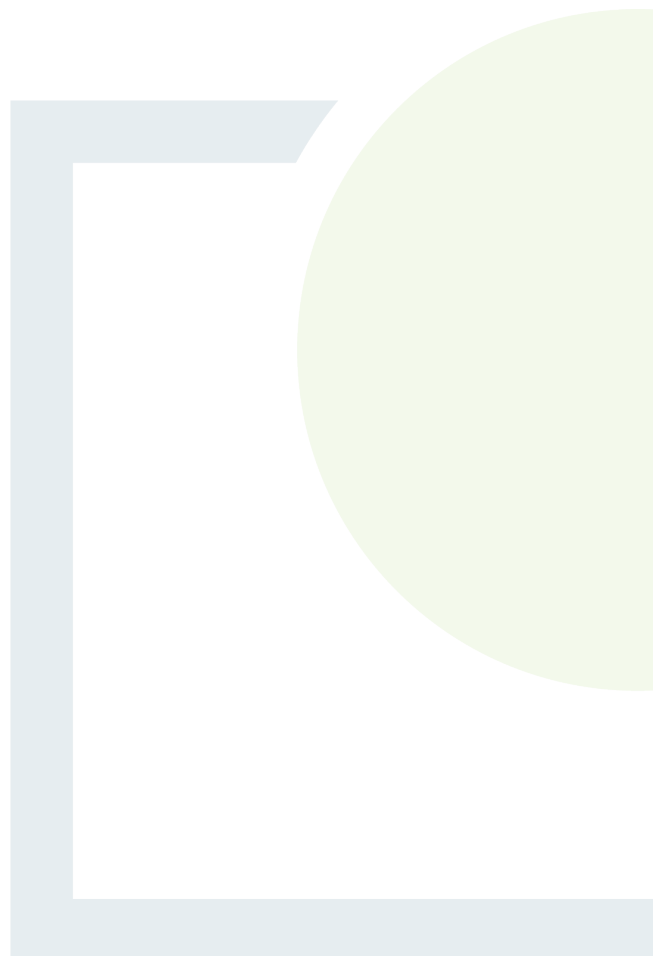




CONSULTANTS IN ENGINEERING,  
ENVIRONMENTAL SCIENCE  
& PLANNING

# APPENDIX 7.1

Baseline Noise Measurements



**Baseline Noise Measurements**

Baseline noise monitoring was undertaken at 17 locations, locations N2 - N8 and N10 – N19, to establish the existing background noise levels at these locations. These locations represent the nearest residential locations to the north, south, east and west of the proposed wind farm.

**Selection of Monitoring Locations**

Section 2.2.5 of the Institute of Acoustics’, *A Good Practice Guide to the Application of ETUS-R-97 for the Assessment at Rating of Wind Turbine Noise* (2013) regarding use of proxy locations states “*When choosing a location that will serve as a proxy for others, the basis for selection is that it can reasonably be claimed, from inspection and observation, to be representative of the non-surveyed locations, in line with the criteria of Section 2.5. Measurement locations outside a property’s curtilage (such as an adjacent field) may be used when access to a representative property cannot be obtained, provided that such a location can be justified as being representative. No general guidance can therefore be given on the number of measurement locations as this will be site-specific.*” Section 2.5 of the GPG is summarised in Table 7.1.1 with the applicability of the proxy locations selected for Ballinagree Wind Farm.

**Table 7.1.1: IOA GPG Section 2.5 Criteria and Applicability to Ballinagree Wind Farm Monitoring Locations**

Requirements of Section 2.5	Ballinagree Wind Farm Monitoring Locations
2.5.1 <i>Where possible, measurements should be made in the vicinity of a dwelling in an area frequently used for rest and recreation.</i>	This was adhered to where possible. In some instances, access to the dwellings of interest were denied. In those instances, proxy locations were identified.
2.5.2 <i>Equipment should be placed at outdoor positions where noise levels are representative of typical ‘low’ levels likely to be experienced in the vicinity of a dwelling (or group of dwellings if the measurements are intended to be applied to more than one dwelling). The overriding consideration is that <u>it can reasonably be claimed, from inspection and observation, that there are no other suitable noise-sensitive locations, in the vicinity of any selected location and close to a dwelling, where background noise levels would be expected to be consistently lower than the levels at the selected position.</u></i>	This was adhered to where possible. In some instances, access to the dwellings of interest was denied e.g. location N1 and N9. Equipment was installed at location N13, however, equipment was tampered with and a request to repeat the noise survey at this location was denied. It was not possible to get access to dwelling adjacent to location N16. A proxy location was used but following a review of the data the location was omitted from further analysis due to high levels on noise observed from a nearby water course.
2.5.3 <i>Ideally the position should be one which would be exposed to noise from the wind turbines whilst being best-screened from other noise sources such as nearby roads or vegetation.</i>	The locations were in open areas or within the curtilage of a property, set back from local roads and vegetation/ forestry.

Requirements of Section 2.5	Ballinagree Wind Farm Monitoring Locations
<p>2.5.4 <i>The background surveys provide the basis for setting both daytime and night-time noise limits: the measurement position must therefore reasonably represent external areas (for daytime noise) and also building façades containing windows (for night-time noise).</i></p>	<p>The locations being used to derive limits are representative of external areas and façade locations.</p>
<p>2.5.5 <i>In most locations, background noise levels will be determined by wind in trees and vegetation and noise sources external to the property such as traffic noise. The presence of local noise sources such as boiler flues, garden fountains, domestic drains, watercourses and farm equipment should be identified.</i></p>	<p>There were some local noise sources described below. At location N16, local noise sources were very high, and this monitoring location has not been considered as it is not representative of the wider noise environment in the vicinity of the site.</p>
<p>2.5.6 <i>Where it is not possible to exclude the influence of variable local noise sources by selection of monitoring position, it is generally possible to identify such data from inspection of noise level time histories and therefore to exclude it from the data set used to derive noise limits</i></p>	<p>Attendance at the monitoring location during installation, battery changes and equipment collection did not identify any variable noise sources. Atypical data was removed from data analysis.</p>
<p>2.5.7 <i>In all cases, microphones should be supported at a height of 1.2 – 1.5 metres above the ground and no closer than 3.5 metres to any significant reflecting surface (such as a building or fence), except the ground. The position should be within 20 metres of the dwelling unless there are particular reasons for measuring at a more distant position (such as the presence of vegetation or denial of access); if so, the reasons should be explained.</i></p>	<p>The microphones were mounted on tripods at approximate height of 1.5 m and at least 3.5 m from any significant reflecting surface other than the ground. Where possible the noise monitors were located within 20 m. When the noise monitors were located at more distant locations this was due to either the refusal of access or presence of vegetation.</p>
<p>2.5.8 <i>A resident at a selected property may request that measurements are made at a position which is considered inappropriate; perhaps because the preferred location(s) are inconvenient (it might obstruct lawn mowing, for example). In this situation the consultant should explain clearly the reasons why the measurements could be compromised; if no agreement can be reached, an alternative property or location should be sought. The assistance of the EHO may help to resolve these situations.</i></p>	<p>This was not an issue.</p>

### Monitoring Locations

Eighteen noise monitoring locations were selected for obtaining a detailed representation of the background noise levels in the area. The chosen noise monitoring locations were representative of the different noise environments in the vicinity of the proposed Ballinagree Wind Farm development as well as being located at some of the closest dwellings (or their representative proxies) to the proposed wind farm development.

Details of the noise monitoring locations are provided in Table 7.1.2 overleaf. The position of the monitoring locations are shown in Figure 7.2.

**Table 7.1.2: Details on the Noise Monitoring Locations**

Location ID	Easting	Northing	Description	Photograph
N2	537874	583205	Located in a field adjacent to the dwelling and approximately 30 m from adjacent dwelling façade. The location was chosen so it was away from trees along the boundary of the property.	Plate 7.1-1
N3	537963	582999	Located in front garden of dwelling in direction of proposed wind farm, approximately 5 m from dwelling façade.	Plate 7.1-2
N4	537598	582500	Located in the rear garden of the dwelling facing the proposed wind farm.	Plate 7.1-3
N5	537142	581929	Located in field adjacent to residential dwelling, immediately at the boundary of the curtilage.	Plate 7.1-4
N6	536628	581611	Located in field approximately same distance from road and row of trees from adjacent dwelling (proxy location), next to a farm.	Plate 7.1-5
N7	536248	581009	Located in the rear garden of the dwelling in the direction of the wind farm.	Plate 7.1-6
N8	534953	582310	In rear garden of dwelling along rear fence, overlooking a field to rear of dwelling, approximately 9 m from rear façade.	Plate 7.1-7
N10	532526	583491	In garden south of dwelling, away from road, approximately 5 m from the dwelling façade. Forested area across road.	Plate 7.1-8
N11	531924	586386	Located in garden of dwelling on raised ground, east of the dwelling. Approximately 10 m from the dwelling façade.	Plate 7.1-9
N12	532125	587243	Located next to drive overlooking rear garden of the dwelling.	Plate 7.1-10
N13	532946	586946	In yard outside the dwelling, adjacent to a forested area (glamping site).	Plate 7.1-11

Location ID	Easting	Northing	Description	Photograph
			Approximately 15 m from the dwelling.	
N14	533759	587844	Proxy location in field opposite dwelling approximately 100 m from the dwelling. The noise monitor is located equidistant from row of trees similar to the aspect for the dwelling.	Plate 7.1-12
N15	535534	588742	Located in the yard of a farmhouse approximately 15 m from the dwelling.	Plate 7.1-13
N16	541499	587708	Proxy location, in field next to dwelling. Approximately 160 m from dwelling.	Plate 7.1-14
N17	535891	585368	Located next to drive opposite front façade of house overlooking adjacent road.	Plate 7.1-15
N18	537054	584578	Located in a disused farmyard to the rear of the derelict dwelling.	Plate 7.1-16
N19	537762	584406	Located in field adjacent to dwelling to the rear of building in the yard of a disused farm.	Plate 7.1-17

**Location N2** This location is a proxy location for the adjacent dwelling. The noise meter was placed in an adjacent field and some distance from the boundary of the dwelling which has trees.



