



REPORT AS9060.161021.NIA



REDRUTH SKATE PARK, CORNWALL

NOISE IMPACT ASSESSMENT



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1.0 INTRODUCTION

A new skate park is proposed at East End Park in Redruth, Cornwall. The currently proposed location is between the centre and the eastern side of the park, as indicated in site plan AS9060/SP1.

The proposals are for an integrated concrete skate park of minimum 300m², having three main sections;

- An outer enclosing rhythm section with snake run, with a possible tunnel/bridge entrance from the planned pedestrian access path, with ledge and functioning as a designated graffiti wall and shelter.
- An inner kidney pool section with more than one level, and requiring different abilities to ride.
- A street emulation area.

East End Park is bounded by a railway line to the west, residential dwellings and a van hire yard along Drump Road to the north, residential dwellings along East End to the east, and a residential care home called Miner's Court to the south.

Clarke Saunders Associates (CSA) have been commissioned by Groundwork South to provide an assessment of the potential for noise impact of the skate park in relation to relevant standards and guidance documents and other appropriate assessment procedures. Where required, suitable outline noise mitigation measures will be provided.

2.0 METHOD OF ASSESSMENT

In relation to the noise produced by leisure activities, such as skateboarding, there are no specific assessment methods or criteria in relation to noise impact. There are, however, a number of assessment methods which are related to this type of activity and have been used extensively by Clarke Saunders Associates in relation to skate park noise. These methods were accepted by the court in the landmark case in relation to skate park noise, Richardson v Devizes Town Council and have been adopted by a number of local authorities and other acoustic consultants.

In order to assess the impact of noise from the skate park, reference should be made to published guidelines which reflect current scientific thinking and Government advice. This 'good practice' of using assessment methods which are relevant and helpful is endorsed by the procedures set out in the draft BS9142: *Guidelines for Environmental Noise Management*.

From experience, all of the following three methods of assessment need to show acceptable noise levels for a new skate park to ensure that complaints in relation to activity noise are unlikely to occur. In practice, the third method of assessment based on the '*Clay Target Shooting, Guidance on the Control of Noise*' which relates specifically to the maximum noise levels, the most common cause of complaints, is the most sensitive.

2.1 British Standard BS4142:1997

British Standard BS4142:1997 *Method for rating industrial noise affecting mixed residential and industrial areas* are designed explicitly to assess the noise impact from industrial noise on residential properties, and do not refer to any recreational activities.

However, due to the lack of guidance when assessing skate park noise and the quantification of tonal, impulsive or intermittent noise upon residential receivers, BS4142:1997 has proved reliable in providing some guidance as to the likelihood of complaints, even though it may not be specifically designed for this purpose. As stated earlier, this assessment methodology has been accepted by the court in the case Richardson v. Devizes Town Council with regard to skate park noise impact. BS4142:1997 has been superseded by the current BS4142:2014, however due to the historic acceptability of the assessment method in the 1997 edition of the Standard, it has been utilised in the current assessment.

In order to quantify the impact of the skate park activities, BS4142:1997 is useful since it considers the character of the noise. This Standard compares the noise levels in terms of an L_{Aeq} for a one hour period during the daytime (07:00 – 23:00 hours) and a five-minute period during the night-time (23:00 – 07:00 hours) for the noise source in operation, the '*Specific Noise Level*', with the existing background noise level in terms of an L_{A90} when the noise source is not operating.

As part of the assessment, consideration is given to the character of the noise. The standard states:

'If the noise contains a distinguishable, discrete, continuous note (whine, hiss, screech, hum, etc.), or if there are distinct impulses in the noise (bangs, clicks, clatters, or thumps), or if the noise is irregular enough to attract attention, add 5dB to the Specific Noise Level to obtain the Rating Level.'

From observations, skateboarding noise is transient with many bangs as the skaters hit the top of the ramps or jump on and off the equipment. This + 5dB '*character correction*' has, therefore, been applied in subsequent calculations.

This Standard then compares the noise level corrected for any '*character correction*' as an L_{Aeq} 1 hour (for daytime) for the noise source in operation, called the '*Rating Level*' with the existing underlying '*background noise level*' in terms of an L_{A90} when the noise source is not operating. The arithmetic difference between the '*Rating Level*' and the background is common referred to as the '*Assessment Level*'.

BS4142:1997 indicates that for the '*Assessment Level*', in relation to noise sources of an industrial nature:

- 'A difference of around +10 dB or higher indicates that complaints are likely.'
- 'A difference of around +5 dB is of marginal significance.'
- 'If the rating level is more than 10 dB below [i.e. -10dB(A)] the measured background noise level then this is a positive indication that complaints are unlikely.'

For new skate parks, however, an Assessment Level of 0dB is used as a criterion of acceptability to ensure a robust assessment of the noise impact.

2.2 World Health Organisation: Guidelines on Community Noise: 1999

The WHO document *Guidelines for Community Noise* sets out guidance on external noise levels at which there will be an unacceptable impact on communities. This guidance considers many different types of noise sources. In paragraph 4.1.7 the impact of noise on dwellings is considered.

The document states:

'During the daytime, few people are seriously annoyed by activities with [steady] L_{Aeq} levels below 55dB; or moderately annoyed with L_{Aeq} levels below 50dB. Sound pressure levels during the evening and night should be 5 -10dB lower than during the day [i.e. 45 – 50dB serious annoyance; 40 – 45dB moderate annoyance]. It is emphasised that for intermittent noise [such as the skateboarding activities] it is necessary to take into account the maximum [i.e. the L_{Amax}] sound pressure level as well as the number of events.'

2.3 Comparison of Skate Park Noise to Gunshot Noise

The sudden nature, duration and the character of the skateboard impact noise during jumps and turns, etc., by skateboarders bears close aural similarity with the noise from gunshots at a distance.

There have been a number of research investigations into what levels of gunshot noise cause annoyance to residential occupants, notably by Sørensen S & Magnusson J, Smoorenburg G F and Hoffman. The current thinking on their impact which generally agrees with the previous research, has been published as *'Clay Target Shooting, Guidance on the Control of Noise'* published by the Chartered Institute of Environmental Health Engineers in January 2003. Measurement and social survey work carried out by the Building Research Establishment during 1996/1997 provides the basis for applying limits at noise sensitive premises, which range between the *'mid fifties'* to the *'mid sixties'* $SNL_{25 \text{ Shots:30minutes}}$.

