

Gunnersbury Park Sports Fields

# Planning Noise Assessment

Report 15/0511/R01

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London Borough of Ealing

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Issue	Description	Date	Prepared by	Checked by
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## Attachments

### **15/0511/R1/SP1**

Site Plan showing assessment positions and proposed sports field layout

### **15/0511/R1/TH1-3**

Time History of Measurement Results

### **15/0511/R1/SCH1**

Schedule of proposed playing fields usage

### **15/0511/R1/SCH2**

Results Schedule

### **15/0511/R1/F1**

Contours based on AGPs, Cricket Pitches, Tennis Courts, and MUGA in use simultaneously

## **Glossary of Acoustic Terms**



## 1 Introduction

- 1.1 It is proposed to redevelop the sports fields at Gunnersbury Park, with provision of a sports centre and a number of playing fields.
- 1.2 *Cole Jarman* have undertaken an environmental noise survey to establish the existing noise climate at the site. An assessment has been undertaken of the potential noise impacts due to the use of the pitches.
- 1.3 This report sets out the details of the environmental noise survey and the results of the noise impact assessment on the proposed fields.

## 2 Site Description

### 2.1 Current Site Layout

- 2.1.1 Gunnersbury Park is located in the west of the London Borough of Hounslow. It is a large green space which currently holds a number of casual playing fields along its western and north eastern sections. A number of unmarked football pitches are situated along the northern section while a marked rugby pitch and six marked football pitches including goal posts are located along the western section. To the east is a miniature golf course, with bowling greens in the centre. To the south east is an existing cricket green.
- 2.1.2 Capel Manor College is located to the north east while Gunnersbury Park Museum is located to the east of the park. The park is bounded to the north by Popes Lane, with residences on this road having gardens which back onto the park. To the east the park is bounded by Lionel Road North. The northern half of this road has residences with gardens backing onto the park.
- 2.1.3 To the south of the park is a Fish Pond and wooded area beyond which is the M4 motorway, with a small number of industrial and commercial buildings to the north of the motorway. To the east is North Circular Road, beyond which are further residential areas.
- 2.1.4 The closest and most exposed noise sensitive receptors are dwellings on Popes Lane and Lionel Road North which back on to the park.
- 2.1.5 The noise climate at the site is contributed to by noise from the Heathrow flight path, road traffic on local roads including Popes Lane, Lionel Road North, North Circular road and the M4 motorway. There was training taking place in the north eastern area of the park between 18:00 and 20:00 during the site visit.

### 2.2 Site Proposals

- 2.2.1 It is proposed to update the site layout to provide a number of designated football pitches, a rugby pitch, MUGA, artificial grass pitch, tennis courts, and cricket greens. The proposed



layout is shown in the attached 15/0511/R1/SP1. A typical activity schedule for the use of the playing fields has been provided as set out in the attached 15/0511/R1/SCH1. This schedule has been used as part of the noise assessment.

### 3 Assessment Basis

#### 3.1 Change in Ambient Noise

3.1.1 In order to quantitatively evaluate the potential effects of noise from the proposed pitches, it is appropriate to undertake a comparative assessment. This is done by comparing  $L_{Aeq}$  ambient noise levels during pitch use with  $L_{Aeq}$  ambient noise levels in the absence of pitch use. This methodology is widely used in the acoustics industry and an example basis can be found in the Guidelines for Noise Impact Assessment (Consultation Draft) produced by the Institute of Environmental Management and Assessment and the Institute of Acoustics in 2002. The following effect descriptors are used:

Change in Noise Level (dB $L_{Aeq}$ )	Impact Description
0.0	None
0.1 to 2.9	Minor
3.0 to 4.9	Moderate
5.0 to 9.9	Substantial
10.0 and more	Major

T1 Noise Impact Descriptors

3.1.2 The presentation of changes in sound level to one decimal place in the table is not a reflection of the accuracy of any assessment undertaken but rather serves to provide a clear threshold between adjacent impact descriptions.

3.1.3 Once a noise level change has been identified an examination must also be made of other factors, which may not be adequately taken into consideration by assessing noise level changes alone. These factors include:

- the averaging time period used
- the time of day
- the frequency of event occurrence
- the nature and spectral characteristics of the noise source being examined
- the subjective character of the noise being examined and of the general noise climate.

3.1.4 Taking these factors into account may or may not have an effect on the impact classification derived solely from the change in noise level.



- 3.1.5 In this case it must be remembered that sports pitches have been present at the location of the proposed pitches for a number of years. The character of the area therefore inherently includes sports pitch noise. For this reason, less weight should be given to a comparison of noise levels during permitted sports pitch use with those in the absence of pitch use than might otherwise be given (for example when assessing a planning application for new sports facilities where none previously existed).
- 3.1.6 So, for example, a purely numerical evaluation of a 7 dB change in noise level might yield an impact description of *Substantial*. However once other factors are taken into account, for example including the presence of sports facilities at the location for a number of years, the overall impact description might be *Slight*.
- 3.1.7 This approach applies, however, only to the elements which are comparable to those in use previously. This includes, for example, the use of football and rugby pitches on an intermittent basis on weekdays and for weekend leagues. The introduction of Artificial Grass Pitches, tennis courts, and a MUGA facility are considered new noise sources and therefore should be assessed appropriately.
- 3.1.8 Therefore there are two assessment scenarios required for the proposed playing fields. The scenarios are set out in the following table, with Scenario A being the most significant assessment and representative of the actual impact from the proposals due to this including only the newly introduced noise sources.
- 3.1.9 Scenario B includes the football and rugby pitches which are an upgrade of the existing uses and so this scenario represents the likely noise levels during full use of the fields but is less representative of the actual impact, as it includes existing noise sources.