**Plate A7.1: Monitoring Location N2**

**Location N3** This was located in the front garden of the dwelling in the direction of the wind farm. There is a propane boiler in the front garden. The area was generally quiet, and the noise audible during the measurement was from wind in trees.



**Plate A7.2: Monitoring Location N3**

**Location N4** This location was in the rear garden of the dwelling, within approximately 10 m of the rear façade of the dwelling. This property had an automatic lawn mower.



**Plate A7.3: Monitoring Location N4**

**Location N5** This location was a proxy location for the adjacent dwelling. The noise meter was located in the field immediately adjacent to the dwelling. The noise monitor was within 10 m of the dwelling. The area was very quiet with noise on the adjacent road from very occasional traffic. When the meter was being installed noise was observed from a farm vehicle engine in a nearby field.



**Plate A7.4: Monitoring Location N5**

**Location N6** This location was a proxy location for the adjacent dwelling, located approximately 40m east of the dwelling opposite the adjacent road. The noise meter was located so that it was approximately the same distance from adjacent trees by the road as the property. The area was observed to be very quiet. Noise sources observed included cows, noise from wind in trees and birdsong. This location is next to a working farm.



**Plate A7.5: Monitoring Location N6**

**Location N7** This location was in the rear garden of the dwelling, approximately 12m from the rear façade and near to the rear boundary of the dwelling. This is a dwelling in a cul-de-sac in the town of Ballinagree. This dwelling had an automatic lawn mower. There is a one meter high and one meter wide stone wall at the rear boundary of the dwelling.



**Plate A7.6: Monitoring Location N7**

**Location N8** This location was in the rear garden of the dwelling, approximately 9 m from the rear façade of the dwelling and next to the fence at the rear boundary of the dwelling. At the car parking space west of the dwelling, trickling from noise from a drain was observed approximately 40m west of the measurement location. Noise from wind in trees was audible at the dwelling. The location was chosen to be at the eastern part of the rear garden, away from trees. The location is next to farmland so noise from farm machinery and livestock is possible.



**Plate A7.7: Monitoring Location N8A**

**Location N10** This location was in the yard south of the property. There is a forested area in the direction of the wind farm to the east. There is a hill to the west. During the meter installation, the area was observed to be quiet with very distant road traffic noise (in direction of R582) to south west. There was also wind induced noise from nearby trees. The nearby wind turbines were not visible as they were blocked by the hill to south. There were 4 No. turbines visible at south of location along valley at Cahernafula on a hill.



**Plate A7.8: Monitoring Location N10**

**Location N11** This location was in the garden to the rear of the dwelling on raised ground (hardstanding area immediately behind house with wall). There is a row of trees south of the site and north of the dwelling. There are forested areas east of the measurement location.



**Plate A7.9: Monitoring Location N11**

**Location N12** At this location the noise monitor was placed at the edge of the drive by the house overlooking the rear garden, in the direction of the proposed wind farm. This dwelling is located close to Musherá Cross. This location is on a rural road, the L1123, but has the potential to be busy during the morning and evening rush hour as the area is a commuter location for cork. Noise observed included road traffic noise. There was noise from a horse in the next field.



**Plate A7.10: Monitoring Location N12**

**Location N13** This is a dwelling and “glamping”/holiday rental location. This dwelling is located on the road approximately 800 m east of Musherá Cross. The dwelling is encircled south of the road by a forested area. The noise monitoring location was in the garden southeast of the dwelling on a raised section of ground. There are some small shrubs in the area. There is a solar panel and water pump in a building in the eastern section of the garden and this area was avoided.



**Plate A7.11: Monitoring Location N13**

**Location N14** The noise monitoring location was in a proxy location for the nearby residential dwelling. The dwelling was located in the Coillte field opposite the entrance to the dwelling. The noise monitoring location was approximately 100 m from the dwelling. The location was approximately equidistant from the row of trees that line the driveway to the dwelling. There was grass next to the noise monitor and some small trees some distance southwest of the noise monitor. The area was generally quiet, with noise from wind in trees noted. Approximately 90 m north of the site is a field with a horse. At the gate (approximately 90 m from meter), a low frequency noise from the gate post was observed.



**Plate A7.12: Monitoring Location N14**

**Location N15** The noise monitoring location was in the yard near farm buildings north of the proposed development, near Kilcorney. There were trailers parked at the edge of the dwelling and a barn south of the dwelling. There are cows in adjacent fields. Noise from crows and sheep were observed during measurement and noise from dogs barking in the yard.



**Plate A7.13: Monitoring Location N15**

**Location N16** The noise monitoring location was a proxy location for the adjacent dwelling. The location was on adjacent Coillte land next to the residential dwelling at a distance of about 160 m from the dwelling. The area was observed to be very quiet, with some noise from sheep in the adjacent field. There was also wind induced noise from nearby trees. There is a wind farm not far from this location, but the turbines were not visible from the measurement location.



**Plate A7.14: Monitoring Location N16**

**Location N17** This location was next to the boundary of the site, in line with the front façade of the house and next to the drive overlooking the proposed wind farm. This property is set back some distance from the road. Again, the road is in a rural location, but can be busy during early morning and evening due to commuter traffic to Cork. There is a field of sheep in the next field and noise from sheep was observed upon setting up the equipment. During the meter installation a loader was generating noise at a location to the north of the measurement location.



**Plate A7.15: Monitoring Location N17**

**Location N18** This location was within a disused farmyard. This was also the location for the rain gauge. The noise meter was placed on a concrete surface in the farmyard. Again, this location is adjacent to a rural road which can be busy during in the morning and evening as it is a commuter location for Cork.



**Plate A7.16: Monitoring Location N18**

**Location N19** This is a proxy location for the adjacent dwelling. The noise monitor was located approximately 8 m from the façade of the adjacent dwelling and set back the same distance from the road. It was located in a field with sheep. When the meter was installed the area was generally very quiet, with noise from occasional cars on the adjacent road and from sheep.



**Plate A7.17: Monitoring Location N19**

### Measurement Periods

The IOA GPG states “The duration of a background noise survey is determined only by the need to acquire sufficient valid data over the range of wind speeds. It is unlikely that this requirement can be met in less than 2 weeks.” If insufficient wind data is collected after two weeks, the monitoring period will be extended subject to acquiring sufficient valid data over the range of wind speeds. Sufficient data was captured at all monitoring locations with a minimum of two and a half weeks’ worth of data captured at all monitoring locations.

### Definition of Time Periods

The following periods were analysed for this report:

Amenity/Quiet Daytime hours	18:00 – 23:00 Monday to Friday 13:00 – 18:00 Saturday 07:00 – 18:00 Sunday
Night-time hours	23:00 – 07:00

### Monitoring Equipment

Baseline noise monitoring was carried out using Svantek Svan 977 and Svan 977A Class 1 sound level meters. Details of the noise monitoring equipment are presented in Table 7.1.3. The sound level meters were fitted with 1/2” microphones. The microphones connected to the Svantek sound level meters were fitted with a UA-0237 type wind shield made from open-pored polyurethane foam with a diameter of 90mm. These were surrounded by a secondary windshield. Some of the microphones were fitted with a single oversized wind shield. The setup used is in keeping with ESTU W/13/00386/REP, Noise Measurements in Windy Conditions and IOA Good Practice Guidelines, 2013. Calibration certificates for each sound level meter are provided in Appendix 7.2.

**Table 7.1.3: Details of Noise Monitoring Equipment**

Monitoring Location	Meter Type	Serial Number
N2	Svan 977	36163
N3	Svan 977	34876

Monitoring Location	Meter Type	Serial Number
N4	Svan 977	34875
N5	Svan 977	34173
N6	Svan 977	34875
N7	Svan 959	14775
N8	Svan 977	34876
N10	Svan 977	34173
N11	Svan 977	34876
N12	Svan 977A	45466
N13	Svan 959	14775
N14	Svan 977A	34173
N15	Svan 977	34875
N16	Svan 977A	69558
N17	Larson Davis Lxt	5896
N18	Svan 977	34876
N19	Svan 977	45466

A CR200 Series data logger was used to record rainfall (ARG 100) and this was located at N3, N14, N18 and N19. This meteorological data was acquired every 10 minutes simultaneously with noise data.

