



Memorial Playing Fields, Steyning Proposed Skate Park Noise Assessment and Recommendations

Steyning Parish Council
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Executive Summary

Acoustic Dimensions has assessed noise from the proposed skateboarding facility at Memorial Playing Fields in Steyning at 32 receiver locations and compared this with ambient noise and noise from football.

The ambient noise at Memorial Playing Fields ranges between 44 dB and 53 dB $L_{Aeq,15min}$. The background noise ranges between 35 dB and 38 dB L_{A90} . The ambient noise is higher than the background noise by up to 18 dB.

Football noise ranges between 40 dB and 50 dB $L_{Aeq,80mins}$. Football noise is higher than the background noise by up to 15 dB. Football noise is not considered to cause disturbance at Memorial Playing Fields. The frequency of occurrence for football noise is one or two matches per week for duration of approximately 90 minutes each match.

Noise from the skateboarding facility at maximum occupancy ranges between 36 dB and 48 dB $L_{Aeq,60min}$. Noise from the skateboarding facility is higher than the background noise by up to 13 dB.

Noise from the skateboarding facility at maximum occupancy is below the range of measured ambient noise levels at the majority of receiver locations. The occurrence of maximum occupancy will be outside school hours. Usage of the skateboarding facility will be very low during school hours, in the early morning and after dark. There will be no activity during wet weather. Existing ambient and background noise levels at Memorial Playing Fields will be unaffected at these times.

There is no significant difference between ambient and background noise levels measured by AD and Atkins at Memorial Playing Fields. Further, there is no significant difference in calculated levels of skateboard noise at the nearest dwelling.

When assessed under BS 4142:1997 even the ambient noise is higher than the background noise to the extent that complaints would be deemed likely. The British Standard gives a false assessment because 1) the site has very low background noise levels and 2) the nature of the ambient noise is not industrial. Assessment of noise from recreational use of the park under BS4142 gives misleading results and is not appropriate.

Noise from the proposed skateboarding facility is unlikely to cause disturbance to nearby residents even when it is used at maximum occupancy.



1.0 Introduction

- 1.1 We carried out external noise level measurements at Memorial Playing Fields on Saturday 20 October 2012 to determine prevailing ambient and background noise levels during the daytime and also, separately, to measure the noise levels during a juniors' football match at the playing fields.
- 1.2 We measured source noise levels caused by typical skateboarding activities at concrete skateboarding facilities in Coventry (see appendices). We recruited a skateboarder on both occasions to allow specific measurements of different skateboarding activities to be made. During these measurement sessions we carefully observed the typical activities of those persons using the skateboarding facilities. Further observations were made on separate occasions.
- 1.3 There are no guidelines or British Standards that apply directly to the assessment of noise from skateboarding facilities. We have completed our assessment based on an appropriate methodology agreed with Horsham District Council.
- 1.4 We compare noise from the proposed skateboarding facility with the ambient noise and with noise from football matches played at Memorial Playing Fields.
- 1.5 We show that noise from the proposed skateboarding facility is unlikely to cause significant disturbance to nearby residents.

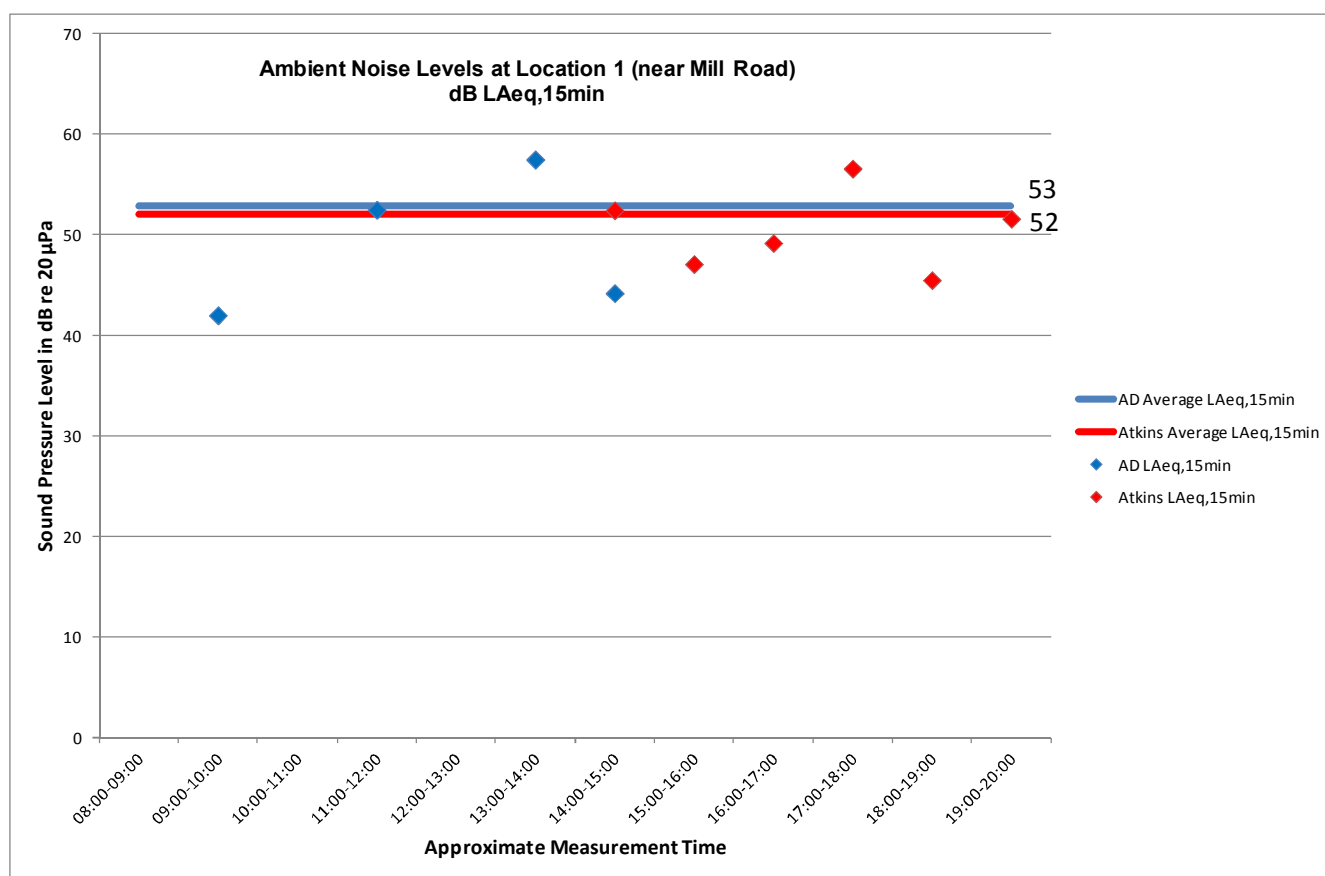
2.0 Project Background

- 2.1 Steyning Parish Council proposes a new skateboarding facility at Memorial Playing Fields in Steyning. Outline Planning permission has been granted for the development subject to conditions, one of which is the requirement for a noise assessment to be completed.
- 2.2 The proposed skateboarding facility will have a footprint of 1200 m². This will constitute 600 m² of active skateboarding area constructed using concrete. The active area will be bordered by a further area of 600 m² for the provision of earth bunds and/or other earth works and landscaping. This will be provided to help screen the active area.
- 2.3 A noise assessment for the proposed facility was undertaken by Atkins and issued to Steyning Parish Council in September 2011. Their report concludes that noise from the proposed skateboarding facility is likely to give rise to complaints from nearby residents.
- 2.4 Atkins' report is largely based on the BS 4142 assessment methodology for industrial noise, which gives misleading results and is not applicable.

