FEHILY TIMONEY

CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
& PLANNING

APPENDIX 6.1

Carbon Calculator Inputs

Carbon Calculator Inputs	Annagh	Comment
Windfarm characteristics:		
No. of Turbines	6	
Duration of consent	35	
Power rating of 1 turbine (MW)	6.2	
Capacity factor	29.3%	
Backup - fraction of output to back up (%)	1.86	Output is 37.2MW; 5% is 1.86
Backup - Additional emissions due to reduced thermal efficiency of the reserve generation (%)	10 (fixed)	Provided by model
CO2 emissions from turbine life (tCO2/MW)	Calculate wrt installed capacity	
Characteristics of peatland before windfarm development:		
Type of peatland	Acid Bog	Must answer Acid Bog or Fen
average annual air temp	10	From Chapter 6
average depth of peat at site (m)	0	No Peat on site
C Content of dry peat (% by weight)	0.49	must be between 19 and 65
Average extent of drainage around drainage features at site (m)	0.3	
average water table depth (m)	1	Based on trial pit results
Dry soil bulk density (g cm-3)	0.05	must be between 0.05 and 0.3
Characteristics of bog plants: (no peat on site)		
Time required for regeneration of bog plants after restoration (years)	2	2 years min, 35 years max
Carbon accumulation due to C fixation by bog plants in undrained peats (tC ha-1 yr-1)	0.1	No peat on site
Forestry Plantation Characteristics:		
area of forestry to be felled (ha)	12.6ha	
Average rate of carbon sequestration in timber (tC ha-1 yr-1)	2.4	2.4 for broadleaf forest
Counterfactual emission factors:		
Fossil fuel-mix emission factor (t CO2 MWh-1)	0.45 (fixed)	The assumption to use this emission factor was made based on the reality that additional wind generation will displace fossil fuel generation and a mix of fossil fuels are used
Borrow pits (if any):		
no. of borrow pits	0	No borrow pits
average length of borrow pits (m)	0	Not applicable (N/A)
average width of borrow pits (m)	0	N/A
average depth of peat removed from pit (m)	0	N/A

Carbon Calculator Inputs	Annagh	Comment
Foundations and hard-standing area associated with each turbine:		
Method used to calculate CO2 loss from foundations and hard-standing	Rectangular with vertical walls	
average length of turbine foundation (m)	19.5	19.5x19.5 = same areas as 22m diameter circle
average width of turbine foundation (m)	19.5	
average depth of peat removed from turbine foundations (m)	0	No peat on site
average length of hard standing (m)	81	
average width of hard standing (m)	28	
average depth of peat removed from hard-standing (m)	0	No peat on site
Volume of concrete (m3) used in construction of wind farm	7800	Includes lean mix for installation of grid connection.
Access tracks:		
Existing track length (m)	0	There is 1145m of existing track. All to be upgraded so included in excavated road.
length of access track that is floating road (m)	0	No floating roads.
Floating road width (m)	0	N/A
floating road depth (m)	0	N/A
Length of floating road that is drained (m)	0	N/A
Average depth of drains associated with floating roads (m)	0	N/A
Length of access track that is excavated road (m)	5056	Total length of roads
Excavated road width (m)	5	
Average depth of peat excavated for road (m)	0	
Length of access track that is rock filled road (m)	5056	
Rock filled road width (m)	5	
Rock filled road depth (m)	0.5	
Length of rock filled road that is drained (m)	5056	
Average depth of drains associated with rock filled roads (m)	0.3	From Hydrology chapter
total length of access track (m)	5056	
Cable Trenches:		
Length of any cable trench on peat that does not follow access tracks and is lined awith a permeable medium eg. sand (m)	0	N/A
Average depth of peat cut for cable trenches (m)	0	N/A
Additional peat excavated (not already accounted above):		
Volume of additional peat excavated (m3)	0	None
Area of additional peat excavated (m2)	0	None
Peat landslide Hazard	negligible	

Carbon Calculator Inputs	Annagh	Comment
Improvement of C sequestration at site by blocking drains, restoration of habitat, etc.		
Area of degraded bog to be improved (ha)	0	None
Water table depth in degraded bog before improvement (m)	0	N/A
Water table depth in degraded bog after improvement (m)	0	N/A
Time required for hydrology and habitat of bog to return to its previous state on improvement (years)	35	between 2 and 35
Period of time when effectiveness of the improvement in degraded bog can be guaranteed (years)	35	
Area of felled plantation to be improved (ha)	0	
Water table depth in felled area before improvement (m)	0	N/A
Water table depth in felled area after improvement (m)	0	N/A
Time required for hydrology and habitat of felled plantation to return to its previous state on improvement (years)	35	
Period of time when effectiveness of the improvement in felled plantation can be guaranteed (years)	35	
Area of borrow pits to be restored (ha)	0	N/A
Depth of water table in borrow pit before restoration with respect to the restored surface (m)	0	N/A
Depth of water table in borrow pit after restoration with respect to the restored surface (m)	0	N/A
Time required for hydrology and habitat of borrow pit to return to its previous state on restoration (years)	0	
Period of time when effectiveness of the restoration of peat removed from borrow pits can be guaranteed (years)	0	
Water table depth around foundations and hardstanding before restoration (m)	0	Not applicable
Water table depth around foundations and hardstanding after restoration (m)	0	Not applicable
Time to completion of backfilling, removal of any surface drains, and full restoration of the hydrology (years)	0	
Restoration of site after decomissioning:		
Will the hydrology of the site be restored on decommissioning - Will you attempt to block any gullies that have formed due to the windfarm?	No	No, site is used as farmland and will continue to be used for farming throughout including after decomissioning
Will the hydrology of the site be restored on decommissioning - Will you attempt to block all artificial ditches and facilitate rewetting?	N/A	N/A
Will the habitat of the site be restored on decommissioning? - Will you control grazing on degraded areas?	N/A	N/A
Will the habitat of the site be restored on decommissioning? - Will you manage areas to favour reintroduction of species?	N/A	N/A

FEHILY TIMONEY

CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

APPENDIX 7

NOISE AND VIBRATION

Appendix 7.1 – Baseline Noise Measurements

Appendix 7.2 – Equipment Calibration Certificates

Appendix 7.3 – Noise Sensitive Location Details

Appendix 7.4 – Sound Power Level Data For Wind Turbines

Appendix 7.5 – Predicted Noise Levels from Annagh Wind Farm at Nearby Noise Sensitive Locations

Appendix 7.6 – Predicted Cumulative Noise Levels from Annagh Wind Farm and Other Adjacent Wind Farms at Nearby Noise Sensitive Locations

Appendix 7.7 – Predicted Cumulative Noise Levels from Annagh Wind Farm and Other Adjacent Wind Farms with Mitigation at Nearby Noise Sensitive Locations

APPENDIX 7.1

BASELINE NOISE MEASUREMENTS

Baseline Noise Measurements

Baseline noise monitoring was undertaken at ten receptor locations, locations N1-10, 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 ETSU-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 Annagh Wind Farm.

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

Requirements of Section 2.5	Annagh Wind Farm Monitoring Locations
2.5.1 *Where possible, measurements should be made in the vicinity of a dwelling in an area frequently used for rest and recreation.*	Location N2 was placed within the boundary of the working farm, in a courtyard by farm outbuildings north west of the house. There was no room immediately next to the house in the direction of the proposed wind farm. Location N5: Noise monitor was placed in the field adjacent to the dwelling in the direction of the proposed wind farm. There was limited space in the rear garden in the direction of the proposed wind farm. The location was chosen to avoid screening effects of the polytunnel at the property. Location N6: Noise monitor was placed at a layby off the private road next to the dwelling. There was limited space in the garden. Location N9: Noise monitor was placed in an adjacent field approximately 14 m from the rear façade of the dwelling. There was no space in the rear garden due to planting and vehicles in the yard. Location N10: Noise monitor was placed in an adjacent field to the dwelling approximately 11 m from the rear façade of the dwelling. All other monitoring locations were in the gardens of the dwellings.

Requirements of Section 2.5	Annagh Wind Farm Monitoring Locations
2.5.2 *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 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.*	This was adhered to for all measurement locations.
2.5.3 *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.*	The locations were in open areas or within the curtilage of a dwelling, set back from local roads and vegetation/ forestry where possible. Locations were chosen to have a direct line of sight to the proposed wind farm development.
2.5.4 *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).*	The locations being used to derive limits are representative of external areas and façade locations.
2.5.5 *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.*	There were some local noise sources described below.
2.5.6 *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*	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.
2.5.7 *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.*	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 to ensure the measurement location had a good line of sight to the proposed wind farm and was avoiding trees.

Requirements of Section 2.5	Annagh Wind Farm Monitoring Locations
2.5.8 *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.*	This was not an issue.

Monitoring Locations

Noise monitoring was conducted at ten locations, selected for obtaining a detailed representation of the background noise levels at receptors surrounding the development. Details of the ten noise monitoring locations are provided in Table 7.1.2. The position of the monitoring locations is shown in Figure 7.2.

Table 7.1.2: Details on the Noise Monitoring Locations

Location ID	Easting	Northing	Description	Photograph
N1	550163	616080	On raised lawn to rear of a dwelling, approximately 5m from the rear façade.	Plate 7.1-1
N2	550457	616240	At the end of drive past farm buildings and overlooking proposed wind farm. Approximately 55m from the dwelling. The location is near trees, but this is representative of this location.	Plate 7.1-2
N3	551232	616474	In rear garden of a dwelling approximately 18m from the rear façade of the dwelling in the direction of the proposed wind farm. To rear of garden shed.	Plate 7.1-3
N4	551526	616833	In the front garden of a dwelling next to wooden fence beside the dwelling, approximately 12m from the façade.	Plate 7.1-4
N5	551795	617479	In field behind a dwelling approximately 25 m from the rear façade away from trees.	Plate 7.1-5
N6	551780	617941	In layby approximately 35m northwest of façade of the dwelling.	Plate 7.1-6
N7	550362	618658	In garden south of a dwelling (derelict being reconstructed), approximately 12m from façade of building, approximately 27m south of road.	Plate 7.1-7

Location ID	Easting	Northing	Description	Photograph
N8	549787	618434	Located 16m east of façade of building on paved area in garden by a pergola.	Plate 7.1-8
N9	549455	618157	In field just south of a dwelling approximately 9m from rear façade.	Plate 7.1-9
N10	548208	617215	In field approximately 11m southeast of a dwelling.	Plate 7.1-10

Location N1: This location was to the north of the dwelling, in the rear garden. The microphone was near the steps by the elevated garden behind the dwelling approximately 5m from the rear façade of the dwelling. Generally, the area was very quiet with the main noise source being birdsong and occasional road traffic. There was some internal building works taking place within the house (e.g. hand tools) observed during deployment and removal of the noise meter. There was noise from drain observed, possibly water from sink being emptied.

Plate A7.1-1: Monitoring Location N1

Location N2: This location was a working farm and there was limited space near the main residential building at the farm. Therefore, a location was chosen at the end of a drive past farm buildings at the dwelling, with a view overlooking the proposed wind farm, and installed met mast. The location has trees nearby, which is representative of this location. It is a working farm and there are livestock in adjacent fields. This location is approximately 55m from the farmhouse, but is considered a representative location. Noise sources observed included distant road traffic. There is also likely to be noise from livestock and activities at the adjacent farm.

Plate A7.1-2: Monitoring Location N2

Location N3: This location is in the rear garden of the property, behind a shed in the rear garden. The measurement location is approximately 18m from the rear façade of the property. There is a slight embankment along the rear boundary of the dwelling and some hawthorn in the next field.

Plate A7.1-3: Monitoring Location N3

Location N4: This location is south of the proposed wind farm, and south of the road that runs south of the site. The noise meter was set up in the front garden, overlooking the road and the proposed wind farm. This was next to the wooden fence, approximately 12m from the façade of the dwelling and approximately 50m from the adjacent local road. There are farm buildings and a working farm to the rear of the dwelling. Noise sources observed during equipment installation included local road traffic noise. When the meter was collected two turbines (Rathnacally Wind Farm) were visible at this location. Noise from the turbines was not observed at the measurement location. There was distant N20 road traffic noise observed.

Plate A7.1-4: Monitoring Location N4

Location N5: This location is south of the proposed wind farm. The noise monitoring location was in the field next to the dwelling, some distance from trees at the boundary of the site. The location was 25m from the rear façade of the property. There is no rear garden at the property. The rain gauge was also installed at this location. When the equipment was being collected it was observed to be very quiet, with birdsong being the main noise source.

Plate A7.1-5: Monitoring Location N5

Location N6: This location is east of the proposed wind farm, set back some distance from the main road east of the site. The measurement location was at the side of the private road approximately 35m northwest of the dwelling. The nearby dwelling has a very small garden with parking area. There are trees north and east of the dwelling. The measurement location is on farmland and there are farm buildings approximately 100m west of the measurement location. Noise sources observed at this location included distant road traffic noise, birdsong and aircraft.

Plate A7.1-6: Monitoring Location N6

Location N7: This location is north of the proposed wind farm and south of the L1322 local road. The meter was approximately 12m from the southern façade of the dwelling (which is partially built). There are some trees nearby and there is low level undergrowth. There is a possibility of noise from vehicles accessing garage on the site and from occasional building works. The area generally was quiet wet with local flooding in places. At the roadside a drain by the road was observed, but noise was not audible at the measurement location.

Self-generated noise - IEC 61672-3 Test #10
SLM Measuring Mode: Leq

SLM Configuration	Freq. Weighting Network	SLM Reading
Microphone Installed	A	18.6
Microphone replaced by electrical input device fitted with short circuit	A	7.3
	C	7.3
	Z	12.6

Acoustical signal test of a frequency weighting - IEC 61672-3 Test #11
Range: reference level range
Frequency Weighting: C
Time Weighting: Slow

Input	Freq	Expected Level	Deviation	Tol +/-
94 dB	1000 Hz	94.0	0.0	1.0
	125 Hz	93.7	0.2	1.0
	4000 Hz	92.3	0.5	1.0

The frequency response was tested using an electrostatic actuator. Appropriate correction factors were applied where available from the manufacturer's instruction manual.

