

Abacus Belsize Primary School

Planning Noise Assessment

Report 19/0084/R1

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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



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1 Introduction

- 1.1 Planning permission is sought for the change of use of the former Hampstead Police Station at 26 Rossllyn 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.
- 1.5 On 17th July 2019 a meeting was held on site with residents of neighbouring buildings to discuss the application and noise mitigation measures originally proposed. The noise mitigation measures have since been amended taking the discussions into account. This revised report reflects those amendments as well as taking account in changes made in July 2019 to national planning guidance on noise.

2 Site Description

Existing site layout

- 2.1 The application site is located at 26 Rossllyn 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 Rossllyn 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 Rossllyn 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.



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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.

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 ¹ (SOAEL), the Lowest Observed Adverse Effect Level ² (LOAEL) and the No Observed Effect Level ³ (NOEL). The aims are to mitigate and reduce to a minimum adverse noise impacts, and to avoid significant adverse effects occurring.
- 3.3 The July 2019 National Planning Practice Guidance on noise cautions against rigidly applying fixed noise standards. For Local Plans it advises:

“Plans may include specific standards to apply to various forms of proposed development and locations in their area. Care should be taken, however, to avoid these being applied as rigid thresholds, as specific circumstances may justify some variation being allowed.”

- 3.4 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*

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

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

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



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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.”

3.5 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.

3.6 Three design criteria are outlined are follows:

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

- 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.”*

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



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

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
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 57dB _{L_{Amax}}	‘Rating level’ between 9dB below and 5dB above background and/or noise events between 57dB and 88dB _{L_{Amax}}	‘Rating level’ greater than 5dB above background and/or events exceeding 88dB _{L_{Amax}}

**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.”*

3.8 For entertainment noise the following criteria are set out:



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

Noise sensitive receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
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 Leq at the octave band centre frequencies.

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

3.9 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."*

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 18th March and 14:45 hours on 19th 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.



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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 19th 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 19th 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	40	45
Office	45	45	45
SEN Calming room	35	35	40

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
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*⁴, 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. There are existing brick walls along the site boundaries shared with residences, which extend between approximately 2 - 4m above the adjacent part of the application site.
- 6.1.2 An assessment has been carried out to consider the noise impact of this new noise source on the neighbouring residences.

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



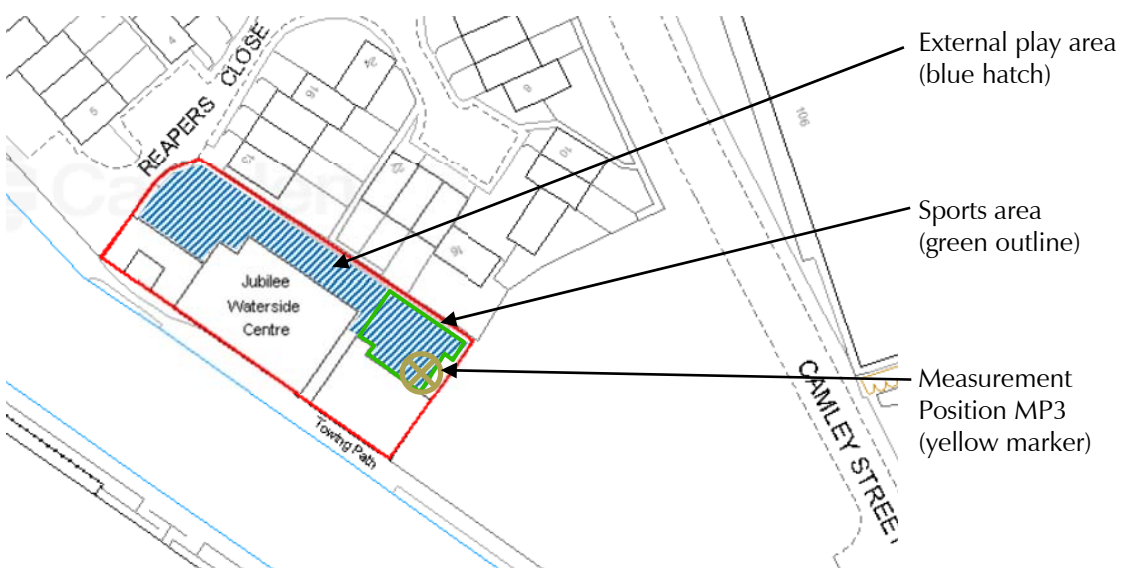
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- 6.1.3 To inform the assessment a noise survey has been undertaken at the Abacus Belsize Primary School temporary site at 105 Camley Street near Camden Town.
- 6.1.4 Computer modelling has been undertaken to calculate noise levels at neighbouring residences to the application site. The modelling has taken account of the effects of existing boundary walls and proposed acoustic screens around the proposed playground, as well as the levelling of the playground areas as proposed. The extent of the proposed acoustics screens has been developed taking account of feedback from nearby residents provided at a meeting on site which took place on 17th July 2019.
- 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 19th 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



