

Maitland Park Estate

NOISE AND VIBRATION IMPACT ASSESSMENT

July 2014



Intended for
EC Harris and London Borough of Camden

Document type
Report

Date
May 2014

MAITLAND PARK NOISE AND VIBRATION IMPACT ASSESSMENT

MAITLAND PARK NOISE AND VIBRATION IMPACT ASSESSMENT

Revision **B**
Date **09/06/2014**

Made by **David Harbon**
BSc (Hons) MSc MIOA

Checked by **Raymond Browne**
BEng PhD MIOA

Approved by **Raymond Browne**
BEng PhD MIOA

Description **Final Issue**

Ref 61031879/NV/R02/B

CONTENTS

1.	INTRODUCTION	1
1.1	Site Description	1
1.2	Scope of Assessment	2
2.	RELEVANT POLICY, GUIDANCE AND LEGISLATION	4
2.1	The National Planning Policy Framework	4
2.2	Noise Policy Statement for England 2010	4
2.3	London Borough of Camden Core Strategy 2010 Policy DP28 – Noise and Vibration	4
2.4	The London Plan (2011) and Revised Early Minor Alterations to the London Plan (2013)	6
2.5	The London Plan: Housing Supplementary Planning Guidance (2012)	6
2.6	BS5228: 2009 'Code of practice for noise and vibration control on construction and open sites'	7
2.7	BS4142: 1997 Method for rating industrial noise affecting mixed residential and industrial Areas	7
2.8	BS8233: 1999 Sound insulation and noise reduction for buildings – Code of practice	8
2.9	World Health Organisation Guidelines	8
3.	METHODOLOGY	10
3.1	Consultation with London Borough of Camden	10
3.2	Assessment of Demolition and Construction Noise and Vibration	10
3.3	Noise Surveys	11
3.4	Operational Noise Assessment - Site Suitability for Residential Development	13
3.5	Operational Noise Assessment - Road Traffic Noise	14
3.6	Operational Noise Assessment – Plant Noise Assessment	14
3.7	Operational Noise Assessment – Internal and External Amenity	14
4.	NOISE SURVEY RESULTS	15
4.1	LT1 – Flat 1 Aspen House Balcony	15
4.2	ST1 – Aspen House Garages	16
4.3	ST2 – West of Maitland Park Site Next to Gym	16
4.4	ST3 – South of Maitland Park Site Next to Aspen House	16
4.5	ST4 – Centre of Site Next to Maitland Park Villas	17
4.6	ST5 – Junction of Maitland Park Villas and Grafton Terrace	17
4.7	ST6 – North-Eastern Corner of Maitland Park site	17
5.	DISCUSSION	18
5.1	Assessment of Demolition and Construction Noise and Vibration	18
5.2	On-site Construction Activities	18
5.3	Operational Noise Assessment - Site Suitability for Residential Development	20
5.4	Operational Noise Assessment - Road Traffic Noise	20
5.5	Operational Noise Assessment – Plant Noise Assessment	21
5.6	Operational Noise Assessment – Internal Noise Levels	22
5.7	Operational Noise Assessment – Noise Levels in Outdoor Amenity Spaces	23

6.	MITIGATION	1
6.1	Demolition and Construction Noise	1
6.2	Operational Noise Assessment - Site Suitability for Residential Development	2
6.3	Operational Noise Assessment - Road Traffic Noise	3
6.4	Operational Noise Assessment – Plant Noise Assessment	3
6.5	Operational Noise Assessment – Internal Noise Levels	3
6.6	Operational Noise Assessment – Noise Levels in Outdoor Amenity Spaces	4
6.7	Cumulative Noise Assessment	4
8.	CONCLUSIONS	5

TABLES

Table 1	Noise levels on residential sites adjoining railways and roads at which planning permission will not be granted (Table A of DP28)	5
Table 2	Noise levels on residential streets adjoining railways and roads at which attenuation measures will be required (Table B of DP28)	5
Table 3	Vibration levels on residential streets adjoining railways and roads at which planning permission will not be granted (Table C of DP28)	6
Table 4	Noise levels from plant and machinery at which planning permission will not be granted (Table E of DP28)	6
Table 5	Indoor ambient noise design levels (Table 5 of BS8233)	8
Table 6	Guideline values for community noise in specific environments	9
Table 7	Distances at which vibration may just be perceptible	11
Table 8	Description of nearest noise sources and noise sensitive receptors to the Maitland Park site	13
Table 9	Noise Levels at monitoring position LT1	16
Table 10	Noise Levels at monitoring position ST1	16
Table 11	Noise Levels at monitoring position ST2	16
Table 12	Noise Levels at monitoring position ST3	16
Table 13	Noise Levels at monitoring position ST4	17
Table 14	Noise Levels at monitoring position ST5	17
Table 15	Noise Levels at monitoring position ST6	17
Table 16	Predicted Construction Activities	19
Table 17	Construction Activities & Corresponding Noise Levels at Various Distances	19
Table 18	Daytime, evening and night-time average noise levels at Kiln Place	20
Table 19	Daytime and night-time rating levels at the nearest sensitive receptors	21

FIGURES

Figure 1	Site boundary of Maitland Park	2
Figure 2	Noise monitoring locations	11
Figure 3	Nearest noise sources and noise sensitive receptors to the Maitland Park site	13
Figure 4	Predicted noise levels at the nearest noise sensitive receptors due to MUGA activity noise	23

APPENDICES

Appendix 1

Acoustic Terminology

Appendix 2

Consultation with LB Camden

1. INTRODUCTION

- 1.1.1 Ramboll UK Limited has been appointed by EC Harris and the London Borough of Camden (LB Camden) to undertake a noise and vibration impact assessment of the proposed development at Maitland Park, Camden, London.
- 1.1.2 This report has been prepared by Ramboll solely for the benefit of EC Harris and LB Camden. It shall not be relied upon or transferred to any third party, without the prior written authorisation of Ramboll. Any liability arising out of the use by EC Harris and LB Camden, or any third party of this report for purposes not wholly connected with the above shall be the responsibility of EC Harris and LB Camden, and such third party who shall indemnify Ramboll against all claims, costs, damages and losses arising out of such use.
- 1.1.3 Ramboll has endeavoured to assess all information provided to them during this assessment. The report summarises information from a number of external sources and cannot offer any guarantees or warranties for the completeness or accuracy of information relied upon. Information from third parties has not been verified by Ramboll unless otherwise stated in this report.
- 1.1.4 This report is copyright of Ramboll. Any unauthorised reproduction or usage by any other person other than the addressee is strictly prohibited.
- 1.1.5 Refer to Appendix 1 for noise terminology.

1.1 Site Description

- 1.1.6 The site is intersected by Maitland Park Villas Road, and is partially bounded by Grafton Terrace to the north and Maitland Park Road to the east.
- 1.1.7 Residential receptors surround the site in all directions (see Figure 1).
- 1.1.8 Maitland Park is an existing social housing estate and gymnasium. The gymnasium was constructed in the 1930s, and the residential blocks were built between the 1950s and the 1970s.
- 1.1.9 The development proposals include improvements to the estate for new housing, community accommodation and improved landscaping.



Figure 1 Site boundary of Maitland Park

1.2 Scope of Assessment

1.2.1 The scope of the assessment undertaken within this report is as follows:

- Consultation with the Environmental Health Officer at the London Borough of Camden regarding the details of the methodology and scope of the assessment;
- Detailed review of relevant regional and national noise policy and legislation, in particular LB Camden's Core Strategy Policy DP28 – *Noise and vibration*;
- Collection of baseline data to establish the existing background noise levels at the proposed development site. This is to include unattended noise monitoring, over the weekend and weekdays, at a location representative of the noise climate experienced by the nearest sensitive receptors, and additional attended monitoring at a number of locations around the site;
- Assessment of the site suitability for residential development in accordance with the guidance of LB Camden's Core Strategy Policy DP28 – *Noise and vibration*;

- A qualitative assessment of road traffic noise will be provided;
- BS5228: 2009 *Code of practice for noise and vibration control on construction and open sites (Part 1: Noise and Part 2: Vibration)* assessment of noise and vibration effects arising during the construction phase;
- BS4142: 1997 *Method for rating industrial noise affecting mixed residential and industrial areas* assessment to establish the impact of fixed plant associated with the proposed development on the nearest noise sensitive receptors and to determine whether the predicted noise levels will give rise to complaints;
- BS8233: 1999 *Sound insulation and noise reduction for buildings – Code of Practice* assessment, to include World Health Organisation (WHO) Guidelines, of the suitability of the site for residential development, including any necessary mitigation measures to reduce noise from all external sources to **'good' standard levels for internal and external residential amenity**. Recommendations for the design of building envelopes will also be made; and
- Conclusions.

2. RELEVANT POLICY, GUIDANCE AND LEGISLATION

2.1 The National Planning Policy Framework

2.1.1 The National Planning Policy Framework (NPPF) adopted in 2012 in England outlines the Government's planning policies and requirements for the planning system. The NPPF forms a material consideration in planning decisions and hence must be complied with for planning permission to be granted.

2.1.2 Regarding noise, paragraph 109 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of noise pollution.

2.1.3 Hence the planning system should seek to:

- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of planning conditions;
- Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

2.1.4 To achieve these aims the NPPF refers to the Noise Policy Statement for England 2010.

2.2 Noise Policy Statement for England 2010

2.2.1 The Noise Policy Statement for England (NPSE) sets out the long term vision of Government noise policy: 'To promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.'

2.2.2 The NPSE outlines three aims for the effective management and control of environmental, neighbour and neighbourhood noise:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life; and
- Where possible, contribute to the improvement of health and quality of life.

2.2.3 The guidance states that it is not possible to have a single objective noise-based measure that defines 'Significant Observed Adverse Effect Level (SOAEL)' that is applicable to all sources of noise in all situations and that not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

2.3 London Borough of Camden Core Strategy 2010 Policy DP28 – Noise and Vibration

2.3.1 LB Camden's Core Strategy (2010) recognises the effects that noise and vibration can have on amenity and health and therefore quality of life.

2.3.2 Policy DP28 seeks to ensure that noise and vibration is controlled and managed, preventing planning permission being obtained for:

- Developments which are likely to generate noise pollution; or
- Developments which are sensitive to noise in locations with noise pollution, unless attenuation measures are provided.

2.3.3 Where developments sensitive to noise are proposed close to an existing noise source, the Council requires an acoustic report to ensure compliance with *Planning Policy Guidance (PPG) 24: Planning and noise*, although this guidance is now superseded.

2.3.4 Where developments are proposed close to an existing source of vibration, the Council sets out limits for vibration levels which refer to guidance in BS6472-1:2008 '*Guide to evaluation of human exposure to vibration in buildings – Vibration sources other than blasting*'.

