APPENDIX 9.1 – BASELINE SURVEY

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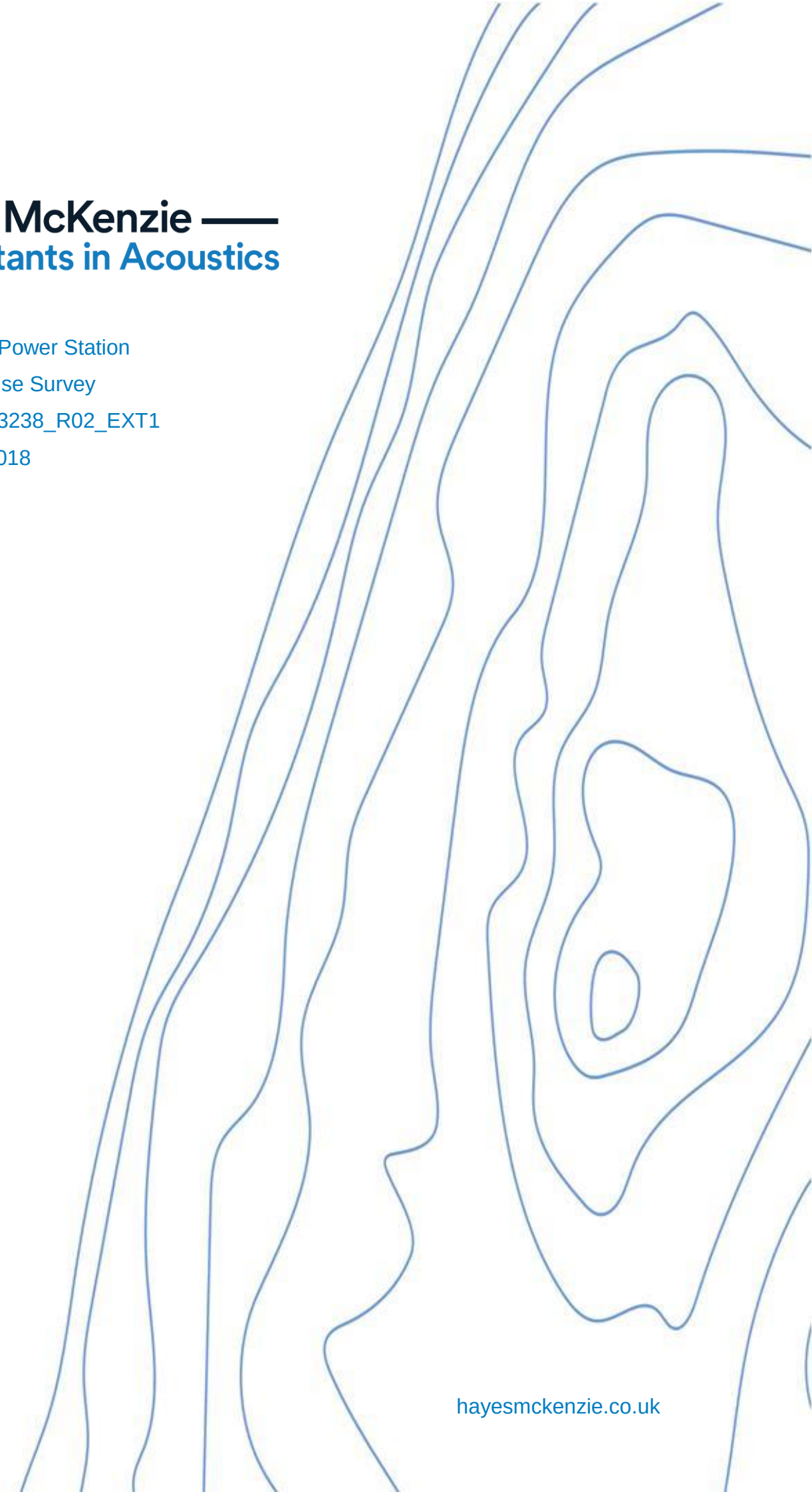
West Offaly Power Station

Baseline Noise Survey

Report HM: 3238_R02_EXT1

24 August 2018



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West Offaly Power Station
Baseline Noise Survey
Report HM: 3238_R02_EXT1,
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1. INTRODUCTION

1.1 Hayes McKenzie have been commissioned to carry out a baseline noise survey at two locations in order to establish environmental noise levels whilst West Offaly Power Station, (Cloniffeen, Shannonbridge, Co. Offaly) is shut down for routine maintenance. The outcome of this noise survey will be used to determine suitable noise assessment criteria for a licensing application at the power station.