Electrical tests of frequency weighting - IEC 61672-3 Test #12
Range: reference level range

A-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.1	0.1	1.5	-1.5
125	95.0	95.0	0.0	1.5	-1.5
250	95.0	94.9	-0.1	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.1	0.1	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.2	0.2	2.1	-3.1
16000	95.0	94.8	-0.2	3.5	-17.0

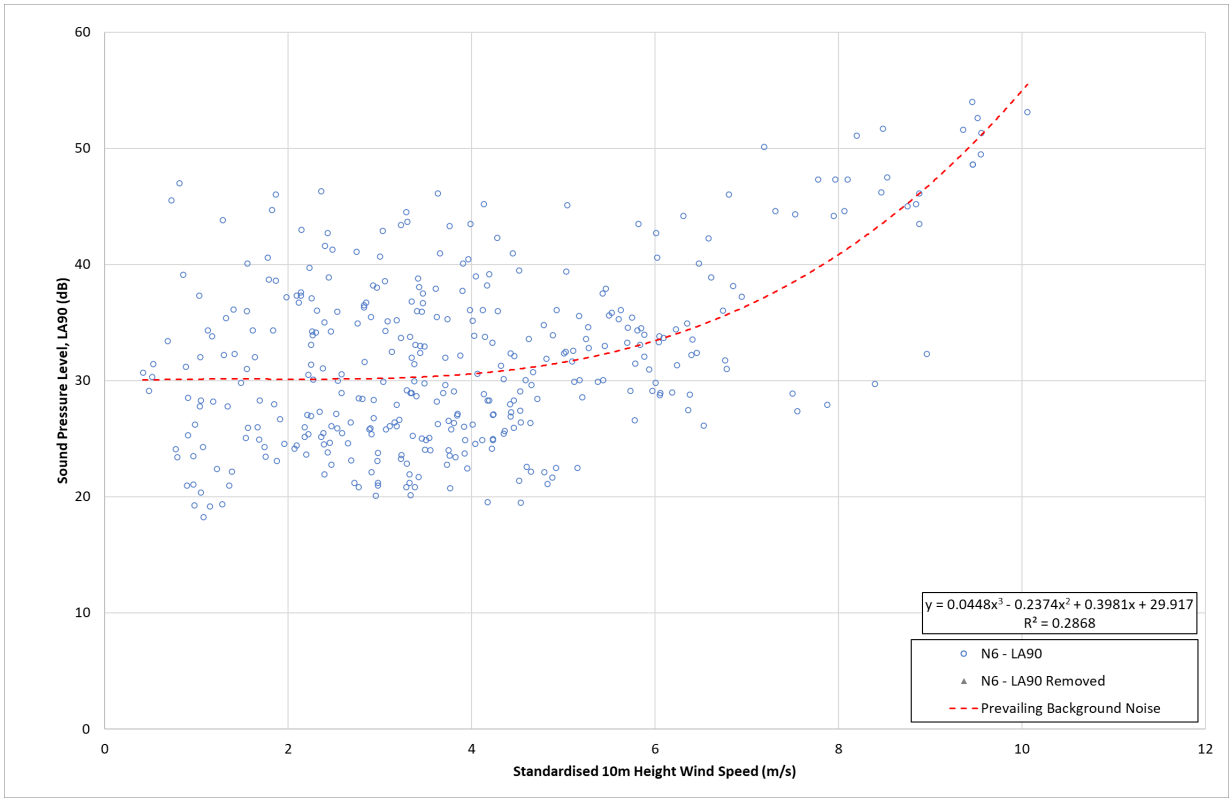

Figure A7.16: Prevailing Daytime Amenity Background (L_{A90}) Noise Levels at N6

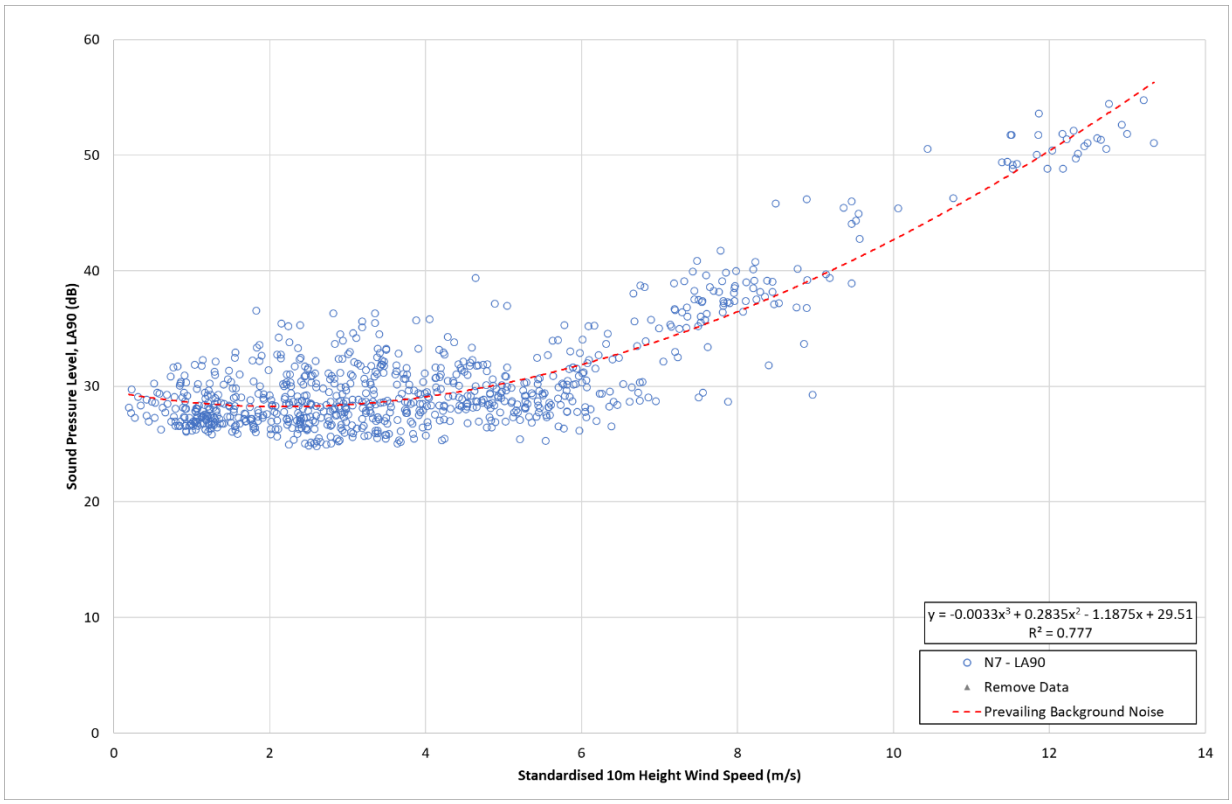

Figure A7.17: Prevailing Daytime Amenity Background (L_{A90}) Noise Levels at N7

Plate A7.1-7: Monitoring Location N7

Location N8: This location is north of the proposed wind farm. The noise monitoring location was in rear garden southwest of the dwelling, on a hardstanding area near a pergola, at a distance of approximately 16m from the façade. When the equipment was being installed and collected it was observed to be very quiet, with occasional noise from a horse in adjacent field.

Plate A7.1-8: Monitoring Location N8

Location N9: This location is north of the proposed wind farm just off the L1322 local road. The meter was set up in a field directly to the south of the dwelling, approximately 9m from the rear façade. Noise observed during the equipment being set up included noise from goats and hens at the property. When the meter was being collected it was observed that there was noise from the drain at the side of the road to the front of the dwelling. The noise was not audible from the measurement location.

Plate A7.1-9: Monitoring Location N9

Location N10: This location is west of the proposed wind farm, off the L1322 local road. The noise meter was installed in the field next to the dwelling at approximately 11m from the façade. This location is near to a working farm and some distance from the nearest public road. The noise meter was installed at the side of the dwelling facing the proposed wind farm, and opposite the façade facing the existing wind farm. It was observed that there were two turbines visible north of the property from a nearby wind farm. The rain gauge was installed at this location. The field has livestock (cows).

Plate A7.1-10: Monitoring Location N10

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
N1[1]	Svan 977A	34173
N2[1]	Svan 977A	34875
N3[1]	Svan 977A	69552
N4[2]	Svan 977A	34875
N5[1]	Svan 977A	69558
N6[2]	Svan 977A	69557
N7[2]	Svan 977A	69556
N8[2]	Svan 977A	69558
N9[2]	Svan 977A	69552
N10[2]	Svan 977A	34173
1 - Lot 1 2 - Lot 2		

A CR800 Series data logger was used to record rainfall (ARG 100) and this was located at monitoring location N5, during round 1 of measurements and at location N10 for round 2 of the survey. This meteorological data was acquired every 10 minutes simultaneously with noise data.

Monitoring Protocol

Baseline noise measurements were undertaken at ten locations near the proposed wind farm. Equipment was installed in two lots. Lot 1 was between 30th October 2020 and 19th November. Lot 2 was between and the 19th November and 8th December 2020.

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 60 m and 80 m were used to extrapolate the wind speed data up to a hub height of 100 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:

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

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 N5 for Lot 1 and Monitoring Location N10 for Lot 2) 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. For the first round of measurements (30th October to 19th November) data between 05:00 and 07:00 was excluded and for the second round of measurements (19th November to 8th December) data between 06:00 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 IOA Good Practice Guide (May 2013) requires, as a minimum, no fewer than five valid data sets across each 1 m/s wind speed from turbine cut-in to rated power. Where integer wind speeds have less than five valid data sets, the prevailing background noise trend will not be 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 (N6 to N10). 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 corrected data set was 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[1] 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 amenity daytime periods. The number of datasets at each integer wind speed are shown in Table 7.1.4. with wind speed ranges greyed out which did not satisfy the criteria of at least 5 data points in any 1 m/s wind speed bin.

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

Wind Speed (at standardised 10 m height), m/s	Valid Datasets									
	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10
0	0	0	0	2	0	10	10	9	10	8
1	8	8	8	38	8	131	131	118	131	113
2	42	42	40	64	42	129	141	124	139	117
3	42	42	34	78	42	132	161	134	161	139
4	97	98	65	62	96	76	103	82	101	93
5	108	107	68	43	106	51	95	64	93	79
6	148	150	89	37	145	36	69	39	77	68
7	127	129	58	12	129	14	38	29	38	38
8	63	65	26	12	65	12	43	38	41	40
9	51	61	21	10	61	10	14	13	14	14
10	23	36	8	4	36	4	5	5	5	5
11	14	18	5	0	18	2	4	3	3	3
12	2	3	0	0	3	13	17	15	15	15
13	2	2	1	0	2	7	8	7	7	7
Total Number of Data Points	727	761	423	362	753	627	839	680	835	739
	Did not satisfy the criteria of at least 5 data points in any 1 m/s wind speed bin									

[1] Department of Trade and Industry (1996), The Assessment and Rating of Noise from Wind Farms Report ETSU-R-97

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 then daytime amenity 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.

