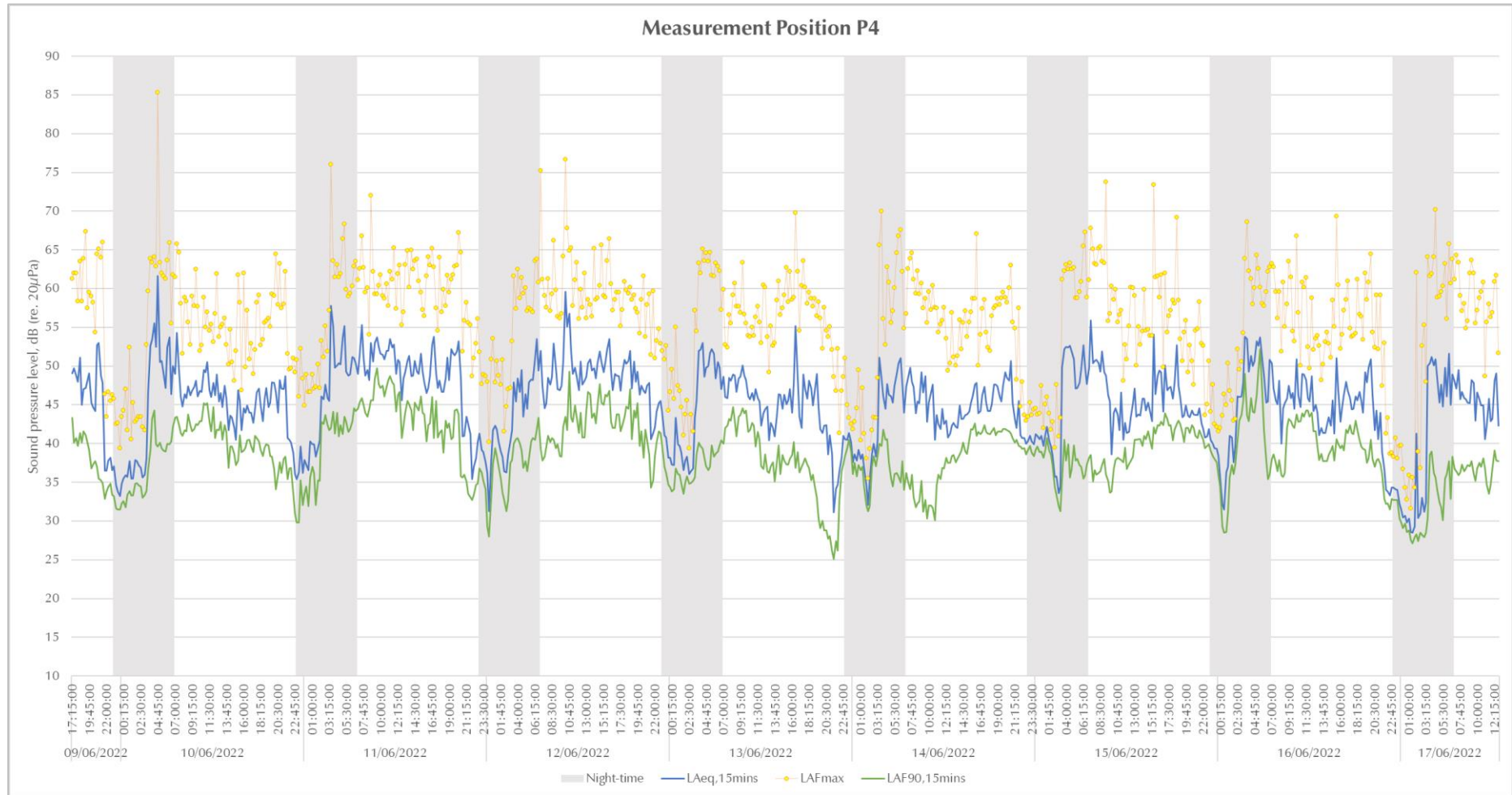


Figure 3.18 – Measured noise levels at Position P4



## Humber Low Carbon Pipelines - Baseline Noise Survey

### 3.9 Representative Background Sound Levels – Position P4

The statistical analysis that has been used to determine a representative background sound level during the daytime and night-time periods is presented in Figure 3.19 and 3.20 respectively. These levels will be used to inform the operational phase assessment for the Pumping Facility undertaken in accordance with BS 4142:2014+A1:2019: 'Methods for rating and assessing industrial and commercial sound'.

