

Abacus Belsize Primary School

# Planning Noise Assessment

Report 19/0084/R1

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## Planning Noise Assessment

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## Planning Noise Assessment

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### Attachments

#### **Glossary of Acoustic Terms**

##### **19/0084/F1**

Existing site plan showing noise survey measurement positions

##### **19/0084/F2**

Proposed site plan showing noise survey assessment positions

##### **19/0084/TH01 – 19/0084/TH02**

Unattended noise survey results at Rosslyn Hill positions MP1 and MP2 respectively

##### **19/0084/TH03**

Attended playground noise survey results at Camley Street position MP3

#### **Appendix A**

Planning Considerations and Guidance

 End of Section



## Planning Noise Assessment

### 1 Introduction

- 1.1 Planning permission is sought for the change of use of the former Hampstead Police Station at 26 Rosslyn Hill NW3 1PD from sui generis to Use Class D1, for occupation by Abacus Belsize Primary School.
- 1.2 The existing ambient noise levels in the area have the potential to affect the use of the site as a school.
- 1.3 New noise generated by the school has the potential to impact on existing noise sensitive receptors.
- 1.4 Cole Jarman have been appointed to undertake noise survey and assessment work to consider the potential noise impacts of the development, as set out within this report.

### 2 Site Description

#### Existing site layout

- 2.1 The application site is located at 26 Rosslyn Hill, at the corner of Downshire Hill in Hampstead within the London Borough of Camden. The previous use of the site was as a police station.
- 2.2 The main building at the site faces onto Rosslyn Hill. There is a yard to the rear which appears to have been used previously for car parking with vehicular access from Downshire Hill. Within the northern part of the yard there is an annex building.
- 2.3 The site is overlooked from the North by the rear of residences on Downshire Hill. There are further residences adjacent to the site to the East and Southeast on Hampstead Hill Gardens and Rosslyn Hill respectively.
- 2.4 Adjoining the main building to the Southeast is a former police residence. This property is understood to be within the applicants control, but is outside the school application site boundary.
- 2.5 The existing site layout is shown on the attached figure 19/0084/F1.

#### Proposed site layout

- 2.6 The main building on the site is proposed to be remodelled internally to suit its use as a school. Part of the annex building to the rear of the site is proposed to be demolished, with the remainder to be remodelled internally to suit its use as a school. The external yard is proposed to be used as a school playground.
- 2.7 The proposed site layout is shown on the attached figure 19/0084/F2.



## Planning Noise Assessment

### 3 Planning Noise Guidance

- 3.1 The National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE) and Planning Practice Guidance (PPG) set out current national planning guidance which is relevant to assessing potential noise impacts associated with development. Relevant sections of the documents are set out within Appendix A.
- 3.2 In summary, the guidance indicates the potential noise impact of a proposed development should be quantified to determine where it falls in relation to the Significant Observed Adverse Effect Level <sup>1</sup> (SOAEL), the Lowest Observed Adverse Effect Level <sup>2</sup> (LOAEL) and the No Observed Effect Level <sup>3</sup> (NOEL). The aims are to mitigate and reduce to a minimum adverse noise impacts, and to avoid significant adverse effects occurring.
- 3.3 The application site is located within the London Borough of Camden. The Camden Local Plan 2017 set out the current local planning guidance, Policy A4 relates to noise as quoted below:

*Policy A4 Noise and vibration*

*The Council will seek to ensure that noise and vibration is controlled and managed.*

*Development should have regard to Camden's Noise and Vibration Thresholds (Appendix 3). We will not grant planning permission for:*

- a. development likely to generate unacceptable noise and vibration impacts; or*
- b. development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses.*

*We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of development."*

- 3.4 Appendix 3 to the Camden Local Plan 2017 sets out thresholds for various types of noise assessment in terms of the various effect levels described in national planning guidance; NOEL, LOAEL, SOAEL.
- 3.5 Three design criteria are outlined are follows:

*"The values will vary depending on the context, type of noise and sensitivity of the receptor:*

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<sup>1</sup> The level of noise exposure above which significant adverse effects on health and quality of life occur.

<sup>2</sup> The level of noise exposure above which adverse effects on health and quality of life can be detected.

<sup>3</sup> The level of noise exposure below which no effect at all on health or quality of life can be detected.



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- *Green – where noise is considered to be at an acceptable level.*
- *Amber – where noise is observed to have an adverse effect level, but which may be considered acceptable when assessed in the context of other merits of the development.*
- *Red – where noise is observed to have a significant adverse effect.”*

### 3.6 For Industrial and Commercial Noise Source the following criteria are set out:

*“Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)*

<b>Existing Noise sensitive receptor</b>	<b>Assessment Location</b>	<b>Design Period</b>	<b>LOAEL (Green)</b>	<b>LOAEL to SOAEL (Amber)</b>	<b>SOAL (Red)</b>
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	‘Rating level’ 10dB* below background	‘Rating level’ between 9dB below and 5dB above background	‘Rating level’ greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	‘Rating level’ 10dB* below background and no events exceeding 57dBL <sub>Amax</sub>	‘Rating level’ between 9dB below and 5dB above background and/or noise events between 57dB and 88dBL <sub>Amax</sub>	‘Rating level’ greater than 5dB above background and/or events exceeding 88dBL <sub>Amax</sub>

*\*10dB should be increased to 15dB if the noise contains audible tonal elements. (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.*

*\*\*levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.”*

### 3.7 For entertainment noise the following criteria are set out:



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*“Table D: Noise levels applicable to proposed entertainment premises (customer noise)”*

<b>Noise sensitive receptor</b>	<b>Assessment Location</b>	<b>Design Period</b>	<b>LOAEL (Green)</b>	<b>LOAEL to SOAEL (Amber)</b>	<b>SOAL (Red)</b>
Dwellings	Garden used for amenity (free field)	Day	The higher of 55dB $L_{Aeq,5min}$ or 10dB below existing $L_{Aeq,5min}$ without entertainment noise	56dB to 60dB $L_{Aeq,5min}$ or 9dB to 3dB below existing $L_{Aeq,5min}$ without entertainment noise	The higher of 61dB $L_{Aeq,5min}$ or 2dB below existing $L_{Aeq,5min}$ without entertainment noise
Dwellings	Garden used for amenity (free field)	Evening	The higher of 50dB $L_{Aeq,5min}$ or 10dB below existing $L_{Aeq,5min}$ without entertainment noise	51dB to 55dB $L_{Aeq,5min}$ or 9dB to 3dB below existing $L_{Aeq,5min}$ without entertainment noise	The higher of 56dB $L_{Aeq,5min}$ or 2dB below existing $L_{Aeq,5min}$ without entertainment noise
Dwellings	Garden used for amenity (free field)	Night	The higher of 45dB $L_{Aeq,5min}$ or 10dB below existing $L_{Aeq,5min}$ without entertainment noise	46dB to 50dB $L_{Aeq,5min}$ or 9dB to 3dB below existing $L_{Aeq,5min}$ without entertainment noise	The higher of 51dB $L_{Aeq,5min}$ or 2dB below existing $L_{Aeq,5min}$ without entertainment noise

For entertainment and plant noise rating curves should be measured as a 15 minute linear  $L_{eq}$  at the octave band centre frequencies.