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- 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.
- 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:



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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

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 9613-2:1996⁵ 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 131m². 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 610m² 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 m²), 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:

⁵ 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.

6.4 Noise Mitigation and Resident Consultation

6.4.1 Initially, 4m acoustic screens were proposed to the application site boundaries shared with properties on Downshire Hill. Residents of the relevant properties raised concerns about the



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height and extent of the proposed acoustic screens, and the effect they would have on visual amenity.

- 6.4.2 A meeting was held on site on 17th July 2019 to discuss the acoustic screening proposals with the residents, prior to which sections of the then proposed 4m acoustic screens were temporarily erected for illustrative purposes.
- 6.4.3 At the meeting the residents indicated their individual preferences for the removal or reduction in height to the sections of acoustic screen most relevant to their properties, at the expense of elevated noise levels from the school playground during school hours (not withstanding some objections to the scheme as a whole).
- 6.4.4 The computer noise model has since been updated to reflect the reduced scheme of noise mitigation. The now proposed acoustic screens are shown on attached figure 19/0084/F2, reaching 3.0m high relative to playground level along part of the boundary with Downshire Hill and 3.5m high relative to playground level to the boundary with 26 Rosslyn Hill. The existing brick boundary walls are included within the model so their screening effects are taken into account.

6.5 Assessment Results

Gardens

- 6.5.1 The results of the noise modelling in the various neighbouring garden areas are set out in table T8 below:



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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	62.5	56.3	55.8	53.9	56.8
09:00 – 10:15	50.8	37.6	37.3	32.8	36.0
10:15 – 10:30	61.3	55.1	54.5	52.6	55.5
10:30 – 10:45	-	-	-	-	-
10:45 – 11:00	64.3	58.1	57.6	55.6	58.5
11:00 – 12:15	-	-	-	-	-
12:15 – 13:00	64.3	58.1	57.6	55.6	58.5
13:00 – 13:15	-	-	-	-	-
13:15 – 15:00 (P.E. 3 days per week only)	59.9	54.2	53.8	51.8	54.7
15:00 – 16:30	59.9	54.2	53.8	51.8	54.7
16:30 – 17:30 (summer only)	59.9	54.2	53.8	51.8	54.7
$L_{Aeq,9.5hours}$ (P.E. day in summer)	59.9	54.2	53.8	51.8	54.7

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.
- 6.5.3 At the garden positions AP2, AP3, AP4 and AP5, the worst case noise level when the playground is fully occupied is 59dB(A) or lower, reducing to 55dB(A) or lower over the 9.5 hours the school is occupied period. Comparing these results in table T8 above with the Camden entertainment criteria set out in Table D beneath paragraph 3.8, it can be seen this equates to “Amber” at worst for some periods of the day and “Green” for the remainder. 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”.
- 6.5.4 As can be seen in table T8 at one location only (AP1) the worst case noise level predicted from the playground (when fully occupied) in a garden area is higher at 64dB $L_{Aeq,T}$, reducing to 60dB(A) over the 9.5 hours the school is occupied. Comparing the results in table T8 above with the Camden entertainment criteria set out in Table D beneath paragraph 3.8, it can be



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seen this equates to “Red” for some periods of the day. The Camden guidance states that “Red” is “where noise is observed to have a significant adverse effect”. It should be noted the relevant residents have indicated they would prefer no new acoustic screening be erected to their relevant section of the site boundary, but that the existing brickwork wall be retained. It is also relevant to note the clarification added to the Planning Practice Guidance in July 2019 on noise standards contained within Local Plans:

“Plans may include specific standards to apply to various forms of proposed development and locations in their area. Care should be taken, however, to avoid these being applied as rigid thresholds, as specific circumstances may justify some variation being allowed.”