### Monitoring Protocol

Baseline noise measurements were undertaken at 17 locations surrounding the proposed wind farm. Equipment was installed in four lots:

- 1) from 19<sup>th</sup> May 2020 to 8<sup>th</sup> June 2020
- 2) 17<sup>th</sup> June 2020 to 6<sup>th</sup> July 2020
- 3) 4<sup>th</sup> August 2020 to 25<sup>th</sup> August 2020
- 4) 4<sup>th</sup> September 2020 to 29<sup>th</sup> September 2020.

These measurements included all 17 monitoring locations N2, N3, N4, N5, N6, N7, N8, N10, N11, N12, N13, N14, N15, N16, N17, N18 and N19.

The following monitoring protocol was carried out at each of the monitoring locations:

1. The sound level meters were calibrated on-site and set to log  $L_{A90}$  statistics on a fast time weighted response every ten minutes.
2. Each sound level meter microphone was mounted at 1.5 m above ground level and fitted with an enhanced windshield. Each microphone was placed at least 3.5 m from reflecting surfaces to obtain 'free field' conditions.

3. Wind speed and wind direction measurements were taken from permanent mast installed on site. Wind speed was measured at a range of heights and data from anemometers at 65 m and 80 m were used to extrapolate the wind speed data up to a hub height of 110 m.

The standardised 10 m wind speed was obtained from the turbine hub height wind speed by correcting it to 10 m height using a ground roughness factor of 0.05 m. Roughness length (or logarithmic) shear profile:

$$U_1 = U_2 \frac{\ln\left(\frac{H_1}{z}\right)}{\ln\left(\frac{H_2}{z}\right)}$$

where  $U_1$  is the wind speed to be calculated,  $U_2$  is the measured wind speed,  $H_1$  is the height of the measured wind speed to be calculated (10m),  $H_2$  is the height of the measured wind speed and  $z$  is the ground roughness length (m). A roughness length of 0.05m is used to standardise hub height wind speeds to 10m height in the IEC 61400-11:2012 standard.

4. The  $L_{A90}$  statistic measurements were synchronised with the 10 m standardised wind speeds derived from the on-site meteorological mast data.
5. A logging rain gauge was also installed (at Monitoring Location N8) and similarly logged rainfall events over successive 10-minute intervals, also synchronised to the noise level and wind speed measurements.
6. After the monitoring was completed, the noise meters were re-tested using the calibration noise source to ensure that the meters had not drifted.

### Analysis of the Baseline Data

Following collection of the site data, the following protocol was used to analyse the baseline data:

1. The raw baseline  $L_{A90}$  noise data was reviewed to determine whether there are any periods of non-consistent noise level due to equipment malfunction.
2. The raw noise level data was then correlated with the time synchronised wind speed and rainfall data. Preliminary data analysis was used to remove datasets ( $L_{A90}$ , wind speed and occurrence of rainfall event) which contain a rainfall event as these data sets are required to be removed from further analysis in line with best practice as outlined in the IOA Good Practice Guide and Supplementary Guidance Note 2 on Data Processing.
3. The prevailing background noise during for daytime periods uses the amenity/quiet daytime hours. The prevailing background noise during night-time periods excludes early morning periods to remove the dawn chorus which is not prevalent through that whole year, with data recorded between 04:00 and 07:00 was removed from further analysis.
4. Once the rainfall events have been accounted for, the remaining data was graphed using a wind speed based plot to establish whether there are any remaining data outliers, representing atypical noise sources or events.
5. Once the remaining data sets were found to be representative of the noise environment, they were analysed to ensure that sufficient data remained to provide sufficient data coverage over the necessary wind speeds. The prevailing background noise trend was not extended beyond the range covered by adequate data sets. See Section 'Data Available for Determination of Prevailing Background Noise Levels' for details.

6. The proposed wind farm is adjacent to several other wind farms. Analysis was undertaken to remove the contribution of adjacent wind farms where applicable. This involved undertaking directional noise predictions and correcting the background noise data. Where the difference between background noise levels and predicted noise levels was less than 3 dB, these data points were omitted from the analysis. The resulting corrected noise levels resulted in a higher prevailing background noise level due to the omission of these data points. Therefore, the uncorrected data set was used as is resulted in lower background noise levels which were used in the derivation of the noise limits.
7. A 'best fit' trend (not higher than a fourth order polynomial) was then derived to present the assumed prevailing background noise level at each monitoring location. See Section 'Results' for details.

#### Data Available for Determination of Prevailing Background Noise Levels

The requirement for the survey duration is dictated by the range of wind speeds to be collected. The IOA Good Practice Guide to the Application of ETSU-R-97<sup>1</sup> for the Assessment and Rating of Wind Turbine Noise, (May 2013) states that *"As a guideline, no fewer than 200 data points should be recorded in each of the amenity hours and night-time periods with no fewer than 5 data points in any 1 m/s wind speed bin."*

The Wind Energy Development Guidelines (Department of Environment, Heritage and Local Government, 2006) do not provide the specific periods which are represented by daytime and night-time hours, therefore the definitions from ETSU-R-97 are taken as 07:00 to 23:00 hrs for daytime and 23:00 to 07:00 hrs for night-time.

Prevailing background noise levels were derived for daytime periods. The number of datasets at each integer wind speed are shown in Tables 7.1.4.

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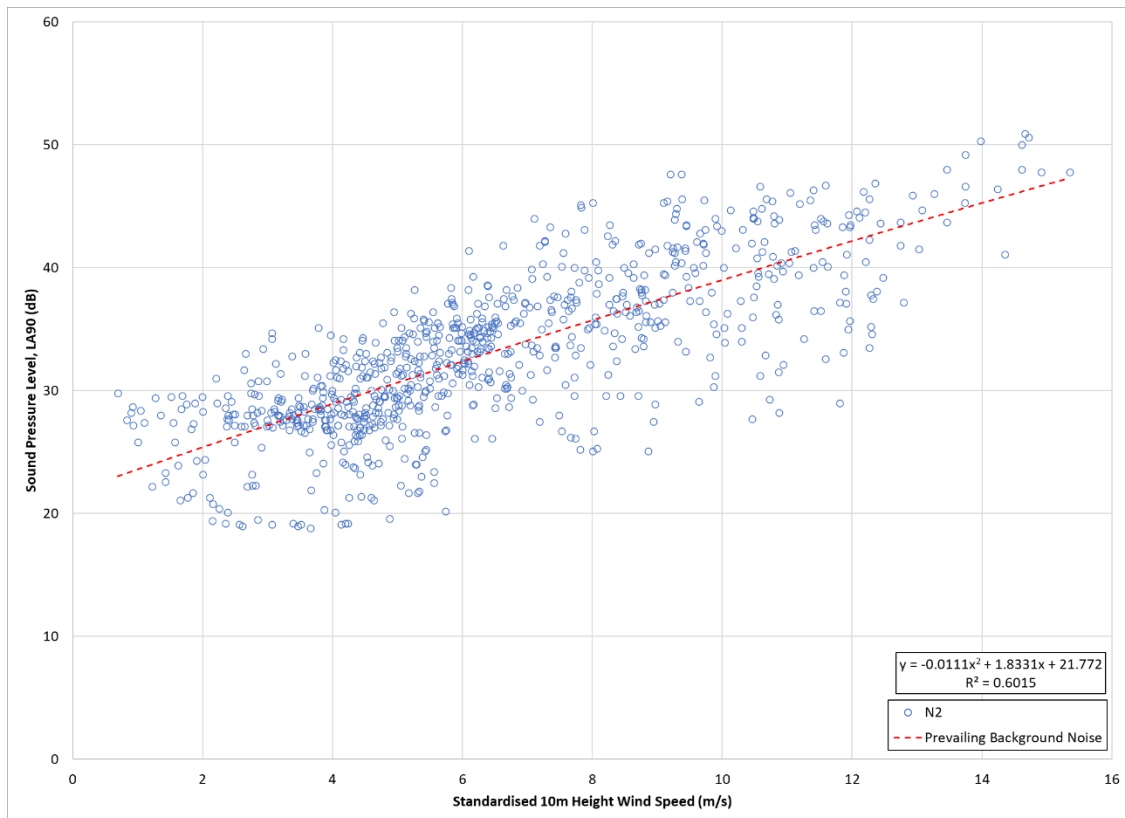
<sup>1</sup> Department of Trade and Industry (1996), The Assessment and Rating of Noise from Wind Farms Report ETSU-R-97