The above research suggests that there is no fixed level for annoyance to occur. There is, however, *'little evidence of significant annoyance'* below a level in the *'mid fifties'*: $SNL_{25 \text{ Shots: 30minutes}}$ and a likelihood of *'significant annoyance being caused.'* above a level in the *'mid sixties'* $SNL_{25 \text{ Shots:30minutes}}$ as measured at the noise sensitive premises. The $SNL_{25 \text{ Shots: 30minutes}}$ is the logarithmic average of the loudest 25 shots measured as a maximum (L_{Amax}) in a 30-minute period.

3.0 ENVIRONMENTAL NOISE SURVEY

In order to assess the potential impact of skateboard noise, an environmental noise survey was carried out in the rear garden of 87 Drump Road (LT1) and 45a East End (LT2) from the afternoon

of Friday 2nd September to the late morning of Tuesday 6th September 2016. These monitoring locations allow the current background noise levels to be established.

Measurements of the $L_{Amax,fast}$, L_{A10} , L_{Aeq} , and L_{A90} noise levels were made over consecutive 5-minute periods. The following equipment was used for the survey.

- NTi Data Logging Sound Level Meter type XL2 – LT1.
- Svantek Data Logging Sound Level Meter type 958 – LT2.
- Norsonic Sound Level Calibrator type 1251.

The measurement locations are shown in the site plan AS9060/SP1, where the approximate location of the new skate park is also indicated. The microphones were situated approximately 1.5 metres above ground level, in free field locations.

The calibration of the equipment was verified before and after use. No significant calibration drift was observed.

Measurements were made following procedures in ISO1996-2:2007 *Acoustics - Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels*. The weather during the survey period varied, overcast with occasional showers on the day of installation, heavy rainfall on Saturday 3rd September, and generally dry from Sunday onwards.

Some periods of the night-time data recorded in the rear garden of 45a (LT2) East End appeared to be erroneous, with an extended period of very high noise levels and other large changes in level without any clear reason. These increases in noise levels were not correlated with the other monitor, indicating a localised noise source in close proximity to the microphone. For this reason, this dataset has been excluded from any assessment of current background and ambient noise levels. It should be noted that this period was outside of the proposed times of use of the skate park in any case, and as such would have no bearing in the assessment.

Since the noise climate in the area consists mainly of road traffic from East End and Drump Road, the Drump Road measurement location may be considered to be representative of the typical noise levels existing at the closest and most affected residential properties on Drump Road, the less busy of the two roads.

An explanation of the acoustic terminology used in this report is in given in Appendix A.

4.0 RESULTS

Figures AS9060/TH1-8 show the L_{Aeq} , $L_{Amax,fast}$, L_{A10} and L_{A90} as 5 minute environmental noise levels at LT1 and LT2. Based on operational periods for the skate park from 09:00 – 21:00 hours split into daytime (09:00 – 19:00) hours and evening (19:00 - 21:00) hours, typical noise levels measured on site are shown in Table 4.1.

Parameter	Daytime period 0900-1900			Evening period 1900-2100		
	Typical $L_{Aeq,5m}$ (dB)	Typical $L_{A90,5m}$ (dB)	Typical $L_{Amax,fast}$ (dB)	Typical $L_{Aeq,5m}$ (dB)	Typical $L_{A90,5m}$ (dB)	Typical $L_{Amax,fast}$ (dB)
LT1	52	37	63	49	35	60
LT2	63	39	65	47	29	56

Table 4.1 - Measured noise environment

The above measured levels have been used in the subsequent noise impact assessment of the proposed skate park.

5.0 NOISE IMPACT ASSESSMENT

Measurements of skate park noise have previously been undertaken at numerous other sites by Clarke Saunders Associates as part of design, assessment and research projects for bowl and 'street scene' skate parks. The data that will be used for this assessment were measured at a similar concrete skate park.

The data for this assessment uses the average noise level generated by approximately 20 skaters, with 5 using the skate park bowls and ramps, measured at a distance of 40m from the centre of the skate park. Maximum noise levels of events have also been measured at a distance of 45m which relate to use of the 'street scene' parts of the skate park, which will be used to assess event noise.

The noise levels will be calculated to the boundary of the nearest residential receivers using standard sound propagation theory.

From experience, all of the following three methods of assessment need to show acceptable noise levels for a new skate park for complaints in relation to activity noise to be unlikely. In practice, the third method of assessment based on the 'Clay Target Shooting, Guidance on the Control of Noise' which relates specifically to the maximum noise levels, the most common cause of complaints, is the most sensitive.

5.1 British Standard BS4142:1997

The measured noise levels for skateboarding activities at another concrete bowl skate park being used simultaneously by about 5 skaters have been used as the basis for this assessment. These measured levels have been corrected for distance so as to give the levels outside the rear of the closest properties on East End and Drump Road.

These predicted noise levels are shown in Table 5.1 based on the calculations AS9060/C1 shown in Appendix B to this report for the base design. These indicate the *Specific Noise Level*: $L_{Aeq,1hr}$ values for skateboarding which have been used for the BS4142 assessments.

Property	Location	Specific Noise Level $L_{Aeq,1h}$ (dB)	Rating Level $L_{AeqT,1h}$ (dB)	Daytime Background $L_{A90,5m}$ (dB)	Evening Background $L_{A90,5m}$ (dB)
45a East End	Rear garden	53	58	39	29
87 Drump Road	Rear garden	51	56	37	35

Table 5.1 - Measured noise environment

dB ref 20µPa

Summarising the differences between the *Rating Level*, and the current *background* L_{A90} level over the daytime hours of 09:00 – 19:00 hours and the hours of 19:00 – 21:00 representative of summertime evening use, the following *Assessment Level* has been predicted.

Location	Daytime Assessment Level (dB)	Evening Assessment Level (dB)	Daytime Assessment	Evening Assessment
Skateboarding noise to 45a East End	+ 19 dB	+ 29 dB	Complaints likely for skateboarding noise	Complaints likely for skateboarding noise
Skateboarding noise to 87 East End	+ 19dB	+ 21 dB	Complaints likely for skateboarding noise	Complaints likely for skateboarding noise

Table 5.2 - Measured noise environment

dB ref 20µPa

The above indicates that the predicted Rating Levels at the nearest properties to the skate park without mitigation are significantly above the Assessment Level criterion for skateboard noise of 0 dB.