For this distribution of data, a daytime  $L_{A90,1hr}$  of 37 dB and a night-time  $L_{A90,15min}$  of 33 dB are considered to be representative of the prevailing background sound level at Position P4.

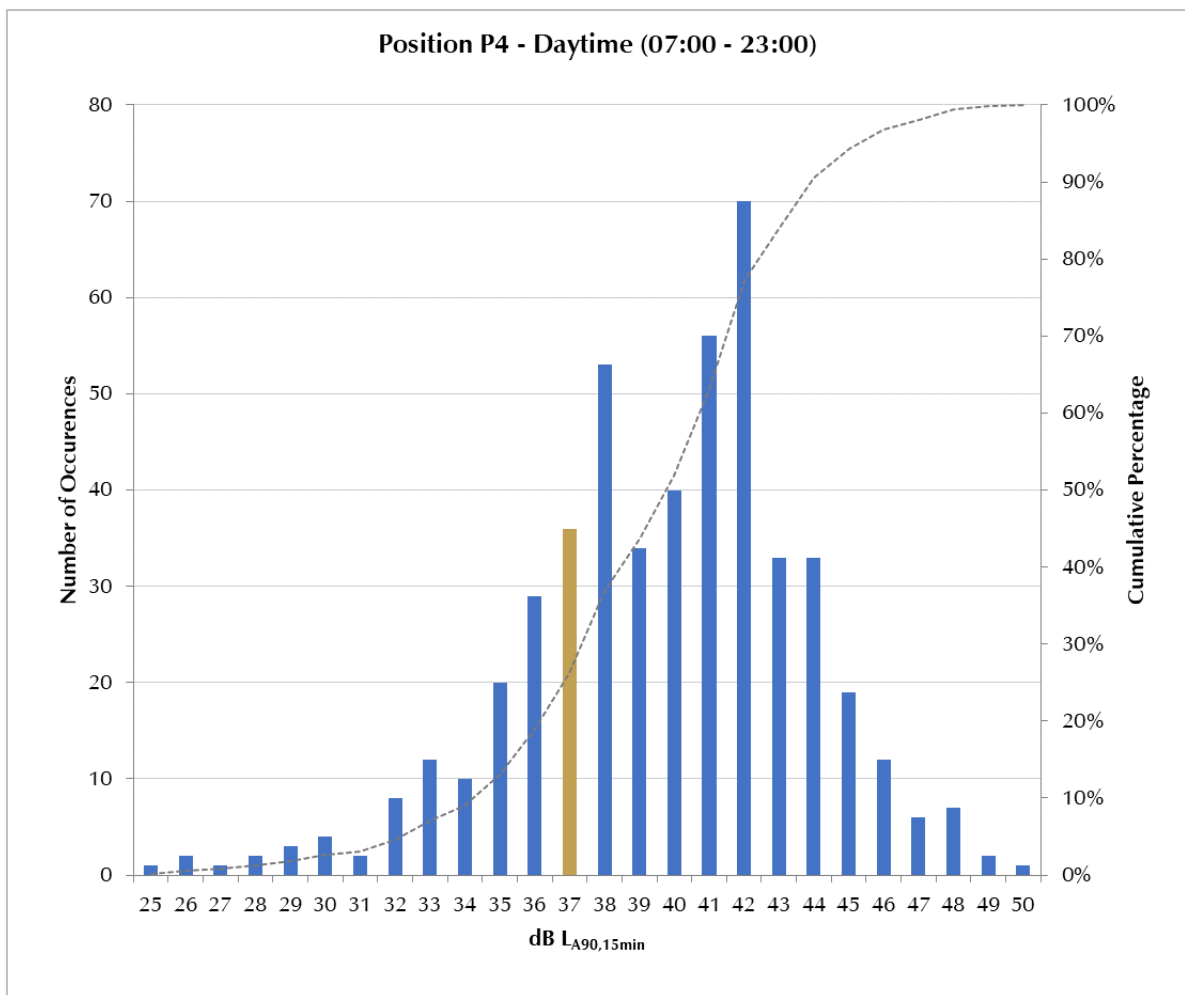


Figure 3.19 – Statistical analysis of measured background sound levels at Position P4 – Daytime