**Table 7.1.4: Number of Valid Datasets: Noise Monitoring Locations N1 – N10 – Daytime**

Wind Speed (at standardised 10 m height), m/s	Valid Datasets														
	N2	N3	N4	N5	N6	N7	N8	N10	N11	N12	N14	N15	N17	N18	N19
0	1	2	1	0	10	1	10	0	0	1	10	0	1	1	0
1	13	64	13	0	149	13	149	0	0	13	149	0	13	13	0
2	37	45	37	9	115	37	115	9	7	37	115	13	34	35	9
3	66	105	65	30	135	66	134	31	19	62	135	33	61	63	31
4	127	147	126	59	129	127	129	60	39	120	129	69	114	119	60
5	136	133	136	53	64	136	64	58	30	134	64	68	132	135	58
6	122	90	122	100	66	122	66	106	79	99	66	117	119	122	106
7	67	88	69	121	56	69	56	124	86	63	56	130	68	66	124
8	65	55	65	147	52	65	52	147	86	64	51	155	65	63	147
9	66	31	67	88	21	67	21	88	44	67	21	100	67	65	88
10	41	27	40	53	11	41	11	54	30	41	11	61	41	38	54
11	42	17	40	39	5	42	5	39	21	42	5	45	42	41	39
12	37	9	34	16	6	37	6	16	6	37	6	22	37	37	16
13	9	0	9	6	3	12	3	5	4	12	3	9	12	12	6
14	6	0	6	6	2	6	2	6	4	6	2	9	6	6	6
15	6	0	6	5	3	6	3	5	5	6	3	8	6	6	5
16	1	0	1	3	2	1	2	3	3	1	2	7	1	1	3
17	0	0	0	3	2	0	2	3	3	0	2	5	0	0	3
Total Number of Data Points	842	813	837	738	831	848	830	754	466	805	830	851	819	823	755

## Results

In this section, the prevailing background noise level in dB  $L_{A90}$  relative to standardised 10 m height wind speeds are provided for each monitoring location as per the requirements of the survey. The prevailing background noise level is plotted as a solid line for each daytime and night-time periods at each monitoring location. In all cases, the highest order of polynomial used is a fourth order polynomials provided lines of best fit to the scatter data.