1.2 Noise measurements were undertaken over a 7 day period to ascertain the indicative daytime, evening and night-time ambient noise levels at the two selected residential locations close to the power station.

1.3 The noise survey has been carried out with reference to *NG4: 'Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities'*. Section 4 of this guidance document sets out appropriate noise limits and an assessment protocol to enable the noise risks of a site to be quantified for the purpose of a licence application.

2. NG4 GUIDANCE ON NOISE ASSESSMENT

Identification of Appropriate Noise Criteria

2.1 Section 4.4 of NG4 details a process for determining whether or not a noise sensitive location (NSL) is classed into one of three categories. The three categories are used for identifying the recommended noise limits and they are as follows:

- Quiet Areas
- Areas of Low Background Noise
- All Other Areas

2.2 The guidance provides a list of non-acoustic criteria, supported by an Environmental

Protection Agency publication[1], for screening assessment locations to determine whether or not they can be classified as being within a 'Quiet Area'. For locations identified as being within a Quiet Area, a long term baseline noise survey is then required in order to determine the appropriate noise limits.

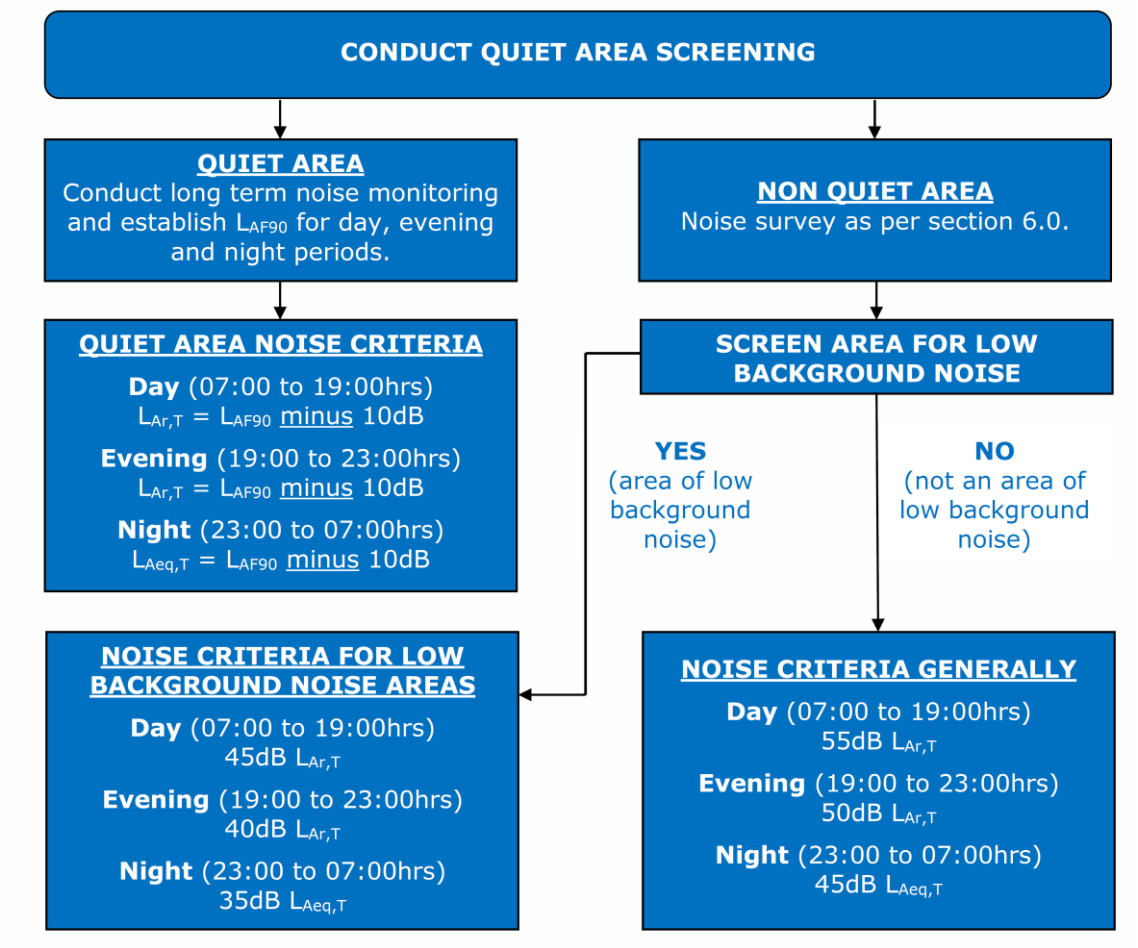
2.3 If a location is not categorised as a quiet area then a further screening stage is undertaken to determine whether or not it is an 'Area of Low Background Noise'. This stage involves a noise survey which does not need to be long term but must provide representative measurements for Daytime (0700-1900), Evening (1900-2300) and Night-time (2300-0700) periods. A location is deemed to be in an Area of Low Background Noise if all three of the following criteria are met:

- Average Daytime Background Noise Level ≤40dB L_{AF90}, and;
- Average Evening Background Noise Level ≤35dB L_{AF90}, and;
- Average Night-time Background Noise Level ≤30dB L_{AF90}.

2.4 For locations not meeting the criteria for the first two categories, these are automatically categorised as 'All Other Areas'. The recommended noise limits for each category are graded in accordance with the noise sensitivity of the area and at the end of section 4.4 there is a helpful flow chart to assist in determining the appropriate noise limits. This flow chart is reproduced below at Figure 1.

[1] Environmental Protection Agency, 2003. Environmental Quality Objectives - Noise in Quiet Areas.

Figure 1 – NG4 Noise Criteria Flow Diagram



3. NOISE MEASUREMENTS

Noise Measurement Setup

3.1 Noise measurements were carried out over a 7 day period from Wednesday 1st to Wednesday 8th of August 2018 to quantify the existing levels of noise at two locations. A previous noise survey carried out in 2016, provided baseline noise data for NSL 1 and NSL 2 and this survey has been commissioned in order to obtain baseline data at NSL 3 and NSL 4. Measurements were carried out at locations considered to be representative of amenity areas which could be affected by noise generated by West Offaly Power Station (when it is operating). The locations of the previous baseline measurements and the two locations used for this noise measurement survey are indicated at Figure 2 below. It should be noted that for NSL 3 the equipment was located on a flat roof (on top of a 3 storey building) in order to avoid measuring noise from activity associated with a busy restaurant (The Riverside Café) below.

Figure 2 – Noise Monitoring Locations

3.2 Baseline noise measurements were carried out using Larson Davis LD820 Type 1 integrating sound level meters (ref. HMP28 s/n 1506, ref. HMP29 s/n 1489) fitted with ½" microphones. The microphones were fitted with a 45 mm radius foam ball windshield surrounded by a 125mm radius secondary windshield of 40 mm thickness and mounted on a tripod at 1.4 m above the ground. The sound level meters were calibrated prior to commencement of the measurements and checked at the end of the measurements using a B&K Type 4231 calibrator (s/n 2699281). A calibration drift of no more than ±0.2 dB was noted at the end of the measurements which is within normally expected tolerances. The sound level meters were programmed to log L_{Aeq}, L_{A90} and L_{Amax} in consecutive 15-minute intervals over the duration of the survey.

3.3 A Vantage Vue meteorological station was set up adjacent to the sound level meter at NSL 3 and programmed to record the wind speed, wind direction, rainfall, temperature, humidity, and pressure in 15-minute intervals. A Pluvi-mate rain gauge was also installed adjacent to the sound level meter at NSL 4, logging rainfall in 15-minute intervals. All noise and meteorological equipment was time synchronised to allow correlation of the data following the survey.

3.4 Photographs of the installed measurement equipment for NSL 3 and NSL 4 are shown at Figure 3 and Figure 4 respectively below.