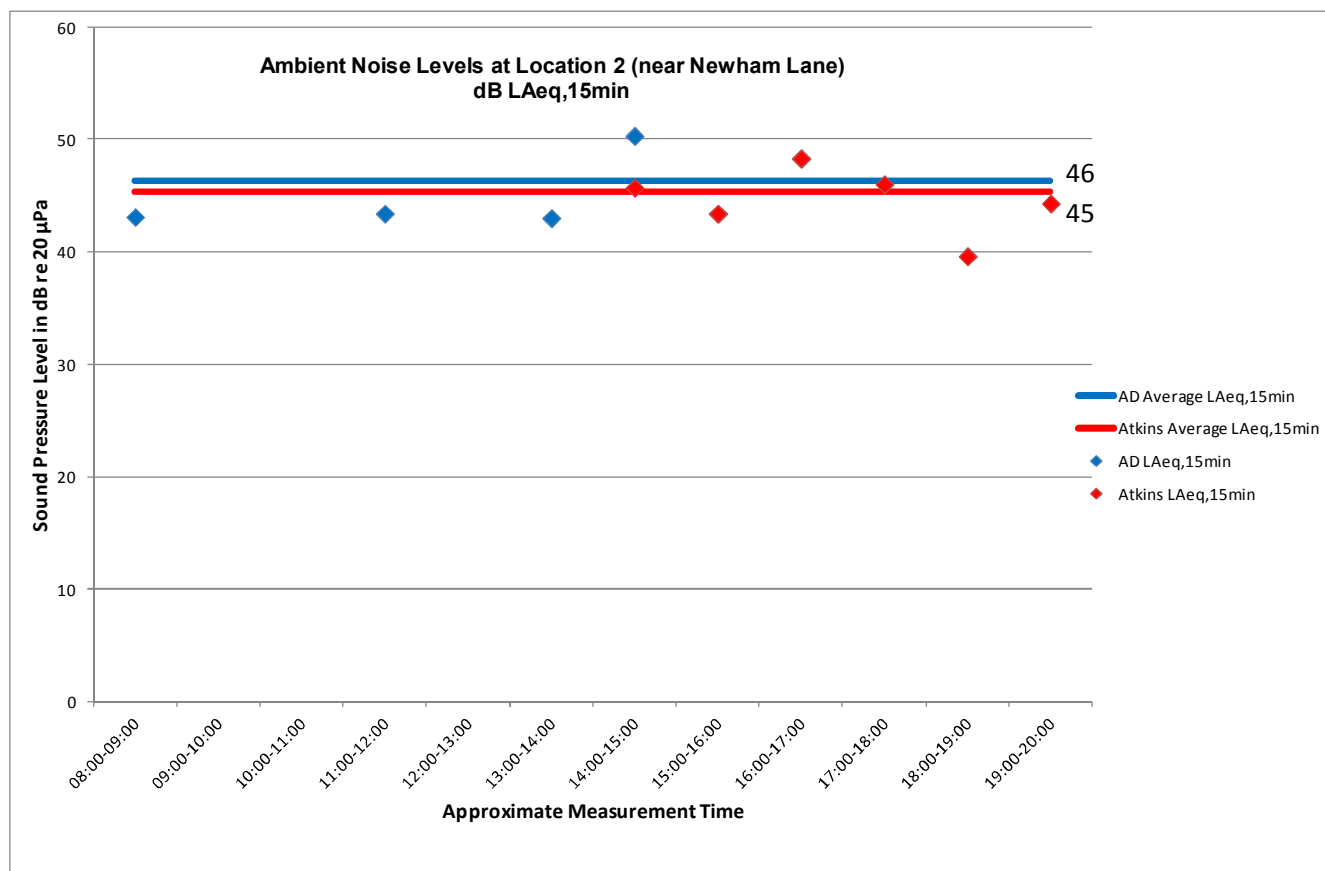


3.0 Characterization of Ambient and Background Noise Levels

3.1 The ambient noise levels measured at Memorial Playing Fields on 20 October 2012 are shown below. Further measurement data is given in the appendices.



Comparison of Ambient Noise Levels Measured at Location 1 (near Mill Road)

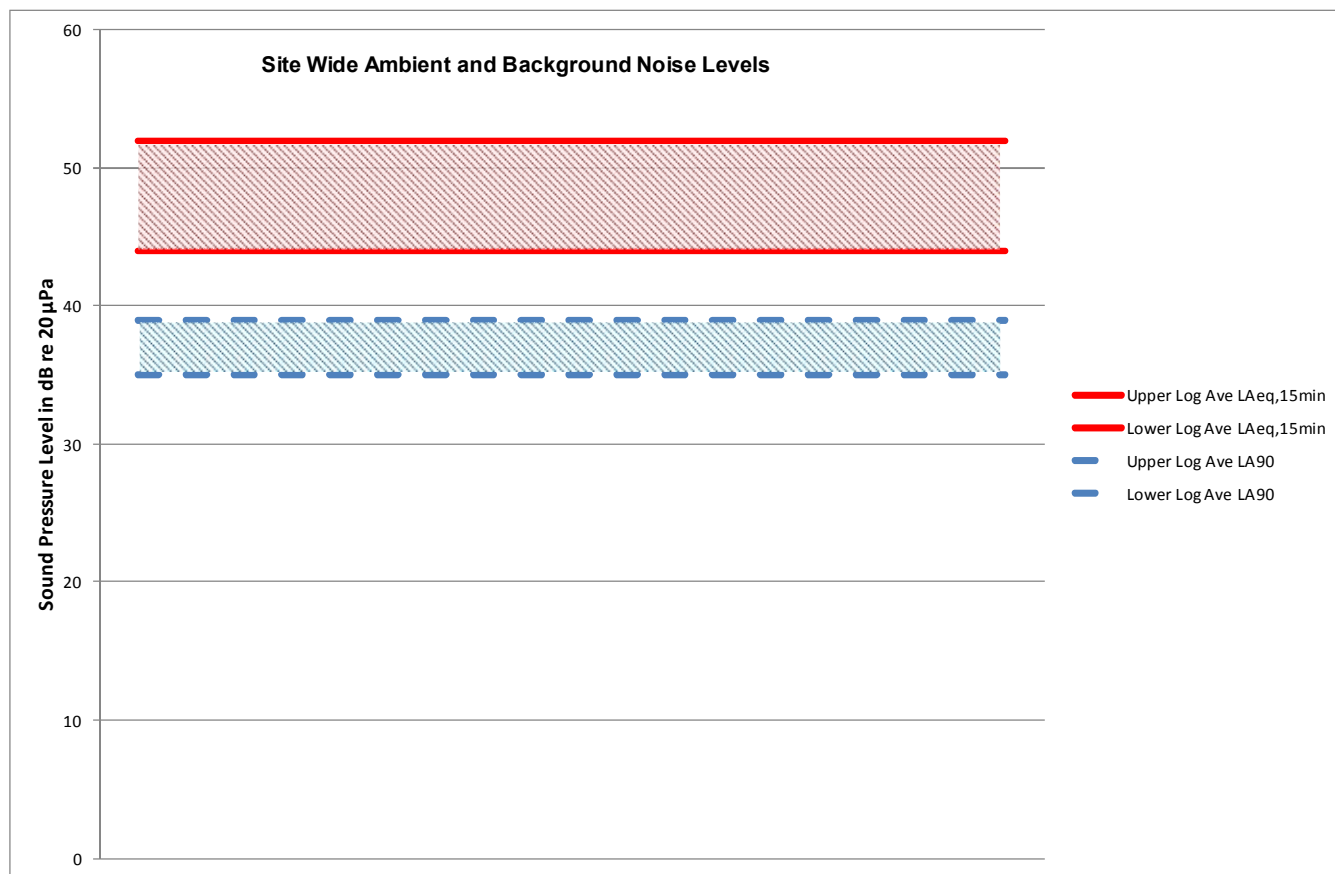


Comparison of Ambient Noise Levels Measured at Location 2 (near Newham Lane)

- 3.2 The graphs show that ambient noise levels measured by Acoustic Dimensions and by Atkins are similar.
- 3.3 Measurements made on different days and at different times produced average results with no significant variation. At both measurement locations there is a difference of only 1 dB between the logarithmic averages of the measured equivalent continuous noise levels (dB $L_{Aeq,15min}$).



- 3.4 We have calculated the maximum average and minimum average noise levels at the four measurement locations to characterize the site-wide noise levels.
- 3.5 The following figure shows the site-wide range of ambient (dB $L_{Aeq,T}$) and background (L_{A90}) noise levels at Memorial Playing Field.



Range of Site Wide Ambient and Background Noise Levels Measured at Memorial Playing Fields

The ambient noise ranges between 44 dB and 53 dB $L_{Aeq,15min}$. The background noise ranges between 35 dB and 38 dB L_{A90} . The ambient noise is higher than the background noise by up to 18 dB.