**Figure A7.18: Prevailing Daytime Background ( $L_{A90}$ ) Noise Levels at N2**

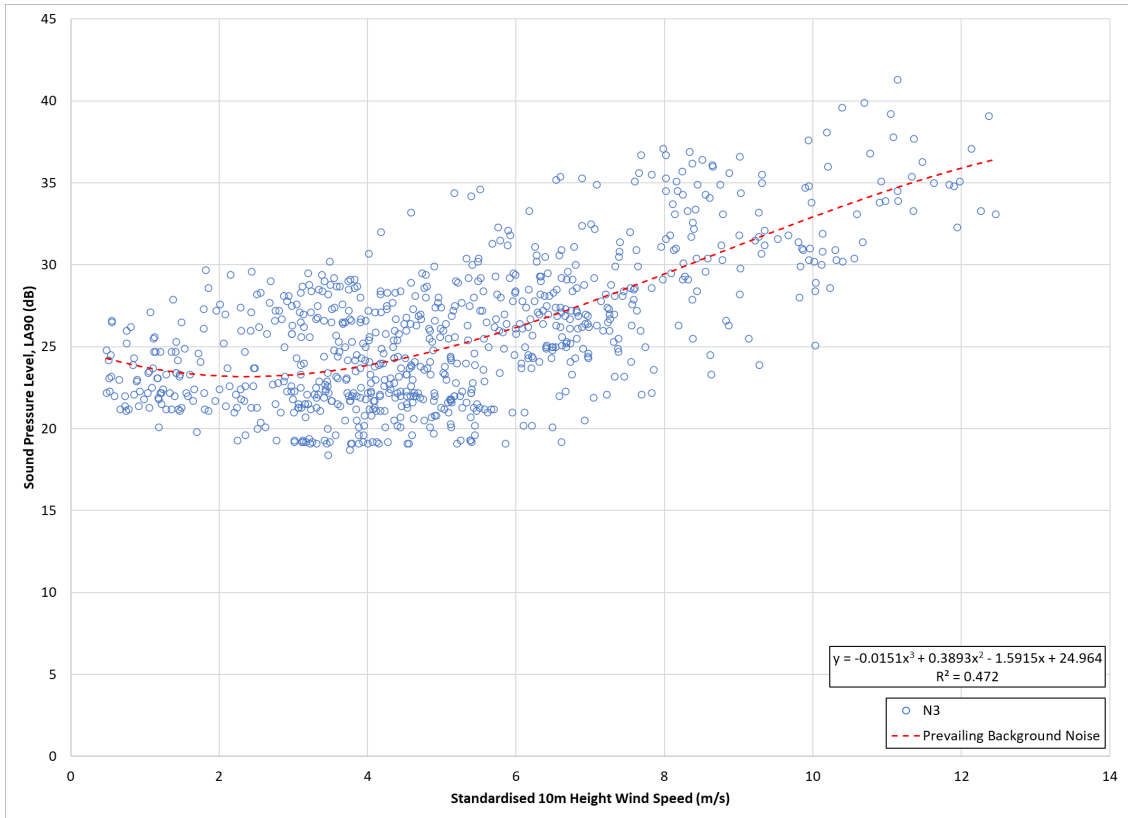


Figure A7.18: Prevailing Daytime Background (LA90) Noise Levels at N3

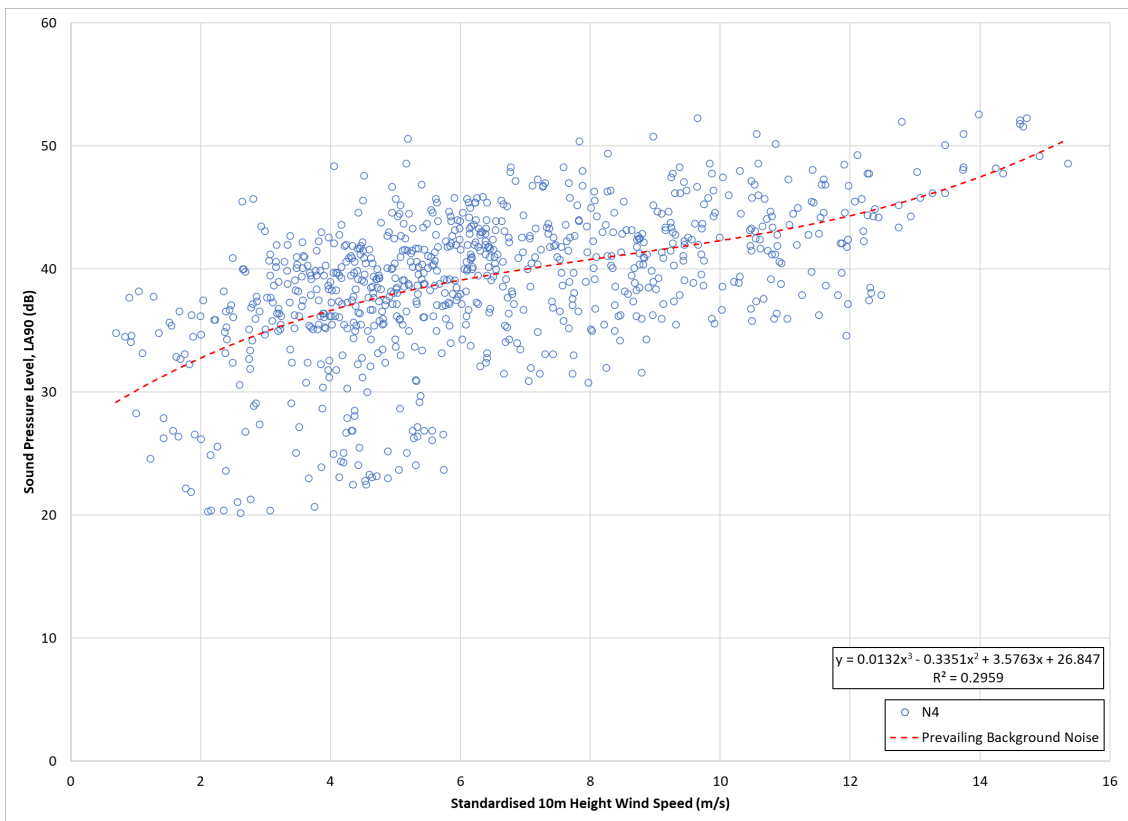
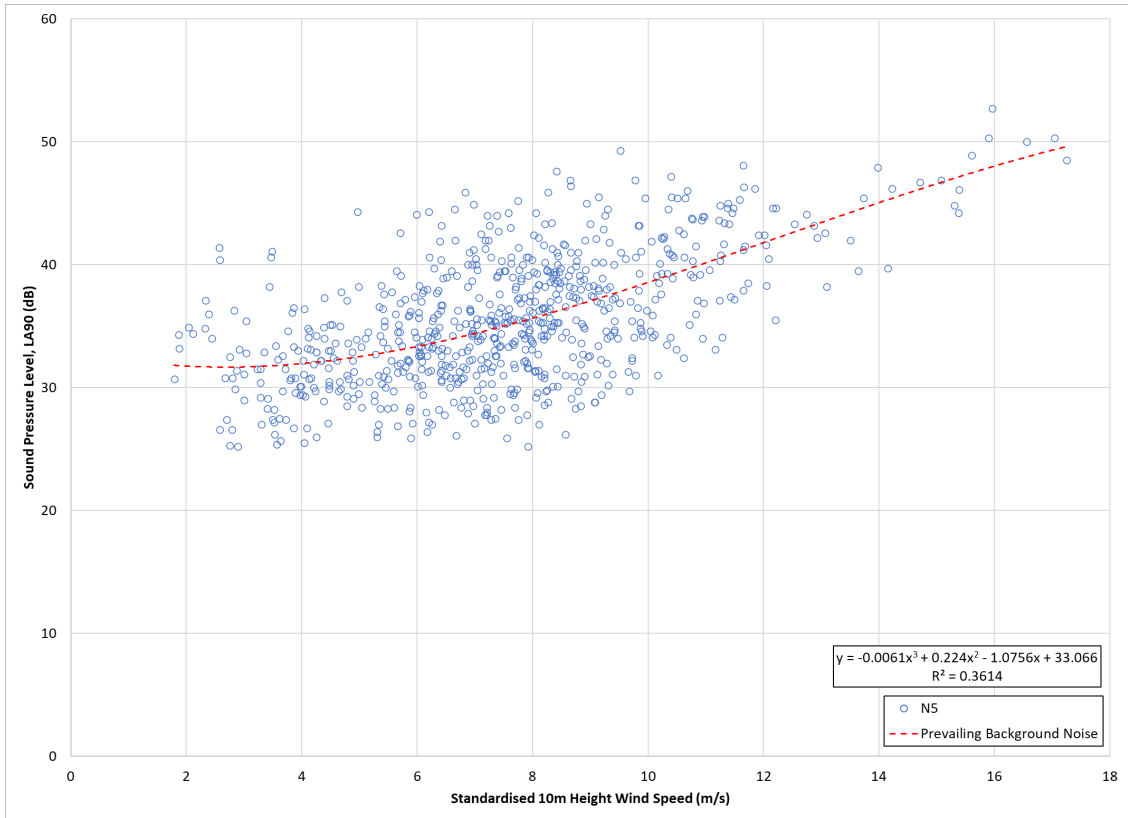
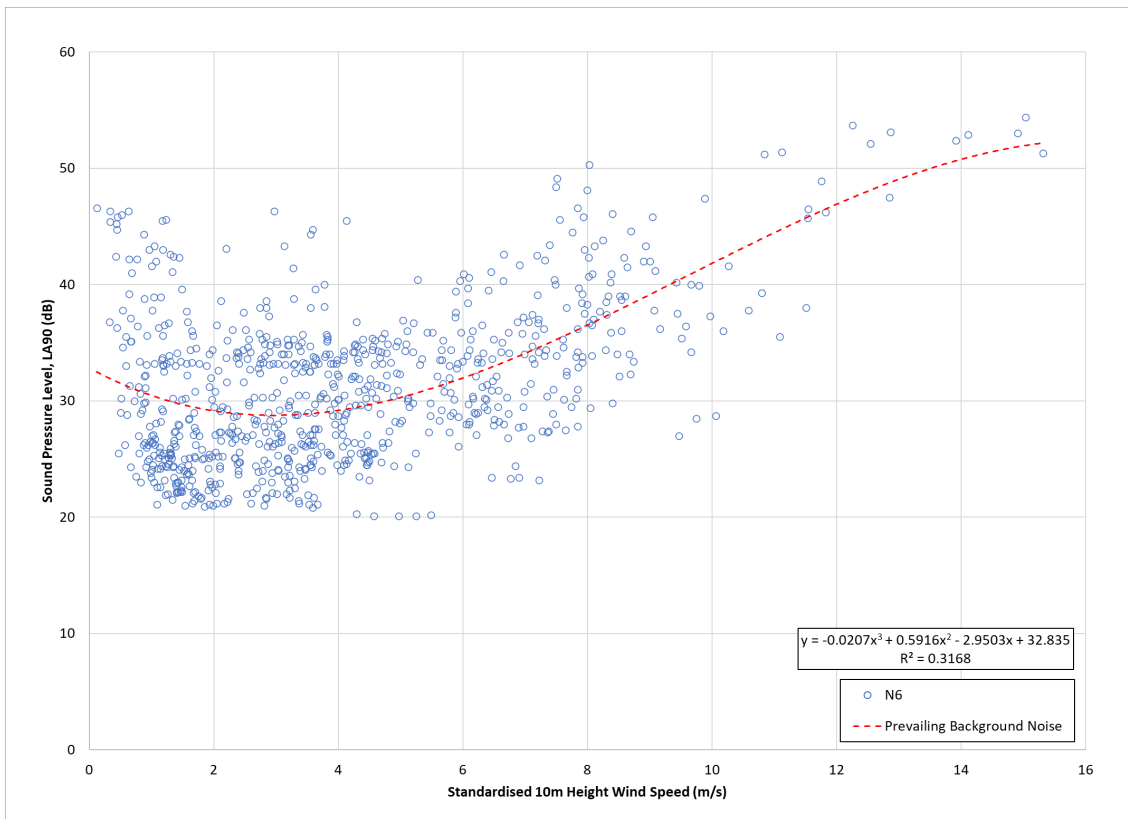