2.3.5 *DP28* sets out Noise and Vibration Thresholds which include an evening period in addition to the day and night standards contained in *PPG24*, and these thresholds are presented in Tables 1 to 4 below. It is not stated within the guidance whether the guideline noise levels are free-field or façade noise levels.

Noise description and location of measurement	Period	Time	Sites adjoining railways	Sites adjoining roads
Noise at 1m external to a sensitive façade	Day	0700-1900	74 dB L _{Aeq,12h}	72 dB L _{Aeq,12h}
Noise at 1m external to a sensitive façade	Evening	1900-2300	74 dB L _{Aeq,4h}	72 dB L _{Aeq,4h}
Noise at 1m external to a sensitive façade	Night	2300-0700	66 dB L _{Aeq,8h}	66 dB L _{Aeq,8h}

Table 1 Noise levels on residential sites adjoining railways and roads at which planning permission will not be granted (Table A of DP28)

Noise description and location of measurement	Period	Time	Sites adjoining railways	Sites adjoining roads
Noise at 1m external to a sensitive façade	Day	0700-1900	65 dB L _{Aeq,12h}	62 dB L _{Aeq,12h}
Noise at 1m external to a sensitive façade	Evening	1900-2300	60 dB L _{Aeq,4h}	57 dB L _{Aeq,4h}
Noise at 1m external to a sensitive façade	Night	2300-0700	55 dB L _{Aeq,8h}	52 dB L _{Aeq,8h}
Individual noise events several times an hour	Night	2300-0700	>82 dB L _{Amax} (S time weighting)	>82 dB L _{Amax} (S time weighting)

Table 2 Noise levels on residential streets adjoining railways and roads at which attenuation measures will be required (Table B of DP28)

Vibration description and location of measurement	Period	Time	Vibration levels
Vibration inside critical areas such as a hospital operating theatre	Day, evening and night	0000-2400	0.1 VDV ms ^{-1.75}

Vibration inside dwellings	Evening	0700-2300	0.2 VDV ms ^{-1.75}
Vibration inside dwellings	Night	2300-0700	0.13 VDV ms ^{-1.75}

Table 3 Vibration levels on residential streets adjoining railways and roads at which planning permission will not be granted (Table C of DP28)

Noise description and location of measurement	Period	Time	Noise level
Noise at 1m external to a sensitive façade	Day, evening and night	0000-2400	5 dB(A) < L _{A90}
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1m external to a sensitive façade	Day, evening and night	0000-2400	10 dB(A) < L _{A90}
Noise that has a distinct impulses (bangs, clicks, clatters, thumps) at 1m external to a sensitive façade	Day, evening and night	0000-2400	10 dB(A) < L _{A90}
Noise at 1m external to sensitive façade where L _{A90} > 60 dB	Day, evening and night	0000-2400	55 dB L _{Aeq}

Table 4 Noise levels from plant and machinery at which planning permission will not be granted (Table E of DP28)

2.4 The London Plan (2011) and Revised Early Minor Alterations to the London Plan (2013)

2.4.1 The London Plan (Mayor of London, 2011) and Revised Early Minor Alterations to the London Plan (2013), is the spatial development strategy for Greater London. The main purpose of the London Plan is to ensure that all of the individual plans produced by the London boroughs work together to meet the priorities that are agreed for the whole of the London region.

2.4.2 Policy 7.15 *"Reducing noise and enhancing soundscapes"* states that "development proposals should seek to reduce noise by:

- Minimising the existing and potential adverse impacts of noise on, from, within, or in the vicinity of, development proposals;
- Separating new noise sensitive development from major noise sources wherever practicable through the use of distance, screening, or internal layout in preference to sole reliance on sound insulation; and
- Promoting new technologies and improved practices to **reduce noise at source**".

2.5 The London Plan: Housing Supplementary Planning Guidance (2012)

2.5.1 The London Plan: Housing Supplementary Planning Guidance (Mayor of London, 2012) was published in November 2012.

2.5.2 Section 2.3.26 of the guidance states that "in exceptional circumstances, where site constraints make it impossible to provide private open space for all dwellings, a proportion of dwellings may instead be provided with additional internal living space equivalent to the area of the private open space requirement. This area must be added to the minimum GIA and minimum living area of the dwelling, and may be added to living rooms or may form a separate living room. Enclosing balconies as glazed, ventilated winter gardens will be considered acceptable alternative to open balconies for all flats and this solution is recommended for all dwellings exposed to **NEC noise category C or D**" of PPG24.

- 2.5.3 Section 2.3.28 refers to policy 3.5 of The London Plan and states that the design of new housing developments is required to consider elements that enable the home to become a comfortable place of retreat. Noise is thus considered in this policy.
- 2.5.4 **Standard 5.2.1 states that** "developments should avoid single aspect dwellings that are north facing, exposed to noise levels above which significant adverse effects on health and quality of life occur, or contain three or more bedrooms".
- 2.5.5 **Standard 5.3.1 refers to policy 7.15 of The London Plan and states that** "the layout of adjacent dwellings and the location of lifts and circulation spaces should seek to limit the transmission of noise to sound sensitive rooms within dwellings". **Noise from activities in the street and adjoining properties can cause stress, sleep disturbance and friction between neighbours.** "All dwellings should be built with acoustic insulation and tested to current Building Regulations standards. However, acoustic insulation should not be relied upon as the only means of limiting noise and the layout and placement of rooms within the building should be considered at an early stage in the design process to limit the impact of external noise on bedrooms and living rooms. The impact of noise should also be considered in the placement of private external spaces."

2.6 BS5228: 2009 'Code of practice for noise and vibration control on construction and open sites'

- 2.6.1 BS5228: 2009 '*Code of practice for noise and vibration control on construction and open sites*' gives recommendations for basic methods of noise and vibration control relating to construction work. It also provides guidance concerning methods of predicting and measuring noise and vibration and assessing its impact on those exposed to it. The prediction method considers the noise emission level of the plant, the separation distance between the source and the receiver and the effect of the intervening topography and structures.
- 2.6.2 The DoE Advisory Leaflet (AL) 72 Noise control on building sites is referenced within BS5228. It provides guidance on fixed limits for construction noise:

"Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut. Noise levels, between 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:

- *70 decibels (dBA) in rural, suburban and urban areas away from main road traffic and industrial noise;*
- *75 decibels (dBA) in urban areas near main roads in heavy industrial areas.*

- 2.6.3 These limits are for daytime working outside living rooms. When working outside the normal hours say between 19.00 and 22.00 the allowable noise levels from building sites will be less: such as the reduced values given in the contract specification or as advised by the Environmental Health Officer (a reduction of 10dB(A) may often be appropriate). Noisy work likely to cause annoyance locally should not be permitted between 22.00 hours and 07.00 hours."

2.7 BS4142:1997 Method for rating industrial noise affecting mixed residential and industrial Areas

- 2.7.1 British Standard BS4142:1997 '*Method of rating industrial noise affecting mixed residential and industrial areas*' can be used to assess whether noise sources of an industrial nature are likely to give rise to complaints from people residing in nearby dwellings.
- 2.7.2 The standard describes a method for assessing whether the noise levels from factories, or industrial premises, or fixed installations, or sources of an industrial nature in commercial premises is likely to give rise to complaints from people residing in the affected building. The method is not suitable for

assessing the noise measured inside buildings or when the background and rating noise levels are both very low¹.

2.7.3 The procedure in BS4142:1997 for assessing the likelihood of complaint is to compare the predicted noise level from the source in question, the “specific noise level”, with the background noise level. The likelihood of noise provoking complaints is assessed by subtracting the background noise level from the rating noise level. BS4142:1997 states:

“A difference of around +10dB or higher indicates that complaints are likely. A difference of around +5dB is of marginal significance. A difference of -10dB is a positive indication that complaints are unlikely.”

2.7.4 The standard also notes that “The greater the difference, the greater the likelihood of complaints.”

2.7.5 The following definitions apply:

- i. Specific noise level $L_{Aeq,T}$: The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval;
- ii. Rating level L_{Ar} : The specific noise level plus any adjustment for the characteristic features of the noise; and
- iii. Background noise level L_{A90} : The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval.

2.8 BS8233:1999 Sound insulation and noise reduction for buildings – Code of practice

2.8.1 Guidance on the acceptable noise levels for living rooms and bedrooms within residential buildings is given in BS8233:1999 ‘*Sound insulation and noise reduction for buildings – Code of Practice*’. Advice is given on the design range of internal noise levels, depending on the use of each room and the sensitivity to noise of the operations expected to be conducted in the rooms. An extract of the design levels is reproduced in Table 5.

Criterion	Typical situation	Design Range $L_{Aeq,T}$ dB
Reasonable resting/sleeping conditions	Living rooms	30
	Bedrooms ^a	30
^a For a reasonable standard in bedrooms at night, individual noise events (measured with F time-weighting) should not normally exceed 45 dB L_{Amax} .		

Table 5 Indoor ambient noise design levels (Table 5 of BS8233)

2.8.2 Section 7.6.1.2 of BS8233 suggests that the steady noise level within external residential amenity areas should not exceed 50 dB $L_{Aeq,T}$ and 55 dB $L_{Aeq,T}$ should be regarded as the upper limit.

2.9 World Health Organisation Guidelines

2.9.1 The World Health Organisation (WHO) published their ‘*Guidelines for Community Noise*’ in 1999. The guidance sets out appropriate noise levels for different scenarios to ensure that communities are not subjected to unacceptable levels of noise. It should be noted that the WHO guidelines, although widely references in the UK, have no legal status.

2.9.2 The guidelines are presented in Table 6.

¹ For the purposes of this standard, background noise levels below about 30 dB and rating levels below about 35 dB are considered to be very low.

Specific Environment	Critical Health Effect(s)	L_{Aeq} [dB(A)]	Time Base [hours]	L_{Amax fast} [dB]
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

Table 6 Guideline values for community noise in specific environments

- 2.9.3 The façades of residential buildings will provide some degree of sound attenuation of outdoor noise levels, which will affect the internal noise levels experienced by occupants. This attenuation is at a minimum when windows are open in the façade of the occupied room. The WHO guidelines indicate that a façade with an open window will provide approximately 15 dB(A) attenuation. However, other sources suggest that this is an upper value and sound attenuation is generally in the range of 10 to 15 dB(A) depending upon the exact situation.

3. METHODOLOGY

3.1 Consultation with London Borough of Camden

3.1.1 The Environmental Health Officer (EHO) at LB Camden was consulted regarding the assessment methodologies and criteria that have been used for the purpose of the assessments contained in this report. The criteria as adopted in this report are as agreed on 26 February 2014 and 28 March 2014. Evidence of email correspondence is provided in Appendix 2. An appropriate construction noise threshold level was confirmed via telephone conversation on 28 March 2014.