5.2 World Health Organisation: Guidelines on Community Noise: 1999

The levels referred to in the WHO guidance above are $L_{Aeq,16h}$ values. As a worst case, assuming that skateboarding on the skate park is continuous for 7 of the 16 daytime hours, the $L_{Aeq,16h}$ at the rear of 87 Drump Road and 45a East End would be approximately 47dB(A) and 49 dB(A) respectively. Noise levels at the front of the buildings would be significantly lower. This value at the nearest property is within the limits indicated above for daytime hours but above the thresholds of resulting in *significant annoyance* during the evening. This indicates that the WHO Guidelines would consider these levels to not be within acceptable levels in nearby gardens during the evenings without additional mitigation.

5.3 Comparison of Skateboard Noise to Gunshot Noise

From the predicted levels of noise for skateboarding activity taking place, the levels at 87 Drump Road would be 69dB $L_{Amax(fast)}$, equivalent to an SNL of 69 dB at the closest residence without mitigation. At 45a East End these levels would be 70 dB $L_{Amax(fast)}$, equivalent to an SNL of 70 dB. For the purposes of calculation, these maximum source noise levels are assumed to be at a nominal height of 0.7 metres above the base of the skate park (datum) to represent the use of 'street scene' parts of the skate park.

Using the above assessment method, this level represents one at which annoyance by the skateboard noise levels at 87 Drump Road and 45a East End would be at a level of some '*significant annoyance being caused*'.

On the basis of this assessment, without mitigation measures, these maximum skateboard noise levels would be likely to cause complaints from the residents living in the closest houses on Drump Road and East End.

6.0 MITIGATION MEASURES PROPOSED

In order to reduce the predicted adverse noise levels from skateboarding at the closest residential property, from the BS4142 based assessment and that using the clay target shooting guidance, the following mitigation measures are proposed.

Due to the magnitude of the assessment level it is recommended that the skatepark site is moved farther from the nearest noise sensitive receivers, approximately 40 m to the west of the current proposed location and at least 90 m from any nearest noise sensitive receiver.

For the park to have an acceptable level of noise impact, a circa 4 m high screening bund or barrier (relative to the top edge of the skate park) will need to be incorporated to the layout of the skate park to protect the nearest residences on Drump Road and East End, and also receptors to the south and west if the skate park location is moved.

The calculations shown in Appendix B of the report as AS9060/C2 give the predicted noise levels at the rear of the properties on Drump Road and East End incorporating the barrier attenuation losses.

This would result in skateboard noise levels being acceptable during daytime using the BS4142: 1997 assessment method and with respect to the clay target shooting guidelines, the SNL will then be tending towards a level at which there is '*little evidence of significant annoyance being caused*'.

Levels during the evening would still be above the BS4142 assessment thresholds, and as such, restrictions on the proposed times of use of the skate park may be required. Additional mitigation would be required to achieve a 0dB rating level during the evening, given the distances involved. It should be noted that this is a worst case assessment, assuming 20 skateboarders in the evening. Less activity (i.e. 5 users) would result in mitigated levels approaching the acceptability threshold.

The mitigated $L_{Aeq,16hr}$ level would be reduced to 29 dB or less at both East End and Drump Road, resulting in a level that is below the threshold where moderate annoyance is deemed to be likely according to the WHO guidelines.

From the predicted mitigated levels of noise for skateboarding activity taking place, the levels at 87 Drump Road and East End would be no more than 51 dB $L_{Amax(fast)}$, equivalent to an SNL of 51 dB. This is a level that would have '*little evidence of any significant annoyance*' according to the Clay Target Shooting assessment guidance.

7.0 SUMMARY & CONCLUSIONS

Library noise measurements of skateboarding on a concrete bowl skate park have been used to predict the likely noise impact of the proposed skate park at the recreation ground in East End Park, Redruth.

There is no directly specific guidance as to the impact of skateboarding noise on the occupants of residential premises, but there is relevant guidance given by British Standard BS4142: 1997 *Rating industrial noise affecting mixed residential and industrial areas* the World Health Organisation document *Guidelines on Community Noise: 1999* and the *Clay Target Shooting, Guidance on the Control of Noise* published by the Chartered Institute of Environmental Health Engineers in January 2003.

The most sensitive properties are the rear gardens of those on East End some 50 m from the centre of the proposed skate park location. The next most sensitive properties would then be on Drump Road, which also have rear gardens bordering East End Park at a distance of approximately 60 m from the site of the proposed skate park location.

From the predicted noise levels at these residences, the likely impact of the skateboarding noise on the residential amenity has been considered using the three documents referred to above. This evaluation procedure has been used successfully at many other currently operational skate parks. The assessment has concluded that complaints are likely from use of the proposed skate park.

Mitigation measures should be provided to reduce the predicted noise impact on the residents in East End and Drump Road. These mitigation measures require relocation of the skate park site to a distance of at least 90 m from the nearest noise sensitive receivers on Drump Road and East End, and an earth bund with a height of around 4 m around the skate park.

Provided these mitigation measures are implemented the noise impact of skateboarding on the nearest noise sensitive properties is expected to be reduced to a level at which there is '*little evidence of significant annoyance*', with '*complaints unlikely*' and below the threshold where '*moderate annoyance*' is deemed to be likely.

pp. 