Figure 3 – NSL 3

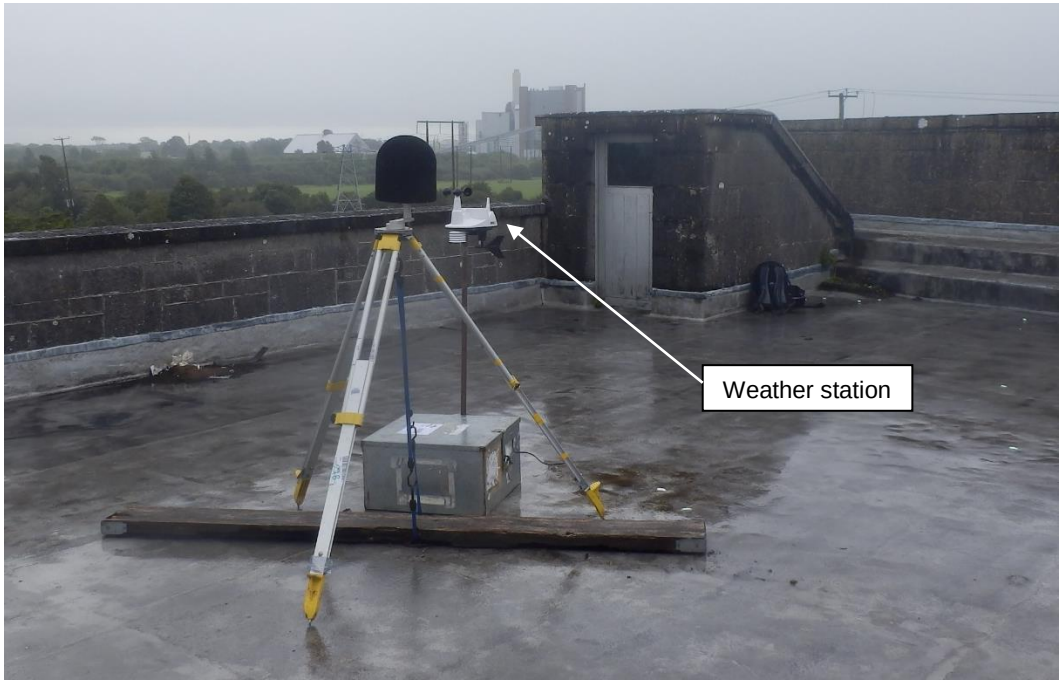


Figure 4 – NSL 4

Noise Measurement Results

Description of the Noise Environment

3.6 The area surrounding West Offaly Power Station can be described as semi-rural and apart from the power station, the main source of noise in the area is road traffic on the R357 running through Shannonbridge. Over the entire duration of the noise survey, West Offaly Power Station was shut-down for routine maintenance and the noise environment is therefore considered to be representative of a baseline level without the influence of the power station.

3.7 At installation and collection of the equipment, road traffic noise from the R357 was noted, along with boats on the river, agricultural machinery, children playing, dogs barking, wind in the trees, and birdsong.

Data Filtering

3.8 The measured noise levels at both locations have been filtered to exclude any 15-minute period where either rainfall was detected or the average wind speed was 5 m/s or greater.

3.9 The measurements at NSL 4 were found to include a number of uncharacteristically noisy events thought to be related to children playing near the microphone. These have been excluded from the analysis by filtering out any period where the measured 15-minute L_{Aeq} is greater than 50 dB.

Measurement Time History

3.10 The results of the noise measurements are presented as time history charts at Figure 5 and Figure 6 below. The charts show the 15-minute $L_{Amax,\ night}$[2], L_{Aeq}[3] and L_{A90}[4] noise levels, the daytime $L_{Aeq,\ 12\ hour}$, the evening $L_{Aeq\ 4\ hour}$, the night time $L_{Aeq\ 8\ hour}$, and the wind speed and rainfall. It should be noted that, on the chart, the rainfall does not indicate the amount of rainfall, but whether any rainfall was detected in each 15-minute period.

[2] The A-weighted maximum (fast time-weighted) noise level during the averaging period, in this case 15-minutes, during the night-time hours
[3] The A-weighted energetic average noise level over the averaging period
[4] The A-weighted noise level exceeded for 90 % of the time, often referred to as background noise level