3.2 Assessment of Demolition and Construction Noise and Vibration

Construction Noise

3.2.1 Proposed demolition and construction works on the Site would involve the use of a variety of working methods, and operations would vary across the Site throughout the development period. Therefore, noise levels from the works are likely to vary significantly over time as the distance from the noise sources and the type of construction activity vary relative to the sensitive receptors.

3.2.2 The exact working methodology and plant to be employed on Site for the demolition and construction work have not been established at this stage in the design. This level of detail will only be available when specialist demolition and civil engineering contractors are engaged as part of the scheme.

3.2.3 However, following best practice, an estimate of the expected noise levels over a representative period during the construction phase was undertaken using a prediction of the construction methods to be used and noise emission data for plant obtained from BS5228:2009. The assessment assumed that all plant would operate for each phase of work, at a given location within the Site.

3.2.4 Construction noise predictions were based on the methodology contained within BS5228:2009-1. This enabled predictions to be made of the noise emissions from the construction activities for given distances from the Site boundary.

3.2.5 A daytime 10 hour construction noise limit of 65dB L_{Aeq} was considered as the basis for identifying potentially significant construction impacts in accordance with the ABC method of BS5228:2009; in line with the consultation undertaken with LB Camden.

3.2.6 The following development stages were considered:

- Use of contractor's compound;
- Demolition of existing site buildings;
- Earthworks and site preparation;
- Building substructure works - CFA piling;
- Building substructure works - pile caps / ground beams; and
- Building superstructure works.

3.2.7 As noted during the consultations with LB Camden, noisy construction work would only be undertaken within daytime hours, between 08.00 and 18.00, Monday to Friday and 08.00 and 13.00 on Saturdays. No work should be undertaken on Sundays or Bank Holidays. If work is required to extend into other periods beyond the core daytime hours, reduced threshold noise levels would apply and separate authorisation would be secured with LB Camden.

Construction Vibration

3.2.8 Certain construction activities can produce a significant amount of ground-borne vibration, which has the potential to cause concern at nearby sensitive receptors. There is no accepted method for predicting the vibration at a sensitive receptor due to the ground-borne vibration from construction plant. However, it is possible to provide an estimate based on historical measurements provided within

BS5228 and therefore provide some guidance on the likely levels that might be generated during the construction period.

- 3.2.9 BS5228 suggests that for the majority of people, vibration levels between 0.14 and 0.3 mms^{-1} PPV are just perceptible. Table 7 details the distances at which certain activities give rise to a just perceptible level of vibration. These figures are based on historical field measurements to inform BS5228. The distances provided in Table 7 have been used to assess if vibration from construction activities would result in an impact on surrounding properties.

Construction activity	Distance from activity (m)
Heavy vehicles (e.g. dump trucks)	5-10
Excavation	10-15
Hydraulic breaker	15-20
Driven piling	50-100

Table 7 Distances at which vibration may just be perceptible

3.3 Noise Surveys

- 3.3.1 Noise surveys were undertaken to establish the existing noise climate around the Maitland Park site against which the assessment of construction and operational noise effects has been determined.
- 3.3.2 Unattended monitoring was carried out from Wednesday 12 March 2014 to Thursday 20 March 2014 at one location that is noted as monitoring position LT1 on Figure 2.
- 3.3.3 Short-term attended noise monitoring was undertaken on Wednesday 12 March 2014 at six locations as indicated on Figure 2 as ST1-ST6. Measurements were 15 minutes in duration at each location.

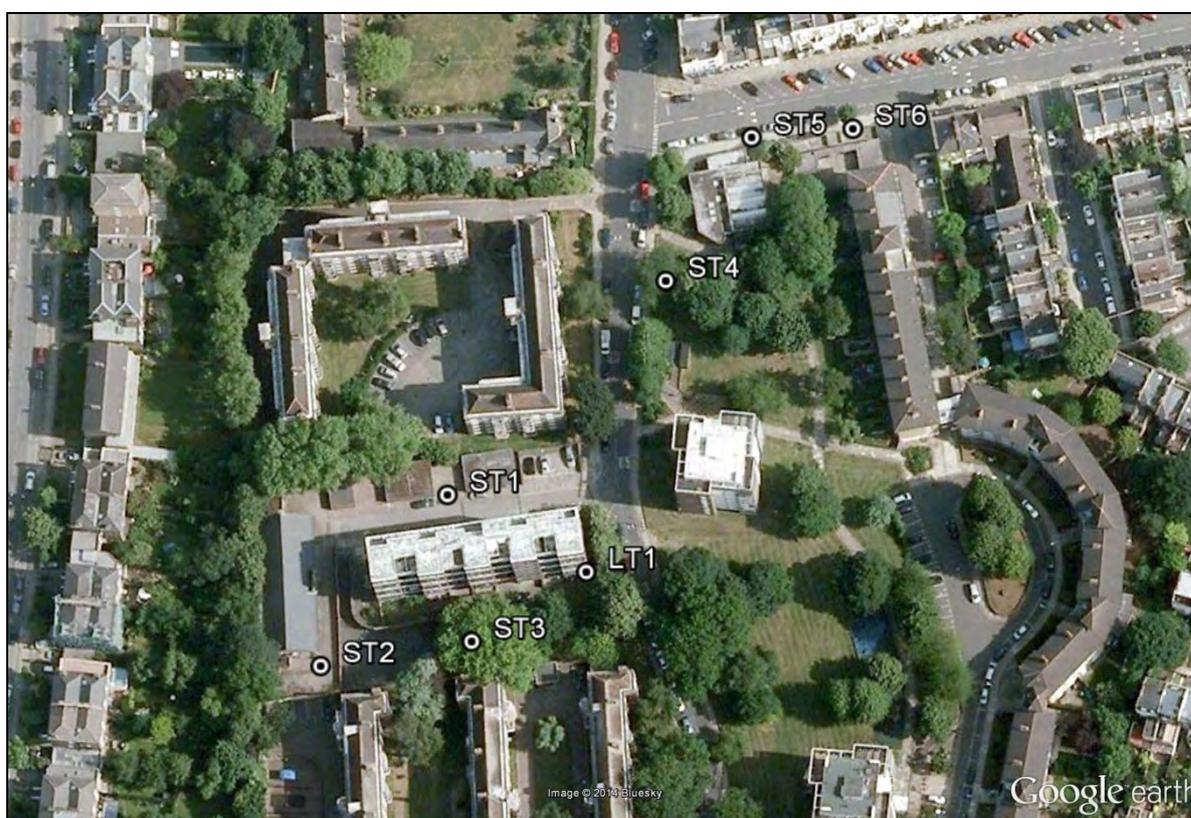


Figure 2 Noise monitoring locations

- 3.3.4 The surveys were carried out using Type 1 Sound Level Meters (SLM). The following equipment was used on site:

- i. 1 No. Nor140 Sound Analyser, Type 1, serial number 1404236;

- ii. 1 No. GRAS-40AF microphone with windshield, serial number 102631;
 - iii. 1 No. Norsonic 1251 Sound Calibrator, serial number 32853;
 - iv. 1 No. 01dB DUO Sound Level Meter, Type 1, serial number 10515;
 - v. 1 No. 01 dB Acoustic Calibrator, serial number 50441973;
 - vi. 1 No. 01 dB Outdoor Microphone Kit;
 - vii. 2 No. Heavy duty tripods; and
 - viii. 1 No. Outdoor weather protection kit (peli case) containing batteries.
- 3.3.5 The attended measurements were taken under free field conditions i.e. >3.5m away from reflecting surfaces unless otherwise stated, and were undertaken at a height of 1.5m above local ground level.
- 3.3.6 The unattended measurements were taken at a height of 1.5m above floor level on the Ground Floor balcony of Flat 1, Aspen House.
- 3.3.7 Each SLM had been calibrated to traceable standards within the preceding two years and the calibrator within the previous 12 months; calibration certificates are available upon request.
- 3.3.8 Each SLM was field calibrated once it was set up in the measurement position and on completion of the survey. No significant drift in the calibration was recorded at any time during the survey.
- 3.3.9 At each measurement location, a comprehensive suite of noise level metrics were recorded. The following noise level indices are relevant to this assessment:
- i. $L_{Aeq,T}$ The A-weighted equivalent continuous noise level over the measurement period;
 - ii. L_{A90} The A-weighted noise level exceeded for 90% of the measurement period. This parameter is often used to describe background noise;
 - iii. L_{AFmax} The maximum A-weighted noise level during the period, with a fast time weighting; and
 - iv. L_{ASmax} The maximum A-weighted noise level during the period, with a slow time weighting.
- 3.3.10 Other metrics were measured and are available for further analysis if required; e.g. L_{AFmin} , L_{peak} , L_{A1} .
- 3.3.11 The weather conditions during the surveys were dry, with wind speeds mostly below 5m/s in variable direction. Periods of wind speeds in excess of 5m/s were experienced from Friday 14 March 2014 to Wednesday 19 March 2014.
- 3.3.12 Figure 3 shows the nearest noise sensitive receptors to the site; as indicated by R1-R13. The nearest permanent noise sources to the site are indicated as S1 and S2. Other noise sources were experienced during the baseline noise surveys, but are not shown on Figure 3 due to the temporary nature of these sources.
- 3.3.13 Table 8 provides a description of the noise sources and receptors identified, and an approximate distance from the site boundary.



Figure 3 Nearest noise sources and noise sensitive receptors to the Maitland Park site

Reference	Description	Approximate distance from the site boundary (m) (at closest point)
S1	Maitland Park Villas	0
S2	Grafton Terrace	0
R1	Alder House	10
R2	Hornbeam House	5
R3	Residents at Parkhill Road	25
R4	Oak House	5
R5	Chestnut House	5
R6	Beech House	5
R7	Rowan House	40
R8	Residents at Maitland Park Road	7
R9	Whitebeam House	0
R10	Residents off Grafton Terrace	5
R11	TRA Hall	0
R12	The Lord Southampton/ residents at Grafton Terrace	17
R13	Fraser Regnart Court	17

Table 8 Description of nearest noise sources and noise sensitive receptors to the Maitland Park site

3.4 Operational Noise Assessment - Site Suitability for Residential Development

3.4.1 The assessment of the Site's suitability for residential use, in terms of noise, will be determined by using the guidelines contained within Camden Policy DP28: Noise and Vibration, and the NPPF as agreed with the LB Camden.