Figure A7.18: Prevailing Daytime Background (LA90) Noise Levels at N4



**Figure A7.18: Prevailing Daytime Background ( $L_{A90}$ ) Noise Levels at N5**



**Figure A7.18: Prevailing Daytime Background ( $L_{A90}$ ) Noise Levels at N6**

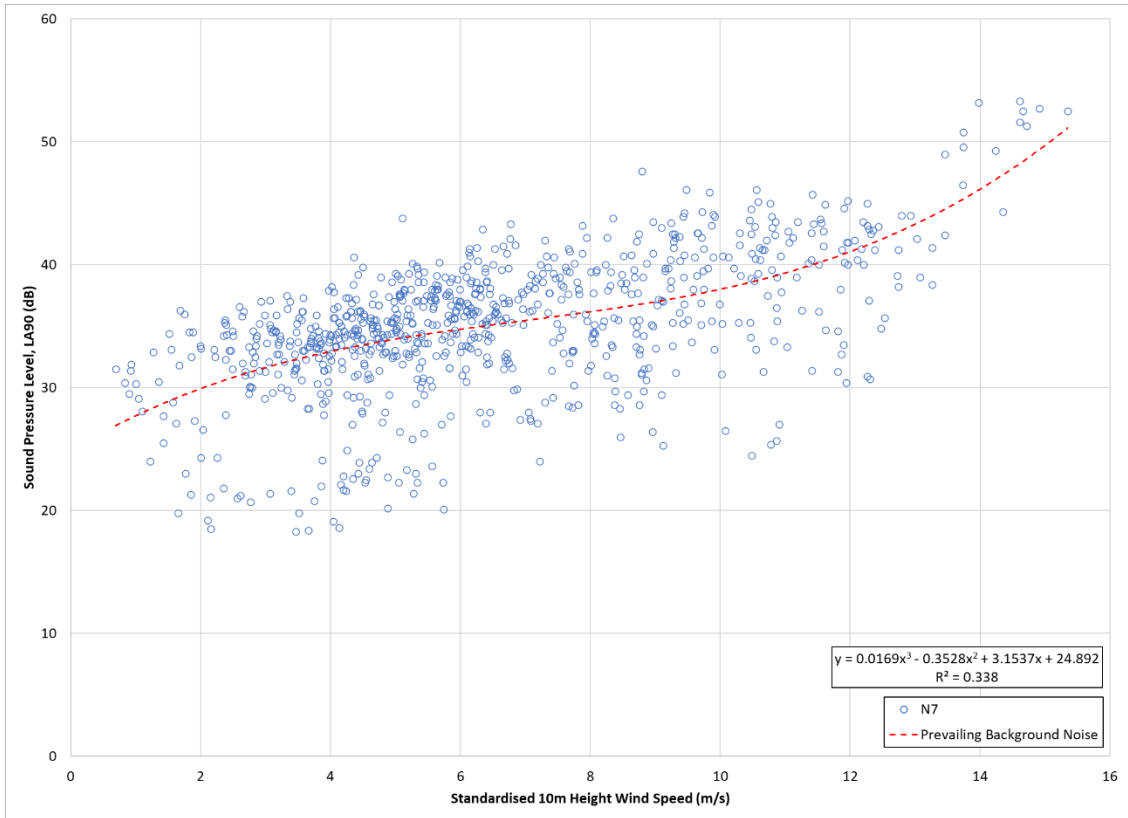


Figure A7.18: Prevailing Daytime Background (LA90) Noise Levels at N7

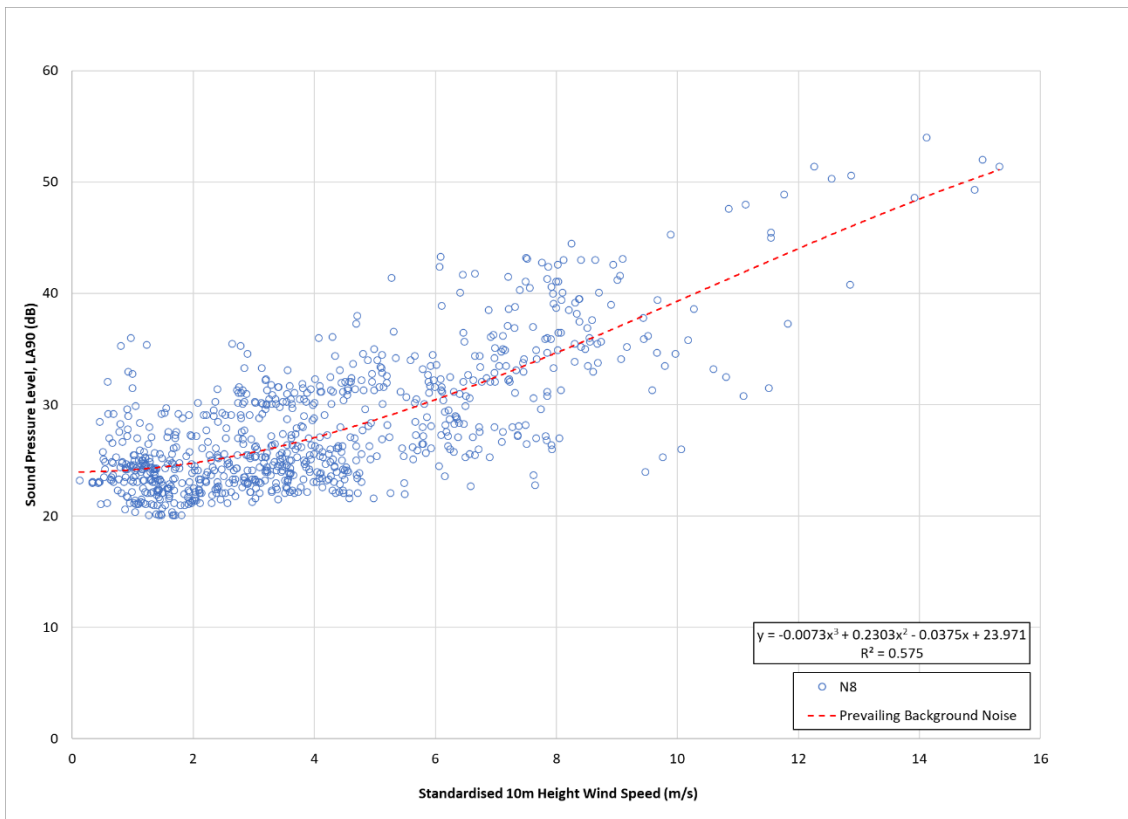


Figure A7.18: Prevailing Daytime Background (LA90) Noise Levels at N8