Mike McLoughlin MIOA

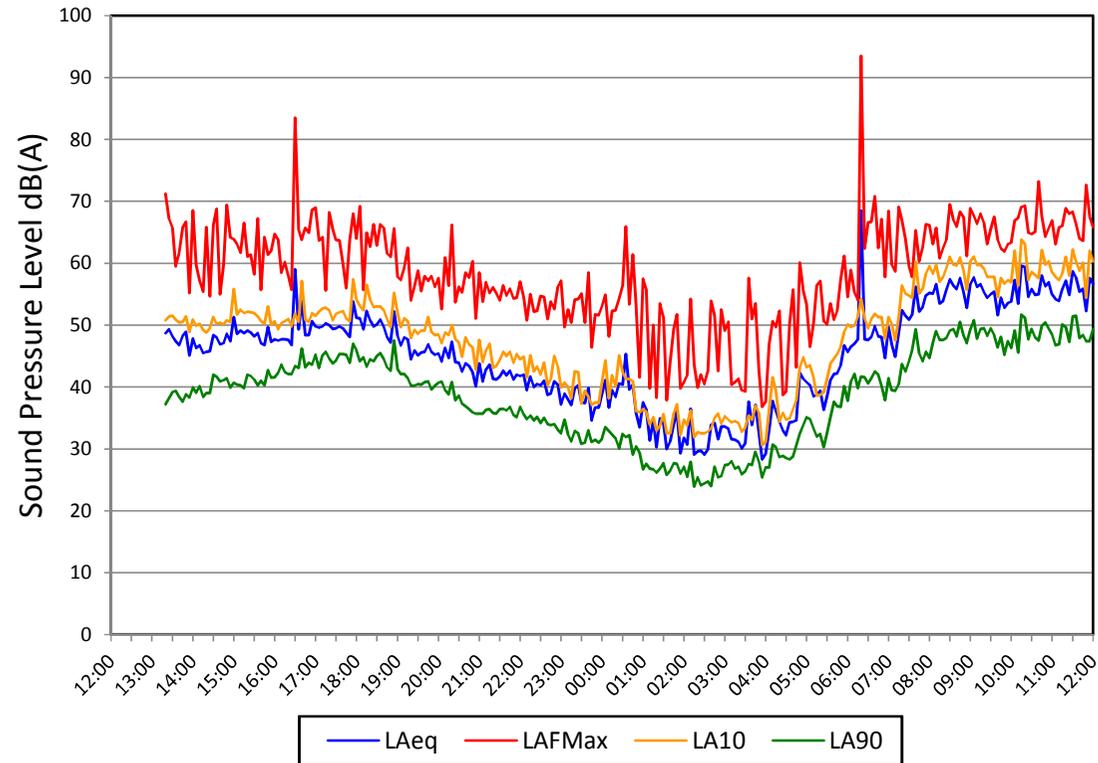
CLARKE SAUNDERS ASSOCIATES



Figure AS9060/SP1

East End Skatepark, Redruth

Environmental Noise Time History: LT1

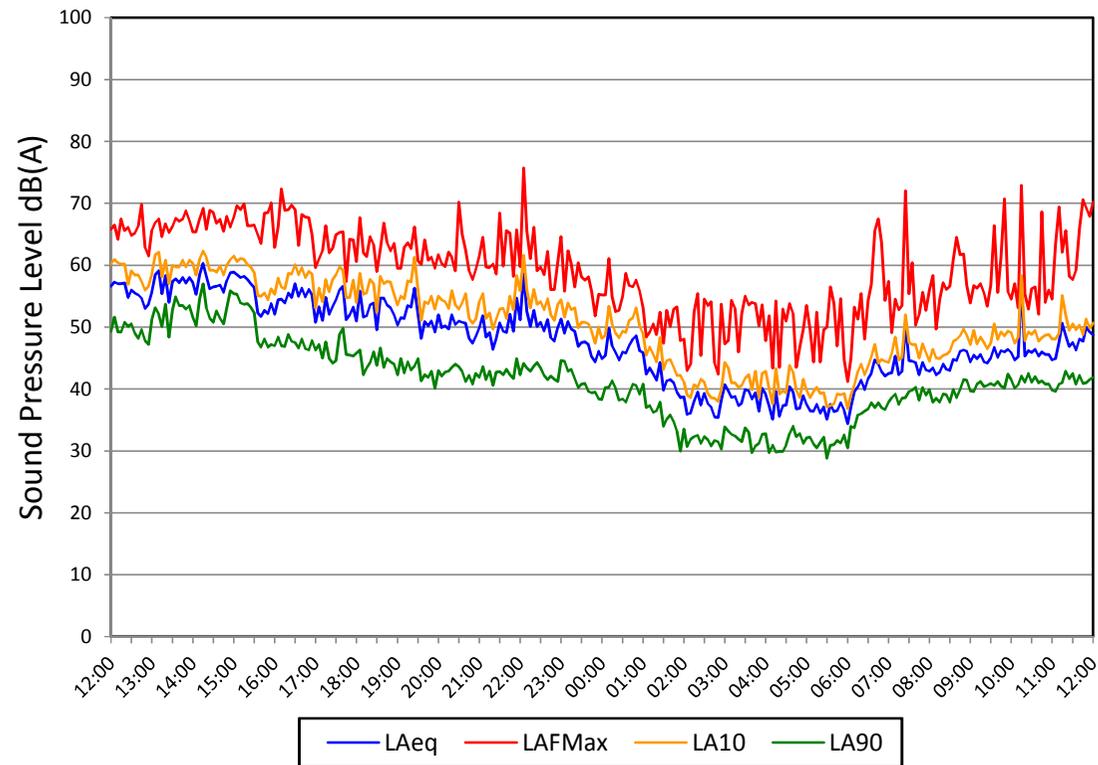


Friday 02 September to Saturday 03 September 2016

Figure AS9060/TH1

East End Skatepark, Redruth

Environmental Noise Time History: LT1

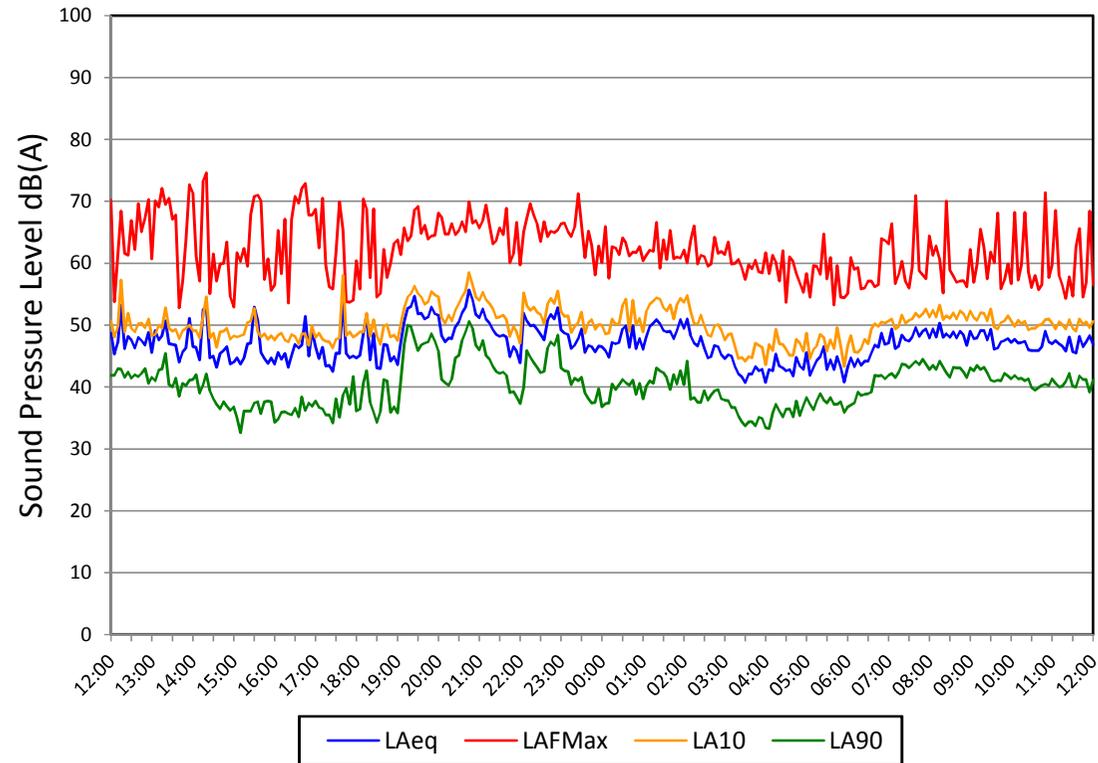


Saturday 03 September to Sunday 04 September 2016

Figure AS9060/TH2

East End Skatepark, Redruth

Environmental Noise Time History: LT1

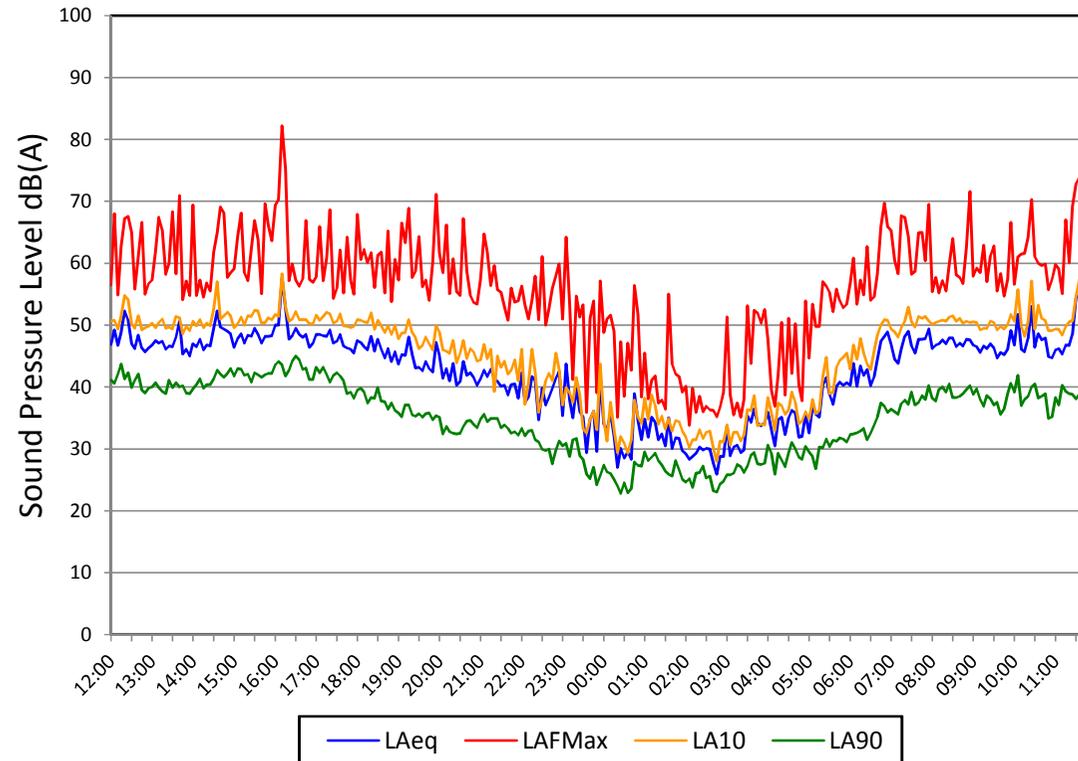


Sunday 04 September to Monday 05 September 2016

Figure AS9060/TH3

East End Skatepark, Redruth

Environmental Noise Time History: LT1

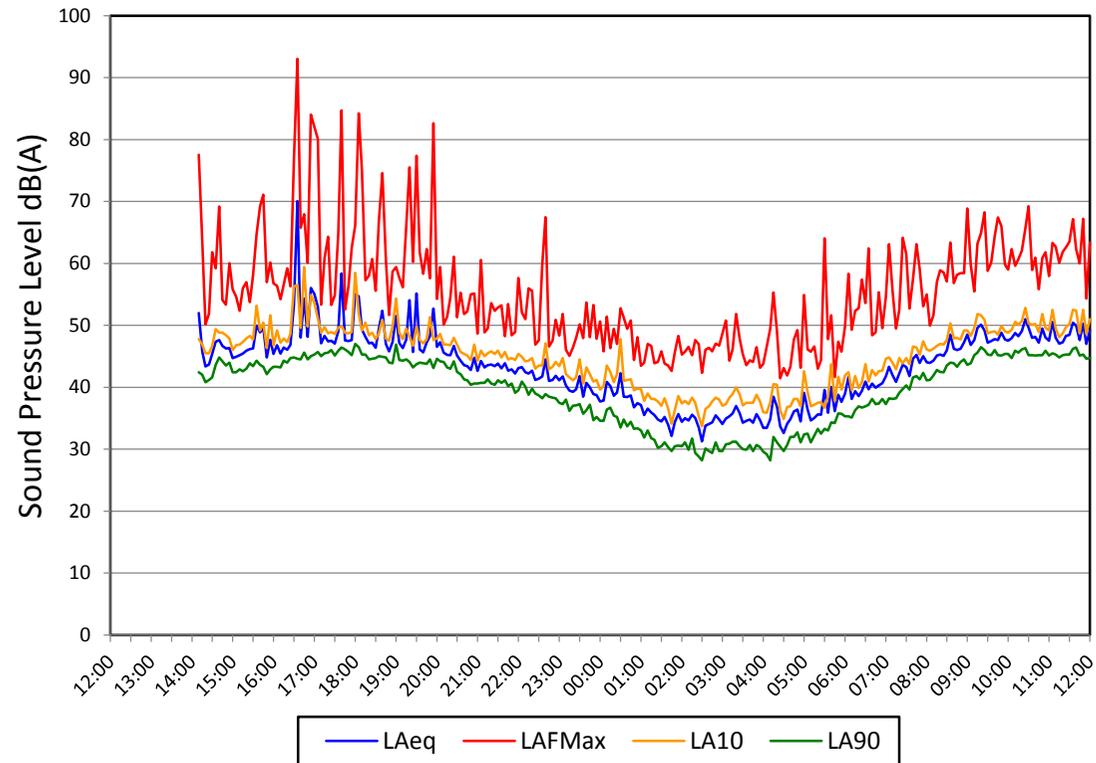


Monday 05 September to Tuesday 06 September 2016

Figure AS9060/TH4

East End Skatepark, Redruth

Environmental Noise Time History: LT2

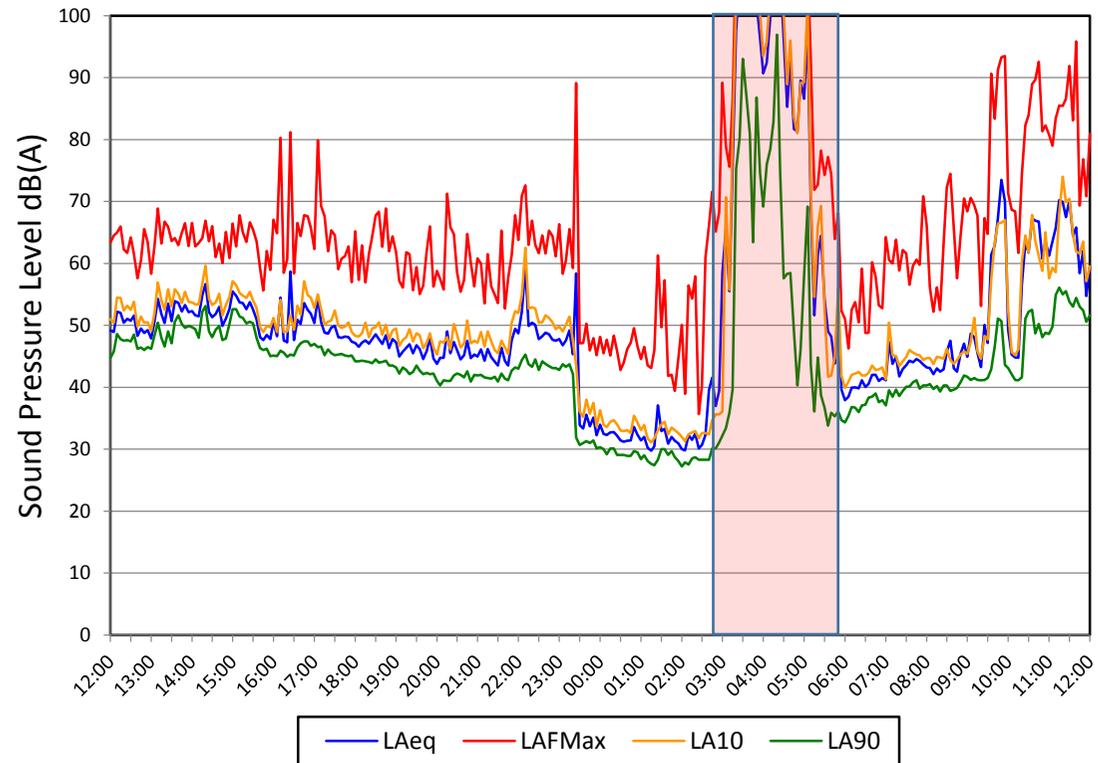


Friday 02 September to Saturday 03 September 2016

Figure AS9060/TH5

East End Skatepark, Redruth

Environmental Noise Time History: LT2

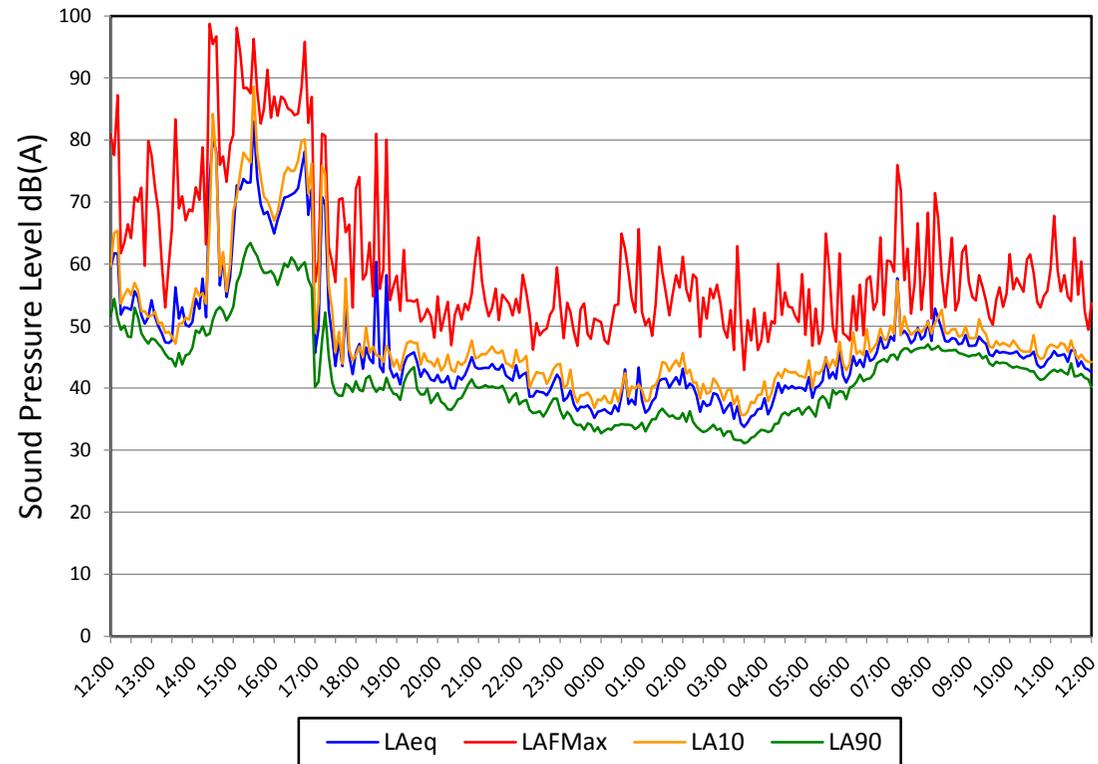


Saturday 03 September to Sunday 04 September 2016

Figure AS9060/TH6

East End Skatepark, Redruth

Environmental Noise Time History: LT2

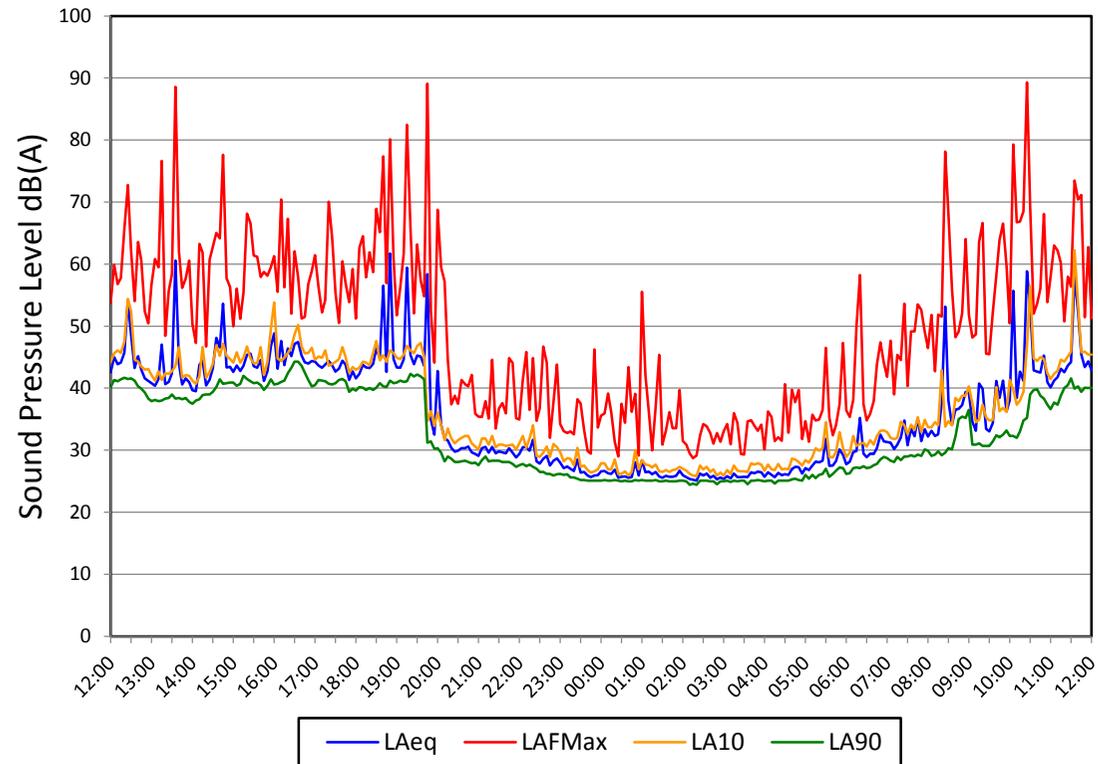


Sunday 04 September to Monday 05 September 2016

Figure AS9060/TH7

East End Skatepark, Redruth

Environmental Noise Time History: LT2



Monday 05 September to Tuesday 06 September 2016