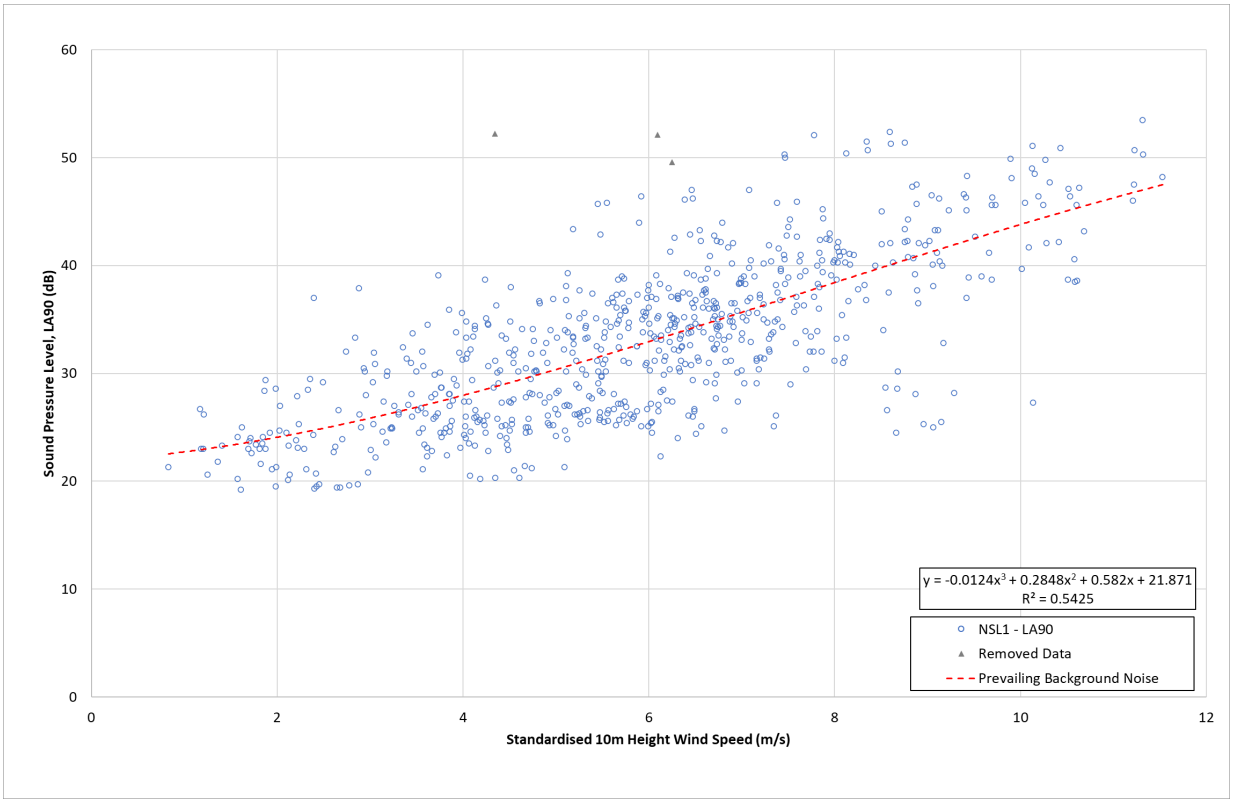

Figure A7.11: Prevailing Daytime Amenity Background (L_{A90}) Noise Levels at N1

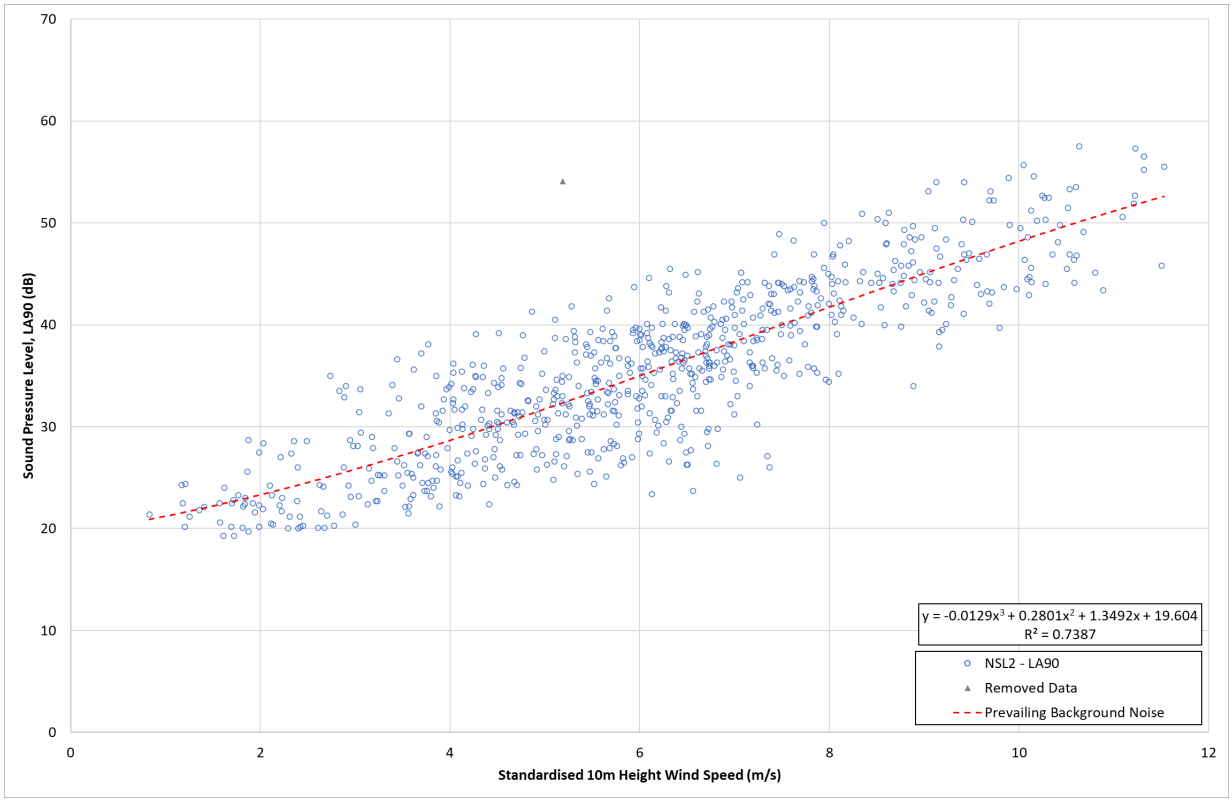

Figure A7.12: Prevailing Daytime Amenity Background (L_{A90}) Noise Levels at N2

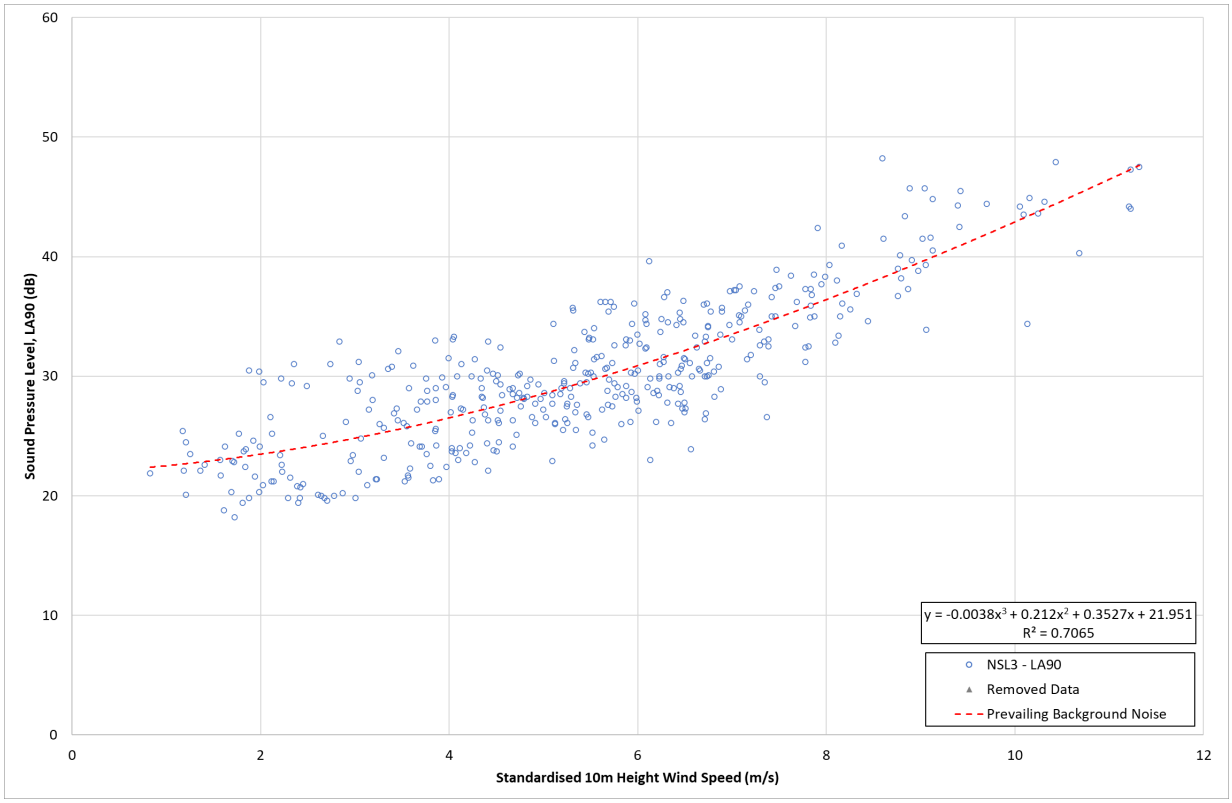

Figure A7.13: Prevailing Daytime Amenity Background (L_{A90}) Noise Levels at N3

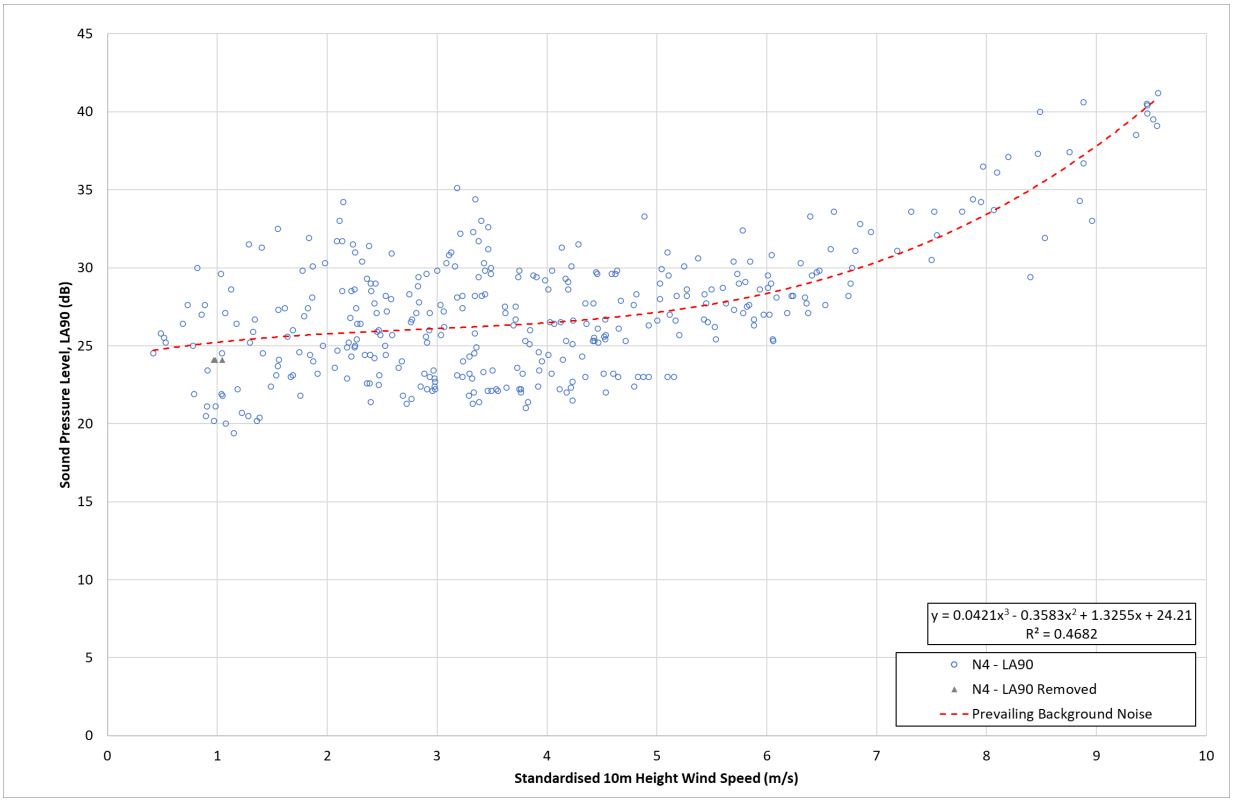

Figure A7.14: Prevailing Daytime Amenity Background (L_{A90}) Noise Levels at N4

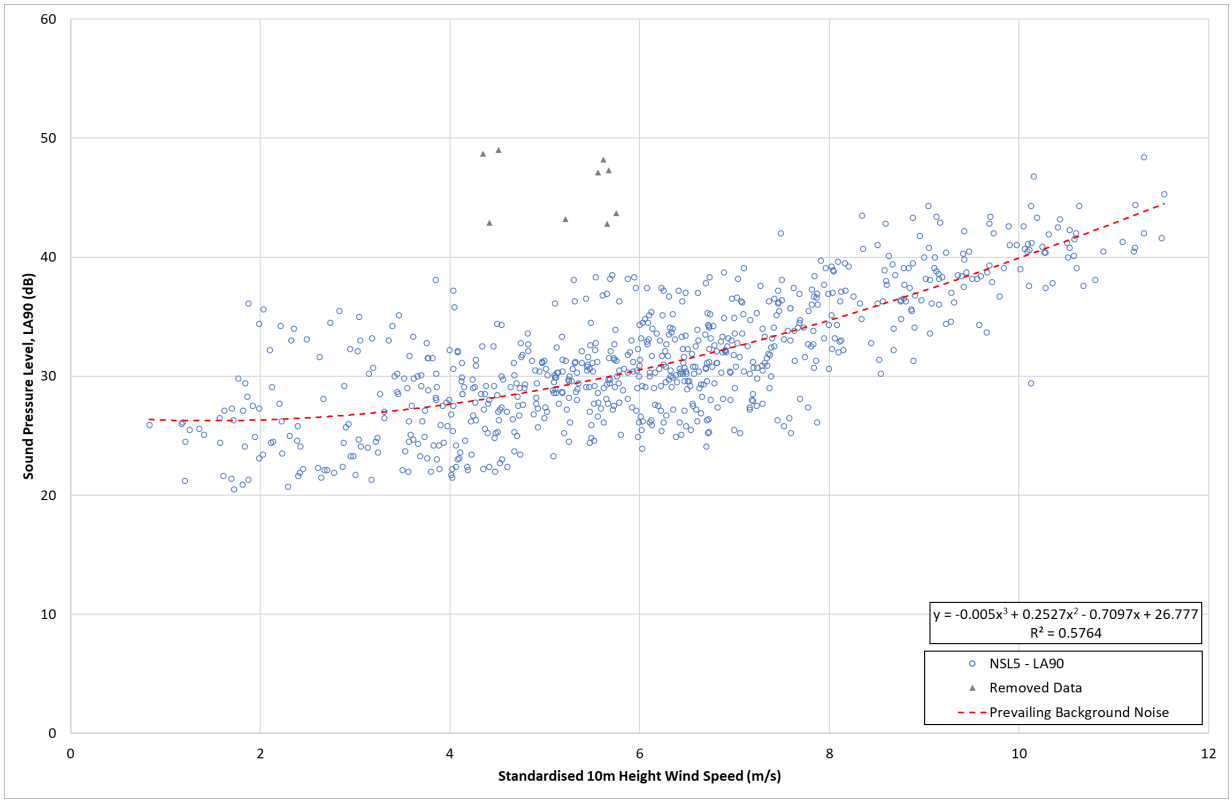

Figure A7.15: Prevailing Daytime Amenity Background (L_{A90}) Noise Levels at N5

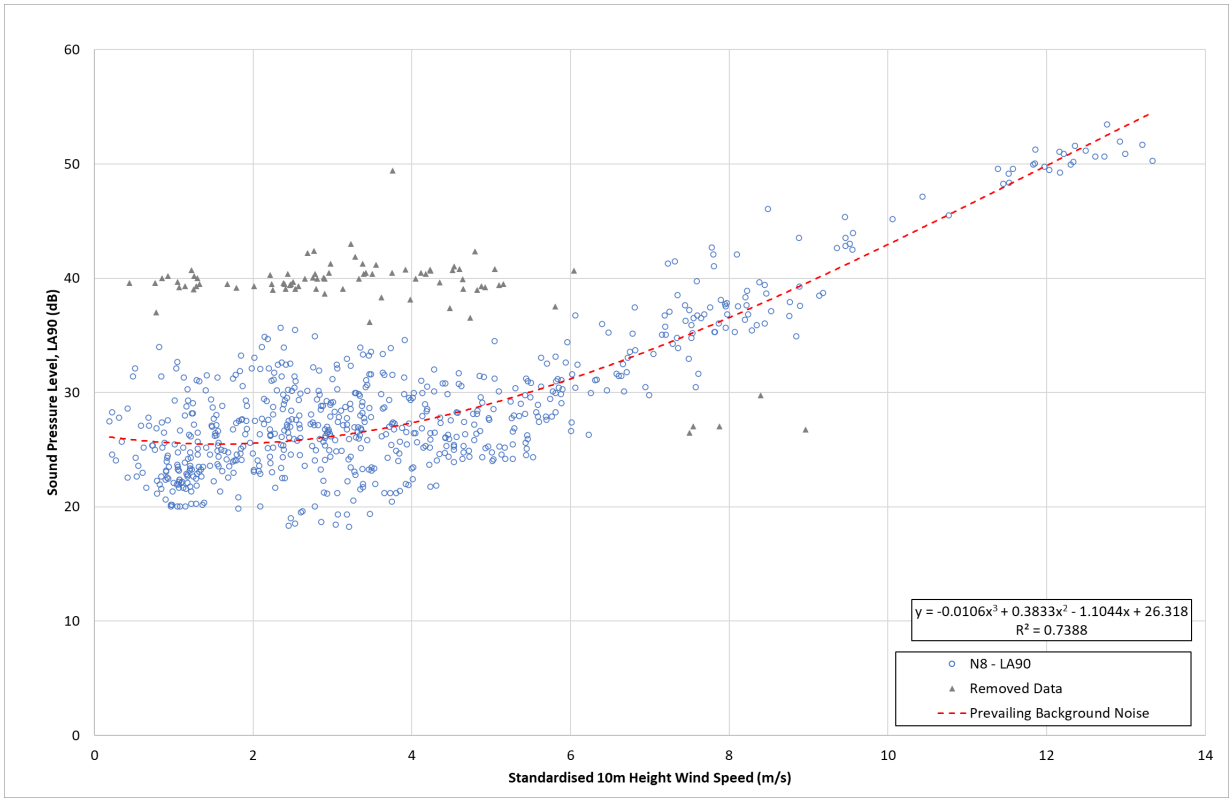

Figure A7.18: Prevailing Daytime Amenity Background (L_{A90}) Noise Levels at N8

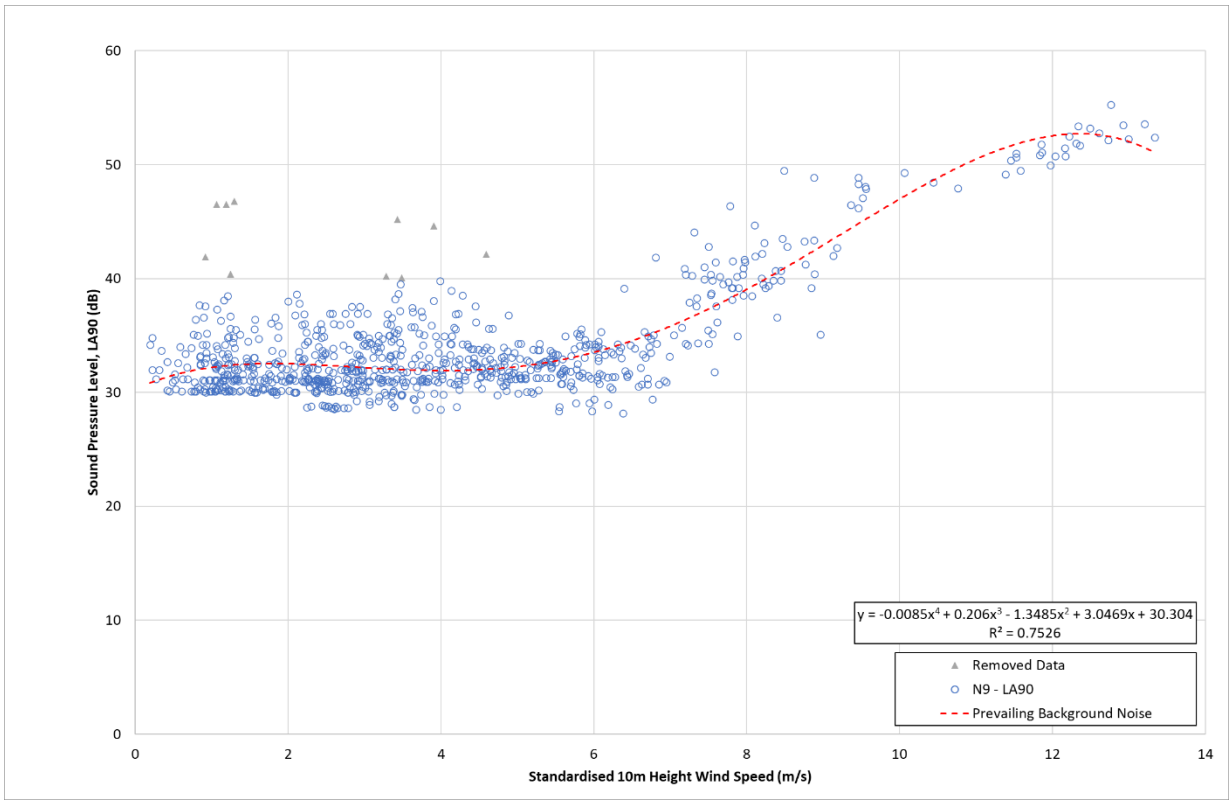

Figure A7.19: Prevailing Daytime Amenity Background (L_{A90}) Noise Levels at N9

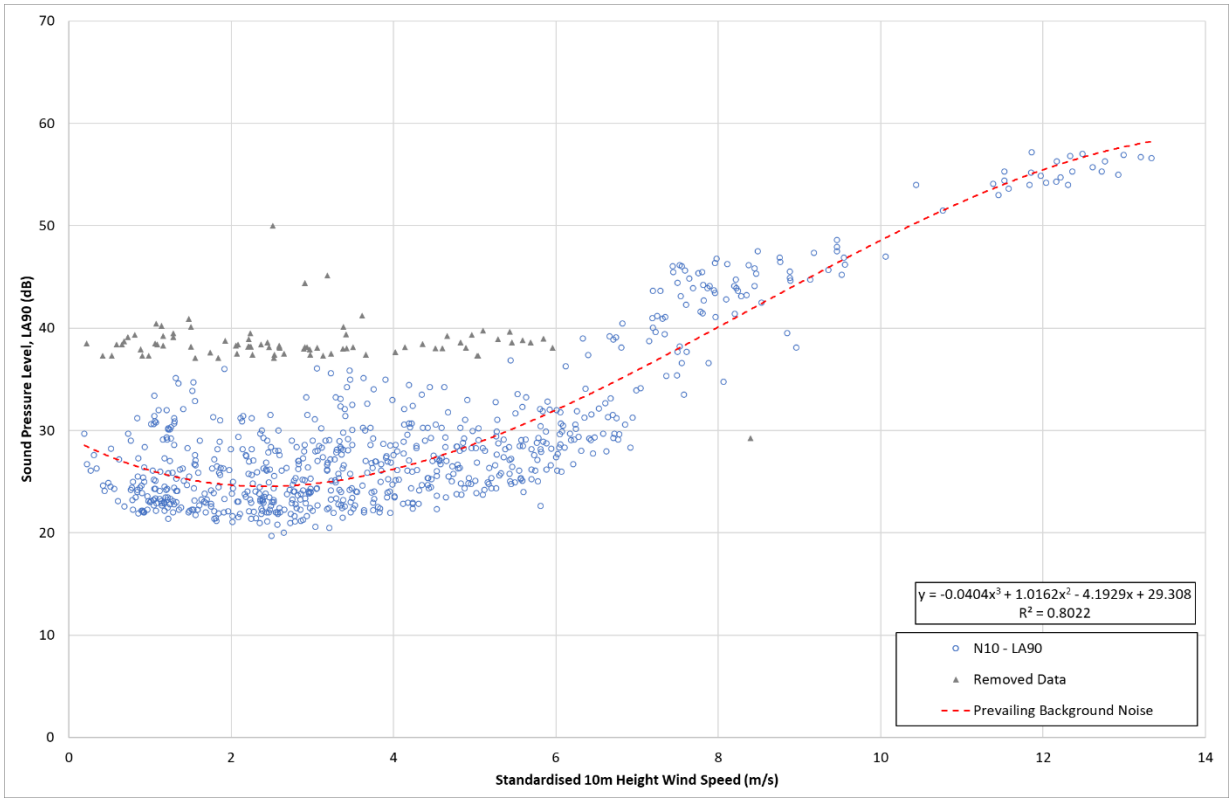

Figure A7.20: Prevailing Daytime Amenity Background (L_{A90}) Noise Levels at N10

Table 7.1.7: Prevailing Background Noise – Daytime Amenity 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
N1	24.1	25.8	28.0	30.4	32.9	35.6	38.4	41.1	43.8	46.2	46.2§
N2	23.3	25.8	28.7	31.7	35.0	38.3	41.7	45.0	48.2	51.2	51.2§
N3	23.5	24.8	26.5	28.5	30.9	33.5	36.4	39.5	42.9	46.4	46.4§
N4	25.8	26.1	26.5	27.1	28.4	30.4	33.4	37.8	37.8§	37.8§	37.8§
N5	26.3	26.8	27.7	28.9	30.5	32.5	34.7	37.2	40.0	42.9	42.9§
N6	30.1	30.2	30.6	31.6	33.4	36.4	40.8	46.9	46.9§	46.9§	46.9§
N7	28.2	28.4	29.1	30.2	31.9	34.0	36.5	39.4	42.7	46.4	50.4
N8	25.6	26.2	27.4	29.1	31.2	33.7	36.6	39.7	43.0	46.4	49.9
N9	31.9*	31.9*	31.9	32.3	33.5	35.8	39.0	42.9	46.9	50.4	52.4
N10	24.7	24.8	26.2	28.7	32.0	35.9	40.1	44.4	48.6	52.4	55.5

* - lowest derived background noise level is adopted for all wind speeds below where this derived minimum occurs. For example, at monitoring location N9 the lowest derived background noise level occurs at a wind speed of 4 m/s. The trend line fitted to noise data showed a higher noise level at 2 and 3 m/s. Therefore, using this criterion, the noise level at 2 and 3 m/s has been assumed to be equal to that of the noise level at 4 m/s.

§ - noise level restricted to the highest derived point

APPENDIX 7.2

EQUIPMENT CALIBRATION CERTIFICATES

NSAI

National Metrology Laboratory

Certificate of Calibration

Issued to	Fehily Timoney & Company J5 Plaza North Business Park North Road Dublin 11
Attention of	John Mahon

Certificate Number	**194958**
Item Calibrated	Svantek SVAN 977 Sound Level Meter with ACO 7052E Microphone
Serial Number	34173 (SLM) and 54691 (Microphone)
Client ID Number	#3
Order Number	6678
Date Received	20 Dec 2019
NML Procedure Number	AP-NM-09
Method	The above sound level meter was allowed to stabilise for a suitable period in laboratory conditions. It was then calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), *Periodic tests, specification for the verification of sound level meters*. This standard specifies a procedure for the periodic verification of conformance of a sound level meter or integrating-averaging meter to IEC 61672-1 (2003).
Calibration Standards	Norsonic 1504A Calibration System incorporating: SR DS360 Signal Generator, No. 0735 [Cal Due Date: 31 Jan 2020] Agilent 34401A Digital Multimeter, No. 0736 [Cal Due Date: 31 Jan 2020] B&K 4134 Measuring Microphone, No. 0743 [Cal Due Date: 24 Apr 2021] B&K 4228 Pistonphone, No. 0741 [Cal Due Date: 19 Jan 2020] B&K 4226 Acoustical Calibrator, No. 0150 [Cal Due Date: 21 Jun 2020]

Calibrated by	David Fleming	**Approved by**	Paul Hetherington
Date of Calibration	10 Jan 2020	**Date of Issue**	10 Jan 2020

CIPM MRA

This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org)

SVANTEK

CALIBRATION CERTIFICATE

Date of issue: 27-09-2019 **Certificate No:** 14013627 **Page:** 1/8

OBJECT OF CALIBRATION	Manufacturer:	**SVANTEK**	
	Model:	**SV977**	
	Serial No.:	34875	
	Description:	Sound Level Meter	
SENSOR	Manufacturer:	**ACO**	**SVANTEK**
	Model:	**7052E**	**SV12L**
	Serial No.:	75727	29835
	Description:	Microphone	Preamplifier
APPLICANT	NVM Ireland Ltd		
	1st Floor, Unit 13, Boyne Business Park, Drogheda, Co. Loth Ireland		
ENVIRONMENTAL CONDITIONS	Temperature:	22.9 – 23.7	°C
	Humidity:	52 – 54	%
	Pressure:	98.9 – 99.0	hPa
DATE OF CALIBRATION	27-09-2019		
APPROVED BY	B. Hunt		

AcSoft
sound & vibration

AcSoft Calibration | Bedford Technology Park
Thurleigh | Bedford | MK44 2YA

+44 (0) 1234 639550

www.acsoft.co.uk

Statement of Calibration

Issued to:	Calibration Reference
Fehily Timoney J5 Plaza North Park Business Park North Road Dublin 11	SLM200095

Test Date: 03/06/2020
Procedure: TP-SLM-1

Equipment

Item Calibrated:	Sound Level Meter	**Model**	977
