OAKLANDS FARM SOLAR PARK

Applicant: Oaklands Farm Solar Ltd

Environmental Statement
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Baseline noise survey

Report No. 20-0102-0 R01A

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Report No.:	20-0102-0 R01A
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0. SYNOPSIS

0.1.1. The report provides the results of baseline noise surveys undertaken at positions around the perimeter of Oaklands Farm Solar Park to inform the environmental noise assessment. The purpose is to quantify the existing noise climate and soundscape at the nearest receptor positions to the Proposed Development.

0.1.2. Environmental Services of South Derbyshire District Council was consulted on the baseline survey methodology and locations, and agreed prior being undertaken. The measurement procedures and analysis of background noise levels follow guidance in BS4142:2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*' and BS7445-1:2003 '*Description and environment of environmental noise* - Part 1: *Guide to quantities and procedure*'.

0.1.3. Existing ambient and background noise levels are generally controlled by road traffic noise on local roads, farm animals and birdsong, wind through trees and vegetation and distant road traffic on the A38 depending on weather conditions. Hum and crackle on existing overhead cables running through Site was also observed at some locations. No significant sources of vibration have been observed.

0.1.4. There is a large variation in existing background noise levels, however, sometimes they are relatively low during both the daytime and night-time periods. Measured background noise levels at positions representative of the nearest residential properties around the site range between 18 and 50 dB L_{A90}. Representative typical low background noise levels at the nearest residential receptors have been determined to be as shown below:

	Typical low background noise level, dB L_{A90}	
Location	Daytime	Night-time
Park Farm House	35	29
Spring Farm Cottage	33	23
The Chestnuts	33	24
Fairfield	33	26
Old Barn Farm	33	29
Corner Farm and Walton Lane Farm	33	29
Walton Hill Farm	34	26
Rosliston	34	30
Twin Oaks House	41	36
Boroughfields	41	35
Ladsgrave Cottage	33	25

Table 0: Summary of representative low background noise levels

1. INTRODUCTION

1.1.1. The report provides the results of baseline noise surveys undertaken at positions around the perimeter of Oaklands Farm Solar Park to inform the environmental noise assessment. The purpose is to quantify the existing noise climate and soundscape at the nearest receptor positions to the proposed development.

1.1.2. An initial attended daytime noise survey was undertaken in May 2021 to observe the existing noise climate and noise sources near to the Site. Subsequently a full baseline survey was undertaken in November 2021 to obtain both daytime and night-time noise levels.

2. INITIAL DAYTIME SURVEY

2.1. Methodology

2.1.1. An initial attended daytime noise survey was undertaken on between 09:00 and 18:00 on 27th May 2021 to observe the existing noise climate and determine existing noise and any vibration sources near to the Site. The measurement locations are shown in the Figure 1. All noise measurements were taken at a height of 1.5m above ground.

2.1.2. A series of 10-minute noise measurements were taken at each of these positions. At the position near to Corner Farm, a logging sound level meter was left at the position for the duration of the survey period, measuring noise levels in 15-minute periods.

2.1.3. In addition, short measurements of 30sec to 2mins were taken closer to some overhead high voltage lines that were observed to be audible on the Site during the survey, and also close to some ventilation fans on barns at Oaklands Farm, which run continuously.

2.1.4. The weather conditions on the 27th May were warm and sunny with either calm conditions or a very light southerly wind of up to 3m/s. The was no precipitation during or before the survey and the ground was dry.

2.1.5. The measurement instrumentation used is shown in the table below. Prior to and on completion of the survey the calibration of the sound level meter was checked with the field calibrator and no significant drift observed.

Equipment	Type	Serial Number	Calibration	
			Date	Certificate no
Near Corner Farm				
Svantek Class 1 Sound Level Meter	SV200	57090	22/04/21	1500174-2
Microphone	MK255	13675	22/04/21	1500174-2
All other positions				
Svantek Class 1 Sound Analyser	977	69526	20/11/20	14016423-1
Microphone	7052E	68247	20/11/20	14016423-1
Preamplifier	SV 12L	72159	20/11/20	14016423-1
Svantek field calibrator	SV36	83721	18/03/21	U37434

Table 1: Instrumentation used during initial survey

Figure 1: Initial daytime noise survey positions

2.2. Observations and Soundscape

2.2.1. The Site and surrounding area are predominantly rural land in farming use. Ambient and background noise levels are generally controlled by road traffic noise on local roads, farm animals and birdsong. Local roads are relatively lightly trafficked and consequently noise levels around the Site are low. The busiest road is Walton Road to the north of Park Farm.

2.2.2. Approximately 2km to the north-west of the site is the A38, which was not observed to be audible during the initial noise survey, but may potentially contribute to background noise levels wind directions with a westerly component. There is also a railway line parallel to the A38 running from Litchfield/ Tamworth to the south towards Burton-upon-Trent to the north and on towards Derby, however, this was also not audible during the initial daytime noise survey under calm/southerly wind conditions. The line carries freight traffic and there are sidings at Barton-under-Needwood approximately 2km to the east.

2.2.3. To the north of Walton Road is Drakelow Power Station. Existing high voltage overhead lines cross the Site towards Drakelow Power Station. During the initial survey, one of these lines was observed to generate noticeable 'corona discharge' crackle noise during dry conditions, which was measurable above the background noise level at around 50m away and in one location faintly audible beyond 200m, which is less common and may be an old line. Noise from high voltage power lines is typically more significant in wet conditions. This line runs north-south across the Site and is approximate 150m from Park Farm, 70m from Corner Farm, 70m from Walton Lane Farm, and 200m from Ladsgrove Cottage. There is another high voltage overhead line running north-south across the site further to the west although this was not audible during the visits to the site (during the dry conditions).

2.2.4. Short term noise sources include farming activity and it is noted that some of the farm buildings in the area contain industrial units. Ventilation fans on barns at Oaklands farm run continuously which control background noise levels at this location.

2.2.5. There is a commercial nursery (plant growing) on Rosliston Road. Rosliston Forestry Centre on Rosliston Road to the east. The Forest Centre contains and outdoor activity centre, café and a number of residential lodges.

2.2.6. No significant sources of vibration were observed during the initial survey.

2.3. Daytime noise survey measurements

2.3.1. The measured noise levels are shown in Table 2 and Table 3.

2.3.2. Daytime background noise levels at the nearest residential properties around the site typically range between approximately 30-45 dB L_{A90}, with average ambient noise levels of approximately 40-55 dB L_{Aeq}, which is common for a rural area.

2.3.3. Background noise levels at Park Farm and Grove lodge are controlled by road traffic on Walton Road to the north.

2.3.4. The background noise levels close to Twin Oaks House were controlled by noise from ventilation fans on barns at Oaklands Farm. It is understood that these run continuously.

2.3.5. The addition short measurements taken closer to audible overhead high voltage lines on the Site, and ventilation fans on barns at Oaklands Farm are shown in Table 4 and the associated measurement locations are shown in Figure 2.