# Humber Low Carbon Pipelines - Baseline Noise Survey

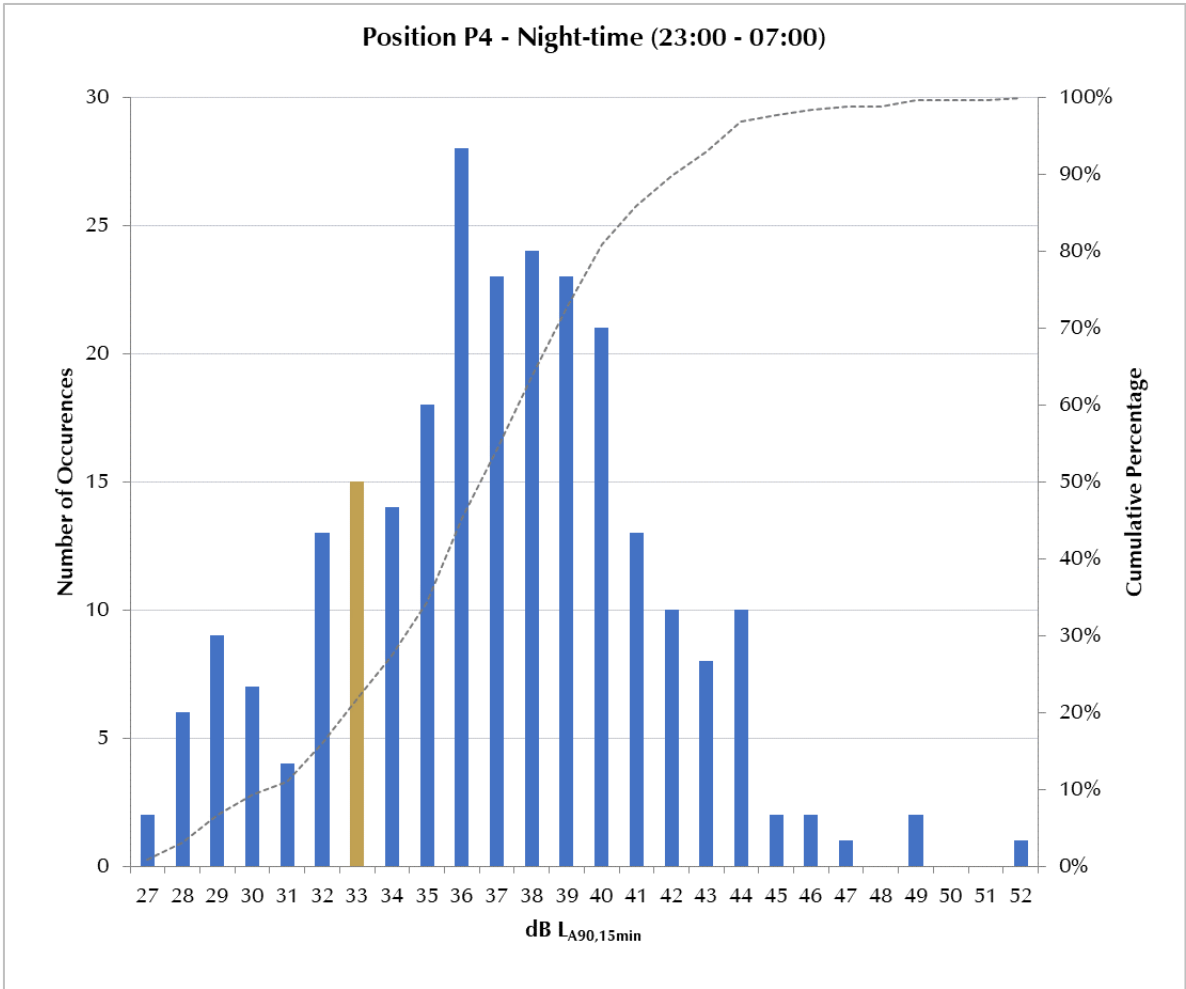


Figure 3.20 – Statistical analysis of measured background sound levels at Position P4 – Night-time





## Humber Low Carbon Pipelines - Baseline Noise Survey

### 3.11 Noise Measurements – Position P5: Coastal path

A summary of the measured noise levels at Position P5 are presented below.