Assessed Noise Sources	Scenario A	Scenario B
	Tennis Courts (x8)	Tennis Courts (x8)
	Cricket Pitches (x3)	Cricket Pitches (x4)
	Artificial Grass Pitches (x2)	Artificial Grass Pitches (x2)
	MUGA	MUGA
		Small Football Pitches (x5)
		Medium Football Pitch
		Large Football Pitches (x5)
		Rugby Pitch (x5)

T2 Assessed Scenarios

- 3.1.10 It is proposed that under Scenario A the change in noise level from existing without any activities ongoing to maximum use should be limited to no greater than an increase of 5 dB, deemed equivalent to a Moderate Impact. Under Scenario B, which combines Scenario A with the existing usage, the change in noise level will be examined to ensure the increase is not too



great. However Scenario A is considered the critical assessment, this being a newly introduced noise source.

### 3.2 Change in Impulsive Noise

- 3.2.1 Where impulsive noise is concerned,  $L_{Amax}$  noise levels due to the activity under examination can be compared with those prevailing in the absence of that activity. If the two are comparable the impact is likely to be negligible.
- 3.2.2 If the  $L_{Amax}$  noise levels due to the activity being examined are frequently higher than those in its absence by a significant margin (e.g. 5 dB or more), then the impact may be considered Slight, Moderate or Substantial (depending on the degree of exceedance, the frequency of occurrence and the nature of the noise source).
- 3.2.3 The frequency of occurrence of events giving rise to elevated  $L_{Amax}$  noise levels must be taken into account. For example, an event taking place only once over an entire evening period may have little impact even if the  $L_{Amax}$  generated exceeded the underlying  $L_{Amax}$  noise levels by a very substantial margin (30 dB for example).
- 3.2.4 At the other extreme (and setting aside for the moment other factors such as the presence of sports facilities at the location currently) events taking place several times a minute throughout the evening period might have a significant impact even if the resulting  $L_{Amax}$  noise levels exceeded the underlying  $L_{Amax}$  noise levels by 5 dB for example.

### 3.3 Inappropriate Assessment Methodologies

- 3.3.1 For the avoidance of doubt we set out below assessment methodologies which are **not** appropriate in this case.

BS 4142

- 3.3.2 The British Standard BS 4142 : 2014 is entitled *Method for rating industrial noise affecting mixed residential and industrial areas*. In the Foreword it states:

*"This British Standard describes a method of determining the level of a noise of an industrial nature"*

- 3.3.3 In the Scope section of the standard the statement is made that it describes methods for sound of an industrial and/or commercial nature, which includes:

- "a) sound from industrial and manufacturing processes;*
- b) sound from fixed installations which comprise mechanical and electrical plant and equipment;*
- c) sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and*
- d) sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift*





*trucks, or that from train or ship movements on or around an industrial and/or commercial site."*

- 3.3.4 It can be seen from the above that the standard relates specifically to noise from sources of an industrial nature. There is absolutely no reasonable basis for applying the principles of the standard to noise sources which are not of an industrial nature, such as sports pitches. Doing so would be likely to lead to an incorrect assessment of the likelihood of complaint.
- 3.3.5 It is therefore incorrect and inappropriate to make use of BS 4142 when assessing noise from sports pitches. Instead of BS 4142, an alternative method of assessment such as that set out in section 3.1 above should be used.

#### Sleep Disturbance

- 3.3.6 Guidance on noise and sleep disturbance is available from the World Health Organisation in the form of the *Guidelines for Community Noise* published in 2000. Those guidelines indicate certain noise level thresholds where sleep disturbance effects become measurable. They apply during the night period when people can be expected to be sleeping. The guidelines define the night period as 23:00-07:00h.
- 3.3.7 There is normally no reasonable basis for using the night time sleep disturbance thresholds as criteria against which to assess noise that occurs during the day only (i.e. only during the period 07:00-23:00h).
- 3.3.8 In this case, the noise in question ceases at 22:00h in the worst case and it is therefore wholly inappropriate to use night time sleep disturbance thresholds as assessment criteria. Doing so would result in an incorrect assessment of the likely effects of the noise. Instead of using night time sleep disturbance thresholds, an alternative method of assessing impulsive noise levels such as that set out in section 3.2 above should be used.

## 4 Environmental Noise Survey

### 4.1 Methodology

- 4.1.1 In order to quantify the existing noise climate at the site a noise survey was conducted. Attended monitors were set up at three locations on the proposed site from 1400h on until 2030h on 10<sup>th</sup> September 2015.

MP1 Free field measurement position located 1.5m above local ground level approximately 5m from fence line at the rear of dwellings facing Lionel Road North

MP2 Free field measurement position located 1.5m above local ground level beside the entrance car park

MP3 Free field measurement position located 1.5m above local ground level approximately 5m from fence line at the rear of dwellings facing popes Lane



## 4.2 Measurements

- 4.2.1 All measurements were made in terms of  $L_{Aeq}$ ,  $L_{Amax}$ ,  $L_{A10}$  and  $L_{A90}$  over continuous 15-minute intervals (see attached Glossary of Acoustic Terms for an explanation of noise units used). 1-minute profile data was also recorded for analysis of  $L_{Amax}$  events.
- 4.2.2 Noise measurements were made using the equipment detailed in the following table T3.

Item	Manufacturer	Type
Sound Level Analyser (x3)	Rion	NL-52
Acoustic Calibrator (x3)	Rion	NC-74
Weatherproof windshield (x3)	Rion	WS-15

T3 Equipment used during attended noise survey.

- 4.2.3 The sound level analysers were fitted with windshields and were calibrated before and after the measurements, to ensure that an acceptable level of accuracy was maintained throughout.
- 4.2.4 The weather throughout the survey was mild and calm with no rain and only light winds.

## 4.3 Monitoring Results and Analysis

- 4.3.1 The noise measurement results for this survey are presented in the attached time histories 15/0511/R1/TH1-3.
- 4.3.2 The main noise sources controlling the climate were traffic on surrounding roads and aircraft flyovers from Heathrow airport. Some activities in the park contributed intermittently. There was a slight increase in noise levels due to rush hour local road traffic on Lionel Road North and Popes Lane between approximately 16:00 and 18:30.
- 4.3.3 Outside of these times the noise levels were reasonably consistent, being controlled by road traffic on the M4 to the south and by regular aircraft flyovers. The attended measurements were stopped at 20:00 for MP1 and MP2 and at 20:30 for MP3 due to closure of the park for the night. At this stage the noise climate was dominated by these sources. It is therefore considered appropriate to identify the baseline noise climate until 22:00 as being equivalent to the lowest hourly levels measured at each measurement position for the purposes of the assessment.
- 4.3.4 The hourly baseline ambient noise levels established from the above analysis are set out in the first column of the attached assessment results schedule 15/0511/R1/SCH2.
- 4.3.5 The lowest  $L_{A90,15min}$  level measured during the survey at MP1 was 47 dB and at MP2 and MP3 was 46 dB.