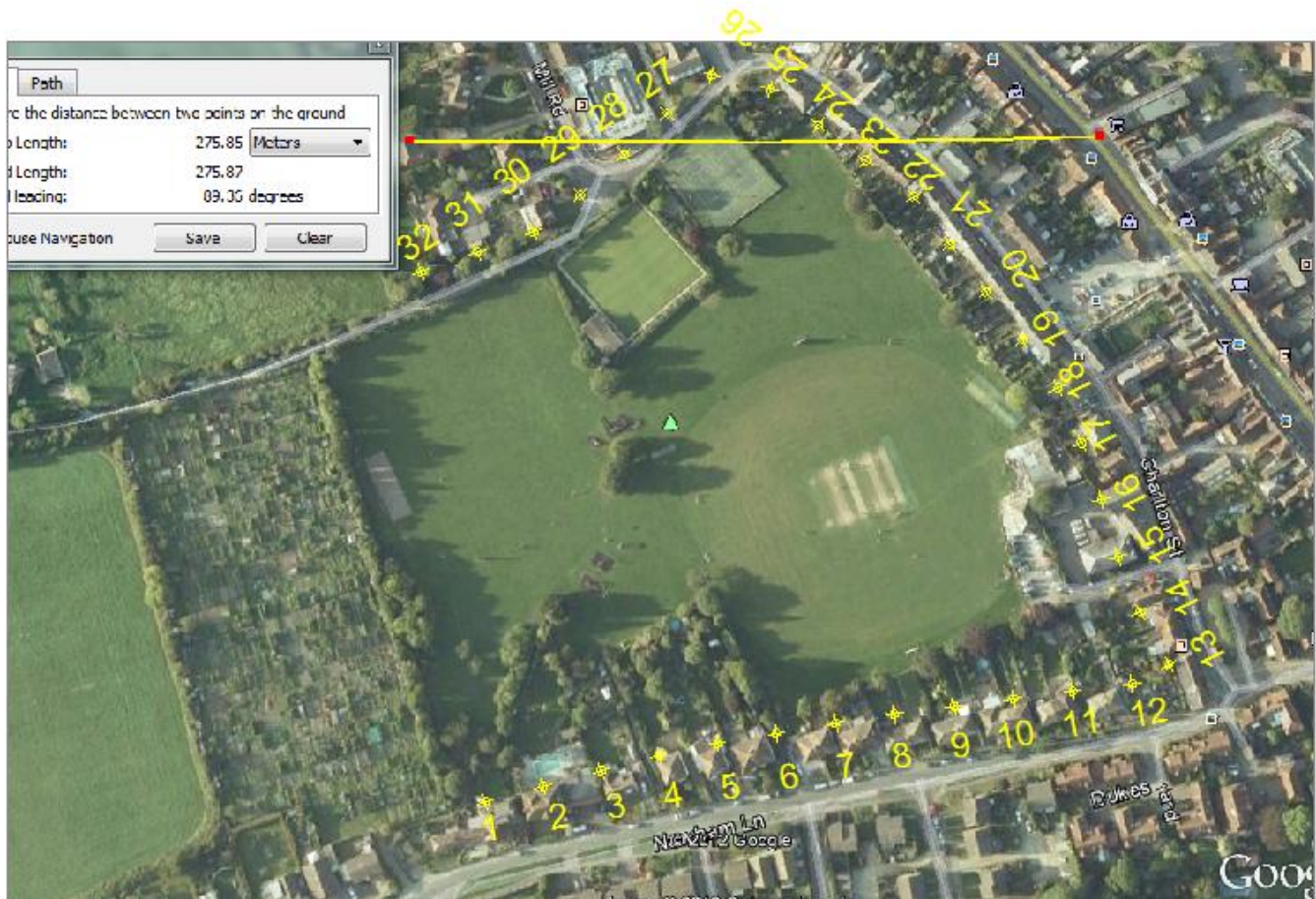
- 3.6 Ambient noise levels at Memorial Playing Fields during our measurements were determined by the following:
- Young people using the fields and play areas
 - Noise from play equipment
 - People waking dogs includes shouts, whistles and dog barks
 - Noise from people at nearby tennis club
 - High altitude commercial aircraft
 - Low altitude light aircraft
 - Occasional traffic noise from cars using the MPF clubhouse car park
- 3.7 Football noise at Memorial Playing Fields is not included in the sources of ambient noise and is assessed separately for the purpose of direct comparison with noise from the skateboarding facility.



4.0 Assessment

4.1 General Methodology

- 4.1.1 We compare specific noise from the skateboarding facility with noise from football. Specific noise levels are compared with the site-wide ambient and background noise levels at Memorial Playing Fields.
- 4.1.2 Comparisons are made in terms of the equivalent continuous noise level over the course of one hour ($\text{dB } L_{\text{Aeq,1hour}}$). This allows direct comparison of ambient, football and skateboarding noise.
- 4.1.3 We have calculated the football and skateboarding noise levels at 32 receiver locations bordering the fields.



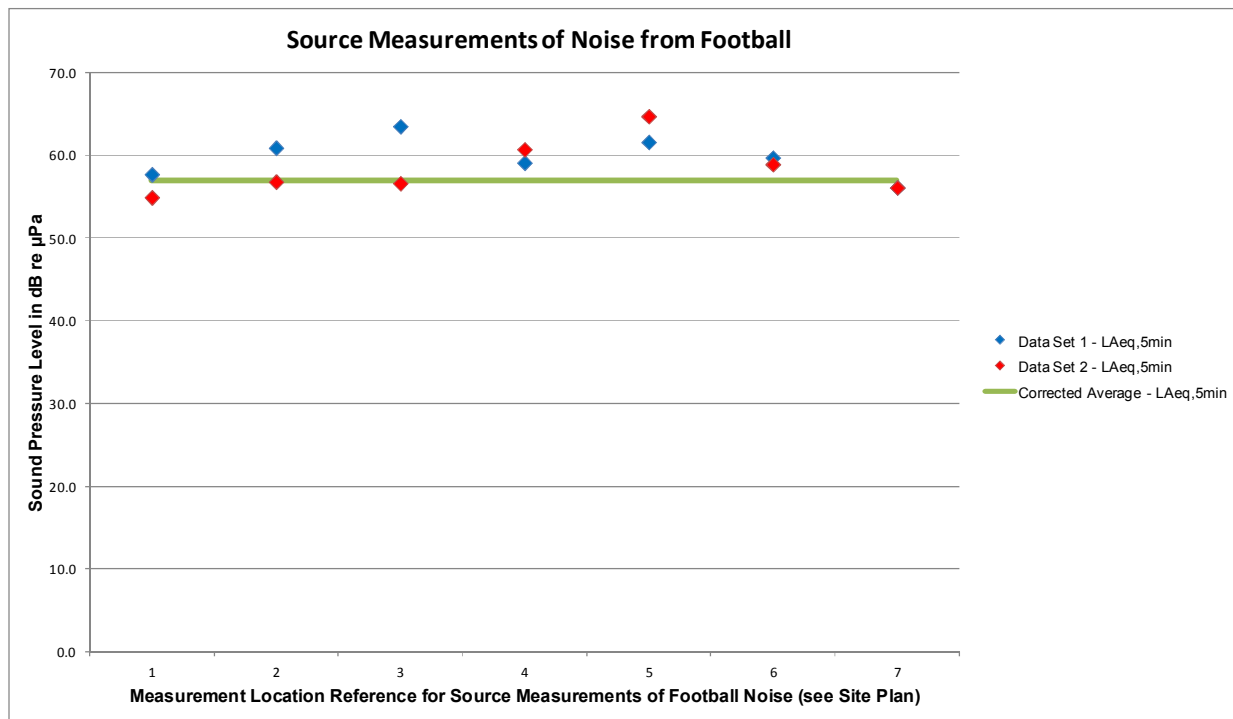
Site Plan Showing Receiver Locations

- 4.1.4 Receiver locations were chosen 3 m off the ground corresponding to first floor (bedroom) windows. Our calculations assume a clear line of sight between source and receiver locations with propagation over grassland.



4.2 Assessment of Noise from Football

4.2.1 Our calculations of specific noise from football are based on measurements of noise from a juniors football match. Measurements were made at seven locations 10 m from the edge of the pitch. Sixteen 5-minute measurements of noise from players and spectators were made.