Name	Start time	Measured levels, dB L_{Aeq}	$L_{Amax,f}$	L_{A10}	L_{A90}	Wind	Notes
Twin Oaks House	08:56	58	77	60	43	0-1m/s NW	Cows mooing in adjacent pasture, fans on barns controls background level, occasional cars on Coton Rd
Twin Oaks House	13:29	55	72	58	41	0-1m/s S	Fans on barns opposite, cows mooing in adjacent pasture, occasional cars on Coton Rd audible.
Twin Oaks House	16:41	52	74	52	42	1-3m/s S	Fans on barns opposite, cows mooing in adjacent pasture, occasional cars on Coton Rd audible.
Ladsgrave Cottage	09:28	49	68	51	30	Calm	Road traffic and birdsong, occasional barking from dogs at Ladsgrave Cottage, 1 lorry on Cotton Rd.
Ladsgrave Cottage	13:53	53	71	55	32	0-1m/s S	Road traffic (7 cars & 2 lorries on Cotton Rd, 5 Cars on Catton Ln North, 13 cars & 2 lorries on Church St, 11 cars on Catton Ln South), birdsong, Gas gun to SE x2, Noise from pylon tower to north just audible at times (290m away).
Ladsgrave Cottage	16:54	54	69	56	36	1-3m/s S	Road traffic, birdsong, Gas gun to SE
Park Farm House	10:15	46	68	48	37	0-1m/s W	Road traffic on Walton Road and birdsong, 1 motorbike, sheep bleating and cow mooing throughout. Roughly equal contribution from traffic/animals/birdsong
Park Farm House	11:54	47	65	50	35	0-1m/s S	Cows mooing, road traffic on Walton Road, birdsong
Park Farm House	16:08	50	63	55	40	1-3m/s S	Road traffic on Walton Road (66 cars, 4 motorbikes, 2 lorries), birdsong, cows mooing. Clatter from farm activity, JCW in yard, engine idle, lawn mowing at farm house for 1 min.
Spring Cottage	11:00	41	58	45	32	0-1m/s SW	Birdsong and sheep bleating. Road traffic not audible. Gas gun discharge to SE
Spring Cottage	11:30	41	53	45	30	0-1m/s S	Birdsong. Sheep bleating, but less than previous. Distant aircraft. Road traffic not audible. Gas gun discharge to SE
Spring Cottage	15:44	43	61	45	34	0-2m/s S	Birdsong. Sheep bleating. Gas gun discharge to SE
Grove Lodge	12:07	53	66	57	40	0-1m/s S	Noise levels controlled by road traffic on Walton Road. Birdsong. Cockerel crowing
Grove Lodge	16:21	56	64	59	46	1-3m/s S	Road traffic on Walton Road (114 cars, 2 lorrys). Birdsong. Cockerel crowing
The Chesnuts	12:44	53	70	56	33	0-1m/s S	Road traffic and birdsong. Gasgun to W. Cockeral crowing.
The Chesnuts	14:32	52	72	56	31	0-1m/s S	Road traffic on Burton Rd (23 cars, 1 motorbike, 1 lorry), gasgun to W, Cockerel crowing
The Chesnuts	17:30	53	80	56	33	1-3m/s S	Road traffic on Burton Rd, birdsong, cockerel crowing
Walton-on-Trent (Rosliston Road)	13:07	48	62	53	34	0-1m/s S	Birdsong and road traffic on Rosliston Rd (9 cars, 1 lorry), lawn mower to west audible for 2 mins, light aircraft, car doors at house opposite.
Walton-on-Trent (Rosliston Road)	15:17	54	68	59	37	0-2m/s S	Road traffic on Rosliston Rd (10 cars), car trailer with load rattle, dog barking for 1min at The Pastures, Car door slams, Light aircraft passes nearby
Walton-on-Trent (Rosliston Road)	17:14	56	76	59	38	1-3m/s S	Road traffic on Rosliston Rd, birdsong, loading car at house nearby, Light aircraft
Rosliston (Daffodil Wood)	14:14	52	72	51	34	0-1m/s S	Road traffic on Catton Ln (8 cars), birdsong, light aircraft

Table 2: Measured daytime noise levels and observations, May 2021 (10 min periods)

Time	Ambient noise level, dB L_{Aeq}		Maximum noise level $L_{Amax,\ 15\ min}$		Background noise level, dB $L_{A90,\ 15\ min}$	
	Range (15 min)	7 hour period	Range	Typical[1]	Range	Typical[2]
10:15-17:15	50 - 57	53	67 - 81	71	33 - 48	34

1 Typical maximum taken as the arithmetic average of 15-minute $L_{Amax,\ f}$ values.
2 Typical background noise level shown is 20th percentile 15-minute L_{A90} values.