<b>Room</b>	<b>Noise rating curve</b>	<b>Design Period</b>
Bedrooms	NR25	23:00-07:00hrs
All habitable rooms	NR35	07:00-23:00hrs

- 3.8 In March 2018 a Camden Planning Guidance document on Amenity was published. Section 6 relates to noise, setting out the following:

“KEY MESSAGES:





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- *The Council will assess the impact of noise and vibration through the consideration of acoustic reports submitted by applicants.*
- *Noise mitigation (where appropriate) is expected to be incorporated into developments at the design stage.*
- *The Council will secure mitigation measures through planning condition or legal agreement where necessary.*
- *The Council will adopt the 'agent of change' principle."*

3.9 The document goes on to provide general guidance on acoustic assessments, which has been taken into account within the assessment set out later in this report.

## 4 Environmental Noise Survey

### 4.1 Methodology and Instrumentation

- 4.1.1 Noise measurements were undertaken at the Rosslyn Hill application site between 10:15 hours on 18<sup>th</sup> March and 14:45 hours on 19<sup>th</sup> March 2019.
- 4.1.2 Measurements were made at two positions, these being:
- MP1 Within the northern part of the yard to the rear of the building, near the annex building. The microphone was positioned at an approximate height of 4m above local ground level;
  - MP2 1m from the outside of a first floor window at the front façade of the building overlooking Rosslyn Hill. The microphone was positioned at an approximate height of 6m above local ground level.
- 4.1.3 The noise measurement positions MP1 and MP2 are indicated on attached site plan 19/0084/F1.
- 4.1.4 Measurements of the  $L_{Aeq}$ ,  $L_{Amax}$  and  $L_{A90}$  indices were made at each position over consecutive periods for the duration of the survey using the equipment listed within table T1 (see attached Glossary of Acoustic Terms for an explanation of the noise units used). Measurements were over continuous 15 minute periods for the duration. The meters also recorded octave band noise levels.



## Planning Noise Assessment

Item	Manufacturer	Type
Sound Level Analyser	Brüel & Kjær	2260
Acoustic Calibrator	Brüel & Kjær	4231
Weatherproof windshield	Brüel & Kjær	UA1404
Sound Level Analyser	Norsonic	140
Acoustic Calibrator	Norsonic	1251
Weatherproof windshield	Norsonic	1212

T1 Equipment used during unattended noise survey at Rosslyn Hill

4.1.5 The microphones of the sound level meters were extended by cable and mounted within weatherproof windshields. The sound level meters were calibrated before and after the survey in order to confirm an acceptable level of accuracy, no drift was observed.

4.1.6 Weather conditions when both setting up and collecting the noise monitors were mild, cloudy and dry with little to no breeze. There was a short period of light rain at approximately 07:00 hours on 19<sup>th</sup> March 2019, though this is not expected to have had any material effect on the results of the survey.

### 4.2 Results

4.2.1 The noise climate around the site was noted to be predominantly affected by traffic on the nearby roads. Site security staff will have intermittently had a minor effect on the noise levels measured at MP1 to the rear of the site while carrying out their duties.

4.2.2 At approximately 02:15 hours on 19<sup>th</sup> March 2019 high noise levels were recorded for a short period at both measurement positions. It is not possible to state the source of the noise with certainty but in any case, these short term high noise levels have no bearing on the noise assessment of daytime use of the site as a school.

4.2.3 The results of the noise measurements at positions MP1 and MP2 are shown graphically in the attached time history graphs 19/0084/TH01 – 19/0084/TH02 respectively.

4.2.4 At position MP1 within the rear yard during school hours (08:00 to 17:30) typical ambient noise levels were 47dB  $L_{Aeq,T}$  and typical background noise levels were 38dB  $L_{A90,15min}$ . Outside of school hours (17:30 to 08:00) typical background noise levels were 30dB  $L_{A90,15min}$ .

4.2.5 At position MP2 at the front of the site during school hours (08:00 to 17:30) typical ambient noise levels were 67dB  $L_{Aeq}$  and typical background noise levels were 52dB  $L_{A90,15min}$ . Outside of school hours (17:30 to 08:00) typical background noise levels were 35dB  $L_{A90,15min}$ .

4.2.6 Typical spectra as measured at MP1 and MP2 during school hours are set out below:



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Location	Typical school hours $L_{eq}$ at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
MP1 – rear of building 48dB(A)	54	50	47	45	42	38	41	36
MP2 – front of building 67dB(A)	71	63	61	59	62	61	56	49

T2 Measured noise levels at MP2 facing Rosslyn Hill

## 5 Assessment of site for school use

### 5.1 Building Regulations and Building Bulletin 93 (BB93)

- 5.1.1 In relation to school buildings, Requirement E4 from Part E of Schedule 1 to the Building Regulations 2003 Edition incorporating 2004, 2010, 2013 and 2015 amendments (ADE) states:

*“Each room or other space in a school building shall be designed and constructed in such a way that it has the acoustic conditions and the insulation against disturbance by noise appropriate to its intended use.”*

- 5.1.2 Section 8 of ADE gives the following guidance:

*“In the Secretary of State's view the normal way of satisfying Requirement E4 will be to meet the values for sound insulation, reverberation time and internal ambient noise which are given in Building Bulletin 93 Acoustic design of schools: performance standards.”*

- 5.1.3 The proposed school building will be designed in accordance with BB93 guidance as a means of complying with Building Regulations Approved Document E requirements. At this stage, it is relevant to consider what effect existing noise levels at the site will have on the external building fabric, ventilation strategy and external play and teaching areas. Internal sound insulation and control of reverberation will be considered at a later stage.

### 5.2 Indoor Ambient Noise Levels (IANL)

- 5.2.1 Table 1 within BB93 sets out the requirements for indoor ambient noise levels, dependent on room type. In a situation such as this where there is material change of use at an existing building to provide school accommodation, refurbishment standards apply.
- 5.2.2 The upper limit for the indoor ambient noise level for typical classrooms within a refurbishment is defined in BB93 Table 1 as 40dB  $L_{Aeq,30mins}$ . The most onerous refurbishment requirement of 35dB  $L_{Aeq,30mins}$  is applicable to the following room types; music ensemble room; recording studio; teaching space intended specifically for students with special hearing and communication needs; SEN calming room. On the first floor of the building facing Rosslyn



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Hill there is proposed to be a SEN Room (Therapy / MI Room), within which the SEN calming room criterion is applicable.

- 5.2.3 BB93 Table 2 sets out tolerances on the Table 1 IANL values for different ventilation conditions. Where a room uses natural ventilation or a hybrid ventilation system, a 5dB relaxation is applied to the total IANL limit as defined with BB93 Table 1 wherever the BB93 Table 1 target is lower than 45dB. For clarity the IANL limits for example spaces under normal ventilation conditions are set out in the table below:

Room Type	Upper Limit for Indoor Ambient Noise Level $L_{Aeq,30mins}$ dB		
	Mechanical	Hybrid	
	Ventilation System	Ventilation System	
	Total Noise Level	Mechanical System Noise	Total Noise Level
Primary classroom	40	45	40
Office	45	45	45
SEN Calming room	35	40	35

T3 IANL Limits for example room types

- 5.2.4 We have carried out indicative calculations of external noise intrusion to the worst case room, this being the first floor SEN Room (Therapy / MI Room) facing Rosslyn Hill. Our calculations are based on the results of the site noise survey at position MP2 (refer to table T2) and assumptions on the performance of the existing building fabric as set out in table T4 below. The existing external façade is a substantial masonry construction; the window sound reduction performance would be expected to be achieved by replacement double glazing configuration of 6mm glass / 12-24mm air gap / 4mm glass.