3.5 Operational Noise Assessment - Road Traffic Noise

- 3.5.1 A qualitative assessment of road traffic noise will be provided as traffic data is not available to produce a quantitative assessment in accordance with the methodology of CRTN, as traffic flows around the site are not deemed to be significant.

3.6 Operational Noise Assessment – Plant Noise Assessment

- 3.6.1 The type, quantity and location of fixed mechanical and electrical (M&E) plant associated with the Proposed Development has not been finalised at this stage in the design and hence it is not possible to fully quantify the building services plant noise impact at the nearest noise sensitive receptors.
- 3.6.2 The noise levels from M&E plant should be considered once details of the plant are known and it is therefore suggested that noise emissions from plant associated with the Proposed Development is controlled via a suitably worded planning condition.
- 3.6.3 However, in accordance with the methodology contained within BS4142:1997, rating noise levels ($L_{A,r}$ dB) at the surrounding noise sensitive premises have been provided based upon the lowest measured daytime and night-time noise levels from the baseline survey, and the assessment criteria stipulated by the LB Camden.

3.7 Operational Noise Assessment – Internal and External Amenity

- 3.7.1 Based upon the external building façade noise levels, recommendations will be made for appropriate glazing build-ups in order to achieve the 'good' criteria of BS8233:1999 and the WHO Guidelines for Community Noise.
- 3.7.2 The noise levels as measured during the baseline noise survey will be assessed against the BS8233:1999 guidance for noise levels in external amenity spaces, including balconies.

4. NOISE SURVEY RESULTS

4.1 LT1 – Flat 1 Aspen House Balcony

4.1.1 A summary of the noise levels as measured at the balcony of Flat 1 Aspen House on the Maitland Park site during the survey is presented following in Table 9.

Date	Time Period	Average L _{Aeq,T} dB	Maximum L _{AF(Max)} dB	Average L _{A90,T} dB	Lowest L _{A90,15min} dB (time occurring)
Wednesday 12/03/2014	Daytime* (10.45 - 19:00)	55.0	84.6	43.7	42.1 (13.30-13.45)
	Evening (19:00 - 23:00)	47.3	78.2	40.6	39.7 (22.45-23.00)
	Night time (23:00 - 07:00)	45.7	72.0	39.4	36.8 (01.45-02.00)
Thursday 13/03/2014	Daytime (07:00 - 19:00)	51.9	80.7	42.6	40.3 (14.15-14.30)
	Evening (19:00 - 23:00)	47.6	70.8	40.3	38.6 (21.45-22.00)
	Night time (23:00 - 07:00)	44.7	70.8	39.8	38.2 (23.00-23.15)
Friday 14/03/2014	Daytime (07:00 - 19:00)	50.7	78.1	41.8	40.3 (11.45-12.00)
	Evening (19:00 - 23:00)	47.3	79.9	38.0	36.3 (22.00-22.15)
	Night time (23:00 - 07:00)	44.6	69.4	38.0	36.3 (03.30-03.45)
Saturday 15/03/2014	Daytime (07:00 - 19:00)	49.6	79.2	41.8	38.6 (07.00-07.15)
	Evening (19:00 - 23:00)	48.3	78.1	40.2	39.1 (21.30-21.45)
	Night time (23:00 - 07:00)	45.5	74.5	38.1	36.8 (04.00-04.15)
Sunday 16/03/2014	Daytime (07:00 - 19:00)	48.9	81.9	40.8	38.1 (08.30-08.45)
	Evening (19:00 - 23:00)	47.6	79.1	39.0	37.0 (22.45-23.00)
	Night time (23:00 - 07:00)	41.8	75.2	36.6	34.9 (02.45-03.00)
Monday 17/03/2014	Daytime (07:00 - 19:00)	54.1	80.4	41.7	39.3 (13.00-13.15)
	Evening (19:00 - 23:00)	47.1	80.8	39.1	37.7 (22.45-23.00)
	Night time (23:00 - 07:00)	43.4	76.5	36.3	34.5 (02.15-02.30)
Tuesday 18/03/2014	Daytime (07:00 - 19:00)	53.3	82.5	43.5	40.3 (07.00-07.15)
	Evening (19:00 - 23:00)	50.2	84.8	40.6	38.8 (22.30-22.45)
	Night time**	43.3	68.1	38.1	36.4

Date	Time Period	Average $L_{Aeq,T}$ dB	Maximum $L_{AF(Max)}$ dB	Average $L_{A90,T}$ dB	Lowest $L_{A90,15min}$ dB (time occurring)
Wednesday 19/03/2014	(23:00 - 07:00)				(02.00-02.15) (03.15-03.30)
	Daytime (07:00 - 19:00)	59.0	92.3	43.8	41.0 (13.30-13.45)
	Evening (19:00 - 23:00)	48.0	71.6	42.6	41.9 (20.15-20.30)
	Night time** (23:00 - 01:00)	46.9	69.0	41.8	41.0 (00.55-01.00)
Thursday 20/03/2014					

* Readings taken from 10.45 to 19.00 only, not full daytime measurements

** Readings taken from 23.00 to 01.00 only, not full night-time measurements

Table 9 Noise Levels at monitoring position LT1

4.2 ST1 – Aspen House Garages

4.2.1 A summary of the noise levels as measured at noise monitoring location ST1 is provided following in Table 10.

Time of measurement	Average $L_{Aeq,T}$ dB	Maximum $L_{AF(Max)}$ dB	Average $L_{A90,T}$ dB
12.10-12.25	58.2	75.6	42.6

Table 10 Noise Levels at monitoring position ST1

4.2.2 The dominant noise sources at this location included road traffic, an overhead circling helicopter and birdsong. Other noise sources included pedestrian conversation, distant sirens and distant construction noise.

4.3 ST2 – West of Maitland Park Site Next to Gym

4.3.1 A summary of the noise levels as measured at noise monitoring location ST2 is provided following in Table 11.

Time of measurement	Average $L_{Aeq,T}$ dB	Maximum $L_{AF(Max)}$ dB	Average $L_{A90,T}$ dB
12.30-12.45	52.3	63.2	43.6

Table 11 Noise Levels at monitoring position ST2

4.3.2 The dominant noise sources at this location included road traffic and construction noise. Other noise sources included pedestrian conversation, distant sirens and birdsong.

4.4 ST3 – South of Maitland Park Site Next to Aspen House

4.4.1 A summary of the noise levels as measured at noise monitoring location ST3 is provided following in Table 12.

Time of measurement	Average $L_{Aeq,T}$ dB	Maximum $L_{AF(Max)}$ dB	Average $L_{A90,T}$ dB
13.22-13.37	52.5	72.9	45.9

Table 12 Noise Levels at monitoring position ST3

4.4.2 The dominant noise sources at this location included plant extract noise from Aspen House, construction noise and road traffic. Other noise sources included pedestrian conversation, distant sirens and birdsong.

4.5 ST4 – Centre of Site Next to Maitland Park Villas

4.5.1 A summary of the noise levels as measured at noise monitoring location ST4 is provided following in Table 13.

Time of measurement	Average $L_{Aeq,T}$ dB	Maximum $L_{AF(Max)}$ dB	Average $L_{A90,T}$ dB
13.47-14.02	50.8	67.6	41.7

Table 13 Noise Levels at monitoring position ST4

4.5.2 The dominant noise sources at this location included road traffic and construction noise. Other noise sources included pedestrian conversation, distant sirens and birdsong.

4.6 ST5 – Junction of Maitland Park Villas and Grafton Terrace

4.6.1 A summary of the noise levels as measured at noise monitoring location ST4 is provided following in Table 14.

Time of measurement	Average $L_{Aeq,T}$ dB	Maximum $L_{AF(Max)}$ dB	Average $L_{A90,T}$ dB
13.19-13.34	55.1	73.7	44.6

Table 14 Noise Levels at monitoring position ST5

4.6.2 The dominant noise sources at this location included road traffic and construction noise. Other noise sources included pedestrian conversation, a car radio and car door slams.

4.7 ST6 – North-Eastern Corner of Maitland Park site

4.7.1 A summary of the noise levels as measured at noise monitoring location ST6 is provided following in Table 15.

Time of measurement	Average $L_{Aeq,T}$ dB	Maximum $L_{AF(Max)}$ dB	Average $L_{A90,T}$ dB
13.35-13.50	57.3	72.2	44.6

Table 15 Noise Levels at monitoring position ST6

4.7.2 The dominant noise sources at this location included road traffic and construction noise. Other noise sources included pedestrian conversation and activity, and car door slams.

5. DISCUSSION

5.1 Assessment of Demolition and Construction Noise and Vibration

Construction Noise

5.1.1 At this stage in the design, it is understood that the proposed development buildings will comprise the following construction methods:

- **Substructure** – Foundation solution is expected to comprise continuous flight auger piles, with reinforced concrete pile caps and ground beams (to be verified).
- **Superstructure** – Reinforced concrete framed structure.

5.1.2 The construction activities associated with this development that have the potential to cause noise impacts are listed below:

- Use of contractor's compound;
- Demolition of existing site buildings;
- Earthworks and site preparation;
- Building substructure works - CFA piling;
- Building substructure works - pile caps / ground beams; and
- Building superstructure works.

5.2 On-site Construction Activities

5.2.1 Exact details of the construction methods and plant to be employed on site have not been finalised. However, in accordance with industry best practice, an estimate of the expected noise levels over a representative period has been prepared to provide initial guidance on the magnitude of the noise impact on the surrounding noise sensitive receptors. The assessment assumes that all plant would operate for each phase of work, at the closest point to each sensitive receptor without any mitigation measures in place.

5.2.2 Table 16 presents typical items of plant likely to be used during the various phases of demolition and construction works at the site. It should be noted that the types of plant and estimated time periods that they will be operational during the construction activities has been based on experience of similar developments. This enables an indication to be provided of the noise levels that would affect the surrounding noise sensitive receptors during the construction period.