Table 3: Measured daytime noise levels nr Corner Farm, May 2021

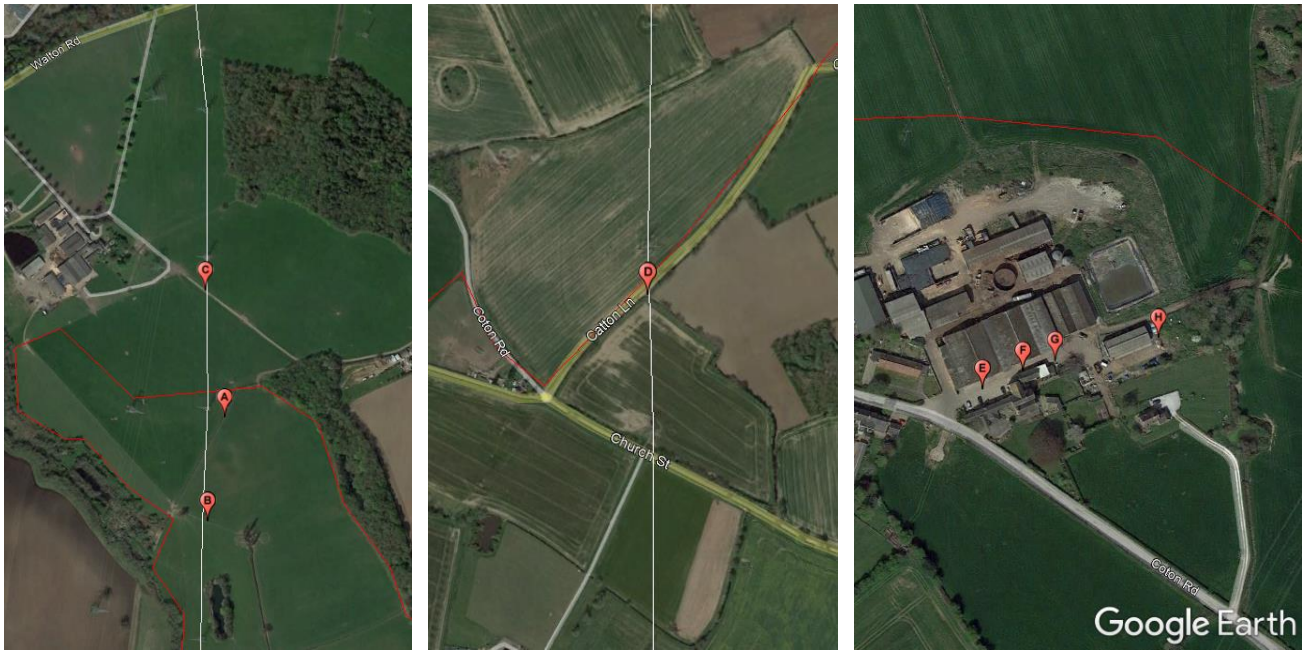


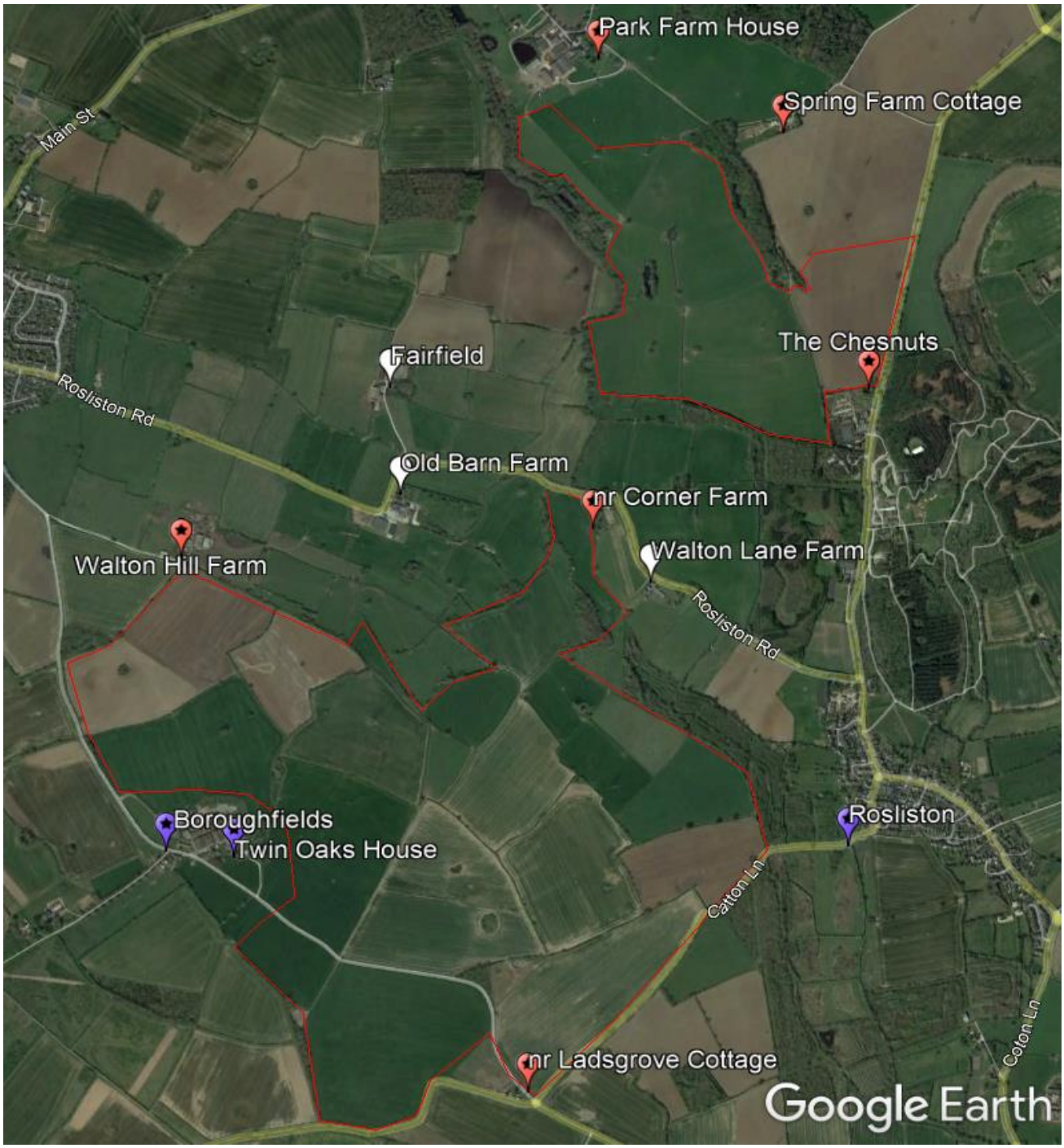
Figure 2: Additional source measurement positions

Location	Source	Start time	Measured levels, dB L_{Aeq}	$L_{Amax,\ f}$	L_{A10}	L_{A90}	Notes
A	Pilon tower noise	10:42	42	46	43	41	100Hz hum and crackle clearly audible from tower at 33m, controls background (L_{A90}) level
B	Mid span crackle	10:51	35	46	38	32	Crackle from cables, tower still audible (400m span)
C	Pilon tower noise	11:47	41	56	42	36	Pylon tower 60m
D	Pilon tower noise	14:08	35	45	37	32	Pylon tower 80m away audible and contributing to L_{A90} level
E	Ventilation fan	09:17	80	87	83	71	5m from fan, broadband spectrum
F	Ventilation fan	09:10	64	66	65	63	5m from fan, broadband spectrum
G	Ventilation fan	09:14	65	70	66	64	5m from fan, broadband spectrum
H	Ventilation fan	09:08	65	68	66	64	5m from fan, broadband spectrum

Table 4: Additional source measurements

3. BASELINE SURVEY

3.1.1. A baseline noise survey was undertaken between 12th and 19th November 2021. Environmental Services of South Derbyshire District Council was consulted on methodology and locations, which were agreed prior being undertaken.



Logging sound level meters Attended evening measurements Other nearby receptors

Figure 3: Continuous and evening measurement positions

3.2. Baseline survey methodology

3.2.1. A baseline noise survey was undertaken between 12th and 19th November 2021. The measurement period was chosen to have calm or low windspeeds (except for the 12th), with a large portion from the prevailing South-Westerly wind direction. Daylight hours during this period are from approximate 07:30-16:00. A summary of the approximate weather conditions from weather records during this period is shown below:

Date:	12th	13th	14th	15th	16th	17th	18th	19th
Typical wind speed:	3-5m/s	0-2m/s	0-1m/s	0-1m/s	0-2m/s	1-2m/s	0-2m/s	0-2m/s
Wind direction:	W	NW	E-SW	SW	SW	SW	SW	SW
Daytime high:	14°C	14°C	14°C	12°C	12°C	12°C	15°C	14°C
Night-time low:	11°C	9°C	8°C	9°C	7°C	8°C	9°C	9°C
Precipitation:	none	none	none	none	none	none	none	none

Table 5: Summary of weather conditions during baseline survey period

3.2.2. Noise levels were measured using unattended logging sound level meters at six locations shown in red in Figure 3. Where access was granted, the logging sound level meters were setup in, or at the boundary, of the gardens of properties. These included Park Farm House, The Chesnuts, Walton Hill Farm and Twin Oaks House. Where access to receptor properties was not available, the logging sound level meters were setup in proxy positions considered to be representative of the properties. Measurements were obtained for a period of 1 week, except at Park Farm House and Walton Hill Farm, where the battery duration allowed measurements for 4 days.

3.2.3. Attended evening measurements were taken on 19th November 2021 between 22:00 and 00:00 at three locations to confirm indicative background noise levels under calm/light wind conditions and the contributing noise sources at each location. The locations are shown in purple in Figure 3.

3.2.4. A seventh logging sound level meter had been setup at Twin Oaks House, however, there was a memory error and the data was not stored. The purpose of this location was to confirm the background noise level that is controlled by ventilation fans on Oaklands Farm during the night-time period, therefore, additional attended measurements were taken in the late evening/night-time period instead.

3.2.5. The procedure and measurement location were agreed with Environmental Health at South Derbyshire District Council.

3.2.6. The measurement instrumentation used is shown below. Prior to and on completion of the survey the calibration of the sound level meter was checked with the field calibrator and no significant drift observed.

Equipment	Type	Serial Number	Calibration	
			Date	Certificate no
The Chesnuts				
Svantek Class 1 Sound and Vibration Analyser	958A	34551	04/03/21	00001054-1a
Microphone	7052E	55952	04/03/21	00001054-1a
Preamplifier	SV 12L	33537	04/03/21	00001054-1a
Spring Farm Cottage				
Svantek Class 1 Sound and Vibration Analyser	958A	59140	19/10/20	14016196-1
Microphone	MK 255	12582	19/10/20	14016196-1
Preamplifier	SV 12L	57964	19/10/20	14016196-1
Nr Corner Farm				
Svantek Class 1 Sound and Vibration Analyser	958A	59146	26/08/20	14015923-1
Microphone	MK 255	12565	26/08/20	14015923-1
Preamplifier	SV 12L	57962	26/08/20	14015923-1
Nr Ladsgrave Cottage				
Svantek Class 1 Sound Analyser	977	69526	20/11/20	14016423-1
Microphone	7052E	68247	20/11/20	14016423-1
Preamplifier	SV 12L	72159	20/11/20	14016423-1
Attended evening				
Rion Class 1 sound level meter	NA-28	00170246	26/05/21	UCRT21/1675
Preamplifier	NH-23	60254	26/05/21	UCRT21/1675
Microphone	UC-59	00299	26/05/21	UCRT21/1675
Walton Hill Farm				
Svantek Class 1 Sound Level Meter	SV200	57090	22/04/21	1500174-2
Microphone	MK255	13675	22/04/21	1500174-2
Park Farm House				
Svantek Class 1 Sound Level Meter	SV200	57092	22/04/21	1500174-1
Microphone	MK255	10669	22/04/21	1500174-1
Field Calibrator	SV33	58228	16/07/21	1500361-2

Table 6: Baseline survey instrumentation

3.3. Baseline survey measurements

3.3.1. A summary of the measured noise levels at each of the monitoring positions is given in the tables and graphs below. For each position a statistical analysis of the daytime and background noise levels is presented, following the methodology shown in BS 4142: 2014.