Building Element	Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)					
	125	250	500	1k	2k	4k
Existing external masonry walls – $R_w$ 51dB	40	44	45	51	55	55
Double glazed windows – $R_w$ 33dB	22	22	28	39	39	42

T4 External building fabric sound reduction performance reference data



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- 5.2.5 Excluding the effect of ventilation openings in the façade, a noise level of 33dB(A) is calculated within the first floor SEN Room facing Rosslyn Hill, meeting the relevant IANL limit.
- 5.2.6 In all rooms facing Rosslyn Hill or Downshire Hill it is feasible for the relevant IANL limits to be achieved using either a hybrid ventilation system or mechanical ventilation system incorporating suitable noise attenuation measures. It will not be possible to use natural ventilation for rooms on these façades.
- 5.2.7 Rooms where windows face the rear of the site, including those on the Annex building, are exposed to lower ambient noise levels. In these areas it is feasible for the relevant IANL limits to be achieved using natural ventilation, a hybrid ventilation system or a mechanical ventilation system.

### 5.3 External Play / Teaching Areas

- 5.3.1 Guidance relating to external noise levels within school areas is provided within *Acoustics of Schools: a design guide*<sup>4</sup>, which supports BB93.
- 5.3.2 The document states that the 60 dB  $L_{Aeq,30 \text{ minutes}}$  should be taken as the aspirational design criterion for the boundary of external areas used for formal and informal outdoor teaching and recreation. The guidance then goes on to state that noise levels in unoccupied playgrounds, playing fields and other outdoor areas should not exceed 55dB $L_{Aeq,30 \text{ min}}$  and that there should be at least one area suitable for outdoor teaching activities where noise levels are below 50dB $L_{Aeq,30 \text{ min}}$  where possible. It is noted that achieving these external noise levels is not a Building Regulations requirement.
- 5.3.3 The results of the site noise survey at position MP1 indicate that the aspirational target of 50dB will be achieved without additional mitigation.

## 6 Playground Noise Assessment

### 6.1 Overview

- 6.1.1 The playground located to the rear of the site is overlooked by existing houses and apartments up to five storeys high.
- 6.1.2 An assessment has been carried out to consider the noise impact of this new noise source on the neighbouring residences.
- 6.1.3 To inform the assessment a noise survey has been undertaken at the Abacus Belsize Primary School temporary site at 105 Camley Street near Camden Town.

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<sup>4</sup> Acoustics of Schools: a design guide (November 2015) – Institute of Acoustics and the Association of Noise Consultants



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6.1.4 Computer modelling has been undertaken to calculate noise levels at neighbouring residences to the application site. The modelling has taken account of the effects of recommended acoustic screens around parts of the proposed playground.

6.1.5 The results of the noise modelling have been considered in the context of the planning guidance set out in section 3.

### 6.2 Playground Use Noise Survey - Temporary School Site, Camley Street

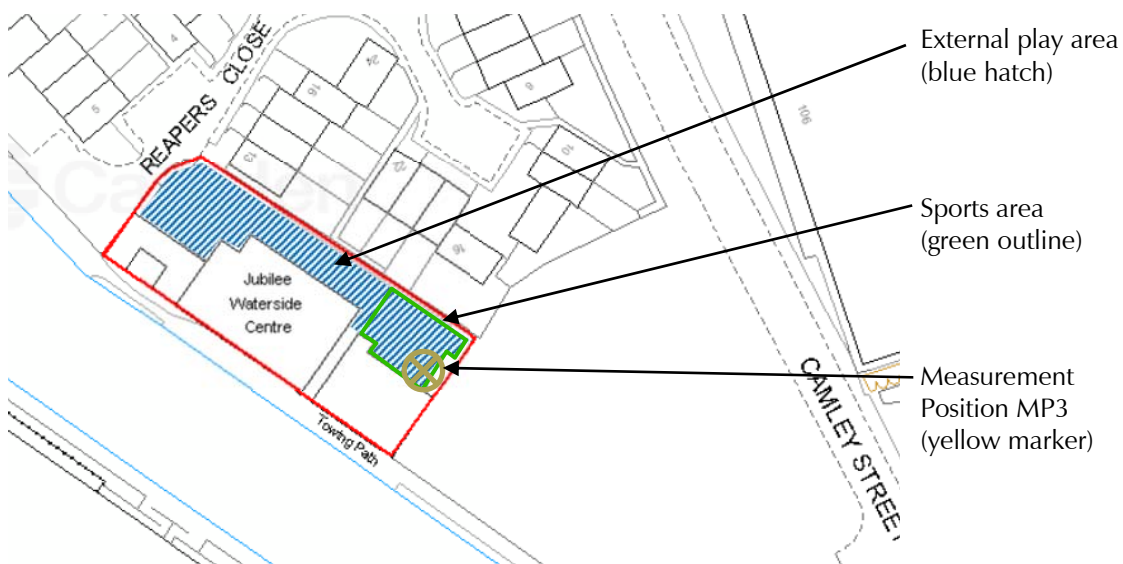
#### Methodology and Instrumentation

6.2.1 Attended noise measurements were undertaken at the temporary Abacus Belsize Primary School site between 12:15 hours and 13:45 hours on 19<sup>th</sup> March 2019. The temporary school site is at the Jubilee Waterside Centre, Camley Street, N1C 4PF.

6.2.2 Measurements were made at one position, this being:

- MP3 On fire escape stairs at the edge of the playground. The microphone was positioned at an approximate height of 4m above local ground level.

6.2.3 The noise measurement position MP3 is indicated on plan below:



Camley Street site plan indicating noise measurement position MP3

6.2.4 During the survey period there was approximately one hour of free play, during which the sports area was used for playing football constantly. There were approximately 25 children and one or two teachers within the sports area at any one time. In total there were estimated to be approximately 50 children within the entire playground at any one time.



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- 6.2.5 The children then returned inside the building, before a smaller number came outside for a P.E. lesson in the sports area, noise levels of which were measured for approximately 20 minutes. There were 18 children and one teacher within the sports area during this time. During the lesson there were periods of throwing and catching when many children spoke at once and periods in between where only one person spoke at once.
- 6.2.6 Measurements of the  $L_{Aeq}$ ,  $L_{Amax}$  and  $L_{A90}$  indices were made over consecutive 1 minute periods for the duration of the survey using the equipment listed within table T5 (see attached Glossary of Acoustic Terms for an explanation of the noise units used). The meter also recorded octave band noise levels.