## 5 Plant Noise

- 5.1 Should mechanical services plant items be installed to the sports centre the plant noise limits should be set in accordance with standard Hounslow planning condition which is typically set as follows:

*“The rating level of noise emitted from fixed plant on the site, shall be lower than the existing background noise level by 10dB. The noise levels shall be determined at the nearest noise sensitive locations. The measurements shall be made according to BS4142”*

- 5.2 Therefore noise from mechanical services plant items associated with the extension works should be 10 dB below the existing background level at the nearest noise sensitive locations.
- 5.3 On this basis, the following plant noise limits apply as set out in table T4. The plant noise limits apply at 1m from the nearest residential window. In accordance with BS4142, any plant item exhibiting tonal or other characteristic elements would be subject to an additional penalty.

Location	Noise Emission Limit, dB	
	Daytime (0700-2200 only)	Night time (24-hour)
Dwellings on Lionel Road North	37	N/A
Dwellings on Popes Lane	36	N/A

T4 Plant noise emission limits at the nearest residential properties.

- 5.4 These plant noise limits would apply to any and all noise generating mechanical services plant items installed as part of the development.
- 5.5 It should be noted that, due to the timescale of the survey, the plant noise limits are deemed suitable to apply until 22:00 only. Should any plant items run over night it may be necessary to undertake further measurements.



## 6 Noise Impact Assessment

### 6.1 Computer Modelling

- 6.1.1 An acoustic model has been created using a computer based noise prediction program (Wölfel IMMI version 2014). This has been used to determine the free field noise levels, at the assessment positions, generated by the playing fields activities. Sound propagation is calculated taking account of factors such as divergence, and ground absorption. Moderate downwind conditions are assumed, which represents a reasonable worst case because it means that in the model there is effectively a light wind from source to receiver *in every case*. Clearly this is not possible in reality.
- 6.1.2 It should be noted that the assessment has been conducted at the assessment positions under free field conditions, for direct comparison with the measured and derived free field noise levels.
- 6.1.3 A number of assessment positions have been positioned in the model regularly spaced along the rear facades of the dwellings on Popes Lane and Lionel Road North at a level of 1.5m above local ground level. A total of 9 assessment positions are located at dwellings along Lionel Road North while 10 are located at dwellings along Popes Lane.
- 6.1.4 The model has been based upon electronic drawings showing the area around the site, as well as the proposed site layout. The landform in the computer model has been based upon elevation information from the topographical survey map covering the site. It therefore takes into account the variation in topography across the site but not very localised variations.
- 6.1.5 The garden fencing to the rear of the dwellings on Popes Lane and Lionel Road North is not included in the model as it is not possible to establish the exact performance of this at each dwelling. However a minor amount of screening from the sports fields to garden areas is expected to be achieved given the existing fence heights being approximately 1.5 to 2m in height. Therefore, when considering garden noise levels and noise levels at ground floor windows the resultant calculated noise levels are pessimistic.
- 6.1.6 The noise sources have been defined based upon archive measurement data, as set out in the following. Where specific noise source data was not available, in this case for cricket and tennis courts, it was pessimistically assumed that the source levels would be similar to that of an open sports football pitch.



Noise Source	Measurement Information		Source Levels, dB	
	Distance	Time	$L_{Aeq}$	$L_{Amax}$
Five-a-Side Football on a MUGA	1m from edge	15min	65.5	84.6
Open Sports Pitch (Football or Rugby)	50m from edge	15min	54.7	62.7
Artificial Grass Pitch (AGP)	10m from edge	10min	67.8	76.6

T5 Source levels used for assessment

6.1.7 To give a pessimistic representation, it was assumed that the short interval measured levels would continue throughout each hour during the relevant activities. The noise levels for the MUGA and AGP were applied as given while the open sports pitch, which was measured on a pitch a similar size to the proposed rugby pitch, was applied to each of the open rugby and football pitches and corrected on the basis of an area source.

## 6.2 Initial Layout Proposals

6.2.1 Initial calculations were undertaken on an alternative layout, showing the AGPs located to the north of the site. The noise levels as a result of this were considered to exceed suitable limits, therefore a rearrangement of the playing fields layout was undertaken in order to achieve suitable noise levels.

## 6.3 Updated Model Results

6.3.1 The modelling was repeated on a new layout, with the artificial grass pitches being moved to a more central location in order to suitably reduce the noise impact upon the neighbouring residences. The new layout is represented in the attached 15/0511/R1/SP1.

6.3.2 The results of this modelling are set out in the attached 15/0511/R1/SCH2. This schedule sets out the predicted hourly levels due to the playing fields in use in combination with the existing baseline ambient noise levels based on the measured noise levels and the proposed playing schedule as set out in 15/0511/R1/SCH1.

6.3.3 The results are based separated into noise levels calculated to dwellings along Lionel Road North and along Popes Lane. The typical noise levels are given for each road, based on the arithmetic mean of noise levels calculated along each road. The maximum  $L_{Aeq,1hr}$  level for each road is also provided, this is the highest noise level calculated in each hour along Popes Lane and Lionel Road North respectively.

6.3.4 The weekday scenario is representative of Scenario A, i.e. the newly introduced noise sources, as the football and rugby pitches are not propose to be regularly in use. The weekend scenario is representative of Scenario B with variation in accordance with the timetabling set out in schedule 15/0511/R1/SCH1.