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 76dB $L_{Aeq,T}$, reducing to 71dB(A) over the 9.5 hours the school is occupied. Our indicative noise intrusion calculations give results of L_{eq} NR41 worst case and L_{eq} NR37 over the 9.5 hour school day internally with windows closed. These noise levels are applicable at first floor level on the rear façades of Downshire Hill residences adjacent to the sections of the playground where no acoustic screen is proposed. It should be noted the relevant residents have indicated they would prefer no new acoustic screening be erected to their relevant section of the site boundary. At second floor level and above on these same façades, and at all other residential façades, our indicative calculations give results of L_{eq} NR40 worst case and L_{eq} NR35 over the 9.5 hour school day internally with windows closed.



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- 6.5.8 During the daytime, the Camden guidance for new entertainment sources including customer noise gives a single internal target of NR35 rather than Red, Amber and Green 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).
- 6.5.9 The conclusion on internal levels is therefore similar as for the assessed noise levels in gardens. By 1dB only a significant adverse noise impact is assessed where the relevant residents have indicated they would prefer no new acoustic screening be erected to the relevant section of the site boundary. This 1dB excess should be seen in the context that only a 3dB change in noise levels is considered perceptible.
- 6.5.10 An adverse impact is assessed at some other locations for some periods of the daytime, which may be considered acceptable when assessed in the context of other merits of the development. Beyond the residences in the immediate vicinity of the proposed school playground, noise from the school 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 Roslyn 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 acoustic screens around the playground. The previous acoustic screening proposals have been amended to take account of feedback from residents provided during a site meeting in July 2019. A significant adverse noise impact is assessed for some periods of the daytime for some Downshire Hill residences where the relevant residents have indicated they would prefer no new acoustic screening be erected to their relevant section of the site boundary. An adverse impact is assessed at some other locations for some periods of the daytime. These impacts may be considered acceptable when assessed in the context of other merits of the development.

■ End of Section



Planning Noise Assessment

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} :