Activity	Plant	Est.% on time	Noise level at 10m (dB)*	Overall noise level per Activity at 10m (L _{Aeq} dB)
Contractor's compound	Generator	100	66	72
	Telescopic handler	10	69	
	Lorry pulling up	25	64	
Demolition	Pulverizer mounted on excavator	80	79	83
	Dozer	50	79	
	Wheeled mobile crane	50	67	
	Gas cutter	20	72	
	Lifting platform	30	65	
	Generator	100	62	
	Lorry pulling up	25	64	
Earthworks & site preparation	Dozer	50	74	76
	Tracked excavator	80	72	
	Lorry pulling up	30	65	
Substructure works (CFA piling)	CFA piling - Crawler mounted rig	80	79	80
	Tracked excavator (inserting cage)	30	69	
	Concrete pump	30	73	
	Lorry pulling up	30	65	
Substructure works (pile caps / ground beams)	Tracked excavator	50	70	77
	Lorry pulling up	20	63	
	Concrete mixer truck + pump	20	71	
	Poker vibrator (x2)	20	71	
	Compressor	50	69	
Superstructure works	Lorry pulling up	15	62	81
	Wheeled mobile telescopic crane	20	71	
	Lifting platform	20	60	
	Telescopic handler	15	71	
	Caged material hoist	50	68	
	Concrete mixer truck + pump (x2)	30	76	
	Poker vibrator (x3)	20	76	
	Vibratory tamper	20	56	
	Power float	20	65	
	Compressor for power tools	50	71	

* Noise level accounts for number of plant items and estimated percentage on-time

Table 16 Predicted Construction Activities

5.2.3 Table 17 shows the noise levels (dB) at various distances from the activities presented in Table 16 by estimating the noise reduction with distance from the source, assuming 6dB reduction per doubling of distance. A +3dB building façade correction factor has been applied in accordance with BS5228.

Construction Activity	Distance to Receptor (m)				
	10	20	30	40	50
Contractor's compound	75	69	65	63	61
Demolition	86	80	76	74	72
Earthworks	79	73	69	67	65
Substructure works - CFA piling	83	77	74	71	69
Substructure works - pile caps / ground beams	80	74	70	68	66
Superstructure works	84	78	74	72	70

Table 17 Construction Activities & Corresponding Noise Levels at Various Distances

- 5.2.4 Table 17 identifies the distances from the construction activities where the 65dB $L_{Aeq,T}$ threshold criteria will be exceeded. It can be seen that most demolition and construction activities are expected to give rise to noise levels that will exceed the 65dB $L_{Aeq,T}$ threshold criteria at a distance of 50m from the site.
- 5.2.5 Due to the proximity of the surrounding residential properties in all directions, as presented in Table 8, there is potential for the construction works to result in adverse impacts if the key noise producing activities are not adequately mitigated.
- 5.2.6 Based on the factors outlined above, mitigation measures will be required to control noise arising from the proposed construction works. Mitigation measures are discussed in Section 6 of the report.

Construction Vibration

- 5.2.7 With reference to Table 7, and the distances to the surrounding vibration sensitive receptors, there is potential for certain construction activities to give rise to a perceptible level of vibration at the nearest sensitive receptors in all directions.
- 5.2.8 For the majority of on-site construction activities, the effects of vibration are only likely to be apparent when the works are being undertaken at the closest point to the receptor. However, the exception to this is the proposed CFA piling which may give rise to a perceptible level of vibration during operation.
- 5.2.9 Construction activities that have the potential to result in vibration impacts will need to be effectively managed so that where practicable, they are undertaken away from sensitive receptors. Where the works cannot be sited in less sensitive locations, the use of alternative techniques and/or smaller plant items which generate lower levels of vibration will be adopted.
- 5.2.10 It should be noted that the vibration criteria used for the assessment is based on the likelihood of perceptibility, rather than causing damage to property.
- 5.2.11 Vibration mitigation measures are discussed in Section 6.

5.3 Operational Noise Assessment - Site Suitability for Residential Development

- 5.3.1 From the unattended noise survey results as presented in Table 9, the average daytime, evening and night-time noise levels in terms of L_{Aeq} are presented following in Table 18.

Daytime average $L_{Aeq12hr}$ dB	Evening average L_{Aeq4hr} dB	Night-time average L_{Aeq8hr} dB
54	48	45

Table 18 Daytime, evening and night-time average noise levels at Kiln Place

- 5.3.2 The noise levels in Table 18 have been assessed against the criteria in DP28 for sites adjoining railways and roads.
- 5.3.3 It can be seen that the noise levels in Table 18 do not exceed the noise levels on residential streets adjoining railways and roads at and above which attenuation measures will be required.
- 5.3.4 The threshold for individual noise events of >82 dB L_{Amax} (slow weighting) during night-time periods was not exceeded at any point throughout the duration of the baseline noise survey.

5.4 Operational Noise Assessment - Road Traffic Noise

- 5.4.1 The Maitland Park site is accessed via Grafton Terrace and Southampton Road. The road immediately adjacent to the site is Maitland Park Villas, which is only accessed from Grafton Terrace and Southampton Road. No access is available from the Prince of Wales Road to the South of the site and so Maitland Park Villas has very low traffic flows.

5.4.2 Vehicle movements on Maitland Park Villas are only required for access to residential properties and typically travel at low speeds. Given this, and that the site already comprises residential use, no significant increase in road traffic noise is expected.

5.4.3 Traffic flows on Grafton Terrace are also travelling at low speeds due to traffic calming restrictions and low speed limits, and it was noted during the baseline noise surveys that traffic flows on this road were limited. Given this, and that the site already comprises residential use, no significant increase in road traffic noise is expected.

5.5 Operational Noise Assessment – Plant Noise Assessment

5.5.1 BS4142:1997 considers the background noise to be measured using the L_{A90} metric. Based on the survey results undertaken at measurement position LT1 which was sited in the locality of the nearest residential receptors the relevant background noise levels are as follows:

- Lowest $L_{A90,15min}$ background noise level during the daytime period = 38 dB
- Lowest average $L_{A90,15min}$ background noise level during the daytime period = 41 dB
- Lowest $L_{A90,15min}$ background noise level during the night-time period = 35 dB
- Lowest average $L_{A90,15min}$ background noise level during the night-time period = 36 dB

5.5.2 The levels presented are deemed to be representative of the noise levels experienced at the nearest sensitive receptors. The duration of the background noise level is not defined in the standard but a representative period should be chosen based on the site conditions.

5.5.3 Based upon the lowest background noise levels ($L_{A90,15min}$) measured during the baseline noise survey at LT1, the rating level (L_{Ar} dB) as per BS4142:1997 can be calculated as shown in Table 19. The rating noise levels are designed to -5 dB (A) below the background noise level, in accordance with the consultation undertaken with LB Camden.

Daytime rating level $L_{Ar,1hour}$ dBA	Night-time rating level $L_{Ar,5mins}$ dBA
33-36	30-31

Table 19 Daytime and night-time rating levels at the nearest sensitive receptors

5.5.4 Section 1 of BS4142:1997 states that background noise levels below about 30 dB and rating levels below about 35 dB(A) are considered to be very low.

5.5.5 Provided that the noise emissions from all of the M&E plant are within the calculated rating noise level above for the appropriate period then noise emissions from plant can be deemed to be adequately controlled.

5.5.6 A +5dB(A) acoustic feature correction must be applied to the rating level if one or more of the following features occur, or are expected to be present for new or modified noise sources:

- The noise contains a distinguishable, discrete, continuous note (whine, hiss, screech, hum, etc.);
- The noise contains distinct impulses (bangs, clicks, clatters, or thumps); and/or
- The noise is irregular enough to attract attention.

5.5.7 If the acoustic feature correction is applied, the rating noise levels presented must be reduced by 5 dB(A).

5.5.8 The operational hours of the plant to be installed is not known at the time of writing. Therefore daytime and night-time criteria have been defined. If the night-time criterion is satisfied, the daytime criterion will be met.

5.6 Operational Noise Assessment – Internal Noise Levels

- 5.6.1 In terms of absolute noise levels, BS8233:1999 specifies that (L_{Aeq}) noise levels should be between 30-40 dB(A) for good to reasonable resting/sleeping conditions within living rooms and 30-35 dB(A) for bedrooms. In accordance with BS8233:1999 and the WHO Guidelines for Community Noise, a level of 45 dB L_{AFmax} in bedrooms should not be exceeded.
- 5.6.2 These are internal noise levels and therefore with 10-15 dB(A) of attenuation that would be provided **with an 'open window' arrangement, this gives an external façade design level between 45-55 dB $L_{Aeq,16hr}$** for living rooms and 45-50 dB $L_{Aeq,16hr}$ for bedrooms.
- 5.6.3 It can be seen that from Table 9 that the daytime façade noise levels are expected to be greater than 50 dB L_{Aeq} and therefore a natural ventilation strategy based purely on opening windows would not be **sufficient to control internal ambient noise levels to achieve the 'good' criterion of BS8233:1999**. Refer to Section 6.5 for mitigation measures.

TRA Hall

- 5.6.4 The TRA Hall at the northern site boundary (at the junction of Grafton Terrace and Maitland Park Villas) has the potential to give rise to negative impacts at the nearest noise sensitive receptors if noise egress is not adequately controlled.
- 5.6.5 It is proposed that there will be residential development above the TRA Hall, and therefore these future residential receptors are expected to be the worst affected by any noise from activity in the hall.
- 5.6.6 Assuming that the internal noise level in the TRA Hall is 85 dB(A) for amplified music, the floor slab that separates the hall from the residential properties (if directly above) should have a sound insulation performance of approximately R_w 60 dB (allowing a 5dB contingency to allow noise ingress from other sources) **in order for the BS8233:1999 'good' criterion to be achieved. Recommended mitigation measures** in order to achieve this criterion are discussed in Section 6. However it is not expected that amplified music will be a regular occurrence in the TRA Hall and is more likely to be used for amplified speech, which may allow reduced sound insulation performance to be required.
- 5.6.7 Noise egress from the TRA Hall should not exceed approximately 60 dB L_{Aeq} at the ground floor façade of the TRA Hall in order to achieve a façade noise level of 45 dB L_{Aeq} (allowing opening windows) at the façade of the nearest noise sensitive receptor at Grafton Terrace, and above the TRA Hall. Assuming an internal noise level in the TRA Hall of 85 dB(A) for amplified music, if the building envelope can provide a sound insulation performance of R_w 30dB then the noise level threshold of 60 dB L_{Aeq} will not be exceeded; thus allowing internal ambient noise levels to be achieved.

Multi-Use Games Area

- 5.6.8 A Multi-Use Games Area (MUGA) is proposed to the south-eastern site boundary; as depicted in red on Figure 1.
- 5.6.9 Noise from games activities on the MUGA has the potential to increase the noise levels as experienced by the nearest sensitive receptors and may provide disturbance to existing and future residential receptors.
- 5.6.10 It is expected that existing residential properties have openable windows. In order to achieve the **BS8233:1999 'good' criterion for internal ambient noise levels, as discussed in Section 6.6.2, the** façade noise levels at existing properties should not exceed 45 dB L_{Aeq} .
- 5.6.11 Assuming a worst case scenario, in order to achieve a façade noise level of 45 dB L_{Aeq} at the façade of the nearest sensitive receptor off Grafton Terrace, a noise level of 78 dB L_{Aeq} cannot be exceeded at the closest point of the site boundary of the MUGA, i.e. north-eastern corner of the MUGA (see Figure 4). The numbers as presented in the large circles on each building are the highest predicted façade noise levels in terms of L_{Aeq} dB.

