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# Southwark Council

# Sceaux Gardens

# Noise Report

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**Project Revision Sheet**

| Revision No | Date | Status | Changes | Author | Approved |
|---|---|---|---|---|---|
| 00 | 22 Dec 16 | Issued for comments | - | Adrien Vinay | Theo Niaounakis |
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| 02 | 1 February 2019 | Final Issue | Updated references to the no of storeys of Garage building and balconies to all buildings | Adrien Vinay | Theo Niaounakis |
| 03 | 13 May 2021 | Final Issue | Updated with the latest development proposals | Ramon Trigueros | James Williams |

## Table of Contents



## Appendices

# 1 Introduction

MLM Acoustics has been commissioned by Calfordseaden LLP on behalf of Southwark Council to assess the impact of noise at Sceaux Gardens, Southwark SE5, in respect of the site's suitability for residential use.

The suitability of the site for residential development has been based on the current development proposals and the measured noise levels. Where predicted levels indicate that noise may be a determining factor in the granting of planning permission, mitigation measures have been considered to ensure satisfactory conditions are met.

Whilst every effort has been made to ensure that this report is easily understood, it is technical in nature; a glossary of terms in Appendix A is included to assist the reader.

# 2 Policy and Assessment Methodology

## 2.1 National Planning Policy Framework, 2019

The revised National Planning Policy Framework (NPPF) published on July 2018 and updated on 19 February 2019 sets out the Government's planning policies for England and how these are expected to be applied. It provides a framework within which locally prepared plans for housing and other development can be produced.

Planning law requires that applications for planning permission be determined in accordance with the development plan, unless material considerations indicate otherwise. The National Planning Policy Framework must be considered in preparing the development plan and is a material consideration in planning decisions.

- Approving development proposals that accord with an up-to-date development plan without delay; or

- Where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless:

  I. The application of policies in this Framework that protect areas or assets of importance provides a clear reason for refusing the development proposed; or

  II. Any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole.

Under Section 11; Making effective use of land, the following is stated:

Planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions.

Regarding noise pollution, the document states the following:

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- Mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

- Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;

- The revised NPPF introduces the concept of 'agent of change' and states:

  *"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on*

*them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."*

As stated above, this document makes reference to mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development, but does not set absolute criteria, so reference has been made to BS8233: 2014, which provides definitive guidance for amenity levels.

## 2.2 Noise Policy Statement for England

The underlying principles and aims of existing noise policy documents, legislation and guidance are clarified in the Noise Policy Statement for England (NPSE)1. The NPSE sets out the 'Long Term Vision' of Government noise policy as follows: "Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable Development".

The NPSE outlines the following 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*".

The guidance defines three established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation (WHO):

- "*NOEL (No observed Effect Level) – This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise";*
- *"LOAEL (Lowest Observed Adverse Effect Level) – This is the level above which adverse effects on health and quality of life can be detected"; and*
- *"SOAEL (Significant Observed Adverse Effect Level) – This is the level above which significant adverse effects on health and quality of life occur".*

The guidance also states that it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations 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 National Planning Practice Guidance, England

Further guidance in relation to the National Planning Policy Framework and the Noise Policy Statement for England has been published in the National Planning Practice Guidance in England: Noise (NPPG-Noise), which summarises the noise exposure hierarchy, based on the likely average response.

The National Planning Practice Guidance (NPPG) has been revised and updated to be easily accessible and available online.

1 Defra (2010) – 'Noise Policy Statement for England'. Defra.

The Noise Guidance advises on how planning can manage potential noise impacts in new development. It sets out when noise is relevant to planning and outlines the following Observed Effect Levels to determine the noise impact:

- Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur.
- Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected.
- No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected.

The document recognises the subjective relationship between noise levels and the impact on those affected, and advises on factors which may influence on whether noise could be a concern.

The significance criteria from NPPG-Noise is reproduced in the table below.

**Table 1: Significance Criteria From NPPG In England: Noise**

| Perception | Examples of Outcomes | Increasing Effect Level | Action |
|---|---|---|---|
| Not noticeable | No Effect | No Observed Effect | No specific measures required |
| Noticeable and not intrusive | Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life. | No Observed Adverse Effect | No specific measures required |
| Lowest Observed Adverse Effect Level | | | |
| Noticeable and intrusive | Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life. | Observed Adverse Effect | Mitigate and reduce to a minimum |
| Significant Observed Adverse Effect Level | | | |
| Noticeable and disruptive | The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for | Significant Observed Adverse Effect | Avoid |

| | | | |
|---|---|---|---|
| | sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area. | | |
| Noticeable and very disruptive | Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory | Unacceptable Adverse Effect | Prevent |

## 2.4 British Standard 8233

BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* draws on the results of research and experience to provide information on achieving internal acoustic environments appropriate to their functions. The guideline values provided are in terms of an average ($L_{Aeq}$) level.