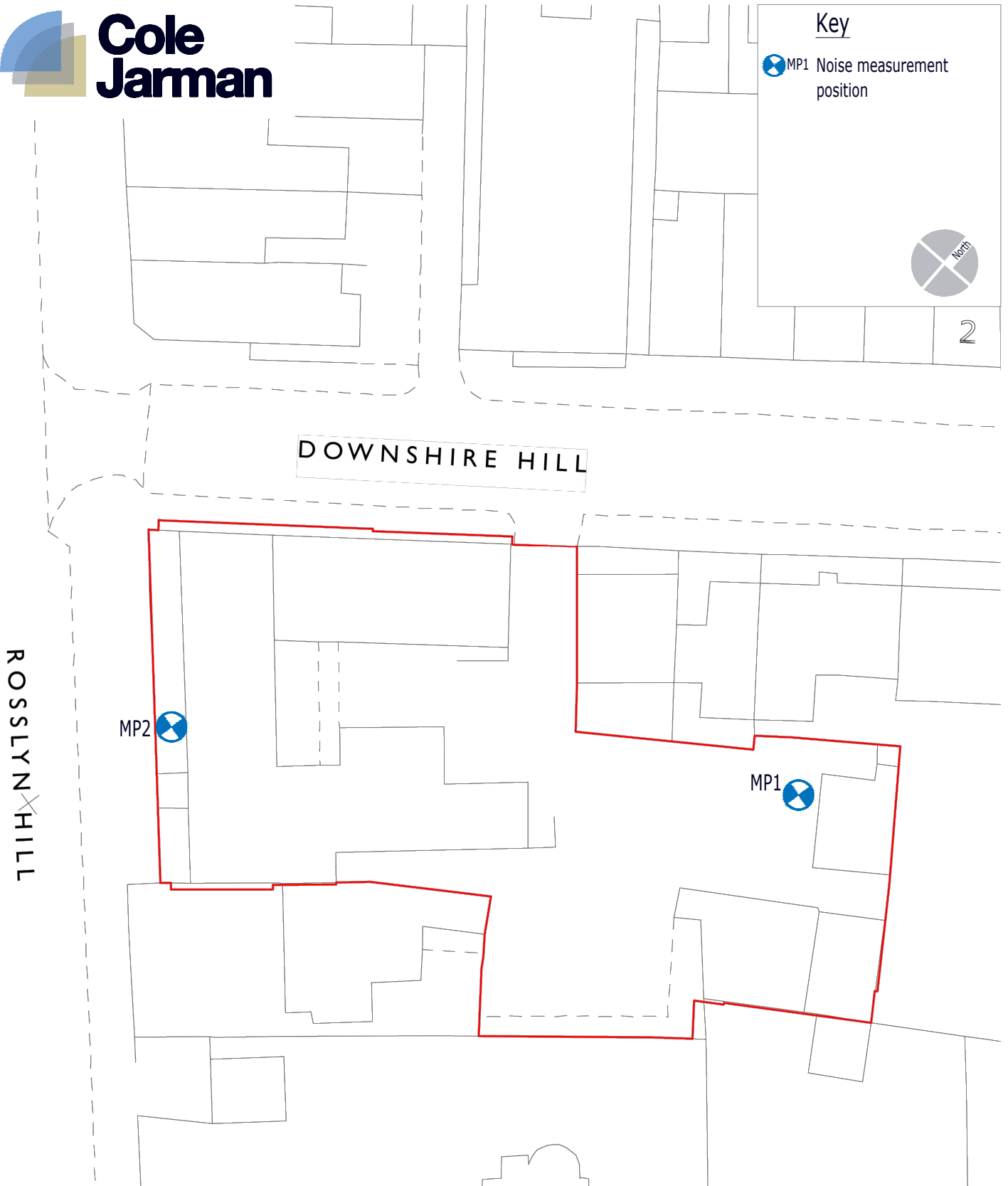
If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} is the level exceeded for 10% of the time and as such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

■ 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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Key

-  AP1 Noise assessment position
-  New acoustic screen
-  Existing boundary wall