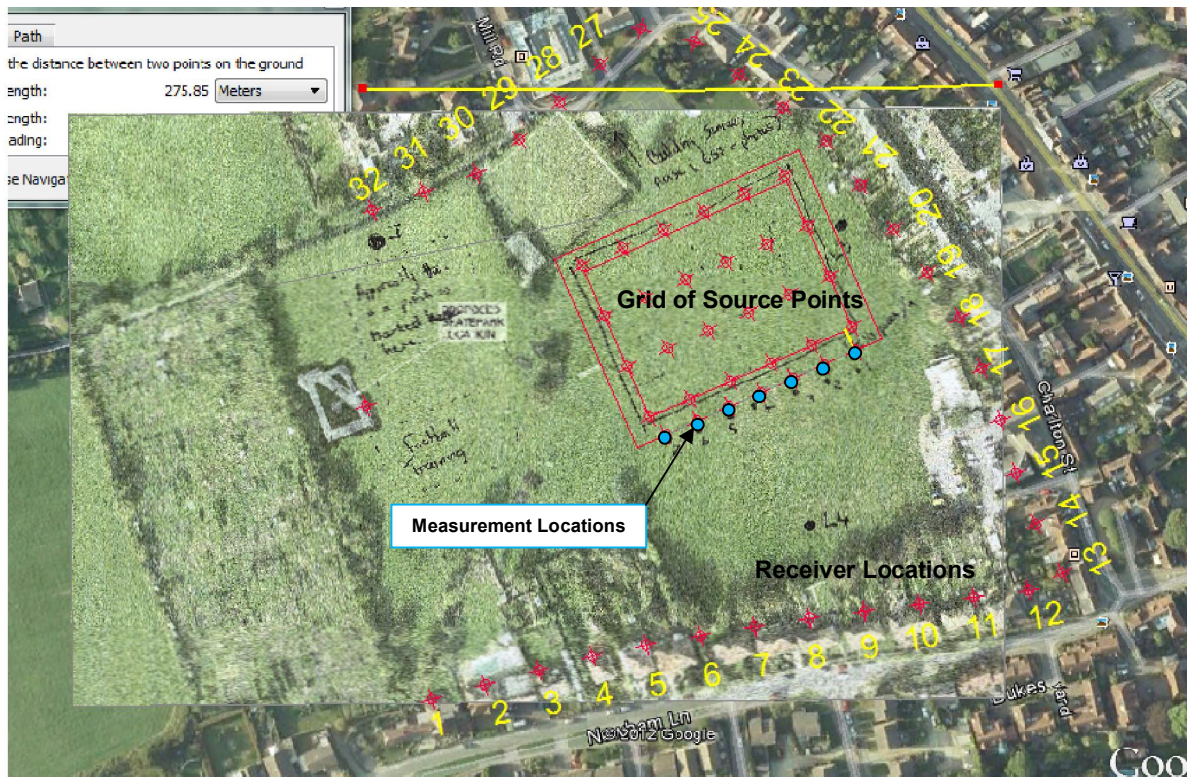


Noise Levels Measured During a Football Match at Memorial Playing Fields

4.2.2 The calculated average source noise level at 10m distance is corrected for proximity to an area source.



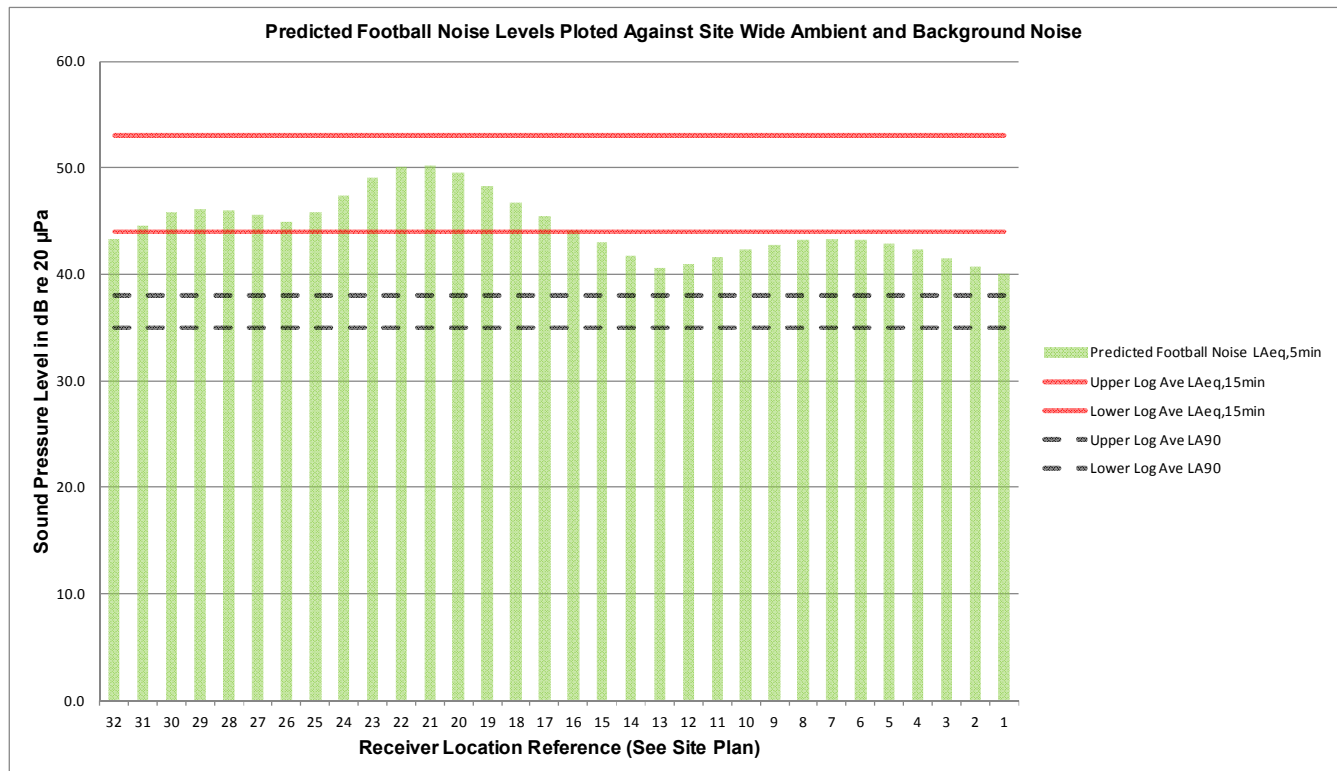
- 4.2.3 We have modeled the football pitch as an area source consisting of 24 points in a grid. We used the measured data to derive a representative source noise level for each of the measurement locations corresponding to a reference distance of 10 m.



Site Plan Showing Source, Receiver and Measurement Locations Used to Assess Noise from Football.



4.2.4 We compare the calculated football noise levels ($L_{Aeq,80min}$) at each of the receiver locations with the site-wide range of ambient ($L_{Aeq,60min}$) and background (L_{A90}) noise levels.