Figure AS9060/TH8

APPENDIX A

ACOUSTIC TERMINOLOGY & HUMAN RESPONSE TO BROADBAND NOISE

1.0 ACOUSTIC TERMINOLOGY

The annoyance produced by noise is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and any variations in its level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

- dB (A):** The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level.
- L₁₀ & L₉₀ :** If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence L₁₀ is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L₉₀ is the average minimum level and is often used to describe the background noise.
- It is common practice to use the L₁₀ index to describe traffic noise, as being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic noise.
- L_{eq} :** The concept of L_{eq} (equivalent continuous sound level) has up to recently been primarily used in assessing noise in industry but seems now to be finding use in defining many other types of noise, such as aircraft noise, environmental noise and construction noise.
- L_{eq} is defined as a notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc).
- The use of digital technology in sound level meters now makes the measurement of L_{eq} very straightforward.
- Because L_{eq} is effectively a summation of a number of noise events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute noise limit.
- L_{max} :** L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.
- D** The sound insulation performance of a construction is a function of the difference in noise level either side of the construction in the presence of a loud noise source in one of the pair of rooms under test. D, is therefore simply the *level difference* in decibels between the two rooms in different frequency bands.
- D_w** D_w is the *Weighted Level Difference* The level difference is determined as above, but weighted in accordance with the procedures laid down in BS EN ISO 717-1.
- D_{nT,w}** D_{nT,w} is the *Weighted Standardised Level Difference* as defined in BS EN ISO 717-1 and represents the *weighted level difference*, as described above, corrected for room reverberant characteristics.
- C_{tr}** C_{tr} is a spectrum adaptation term to be added to a single number quantity such as D_{nT,w}, to take account of characteristics of a particular sound.
- L'_{nT,w}** L'_{nT,w} is the *Weighted Standardised Impact Sound Pressure Level* as defined in BS EN ISO 717-2 and represents the level of sound pressure when measured within room where the floor above is under excitation from a calibrated tapping machine, corrected for the receive room reverberant characteristics.

APPENDIX A

ACOUSTIC TERMINOLOGY & HUMAN RESPONSE TO BROADBAND NOISE

2.0 OCTAVE BAND FREQUENCIES

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation have agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band. In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, eg. 250 Hz octave band runs from 176 Hz to 353 Hz. The most commonly used bands are:

Octave Band Centre Frequency Hz 63 125 250 500 1000 2000 4000 8000

3.0 HUMAN PERCEPTION OF BROADBAND NOISE

Because of the logarithmic nature of the decibel scale, it should be borne in mind that noise levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) is not twice as loud as 50 dB(A) sound level. It has been found experimentally that changes in the average level of fluctuating sound, such as traffic noise, need to be of the order of 3 dB(A) before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10 dB(A) is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in traffic noise level can be given.

INTERPRETATION

Change in Sound Level dB(A)	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial

4.0 EARTH BUNDS AND BARRIERS - EFFECTIVE SCREEN HEIGHT

When considering the reduction in noise level of a source provided by a barrier, it is necessary to establish the "effective screen height". For example if a 3 metre high barrier exists between a noise source and a listener, with the barrier close to the listener, the listener will perceive the noise source is louder, if he climbs up a ladder (and is closer to the top of the barrier) than if he were standing at ground level. Equally if he sat on the ground the noise source would seem quieter than it was if he were standing. This may be explained by the fact that the "effective screen height" is changing with the three cases above, the greater the effective screen height, in general, the greater the reduction in noise level.