- 6.3.5 It can be seen that during weekdays a level difference of 0 to 5dB with and without the proposed usage in place. Over the majority of locations and times the difference is no greater than 0 to 3 dB, with only one assessment location showing a level difference of 5 dB between the hours of 19:00 and 20:00.
- 6.3.6 At the weekend a similar impact is experienced due to the usage of the newly introduced AGP, tennis courts, MUGA, and cricket pitches. During the usage of football pitches and the rugby pitch the noise levels are higher, in particular at dwellings along Lionel Road North. This football and rugby pitch use is already in place therefore the weighting of these is significantly lower than the proposed new playing fields.
- 6.3.7 To give a picture of the propagation of the calculated noise emissions from the Scenario A playing fields, i.e. the newly introduced noise sources, noise contours have been produced as shown in the attached 15/0511/R1/F1. It can be seen that under the usage of the AGP pitch, Tennis courts, MUGA, and Cricket pitches – the noise level at the surrounding dwellings due to these sources alone lies in the 50-55 dB  $L_{Aeq,1h}$ . This reflects the point calculations which indicate that the noise level is not exceeded by 5 dB at any time during the week, commensurate with a Moderate impact.
- 6.3.8 When the football and rugby pitches are included, the noise level rises above this. However these noise sources are already in place at the weekends and therefore the impact is weighted differently. It can be seen that at the weekend a maximum level difference between the existing baseline without any activities, and the worst case scenario is 7 dB. This is considered to be an impact of Minor to Moderate significance given the noise sources in question.

6.4 Short event noise levels

6.4.1 The following table sets out the worst case predicted short event noise levels and also details the measured range of  $L_{Amax}$  level over the assessment period.

Location	Measured $L_{Amax}$ levels		Highest Calculated $L_{Amax}$	
	Range	Average	Scenario A	Scenario B
Lionel Road North	63.5 – 87.4	69.9	57.2	66.1
Popes Lane	60.9 – 89.5	71.4	60.2	60.2

T6 Measured and assessed  $L_{Amax}$  levels at the nearest residences on each road

6.4.2 As can be seen, the predicted worst  $L_{Amax}$  levels at the nearest residences during use of the playing fields lie within the existing range, and in all cases are below the average  $L_{Amax}$  level measure. Therefore, even should the  $L_{Amax}$  levels predicted under both scenarios be regularly occurring they would fall within the low to middle end of the existing range and so would be considered to have a Minor impact.



## 6.5 Impact Noise Control

- 6.5.1 The critical noise source in this development is the artificial grass pitches. This has been moved to the centre of the park to ensure that suitable noise levels are achieved at the neighbouring residences. In order to further control noise levels it is recommended that the sports field fencing comprises a low noise system. Double wire fencing with resilient mountings can substantially reduce the impact noise from balls hitting the fence. One such product is *Zaun Duo Sports*, however other such products are likely to be available.
- 6.5.2 This fencing should be used for all sports area fencing. It is expected that this will comprise the AGPs, the tennis courts, and the MUGA.

## 7 Conclusions

- 7.1 An assessment has been made of the expected noise impacts due to the proposals for playing fields as part of the Sports Centre development at Gunnersbury Park. The assessment has taken into account the full proposed usage of the pitches on both weekdays and weekends.
- 7.2 The assessment has divided the usage into newly introduced noise sources, these being the MUGA, Tennis Courts, Artificial Grass Pitch, and 3 Cricket Greens, and noise sources which are already existing, these being the open football pitches and rugby pitch in use at weekends.
- 7.3 It has been established that the noise impact on residences backing onto the park will be Moderate in the worst case due to the newly introduced noise sources and Minor to Moderate in the worst case due to the sources which are already existing under the current park usage.
- 7.4 It has been shown that  $L_{Amax}$  levels will be within the existing range of  $L_{Amax}$  levels and equivalent to the existing average  $L_{Amax}$  level. Advice is also provided on limiting noise from impacts on the fence surrounding the AGP, Tennis Courts, and MUGA pitches.
- 7.5 Plant Noise limits have also been set for any plant items which are running as part of the sports centre development.