Make:	Svantek	**Serial Number:**	69552

Calibration Procedure

The sound level meter was allowed to stabilize for a suitable period, as described in the manufacturer's instruction manual, in laboratory conditions. The sound level meter was calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), Periodic tests, specification of sound level meters. Tolerances for verification procedures are specified in IEC 61672-1 (2003).

Calibration Standards

Description	Serial Number
National Instruments PXI-4461	19C91D2
Stanford Research DS360	123803

The standards used in this calibration are traceable to NIST and/or other National Measurement Institutes (NMI's) that are signatories of the International Committee of Weights and Measures (CIPM) mutual recognition agreement (MRA).

Signed on behalf of Sonitus Systems:

SONITUS SYSTEMS

Calibration Report

Equipment Description

Model:	Svantek	**Serial Number:**	69552
Model:	977	**Microphone Model:**	ACO 7052E

Ambient Conditions

Measurement conditions were within the tolerances defined in IEC 61672-1 and IEC 60942.

Barometric Pressure:	1030	hPa
Temperature:	21.6	°C
Relative Humidity:	45	%

Results Summary

IEC 61672 Test #	Test Description	Result
10	Self-generated noise	-
11	Frequency weighting (acoustical)	PASS
12	Frequency weighting (electrical)	PASS
13	Frequency and time weighting (1kHz)	PASS
14	Level linearity on reference level range	PASS
15	Level linearity with level range control	-
16	Toneburst response	PASS
17	Peak C sound level	PASS
18	Overload indication	PASS

As public evidence was available, from a testing organization responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound level meter fully conformed to the requirements for pattern evaluation described in IEC 61672:2003, the sound level meter tested is considered to conform to all the Class 1 requirements of IEC 61672:2003.

The manufacturer's guidelines concerning appropriate set up for measurement under various conditions should be observed during usage.

Prior to carrying out the verification tests the sound level meter was adjusted to read correctly using the acoustic calibrator held by the testing lab (Cirrus CR511ES, Serial number: 60871). The calibration procedure is described in the manufacturer's instruction manual.

C-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	95.4	0.4	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.1	0.1	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.2	0.2	2.1	-3.1
16000	95.0	94.7	-0.3	3.5	-17.0

Linear

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.1	0.1	1.5	-1.5
125	95.0	95.1	0.1	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.0	0.0	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.1	0.1	2.1	-3.1
16000	95.0	95.1	0.1	3.5	-17.0

Frequency and Time Weightings at 1 kHz IEC 61672-3 Test #13
Range: reference level range

Time Weighting	Freq. Weighting	Expected Level	Deviation	Tol +/-
Fast	A	94.0	ref	
	C	94.0	0.0	0.2
Slow	A	94.0	0.0	0.2
LEQ	A	94.0	0.0	0.2

Linearity level on reference range - IEC 61672-3 Test #14
Input frequency: 8 kHz
SLM Measuring Mode: SPL

Range	Expected Level	SLM Reading	Deviation	Tol +/-
123 dB	94.0	94.0	0.0	1.1
	99.0	99.0	0.0	1.1
	104.0	104.0	0.0	1.1
	109.0	109.0	0.0	1.1
	114.0	114.0	0.0	1.1
	119.0	119.0	0.0	1.1
	124.0	124.0	0.0	1.1
	129.0	129.0	0.0	1.1
	134.0	134.0	0.0	1.1
	135.0	135.0	0.0	1.1
	136.0	136.0	0.0	1.1
	137.0	137.0	0.0	1.1
	89.0	89.0	0.0	1.1
	84.0	84.0	0.0	1.1
	79.0	79.0	0.0	1.1
	74.0	74.0	0.0	1.1
	69.0	69.0	0.0	1.1
	64.0	64.0	0.0	1.1
	59.0	59.0	0.0	1.1
	54.0	54.0	0.0	1.1
	49.0	49.0	0.0	1.1
	44.0	44.0	0.0	1.1
	39.0	39.0	0.0	1.1
	38.0	38.0	0.0	1.1
	37.0	37.0	0.0	1.1
	36.0	36.0	0.0	1.1
	35.0	35.0	0.0	1.1

Toneburst response - IEC 61672-3 Test #16
Range: reference level range

Burst Type	Response	Expected Level	SLM Reading	Deviation	Tol +	Tol -
0.25 ms	LAF_{MAX}	111.0	110.9	-0.1	0.8	-0.8
2.0 ms	LAF_{MAX}	120.0	119.9	-0.1	1.3	-1.3
200 ms	LAF_{MAX}	137.0	137.0	0.0	1.3	-3.3
2.0 ms	LAS_{MAX}	111.0	111.3	0.3	0.8	-0.8
200 ms	LAS_{MAX}	130.6	130.6	0.0	1.3	-3.3

Peak C sound level - IEC 61672-3 Test #17
Range: reference level range

Pulse Type	Freq	Expected Level	SLM Reading	Deviation	Tol +/-
1 cycle	8 kHz	135.4	135.3	-0.1	2.4
Pos ½ cycle	500 Hz	137.4	137.3	-0.1	1.4
Neg ½ cycle	500 Hz	137.4	137.3	-0.1	1.4

Overload indication IEC 61672-3 Test #18

Test Description	Overload at	Meas. Diff. (Pos – Neg)	Tol +/-
Pos. ½ cycle at 4 kHz	140.0		
Neg. ½ cycle at 4 kHz	140.0		
Level difference		0.0	1.8

Calibration Notes

1. The manufacturer's instruction manual was accessed through the manufacturer's website.
2. The sound level meter was powered by a regulated 9V power supply provided by the testing laboratory.