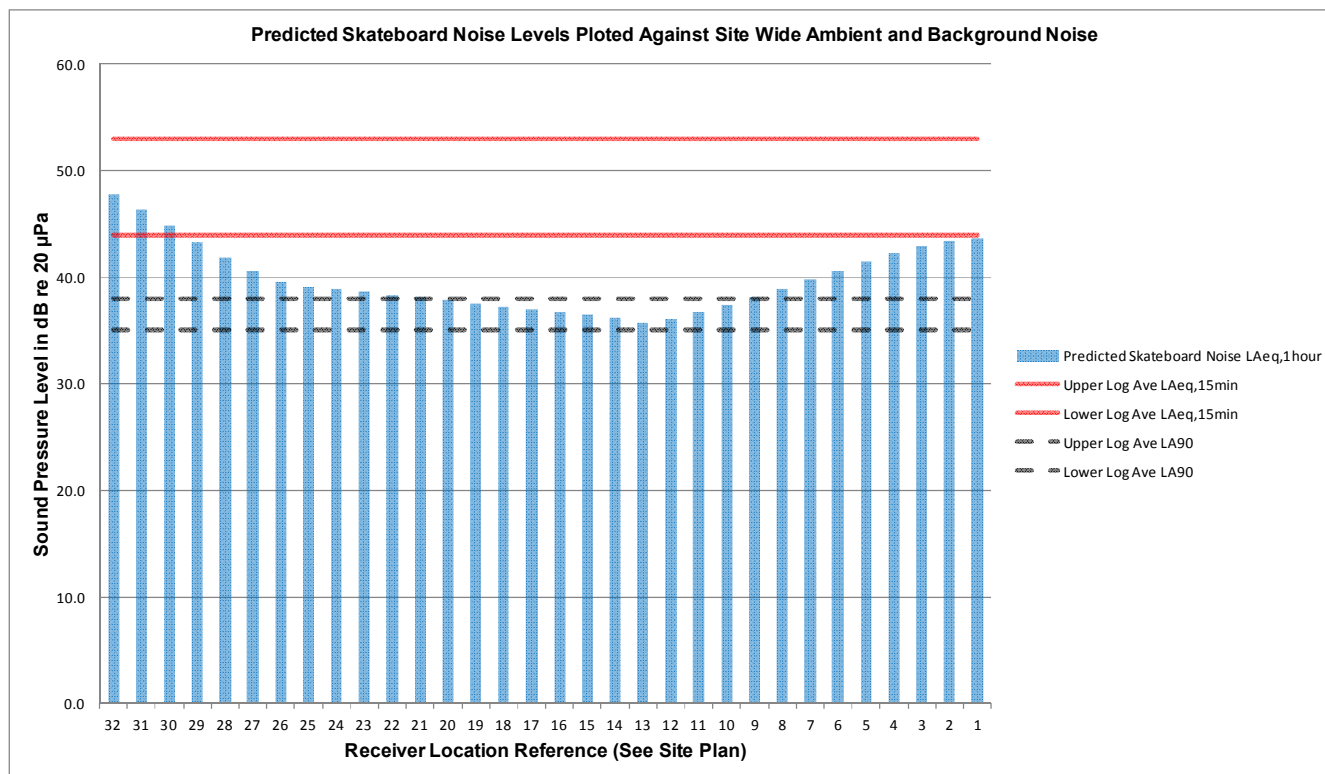
Football Noise Predicted at Nearby Residential Dwellings

- 4.2.5 Football noise ranges between 40 dB and 50 dB $L_{Aeq,80mins}$. Football noise is higher than the background noise by up to 15 dB.
- 4.2.6 Football noise is unlikely to result in a significant measurable (as distinct from calculable) increase in ambient noise levels at Memorial Playing Fields.
- 4.2.7 Some of the predicted football levels are less than the lower limit of measured ambient noise. The character of noise from football means that it is likely to be audible at many of the receiver locations but is not significant in terms of level.
- 4.2.8 When assessed under BS 4142:1997 football noise is higher than the background noise to the extent that complaints would be deemed likely. The British Standard gives a false assessment because 1) the site has very low background noise levels and 2) the nature of football noise is not industrial.



4.3 Noise from Skateboarding

4.3.1 We compare calculated noise levels for the proposed skateboarding facility ($L_{Aeq,60min}$) with the site-wide range of ambient ($L_{Aeq,60min}$) and background (L_{A90}) noise levels.



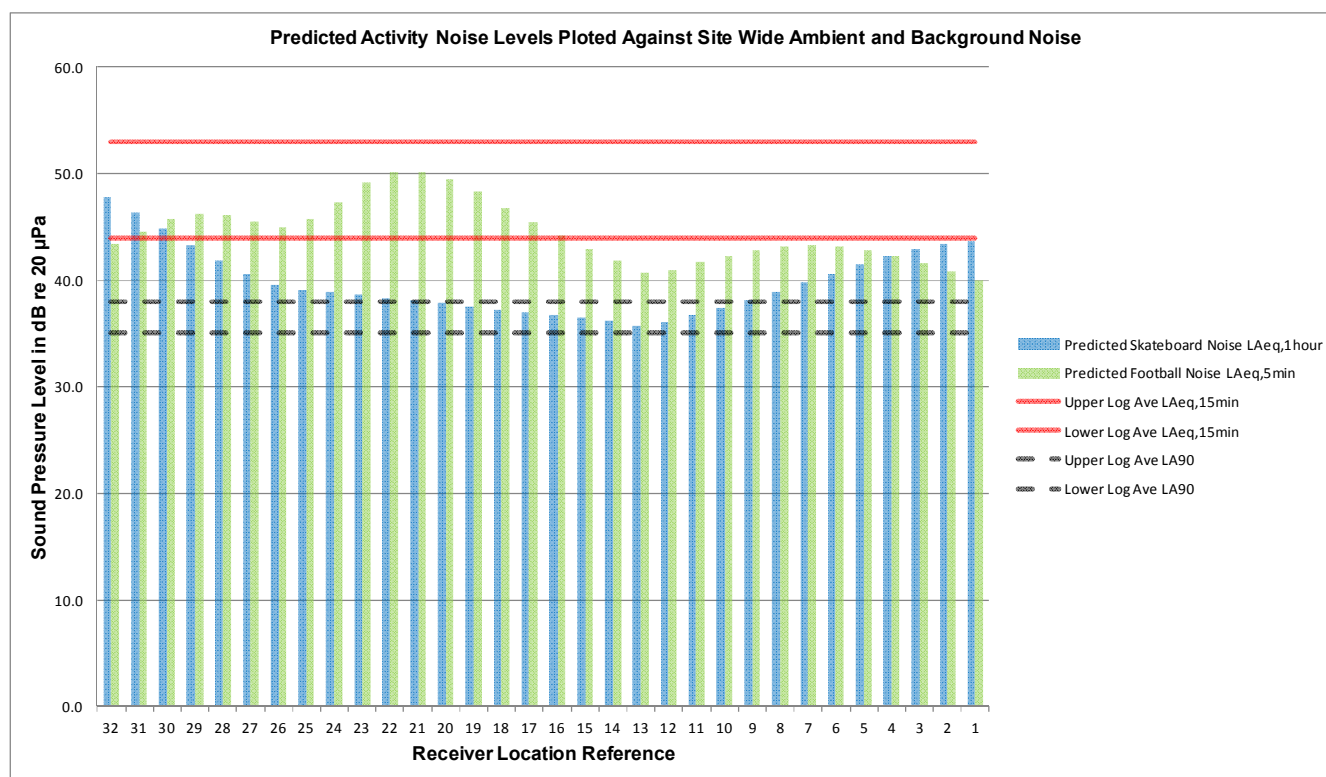
Skateboard Noise Predicted at Nearby Residential Dwellings

- 4.3.2 Noise from the skateboarding facility at maximum occupancy ranges between 36 dB and 48 dB $L_{Aeq,60min}$ and is higher than the background noise by up to 13 dB.
- 4.3.3 Noise from the skateboarding facility at maximum occupancy is within the range of measured ambient noise levels at the nearest dwelling (Receiver Location 32) but would not cause a measureable (distinct from calculable) increase in those levels.
- 4.3.4 Some of the calculated skateboard noise levels are within or just below the range of measured background noise levels. The character of skateboard noise means that it will still be audible at the nearby receiver locations but is not significant in terms of level.
- 4.3.5 There is no significant difference in the calculation of skateboard noise by AD and by Atkins.



4.4 Comparison of Noise from Football and from Skateboarding

4.4.1 We compare noise levels from football and for the skateboarding facility with the site-wide ambient and background noise levels.



Comparative Assessment of Football and Skateboarding Noise Plotted Against Site Wide Range of Ambient of Background Noise.

4.4.2 At maximum occupancy, noise from the skateboarding facility is generally lower than noise from football and typically below the measured range of ambient noise levels for the site.