■ End of Section





Title: Site Plan showing assessment positions and proposed layout

Project: Gunnersbury Park Sports Fields

Date: October 2015

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Scale: Not to scale

Figure 15/0511/R1/SP1

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Figure 15/0511/R1/TH01

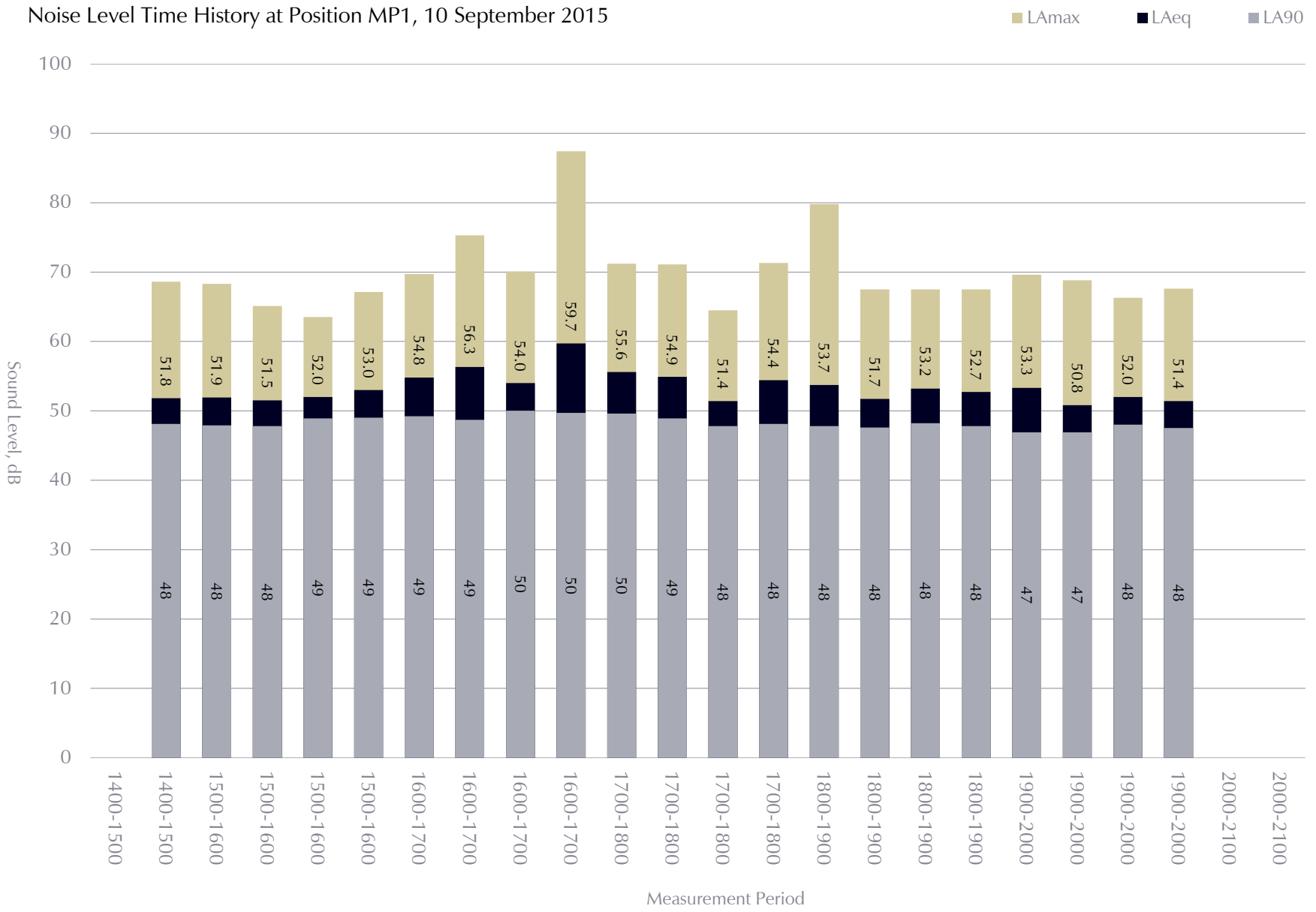




Figure 15/0511/R1/TH02

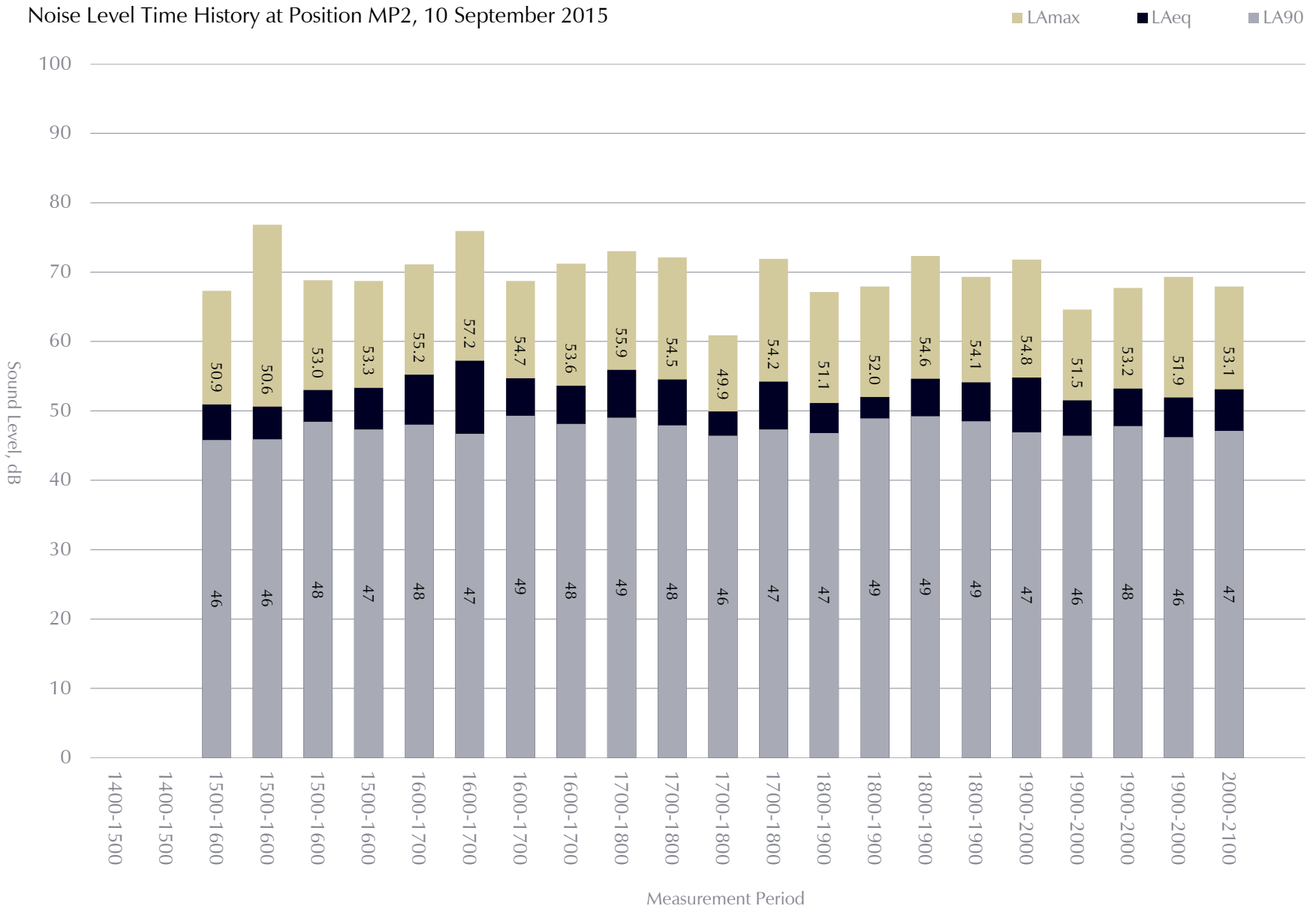
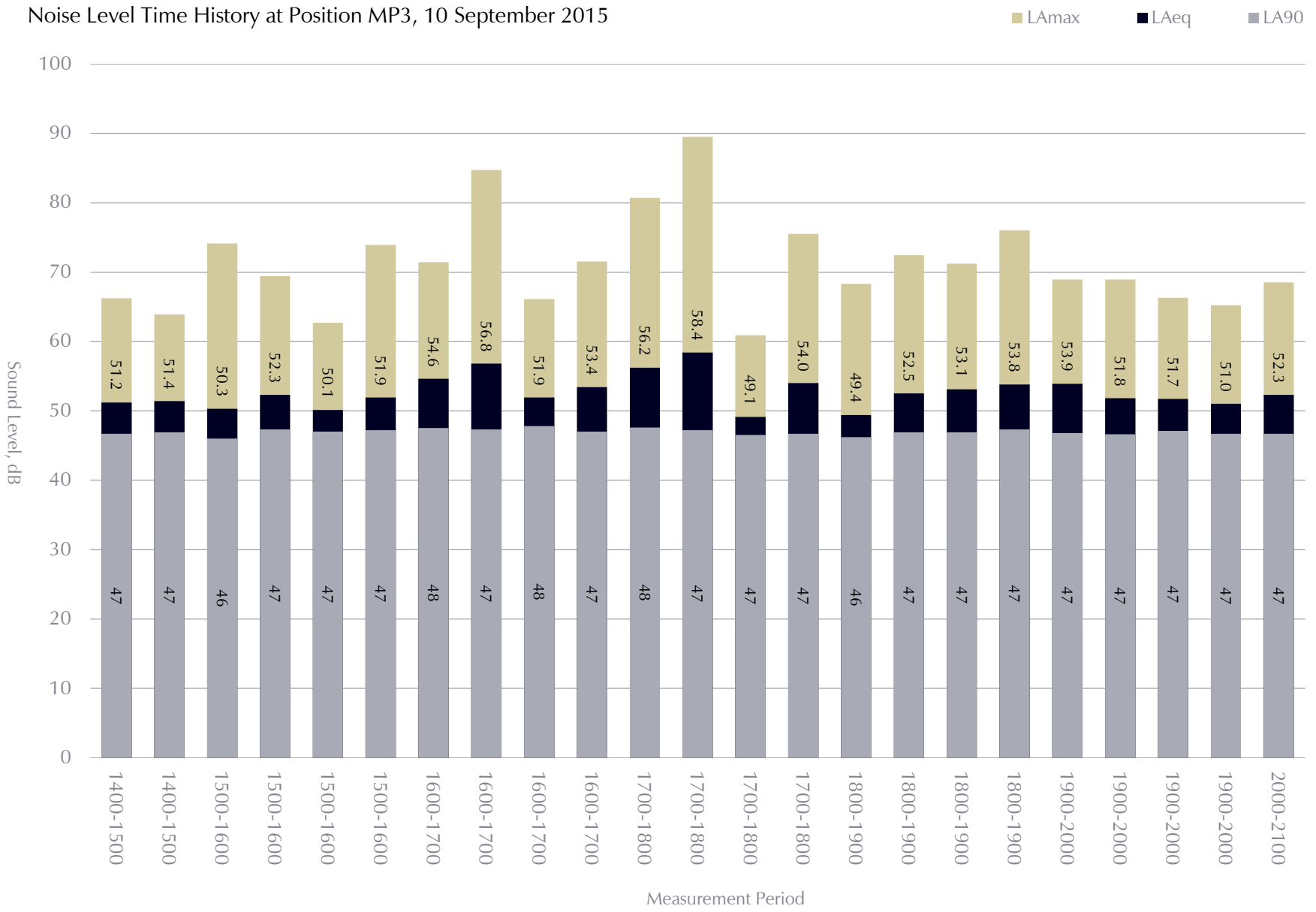