Statement of Calibration

Issued to:	Calibration Reference
Fehily Timoney J5 Plaza North Park Business Park North Road Dublin 11	SLM200094

Test Date: 03/06/2020
Procedure: TP-SLM-1

Equipment

Item Calibrated:	Sound Level Meter	**Model**	977
Make:	Svantek	**Serial Number:**	69558

Calibration Procedure

The sound level meter was allowed to stabilize for a suitable period, as described in the manufacturer's instruction manual, in laboratory conditions. The sound level meter was calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), Periodic tests, specification of sound level meters. Tolerances for verification procedures are specified in IEC 61672-1 (2003).

Calibration Standards

Description	Serial Number
National Instruments PXI-4461	19C91D2
Stanford Research DS360	123803

The standards used in this calibration are traceable to NIST and/or other National Measurement Institutes (NMI's) that are signatories of the International Committee of Weights and Measures (CIPM) mutual recognition agreement (MRA).

Signed on behalf of Sonitus Systems:

SONITUS SYSTEMS

Calibration Report

Equipment Description

Model:	Svantek	**Serial Number:**	69558
Model:	977	**Microphone Model:**	ACO 7052E

Ambient Conditions

Measurement conditions were within the tolerances defined in IEC 61672-1 and IEC 60942.

Barometric Pressure:	1030	hPa
Temperature:	23.4	°C
Relative Humidity:	39	%

Results Summary

IEC 61672 Test #	Test Description	Result
10	Self-generated noise	-
11	Frequency weighting (acoustical)	PASS
12	Frequency weighting (electrical)	PASS
13	Frequency and time weighting (1kHz)	PASS
14	Level linearity on reference level range	PASS
15	Level linearity with level range control	-
16	Toneburst response	PASS
17	Peak C sound level	PASS
18	Overload indication	PASS

As public evidence was available, from a testing organization responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound level meter fully conformed to the requirements for pattern evaluation described in IEC 61672:2003, the sound level meter tested is considered to conform to all the Class 1 requirements of IEC 61672:2003.

The manufacturer's guidelines concerning appropriate set up for measurement under various conditions should be observed during usage.

Prior to carrying out the verification tests the sound level meter was adjusted to read correctly using the acoustic calibrator held by the testing lab (Cirrus CR511ES, Serial number: 60871). The calibration procedure is described in the manufacturer's instruction manual.

Self-generated noise - IEC 61672-3 Test #10
SLM Measuring Mode: Leq

SLM Configuration	Freq. Weighting Network	SLM Reading
Microphone Installed	A	18.8
Microphone replaced by electrical input device fitted with short circuit	A	10.6
	C	10.6
	Z	10.6

Acoustical signal test of a frequency weighting - IEC 61672-3 Test #11
Range: reference level range
Frequency Weighting: C
Time Weighting: Slow

Input	Freq	Expected Level	Deviation	Tol +/-
94 dB	1000 Hz	94.0	0.0	1.0
	125 Hz	93.7	0.2	1.0
	4000 Hz	92.3	0.5	1.0

The frequency response was tested using an electrostatic actuator. Appropriate correction factors were applied where available from the manufacturer's instruction manual.

Electrical tests of frequency weighting - IEC 61672-3 Test #12
Range: reference level range

A-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	94.9	-0.1	1.5	-1.5
250	95.0	94.9	-0.1	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.0	0.0	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.1	0.1	2.1	-3.1
16000	95.0	94.7	-0.3	3.5	-17.0

C-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	95.4	0.4	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.1	0.1	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.1	0.1	2.1	-3.1
16000	95.0	94.7	-0.3	3.5	-17.0

Linear

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	95.0	0.0	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.0	0.0	1.6	-1.6
4000	95.0	95.0	0.0	1.6	-1.6
8000	95.0	95.0	0.0	2.1	-3.1
16000	95.0	95.0	0.0	3.5	-17.0

Frequency and Time Weightings at 1 kHz IEC 61672-3 Test #13
Range: reference level range

Time Weighting	Freq. Weighting	Expected Level	Deviation	Tol +/-
Fast	A	94.0	ref	
	C	94.0	0.0	0.2
Slow	A	94.0	0.0	0.2
LEQ	A	94.0	0.0	0.2

Linearity level on reference range - IEC 61672-3 Test #14
Input frequency: 8 kHz
SLM Measuring Mode: SPL

Range	Expected Level	SLM Reading	Deviation	Tol +/-
123 dB	94.0	94.0	0.0	1.1
	99.0	99.0	0.0	1.1
	104.0	104.0	0.0	1.1
	109.0	109.0	0.0	1.1
	114.0	114.0	0.0	1.1
	119.0	119.0	0.0	1.1
	124.0	124.0	0.0	1.1
	129.0	129.0	0.0	1.1
	134.0	134.0	0.0	1.1
	135.0	135.0	0.0	1.1
	136.0	136.0	0.0	1.1
	137.0	137.0	0.0	1.1
	89.0	89.0	0.0	1.1
	84.0	84.0	0.0	1.1
	79.0	79.0	0.0	1.1
	74.0	74.0	0.0	1.1
	69.0	69.0	0.0	1.1
	64.0	64.0	0.0	1.1
	59.0	59.0	0.0	1.1
	54.0	54.0	0.0	1.1
	49.0	49.1	0.1	1.1
	44.0	44.1	0.1	1.1
	39.0	39.1	0.1	1.1
	38.0	38.1	0.1	1.1
	37.0	37.2	0.2	1.1
	36.0	36.2	0.2	1.1
	35.0	35.3	0.3	1.1

Toneburst response - IEC 61672-3 Test #16
Range: reference level range

Burst Type	Response	Expected Level	SLM Reading	Deviation	Tol +	Tol -
0.25 ms	LAF_{MAX}	111.0	110.8	-0.2	0.8	-0.8
2.0 ms	LAF_{MAX}	120.0	119.9	-0.1	1.3	-1.3
200 ms	LAF_{MAX}	137.0	137.0	0.0	1.3	-3.3
2.0 ms	LAS_{MAX}	111.0	111.3	0.3	0.8	-0.8
200 ms	LAS_{MAX}	130.6	130.6	0.0	1.3	-3.3

Peak C sound level - IEC 61672-3 Test #17
Range: reference level range

Pulse Type	Freq	Expected Level	SLM Reading	Deviation	Tol +/-
1 cycle	8 kHz	135.4	135.3	-0.1	2.4
Pos ½ cycle	500 Hz	137.4	137.4	0	1.4
Neg ½ cycle	500 Hz	137.4	137.4	0	1.4

Overload indication IEC 61672-3 Test #18

Test Description	Overload at	Meas. Diff. (Pos – Neg)	Tol +/-
Pos. ½ cycle at 4 kHz	142.5		
Neg. ½ cycle at 4 kHz	142.5		
Level difference		0.0	1.8

Calibration Notes

1. The manufacturer's instruction manual was accessed through the manufacturer's website.
2. The sound level meter was powered by a regulated 9V power supply provided by the testing laboratory.

Statement of Calibration

Issued to:	Calibration Reference
Fehily Timoney J5 Plaza North Park Business Park North Road Dublin 11	SLM200093

Test Date: 03/06/2020
Procedure: TP-SLM-1

Equipment

Item Calibrated:	Sound Level Meter	**Model**	977
Make:	Svantek	**Serial Number:**	69557

Calibration Procedure

The sound level meter was allowed to stabilize for a suitable period, as described in the manufacturer's instruction manual, in laboratory conditions. The sound level meter was calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), Periodic tests, specification of sound level meters. Tolerances for verification procedures are specified in IEC 61672-1 (2003).

Calibration Standards

Description	Serial Number
National Instruments PXI-4461	19C91D2
Stanford Research DS360	123803

The standards used in this calibration are traceable to NIST and/or other National Measurement Institutes (NMI's) that are signatories of the International Committee of Weights and Measures (CIPM) mutual recognition agreement (MRA).

Signed on behalf of Sonitus Systems:

Linearity level on reference range - IEC 61672-3 Test #14
Input frequency: 8 kHz
SLM Measuring Mode: SPL

Range	Expected Level	SLM Reading	Deviation	Tol +/-
123 dB	94.0	94.0	0.0	1.1
	99.0	99.0	0.0	1.1
	104.0	104.0	0.0	1.1
	109.0	109.0	0.0	1.1
	114.0	114.0	0.0	1.1
	119.0	119.0	0.0	1.1
	124.0	124.0	0.0	1.1
	129.0	129.0	0.0	1.1
	134.0	134.0	0.0	1.1
	135.0	135.0	0.0	1.1
	136.0	136.0	0.0	1.1
	137.0	137.0	0.0	1.1
	89.0	89.0	0.0	1.1
	84.0	84.0	0.0	1.1
	79.0	79.0	0.0	1.1
	74.0	74.0	0.0	1.1
	69.0	69.0	0.0	1.1
	64.0	64.0	0.0	1.1
	59.0	59.0	0.0	1.1
	54.0	54.0	0.0	1.1
	49.0	49.0	0.0	1.1
	44.0	44.0	0.0	1.1
	39.0	38.9	-0.1	1.1
	38.0	37.8	-0.2	1.1
	37.0	37.0	0.0	1.1
	36.0	36.0	0.0	1.1
	35.0	35.0	0.0	1.1

SONITUS SYSTEMS

Calibration Report

Equipment Description

Model:	Svantek	**Serial Number:**	69557
Model:	977	**Microphone Model:**	ACO 7052E

Ambient Conditions

Measurement conditions were within the tolerances defined in IEC 61672-1 and IEC 60942.

Barometric Pressure:	1030	hPa
Temperature:	23.5	°C
Relative Humidity:	39	%

Results Summary

IEC 61672 Test #	Test Description	Result
10	Self-generated noise	-
11	Frequency weighting (acoustical)	PASS
12	Frequency weighting (electrical)	PASS
13	Frequency and time weighting (1kHz)	PASS
14	Level linearity on reference level range	PASS
15	Level linearity with level range control	-
16	Toneburst response	PASS
17	Peak C sound level	PASS
18	Overload indication	PASS

As public evidence was available, from a testing organization responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound level meter fully conformed to the requirements for pattern evaluation described in IEC 61672:2003, the sound level meter tested is considered to conform to all the Class 1 requirements of IEC 61672:2003.

The manufacturer's guidelines concerning appropriate set up for measurement under various conditions should be observed during usage.

Prior to carrying out the verification tests the sound level meter was adjusted to read correctly using the acoustic calibrator held by the testing lab (Cirrus CR511ES, Serial number: 60871). The calibration procedure is described in the manufacturer's instruction manual.

Self-generated noise - IEC 61672-3 Test #10
SLM Measuring Mode: Leq

SLM Configuration	Freq. Weighting Network	SLM Reading
Microphone Installed	A	21.6
Microphone replaced by electrical input device fitted with short circuit	A	7.9
	C	7.9
	Z	7.9

Acoustical signal test of a frequency weighting - IEC 61672-3 Test #11
Range: reference level range
Frequency Weighting: C
Time Weighting: Slow

Input	Freq	Expected Level	Deviation	Tol +/-
94 dB	1000 Hz	94.0	0.0	1.0
	125 Hz	93.7	0.2	1.0
	4000 Hz	92.3	0.2	1.0

The frequency response was tested using an electrostatic actuator. Appropriate correction factors were applied where available from the manufacturer's instruction manual.

Electrical tests of frequency weighting - IEC 61672-3 Test #12
Range: reference level range

A-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	94.9	-0.1	1.5	-1.5
250	95.0	94.9	-0.1	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.0	0.0	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.1	0.1	2.1	-3.1
16000	95.0	94.7	-0.3	3.5	-17.0

C-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	95.4	0.4	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.1	0.1	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.1	0.1	2.1	-3.1
16000	95.0	94.7	-0.3	3.5	-17.0

Linear

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	95.0	0.0	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.0	0.0	1.6	-1.6
4000	95.0	95.0	0.0	1.6	-1.6
8000	95.0	95.0	0.0	2.1	-3.1
16000	95.0	95.0	0.0	3.5	-17.0

Frequency and Time Weightings at 1 kHz IEC 61672-3 Test #13
Range: reference level range

Time Weighting	Freq. Weighting	Expected Level	Deviation	Tol +/-
Fast	A	94.0	ref	
	C	94.0	0.0	0.2
Slow	A	94.0	0.0	0.2
LEQ	A	94.0	0.0	0.2

Toneburst response - IEC 61672-3 Test #16
Range: reference level range

Burst Type	Response	Expected Level	SLM Reading	Deviation	Tol +	Tol -
0.25 ms	LAF_{MAX}	111.0	110.8	-0.2	0.8	-0.8
2.0 ms	LAF_{MAX}	120.0	119.9	-0.1	1.3	-1.3
200 ms	LAF_{MAX}	137.0	137.0	0.0	1.3	-3.3
2.0 ms	LAS_{MAX}	111.0	111.3	0.3	0.8	-0.8
200 ms	LAS_{MAX}	130.6	130.5	-0.1	1.3	-3.3

Peak C sound level - IEC 61672-3 Test #17
Range: reference level range

Pulse Type	Freq	Expected Level	SLM Reading	Deviation	Tol +/-
1 cycle	8 kHz	135.4	135.3	-0.1	2.4
Pos ½ cycle	500 Hz	137.4	137.4	0	1.4
Neg ½ cycle	500 Hz	137.4	137.4	0	1.4

Overload indication IEC 61672-3 Test #18

Test Description	Overload at	Meas. Diff. (Pos – Neg)	Tol +/-
Pos. ½ cycle at 4 kHz	139.5		
Neg. ½ cycle at 4 kHz	139.5		
Level difference		0.0	1.8

Calibration Notes

1. The manufacturer's instruction manual was accessed through the manufacturer's website
2. The sound level meter was powered by a regulated 9V power supply provided by the testing laboratory.

SONITUS SYSTEMS

Statement of Calibration

Issued to:	Calibration Reference
Fehily Timoney J5 Plaza North Park Business Park North Road Dublin 11	SLM200096

Test Date: 03/06/2020
Procedure: TP-SLM-1

Equipment

Item Calibrated:	Sound Level Meter	**Model**	977
Make:	Svantek	**Serial Number:**	69556

Calibration Procedure

The sound level meter was allowed to stabilize for a suitable period, as described in the manufacturer's instruction manual, in laboratory conditions. The sound level meter was calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), Periodic tests, specification of sound level meters. Tolerances for verification procedures are specified in IEC 61672-1 (2003).

Calibration Standards

Description	Serial Number
National Instruments PXI-4461	19C91D2
Stanford Research DS360	123803

The standards used in this calibration are traceable to NIST and/or other National Measurement Institutes (NMI's) that are signatories of the International Committee of Weights and Measures (CIPM) mutual recognition agreement (MRA).