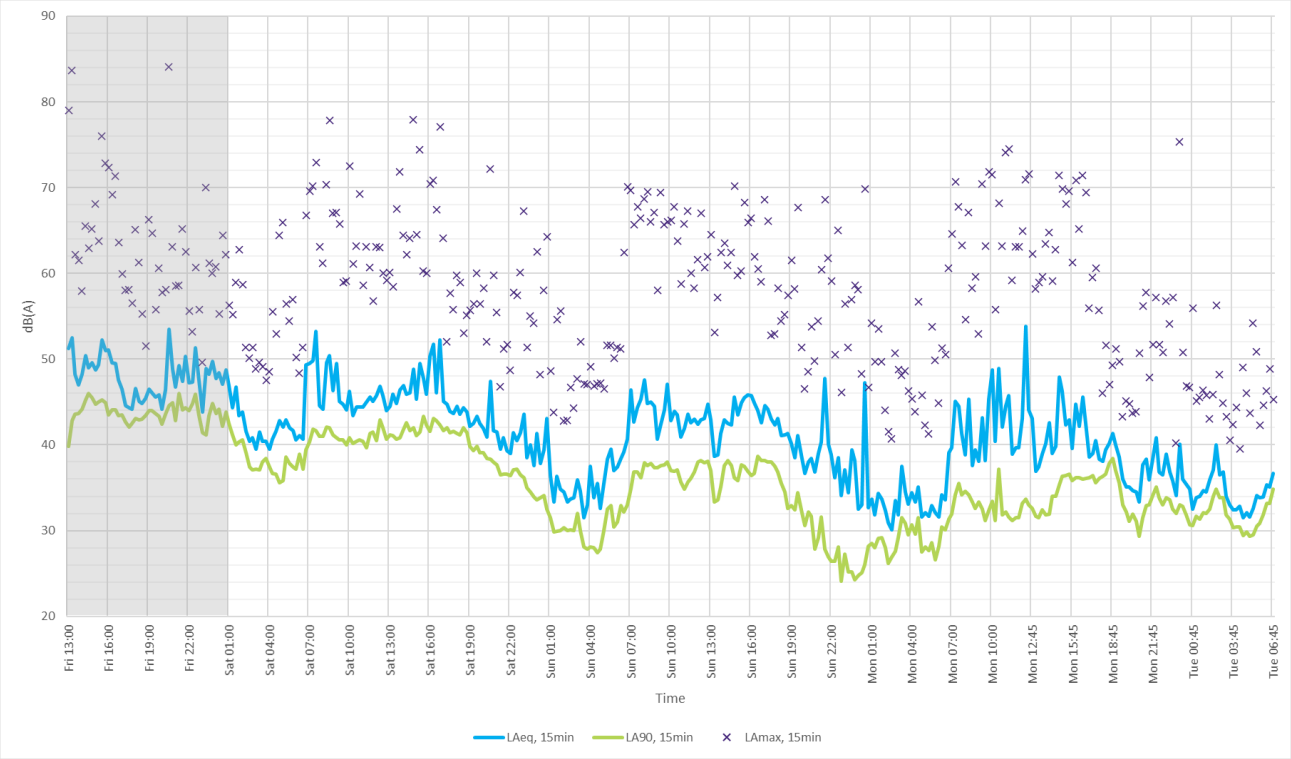


Figure 4: Measured levels at Park Farm House

Time		Ambient noise level, dB L_{Aeq}		Maximum noise level, dB $L_{Amax,\ 15\ min}$		Background noise level, dB $L_{A90,\ 15\ min}$			
		Range (15 min)	Period	Range	Typical[1]	Range	Arithmetic average	Average of daily typical[2]	Lowest typical[2] (all data)
Daytime	07:00-19:00	37 - 54	46	46 - 84	64	31 - 46	39	38	35
Evening	19:00-23:00	33 - 54	44	43 - 84	56	24 - 46	36	35	32
Night	23:00-07:00	30 - 50	41	40 - 75	54	24 - 45	33	31	29

1 'Typical' maximum taken as the average of the 10th highest values for each night, and the arithmetic average for all other periods.
2 'Typical' background noise level shown is the 20th percentile of values for each period.