Date	Period	dB L <sub>Aeq,T</sub>	dB L <sub>A90,T</sub>	dB L <sub>Amax</sub> (Range)
09/06/2022 (Thursday)	Day	54.7	51.9	60.5 - 81.2
	Night	54.9	50.9	59.2 - 74.6
10/06/2022 (Friday)	Day	54.3	50.1	55.8 - 74.4
	Night	53.5	49.1	57.7 - 71.7
11/06/2022 (Saturday)	Day	55.7	49.7	53.9 - 78.4
	Night	50.0	48.1	54.5 - 66.0
12/06/2022 (Sunday)	Day	57.2	48.6	60.1 - 80.4
	Night	50.8	48.4	55.8 - 67.3
13/06/2022 (Monday)	Day	52.9	49.9	52.4 - 75.1
	Night	51.0	48.4	51.4 - 59.9
14/06/2022 (Tuesday)	Day	50.9	48.3	51.7 - 78.1
	Night	51.3	49.2	49.9 - 73.7
15/06/2022 (Wednesday)	Day	50.8	48.8	51.1 - 70.2
	Night	51.1	49.3	52.4 - 62.7
16/06/2022 (Thursday)	Day	49.6	46.7	49.7 - 73.4
	Night	50.3	48.7	53.2 - 62.7
17/06/2022	Day	50.8	48.1	56.0 - 76.5

**Notes:**

- Daytime period: 07:00 – 23:00 hrs, night-time: 23:00 – 07:00 hrs
- Daytime measurements taken on the 09/06/2022 and 17/06/2022 were not taken throughout full 16hr daytime period.
- L<sub>Aeq,T</sub> values are the logarithmic average of L<sub>Aeq,15min</sub> samples, and the L<sub>A90,T</sub> values are the arithmetic average of L<sub>A90,15min</sub> samples.

Table 3.5 - Measured noise levels at Position P5

During the daytime installation and collection of the noise monitoring equipment at Position P5, the acoustic environment was dominated by natural sounds, primarily comprising breaking waves, in addition to intermittent traffic on Warner Lane/Dimlington Road.



## Humber Low Carbon Pipelines - Baseline Noise Survey



Figure 3.21 – Noise monitoring installations at Position P5 – view facing south



Figure 3.22 – Noise monitoring installations at Position P5 – view facing north





# Humber Low Carbon Pipelines - Baseline Noise Survey

## 3.12 Representative Background Sound Levels – Position P5

The statistical analysis that has been used to determine a representative background sound level during the daytime and night-time periods is presented in Figure 3.24 and 3.25 respectively. These levels will be used to inform the operational phase assessment for the Pumping Facility undertaken in accordance with BS 4142:2014+A1:2019: *'Methods for rating and assessing industrial and commercial sound'*.

For this distribution of data, a daytime  $L_{A90,1hr}$  of 48 dB and a night-time  $L_{A90,15min}$  of 48 dB are considered to be representative of the prevailing background sound level at Position P5.