Figure 15/0511/R1/TH03





Proposed Activity Schedule



<b>Pitch Type</b>	<b>Summer (May to August incl.)</b>	<b>Winter (Sept to April incl.)</b>	<b>Comments</b>
Football Small Grass x 5 pitches	<i>Not in Use</i>	Sat 1.30 – 3.30pm & Sun 10.30 – 12.30pm	Adult grass pitch usage will only be Saturday afternoon and Sunday morning time slots (Winter Only)
Football (U15/U16) Large Grass x 5 pitches	<i>Not in Use</i>	Sun 1 – 3pm	Youth football grass pitch usage will be Sunday afternoon time slot (Winter Only)
Football (U11/U12) Medium Grass x 1	<i>Not in Use</i>	Sun 11am – 1pm	Youth football grass pitch usage will only be Sunday morning/ afternoon time slot (Winter Only)
Rugby Large Grass x 1	<i>Not in Use</i>	Sat 1.30 – 3.30pm	Grass rugby pitch usage will only be Saturday afternoon time slot
Cricket Grass Wickets x 3	6 – 8 Jnr &/or adult matches Sat & Sun 12:00 – 18:00 6 hour hire	<i>Not in Use</i>	Cricket pitch usage will be one match per pitch Saturday and Sunday
Tennis (8 courts)	Mon – Fri 09:00 – 22:00 Sat & Sun 9am – 6pm 1 hour hire	Mon – Fri 09:00 – 22:00 Sat & Sun 9am – 6pm 1 hour hire	Mon – Fri: 9am – 4pm limited use 4 – 7pm junior activity 7 – 10pm adult activity Sat & Sun: Mixed activity all day



## Schedule

15/0511/R1/SCH1

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<b>Pitch Type</b>	<b>Summer (May to August incl.)</b>	<b>Winter (Sept to April incl.)</b>	<b>Comments</b>
Artificial Grass Pitch 2 x Pitches	Mon – Fri 09:00 – 22:00 1 or 2 hour hire Sat & Sun 9am – 6pm	Mon – Fri 09:00 – 22:00 1 or 2 hour hire Sat & Sun 9am – 6pm	Mon – Fri: 9am – 4pm very limited 4 – 8pm junior activity 8 – 10pm adult activity Sat: 9 – 12 junior activity 12 – 5 adult matches x 2 on each pitch Sun: 10 – 1 Jnr matches 1 – 4 Youth matches
MUGA	1 or 2 hour hire		Usage will be almost solely young people so Mon to Fri daytime/school hrs usage will be negligible, summer early evening usage will be highest, winter evenings zero due to no floodlights