4.4.3 Typically, skateboard noise is 5 dB to 10 dB quieter than football noise.



5.0 Discussions

- 5.1 Our assessment is based on the condition of maximum occupancy of the skateboarding facility as discussed in Appendix C. Maximum occupancy will typically occur outside of school hours in the late afternoon.
- 5.2 Noise from the facility at maximum occupancy is below the range of measured ambient noise levels at the majority of receiver locations. At the nearest receiver (receiver 32 $\approx$ 80 m) predicted noise from skateboarding activities is within the measured range of site-wide ambient noise levels. Noise from the facility will be audible but will not be significant in terms of level and disturbance at the nearest dwellings is unlikely.
- 5.3 Use of the skateboarding facility will be very low during school hours, in the early morning and after dark. There will be no activity during wet weather. Existing ambient and background noise levels will be preserved at these times.
- 5.4 Noise from the proposed skateboarding facility will be lower than noise from football at the nearest dwellings. It is our understanding that football occurs regularly at Memorial Playing Fields and there have been no complaints concerning noise from this activity.
- 5.5 The occurrence of football noise is from one or two matches per week with potential for additional training sessions at weekends and in the evenings. Use of the skateboarding facility is likely to be more frequent than scheduled football matches but calculated noise levels, even based on maximum occupancy, are lower. Maximum occupancy is not expected to occur regularly based on our observations of skateboarding facilities in Coventry. As such, it is expected that noise levels from the skateboarding facility will be lower than our calculated levels for much of the time that the facility is in use.
- 5.6 Our calculated noise levels for the skateboarding facility are lower than the upper limit for gardens and balconies given in BS 8233:1999 which is 55 dB $L_{Aeq,T}$. Our calculations represent maximum occupancy of the facility for a one-hour period. This occupancy will not be sustained over longer periods.
- 5.7 The distance between the proposed skateboarding facility and the nearest dwelling is more than double the minimum recommended distance given in the Fields in Trust (FIT) document '*Planning and design for outdoor sports and play*'.
- 5.8 While there is no significant difference between ambient and background noise levels measured by AD and Atkins at Memorial Playing Fields nor significant difference in the calculation of skateboarding noise, there are differences in our assessments of the noise.
- 5.9 These differences come from our respective assessment methodologies. Atkins has based their assessments on the two standards which give conflicting conclusions. According to BS 4142:1997 complaints due to noise are considered likely. According to CIEH 'Clay target shooting' disturbance is considered unlikely. However, neither of these standards provides a suitable basis for assessment of noise from skateboarding facilities (see further discussion in Appendix A).
- 5.10 **We have compared noise from the skateboarding facility with football noise and with the ambient noise and our assessment is that complaints are unlikely.**



6.0 Mitigation

- 6.1 Current proposals for the facility include earth bunds that are limited by planning condition to a height of 1500 mm above existing ground level. Screening effects from earth bunds do not have a significant on our calculations of noise at residential properties.
- 6.2 For screening to be effective, earth bunds must break the line of sight between noise source and receiver. This would require either:
- Increase in the permitted height of earth bunds and/or
 - Significant reduction in the level of the skateboarding facility below ground level
- 6.3 Screening by earth bunds will reduce the noise from skateboarding in the immediate vicinity of the skateboarding facility but not at the residences.
- 6.4 It is our opinion that earth bunds are not required to provide additional reduction of noise from the proposed skateboarding facility. Noise levels will be suitably low that disturbance is unlikely.



Appendix A: Relevant Guidance and Criteria

1.0 Guidance and Criteria

1.1 Horsham District Council

- 1.1.1 Acoustic Dimensions has discussed the assessment of noise from the proposed skateboarding facility at Memorial Playing Fields with Adam Dracott who is Principal Environmental Health Officer at Horsham District Council.
- 1.1.2 We proposed our methodology for the assessment of noise from the skateboarding facility on 8 October 2012.
- 1.1.3 Horsham District Council has established no specific requirement concerning appropriate noise emission limits from the proposed skateboarding facility.

1.2 Fields in Trust (FIT)

- 1.2.1 Fields in Trust (FIT) '*Planning and design for outdoor sports and play*' provides guidance and recommendations concerning the design of skateboarding facilities and BMX tracks as part of guidance concerning '*Neighbourhood Equipped Areas for Play*' (NEAPs) such as the Memorial Playing Fields.
- 1.2.2 The guidance document provides general recommendations for the use of buffer zones between activity areas and nearby dwellings at a given NEAP. The minimum recommended buffer zone depth is 30 m which compares with a distance of approximately 80 m between the proposed skate park and the nearest dwelling at Memorial Playing Fields.
- 1.2.3 Specific recommendations for skateboarding facilities state:
'Consideration must be carefully given to the buffer zone to nearest dwellings, and this may need to be greater than the 30 meters recommended for a NEAP. Topography, orientation, sound-deadening and materials used in design all have a bearing on sound reduction'
- 1.2.4 Specific recommendations for BMX tracks state:
'Landscape screening can also be used to mitigate any adverse impact. A minimum distance of 30 meters from neighbouring property is recommended.'
- 1.2.5 '*Planning and design for outdoor sports and play*' also makes reference to Planning Policy Guidance (PPG) 24 which was superseded by the National Planning Policy Framework (NPPF). The latter gives no specific recommendations for the control of noise from areas used for outdoor sports and play.

1.3 British Standard 8233:1999

- 1.3.1 British Standard 8233:1999 '*Sound insulation and noise reduction for buildings – Code of practice*' gives recommendations in accordance with World Health Organization '*Guidelines for community noise*' concerning noise from different sources affecting residential dwellings.
- 1.3.2 With reference to 'design criteria and limits for intrusive noise', BS 8233:1999 states the following:
'For dwellings, the main criteria are reasonable resting/sleeping conditions in bedrooms and good listening conditions in other rooms. Occupants will usually tolerate higher levels of anonymous noise, such as that from road traffic, than noise from neighbours which may trigger complex emotional reactions that are disproportionate to the noise level.'



...In gardens and balconies etc. it is desirable that the steady noise level does not exceed 50 $L_{Aeq,T}$ dB and 55 $L_{Aeq,T}$ dB should be regarded as the upper limit.' T daytime is 16 hours (07:00-23:00)

- 1.3.3 Noise from the proposed skateboarding facility at Memorial Playing Fields would constitute an 'anonymous noise'. and is below 55dBA at all times[????]

1.4 *British Standard 4142:1997*

- 1.4.1 British Standard 4142:1997 'Method for rating industrial noise affecting mixed residential and industrial areas' provides guidance on the assessment of the likelihood of complaints relating to noise from building services equipment. The standard presents a method of rating noise levels by comparing the noise levels of the new source (the specific noise level) with that of the existing background noise level in the area.

- 1.4.2 This standard is used in the assessment of noise from industrial premises but it is inappropriate for use in the assessment of noise from skateboarding facilities and is unlikely to give a representative appraisal of the likelihood of complaints.

1.5 *CIEH 2003: Clay Target Shooting*

- 1.5.1 Chartered Institute of Environmental Health 2003: 'Clay target shooting: Guidance on the control of noise'. This is a specialist guidance and assessment method that relates specifically to noise from clay target shooting.

- 1.5.2 Section 1.1 states the following:

'The scope of this guidance is limited to clay target (pigeon) shoots. It should not be taken as having any application to other outdoor shooting events or other gun club activities.'

- 1.5.3 As such, the document should not be applied to the assessment of noise from skateboarding facilities.

1.6 *International Standard 9613-2*

- 1.6.1 International Standard ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation' provides relevant guidance on predicting noise propagation across open spaces with particular focus on ground effects for porous ground cover – such as the grassland of the Memorial Playing Fields.

1.7 *British Standard 7445:2003*

- 1.7.1 BS 7445:2003 'Description and measurement of environmental noise – Part 1: Guide to quantities and procedures' provides definitions for different noise measures. The terms used in our report are based on these definitions with the exception of the background noise level for which the definition is taken from BS 4142:1997.



Appendix B: External Noise Surveys

2.0 External Noise Surveys

2.1 Site and Surroundings

- 2.1.1 Memorial Playing Fields is located in a residential area at in the western part of Steyning. The fields contain pitches and facilities for football and cricket as well as a play area for children and an area of hard standing for basketball and other activities. The area of hard standing occupies the location of the proposed skateboarding facility.
- 2.1.2 Noise from commercial and light aircraft was audible occasionally during the external noise survey and was a contributor to the ambient noise. Noise from people using the park was the main contributor to the noise climate and this included noise from people and their dogs, and from children and young people using the play area or playing on the fields.
- 2.1.3 The playing fields are bordered by the backs of houses facing residential streets on three sides and by allotments on the western boundary. Road traffic noise was occasionally audible from these streets while ambient noise levels at Memorial Playing Fields were relatively low. Road traffic noise was not a significant contributor to the noise climate at Memorial Playing Fields.
- 2.1.4 During summer, we would expect the ambient noise to include outdoor activities associated with residential gardens such as noise from cutting lawns. Ambient noise would also include the grass-cutting of the MPF itself and more frequent cutting of the grass on the cricket pitches. None of these grass-cutting activities was talking place during our surveys.
- 2.1.5 There is a industrial building (SME Ltd) located at the northern boundary of Memorial Playing Fields with Charlton Street and beyond the bowls and tennis clubs. Building services noise from this building was audible during our external noise survey of 20 October 2012 from locations near to the northern boundary and during periods of little human activity at the playing fields. While this noise was audible, we would not expect anyone to consider this noise to be a nuisance.