5.6.12 It is deemed unlikely that this noise threshold will be exceeded due to activity on the MUGA and therefore negative impacts are not expected to existing and future residential receptors.

5.6.13 Furthermore noise from the MUGA is expected to be intermittent and shall not be continuous during daytime and evening periods and so any noise arising from activity on the MUGA is expected to be limited to short periods; thus reducing any potential impacts to the nearest residential receptors.

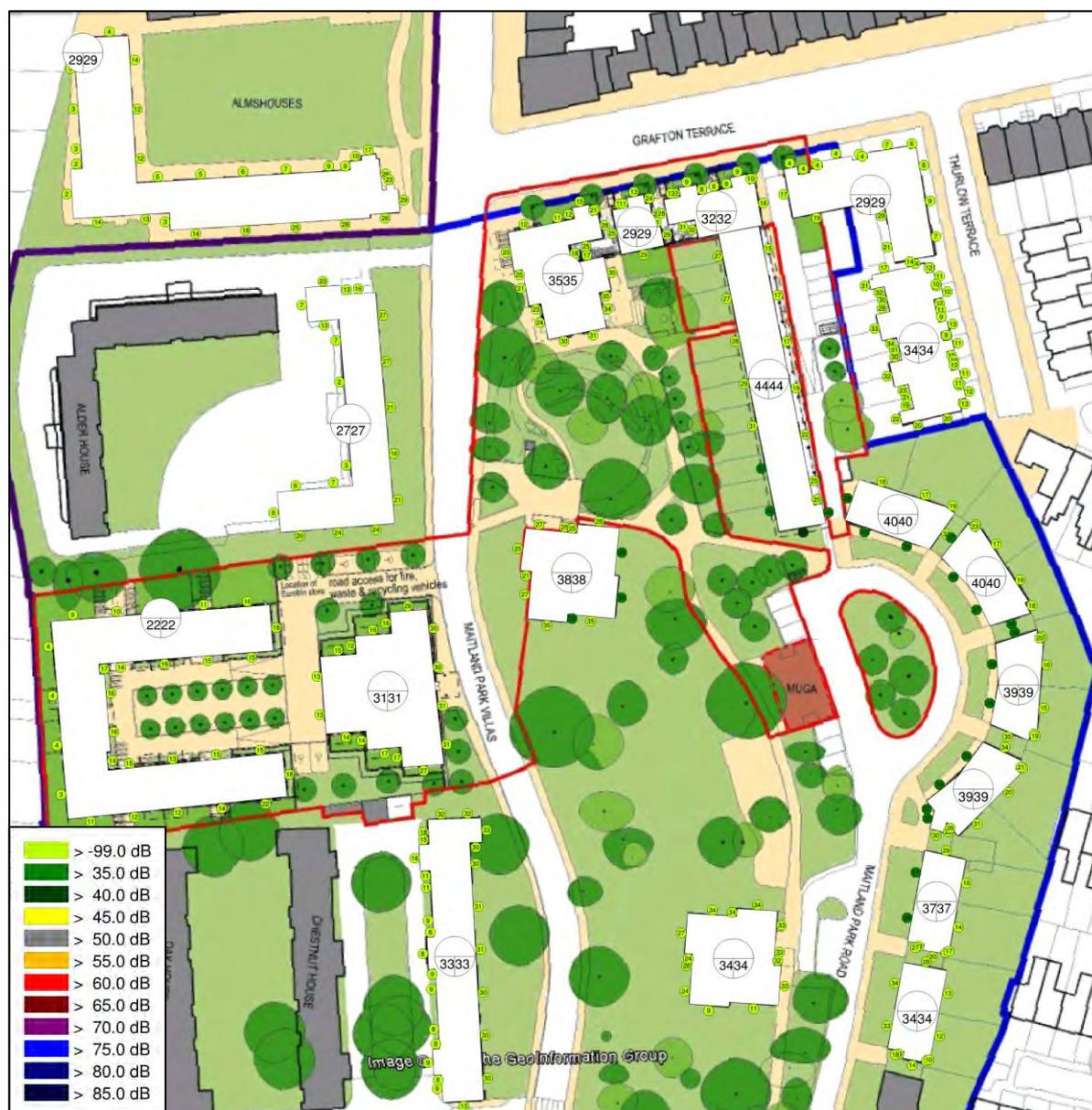


Figure 4 Predicted noise levels at the nearest noise sensitive receptors due to MUGA activity noise

5.6.14 Any future noise complaints that arise from the use of the MUGA should be treated as a noise nuisance issue.

5.7 Operational Noise Assessment – Noise Levels in Outdoor Amenity Spaces

5.7.1 BS8233:1999 and the WHO Guidelines recommend an upper ambient noise level of 55 dB L_{Aeq} in outdoor amenity spaces. The results of the noise survey as shown in Table 9 indicate that there will be periods when this criterion will be exceeded; although the background noise levels are mostly below the criterion. However this is deemed typical of outdoor amenity spaces in London.

5.7.2 Noise activity from the MUGA may cause the noise level in outdoor amenity areas that are local to the MUGA to be intermittently exceeded. However as the MUGA is only expected to be used for short periods, significant impacts are not expected to occur.

6. MITIGATION

6.1 Demolition and Construction Noise

6.1.1 As noted previously, in the absence of mitigation, adverse noise effects are likely to arise during the demolition and construction phase of the Proposed Development. At this stage, the detailed methodology for the works has not been defined and consequently specific mitigation measures cannot be given. However, standard best practice controls and measures would be adopted on-site to ensure **that noise management forms an integral part of the contractors' scope of works.**

6.1.2 A Construction Management Plan (CMP) will be prepared which will define mitigation measures to be adopted to minimise noise and vibration emissions at surrounding sensitive receptors. This will incorporate specific measures within all phases of the works where noise and vibration may give rise to disturbance. It is expected that the CMP will be secured by means of an appropriately worded planning condition.

6.1.3 A monitoring regime will be derived for review with the Council Officers and the appropriate threshold and action levels will be agreed for the noise and vibration parameters that are to be measured, both pre & post construction. Monitoring locations will be established on and around site and on delivery routes where necessary. On a regular basis the site team will produce reports and arrange meetings with the Council Officers and Health & Safety Executive (HSE), if appropriate and other agreed stakeholders to review the reports, monitor the procedures and review the action plans. Weekly monitoring will be carried out both during demolition and construction activities, from previously established and agreed monitoring stations around the development, to ensure that action levels set and agreed have not been exceeded.

6.1.4 Best practicable means (BPM) as defined by the Control of Pollution Act 1974, will be implemented as part of the working methodology. This will serve to minimise the noise and vibration effects at receptors in the vicinity of the construction works. The reduction in noise levels provided through the implementation of BPM varies depending on the nature of the works; however, values in excess of 10 dB can be expected through a combination of appropriate measures.

6.1.5 Typical BPM measures which could be implemented are listed below:

- Restrict working hours;
- Plan working hours to take account of the effects of noise and vibration upon persons in areas surrounding site operations and upon persons working on-site;
- Where reasonably practicable, adopt quiet working methods, using plant with lower noise emissions;
- Where reasonably practicable, adopt working methods that minimise vibration generation;
- Locate plant away from noise and vibration sensitive receptors, where feasible;
- Use silenced and well-maintained plant conforming with the relevant EU directives relating to noise and vibration;
- Avoid unnecessary revving of engines and switch off equipment when not required;
- Keep internal haul routes well maintained;
- Use rubber linings for chutes and dumpers to reduce impact noise;
- Minimise drop height of materials;
- Start-up plant and vehicles sequentially rather than all together;
- Carry out regular inspections of noise mitigation measures to ensure integrity is maintained at all times;
- Provide briefings for all site-based personnel so that noise and vibration issues are understood and mitigation measures are adhered to; and
- Manage plant movement to take account of surrounding noise sensitive receptors, as far as is reasonably practicable.

6.1.6 Other measures to be adopted by the contractor include:

- Loading excavators at ground level to reduce movement vibration by remaining static; tipper lorries with rubber tyres will be loaded from a centralised heap of rubble;
- Travelling on a site road of compacted hard core to further reduce the vibration of the lorries travelling across the site;
- The utilisation of tipping skips lowered to the ground by a crane to reduce ground-borne vibration;
- The use of mains generated electricity instead of diesel generators (where possible);
- Minimising the use of vehicle reversing alarms and a one-way driving system on site;
- Switching off engines on-site when not in use;
- Prohibiting the use of radios and other audio equipment on site;
- The utilisation of a two-way radio communications system to reduce the need for shouting; and
- Regular maintenance of the equipment noise register on site.

6.1.7 Hoarding 2.4 m high would be erected around the working areas, which will serve to provide acoustic screening to the nearby noise sensitive receptors.

6.1.8 The further use of temporary acoustic screens and/or enclosures may need to be adopted for all static items of plant which generate noise levels that have the potential to cause disturbance. Any specific construction activities requiring acoustic screening will be defined as part of the CMP process, which may include demolition activities and elements of the earthworks/external works.

6.1.9 Community liaison and communication regarding construction works should be undertaken throughout the construction phase to provide information to people residing in properties located in the vicinity of the construction works, to reduce the likelihood of adverse effects on the local community which could result in potential noise complaints. The level of engagement required would vary during the construction period, depending upon the expected effects experienced by individual receptors due to the construction works.

6.1.10 Details relating to liaison with the local community will be managed by the Contractor. It is envisaged that community liaison will provide local residents with the following information in relation to the construction works:

- The nature of the works being undertaken;
- The expected duration of the works;
- **The contractor's working hours;**
- Mitigation measures that have been adopted to minimise noise and vibration, as detailed in the CMP;
- Contact details in the event of a noise disturbance; and
- If work is required to extend into periods beyond the agreed hours, separate authorisation should be secured with LB Camden via the CMP.

Controlled Demolition Techniques

6.1.11 In order to reduce the noise and vibration impacts associated with the demolition works at the development site, the works will be undertaken using controlled demolition techniques. This approach requires the demolition methodology to be planned meticulously in advance of works commencing to ensure potential environmental disturbances to surrounding receptors are minimised wherever possible i.e. noise, vibration, dust.

Considerate Constructors Scheme

6.1.12 It is intended that the development will be registered with the Considerate Constructors Scheme. The Scheme strives to minimise any negative impact that construction activities may have on neighbourhoods, while leaving behind long-lasting benefits that enhance communities.

6.2 Operational Noise Assessment - Site Suitability for Residential Development

6.2.1 The mitigation measures required in order to achieve internal ambient noise level criteria are discussed in Section 6.5.