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## Calculation Model Results

**Typical<sup>i</sup> Levels along Lionel Road North dwellings rear facades**

<b>Period</b>	<b>Existing Level (<math>L_{Aeq,1hr}</math>)<sup>ii</sup></b>	<b>Calculated Level (<math>L_{Aeq,1hr}</math>)<sup>iii</sup></b>	<b>Level Difference<sup>iv</sup> (dB)</b>
0900-1000	52	55	3
1000-1100	52	55	3
1100-1200	52	55	3
1200-1300	52	55	3
1300-1400	52	55	3
1400-1500	52	55	3
1500-1600	52	55	3
1600-1700	55	57	2
1700-1800	54	56	2
1800-1900	53	56	3
1900-2000	52	55	3
2000-2100	52	55	3
2100-2200	52	55	3

T1 Typical weekday calculated Levels and Impact along nearest facades

<b>Period</b>	<b>Existing Level (<math>L_{Aeq,1hr}</math>)<sup>ii</sup></b>	<b>Calculated Level (<math>L_{Aeq,1hr}</math>)<sup>iii</sup></b>	<b>Level Difference (dB)<sup>iv</sup></b>
0900-1000	52	55	3
1000-1100	52	55	3
1100-1200	52	55	3
1200-1300	52	56	4
1300-1400	52	57	5
1400-1500	52	57	5
1500-1600	52	56	4
1600-1700	55	57	2
1700-1800	54	56	2
1800-1900	53	54	1
1900-2000	52	52	0
2000-2100	52	52	0
2100-2200	52	52	0

T2 Typical weekend calculated Levels and Impact along nearest facades

**Typical<sup>i</sup> Levels along Popes Lane dwellings rear facades**

<b>Period</b>	<b>Existing Level (<math>L_{Aeq,1hr}</math>)<sup>ii</sup></b>	<b>Calculated Level (<math>L_{Aeq,1hr}</math>)<sup>iii</sup></b>	<b>Level Difference (dB)<sup>iv</sup></b>
0900-1000	51	53	2
1000-1100	51	53	2
1100-1200	51	53	2
1200-1300	51	53	2
1300-1400	51	53	2
1400-1500	51	53	2
1500-1600	51	53	2
1600-1700	55	56	1
1700-1800	56	57	1
1800-1900	53	55	2
1900-2000	52	55	3
2000-2100	52	54	2
2100-2200	51	53	2

T3 Typical weekday calculated Levels and Impact along nearest facades

<b>Period</b>	<b>Existing Level (<math>L_{Aeq,1hr}</math>)<sup>ii</sup></b>	<b>Calculated Level (<math>L_{Aeq,1hr}</math>)<sup>iii</sup></b>	<b>Level Difference (dB)<sup>iv</sup></b>
0900-1000	51	53	2
1000-1100	51	53	2
1100-1200	51	53	2
1200-1300	51	54	3
1300-1400	51	55	4
1400-1500	51	55	4
1500-1600	51	54	3
1600-1700	55	57	2
1700-1800	56	57	1
1800-1900	53	54	1
1900-2000	52	52	0
2000-2100	52	52	0
2100-2200	51	51	0

T4 Typical weekend calculated Levels and Impact along nearest facades

**Worst Case<sup>v</sup> Levels along Lionel Road North dwellings rear facades**

<b>Period</b>	<b>Existing Level (<math>L_{Aeq,1hr}</math>)<sup>ii</sup></b>	<b>Calculated Level (<math>L_{Aeq,1hr}</math>)<sup>iii</sup></b>	<b>Level Difference (dB)<sup>iv</sup></b>
0900-1000	52	56	4
1000-1100	52	56	4
1100-1200	52	56	4
1200-1300	52	56	4
1300-1400	52	56	4
1400-1500	52	56	4
1500-1600	52	56	4
1600-1700	55	57	2
1700-1800	54	57	3
1800-1900	53	57	4
1900-2000	52	57	5
2000-2100	52	56	4
2100-2200	52	56	4

T5 Worst Case weekday calculated Levels and Impact along nearest facades

<b>Period</b>	<b>Existing Level (<math>L_{Aeq,1hr}</math>)<sup>ii</sup></b>	<b>Calculated Level (<math>L_{Aeq,1hr}</math>)<sup>iii</sup></b>	<b>Level Difference (dB)<sup>iv</sup></b>
0900-1000	52	56	4
1000-1100	52	58	6
1100-1200	52	58	6
1200-1300	52	58	6
1300-1400	52	59	7
1400-1500	52	59	7
1500-1600	52	59	7
1600-1700	55	58	3
1700-1800	54	57	3
1800-1900	53	54	1
1900-2000	52	52	0
2000-2100	52	52	0
2100-2200	52	52	0

T6 Worst Case weekend calculated Levels and Impact along nearest facades



**Worst Case Levels along Popes Lane dwellings rear facades**

<b>Period</b>	<b>Existing Level (<math>L_{Aeq,1hr}</math>)<sup>ii</sup></b>	<b>Calculated Level (<math>L_{Aeq,1hr}</math>)<sup>iii</sup></b>	<b>Level Difference (dB)<sup>iv</sup></b>
0900-1000	51	53	2
1000-1100	51	53	2
1100-1200	51	53	2
1200-1300	51	53	2
1300-1400	51	53	2
1400-1500	51	53	2
1500-1600	51	53	2
1600-1700	55	56	1
1700-1800	56	57	1
1800-1900	53	56	3
1900-2000	52	56	4
2000-2100	52	54	2
2100-2200	51	53	2