2.2 Survey Methodology

- 2.2.1 Measurements of noise from the juniors' football match were made at a distance of 10 m from the touchline (so as not to be too close to any one individual source) and included a series of 7 measurement locations along the length of the pitch. The duration of each measurement was 5 minutes.
- 2.2.2 We made specific source noise measurements of skateboarding activities on two occasions at different skateboarding facilities in Coventry. The first set of measurements was made at an outdoor facility at Coventry's War Memorial Park. The second set of measurements was made at an outdoor facility in the Holbrooks area of Coventry. Both skateboarding facilities are made of concrete.



- 2.2.3 We made ambient and background noise level measurements at the locations 1 - 4 shown in the figure below. The duration of each measurement was 15 minutes.



Site Plan Showing Measurement Locations and Nearest Dwellings

- 2.2.4 The following table lists the equipment used to make noise level measurements.

Equipment Item	Serial Number
Bruel & Kjaer Type 2238 Sound Level Meter (Type1)	2448204
Bruel & Kjaer Type 4231 Sound Calibrator	2450834

List of Equipment

- 2.2.5 The sound level meter was check calibrated at the start and end of the measurement period. No drift in the calibration was observed.
- 2.2.6 All measurements were made in free-field conditions with the microphone positioned approximately 1.5 m off the ground.
- 2.2.7 Weather conditions on 20 October 2012 began with fog during the early morning period which cleared by approximately 08:30. During the daytime the sky was overcast. There was little to no wind and no rain during the survey period. There were light showers at approximately 16:00 but measurements were not undertaken after this time. The temperature during the daytime was approximately 11 °C. Weather conditions at the time of the external noise survey did not significantly affect the measurement results.
- 2.2.8 Weather conditions during noise level measurements at the War Memorial Park were partly cloudy with little to no wind. The temperature was approximately 7 °C at the time of the measurements and there was no rain. Weather conditions did not significantly affect the measurement results.
- 2.2.9 Weather conditions during noise level measurements of skateboard noise in the Holbrooks area of Coventry were over cast with little to no wind. The temperature was approximately 6 °C and there were no periods of rain.

2.3 Measured Ambient and background Noise Levels



- 2.3.1 The following table shows the ambient (dB $L_{Aeq,15min}$) and background (dB L_{A90}) noise levels measured at the locations in the above site plan.

Measurement Location	Measurement Duration	dB $L_{Aeq,15min}$	dB L_{AF90}
1	15:00	53	36
2	15:00	46	35
3	15:00	44	38
4	15:00	47	36

Values are sound pressure levels in dB re 20 μ Pa

Summary of Noise Levels Measured at Memorial Playing Fields on 20 October 2012

Location	Date	Start Time	Duration	dB $L_{Aeq,15min}$	dB L_{A90}
1	19/10/2012	09:54:52	00:15:00	42.0	35.0
1	20/10/2012	11:37:32	00:15:00	52.5	38.5
1	20/10/2012	13:01:00	00:15:00	57.5	33.0
1	20/10/2012	14:22:33	00:15:00	44.2	33.0
2	20/10/2012	08:44:25	00:15:00	43.1	35.5
2	20/10/2012	11:57:46	00:15:00	43.4	34.0
2	20/10/2012	13:26:04	00:15:00	43.0	35.0
2	20/10/2012	14:42:31	00:15:00	50.3	35.0
3	20/10/2012	08:24:01	00:15:00	41.8	37.5
3	20/10/2012	11:15:20	00:15:00	44.6	38.5
3	20/10/2012	12:40:52	00:15:00	40.8	35.5
3	20/10/2012	14:03:17	00:15:00	47.3	37.0
3	20/10/2012	15:19:34	00:15:00	44.7	38.5
4	20/10/2012	12:17:04	00:15:00	50.1	36.5
4	20/10/2012	13:44:23	00:15:00	45.6	35.5
4	20/10/2012	15:01:31	00:15:00	41.8	34.5

Values are sound pressure levels in dB re 20 μ Pa

Ambient and Background Noise Levels measured at Memorial Playing Fields on 20 October 2012



Appendix C: Assessment Methodology for Skateboard Noise

3.0 Skateboard Noise Assessment

3.1 Assessment Methodology for Skateboard Noise

- 3.1.1 We have used a point source propagation method to calculate noise from the proposed skateboarding facility.
- 3.1.2 Our calculations account for propagation over soft ground based on guidance in ISO 9623-2:1996 'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation'.
- 3.1.3 We have calculated the equivalent continuous noise level (dB $L_{Aeq,60mins}$) for skateboard noise by adding together noise levels from a number of discrete skateboard events over the reference period. To do this we have based our calculations on a number of assumptions concerning the use of the proposed skateboarding facility. We have made noise level corrections based on these assumptions:

Assumptions Used in Calculations	Value
Number of active users on the Park at any one time (maximum occupancy)	15
Number of tricks performed in one hour	120
Percentage of time that skateboarders are in motion	75%
Percentage of users that are on skateboards (remainder will be using scooters and BMX bikes)	50%

Assumptions Used to Derive Calculation Corrections

- 3.1.4 Our assumptions are based on observations of skate park usage at facilities in Coventry. We have also talked with industry professionals including designers at Maverick Industries and the owner of Ride (skateboard and cycle shop in Coventry) and practicing skateboarders.
- 3.1.5 Our assumptions concerning usage of the proposed skateboarding facility represent maximum occupancy.

3.2 Source Noise Levels

- 3.2.1 We measured noise levels caused by 1) rolling noise created when the skateboard is in motion over a concrete surface and 2) impact noise caused by tricks.
- 3.2.2 We recruited the help of individual skateboarders in order to obtain specific measurements of activities which were performed on request. Our calculations do not include noise from scooters or BMX bikes. Noise from these is sufficiently low that the effects on the overall predicted levels can safely be disregarded.
- 3.2.3 We have used the logarithmic averages of our measured data to derive source noise levels for skateboarding activities in terms of short-term equivalent continuous noise (dB $L_{Aeq,T}$) and sound exposure (dB L_{AE}) levels.

Type of Skateboard Activity	Logarithmic Average Continuous Equivalent Noise Level dB $L_{Aeq,T}$	Logarithmic Average Sound Expose Level, dB L_{AE}
Rolling	76	92
Tricks	82	93