Signed on behalf of Sonitus Systems:

SONITUS SYSTEMS

Calibration Report

Equipment Description

Model:	Svantek	**Serial Number:**	69556
Model:	977	**Microphone Model:**	ACO 7052E

Ambient Conditions

Measurement conditions were within the tolerances defined in IEC 61672-1 and IEC 60942.

Barometric Pressure:	1030	hPa
Temperature:	22.5	°C
Relative Humidity:	39	%

Results Summary

IEC 61672 Test #	Test Description	Result
10	Self-generated noise	-
11	Frequency weighting (acoustical)	PASS
12	Frequency weighting (electrical)	PASS
13	Frequency and time weighting (1kHz)	PASS
14	Level linearity on reference level range	PASS
15	Level linearity with level range control	-
16	Toneburst response	PASS
17	Peak C sound level	PASS
18	Overload indication	PASS

As public evidence was available, from a testing organization responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound level meter fully conformed to the requirements for pattern evaluation described in IEC 61672:2003, the sound level meter tested is considered to conform to all the Class 1 requirements of IEC 61672:2003.

The manufacturer's guidelines concerning appropriate set up for measurement under various conditions should be observed during usage.

Prior to carrying out the verification tests the sound level meter was adjusted to read correctly using the acoustic calibrator held by the testing lab (Cirrus CR511ES, Serial number: 60871). The calibration procedure is described in the manufacturer's instruction manual.

Self-generated noise - IEC 61672-3 Test #10
SLM Measuring Mode: Leq

SLM Configuration	Freq. Weighting Network	SLM Reading
Microphone Installed	A	21.2
Microphone replaced by electrical input device fitted with short circuit	A	8.7
	C	8.7
	Z	8.7

Acoustical signal test of a frequency weighting - IEC 61672-3 Test #11
Range: reference level range
Frequency Weighting: C
Time Weighting: Slow

Input	Freq	Expected Level	Deviation	Tol +/-
94 dB	1000 Hz	94.0	0.0	1.0
	125 Hz	93.7	0.2	1.0
	4000 Hz	92.3	0.1	1.0

The frequency response was tested using an electrostatic actuator. Appropriate correction factors were applied where available from the manufacturer's instruction manual.

Electrical tests of frequency weighting - IEC 61672-3 Test #12
Range: reference level range

A-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	95.0	0.0	1.5	-1.5
250	95.0	94.9	-0.1	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	94.9	-0.1	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.1	0.1	2.1	-3.1
16000	95.0	94.7	-0.3	3.5	-17.0

C-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	94.9	-0.1	1.5	-1.5
125	95.0	95.3	0.3	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.1	0.1	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.1	0.1	2.1	-3.1
16000	95.0	94.7	-0.3	3.5	-17.0

Linear

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	95.0	0.0	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.0	0.0	1.6	-1.6
4000	95.0	95.0	0.0	1.6	-1.6
8000	95.0	95.0	0.0	2.1	-3.1
16000	95.0	95.0	0.0	3.5	-17.0

Frequency and Time Weightings at 1 kHz IEC 61672-3 Test #13
Range: reference level range

Time Weighting	Freq. Weighting	Expected Level	Deviation	Tol +/-
Fast	A	94.0	ref	
	C	94.0	0.0	0.2
Slow	A	94.0	0.0	0.2
LEQ	A	94.0	0.0	0.2

Linearity level on reference range - IEC 61672-3 Test #14
Input frequency: 8 kHz
SLM Measuring Mode: SPL

Range	Expected Level	SLM Reading	Deviation	Tol +/-
123 dB	94.0	94.0	0.0	1.1
	99.0	99.0	0.0	1.1
	104.0	104.0	0.0	1.1
	109.0	109.0	0.0	1.1
	114.0	114.0	0.0	1.1
	119.0	119.0	0.0	1.1
	124.0	124.0	0.0	1.1
	129.0	129.0	0.0	1.1
	134.0	134.1	0.1	1.1
	135.0	135.1	0.1	1.1
	136.0	136.1	0.1	1.1
	137.0	137.1	0.1	1.1
	89.0	89.0	0.0	1.1
	84.0	84.0	0.0	1.1
	79.0	79.0	0.0	1.1
	74.0	74.0	0.0	1.1
	69.0	69.0	0.0	1.1
	64.0	64.0	0.0	1.1
	59.0	59.0	0.0	1.1
	54.0	54.0	0.0	1.1
	49.0	49.1	0.1	1.1
	44.0	44.1	0.1	1.1
	43.0	43.2	0.2	1.1
	42.0	42.2	0.2	1.1
	41.0	41.2	0.2	1.1
	40.0	40.3	0.3	1.1
	39.0	39.4	0.4	1.1

Toneburst response - IEC 61672-3 Test #16
Range: reference level range

Burst Type	Response	Expected Level	SLM Reading	Deviation	Tol +	Tol -
0.25 ms	LAF_{MAX}	111.0	110.8	-0.2	0.8	-0.8
2.0 ms	LAF_{MAX}	120.0	119.9	-0.1	1.3	-1.3
200 ms	LAF_{MAX}	137.0	137.0	0.0	1.3	-3.3
2.0 ms	LAS_{MAX}	111.0	111.3	0.3	0.8	-0.8
200 ms	LAS_{MAX}	130.6	130.6	0.0	1.3	-3.3

Peak C sound level - IEC 61672-3 Test #17
Range: reference level range

Pulse Type	Freq	Expected Level	SLM Reading	Deviation	Tol +/-
1 cycle	8 kHz	135.4	135.2	-0.2	2.4
Pos ½ cycle	500 Hz	137.4	137.3	-0.1	1.4
Neg ½ cycle	500 Hz	137.4	137.3	-0.1	1.4

Overload indication IEC 61672-3 Test #18

Test Description	Overload at	Meas. Diff. (Pos – Neg)	Tol +/-
Pos. ½ cycle at 4 kHz	140.6		
Neg. ½ cycle at 4 kHz	140.7		
Level difference		-0.1	1.8

Calibration Notes

1. The manufacturer's instruction manual was accessed through the manufacturer's website.
2. The sound level meter was powered by a regulated 9V power supply provided by the testing laboratory.

APPENDIX 7.3

NOISE SENSITIVE LOCATION DETAILS

Table 7.3.1: Noise Sensitive Location Details

Receptor ID	Description	Easting	Northing
R2	Mixed Use	549710	615521
R3	Residential	550249	616041
R4	Residential	550203	616104
R5	Residential	551185	616336
R7	Residential	549956	615947
R8	Residential	549925	615829
R10	Residential	550510	616234
R11	Mixed Use	550507	616066
R12	Residential	550173	616083
R13	Residential	550060	615933
R29	Residential	550083	615925
R38	Residential	549926	615884
R44	Residential	550031	615930
R65	Residential	551227	616477
R71	Residential	550110	615936
R85	Mixed Use	551298	616488
R86	Residential	551266	616551
R88	Residential	551323	616689
R107	Residential	549993	616018
R108	Residential	549949	615824
R119	Residential	549483	618195
R120	Residential	548584	617883
R121	Residential	548517	618602
R122	Residential	547515	618905
R128	Residential	547687	619154
R129	Residential	547452	618654
R131	Residential	549045	618080
R132	Residential	548310	617830
R137	Residential	549566	618471
R138	Mixed Use	549635	618192
R139	Residential	549457	618150
R140	Residential	548929	618066
R141	Mixed Use	548976	617968
R142	Mixed Use	548706	617936
R143	Residential	548541	617893
R144	Residential	548366	617838

Receptor ID	Description	Easting	Northing
R145	Mixed Use	548281	617428
R151	Mixed Use	548856	618084
R152	Residential	548229	617224
R156	Mixed Use	547690	618372
R164	Residential	547416	618726
R166	Residential	548832	620263
R167	Mixed Use	551514	616837
R171	Residential	551763	617442
R172	Residential	550638	619518
R173	Residential	551736	618603
R174	Residential	551869	618104
R175	Residential	552029	618236
R179	Residential	551893	619288
R184	Residential	551733	617405
R192	Residential	549771	618403
R193	Residential	549729	618467
R197	Mixed Use	551800	617901
R199	Residential	551672	617315
R205	Mixed Use	551526	617145
R206	Residential	551808	617472
R207	Mixed Use	551922	618008
R208	Residential	551879	618143
R209	Residential	551700	618595
R210	Residential	551946	618434
R211	Residential	551984	618154
R212	Residential	552229	618107
R213	Residential	552265	618118
R220	Residential	552721	619222
R221	Residential	552720	619244
R222	Residential	552719	619266
R238	Residential	552180	617586
R239	Residential	551557	618701
R240	Residential	552248	618144
R247	Residential	550372	618655
R248	Residential	550047	618477
R249	Residential	549808	618535
R250	Residential	549866	618486
R256	Residential	552031	618939

Receptor ID	Description	Easting	Northing
R257	Residential	551912	619346
R258	Residential	551822	619264
R259	Mixed Use	551713	619418
R260	Mixed Use	551191	618857
R261	Residential	550908	618921
R262	Residential	550882	618916
R263	Mixed Use	550664	618582
R266	Residential	550597	619548
R267	Residential	550828	619276
R268	Mixed Use	550680	619248
R269	Residential	551634	618597
R271	Mixed Use	550581	619330
R279	Commercial	551892	619342
R280	Mixed Use	551289	619110
R281	Residential	550519	618722
R282	Residential	549778	618474
R283	Residential	551804	618369
R284	Residential	551967	619309
R287	Commercial	551789	618357
R288	Residential	550651	619471
R289	Residential	550994	618961
R290	Residential	551580	618638

APPENDIX 7.4

SOUND POWER LEVEL DATA FOR WIND TURBINES

Table 7.4.1: Boolard Wind Farm – Nordex N100 2500 (Nordex Document F008_145_A03_EN_R00) - Sound Power Data at Standardised 10m Height Wind Speeds

Wind Speed (m/s)	3	4	5	6	7	8	9	10	11	12
31.5Hz	64.4	66.4	68.6	74.7	75.2	75.5	74.4	74.4	74.4	74.4
63Hz	74.1	76.1	78.4	83.9	84.3	84.6	84.1	84.1	84.1	84.1
125Hz	79.7	81.7	82.7	88	90.3	90.9	90.8	90.8	90.8	90.8
250Hz	85.8	87.8	89.9	93.4	94.7	94.6	93.4	93.4	93.4	93.4
500Hz	89	91	94.9	97.7	99	98.7	97.5	97.5	97.5	97.5
1000Hz	90.2	92.2	96.5	100.2	101.3	101.4	101.6	101.6	101.6	101.6
2000Hz	90.8	92.8	96.1	99.4	100.2	100.3	101	101	101	101
4000Hz	86.2	88.2	91	95.4	95.3	95.3	95.2	95.2	95.2	95.2
8000Hz	72.9	74.9	77.1	81.8	82	81.7	80.6	80.6	80.6	80.6
LwA	96	98	101.5	105	106	106	106	106	106	106

Table 7.4.2: Rathnacally Wind Farm – Senvion 3.2M 114 - Sound Power Data at Standardised 10m Height Wind Speeds

Wind Speed (m/s)	2	3	4	5	6	7	8	9	10
63Hz	74.3	74.8	77.3	80.9	83.3	83.5	83.4	83.1	83.1
125Hz	82.5	83	85.5	89.1	91.5	91.7	91.6	91.3	91.3
250Hz	88.9	89.4	91.9	95.5	97.9	98.1	98	97.7	97.7
500Hz	91	91.5	94	97.6	100	100.2	100.1	99.8	99.8
1000Hz	89.1	89.6	92.1	95.7	98.1	98.3	98.2	97.9	97.9
2000Hz	87.8	88.3	90.8	94.4	96.8	97	96.9	96.6	96.6
4000Hz	83.3	83.8	86.3	89.9	92.3	92.5	92.4	92.1	92.1
8000Hz	80.1	80.6	83.1	86.7	89.1	89.3	89.2	88.9	88.9
LwA	96	96.5	99	102.6	105	105.2	105.1	104.8	104.8

Guaranteed sound power levels for the Senvion 3.2M114 turbine are provided in the Senvion document No. SD-3.2-WT.PC.00-B-D-EN Power Curve & Sound Power Level 3.2M114 [50Hz] dated 20 January 2014.

A-weighted octave band sound power spectra were sourced from DNV-GL document No. GLGH-4286 14 12058 293-S-0002-A Summary of results of a noise emission measurement in accordance with IEC 61400-11 Ed. 2.1 dated 23 July 2014.

APPENDIX 7.5

PREDICTED NOISE LEVELS FROM ANNAGH WIND FARM AT NEARBY NOISE SENSITIVE LOCATIONS

Table 7.5.1: Predicted noise levels (L_{A90}) from Annagh Wind Farm at Noise Sensitive Locations for Standardised 10m Wind Speeds of 2 m/s to 14 m/s

Receptor ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)												
		2	3	4	5	6	7	8	9	10	11	12	13	14
R2	Mixed Use	21.9	22.6	25.1	28.7	31.5	32.0	32.9	32.8	32.8	32.7	32.6	32.4	32.2
R3	Residential	25.8	26.6	29.3	33.1	36.0	36.6	37.4	37.4	37.3	37.2	37.1	37.1	36.9
R4	Residential	26.3	27.1	29.8	33.6	36.5	37.1	37.8	37.8	37.8	37.7	37.6	37.5	37.4
R5	Residential	25.3	26.4	29.9	34.1	37.1	37.7	38.5	38.5	38.4	38.3	38.3	38.2	38.1
R7	Residential	23.4	24.4	27.6	31.6	34.6	35.2	36.0	36.0	35.9	35.8	35.8	35.6	35.5
R8	Residential	22.6	23.5	26.7	30.7	33.7	34.3	35.1	35.1	35.0	34.9	34.8	34.7	34.5
R10	Residential	27.6	28.4	31.4	35.3	38.2	38.8	39.6	39.6	39.5	39.4	39.4	39.3	39.2
R11	Mixed Use	26.0	26.8	29.7	33.6	36.5	37.1	37.9	37.8	37.8	37.7	37.7	37.6	37.4
R12	Residential	26.1	26.9	29.6	33.3	36.3	36.8	37.6	37.6	37.5	37.4	37.4	37.3	37.1
R13	Residential	23.5	24.5	27.7	31.7	34.7	35.3	36.1	36.1	36.0	35.9	35.9	35.7	35.6
R29	Residential	23.5	24.4	27.7	31.7	34.7	35.3	36.1	36.1	36.0	35.9	35.8	35.7	35.5
R38	Residential	23.0	23.9	27.1	31.1	34.1	34.7	35.5	35.5	35.4	35.3	35.2	35.1	34.9
R44	Residential	23.5	24.4	27.6	31.7	34.6	35.2	36.0	36.0	35.9	35.8	35.8	35.7	35.5
R65	Residential	26.2	27.3	30.7	34.9	37.9	38.5	39.4	39.3	39.3	39.2	39.2	39.1	38.9
R71	Residential	23.6	24.6	27.8	31.8	34.8	35.4	36.2	36.2	36.1	36.0	36.0	35.9	35.7
R85	Mixed Use	25.7	26.8	30.3	34.5	37.5	38.1	38.9	38.9	38.8	38.7	38.7	38.6	38.5
R86	Residential	26.4	27.5	31.0	35.2	38.2	38.8	39.6	39.6	39.5	39.5	39.4	39.3	39.2
R88	Residential	26.8	27.9	31.4	35.6	38.6	39.2	40.0	40.0	40.0	39.9	39.9	39.8	39.6
R107	Residential	25.4	26.1	28.8	32.5	35.3	35.9	36.7	36.7	36.6	36.5	36.5	36.3	36.2
R108	Residential	22.6	23.6	26.7	30.7	33.7	34.3	35.1	35.1	35.0	34.9	34.9	34.7	34.5
R119	Residential	27.5	28.3	31.0	34.9	37.7	38.3	39.1	39.1	39.0	38.9	38.9	38.8	38.6
R120	Residential	23.4	24.0	26.6	30.2	33.0	33.6	34.4	34.4	34.3	34.2	34.1	34.0	33.8
R121	Residential	18.0	19.2	22.9	27.2	30.2	30.8	31.6	31.6	31.6	31.4	31.3	31.2	30.9
R122	Residential	13.3	14.4	18.1	22.3	25.3	25.9	26.8	26.8	26.7	26.5	26.4	26.2	25.9