Item	Manufacturer	Type
Sound Level Analyser	Rion	NL-52
Acoustic Calibrator	Rion	NC-74

T5 Equipment used during attended noise survey at Rosslyn Hill

- 6.2.7 The microphone of the sound level meter was fitted with a windshield. The sound level meter was calibrated before and after the survey in order to confirm an acceptable level of accuracy, no drift was observed.
- 6.2.8 Weather conditions during the survey period were mild, cloudy and dry with little to no breeze.

### Results

- 6.2.9 The measured noise levels were observed to be controlled by voices of pupils within the sports area.
- 6.2.10 The results of the noise measurements at position MP3 are shown graphically in the attached time history graph 19/0084/TH03.
- 6.2.11 Typical spectra as measured at MP3 are set out below:

Activity	$L_{eq}$ at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Play 79dB(A)	65	60	59	71	76	74	67	53
P.E. Lesson 76dB(A)	62	54	54	65	72	71	63	49

T6 Measured noise levels at MP3, Camley Street



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- 6.2.12 These measured noise levels are comparable but slightly higher (by approximately 3dB) than the results of noise surveys undertaken by Cole Jarman at other primary school playground.

### 6.3 Computer Noise Modelling

- 6.3.1 In order to assess external play area noise emissions acoustic models have been developed of the Camley Street site and the Hampstead site. A computer based noise prediction program (Wölfel IMMI version 2018) has been used for this purpose. The software implements procedures defined within ISO 9613-2:1996<sup>5</sup> to calculate the propagation of noise.
- 6.3.2 The existing Camley Street external play area has been modelled as area noise sources at a height of 1m. Two noise sources have been calibrated to match the two sets of measured activity noise levels set out in table T6 above.
- 6.3.3 The Camley Street sports area is approximately 131m<sup>2</sup>. During the free play measurement period there were typically approximately 25 children in the area at any one time. The overall playground area at the Hampstead application site is approximately 610m<sup>2</sup> and the maximum number of children that will use the space at any one time is 120. This is a very similar ratio of children to square metre of playground (~0.19 children per m<sup>2</sup>), therefore the area noise source in the Hampstead application site computer model has been defined with the same sound power per unit area as the calibrated Camley Street model. At times when there are fewer children in the playground resulting noise levels would be expected to be marginally lower accordingly; corrections have been applied to the play noise source within the modelling to reflect this.
- 6.3.4 We have been provided with a forecast of playground occupation throughout a typical school day, as set out below:

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<sup>5</sup> Acoustics. Attenuation of sound during propagation outdoors. General method of calculation





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Time	Lower Playground	Higher Playground	Reception Playground
08:00 – 08:30	0	0	0
08:30 – 09:00	80 play in total		
09:00 – 10:15	0	0	12 learning
10:15 – 10:30	60 play in total		
10:30 – 10:45	0	0	0
10:45 – 11:00	120 play in total		
11:00 – 12:15	0	0	0
12:15 – 13:00	90 play in total		30 play
13:00 – 13:15	0	0	0
13:15 – 15:00 (3 days per week only)	30 P.E.	30 P.E.	0
15:00 – 16:30	20 after school club	20 after school club	0
16:30 – 17:30 (summer only)	10-12 supervised play		

T7 Playground occupation forecast

- 6.3.5 The Hampstead application site has been modelled taking account of the proposed playground levels as marked on attached figure 19/0084/F2.
- 6.3.6 The playground source noise data has been used for the following periods with the corrections noted for reduced occupancy as appropriate:
- 08:30 – 09:00 (-1.8dB);
  - 10:15 – 10:30 (-3.0dB);
  - 10:45 – 11:00; and
  - 12:15 – 13:00.
- 6.3.7 During the following times when children will be more closely supervised, the P.E. source noise data has been used within the relevant playground areas:
- 09:00 – 10:15;
  - 13:15 – 16:30 (P.E. 3 days per week only);
  - 15:00 – 16:30; and
  - 16:30 – 17:30 (summer only).
- 6.3.8 Noise levels have been calculated to a series of receiver locations representing neighbouring residences as shown on attached figure 19/0084/F2.



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### 6.4 Noise Mitigation

- 6.4.1 Screening up to 4m high relative to playground level has been incorporated into the model to mitigate noise impacts as far as practicable. The screens are shown on attached figure 19/0084/F2.

### 6.5 Assessment Results

#### Gardens

- 6.5.1 The results of the noise modelling in the various neighbouring garden areas are set out below:

Calculated noise level from playground use in neighbouring garden areas, dB $L_{Aeq,T}$					
Time	AP1	AP2	AP3	AP4	AP5
08:00 – 08:30	-	-	-	-	-
08:30 – 09:00	58.4	53.3	51.7	53.6	57.9
09:00 – 10:15	43.8	33.0	32.9	32.5	36.2
10:15 – 10:30	57.1	52.1	50.5	52.4	56.6
10:30 – 10:45	-	-	-	-	-
10:45 – 11:00	60.1	55.1	53.5	55.4	59.6
11:00 – 12:15	-	-	-	-	-
12:15 – 13:00	60.1	55.1	53.5	55.4	59.6
13:00 – 13:15	-	-	-	-	-
13:15 – 15:00 (P.E. 3 days per week only)	56.1	51.3	49.8	51.6	55.9
15:00 – 16:30	56.1	51.3	49.8	51.6	55.9
16:30 – 17:30 (summer only)	56.1	51.3	49.8	51.6	55.9
$L_{Aeq,9.5hours}$ (P.E. day in summer)	55.3	50.4	48.8	50.7	55.0

#### T8 Playground Noise Modelling Results

- 6.5.2 As discussed in section 3 of this report, Appendix 3 to the Camden Local Plan 2017 sets out thresholds for various types of noise assessment in terms of the effect levels described in national planning guidance; NOEL, LOAEL, SOAEL. No thresholds are defined specifically covering noise from a school playground, but the criteria for noise from new entertainment sources includes customer noise is considered to be similar in nature to that of a playground, although entertainment noise usually peaks in the more noise sensitive evening period. Therefore, considering school playground noise against these criteria represents a robust assessment.



## Planning Noise Assessment

- 6.5.3 As can be seen in table T8, with the specified noise screens in place, the worst case noise level predicted from playground (when fully occupied) in a garden area is  $60\text{dBL}_{\text{Aeq,T}}$  (at AP1 and AP5), reducing to  $55\text{dB(A)}$  over the 9.5 hours the school is occupied. At the other positions AP2, AP3 and AP4, the worst case noise level when the playground is fully occupied is  $55\text{dB}$  or lower, again reducing over the 9.5 hour period.
- 6.5.4 Comparing the results in table T8 above with the Camden entertainment criteria set out in Table D beneath paragraph 3.7, it can be seen this equates to “Amber” at worst for some periods of the day at two positions, and “Green” at the other three positions. The Camden guidance states that “Amber” is “where noise is observed to have an adverse effect level, but which may be considered acceptable when assessed in the context of other merits of the development” and “Green” is “where noise is considered to be at an acceptable level”.

### Internal noise levels

- 6.5.5 The computer noise model has also been used to calculate noise levels at the upper floors of existing residential façades so internal noise levels within existing residences can be considered in the context of local planning authority guidance.
- 6.5.6 We have carried out indicative calculations of external noise intrusion to neighbouring residences based on assumptions on the performance of the existing building fabric as set out in table T9 below. The existing external façade is assumed to be a substantial masonry construction; the windows are assumed to be single glazed with 4mm glass.

