

Surf Snowdonia, Dolgarrog

Noise Survey Report

July 2015

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Authorised by	Ryan Swales, BSc, MIOA Director & Principal Engineer
Signature	

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RS Acoustic Engineering Ltd, a company registered in England & Wales
Registered number: 07604309
Registered address: 156 Turncroft Lane, Stockport, SK1 4AR
info@rs-acoustic.co.uk
www.rs-acoustic.co.uk

Member of the Institute of Acoustics (No. 43109)

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1. Introduction

- 1.1 RS Acoustic Engineering Ltd has been appointed by Conwy Adventure Leisure Ltd to undertake an operational noise survey of plant and equipment associated with the new Surf Snowdonia facility in Dolgarrog, Conwy, LL32.
- 1.2 Ambient and background sound level measurements were undertaken during the evening period of Thursday 30 July 2015.
- 1.3 Measurements were undertaken during the evening period in order to help minimise the effect of noise from passing road traffic on Conwy Road.
- 1.4 The principal noise sources associated with the facility include the following:
- Building services plant within the family activity centre, hub building and control centre
 - Drive and return towers with associated internal plant and four external condenser units
 - Waves generated by the operation of the drive and return towers
 - Electrical substation
 - UV pump/filters and associated plant
- 1.5 This summary report provides details of the measurements undertaken and the results obtained.

2. Noise Related Planning Condition

Conwy County Borough Council Criteria

- 2.1 Conwy County Borough Council has stipulated the following noise related planning condition with regard to the operation of the facility:

Condition 15, 0/40529

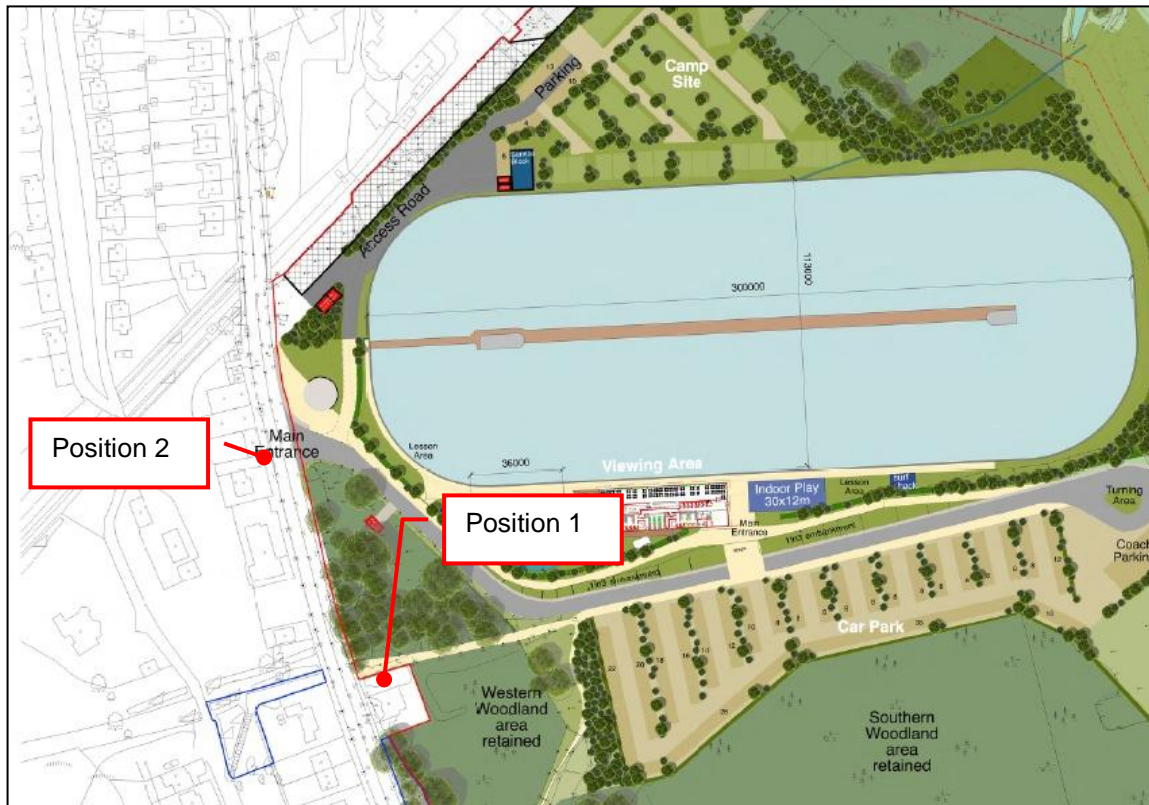
Prior to opening of the Wave Garden, a full noise test shall be undertaken of the wave facility to ensure that the combined noise generated by the Wave Garden, plant and equipment does not cause ambient noise levels to exceed 50dB(A) L_{eq} , 15min, and a L_{max} of 60dB(A) at any noise sensitive building (i.e. dwelling, school or residential institution), when measured at a distance of 1.5m from that building at a height of 1.2m above ground level. The method of such testing shall be submitted to, and approved in writing by, the local planning authority prior to testing commencing and shall be carried out as approved. The Wave Garden shall not be brought into use until the results of the testing regime, together with any mitigation measures that may be required to comply with this condition, have been submitted to, and approved in writing by, the local planning authority. The mitigation measures shall be implemented as approved before the Wave Garden is brought into use, and those measures shall thereafter be retained.