6.3 Operational Noise Assessment - Road Traffic Noise

6.3.1 As no perceptible increase in road traffic noise is expected to occur as the site currently comprises residential development, no mitigation measures are proposed.

6.4 Operational Noise Assessment – Plant Noise Assessment

6.4.1 The following mitigation measures should be taken into account by the design team at the detailed design stage:

- Where possible, placing fixed plant installations internally;
- Selection of low noise emission plant;
- Use of enclosures, acoustic louvres and acoustic barriers;
- Selection of appropriately sized attenuators; and
- Operating plant installations at reduced duty during night-time periods.

6.4.2 It is recommended that the noise levels from fixed plant installations should be considered once details of the building services plant are known and it is therefore suggested that noise emissions from plant associated with the Proposed Development are controlled via a suitably worded planning condition.

6.5 Operational Noise Assessment – Internal Noise Levels

6.5.1 A combination of standard double glazing and acoustic ventilators are expected to be sufficient to **control internal ambient noise levels to within the BS8233:1999 'good' criterion.**

6.5.2 Glazing should meet a minimum specification of R_w 30 dB so as not to compromise the sound insulation performance of the façade. This could typically be achieved with a specification of 6mm glass, 12mm air gap, and 6mm glass, however the sound insulation performance of the glazing must be confirmed by the manufacturer. This assumes the building fabric provides a sound insulation performance in excess of R_w 40 dB.

6.5.3 Acoustic ventilators of minimum performance 30 dB $D_{n,e,w}$ should be sought so as not to compromise the sound insulation performance of the façade.

6.5.4 The recommended sound insulation performance is expected to meet the WHO Guidelines criterion 45 dB L_{AFmax} inside bedrooms based upon the 10th highest L_{AFmax} value measured during the survey period of 70 dB L_{AFmax} . This approach recognises that the suggested 45 dB(A) limit should not be exceeded more than 10-15 times in the night.

6.5.5 The required sound insulation performance is not deemed to be onerous and is also expected to mitigate against future noise sources, e.g. noise egress from the TRA Hall.

TRA Hall Noise

6.5.6 In order to **achieve the BS8233:1999 'good' criterion for internal ambient noise levels above the TRA Hall**, the floor slab that separates the hall from the residential properties (if directly above) should have a sound insulation performance of approximately R_w 60 dB (allowing a 5dB contingency to allow noise ingress from other sources) is expected to be required.

6.5.7 This criterion is expected to be achieved with a combination of a concrete first floor slab and a suspended ceiling in the hall, e.g. 150mm lightweight concrete slab, 240mm cavity, 100mm mineral wool and 2 layers of 12.5mm plasterboard suspended from the slab. However any constructions should be approved by an acoustic consultant during the detailed design stage. Further details will also need to be considered, e.g. vertical flanking transmission provided by structure-borne noise.

6.5.8 If noise levels in the TRA Hall are expected to be less than 85 dB(A), a reduced sound insulation performance criterion may apply. Conversely, if noise levels in the hall are expected to be greater than 85 dB(A), then increased sound insulation performance will be required.

- 6.5.9 Any windows to the TRA Hall should achieve a minimum sound insulation performance of R_w 30 dB. This could typically be achieved with a specification of 6mm glass, 12mm air gap, and 6mm glass, however the sound insulation performance of the glazing must be confirmed by the manufacturer.
- 6.5.10 The layout of the TRA Hall should also be carefully considered at the detailed design stage to place less sensitive rooms, e.g. store rooms and corridors, at the façade to create a buffer between the hall and the façade, to therefore reduce noise egress.

Multi-Use Games Area Noise

- 6.5.11 Mitigation measures are not expected to be required to reduce noise levels from activity on the MUGA.

6.6 Operational Noise Assessment – Noise Levels in Outdoor Amenity Spaces

- 6.6.1 No mitigation measures are proposed in order to reduce noise levels in outdoor amenity spaces. Although at periods the criterion for outdoor amenity spaces will be exceeded, due to existing and future noise sources, e.g. the MUGA, this is deemed typical of a London location.

6.7 Cumulative Noise Assessment

- 6.7.1 It is expected that the cumulative noise climate as a result of the proposed development and existing noise sources will not significantly change when compared to the baseline noise levels as presented in Section 4.
- 6.7.2 The main on-site noise sources, i.e. Maitland Park Villas and Grafton Terrace, will remain in place and as discussed, the change in road traffic noise levels at the nearest noise sensitive receptors is not expected to increase significantly due to traffic calming measures on and surrounding the site.
- 6.7.3 If noise emissions from fixed plant installations are designed to within guideline criteria, the noise climate should not be expected to be significantly affected. Designing to -5dB below background noise levels, in accordance with LB Camden policy, provides a likelihood of complaints of **between a 'positive indication that complaints are unlikely' and 'marginal significance'** in accordance with BS4142:1997.
- 6.7.4 Noise egress from the TRA Hall is not expected to be worse than current noise emissions from activities within the hall. It is expected that if the mitigation measures for building façade elements within Section 6 are adopted, noise egress will be controlled sufficiently to minimise impacts upon the nearest sensitive receptors.
- 6.7.5 The main noise source that is not currently present on the site is the proposed MUGA. The MUGA is expected to locally increase noise levels during daytime periods, but it is not expected that noise as generated by activities on the MUGA will provide significant impacts to the nearest sensitive receptors. Any noise complaints arising from the use of the MUGA should be treated as a noise nuisance issue.

8. CONCLUSIONS

- 8.1.1 Ramboll UK Limited has been appointed by EC Harris and the London Borough of Camden (LB Camden) to undertake a noise and vibration impact assessment of the proposed development at Maitland Park, Camden, London.
- 8.1.2 A detailed review of relevant national, regional and local policy has been undertaken.
- 8.1.3 The EHO at LB Camden was consulted regarding the assessment methodologies and criteria as adopted for the assessments contained in this report.
- 8.1.4 Unattended monitoring was undertaken at 1 location between Wednesday 12 March 2014 and Thursday 20 March 2014 to assess the current noise climate at the Lloyd House building. Attended monitoring was undertaken at 6 locations on Wednesday 12 March 2014.
- 8.1.5 A construction noise and vibration assessment has been undertaken based upon likely construction activities to occur at the proposed development site. Likely construction noise levels are predicted to be more than 10 dB(A) greater than background noise levels at the proposed development site. There is potential for significant impacts at the nearest sensitive receptors if key noise producing activities are not adequately mitigated.
- 8.1.6 Due to the proximity of the sensitive receptors in the vicinity of the application site boundary, it is likely that some vibration will be perceptible in the properties during construction activities.
- 8.1.7 The site suitability for residential development in terms of noise and vibration have been determined in accordance with LB Camden policy; DP28. The assessment found that noise levels at the site do not exceed the criteria for attenuation measures to be required.
- 8.1.8 A qualitative assessment of road traffic noise levels has been provided. The change in vehicular movements due to the proposed development is not expected to give rise to a significant change in noise levels at the façade of the nearest sensitive receptors.
- 8.1.9 The type, quantity and location of mechanical and electrical plant associated with the proposed development have not been defined at this stage in the design and hence it is not possible to fully quantify the noise impact at the nearest noise sensitive receptors. Therefore daytime and night-time rating noise levels have been recommended to be considered during the detailed design stage in order to achieve the LB Camden criterion of -5dB below the background noise level. It is therefore suggested that noise emissions from plant associated with the proposed refurbishment is controlled via a suitably worded planning condition.
- 8.1.10 Suitable façade sound insulation performances have been provided in order to mitigate against existing and future noise sources, e.g. the TRA Hall and the MUGA, to therefore **achieve the 'good' criterion of BS8233:1999 and WHO Guidelines.**
- 8.1.11 Suitable internal sound insulation and building façade sound insulation performances have been recommended for the TRA Hall in order to reduce the likelihood for potential impacts to the nearest residential receptors. However the recommendations made in this report are required to be confirmed and approved by an acoustic consultant during the detailed design stage.
- 8.1.12 It is likely that there will be periods in which the upper ambient noise level of 55 dB L_{Aeq} in outdoor amenity spaces will be exceeded due to the existing noise climate and noise from activity at the MUGA; although the background noise levels as measured during the surveys are mostly below the criterion. However this is deemed typical of outdoor amenity spaces in London.
- 8.1.13 Mitigation measures for the construction and operational phases have been identified. A discussion of cumulative noise impacts has been provided, and with the application of appropriate mitigation measures, it is considered that all significant noise and vibration issues associated with the

construction and operational phases of the proposed development can be controlled and minimised to acceptable levels.

APPENDIX 1
ACOUSTIC TERMINOLOGY

Term	Definition
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20 μ Pa (20x10 ⁻⁶ Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by 20 log ₁₀ (s_1/s_2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20 μ Pa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the time period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$ or Background Noise Level	A noise level index defined as the noise level exceeded for 90% of the time over the time period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5 metres
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS5969.

APPENDIX 2 CONSULTATION WITH LB CAMDEN

From: David Harbon
Sent: 25 March 2014 12:58
To: Parsons, Claire
Cc: Heavey, Eimear
Subject: RE: Maitland Park and Kiln Place, Camden; DH-CP; Scope of Noise and Vibration Assessments; 25 03 14
Importance: High

Claire,

Following on from our discussion regarding the scope of the noise and vibration assessments, I would be grateful for your thoughts regarding the construction noise threshold that should be used for the basis of assessment.

I hoped to be in contact with you sooner regarding this but the noise surveys on both sites took longer than expected.

Between Wednesday 12 March and Wednesday 19 March, the daytime average L_{Aeq} at Maitland Park was 54 dB L_{Aeq} .

Between Wednesday 12 March and Saturday 15 March, the daytime average L_{Aeq} at Kiln Place was 54 dB L_{Aeq} .

In accordance with the ABC method of BS5228:2009 Code of practice for noise and vibration control on construction and open sites (Part 1: Noise), I would be grateful for your thoughts on the use of 65 dB L_{Aeq} as the construction noise threshold for our assessment.

Your earliest response would be gratefully received in order to help us achieve tight deadlines.

Thank you very much for your time and I hope to hear from you shortly.

Kind regards

David Harbon

BSc (Hons) MSc MIOA
Assistant Consultant
Acoustics, Noise and Vibration

D +44 (0)121 230 1650
david.harbon@ramboll.co.uk

From: David Harbon
Sent: 26 February 2014 09:53
To: 'Parsons, Claire'
Cc: Heavey, Eimear
Subject: RE: Maitland Park Estate and Kiln Place, Camden; DH-CP; Scope of Noise and Vibration Assessments; 26 02 14 [Filed 26 Feb 2014 09:53]

Dear Claire,

Thank you for your email.