Building Element	Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)					
	125	250	500	1k	2k	4k
Existing external masonry walls – $R_w$ 51dB	40	44	45	51	55	55
Single glazing 4mm– $R_w$ 31dB	20	22	28	33	34	28

T9 External building fabric sound reduction performance reference data

- 6.5.7 The worst case noise level calculated at a residential façade while the playground is fully occupied (i.e. 10:45 – 11:00 and 12:15 – 13:00 hours) is  $75\text{dBL}_{\text{Aeq,T}}$ , reducing to  $70\text{dB(A)}$  over the 9.5 hours the school is occupied. Our indicative noise intrusion calculations give results of  $L_{\text{eq}}$  NR40 worst case and  $L_{\text{eq}}$  NR35 over the 9.5 hour school day internally.
- 6.5.8 These noise levels are applicable at second floor level and above on the rear façade of Downshire Hill residences directly adjacent to the playground (marked as AP6 on attached figure 19/0084/F2). Noise levels at all residential façades would be lower.
- 6.5.9 During the daytime, the Camden guidance for new entertainment sources including customer noise entertainment gives a single internal target of NR35 rather than Red, Amber and Green



## Planning Noise Assessment

ranges as is provided for garden criteria. The NR35 target is therefore taken to be intended to equate to the threshold between Green and Amber (i.e. LOAEL). Applying a 5dB “Amber” range as for the gardens gives a second threshold of NR40, equating to the threshold between Amber and Red (i.e. SOAEL).

- 6.5.10 The conclusion on internal levels is therefore the same as for the assessed noise levels in gardens i.e. no significant adverse noise impacts are assessed. An adverse impact is assessed in a small number of locations for some periods of the daytime, which may be considered acceptable when assessed in the context of other merits of the development. At other locations, noise is considered to be at an acceptable level.

## 7 Conclusions

- 7.1 Planning permission is sought for the change of use of the Former Hampstead Police Station at 26 Rosslyn Hill NW3 1PD from sui generis to Use Class D1, for occupation by Abacus Belsize Primary School.
- 7.2 This report sets out details of noise survey and assessment work undertaken to consider the potential impacts of noise on the use of the site as a school, and the potential impact of noise from the school on existing residences nearby. In undertaking the assessment work reference is made to national and local planning guidance, and guidance set out in Building Bulletin 93 (BB93).
- 7.3 It is found the existing noise levels around the site can be adequately controlled to enable BB93 criteria to be achieved within both internal and external areas of the school. Outline acoustic advice on external glazing and ventilation strategy for the school building is provided.
- 7.4 The noise from the use of the proposed playground has been assessed, allowing for proposed 4m acoustic screens around the playground. Noise levels at some neighbouring residences are found to equate to an adverse impact, but not a significant adverse impact.

 End of Section



## Planning Noise Assessment

# Glossary of Acoustic Terms

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### $L_{Aeq}$ :

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.

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

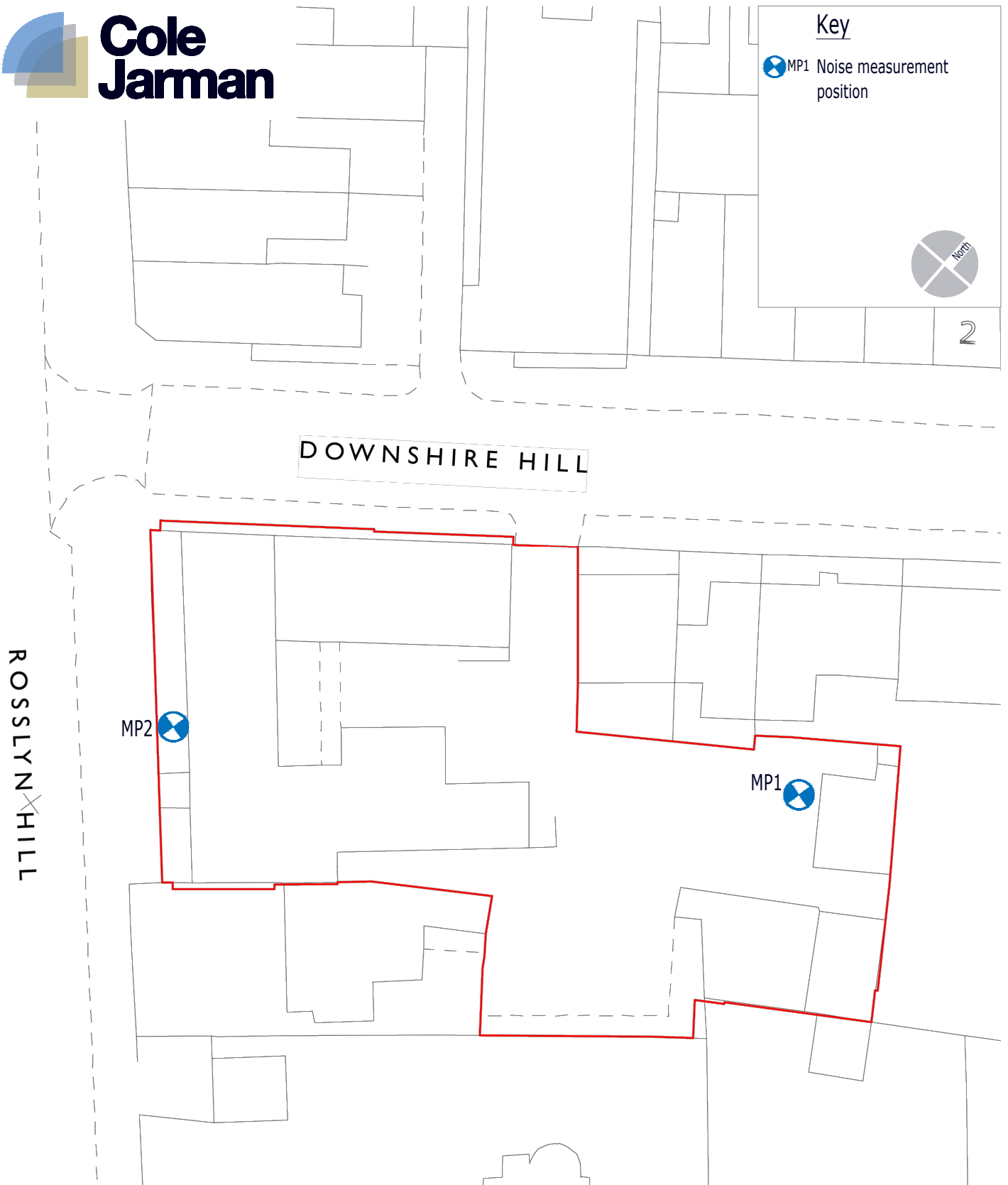
If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The  $L_{An}$  indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified.  $L_{A10}$  is the level exceeded for 10% of the time and 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).