Title: Proposed site layout showing noise assessment positions

Figure 19/0071/F2

Project: Abacus Belsize Primary School, Hampstead

Date: 25 September 2019

Revision: 1

Scale: Not to scale

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Figure 19/0084/TH01

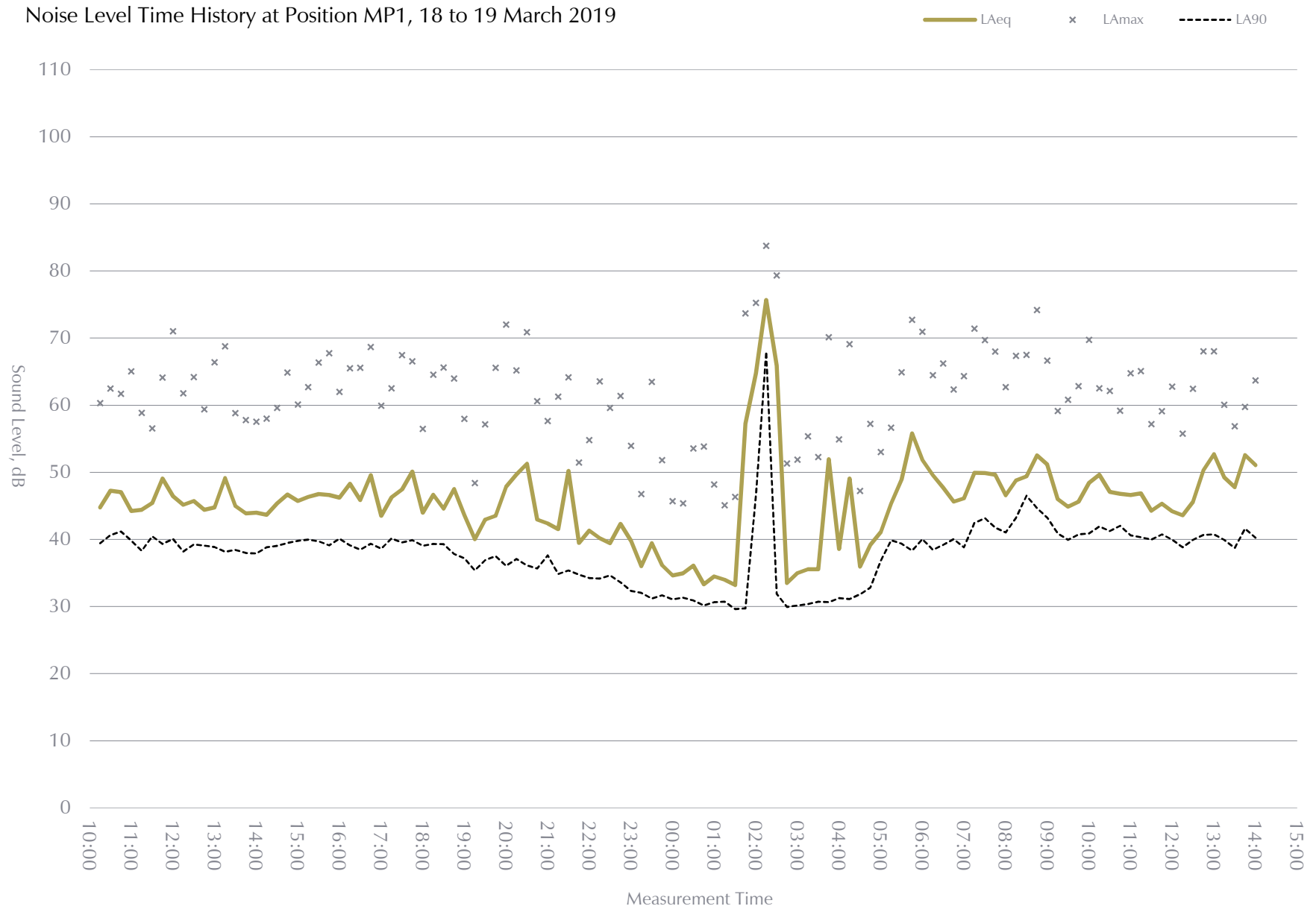




Figure 19/0084/TH02

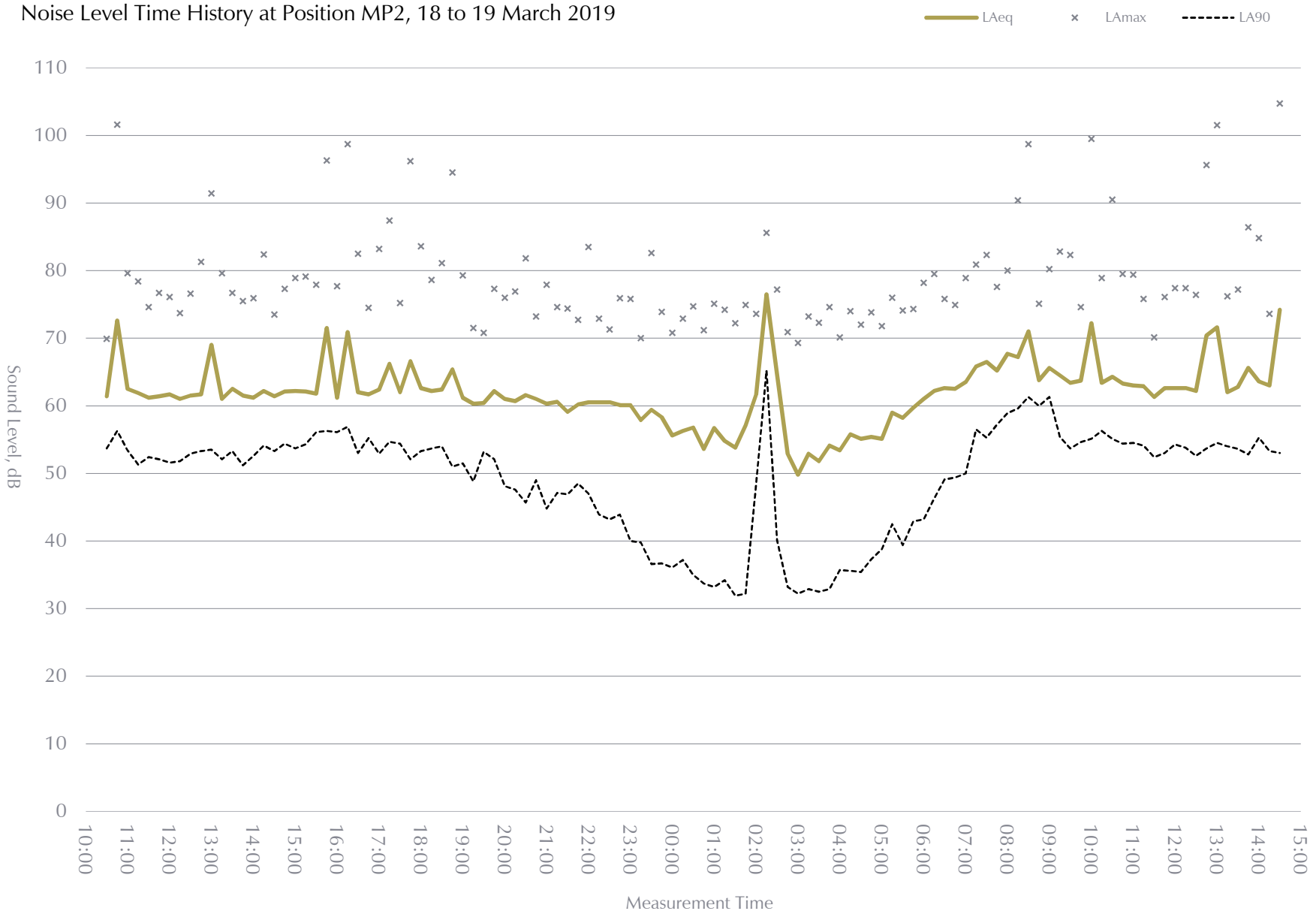
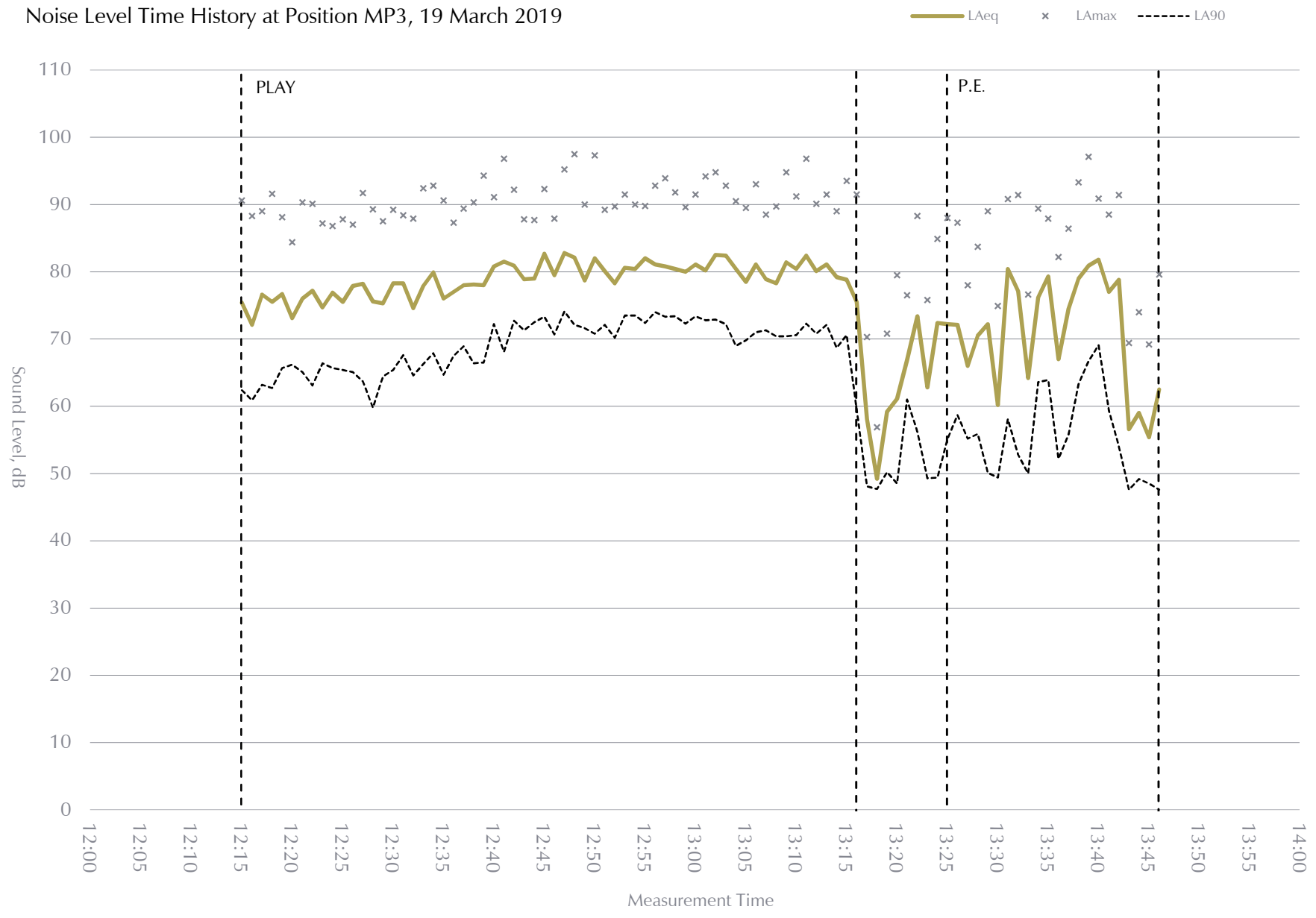