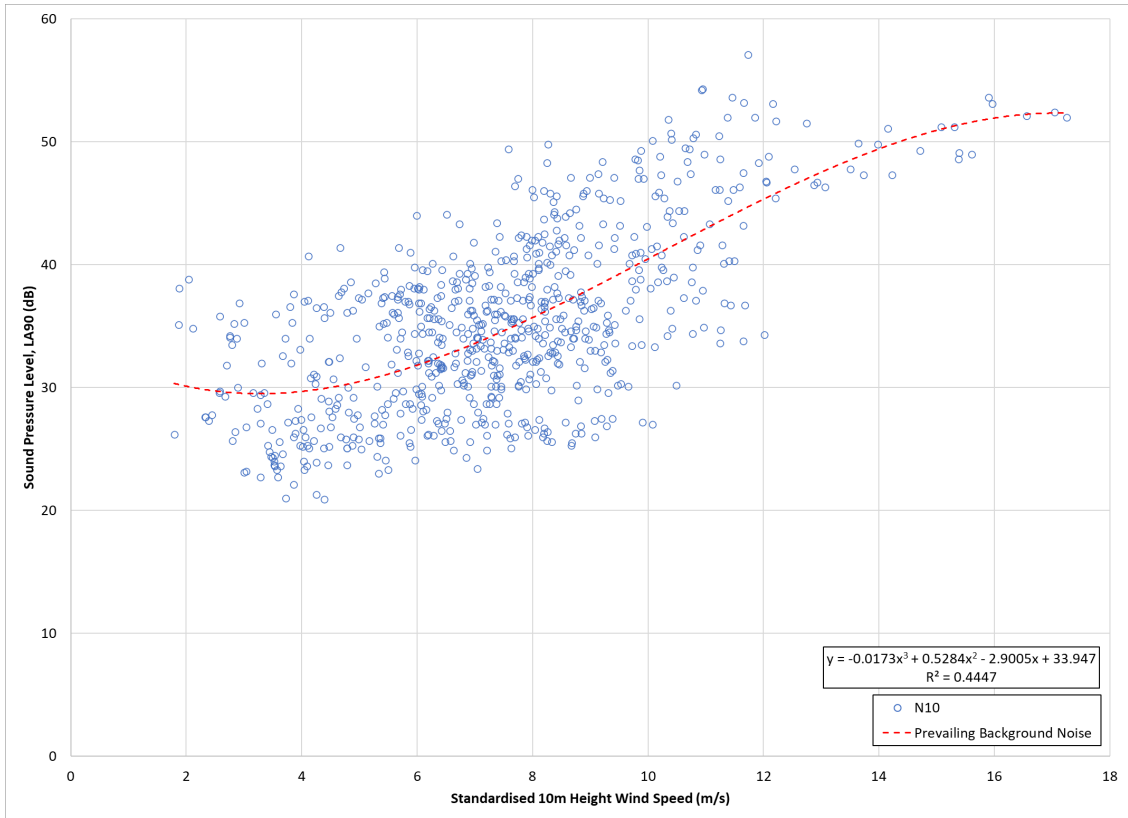


Figure A7.18: Prevailing Daytime Background (LA90) Noise Levels at N10

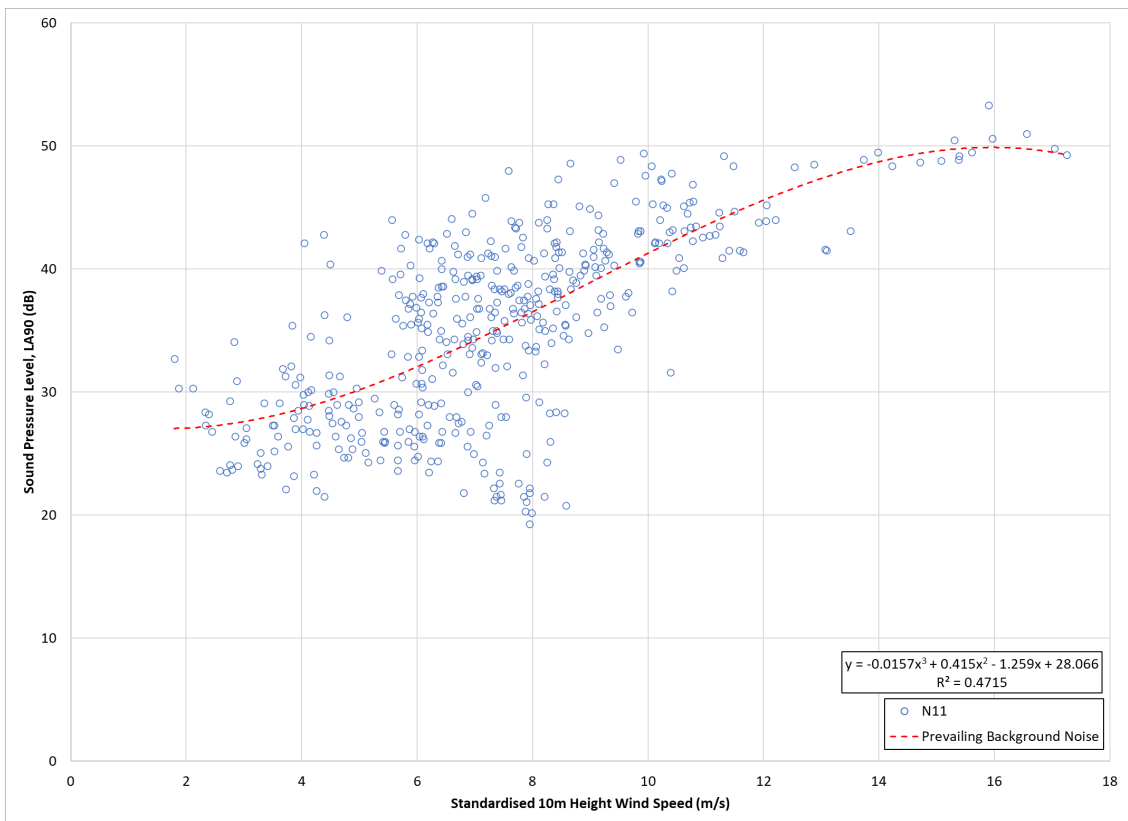


Figure A7.18: Prevailing Daytime Background (LA90) Noise Levels at N11

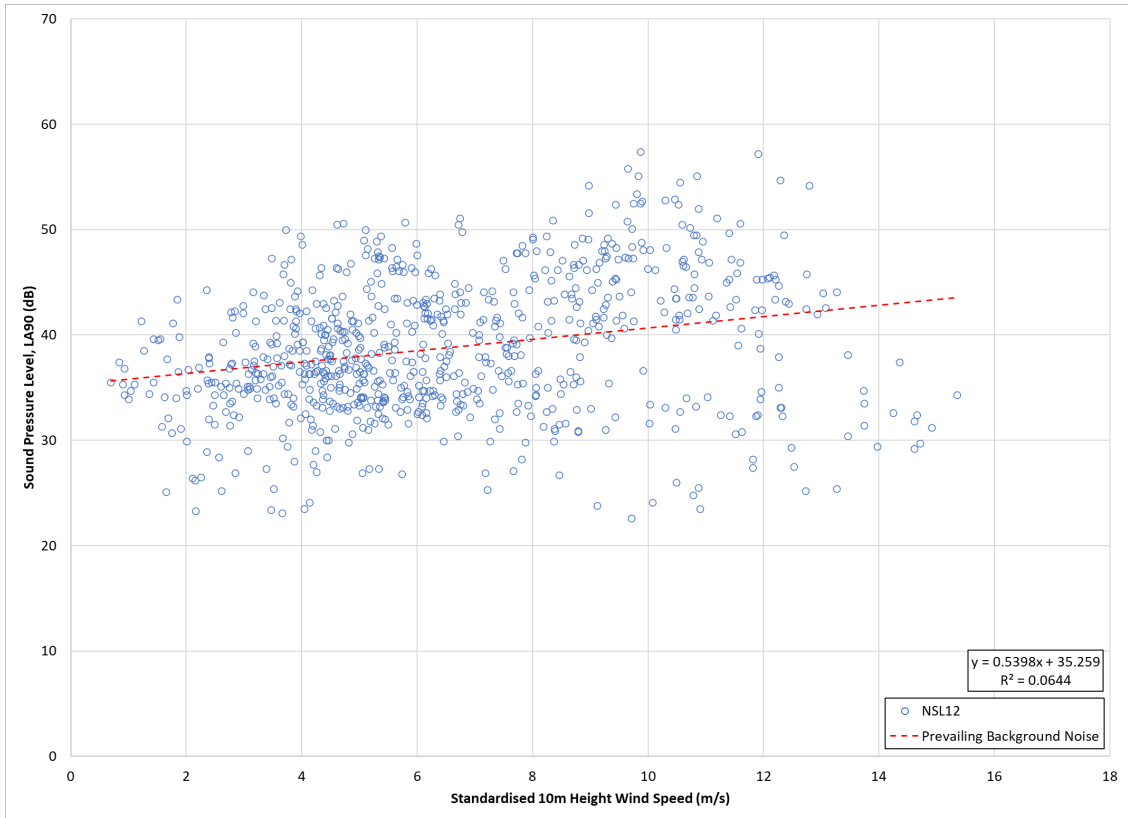


Figure A7.18: Prevailing Daytime Background (L<sub>A90</sub>) Noise Levels at N12

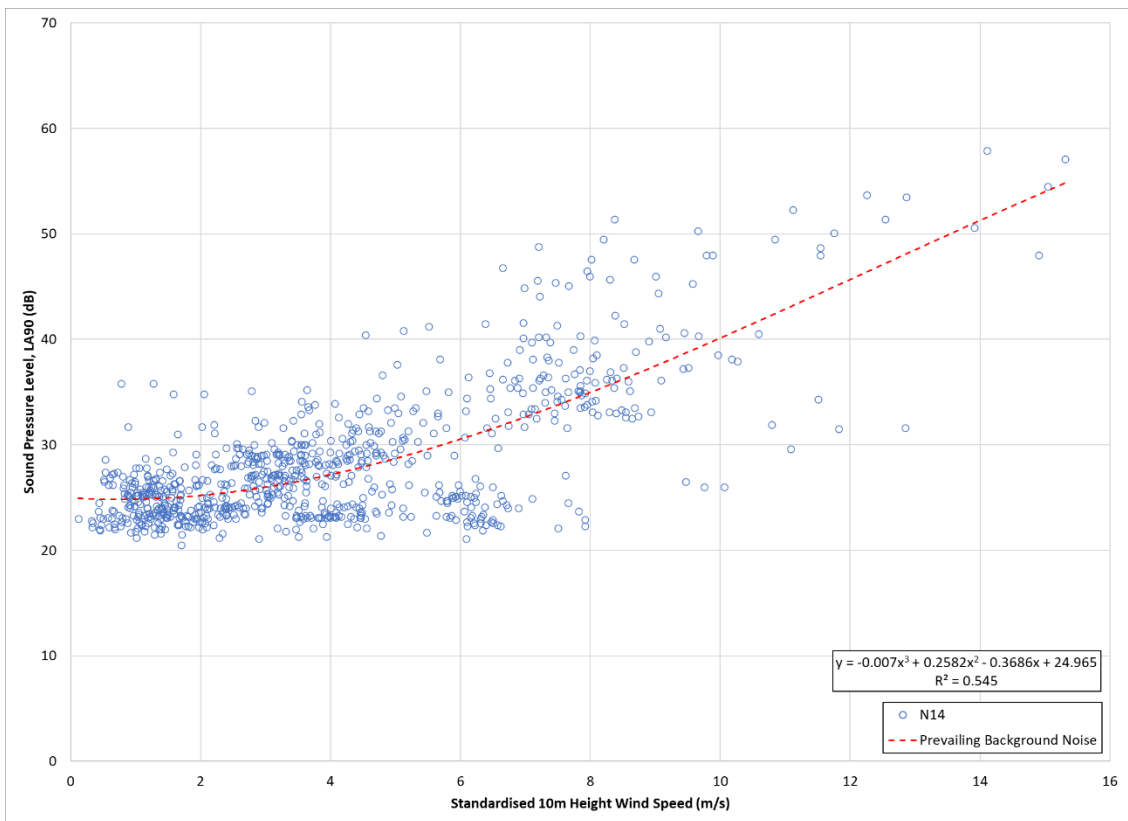


Figure A7.18: Prevailing Daytime Background (L<sub>A90</sub>) Noise Levels at N14