■ End of Section



Title: Existing site layout showing noise measurement positions

Figure 19/0084/F1

Project: Abacus Belsize Primary School, Hampstead

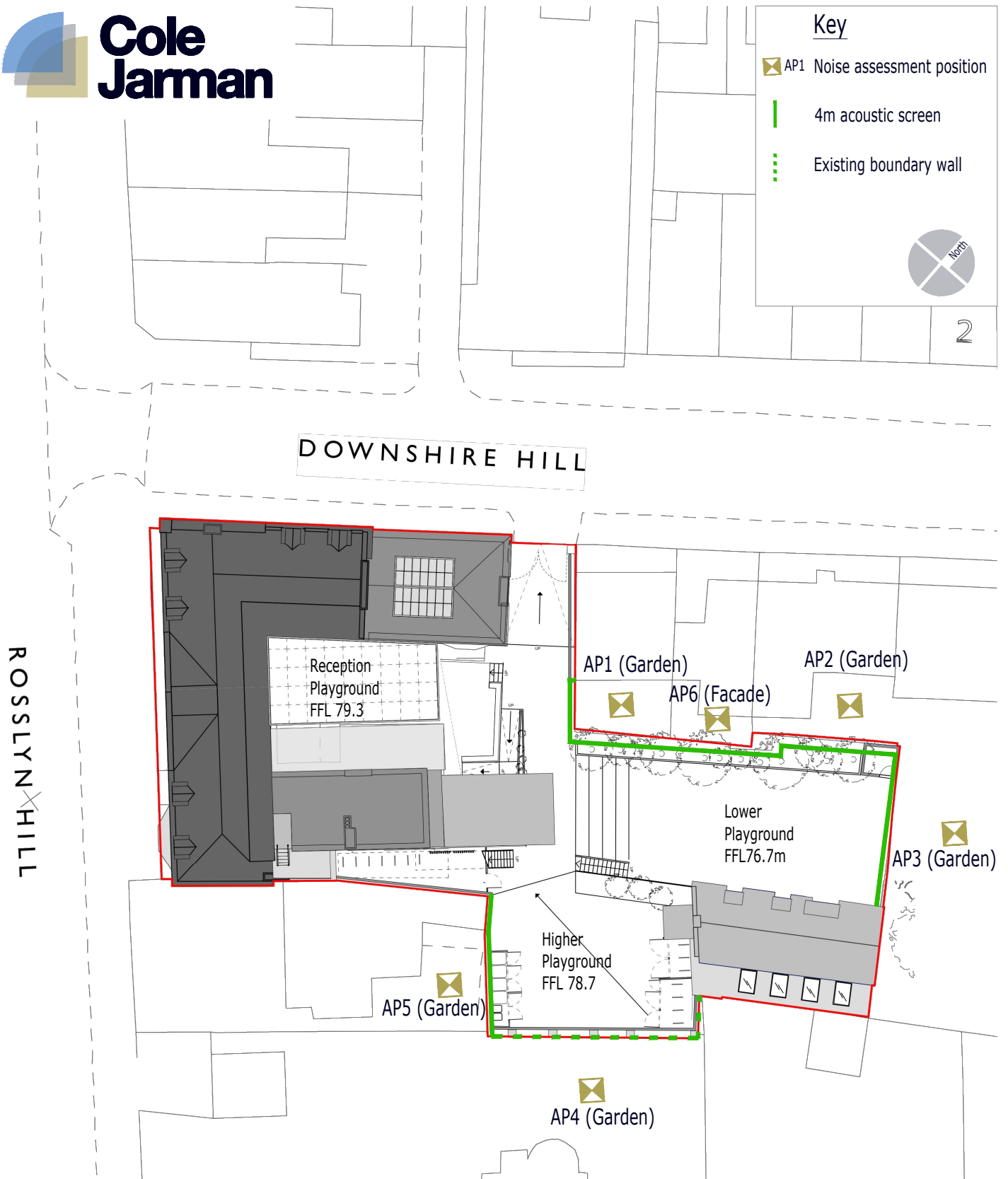
Date: 11 April 2019

Revision: -

Scale: Not to scale

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Title: Proposed site layout showing noise assessment positions