Table 7: Summary of measured levels at Park Farm House

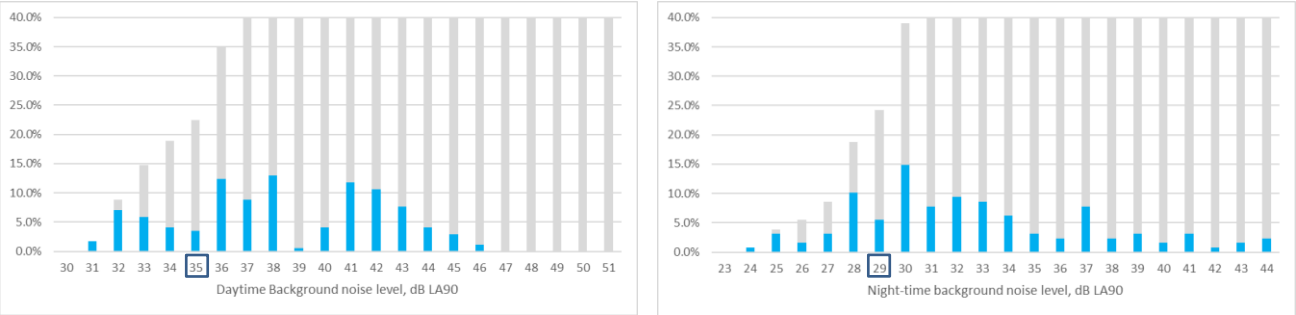


Figure 5: Statistical analysis of background levels at Park Farm House

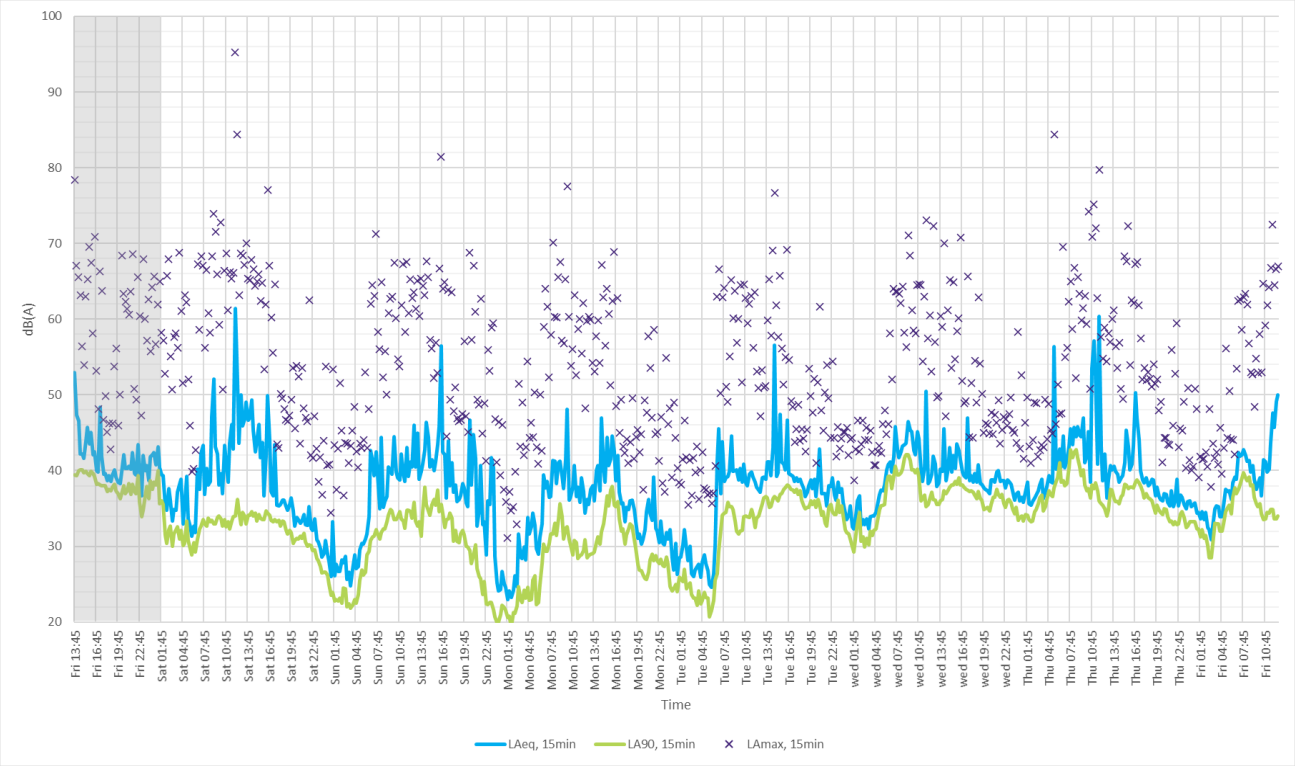


Figure 6: Measured levels at Spring Farm Cottage

Time		Ambient noise level, dB L_{Aeq}		Maximum noise level, dB $L_{Amax,\ 15\ min}$		Background noise level, dB $L_{A90,\ 15\ min}$			
		Range (15 min)	Period	Range	Typical[1]	Range	Arithmetic average	Average of daily typical[2]	Lowest typical[2] (all data)
Daytime	07:00-19:00	33 - 61	45	41 - 95	60	28 - 43	36	34	33
Evening	19:00-23:00	29 - 47	38	38 - 69	50	22 - 39	33	32	29
Night	23:00-07:00	23 - 56	38	31 - 84	48	19 - 41	30	28	23

1 'Typical' maximum taken as the average of the 10th highest values for each night, and the arithmetic average for all other periods.
2 'Typical' background noise level shown is the 20th percentile of values for each period.

Table 8: Summary of measured levels at Spring Farm Cottage

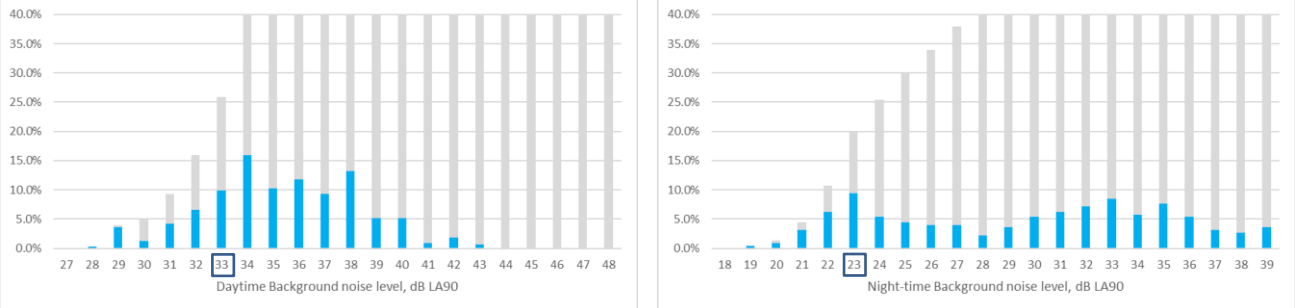


Figure 7: Statistical analysis of background levels at Spring Farm Cottage

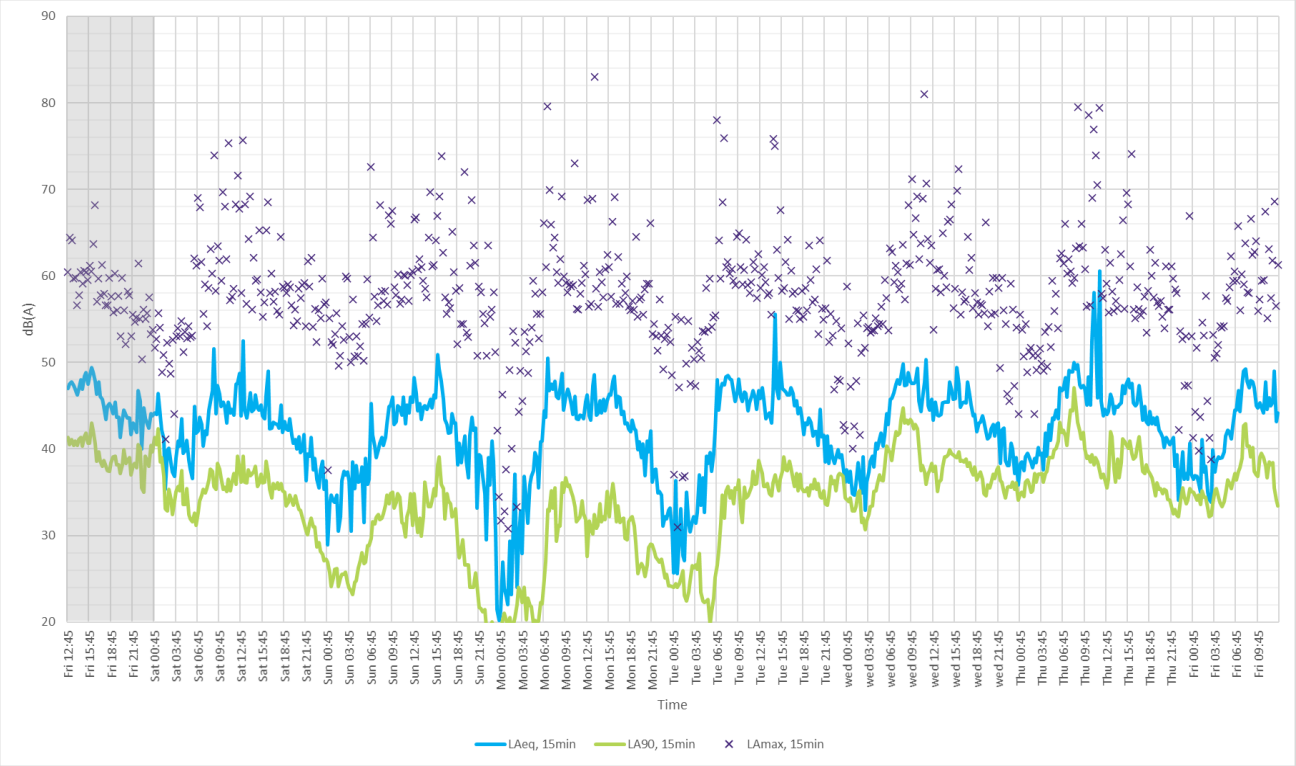


Figure 8: Measured levels at The Chestnuts

Time		Ambient noise level, dB L_{Aeq}		Maximum noise level, dB $L_{Amax,\ 15\ min}$		Background noise level, dB $L_{A90,\ 15\ min}$			
		Range (15 min)	Period	Range	Typical[1]	Range	Arithmetic average	Average of daily typical[2]	Lowest typical[2] (all data)
Daytime	07:00-19:00	38 - 61	47	52 - 83	62	27 - 47	37	35	33
Evening	19:00-23:00	30 - 47	42	42 - 72	57	19 - 41	33	31	28
Night	23:00-07:00	20 - 48	40	31 - 78	55	18 - 43	31	29	24

1 'Typical' maximum taken as the average of the 10th highest values for each night, and the arithmetic average for all other periods.
2 'Typical' background noise level shown is the 20th percentile of values for each period.