Receptor ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speed of 6 m/s
R262	Residential	36.3
R263	Mixed Use	38.9
R266	Residential	33.7
R267	Residential	34.9
R268	Mixed Use	34.7
R269	Residential	36.2
R271	Mixed Use	34.3
R279	Commercial	40.5
R280	Mixed Use	36.1
R281	Residential	37.5
R282	Residential	37.9
R283	Residential	35.9
R284	Residential	40.4
R287	Commercial	36.0
R288	Residential	34.0
R289	Residential	36.1
R290	Residential	36.3

Receptor ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)												
		2	3	4	5	6	7	8	9	10	11	12	13	14
R184	Residential	26.6	27.5	30.7	34.8	37.8	38.4	39.1	39.1	39.1	39.0	38.9	38.8	38.7
R192	Residential	28.0	28.8	31.6	35.5	38.4	39.0	39.8	39.7	39.7	39.6	39.5	39.4	39.3
R193	Residential	27.5	28.2	31.0	34.8	37.8	38.4	39.1	39.0	39.0	38.9	38.9	38.8	38.6
R197	Mixed Use	26.0	26.9	30.0	34.0	37.0	37.5	38.2	38.2	38.1	38.1	38.0	37.9	37.7
R199	Residential	27.0	28.0	31.2	35.2	38.3	38.8	39.6	39.6	39.5	39.5	39.4	39.3	39.2
R205	Mixed Use	27.9	28.8	32.2	36.2	39.2	39.8	40.6	40.5	40.5	40.4	40.4	40.3	40.2
R206	Residential	26.0	27.0	30.1	34.2	37.2	37.7	38.5	38.5	38.4	38.3	38.3	38.2	38.0
R207	Mixed Use	25.2	26.0	29.0	33.0	35.9	36.4	37.1	37.0	37.0	36.9	36.9	36.8	36.6
R208	Residential	25.3	26.1	29.1	33.1	36.0	36.5	37.1	37.1	37.0	37.0	36.9	36.8	36.6
R209	Residential	25.9	26.6	29.5	33.3	36.1	36.6	37.1	37.0	36.9	36.9	36.8	36.7	36.6
R210	Residential	25.2	25.9	28.8	32.6	35.4	35.8	36.3	36.3	36.2	36.2	36.1	36.0	35.9
R211	Residential	24.8	25.6	28.6	32.5	35.3	35.9	36.5	36.4	36.3	36.3	36.2	36.1	36.0
R212	Residential	23.9	24.6	27.5	31.3	34.1	34.6	35.2	35.1	35.0	35.0	34.9	34.8	34.7
R213	Residential	23.8	24.5	27.3	31.2	34.0	34.5	35.0	34.9	34.9	34.8	34.7	34.6	34.5
R220	Residential	28.2	28.8	31.3	35.0	37.4	37.7	37.7	37.4	37.4	37.4	37.4	37.4	37.3
R221	Residential	28.5	29.0	31.6	35.2	37.7	37.9	37.9	37.6	37.6	37.6	37.6	37.6	37.5
R222	Residential	28.7	29.2	31.8	35.4	37.8	38.1	38.1	37.8	37.8	37.8	37.8	37.8	37.7
R238	Residential	23.7	24.5	27.5	31.4	34.3	34.9	35.6	35.5	35.5	35.4	35.3	35.2	35.0
R239	Residential	26.2	26.9	29.7	33.6	36.3	36.8	37.3	37.2	37.2	37.1	37.0	37.0	36.8
R240	Residential	23.9	24.6	27.4	31.3	34.0	34.5	35.1	35.0	35.0	34.9	34.8	34.7	34.6
R247	Residential	27.3	28.1	31.1	35.1	38.0	38.6	39.3	39.2	39.2	39.1	39.1	39.0	38.9
R248	Residential	28.2	29.0	32.0	35.9	38.9	39.5	40.2	40.2	40.1	40.1	40.0	39.9	39.8
R249	Residential	27.3	28.0	30.8	34.7	37.6	38.2	38.9	38.9	38.8	38.7	38.7	38.6	38.5
R250	Residential	27.8	28.5	31.3	35.2	38.2	38.8	39.5	39.5	39.4	39.3	39.3	39.2	39.0
R256	Residential	27.4	28.0	30.5	34.2	36.8	37.1	37.2	37.0	37.0	37.0	36.9	36.9	36.8
R257	Residential	31.5	32.0	34.6	38.2	40.7	40.9	40.9	40.6	40.6	40.6	40.6	40.6	40.5

Receptor ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)												
		2	3	4	5	6	7	8	9	10	11	12	13	14
R192	Residential	27.4	28.2	31.1	35.0	38.0	38.6	39.4	39.3	39.3	39.2	39.1	39.0	38.9
R193	Residential	26.7	27.5	30.4	34.3	37.2	37.8	38.6	38.5	38.5	38.4	38.4	38.3	38.1
R197	Mixed Use	25.1	26.1	29.3	33.4	36.4	37.0	37.8	37.8	37.7	37.7	37.6	37.5	37.3
R199	Residential	26.7	27.7	30.9	35.0	38.1	38.7	39.5	39.5	39.4	39.3	39.2	39.2	39.0
R205	Mixed Use	27.6	28.7	32.0	36.1	39.1	39.7	40.5	40.5	40.4	40.4	40.3	40.2	40.1
R206	Residential	25.6	26.5	29.8	33.9	36.9	37.5	38.3	38.3	38.2	38.1	38.0	37.9	37.8
R207	Mixed Use	23.9	24.9	28.1	32.1	35.1	35.7	36.5	36.4	36.4	36.3	36.3	36.1	36.0
R208	Residential	23.8	24.8	28.0	32.0	35.0	35.6	36.4	36.4	36.3	36.2	36.2	36.0	35.9
R209	Residential	23.1	24.0	27.1	31.2	34.2	34.7	35.6	35.5	35.5	35.4	35.3	35.2	35.0
R210	Residential	22.4	23.3	26.5	30.5	33.4	34.0	34.8	34.8	34.8	34.7	34.6	34.5	34.2
R211	Residential	23.1	24.0	27.1	31.2	34.2	34.8	35.6	35.6	35.5	35.4	35.4	35.2	35.0
R212	Residential	21.7	22.6	25.7	29.7	32.6	33.2	34.0	34.0	33.9	33.8	33.7	33.6	33.5
R213	Residential	21.5	22.4	25.4	29.4	32.4	33.0	33.8	33.8	33.7	33.6	33.5	33.3	33.1
R220	Residential	14.8	16.0	19.6	23.9	26.9	27.5	28.4	28.4	28.3	28.2	28.1	27.9	27.6
R221	Residential	14.8	16.0	19.6	23.9	26.9	27.5	28.4	28.3	28.3	28.1	28.0	27.8	27.6
R222	Residential	14.7	15.9	19.5	23.8	26.8	27.4	28.3	28.3	28.2	28.1	27.9	27.8	27.5
R238	Residential	22.7	23.6	26.7	30.7	33.7	34.3	35.1	35.1	35.0	34.9	34.8	34.7	34.5
R239	Residential	23.2	24.2	27.3	31.4	34.3	34.9	35.7	35.7	35.7	35.5	35.5	35.4	35.2
R240	Residential	21.5	22.4	25.5	29.5	32.4	33.0	33.8	33.8	33.7	33.6	33.6	33.4	33.2
R247	Residential	26.5	27.4	30.5	34.6	37.5	38.1	38.9	38.9	38.8	38.7	38.7	38.6	38.5
R248	Residential	27.6	28.5	31.6	35.5	38.5	39.1	39.9	39.9	39.8	39.8	39.7	39.6	39.5
R249	Residential	26.5	27.3	30.2	34.1	37.0	37.6	38.4	38.4	38.3	38.2	38.2	38.0	37.9
R250	Residential	27.1	27.9	30.8	34.7	37.7	38.3	39.1	39.1	39.0	38.9	38.9	38.8	38.6
R256	Residential	20.2	21.0	24.0	27.9	30.8	31.4	32.2	32.2	32.2	32.1	31.9	31.8	31.6
R257	Residential	17.3	18.4	22.1	26.4	29.4	29.9	30.8	30.8	30.7	30.6	30.5	30.3	30.1
R258	Residential	17.9	19.1	22.7	27.0	30.0	30.6	31.5	31.5	31.4	31.3	31.2	31.1	30.8

Receptor ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)												
		2	3	4	5	6	7	8	9	10	11	12	13	14
R128	Residential	14.8	15.7	18.7	22.6	25.5	26.1	27.0	26.9	26.9	26.7	26.6	26.4	26.1
R129	Residential	13.5	14.6	18.3	22.5	25.6	26.2	27.0	27.0	26.9	26.8	26.7	26.5	26.2
R131	Residential	25.5	26.3	28.9	32.6	35.4	36.0	36.8	36.8	36.7	36.6	36.6	36.5	36.3
R132	Residential	21.9	22.6	25.0	28.6	31.4	32.0	32.8	32.7	32.7	32.6	32.5	32.3	32.2
R137	Residential	26.0	26.8	29.6	33.4	36.3	36.9	37.7	37.7	37.6	37.5	37.5	37.4	37.2
R138	Mixed Use	28.4	29.2	32.1	36.0	38.8	39.4	40.2	40.2	40.2	40.1	40.0	39.9	39.8
R139	Residential	27.7	28.4	31.2	35.0	37.8	38.4	39.2	39.2	39.2	39.1	39.0	38.9	38.8
R140	Residential	24.9	25.6	28.2	31.9	34.7	35.3	36.1	36.1	36.0	35.9	35.9	35.8	35.6
R141	Mixed Use	25.6	26.3	28.9	32.6	35.5	36.1	36.9	36.9	36.8	36.7	36.6	36.5	36.4
R142	Mixed Use	24.0	24.7	27.2	30.9	33.7	34.3	35.1	35.1	35.0	34.9	34.9	34.7	34.5
R143	Residential	23.1	23.8	26.3	29.9	32.7	33.3	34.1	34.0	34.0	33.9	33.8	33.7	33.5
R144	Residential	22.2	22.8	25.3	28.9	31.7	32.3	33.1	33.1	33.0	32.9	32.8	32.7	32.5
R145	Mixed Use	20.6	21.5	24.5	28.5	31.5	32.1	32.9	32.9	32.8	32.7	32.6	32.5	32.3
R151	Mixed Use	24.4	25.1	27.6	31.3	34.2	34.8	35.5	35.5	35.4	35.3	35.3	35.2	35.0
R152	Residential	20.3	21.2	24.2	28.2	31.2	31.7	32.6	32.5	32.5	32.4	32.3	32.1	31.9
R156	Mixed Use	14.9	16.1	19.7	24.0	27.0	27.6	28.5	28.4	28.4	28.2	28.1	27.9	27.7
R164	Residential	13.2	14.4	18.0	22.3	25.3	25.9	26.8	26.8	26.7	26.5	26.4	26.2	25.9
R166	Residential	13.1	14.3	17.9	22.2	25.2	25.8	26.7	26.7	26.6	26.4	26.3	26.0	25.8
R167	Mixed Use	26.6	27.5	30.7	34.8	37.8	38.3	39.2	39.1	39.1	39.0	39.0	38.9	38.8
R171	Residential	25.9	26.9	30.2	34.3	37.3	37.9	38.7	38.7	38.6	38.5	38.5	38.4	38.2
R172	Residential	19.6	20.6	23.9	28.0	31.0	31.6	32.4	32.4	32.3	32.2	32.1	32.0	31.7
R173	Residential	22.9	23.8	26.9	30.9	33.9	34.5	35.3	35.3	35.2	35.1	35.0	34.9	34.7
R174	Residential	24.0	25.0	28.2	32.2	35.2	35.8	36.6	36.6	36.5	36.4	36.4	36.3	36.1
R175	Residential	22.6	23.5	26.6	30.7	33.6	34.2	35.0	35.0	34.9	34.8	34.7	34.6	34.4
R179	Residential	17.6	18.7	22.4	26.7	29.7	30.3	31.1	31.1	31.1	30.9	30.8	30.7	30.4
R184	Residential	26.2	27.2	30.5	34.6	37.6	38.1	39.0	38.9	38.9	38.8	38.8	38.6	38.5

Receptor ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)												
		2	3	4	5	6	7	8	9	10	11	12	13	14
R259	Mixed Use	17.5	18.7	22.3	26.6	29.7	30.3	31.1	31.1	31.0	30.9	30.8	30.6	30.4
R260	Mixed Use	23.8	24.7	27.8	31.8	34.8	35.4	36.2	36.2	36.1	36.0	36.0	35.9	35.7
R261	Residential	24.1	25.0	28.0	32.0	35.0	35.6	36.4	36.4	36.3	36.2	36.2	36.1	35.9
R262	Residential	24.1	25.0	28.1	32.1	35.1	35.7	36.5	36.5	36.4	36.3	36.3	36.2	36.0
R263	Mixed Use	27.3	28.2	31.4	35.5	38.5	39.1	39.9	39.9	39.8	39.8	39.7	39.6	39.5
R266	Residential	19.4	20.4	23.7	27.8	30.8	31.4	32.2	32.2	32.2	32.0	31.9	31.8	31.6
R267	Residential	21.9	22.7	25.7	29.6	32.5	33.1	33.9	33.9	33.8	33.7	33.6	33.5	33.3
R268	Mixed Use	22.2	23.0	25.9	29.9	32.8	33.4	34.2	34.2	34.1	34.0	33.9	33.8	33.6
R269	Residential	23.4	24.4	27.5	31.5	34.5	35.1	35.9	35.9	35.8	35.8	35.7	35.6	35.4
R271	Mixed Use	21.7	22.6	25.5	29.4	32.3	32.9	33.7	33.6	33.6	33.5	33.4	33.2	33.1
R279	Commercial	17.3	18.5	22.2	26.4	29.4	30.0	30.9	30.9	30.8	30.7	30.6	30.4	30.2
R280	Mixed Use	21.9	22.8	25.8	29.8	32.7	33.3	34.1	34.1	34.0	33.9	33.9	33.7	33.6
R281	Residential	26.0	26.9	30.1	34.1	37.0	37.6	38.4	38.4	38.4	38.3	38.2	38.1	38.0
R282	Residential	26.8	27.7	30.6	34.4	37.4	38.0	38.7	38.7	38.7	38.6	38.5	38.4	38.3
R283	Residential	23.5	24.5	27.6	31.7	34.6	35.2	36.0	36.0	35.9	35.8	35.8	35.7	35.5
R284	Residential	17.2	18.4	22.1	26.4	29.4	30.0	30.8	30.8	30.7	30.6	30.4	30.3	30.1
R287	Commercial	23.7	24.6	27.8	31.8	34.8	35.4	36.2	36.2	36.1	36.0	36.0	35.8	35.7
R288	Residential	19.8	20.9	24.2	28.3	31.3	31.9	32.7	32.7	32.6	32.5	32.4	32.2	32.1
R289	Residential	23.6	24.5	27.6	31.6	34.5	35.1	35.9	35.9	35.8	35.7	35.7	35.6	35.4
R290	Residential	23.5	24.4	27.6	31.6	34.6	35.2	36.0	36.0	35.9	35.8	35.8	35.6	35.5