Figure A7.18: Prevailing Night-time Background (LA90) Noise Levels at N15

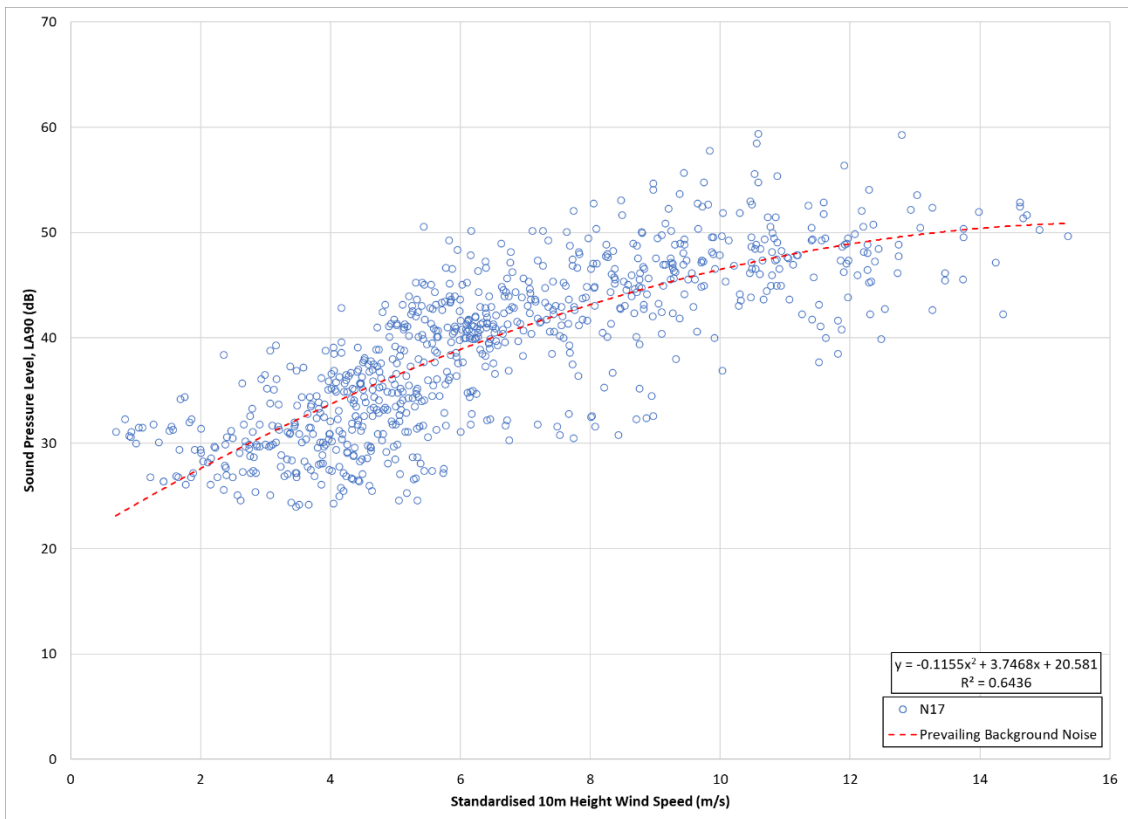


Figure A7.18: Prevailing Night-time Background (LA90) Noise Levels at N17

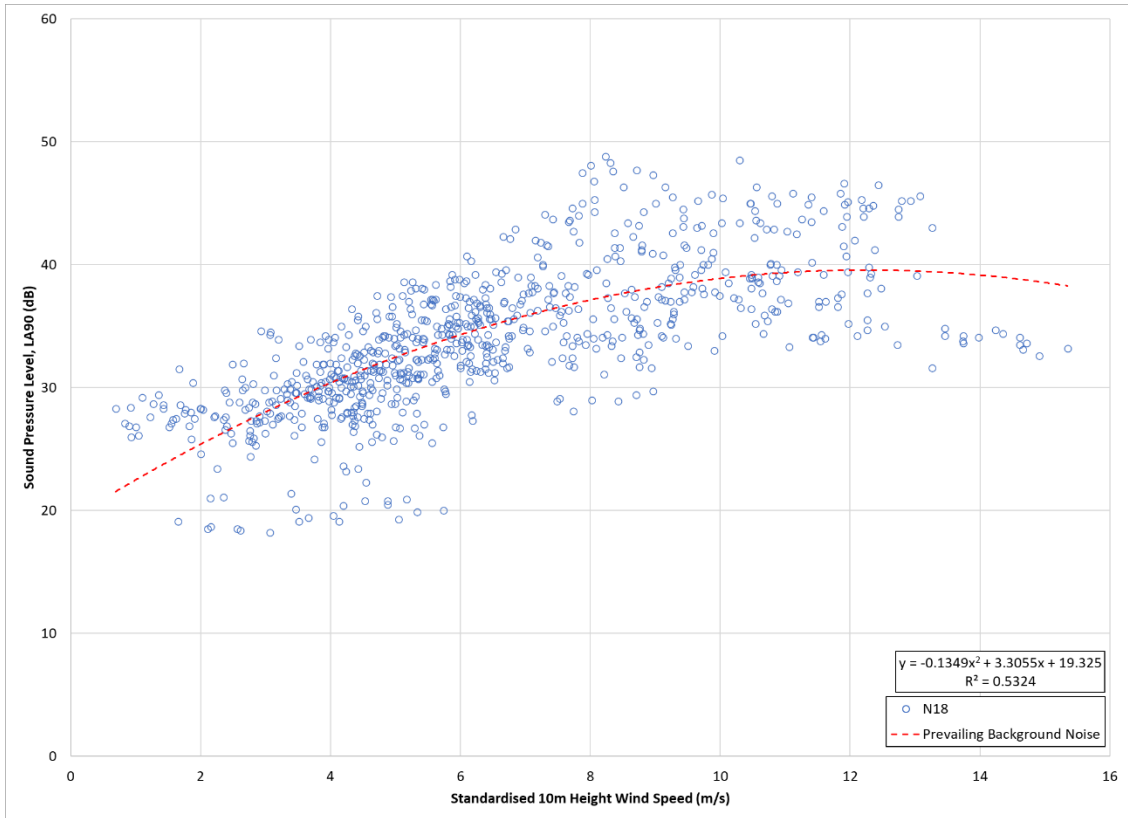


Figure A7.18: Prevailing Night-time Background (LA90) Noise Levels at N18

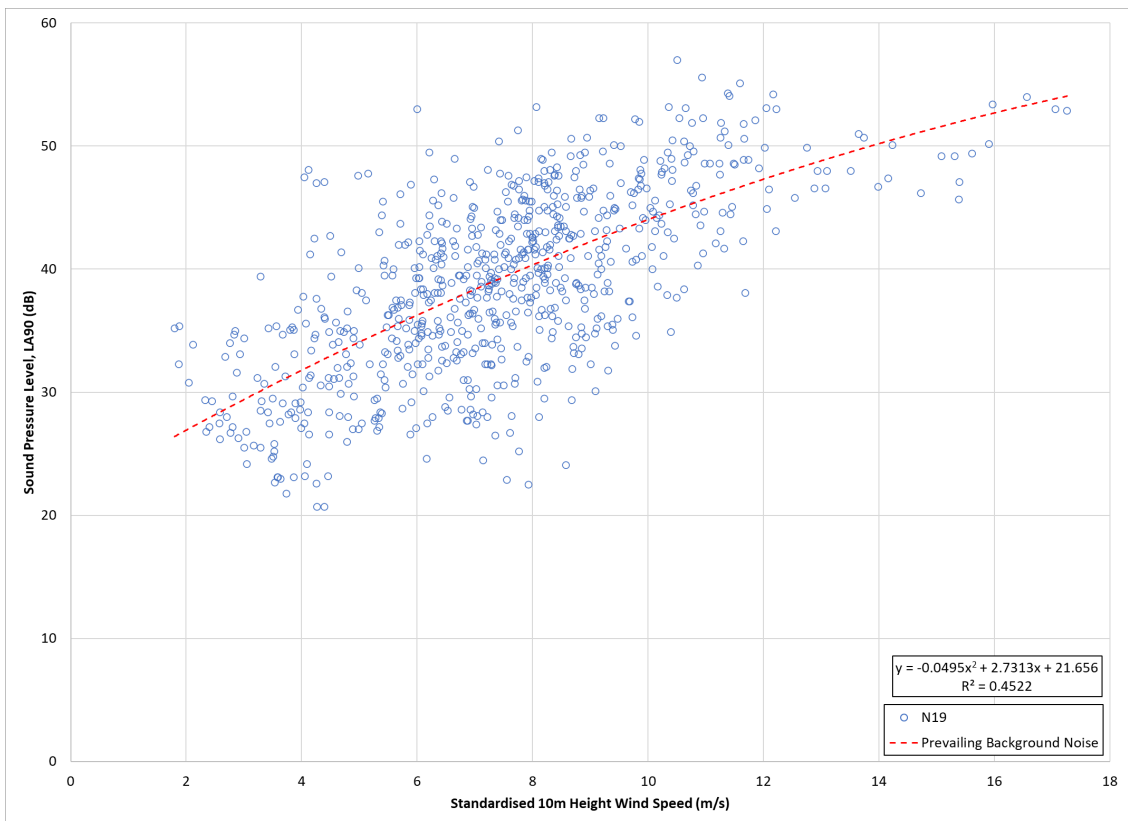


Figure A7.18: Prevailing Night-time Background (LA90) Noise Levels at N19

The assumed prevailing noise levels at the 15 noise monitoring locations is presented in 7.1.7.

**Table 7.1.7: Prevailing Background Noise – Daytime Periods**

Location	Prevailing Background Noise $L_{A90,10min}$ (dB) at Standardised 10 m Height Wind Speed (m/s)													
	2	3	4	5	6	7	8	9	10	11	12	13	14	
N2	25.4	27.2	28.9	30.7	32.4	34.1	35.7	37.4	39.0	40.6	42.2	43.7	45.3	
N3	23.2	23.3	23.9	24.9	26.2	27.7	29.4	31.2	32.9	34.5	35.8	35.8 <sup>§</sup>	35.8 <sup>§</sup>	
N4	32.8	34.9	36.6	38.0	39.1	40.0	40.8	41.5	42.3	43.2	44.3	45.7	47.5	
N5	31.8	31.7	32.0	32.5	33.4	34.4	35.7	37.1	38.6	40.2	41.9	43.5	45.2	
N6	29.1	28.7	29.2	30.3	32.0	34.1	36.5	39.1	41.8	44.4	46.9	49.0	50.7	
N7	29.9	31.6	32.9	34.0	34.8	35.5	36.2	37.0	38.0	39.4	41.1	43.4	46.3	
N8	24.8	25.7	27.0	28.6	30.5	32.5	34.7	37.0	39.3	41.7	44.1	46.4	48.6	
N10	29.5*	29.5	29.7	30.5	31.8	33.6	35.7	38.0	40.5	43.0	45.3	47.5	49.4	
N11	27.1	27.6	28.7	30.2	32.1	34.2	36.5	38.9	41.3	43.5	45.6	47.3	48.7	
N12	36.3	36.9	37.4	38.0	38.5	39.0	39.6	40.1	40.7	41.2	41.7	42.3	42.8	
N14	25.2	26.0	27.2	28.7	30.5	32.6	35.0	37.5	40.1	42.8	45.6	48.4	51.2	
N15	34.5*	34.5	34.7	35.4	36.5	38.0	39.8	41.8	44.0	46.2	48.3	50.3	52.1	
N17	27.6	30.8	33.7	36.4	38.9	41.1	43.2	44.9	46.5	47.8	48.9	49.8	50.4	
N18	25.4	28.0	30.4	32.5	34.3	35.9	37.1	38.1	38.9	39.4	39.6	39.6 <sup>§</sup>	39.6 <sup>§</sup>	
N19	26.9	29.4	31.8	34.1	36.3	38.3	40.3	42.2	44.0	45.7	47.3	48.8	50.2	

§ - noise level restricted to the highest derived point  
\* - noise level restricted to lowest derived point