Table 9: Summary of measured levels at The Chestnuts

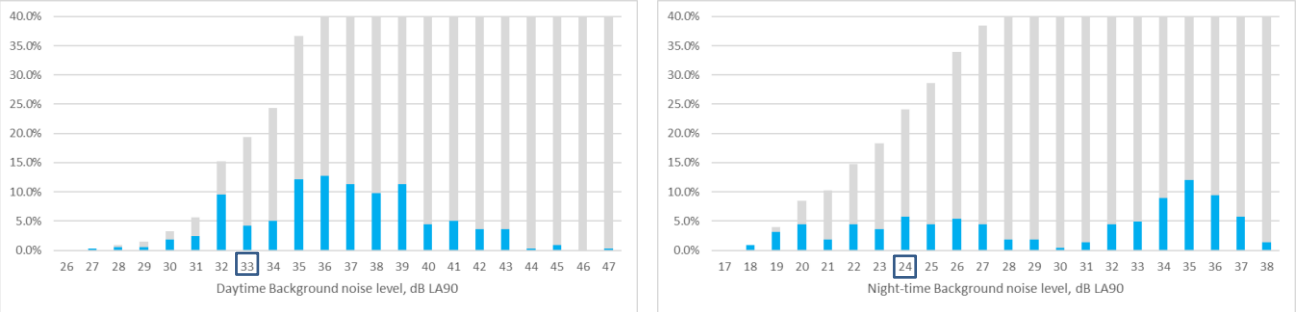


Figure 9: Statistical analysis of background levels at The Chestnuts

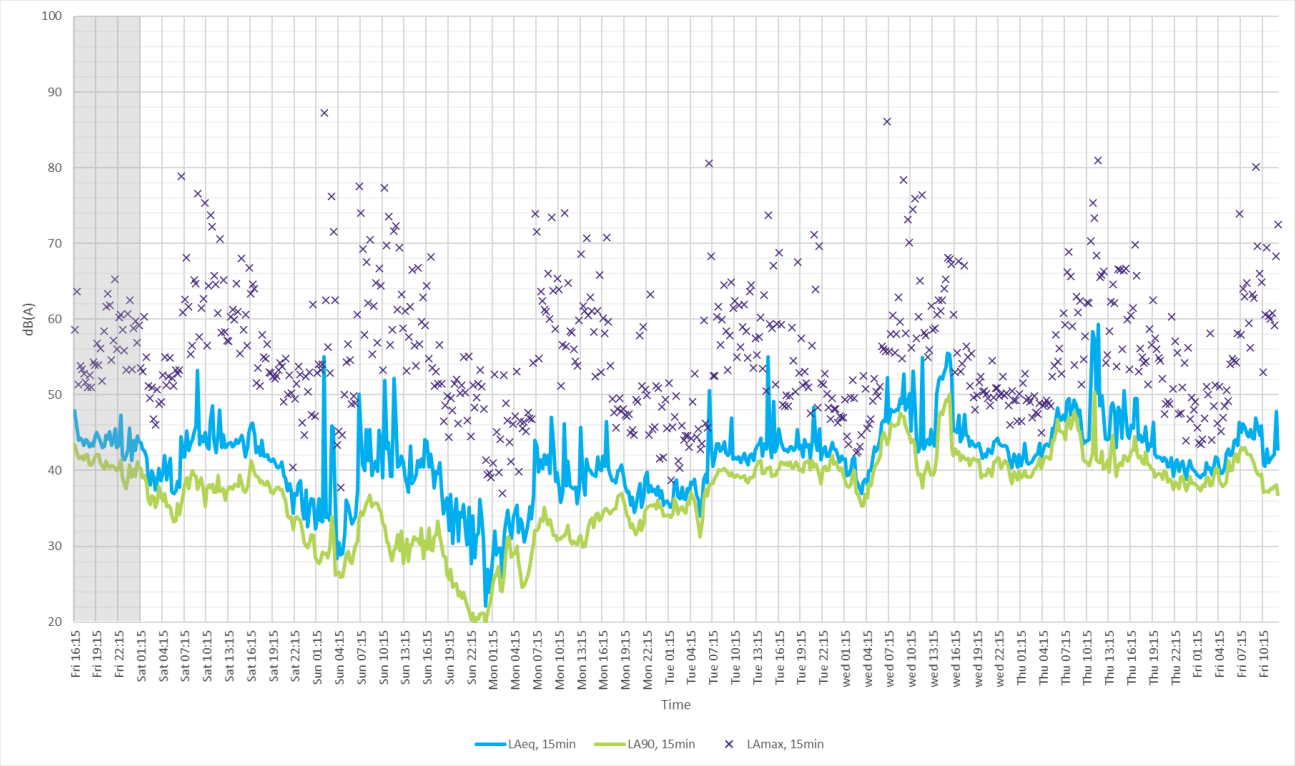


Figure 10: Measured levels near Corner Farm

Time		Ambient noise level, dB L_{Aeq}		Maximum noise level, dB $L_{Amax,\ 15\ min}$		Background noise level, dB $L_{A90,\ 15\ min}$			
		Range (15 min)	Period	Range	Typical[1]	Range	Arithmetic average	Average of daily typical[2]	Lowest typical[2] (all data)
Daytime	07:00-19:00	34 - 59	46	46 - 86	60	28 - 50	39	37	33
Evening	19:00-23:00	28 - 48	42	40 - 71	53	20 - 42	36	35	33
Night	23:00-07:00	22 - 55	41	37 - 87	51	20 - 47	35	33	29

1 'Typical' maximum taken as the average of the 10th highest values for each night, and the arithmetic average for all other periods.
2 'Typical' background noise level shown is the 20th percentile of values for each period.