Figure 19/0084/TH03



Appendix A

Subject: Planning Considerations and Guidance
Project: Abacus Belsize Primary School
Date: September 2019 **Prepared: AE**
Revision: 1 **Approved: NJ**

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:



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“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.”



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- 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 and updated in July 2019.
- 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:

"Plan-making and decision making need to 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 ¹ (SOAEL), the Lowest Observed Adverse Effect Level ² (LOAEL) and the No Observed Effect Level ³ (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.

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

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

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



Planning Considerations and Guidance

Response	Examples of Outcomes	Increasing effect level	Action
NOEL (No Observed Effect Level)			
Not present	No Effect	No Observed Effect	No specific measures required
NOAEL (No Observed Adverse Effect Level)			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
LOAEL (Lowest Observable Adverse Effect Level)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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 small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
SOAEL (Significant Observed Adverse Effect Level)			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. 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.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

AT1 Summary of Noise Exposure Hierarchy (from PPG)



Planning Considerations and Guidance

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

“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 a new noise making source, how the noise from it relates to the existing sound environment;*
- *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 (i.e. whether or not the noise contains particular high or low frequency content) and the general character of the noise (i.e. whether or not the noise contains particular tonal characteristics or other particular features), and;*
- *the local arrangement of buildings, surfaces and green infrastructure, and the extent to which it reflects or absorbs noise.*

A3.7 On Local Plans and noise standards the PPG states the following:

“Can Local Plans include noise standards?

Plans may include specific standards to apply to various forms of proposed development and locations in their area. Care should be taken, however, to avoid these being applied as rigid thresholds, as specific circumstances may justify some variation being allowed.”

 End of Section



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