Figure 5 – Time-History Chart of Baseline Noise Measurements at NSL 3

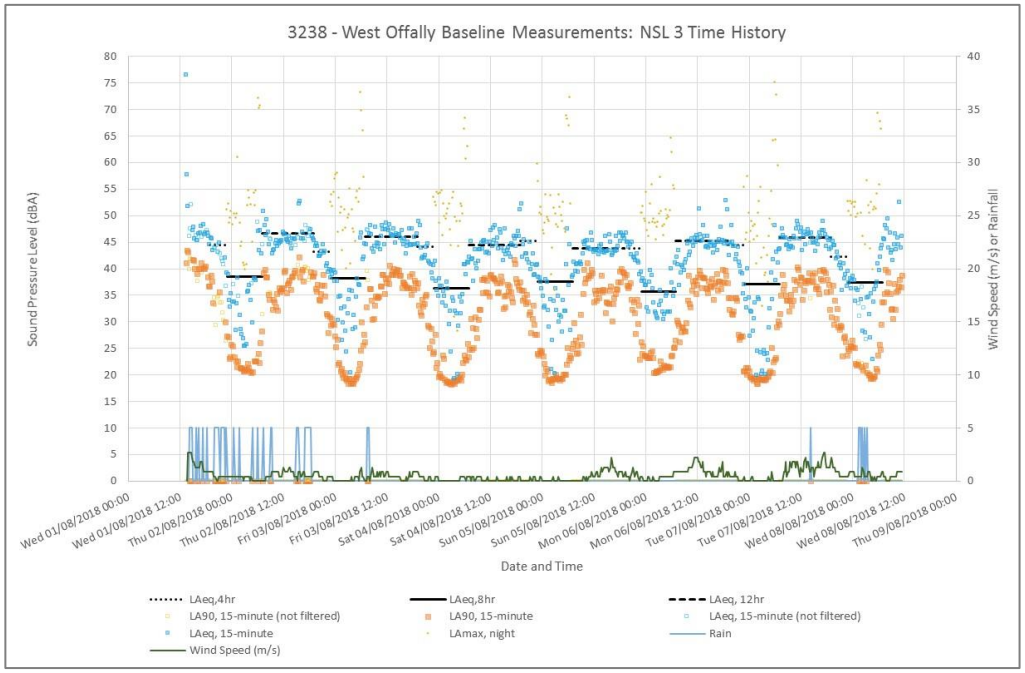
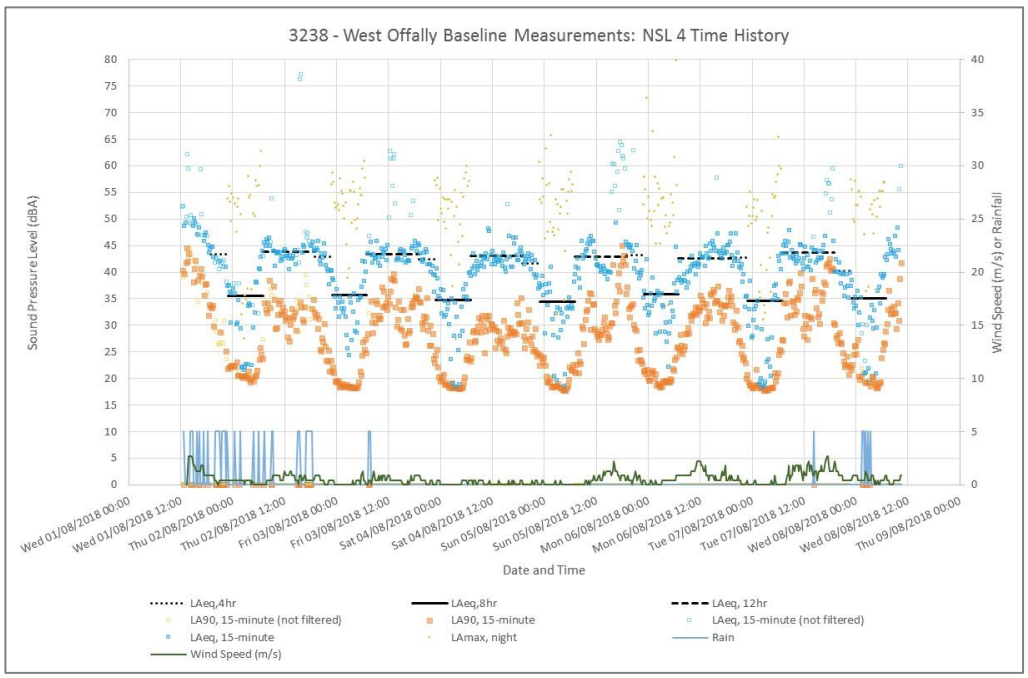


Figure 6 – Time-History Chart of Baseline Noise Measurements at NSL 4



3.11 The time history charts indicate a typical diurnal cycle, and indicate that during the day, noise levels are generally dominated by road traffic noise. The charts show generally consistent levels of noise with little variation from day to day. It can be seen that there are slightly lower levels of noise measured over the weekend at NSL 3 and this is consistent with the proximity to the main road and the expected reduction in traffic volumes over the weekend.