APPENDIX 7.6

PREDICTED CUMULATIVE NOISE LEVELS FROM ANNAGH WIND FARM AND OTHER ADJACENT WIND FARMS AT NEARBY NOISE SENSITIVE LOCATIONS

Table 7.6.1: Predicted Cumulative Noise Levels (L_{A90}) from Annagh Wind Farm and Other Adjacent Wind Farms at Noise Sensitive Locations for Standardised 10m Wind Speeds of 2 m/s to 14 m/s

Receptor ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)												
		2	3	4	5	6	7	8	9	10	11	12	13	14
R2	Mixed Use	22.2	22.8	25.3	28.9	31.7	32.3	33.1	33.0	33.0	32.8	32.8	32.6	32.4
R3	Residential	26.0	26.7	29.4	33.2	36.1	36.7	37.5	37.5	37.4	37.3	37.2	37.1	37.0
R4	Residential	26.5	27.2	29.9	33.7	36.6	37.2	37.9	37.9	37.9	37.7	37.7	37.6	37.4
R5	Residential	25.5	26.6	30.0	34.2	37.2	37.8	38.6	38.5	38.5	38.4	38.4	38.3	38.1
R7	Residential	23.7	24.6	27.8	31.8	34.7	35.3	36.1	36.1	36.0	35.9	35.9	35.8	35.6
R8	Residential	22.9	23.8	26.9	30.9	33.9	34.5	35.2	35.2	35.1	35.0	35.0	34.9	34.7
R10	Residential	27.7	28.5	31.5	35.4	38.3	38.9	39.7	39.6	39.6	39.5	39.5	39.4	39.2
R11	Mixed Use	26.1	27.0	29.8	33.7	36.6	37.2	38.0	37.9	37.9	37.8	37.8	37.7	37.5
R12	Residential	26.3	27.0	29.7	33.4	36.4	36.9	37.7	37.7	37.6	37.5	37.5	37.3	37.2
R13	Residential	23.8	24.7	27.8	31.9	34.8	35.4	36.2	36.2	36.1	36.0	36.0	35.9	35.7
R29	Residential	23.7	24.6	27.8	31.9	34.8	35.4	36.2	36.2	36.1	36.0	36.0	35.8	35.7
R38	Residential	23.2	24.1	27.3	31.3	34.2	34.8	35.6	35.6	35.5	35.4	35.4	35.3	35.1
R44	Residential	23.7	24.6	27.8	31.8	34.8	35.4	36.2	36.1	36.0	36.0	35.9	35.8	35.6
R65	Residential	26.4	27.4	30.9	35.0	38.0	38.6	39.5	39.4	39.4	39.3	39.2	39.1	39.0
R71	Residential	23.8	24.8	28.0	32.0	34.9	35.5	36.4	36.3	36.2	36.1	36.1	36.0	35.8
R85	Mixed Use	25.9	27.0	30.4	34.6	37.6	38.2	39.0	38.9	38.9	38.8	38.8	38.7	38.5
R86	Residential	26.6	27.7	31.1	35.3	38.3	38.9	39.7	39.6	39.6	39.5	39.5	39.4	39.3
R88	Residential	27.0	28.1	31.5	35.7	38.7	39.3	40.1	40.1	40.1	40.0	39.9	39.8	39.7
R107	Residential	25.6	26.3	28.9	32.6	35.5	36.0	36.8	36.8	36.7	36.6	36.6	36.4	36.3
R108	Residential	22.9	23.8	26.9	30.9	33.9	34.5	35.3	35.2	35.2	35.1	35.0	34.8	34.7
R119	Residential	28.2	28.9	31.6	35.3	38.2	38.9	39.6	39.5	39.5	39.4	39.3	39.3	39.1
R120	Residential	25.3	25.8	28.2	31.8	34.7	35.5	36.0	35.9	35.8	35.8	35.7	35.6	35.5
R121	Residential	28.9	29.1	31.3	35.1	38.4	39.4	39.5	39.3	39.3	39.3	39.3	39.3	39.2

Receptor ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)												
		2	3	4	5	6	7	8	9	10	11	12	13	14
R122	Residential	27.5	27.5	29.6	33.3	36.7	37.8	37.8	37.6	37.6	37.5	37.5	37.5	37.5
R128	Residential	30.9	31.0	33.0	36.7	40.1	41.2	41.2	41.0	41.0	41.0	41.0	41.0	41.0
R129	Residential	25.3	25.4	27.6	31.3	34.6	35.7	35.8	35.5	35.5	35.5	35.5	35.4	35.4
R131	Residential	26.8	27.4	29.9	33.5	36.5	37.2	37.8	37.7	37.7	37.6	37.5	37.5	37.3
R132	Residential	24.4	24.8	27.1	30.6	33.7	34.5	34.9	34.7	34.7	34.6	34.6	34.5	34.4
R137	Residential	27.1	27.7	30.4	34.2	37.1	37.8	38.5	38.4	38.3	38.2	38.2	38.1	38.0
R138	Mixed Use	28.9	29.6	32.5	36.3	39.2	39.8	40.5	40.5	40.5	40.4	40.3	40.2	40.1
R139	Residential	28.3	29.0	31.6	35.4	38.3	39.0	39.7	39.6	39.6	39.5	39.4	39.3	39.2
R140	Residential	26.5	27.0	29.4	33.1	36.1	36.8	37.3	37.2	37.2	37.1	37.1	37.0	36.8
R141	Mixed Use	26.7	27.3	29.8	33.5	36.5	37.1	37.8	37.7	37.6	37.5	37.5	37.4	37.3
R142	Mixed Use	25.8	26.2	28.6	32.3	35.3	36.0	36.6	36.4	36.3	36.3	36.3	36.1	36.0
R143	Residential	25.2	25.6	28.0	31.6	34.6	35.4	35.9	35.7	35.7	35.6	35.5	35.4	35.3
R144	Residential	24.6	25.0	27.3	30.9	33.9	34.7	35.2	35.0	34.9	34.8	34.8	34.7	34.6
R145	Mixed Use	22.4	23.1	25.8	29.7	32.8	33.5	34.1	34.0	33.9	33.8	33.7	33.7	33.5
R151	Mixed Use	26.2	26.7	29.1	32.8	35.8	36.5	37.1	36.9	36.9	36.8	36.8	36.7	36.5
R152	Residential	21.8	22.5	25.3	29.2	32.2	32.9	33.6	33.4	33.4	33.3	33.2	33.1	32.9
R156	Mixed Use	25.0	25.1	27.4	31.1	34.4	35.5	35.7	35.4	35.4	35.3	35.3	35.3	35.2
R164	Residential	25.3	25.4	27.6	31.3	34.7	35.8	35.8	35.5	35.5	35.5	35.5	35.4	35.4
R166	Residential	25.9	26.0	28.1	31.8	35.1	36.2	36.3	36.0	36.0	36.0	36.0	36.0	35.9
R167	Mixed Use	26.8	27.7	30.9	34.9	37.9	38.5	39.3	39.2	39.2	39.1	39.1	39.0	38.9
R171	Residential	26.4	27.3	30.5	34.6	37.5	38.1	38.9	38.8	38.8	38.7	38.7	38.6	38.4
R172	Residential	23.8	24.5	27.3	31.1	33.9	34.4	34.8	34.6	34.6	34.5	34.5	34.4	34.3
R173	Residential	25.9	26.6	29.4	33.2	36.0	36.5	37.0	36.9	36.8	36.7	36.7	36.6	36.5
R174	Residential	25.4	26.2	29.2	33.2	36.1	36.6	37.3	37.2	37.2	37.1	37.1	36.9	36.8
R175	Residential	24.7	25.5	28.4	32.3	35.0	35.5	36.1	36.0	36.0	35.9	35.9	35.8	35.6
R179	Residential	30.6	31.1	33.7	37.4	39.8	40.1	40.1	39.8	39.8	39.8	39.8	39.8	39.7

Receptor ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)												
		2	3	4	5	6	7	8	9	10	11	12	13	14
R258	Residential	29.9	30.4	33.0	36.7	39.2	39.4	39.5	39.2	39.2	39.2	39.2	39.1	39.1
R259	Mixed Use	30.9	31.4	34.0	37.6	40.1	40.3	40.3	40.1	40.0	40.0	40.0	40.0	40.0
R260	Mixed Use	26.2	26.9	29.8	33.6	36.5	37.0	37.5	37.4	37.4	37.3	37.2	37.2	37.0
R261	Residential	26.0	26.7	29.6	33.5	36.3	36.9	37.5	37.4	37.3	37.2	37.2	37.1	37.0
R262	Residential	26.0	26.7	29.6	33.5	36.4	36.9	37.5	37.4	37.4	37.3	37.2	37.2	37.0
R263	Mixed Use	27.9	28.8	31.9	36.0	38.9	39.5	40.2	40.2	40.1	40.1	40.0	39.9	39.8
R266	Residential	23.7	24.3	27.1	31.0	33.7	34.3	34.7	34.5	34.5	34.4	34.3	34.2	34.1
R267	Residential	25.1	25.7	28.4	32.2	34.9	35.4	35.9	35.7	35.7	35.6	35.6	35.5	35.4
R268	Mixed Use	24.9	25.5	28.2	32.0	34.8	35.3	35.8	35.7	35.7	35.6	35.5	35.4	35.3
R269	Residential	26.0	26.8	29.6	33.5	36.3	36.8	37.3	37.2	37.2	37.1	37.1	37.0	36.9
R271	Mixed Use	24.5	25.1	27.8	31.6	34.4	34.9	35.4	35.3	35.2	35.1	35.1	35.0	34.9
R279	Commercial	31.4	31.9	34.4	38.1	40.5	40.8	40.8	40.5	40.5	40.5	40.5	40.4	40.4
R280	Mixed Use	26.4	27.0	29.7	33.5	36.1	36.6	36.9	36.8	36.7	36.7	36.6	36.6	36.5
R281	Residential	26.9	27.7	30.7	34.7	37.6	38.2	38.9	38.8	38.8	38.7	38.6	38.5	38.4
R282	Residential	27.6	28.3	31.1	35.0	37.9	38.5	39.2	39.2	39.1	39.1	39.0	38.9	38.8
R283	Residential	25.5	26.3	29.2	33.2	36.0	36.5	37.1	37.0	37.0	36.9	36.8	36.7	36.6
R284	Residential	31.2	31.8	34.3	38.0	40.4	40.6	40.6	40.4	40.4	40.3	40.3	40.3	40.3
R287	Commercial	25.6	26.4	29.3	33.2	36.1	36.6	37.2	37.1	37.1	37.0	36.9	36.8	36.7
R288	Residential	23.9	24.6	27.4	31.3	34.0	34.5	35.0	34.8	34.8	34.7	34.6	34.5	34.4
R289	Residential	25.9	26.6	29.5	33.3	36.1	36.7	37.2	37.1	37.0	37.0	36.9	36.8	36.7
R290	Residential	26.1	26.9	29.8	33.6	36.4	36.9	37.4	37.3	37.3	37.2	37.1	37.0	36.9

APPENDIX 7.7

PREDICTED CUMULATIVE NOISE LEVELS FROM ANNAGH WIND FARM AND OTHER ADJACENT WIND FARMS WITH MITIGATION AT NEARBY NOISE SENSITIVE LOCATIONS

Table 7.6.1: Predicted Cumulative Noise Levels (L_{A90}) from Annagh Wind Farm and Other Adjacent Wind Farms with Mitigation at Noise Sensitive Locations for a Standardised 10m Wind Speeds of 6 m/s

Receptor ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speed of 6 m/s
R2	Mixed Use	31.4
R3	Residential	35.6
R4	Residential	36.1
R5	Residential	36.6
R7	Residential	34.4
R8	Residential	33.5
R10	Residential	37.6
R11	Mixed Use	36.0
R12	Residential	35.9
R13	Residential	34.4
R29	Residential	34.4
R38	Residential	33.9
R44	Residential	34.4
R65	Residential	37.4
R71	Residential	34.5
R85	Mixed Use	37.0
R86	Residential	37.7
R88	Residential	38.1
R107	Residential	35.1
R108	Residential	33.5
R119	Residential	38.2
R120	Residential	34.7
R121	Residential	38.4
R122	Residential	36.6
R128	Residential	40.1

Receptor ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speed of 6 m/s
R129	Residential	34.6
R131	Residential	36.4
R132	Residential	33.6
R137	Residential	37.1
R138	Mixed Use	39.1
R139	Residential	38.3
R140	Residential	36.0
R141	Mixed Use	36.4
R142	Mixed Use	35.2
R143	Residential	34.5
R144	Residential	33.8
R145	Mixed Use	32.7
R151	Mixed Use	35.7
R152	Residential	32.1
R156	Mixed Use	34.4
R164	Residential	34.7
R166	Residential	35.1
R167	Mixed Use	37.5
R171	Residential	37.4
R172	Residential	33.8
R173	Residential	35.9
R174	Residential	36.0
R175	Residential	34.9
R179	Residential	39.8
R184	Residential	37.6
R192	Residential	38.4
R193	Residential	37.7

Receptor ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speed of 6 m/s
R197	Mixed Use	36.8
R199	Residential	38.0
R205	Mixed Use	38.9
R206	Residential	37.0
R207	Mixed Use	35.8
R208	Residential	35.9
R209	Residential	36.0
R210	Residential	35.3
R211	Residential	35.2
R212	Residential	34.0
R213	Residential	33.9
R220	Residential	37.4
R221	Residential	37.7
R222	Residential	37.8
R238	Residential	34.2
R239	Residential	36.3
R240	Residential	33.9
R247	Residential	37.9
R248	Residential	38.8
R249	Residential	37.6
R250	Residential	38.1
R256	Residential	36.7
R257	Residential	40.6
R258	Residential	39.2
R259	Mixed Use	40.1
R260	Mixed Use	36.4
R261	Residential	36.3