I have provided my responses to your comments below in red.

Thank you for your time and I will be in contact again shortly to further discuss the construction noise threshold that will be used for the basis of assessment.

Kind regards

David Harbon

BSc (Hons) MSc MIOA
Assistant Consultant
Acoustics, Noise and Vibration

D +44 (0)121 230 1650
david.harbon@ramboll.co.uk

From: Parsons, Claire [mailto:Claire.Parsons@camden.gov.uk]
Sent: 25 February 2014 11:56
To: David Harbon
Cc: Heavey, Eimear
Subject: RE: Maitland Park Estate and Kiln Place, Camden; DH-CP; Scope of Noise and Vibration Assessments; 17 02 14

Dear David,

Thank you for your enquiry.

Please find my responses in [blue](#) text below.

Please let me know if you have any further queries.

Kind regards,

Claire Parsons
Environmental Health Officer
Regulatory Services
Communities
Culture and Environment
London Borough of Camden

Telephone: 020 7974 2638
Web: camden.gov.uk
Town Hall Extension (Culture and Environment)
Argyle Street
London WC1H 8EQ

Please consider the environment before printing this email.

From: David Harbon [mailto:david.harbon@ramboll.co.uk]
Sent: 17 February 2014 12:19
To: Parsons, Claire
Subject: Maitland Park Estate and Kiln Place, Camden; DH-CP; Scope of Noise and Vibration Assessments; 17 02 14

Dear Claire,

Ramboll UK Ltd has been appointed to undertake the noise and vibration assessments associated with the proposed developments at Maitland Park and Kiln Place, Camden. I wish to discuss the scope of the noise and vibration assessments with you, to confirm that the London Borough of Camden Council (LBCC) are satisfied with the approach adopted. From the email forwarded to me, as below, I understand that you are familiar with the proposals. If not then please advise and I can look to provide you with any additional information that you may require.

I have undertaken an initial review of attachments provided and relevant LBCC policy, e.g. DP28, and have found some information regarding construction noise and plant noise emissions from the Adopted Noise Strategy. I would be grateful if you could please review the proposed assessment methodologies outlined below and provide answers to the queries that I have raised.

Proposed Methodology

1. Undertake a detailed review of relevant local, regional and national noise policy and legislation.
2. Consultation with the LBCC Environmental Health Department. The assessment will be undertaken with due consideration given to the National Planning Policy Framework (NPPF) and the Noise Policy Statement for England (NPSE). However, Planning Policy Guidance 24 (PPG24) provides a methodology for the assessment of site suitability for residential development, although now superseded by the NPPF. Our previous experience demonstrates that Local Authorities welcome an assessment in accordance with PPG24 as an alternative quantitative method of assessment has not been adopted in the NPPF. Please could you confirm if this approach would be acceptable to LBCC? I would believe that this is acceptable as the LBCC guidance is based upon the guidance of PPG24. **Please refer to policy DP 28 for site suitability for residential development. DP28 shall be used as the basis for assessment.**
3. Unattended baseline noise monitoring at locations representative of the noise climate experienced by the nearest sensitive receptors. It is expected that 2 noise monitoring locations will be required at the Maitland Park site and 1 noise monitoring location will be required at the Kiln Place site. The baseline noise survey will monitor noise levels during daytime, evening, night-time and weekend periods to obtain a representative dataset. Additional attended monitoring will be undertaken on site to supplement the unattended surveys. Attended measurements will be typically 30 minutes in duration. **Please ensure the days of the week selected for the baseline noise monitoring are representative e.g. mixture of weekdays and weekends. We intend to survey for a 1 week period. However as a minimum the survey could last from e.g. Thursday through to Tuesday.**
4. Vibration monitoring will be undertaken at the Kiln Place site to ensure that vibration limits, in accordance with Camden Council guidance, due to passing trains, are not exceeded. Vibration monitoring is not proposed at the Maitland Park site.
5. The assessment of noise and vibration effects arising during the construction phase of the Proposed Development will be undertaken in accordance with the methodology outlined in BS 5228: 2009 Code of practice for noise and vibration control on construction and open sites (Part 1: Noise and Part 2: Vibration). Please could you confirm if LBCC have a Code of Construction Practice? **I have attached a copy of Camden Minimum Requirements for construction. Thank you.** From the information on the LBCC website I have obtained the typical construction working hours but I would be grateful if you could please confirm a daytime construction noise threshold against which the likely impacts from construction noise can be assessed, e.g. 75 dB $L_{Aeq,10hour}$ for urban areas? **This would appear to be too high for these locations. Suggest impact and appropriate limits are set relative to the existing ambient environment. We will undertake the baseline noise survey and further consult with yourself to agree on an appropriate construction noise threshold.**
6. Noise modelling will be undertaken using CADNA software which uses 3D modelling to predict the noise impacts on the development and also at the nearest sensitive receptors.

7. Noise from road traffic generated by the Proposed Development during the operational phase of the development will be predicted using the methodology contained in the Department of Transport and Welsh Office memorandum Calculation of Road Traffic Noise (CRTN). The significance of predicted noise changes will be determined using relevant guidance, such as that contained in The Design Manual for Roads and Bridges (DMRB) Section 3, Part 7 of Volume 11 (HD 213/11 Noise and Vibration).

8. Noise from fixed plant associated with the Proposed Development will be assessed in accordance with BS 4142: 1997 Method for rating industrial noise affecting mixed residential and industrial areas. In accordance with the Adopted Noise Strategy I note that LBCC require noise emissions from plant to be designed to a rating noise level (L_{Ar} dB) of -5dB below the background noise level, and -10 dB below the background noise level if an acoustic feature correction is to be applied in accordance with BS4142: 1997. Please could you confirm if these are appropriate criteria? **Yes Thank you for the confirmation.**

9. The suitability of the Site for residential development will be assessed in accordance with BS 8233: 1999 and the World Health Organisation (WHO) Guidelines, and mitigation measures will be designed (if necessary) to reduce noise levels to acceptable levels for internal and external residential amenity. Recommendations for the design of building envelopes will be provided. A good standard in accordance with BS8233: 1999 shall be targeted **and will be required to be met.** Noise ingress into the residential units shall consider noise sources such as road, rail and air noise sources. **And any other sources where appropriate e.g. noise from the community centre, any plant which may be installed including renewable energy sources if they are planned for this site. We shall assess the likely noise impacts from the community hall and MUGA addition to the other noise sources as previously stated, i.e. road, rail, air, plant, etc. With regard to the community hall at the Maitland Park site, we understand that the existing building will be demolished and therefore we will not be making an assessment of the contribution to the current noise climate due to noise egress from activities in the hall. However, we will be able to comment on the layout of the proposed development and sound insulation performance that is expected to be required (for the new hall) in order to achieve the relevant internal ambient noise level criteria in or at the adjoining/surrounding residential properties. Separate from planning, during detailed design, we will provide the recommendation that the acoustic details of the building fabric and façade elements will need to be carefully examined and specified to control the noise from the hall to ensure that the relevant criteria are achieved at the residential properties.**

I would be grateful if you could advise if you foresee any issues with the proposals outlined above. **If you have any queries or comments on the above, please don't hesitate to contact me. Please note the other points raised in my e-mail below, e.g. layout and design, noise impacts from the MUGA etc. Thank you.**

Thank you for your time and I hope to hear from you shortly

Kind regards

David Harbon

BSc (Hons) MSc MIOA
Assistant Consultant
Acoustics, Noise and Vibration

D +44 (0)121 230 1650
david.harbon@ramboll.co.uk

From: Parsons, Claire [mailto:Claire.Parsons@camden.gov.uk]
Sent: 20 January 2014 16:32
To: Poppy Carmody-Morgan
Cc: Heavey, Eimear
Subject: Maitland Park Estate and Kiln Place, Camden - Noise and Vibration Assessments

Dear Poppy,

Thank you for your e-mail regarding the above sites. I understand you would like information on the scope of the acoustic report to accompany these applications.

I have attached a document which sets out the requirements for an acoustic report and a copy of our current policy on noise, DP28, which may assist with both applications. When you appoint an acoustic consultant, please feel free to pass on my details, if they would like to contact me to discuss or agree any further details.

Other advice would be as follows:

Kiln Place

I advise that the "good" standard as noted within BS8233:1999 must be met and the noise report and any recommended mitigation must demonstrate how this standard can be met.

I advise that the acoustic report should account for noise including road traffic, rail and aircraft and also any vibration including structure borne or re reradiated noise particularly from the railway lines which are in the vicinity.

I recommend that the layout of the rooms within the properties are re-evaluated following the acoustic survey to determine if any changes should be made to account for the noise environment. The **principles of "stacking" must be followed and habitable rooms** should be placed on the least noisy elevation. Should any balconies be proposed, the potential impact of noise on these amenity spaces should be considered also.

Should any plant and/or machinery be proposed (including any renewable energy sources) the potential impacts should be considered along with any mitigation required to meet the relevant Camden noise standards.

The potential impact of the construction of the scheme should also be considered.

Maitland Park

I advise that the "good" standard as noted within BS8233:1999 must be met and the noise report and any recommended mitigation must demonstrate how this standard can be met. I advise that the acoustic report should account for noise from local sources including road traffic and aircraft which is noticeable in this location.

I recommend that the layout of the rooms within the properties are re-evaluated following the acoustic survey to determine if any changes should be made to account for the noise environment. The principles of **"stacking" must be followed and habitable rooms should be placed on the least noisy** elevation. Should any balconies be proposed, the potential impact of noise on these amenity spaces should be considered also.

I note that the community centre is proposed to have housing above – I have concerns regarding the noise impacts of this proposal. I recommend care is taken within the report to assess the potential noise impact of this and the potential mitigation that could be incorporated. As discussed earlier, complaints about noise from community centres is not uncommon and both impact and airborne sound should be considered to include potential sources such as music, dance, sport and exercise classes, **children's parties etc.**

Should any plant and/or machinery be proposed (including any renewable energy sources) the potential impacts should be considered along with any mitigation required to meet the relevant Camden noise standards.

I recommend that the potential noise impacts of the MUGA are considered within the report and mitigation options are considered.

The potential impact of the construction of the scheme should also be considered.

Please note that the advice provided above constitutes my initial observations based on the plans received and further information may be requested once the application is received and further information is available for review.

I hope this helps, please let me know if you have any further queries.

Kind regards,

Claire Parsons
Environmental Health Officer
Regeneration and Planning
Culture and Environment
London Borough of Camden

Telephone: 020 7974 2638
Web: camden.gov.uk
Town Hall Extension (Culture and Environment)
Argyle Street
London WC1H 8EQ