Table 10: Summary of measured levels near Corner Farm

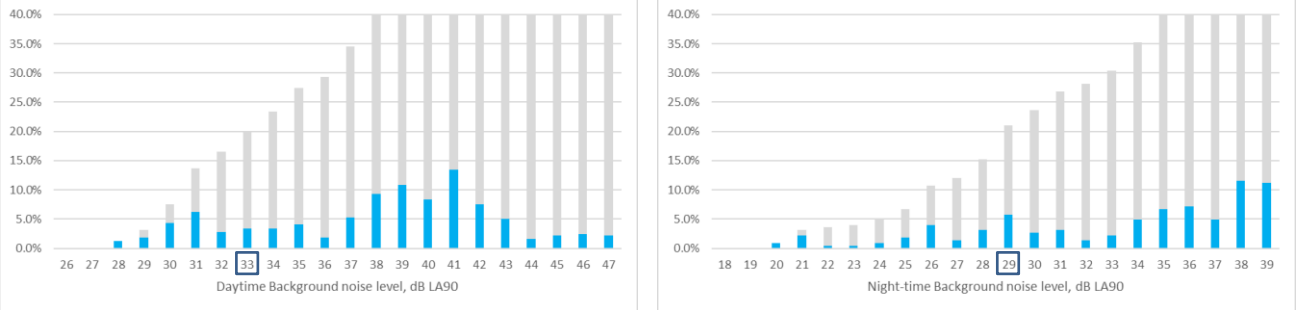


Figure 11: Statistical analysis of background levels near Corner Farm

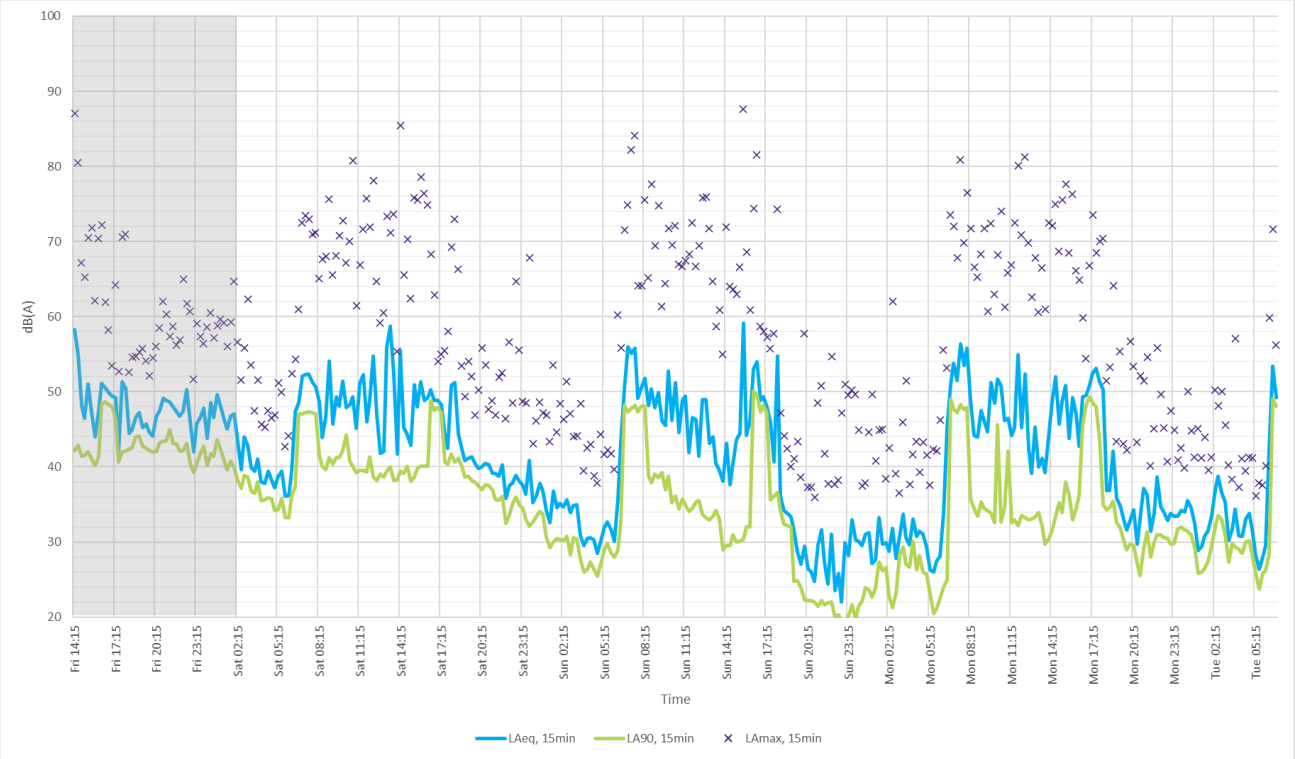


Figure 12: Measured levels at Walton Hill Farm

Time		Ambient noise level, dB L_{Aeq}		Maximum noise level, dB $L_{Amax,\ 15\ min}$		Background noise level, dB $L_{A90,\ 15\ min}$			
		Range (15 min)	Period	Range	Typical[1]	Range	Arithmetic average	Average of daily typical[2]	Lowest typical[2] (all data)
Daytime	07:00-19:00	34 - 59	50	42 - 88	67	29 - 50	40	36	34
Evening	19:00-23:00	22 - 50	42	36 - 65	50	19 - 45	33	32	24
Night	23:00-07:00	26 - 53	41	36 - 74	51	19 - 49	31	28	26

1 'Typical' maximum taken as the average of the 10th highest values for each night, and the arithmetic average for all other periods.
2 'Typical' background noise level shown is the 20th percentile of values for each period.

Table 11: Summary of measured levels at Walton Hill Farm

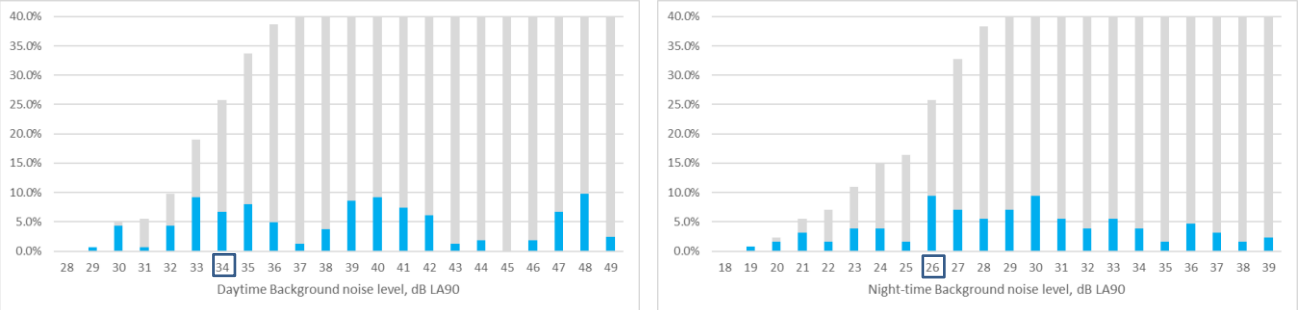


Figure 13: Statistical analysis of background levels at Walton Hill Farm

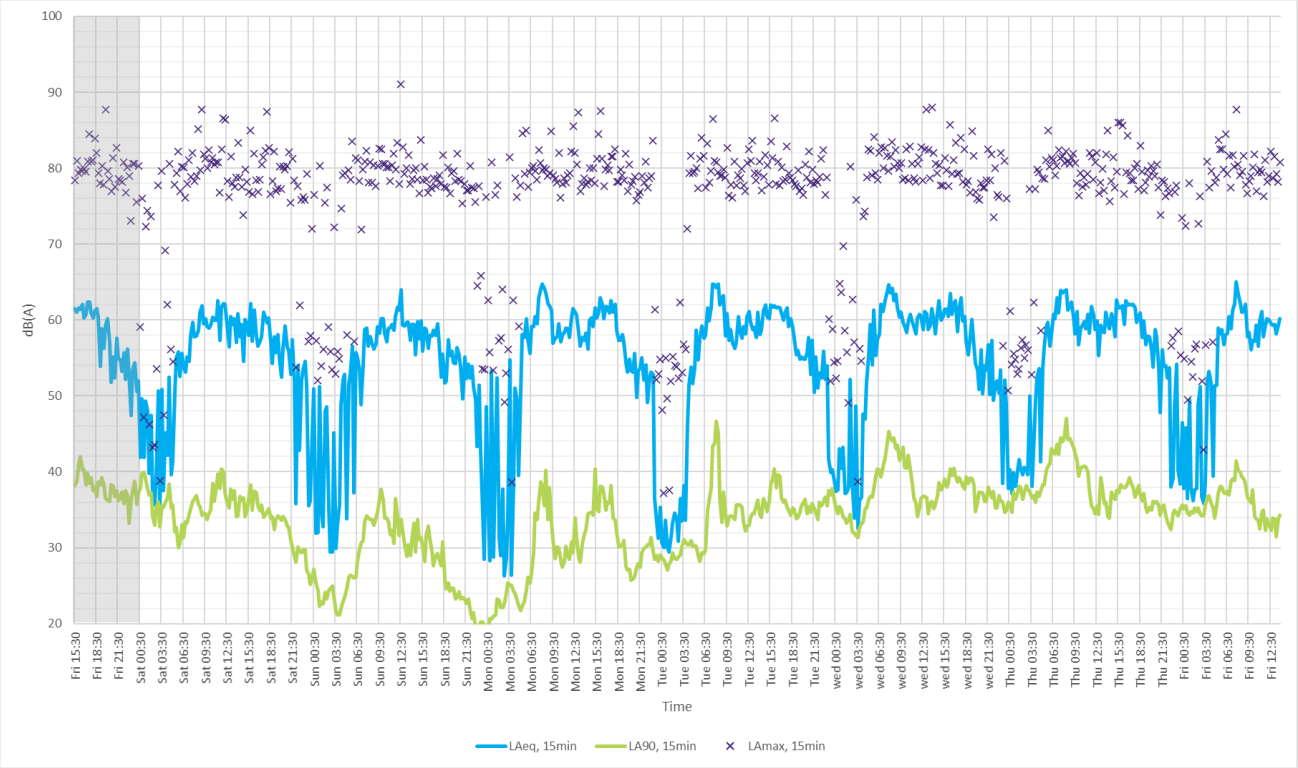


Figure 14: Measured levels near Ladsgrave Cottage

Time		Ambient noise level, dB L_{Aeq}		Maximum noise level, dB $L_{Amax,\ 15\ min}$		Background noise level, dB $L_{A90,\ 15\ min}$			
		Range (15 min)	Period	Range	Typical[1]	Range	Arithmetic average	Average of daily typical[2]	Lowest typical[2] (all data)
Daytime	07:00-19:00	49 - 65	60	72 - 91	80	25 - 47	36	34	33
Evening	19:00-23:00	36 - 60	55	54 - 88	78	19 - 39	32	31	27
Night	23:00-07:00	26 - 62	53	37 - 85	79	19 - 43	32	30	25

1 'Typical' maximum taken as the average of the 10th highest values for each night, and the arithmetic average for all other periods.
2 'Typical' background noise level shown is the 20th percentile of values for each period.