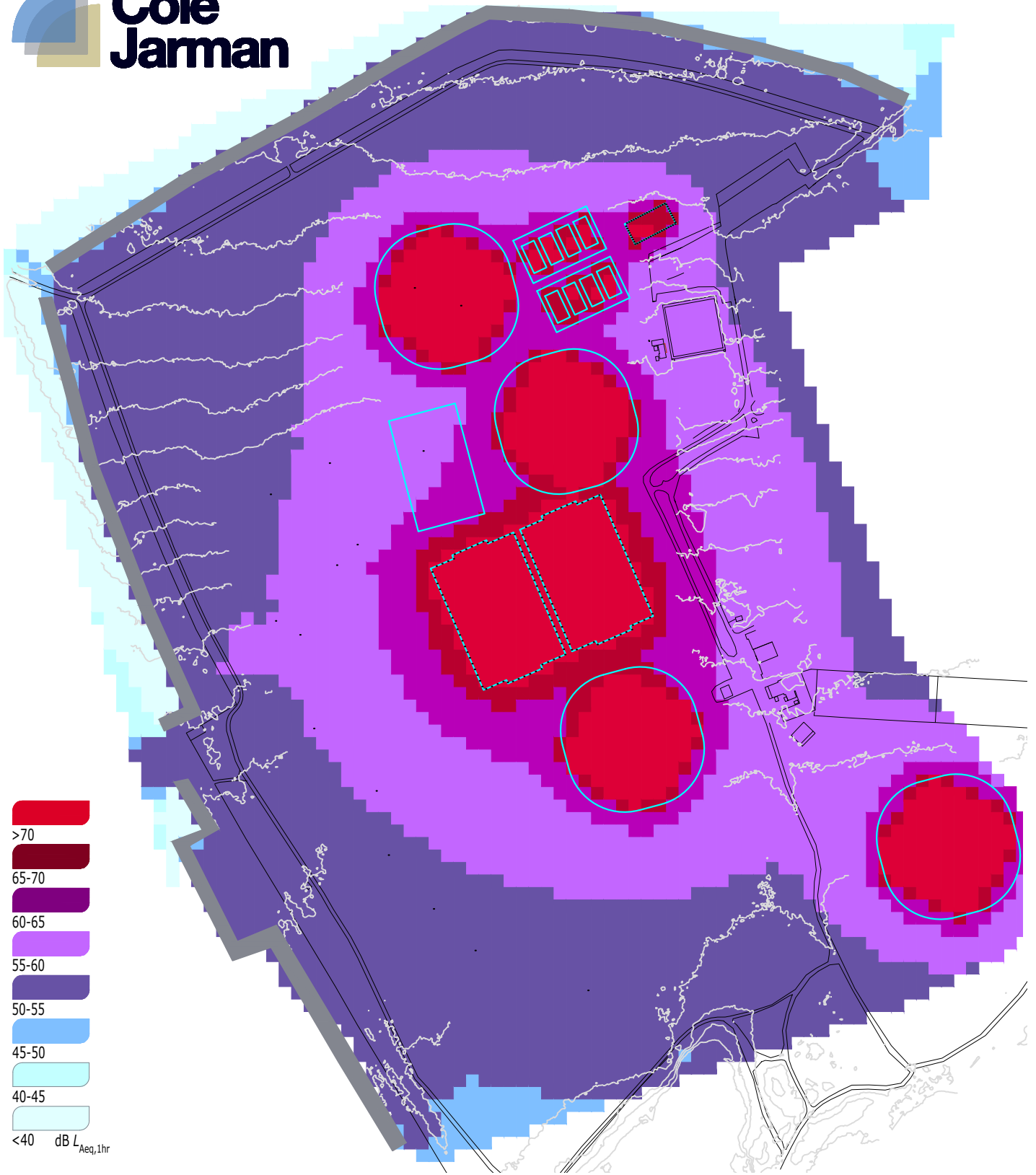
T7 Worst Case weekday calculated Levels and Impact along nearest facades

<b>Period</b>	<b>Existing Level (<math>L_{Aeq,1hr}</math>)<sup>ii</sup></b>	<b>Calculated Level (<math>L_{Aeq,1hr}</math>)<sup>iii</sup></b>	<b>Level Difference (dB)<sup>iv</sup></b>
0900-1000	51	53	2
1000-1100	51	54	3
1100-1200	51	54	3
1200-1300	51	56	5
1300-1400	51	56	5
1400-1500	51	56	5
1500-1600	51	56	5
1600-1700	55	57	2
1700-1800	56	58	2
1800-1900	53	55	2
1900-2000	52	52	0
2000-2100	52	52	0
2100-2200	51	51	0

T8 Worst Case weekend calculated Levels and Impact along nearest facades



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- <sup>i</sup> Typical  $L_{Aeq,1hr}$  level across all facades facing into the park on dwellings along the given road
  - <sup>ii</sup> Existing  $L_{Aeq}$  based on measured hourly  $L_{Aeq}$  during survey  
Morning until 15:00 based on 14:00 – 15:00 measurement  
15:00 to 20:00 (21:00 at Popes Lane) based on attended measurements  
Evening until 22:00 based on lowest measured during survey
  - <sup>iii</sup> Calculated cumulative modelled level and existing baseline level
  - <sup>iv</sup> Noise level difference between cumulative and baseline levels
  - <sup>v</sup> Worst case  $L_{Aeq,1hr}$  level at each assessment point along the rear façade of the dwelling row in question



Title: Noise Contours Based on Scenario A Usage

Figure 15/0511/R1/F1

Project: Gunnensbury Parks Sports Fields

Date: October 2015

Revision: -

Scale: Not to scale

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## Glossary of Acoustic Terms

### $L_{Aeq}$ :

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A)  $L_{eq}$ .

### $L_{Amax}$ :

The maximum A-weighted sound pressure level recorded over the period stated.  $L_{Amax}$  is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the  $L_{Aeq}$  noise level. Unless described otherwise,  $L_{Amax}$  is measured using the “fast” sound level meter response.

### $L_{A10}$ & $L_{A90}$ :

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The  $L_{An}$  indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified.  $L_{A10}$  is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly  $L_{A90}$  gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

$L_{A10}$  is commonly used to describe traffic noise. Values of dB  $L_{An}$  are sometimes written using the alternative expression dB(A)  $L_n$ .

### $L_{AX}$ , $L_{AE}$ or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event.  $L_{AX}$  values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of  $L_{Aeq}$  for the total noise. The  $L_{AX}$  term can sometimes be referred to as Exposure Level ( $L_{AE}$ ) or Single Event Level (SEL).