Project: Abacus Belsize Primary School, Hampstead

Date: 11 April 2019

Revision: -

Scale: Not to scale

**Figure 19/0084/F2**

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Figure 19/0084/TH01

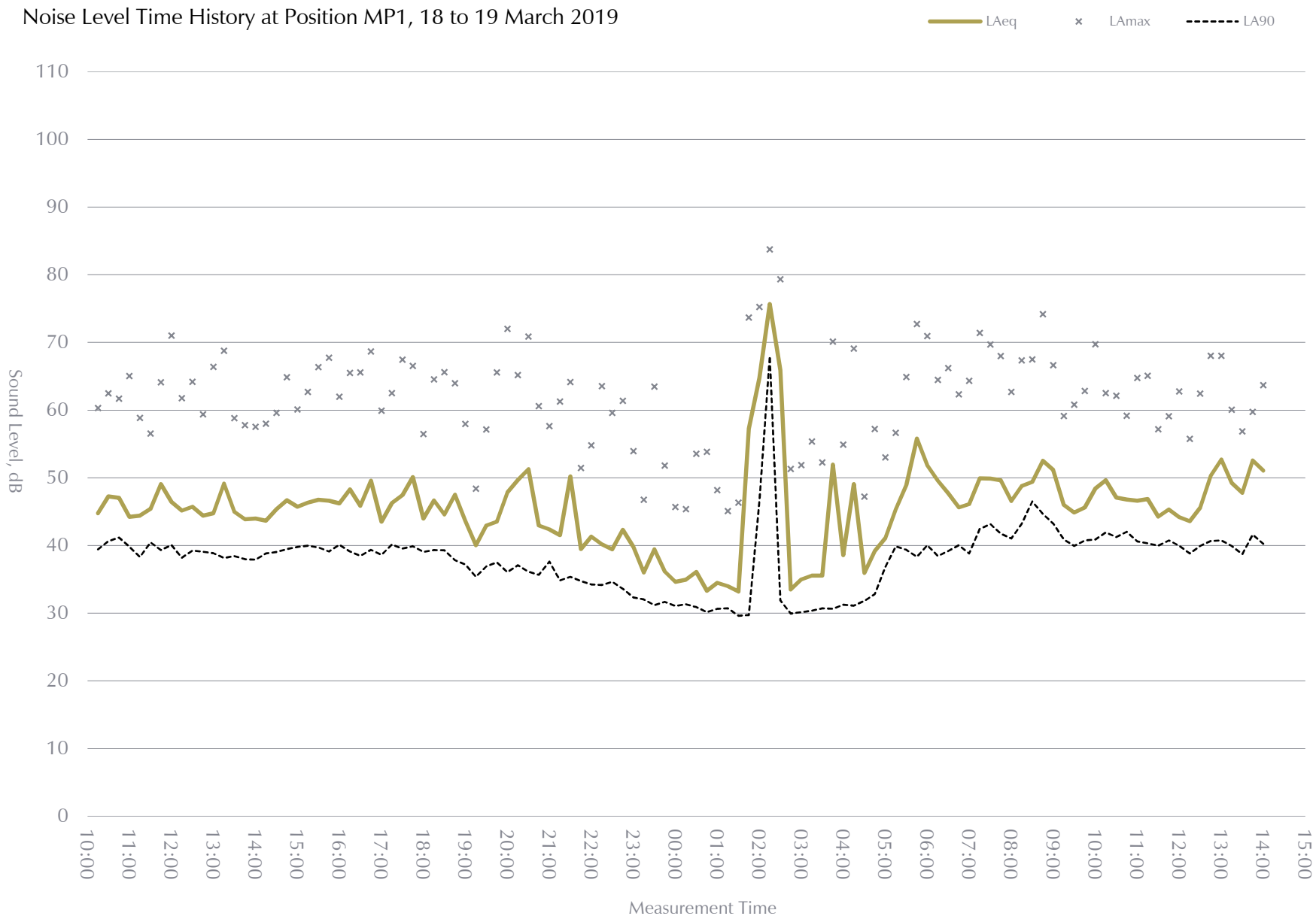






Figure 19/0084/TH02

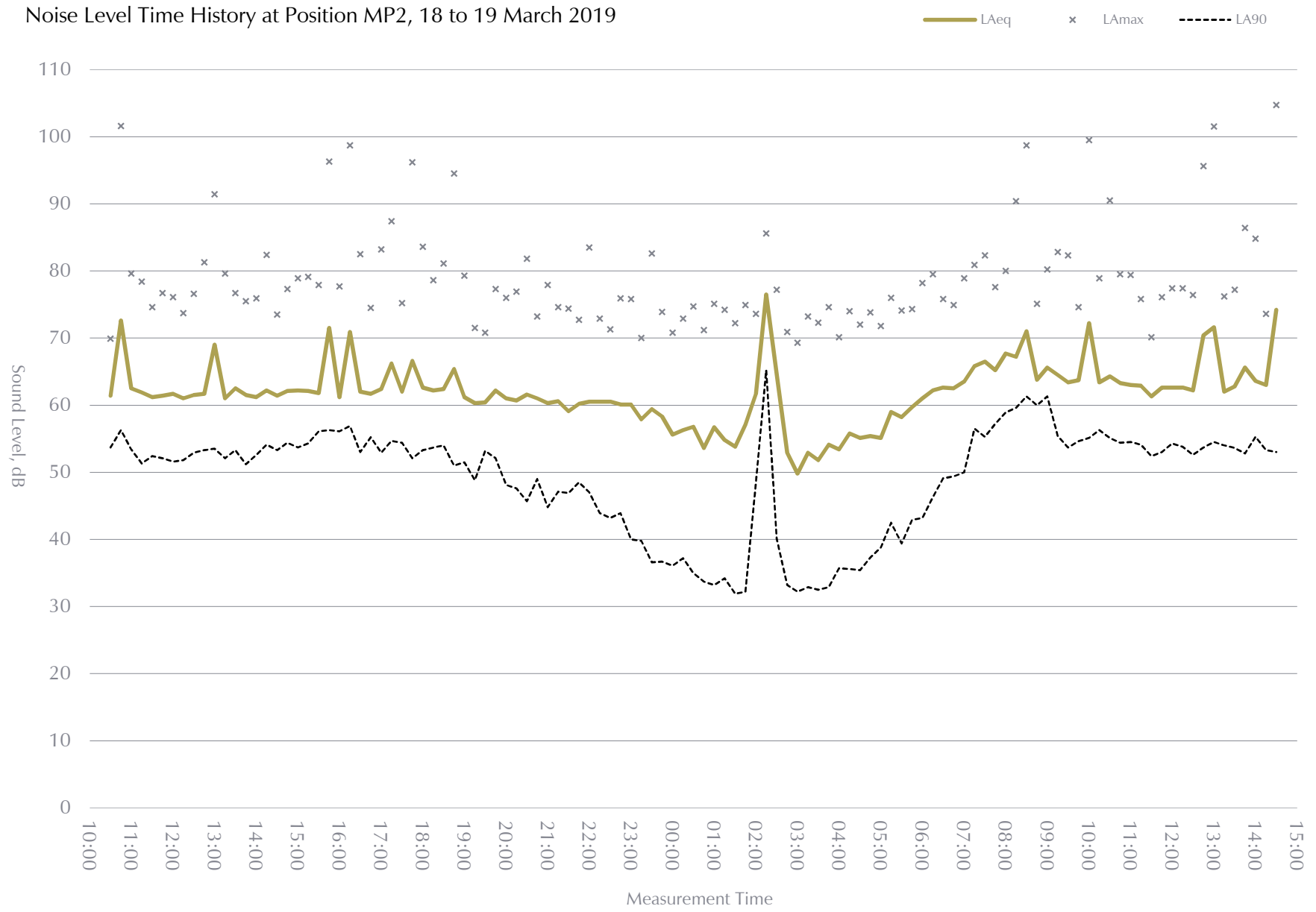
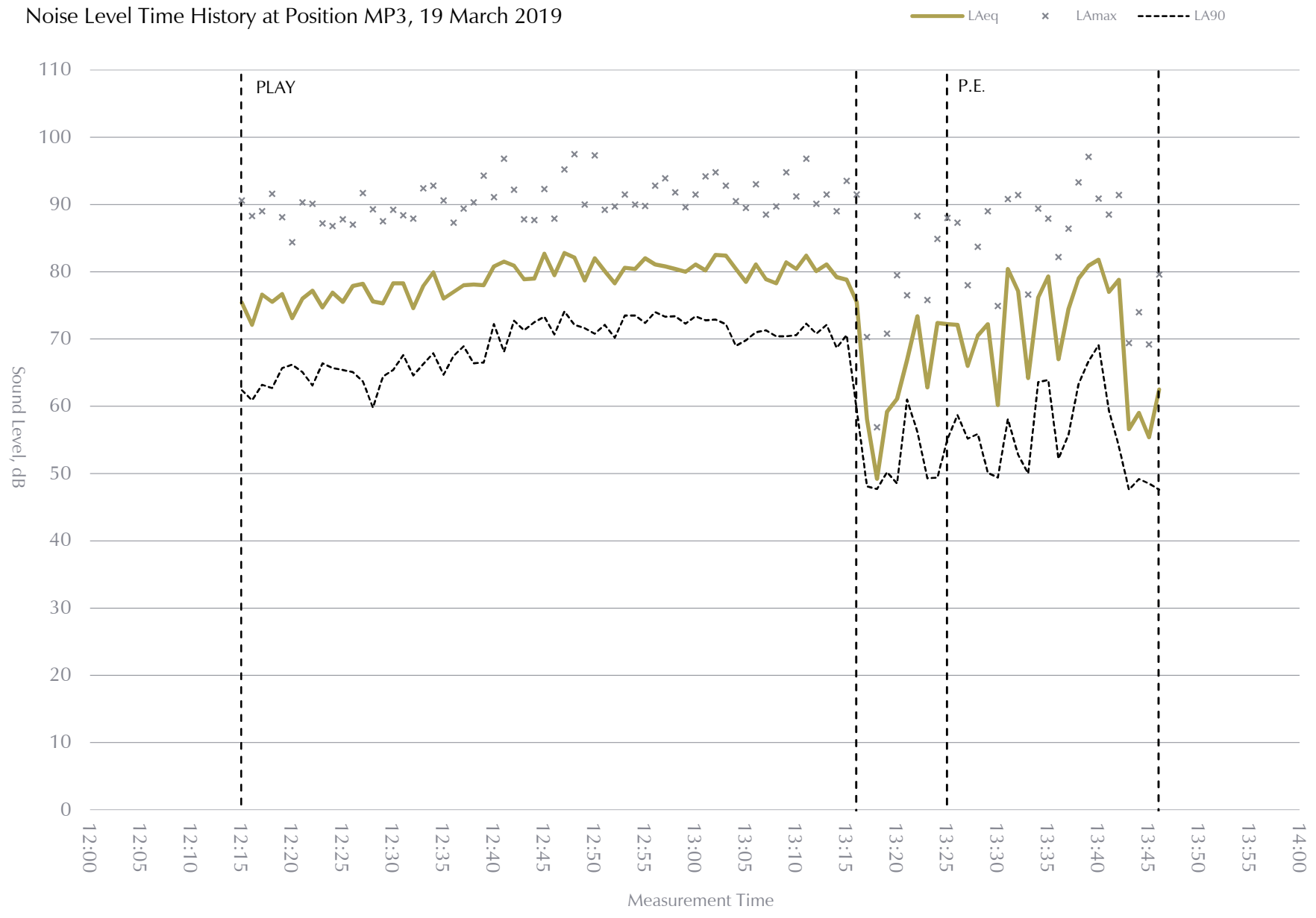