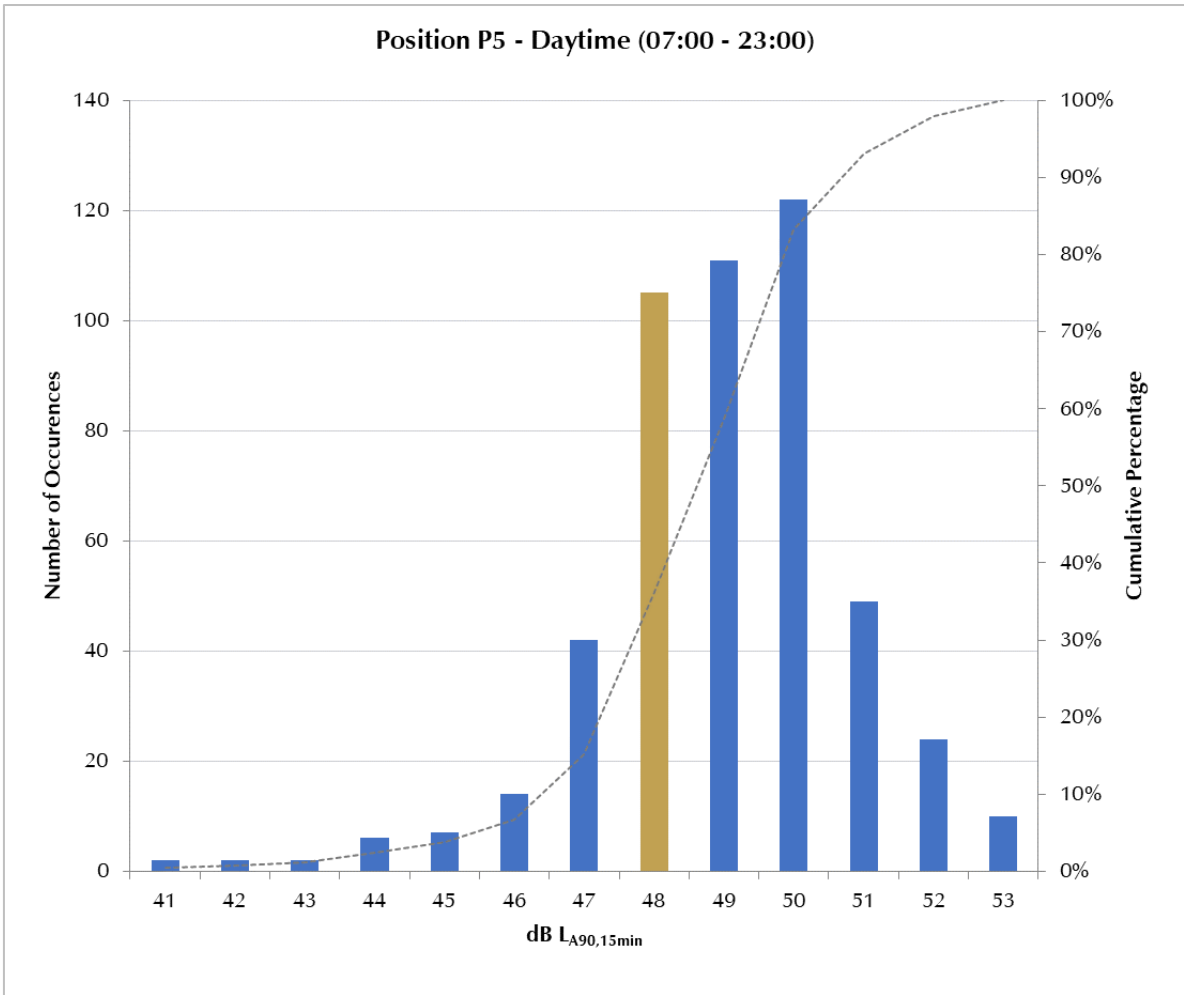


Figure 3.24 – Statistical analysis of measured background sound levels at Position P5 – Daytime