3. Environmental Noise Survey

Survey methodology

- 3.1 Sample sound level measurements were undertaken on Thursday 30 July 2015 between 20:15 and 21:30 hours adjacent to the nearest noise sensitive receptors on Conway Road (B5106).
- 3.2 The nearest noise sensitive receptors were considered to be a detached dwelling (Bankfield House) approximately 60 metres south west of the site (position 1) and a first floor flat and detached dwelling approximately 30 metres west of the site (position 2).
- 3.3 At position 1, the microphone was positioned at a height of 1.2 metres from the ground, 5 metres from the side elevation and approximately 8 metres from the carriageway edge of Conway Road.
- 3.4 At position 2, the microphone was positioned at a height of 1.2 metres from the ground, 1.5 metres from the front elevation and approximately 3 metres from the carriageway edge of Conway Road.
- 3.5 A measurement interval of 15 minutes was used at each position throughout the survey. Both one-third octave band and A-weighted broadband sound pressure levels were recorded throughout the survey.
- 3.6 The measurement positions used during the survey are shown in Figure 3.1.

Figure 3.1 – Site location, surrounding area and survey measurement positions



- 3.7 The photographs overleaf also show the measurement positions used during the survey.

Figure 3.2 – Photographs showing survey measurement positions



Survey equipment

- 3.8 The survey was carried out using the following class 1 specification equipment:
- Brüel & Kjaer 2260 sound level meter, with microphone type 4189 and pre-amplifier type ZC0026 (position 1).
 - Casella CEL 633C, with microphone type CEL 251 and pre-amplifier type CEL 495 (position 2).
 - Brüel & Kjaer 4231 acoustic calibrator.

- 3.9 The calibration of both sound level meter and microphone was checked using a 1 kHz tone at 94 dB prior to and following the measurements performed. The drift in calibration was less than 0.1 dB.

Weather conditions

- 3.10 The weather conditions during the survey were dry and fine with warm sunny spells. Wind speed measurements were less than 2 m/s^{-1} .
- 3.11 Temperatures during the survey ranged between 10°C and 12°C . The overall weather conditions were considered suitable to obtain representative measurements.

Measured indices

- 3.12 Although a wide range of statistical sound level data was recorded during the survey, the L_{Aeq} , L_{Amax} and L_{A90} indices are of most interest here:
- $L_{Aeq,T}$ – The A-weighted equivalent continuous sound pressure level over a period of time, T. Representative of the ‘average’ sound pressure level over a given period.
 - $L_{Amax,T}$ – The A-weighted ‘maximum’ sound pressure level that occurred during a given period, T and is typically used for the assessment of occasional loud noises.
 - $L_{A90,T}$ – The noise level that is exceeded for 90% of the measurement time interval, T. L_{A90} is often used to describe the ‘background’ sound level.

- 3.13 Sound pressure level measurements are taken with an A-weighting (denoted by a subscript 'A', e.g. L_{Aeq}) to approximate the frequency response of the human ear.

Results summary

- 3.14 Tables 3.1 and 3.2 present a summary of the measured sound pressure levels at the two monitoring locations. Additional statistical and 1/3rd octave band data can be made available on request.