Values are sound pressure levels in dB re 20 μ Pa

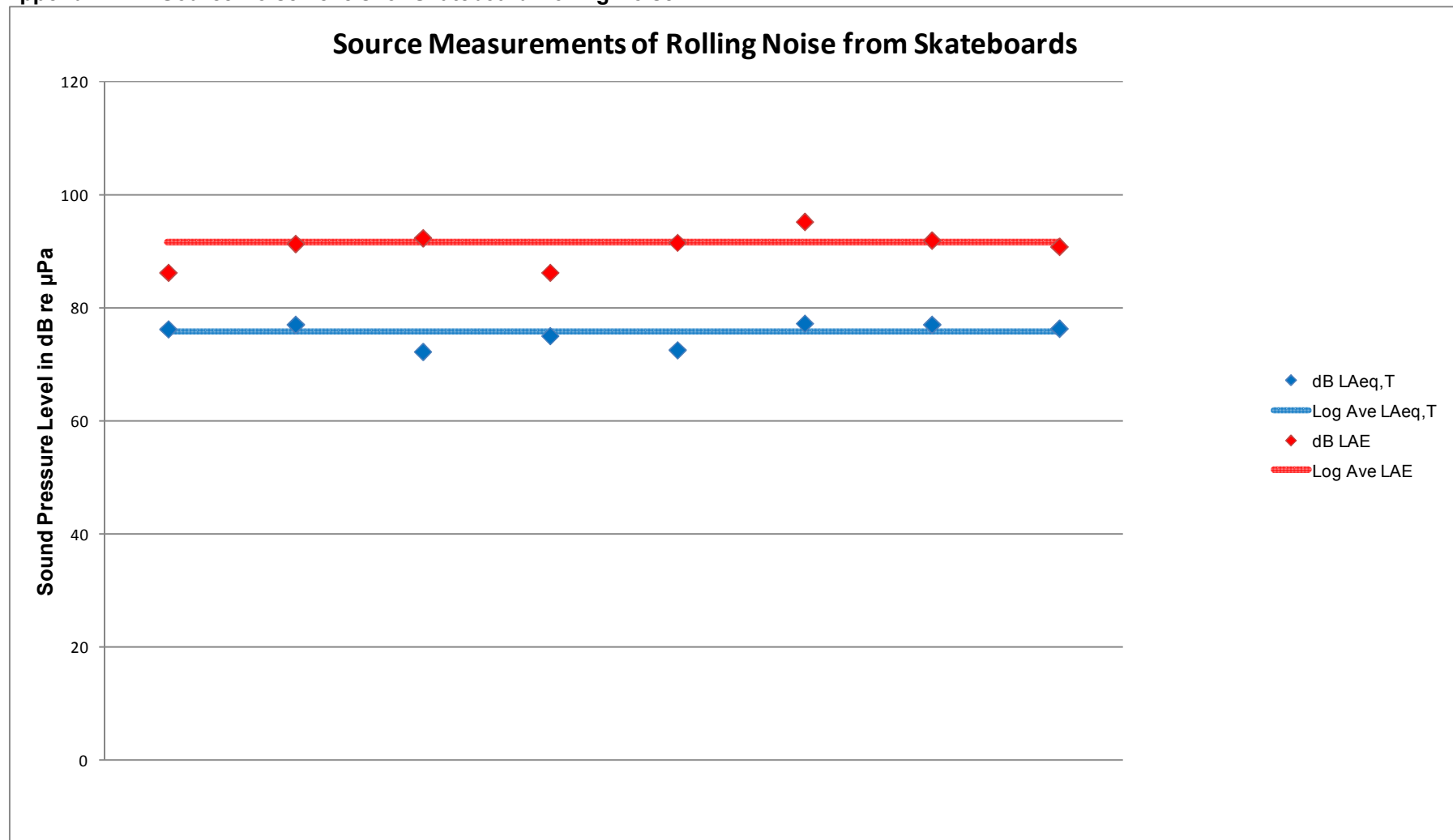
The time periods (T) for different measurements are given in the appendices.

Noise Levels Measured of Skateboarding Activities

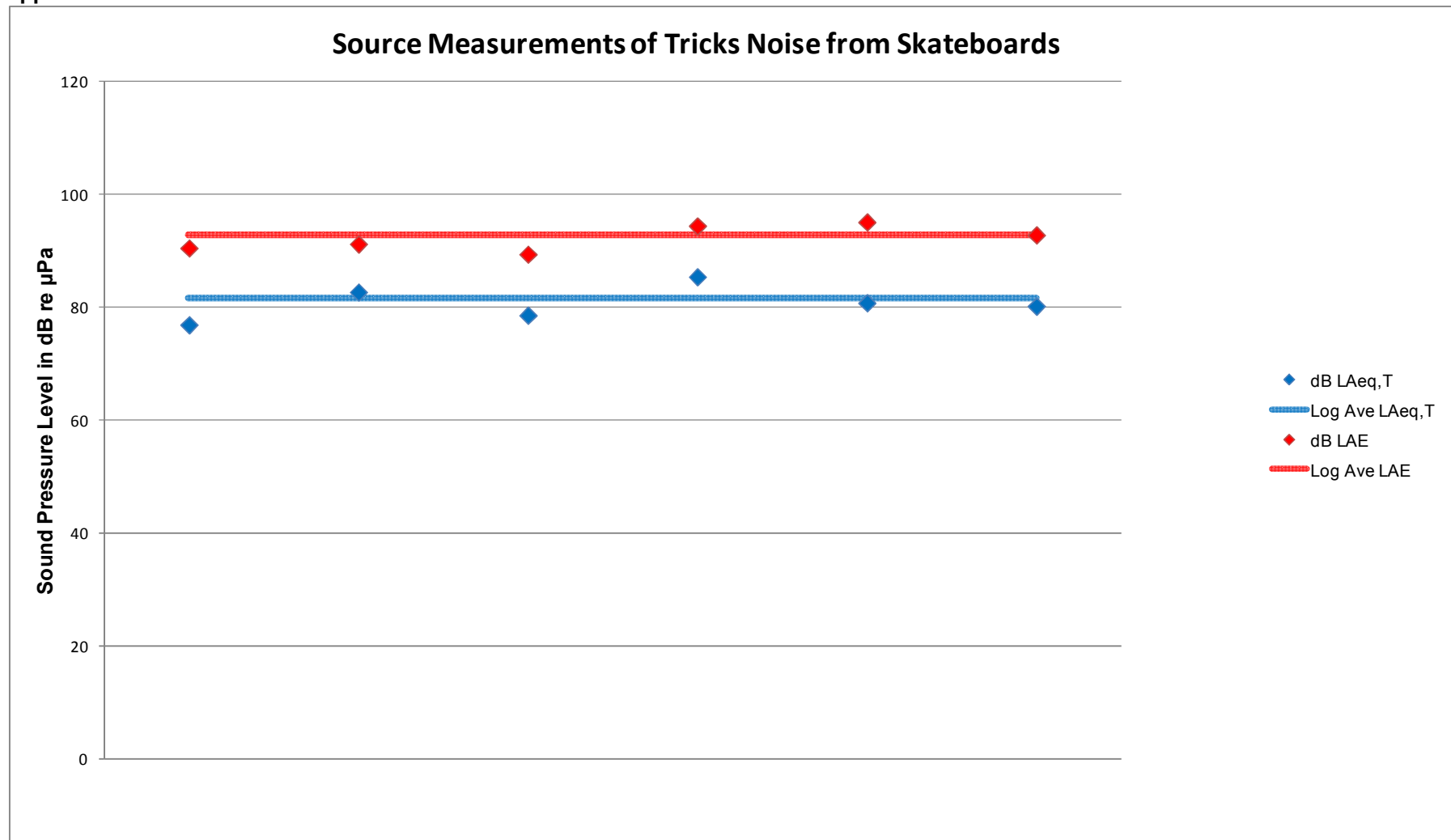


3.2.4 The above logarithmic averages are based on the following measurement data of noise from skateboarding activities.

Appendix C.1: Source Noise Levels for Skateboard Rolling Noise



Appendix C.2: Source Noise Levels for Skateboard Tricks Noise



Results for Measurements of Skateboard Noise Made at Facilities in Coventry

Action Type	Location	Time	Duration	Distance	dB $L_{Aeq,T}$	dB L_{AE} (SEL)	Notes
Rolling	War Memorial Park	15:23:27	00:00:10	2	76	86	Skateboarder rolling back and forth - twice past the microphone
Rolling	War Memorial Park	15:27:02	00:00:27	2	77	91	Skateboard rolling past then jump on to grind box
Rolling	War Memorial Park	15:49:09	00:01:42	2	72	92	Skateboarder rolling back and forth past the microphone
Rolling	War Memorial Park	15:51:35	00:00:13	2	75	86	Skateboarder rolling past with trick jump then roll past again
Rolling	War Memorial Park	16:04:25	00:01:20	2	73	92	Skateboarder rolling past back and forth past the microphone
Rolling	Holbrooks Park	17:17:32	00:01:03	2	77	95	Rolling past in front of the microphone - board on to the coping each time
Rolling	Holbrooks Park	17:20:36	00:00:31	2	77	92	Back and forth with jumps on the edges
Rolling	Holbrooks Park	17:31:45	00:00:28	2	76	91	Back and forth in the 6 ft bowl with contact between board and coping of the bowl edge
Tricks	War Memorial Park	15:27:02	00:00:23	2	77	91	Skateboard on to grind box and then jump on to floor at approx 1 m
Tricks	Holbrooks Park	17:26:58	00:00:07	2	83	91	Small run up with 'Pop Shove-It' trick
Tricks	Holbrooks Park	17:27:42	00:00:12	2	79	89	Small run up with 'Pop Shove-It' trick with photograph
Tricks	Holbrooks Park	17:29:28	00:00:08	2	85	94	Small run up with '180 trick'
Tricks	Holbrooks Park	17:33:08	00:00:27	2	81	95	'360 flip' and 'Big Spin'
Tricks	Holbrooks Park	17:34:34	00:00:18	2	80	93	'360 tail flip' plus a 'Big Spin' on the way back