Figure 19/0084/TH03



## Appendix A

<b>Subject:</b>	<b>Planning Considerations and Guidance</b>	
<b>Project:</b>	<b>Abacus Belsize Primary School</b>	
<b>Date:</b>	<b>April 2019</b>	<b>Prepared: AE</b>
<b>Revision:</b>	<b>0</b>	<b>Approved: NJ</b>

This document sets out relevant sections of various standards and national guidance upon which the noise assessment has been based.

### A1 National Planning Policy Framework (NPPF)

- A1.1 The National Planning Policy Framework (NPPF), published in March 2012 and updated in February 2019, is currently the relevant document for defining the national policy toward noise generating or noise sensitive development. It refers to the Noise Policy Statement for England (NPSE), which is discussed in the subsequent section.
- A1.2 The current policy on sustainable development influences the emphasis of any noise assessment. The development of a quiet, rural site is by most measures less sustainable than the development of a site located near existing infrastructure and facilities. The rating of development sites based on prevailing noise levels should reflect this.
- A1.3 Specifically, on the subject of noise, paragraph 180 of NPPF states:
- “Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
- a. mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
  - b. identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;”*
- A1.4 Paragraph 180 references the Noise Policy Statement for England and no other particular standards.
- A1.5 On the general issue of amenity, paragraph 127 states that planning policies and decisions should ensure that developments:



## Planning Considerations and Guidance

*“create places that [...] promote health and well-being, with a high standard of amenity for existing and future users...”*

- A1.6 Further to this, paragraph 170 states that planning policies and decisions should contribute to and enhance the natural and local environment by:

*“preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution”*

- A1.7 A notable inclusion in the July 2018 edition of NPPF is the ‘agent of change’ principle in paragraph 182. In terms of noise, this principle requires that those proposing a new noise sensitive development incorporate sufficient mitigation such that the operation of existing premises in the area is not unreasonably restricted in order to control noise impact upon the new development:

*“Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.”*

## A2 Noise Policy Statement for England (NPSE)

- A2.1 The NPSE sets out three aims:

The first aim of the Noise Policy Statement for England

*“Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.”*

The second aim of the Noise Policy Statement for England

*“Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.”*

The third aim of the Noise Policy Statement for England

*“Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.”*



## Planning Considerations and Guidance

- A2.2 Paragraph 2.24 states that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life. It also states that this does not mean that such adverse effects cannot occur.
- A2.3 In essence, therefore, each development site must be judged on its ability to deliver on each of the stated aims.
- A2.4 The NPSE refers to SOAEL, the Significant Observed Adverse Effect Level. This is defined as the level above which significant adverse impacts on health and quality of life occur. Given the overall thrust of the NPSE, the SOAEL is therefore an important assessment standard although the document also comments that:
- "It is not possible to have a single objective noise based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times."*
- A2.5 Attention is drawn to the fact that the SOAEL is the level above which significant adverse effects can be observed. Importantly, it should be noted that the overall objective is to avoid or minimise significant adverse impacts; some degree of impact is acceptable and it is not necessary to seek to achieve no impact at all.

## A3 Planning Practice Guidance (PPG)

- A3.1 The Department for Communities and Local Government 'Planning Practice Guidance' (PPG) was published on 6 March 2014.
- A3.2 The PPG on Noise expands upon the NPPF and NPSE and sets out more detailed guidance on noise assessment. Like the NPPF and NPSE, the guidance does not include any specific noise levels but sets out further principles that should underpin an assessment.
- A3.3 The PPG includes a section on noise, which states:
- "Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:*
- whether or not a significant adverse effect is occurring or likely to occur;*
- whether or not an adverse effect is occurring or likely to occur; and*
- whether or not a good standard of amenity can be achieved."*



## Planning Considerations and Guidance

- A3.4 It then refers to the NPSE and states that the aim is to identify where the overall effect of the noise exposure falls in relation to Significant Observed Adverse Effect Level <sup>1</sup> (SOAEL), the Lowest Observed Adverse Effect Level <sup>2</sup> (LOAEL) and the No Observed Effect Level <sup>3</sup> (NOEL).
- A3.5 The guidance then presents a table, which is reproduced as table AT1 overleaf. The implication of the final line of the table is that only the 'noticeable and very disruptive' outcomes are unacceptable and should be prevented. All other outcomes (i.e. all other lines in the table) can be acceptable, depending upon the specific circumstances and factors such as the practicalities of mitigation.

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<sup>1</sup> The level of noise exposure above which significant adverse effects on health and quality of life occur.

<sup>2</sup> The level of noise exposure above which adverse effects on health and quality of life can be detected.

<sup>3</sup> The level of noise exposure below which no effect at all on health or quality of life can be detected.



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Effect Level (increasing)	Perception	Examples of Outcomes	Action
<i>No Observed Effect</i>	Not noticeable	No effect	No specific measures required
<b>NOEL</b> ( <i>No Observed Effect Level</i> )			
<i>No Observed Adverse Effect</i>	Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No specific measures required
<b>LOAEL</b> ( <i>Lowest Observable Adverse Effect Level</i> )			
<i>Observed Adverse Effect</i>	Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Mitigate and reduce to a minimum
<b>SOAEL</b> ( <i>Significant Observed Adverse Effect Level</i> )			
<i>Significant Observed Adverse Effect</i>	Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Avoid
<i>Unacceptable Adverse Effect</i>	Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Prevent

AT1 Summary of Noise Exposure Hierarchy (from PPG)

A3.6 The PPG provides the following general guidance on noise assessments:



## Planning Considerations and Guidance

*“The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.*

*These factors include:*

- the source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;*
- for non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;*
- the spectral content of the noise (ie whether or not the noise contains particular high or low frequency content) and the general character of the noise (ie whether or not the noise contains particular tonal characteristics or other particular features). The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.”*

 End of Section





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