Table 3.1 – Sample measurement results, position 1 (south west of the lagoon)

Start Time	$L_{Aeq,15min}$ dB	$L_{A90,15min}$ dB	$L_{AFmax,15min}$ dB	Comments
20:15	53.2	44.4	74.5	No building plant/equipment operating, filtration unit running, dominant source was passing road traffic and pedestrians
20:40	49.6	44.4	65.4	All plant/equipment operating, 4 waves generated, several cars passed by
20:55	50.2	45.2	67.8	All plant/equipment operating, 4 waves generated, several cars passed by
21:15	49.3	46.8	62.2	All plant/equipment operating but no waves generated, several cars passed by

Table 3.2 – Sample measurement results, position 2 (west of the lagoon)

Start Time	$L_{Aeq,15min}$ dB	$L_{A90,15min}$ dB	$L_{AFmax,15min}$ dB	Comments
20:15	61.1	45.5	82.2	No building plant/equipment operating, filtration unit running, dominant source was passing road traffic and pedestrians
20:40	57.2	44.5	75.8	All plant/equipment operating, 4 waves generated, several cars passed by
20:55	57.6	44.5	78.0	All plant/equipment operating, 4 waves generated, several cars passed by
21:15	58.7	46.5	76.1	All plant/equipment operating but no waves generated, several cars passed by

4. Discussion

- 4.1 With no building services plant or equipment operating within the facility, the equivalent continuous sound levels were 53 to 61 dB $L_{Aeq,15min}$ and 75 to 82 dB $L_{AFmax,15min}$ at positions 1 and 2 respectively.
- 4.2 At position 1, with all plant and equipment operating and 4 waves generated (2 waves in each direction), the equivalent continuous sound level was 50 dB $L_{Aeq,15min}$ and the maximum sound level was 65 to 68 dB $L_{AFmax,15min}$.
- 4.3 However, the measured maximum sound level at position 1 was generated by a passing car on Conway Road and not by plant or equipment. It was observed during the survey that the maximum sound level was typically below 56 dB L_{AFmax} when no vehicles passed-by and all plant and equipment was operating (including waves being generated).
- 4.4 At position 2, with all plant and equipment operating and 4 waves generated (2 waves in each direction), the equivalent continuous sound level was 57 to 58 dB $L_{Aeq,15min}$ and the maximum sound level was 76 to 78 dB $L_{AFmax,15min}$.
- 4.5 At position 2, the measured maximum sound levels were again generated by passing traffic (and not by plant or equipment) and the equivalent continuous sound levels were held above 50 dB $L_{Aeq,15min}$ due to the contribution of noise from passing traffic and pedestrians. It was observed during the survey that the maximum sound level was below 60 dB L_{AFmax} when no vehicles passed-by and all plant and equipment was operating (including waves being generated).
- 4.6 The sound levels measured at position 2 were higher than those measured at position 1 due to being closer to the carriageway edge of Conway Road.
- 4.7 At position 2, approximately 30 metres from the edge of the lagoon, it was observed that waves heading east away from Conway Road generated an equivalent continuous sound level of approximately 52 dB $L_{Aeq,30secs}$ with no road traffic passing by.
- 4.8 It was also observed that waves heading west towards Conway Road generated an equivalent continuous sound level of approximately 60 dB $L_{Aeq,30secs}$ with no road traffic passing by.
- 4.9 During the survey, the waves were generated at full height (approximately 2 metres high) and it was observed that each wave took approximately 30 seconds to evolve, travel and then collapse.
- 4.10 During each fifteen minute measurement period, a total of 4 waves were generated (2 waves in each direction).
- 4.11 On the basis that 4 waves are generated in a 15-minute period, the resulting equivalent continuous sound level is 49 dB $L_{Aeq,15min}$ with no contribution from passing road traffic.
- 60 dB $L_{Aeq,60secs}$ (2 waves heading west) + 52 dB $L_{Aeq,60secs}$ (2 waves heading east) = 60.6 dB $L_{Aeq,60sec}$ (for 4 waves combined)
 - On-time correction $10\log(60sec/900sec) = -11.8$ dB
 - 60.6 dB $L_{Aeq,60sec} - 11.8$ dB = 48.8 dB $L_{Aeq,15min}$
- 4.12 Assuming that the operating conditions during the survey are typical of when the facility is open, the noise related planning condition of 50 dB $L_{Aeq,15min}$ and 60 dB L_{AFmax} should be satisfied at all neighbouring dwellings.