Where the noise sources are various roads, the attenuation provided by a fixed barrier at a specific property will be greater for roads close to the barrier than for roads further away.

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Appendix B

Project: AS9060

East End Skatepark, Redruth

Drump Road Impact

Noise Impact Assessment as 'base' design

BS4142 Assessment

Receptor	Drump Road	Distance 60 m
L _{Aeq,1h} for Skateboarding	55 dB @ 40m	
Distance Loss to 60m	-4 dB	
Acoustic Screening	0 dB	
L _{Aeq,1hr} at Receiver (specific noise level)	51 dB	
Character Correction	5 dB	
Rating Level	56 dB	
Daytime Background LA90 Level	37 dB	
Evening Background LA90 level	35 dB	
Daytime Assessment Level	19 dB	
Evening Assessment Level	21 dB	* rounded to nearest dB
Conclusion	<i>'Complaints Likely'</i>	

WHO Guidelines Assessment

Skate Boarding 09:00 - 21:00hrs

12 hours

Worst case continuous

7 hours out of 16hr Daytime

7 hours @

51 dB(A)

9 hours @

0 dB(A)

Skating for 7

Correction

-4 dB

out of 16 hours

Acoustic Screening

0dB

L_{Aeq,16hr}=

47 dB(A)

* rounded to nearest dB

'moderate annoyance'

Clay Target Assessment

L_{Amax} for Bowlpark

71dB @ 45m

L_{Amax} at Receptor

69dB @ 60m

Acoustic Screening

0dB

L_{Amax} at Receptor

69 dB

Comment L_{Amax}(SNL)>55dB<65dB

Tending towards 'Complaints being highly likely'

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Appendix B

Project: AS9060

East End Skatepark, Redruth

East End Impact

Noise Impact Assessment as 'base' design

BS4142 Assessment

Receptor	East End	Distance 50 m
L _{Aeq,1h} for Skateboarding	55 dB @ 40m	
Distance Loss to 50m	-2 dB	
Acoustic Screening	0 dB	
L _{Aeq,1hr} at Receiver(specific noise level)	53 dB	
Character Correction	5 dB	
Rating Level	58 dB	
Daytime Background LA90 Level	39 dB	
Evening Background LA90 level	29 dB	
Daytime Assessment Level	19 dB	
Evening Assessment Level	29 dB	* rounded to nearest dB
Conclusion	<i>'Complaints Likely'</i>	

WHO Guidelines Assessment

Skate Boarding 09:00 - 21:00hrs

12 hours

Worst case continuous

7 hours out of 16hr Daytime

7 hours @

53 dB(A)

9 hours @

0 dB(A)

Skating for 7

Correction

-4 dB

out of 16 hours

Acoustic Screening

0dB

L_{Aeq,16hr}=

49 dB(A)

* rounded to nearest dB

'moderate annoyance'

Clay Target Assessment

L_{Amax} for Bowlpark

71dB @ 45m

L_{Amax} at Receptor

70dB @ 50m

Acoustic Screening

0dB

L_{Amax} at Receptor

70 dB

Comment L_{Amax}(SNL)>55dB<65dB

Tending towards 'Complaints being highly likely'

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Appendix B

Project: AS9060

East End Skatepark, Redruth

Drump Road Impact - Mitigated

Noise Impact Assessment as 'mitigated' design

BS4142 Assessment

Receptor	Drump Road	Distance 90 m
L _{Aeq,1h} for Skateboarding	55 dB @ 40m	
Distance Loss to 90m	-7 dB	
Acoustic Screening	-14 dB	
L _{Aeq,1hr} at Receiver (specific noise level)	33 dB	
Character Correction	5 dB	
Rating Level	38 dB	
Daytime Background LA90 Level	37 dB	
Evening Background LA90 level	35 dB	
Daytime Assessment Level	1 dB	
Evening Assessment Level	3 dB	
Conclusion	<i>'Complaints Unlikely' during daytime</i>	

* rounded to nearest dB

WHO Guidelines Assessment

Skate Boarding 09:00 - 21:00hrs

12 hours

Worst case continuous

7 hours out of 16hr Daytime

7 hours @

33 dB(A)

Skating for 7

9 hours @

0 dB(A)

out of 16 hours

Correction

-4 dB

L_{Aeq,16hr} =	30 dB(A)
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* rounded to nearest dB

<i>Below threshold where 'moderate annoyance' is deemed to be likely</i>

Clay Target Assessment

L_{Amax} for Bowlpark

71dB @ 45m

L_{Amax} at Receptor

65dB @ 90m

Acoustic Screening

-12 dB

L_{Amax} at Receptor

51 dB

Comment L_{Amax}(SNL) > 55dB < 65dB

<i>'little evidence of significant annoyance'</i>
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Appendix B

Project: AS9060

East End Skatepark, Redruth

East End Impact

Noise Impact Assessment as 'base' design

BS4142 Assessment

Receptor	East End	Distance 90 m
L _{Aeq,1h} for Skateboarding	55 dB @ 40m	
Distance Loss to 90m	-7 dB	
Acoustic Screening	-14 dB	
L _{Aeq,1hr} at Receiver (specific noise level)	33 dB	
Character Correction	5 dB	
Rating Level	38 dB	
Daytime Background LA90 Level	39 dB	
Evening Background LA90 level	29 dB	
Daytime Assessment Level	-1 dB	
Evening Assessment Level	9 dB	
Conclusion	<i>'Complaints Unlikely' during daytime</i>	

* rounded to nearest dB

WHO Guidelines Assessment

Skate Boarding 09:00 - 21:00hrs

12 hours

Worst case continuous

7 hours out of 16hr Daytime

7 hours @

33 dB(A)

Skating for 7

9 hours @

0 dB(A)

out of 16 hours

Correction

-4 dB

L_{Aeq,16hr}	30 dB(A)
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* rounded to nearest dB

<i>Below threshold where 'moderate annoyance' is deemed to be likely</i>

Clay Target Assessment

L_{Amax} for Bowlpark

71dB @ 45m

L_{Amax} at Receptor

65dB @ 90m

Acoustic Screening

-14 dB

L_{Amax} at Receptor

51 dB

Comment L_{Amax}(SNL)>55dB<65dB

<i>'little evidence of any significant annoyance'</i>
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