Humber Low Carbon Pipelines - Baseline Noise Survey

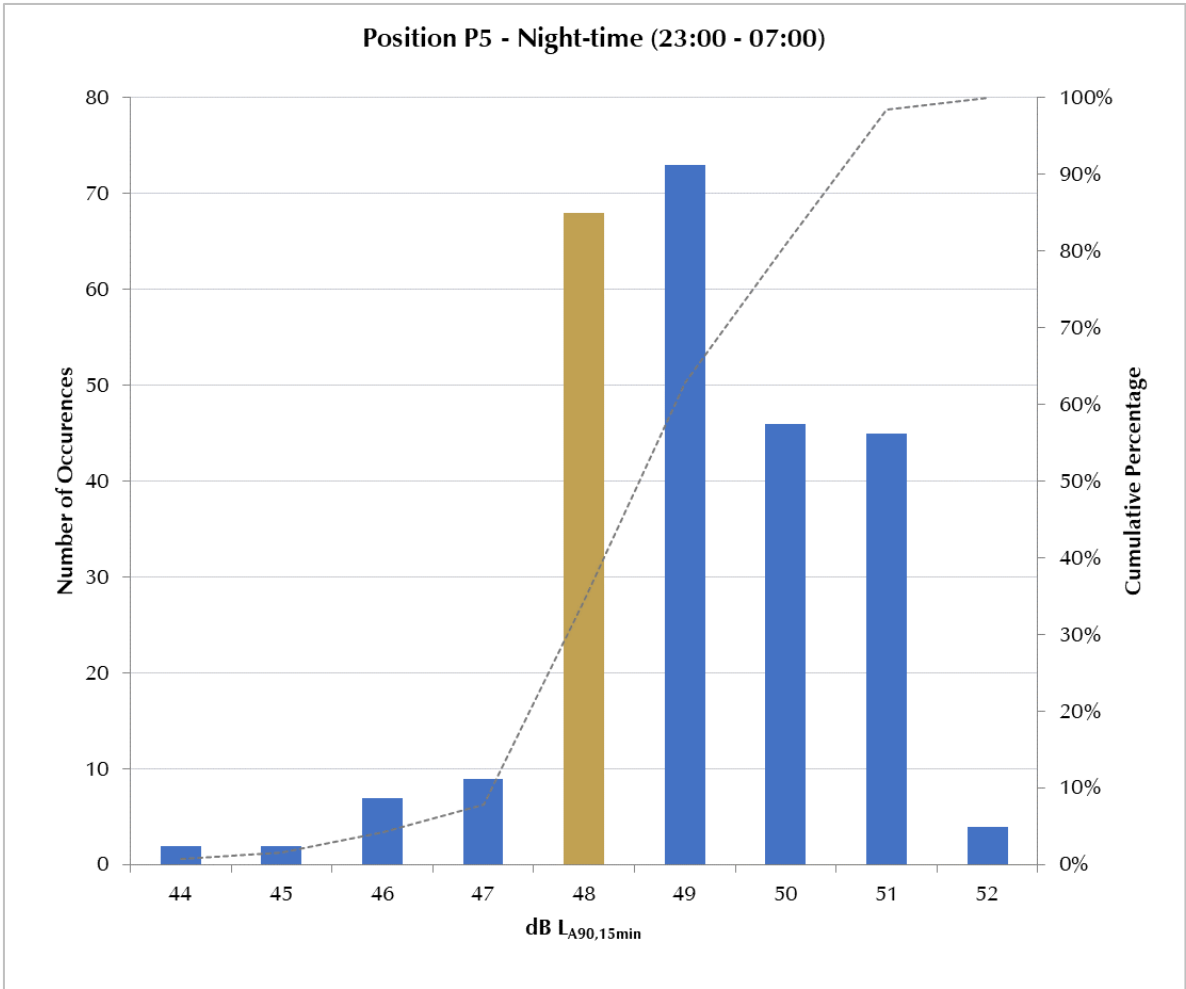


Figure 3.25 – Statistical analysis of measured background sound levels at Position P5 – Night-time

■ End of Section



## Humber Low Carbon Pipelines - Baseline Noise Survey

### Glossary of Acoustic Terms

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$L_{Aeq}$ :

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A)  $L_{eq}$ .

$L_{Amax}$ :

The maximum A-weighted sound pressure level recorded over the period stated.  $L_{Amax}$  is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the  $L_{Aeq}$  noise level. Unless described otherwise,  $L_{Amax}$  is measured using the “fast” sound level meter response.

$L_{A10}$  &  $L_{A90}$ :

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The  $L_{An}$  indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified.  $L_{A10}$  is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly  $L_{A90}$  gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

$L_{A10}$  is commonly used to describe traffic noise. Values of dB  $L_{An}$  are sometimes written using the alternative expression dB(A)  $L_n$ .

■ End of Section