Table 12: Summary of measured levels near Ladsgrave Cottage

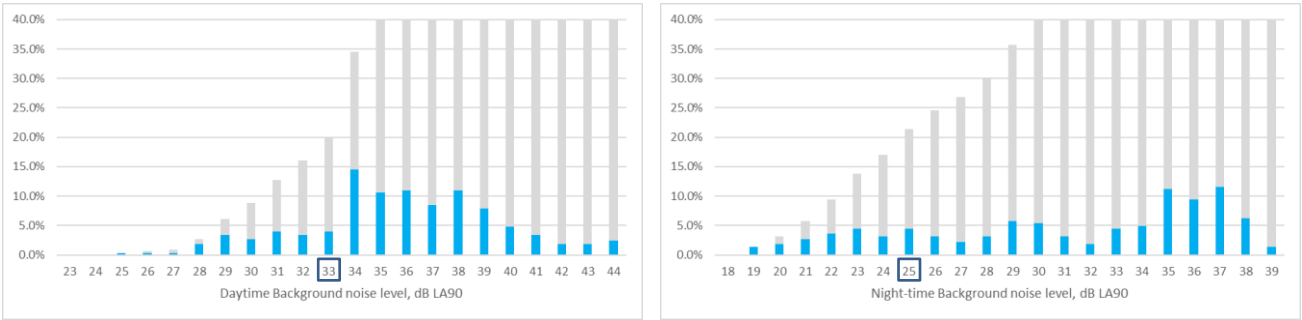


Figure 15: Statistical analysis of background levels near Ladsgrave Cottage

3.3.2. There is a large variation in background noise level at each location. It is stated in guidance in BS 4142 that "the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify that is typical during particular time periods".

3.3.3. At all positions it is noted that the background noise levels during the early hours of 15th are significantly lower than the typical low of other nigh-time periods, and at some positions this also occurs during the early hours of the 14th and 16th, however the degree of difference is less. This may be due to prolonged periods of absolute calm (zero wind), however, it may also be due to presence of fog or temperature inversion.

3.3.4. The statistical analysis indicates that the 20th percentile of all measured values for each of the time periods is a reasonably conservative value for the representative 'typical' background noise level.

3.4. Evening/night-time attended measurements

3.4.1. The measured noise levels and observations from the evening measurements on the 19th November are shown below.

Name	Start time	Measured levels, dB L_{Aeq}	$L_{Amax,f}$	L_{A10}	L_{A90}	Wind	Notes
Rosliston	22:02	34.3	n/a	n/a	30.9	0-1m/s WSW	A38 in distance, 2 distant aircraft
Rosliston	23:17	38.1	56.9	38.8	30.8	0-2m/s SW	A38 in distance, 3 cars pass (paused out of measurement)
Twin Oaks House	22:31	39.6	63.8	40.5	37.8	0-2m/s WSW	Fans on barn opposite control level, cows hoofing, in distance, 1 car on road, large train in distance
Twin Oaks House	23:42	38.4	52.3	39.8	36.5	1-2m/s SW	Fans on barn opposite control level.
Boroughfields Cottage	22:49	43.3	64.5	43.1	35.5	1-2m/s WSW	A38 in distance, fan opposite cuts in and out, 2 car pass (paused out of measurement), 1 high plane
Boroughfields Cottage	00:01	40.9	64.6	43.5	36.4	0-2m/s SW	A38 in distance, 1 car passes (paused out of measurement), fans opposite cut in and out, large train (freight?) in distance.

Table 13: Measured noise levels evening/night-time noise levels 19th November

3.5. Representative noise levels

3.5.1. From the measured noise levels of all survey results, representative noise levels for each of the nearest receptor positions to the Site have been determined and are shown below in Table 14.

3.5.2. It is considered that similar levels will occur at Walton Hill Farm and Old Barn Farm as at the Corner Farm monitoring position (see Figure 3 for positions). All are located off Rosliston Road. There are some industrial units adjacent to Old Barn Farm, which could potentially increase ambient noise levels at this position, however, are less likely to influence the background noise levels as no continuous sources of noise at this location have been observed. For Fairfields, the lower of either Corner Farm or Walton Hill Farm have been used.

Location	Daytime ambient, dB $L_{Aeq, 12\ hour}$	Daytime background, dB $L_{A90, 15\ min}$	Night-time ambient, dB L_{Aeq}	Night-time background, dB $L_{A90, 15\ min}$
Park Farm House	46	35	41	29
Spring Farm Cottage	45	33	38	23
The Chestnuts	47	33	40	24
Fairfield	46	33	41	26
Old Barn Farm	46	33	41	29
Corner Farm & Walton Lane Farm	46	33	41	29
Walton Hill Farm	50	34	41	26
Rosliston	52	34	41	30
Twin Oaks House	52	41	n/a	36
Boroughfields Cottage	n/a	41	n/a	35
Ladsgrave Cottage	60	33	53	25

Table 14: Summary of ambient and representative low background noise levels

3.5.3. It is noted that some elements of the proposed development will only operate during daylight hours, which is from approximately 04:45 to 10:15 at the summer solstice. It is not, however, considered appropriate to determine representative background noise levels for the separate early morning period of say 04:45 to 07:00 from the survey results in November, well before sunrise, as the background noise levels will vary depending on the time of year. For assessment purposes it is considered reasonable to assume the early morning and night-time background noise levels will be similar as a worst case.

APPENDIX 1 ACOUSTIC TERMINOLOGY

Environmental Noise

Environmental noise is normally described in terms of the single figure A-weighted sound pressure level, in decibels (dB). The A-weighting corresponds to the frequency sensitivity of the ear and, therefore, provides an approximation to the subjective response to sound at different frequencies. When a sound level is expressed in this way, the units can be denoted dB(A).

When sound is time varying, it is convenient to express the sound level using an indicator, or descriptor that takes account of this variation. Two types of indicator are in common use, the equivalent continuous sound level and the statistical indicators.

Equivalent continuous sound level

$L_{Aeq, T}$: This indicator provides the overall noise exposure to time varying sound and is the energy average of the sound over a specified time period. It is the notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound over the same period. It is denoted $L_{eq, T}$, or, if A-weighted, $L_{Aeq, T}$, where T is the time period of interest.

Statistical indicators

The statistical indicators are also single figure descriptors, but provide additional information on the temporal variation of the noise level with time. The indicators are expressed as the sound level exceeded for a specified percentage of the time period of interest and the most commonly used are described below:

$L_{A90, T}$: the A-weighted noise level exceeded for 90% of the time period T. This indicator is representative of the noise level occurring in the absence of short-term events and is used in the UK to represent the background noise level.

$L_{A10, T}$: the A-weighted noise level exceeded for 10% of the time period T. This indicator is used in the UK to define traffic noise in A Calculation of Road Traffic Noise[1], although in most guidance and standards, the $L_{Aeq, T}$ is used. For freely flowing continuous traffic, the $L_{Aeq, T}$ is approximately 3 dB lower than the $L_{A10, T}$.

$L_{Amax, T}$: the maximum A-weighted noise level that occurred during the time period T. It usually includes an additional subscript, slow (s) or fast (f), ie $L_{Amax, slow, T}$ or $L_{Amax, fast, T}$ which denotes the response time used in the analysis algorithm. The fast response tracks the maximum level of a rapidly changing sound more accurately than the slow response and the value is generally higher for impulsive or transient sounds.

[1] Calculation of Road Traffic Noise (CRTN), Department of Transport and Welsh Office, 1988