Average Noise Levels

3.12 The daily average noise levels are presented below at Table 1 and Table 2.

Table 1 – NSL 3 Daily Average Noise Levels

Period (24hrs from 0700 to 0700)	Day-time 0700 – 1900 Average Noise Level		Evening 1900 – 2300 Average Noise Level		Night-time 2300 – 0700 Average Noise Level	
	dB L_{Aeq} 16 Hour	dB L_{A90} (Ave.)	dB L_{Aeq} 4 Hour	dB L_{A90} (Ave.)	dB L_{Aeq} 8 Hour	dB L_{A90} (Ave.)
Wed 1st - Thu 2nd Aug	-	-	44.5	35.3	38.5	22.6
Thu 2nd - Fri 3rd Aug	46.7	36.8	43.2	34.9	38.3	22.6
Fri 3rd - Sat 4th Aug	46.0	36.6	44.1	31.4	36.4	20.6
Sat 4th - Sun 5th Aug	44.5	34.6	45.2	32.4	37.5	21.0
Sun 5th - Mon 6th Aug	43.8	34.3	43.8	33.9	35.7	22.6
Mon 6th - Tue 7th Aug	45.2	35.1	44.5	30.8	37.2	20.7
Tue 7th - Wed 8th Aug	45.9	36.5	42.2	29.6	37.4	22.6
-						
Overall	45.5	35.7	44.0	33.0	37.4	21.9

Table 2 – NSL 4 Daily Average Noise Levels

Period (24hrs from 0700 to 0700)	Day-time 0700 – 1900 Average Noise Level		Evening 1900 – 2300 Average Noise Level		Night-time 2300 – 0700 Average Noise Level	
	dB L_{Aeq} 16 Hour	dB L_{A90} (Ave.)	dB L_{Aeq} 16 Hour	dB L_{A90} (Ave.)	dB L_{Aeq} 8 Hour	dB L_{A90} (Ave.)
Wed 1st - Thu 2nd Aug	-	-	43.4	30.6	35.5	21.3
Thu 2nd - Fri 3rd Aug	43.8	32.1	42.9	27.1	35.7	19.9
Fri 3rd - Sat 4th Aug	43.4	32.7	42.5	30.0	34.8	20.0
Sat 4th - Sun 5th Aug	43.0	28.8	41.7	27.4	34.5	19.9
Sun 5th - Mon 6th Aug	43.0	31.3	43.2	29.4	35.8	20.4
Mon 6th - Tue 7th Aug	42.7	32.0	42.8	28.2	34.6	19.3
Tue 7th - Wed 8th Aug	43.6	34.6	40.2	25.4	35.1	21.6
-						
Overall	43.3	31.9	42.5	28.6	35.2	20.4

3.13 The results indicate similar average noise levels at both locations with NSL 3 having slightly increased L_{Aeq} values of around 2 dB higher than NSL 4. The difference between L_{Aeq} and L_{A90} is similar at both locations with average L_{A90} values being generally 11 – 15 dB lower than average L_{Aeq} values.

4. NOISE LIMITS

4.1 The results of the baseline noise measurements, at both locations, indicate average day evening and night noise levels that are all well below the respective 40 dB, 35 dB and 30 dB L_{AF90} criteria for Areas of Low Background Noise. Both locations have therefore been identified as being within an 'Area of Low Background Noise' for the purposes of determining appropriate noise limits in accordance with NG4.

4.2 The appropriate noise limits for NSL 3 and NSL 4, as defined by NG4, are 45 dB $L_{Aeq, 12\ hour}$ 40 dB $L_{Aeq, 4\ hour}$ and 35 dB $L_{Aeq, 8\ hour}$ for the day evening and night periods respectively.

4.3 It should be noted that the noise measurements were undertaken at locations considered to be representative of quiet residential amenity spaces, with care taken to minimise the influence of local noise sources on the results. Other NSLs in the vicinity are likely to be more exposed to road traffic noise from the R357 or significantly further away from the power station such that the noise impact from operations at West Offaly Power Station would therefore be lower.

5. CONCLUSIONS

5.1 A baseline noise survey has been undertaken at two locations around the West Offaly Power Station in order to determine appropriate noise limits for the purposes of a license application.

5.2 Noise measurements were undertaken, whilst the power station was shut-down for routine maintenance, over a 7 day period to ascertain the indicative day-time, evening and night-time background (L_{A90}) noise levels.

5.3 The noise survey was carried out with reference to *NG4: 'Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities'*. This guidance document sets out a range of noise limits to enable the noise impacts of a site to be quantified.

5.4 The results of the survey indicate that both locations are in Areas of Low Background Noise and are therefore subject to the appropriate noise limits as defined within NG4.