The standard advises that, for steady external noise sources, it is desirable for internal ambient noise levels to not exceed the guidance values, as detailed below in Table 2.

**Table 2: BS8233:2014 Indoor Ambient Noise Levels**

| **Activity** | **Location** | **07:00 to 23:00** | **23:00 to 07:00** |
|---|---|---|---|
| Resting | Living room | 35 dB $L_{Aeq,16hour}$ | - |
| Dining | Dining room | 40 dB $L_{Aeq,16hour}$ | - |
| Sleeping (daytime resting) | Bedroom | 35 dB $L_{Aeq,16hour}$ | 30 dB $L_{Aeq,8hour}$ |

BS8233:2014 goes on to suggest that where development is considered necessary or desirable, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions will still be achieved.

With regard to maximum noise levels, the standard identifies that regular individual noise events (such as passing trains or scheduled aircraft etc) can cause sleep disturbance. The standard does not provide a guideline design target, but simply goes on to suggest that a guideline value may be set in terms of SEL or $L_{Amax,F}$, depending upon the character and number of events per night. It goes on to suggest that more sporadic noise events could require separate values.

In respect of external noise levels, the guidance in BS8233:2014 suggests that "*it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments*". Accordingly, the design criteria adopted for this assessment will ensure that noise within external amenity areas will be adequately controlled.

BS8233:2014 provides a much more detailed narrative on noise levels in external amenity areas and acknowledges that it may not always be necessary or feasible to ensure that noise levels remain within these guideline values.

In respect of gardens and patios, BS8233:2014 states; "*however, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited*".

In respect of balconies, roof gardens and terraces, BS8233:2014 states, "*Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses; however, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space*".

It is clear from the narrative of BS8233:2014, that proposed development within noisy environments should be designed to ensure that the recommended internal design standards are achieved, and that noise levels in external amenity areas are designed to effectively control and reduce noise levels, although it acknowledges that in certain circumstance meeting the external design recommendations may not be feasible, or necessary, especially where the provision of such spaces is desirable for other technical, planning or policy reasons.

The following internal noise level criteria have been adopted for this assessment, which will ensure no adverse impact:

| | | | | |
|---|---|---|---|---|
| Living Rooms | - | 07:00–23:00 hours | - | 35 dB $L_{Aeq}$ |
| Bedrooms | - | 07:00–23:00 hours | - | 35 dB $L_{Aeq}$ |
| | | 23:00–07:00 hours | - | 30 dB $L_{Aeq}$ and 45 dB $L_{Amax}$ |
| Dining Rooms | - | 07:00–23:00 hours | - | 40 dB $L_{Aeq}$ |
| External Living Areas | - | 07:00–23:00 hours | - | 55 dB $L_{Aeq}$ |

## 2.5 British Standard 4142 Method for Rating and Assessing Industrial and Commercial Sound

BS 4142 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS 4142 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the LAeq,T 'specific sound level', immediately outside the dwelling with the LA90,T background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the LAr,Tr 'rating sound level'. A correction to include consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

BS 4142 states: "The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs". An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

· "Typically, the greater this difference, the greater the magnitude of the impact."

· "A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."

· "A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context."

· "The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

For the daytime, the assessment is carried out over a reference time period of one hour, but at night-time it is carried out over a 15 minute period. The periods associated with day or night, for the purposes of the Standard, are considered to be 07.00 to 23.00 and 23.00 to 07.00, respectively.

As the operation for the industrial or commercial units within the development is not known or decided at this stage, both night time and daytime periods have been considered.

## 2.6 Local Authority Requirements

Consultation with Sarah Newman, Team Leader of Environmental Protection Team of Southwark Council has been undertaken on the 11 September 2015. This consultation revealed a requirement to undertake a noise assessment in line with the requirements of BS8233:2014 to demonstrate the suitability of the site for residential purposes. With regards to plant noise emissions, it is understood that the rated noise level from any plant, together with any associated ducting shall be 10 dBA or more below the lowest measured $L_{A90\ 15min}$ at the nearest noise sensitive premises.

## 3 Site Description

It is proposed to redevelop part of the existing site at Sceaux Gardens, Southwark SE5 to provide residential accommodation. At present, the site comprises two residential buildings; Florian block and Racine block, as well as associated garage facilities, which will be removed under the proposals.

The site will be redeveloped into three new residential blocks. The existing blocks on site are identified in Figure 1 below. The current proposed scheme comprises:

- Florian block: 34 residential units;
- Racine block: 23 residential units;
- Garage facility site: 23 residential units.

The proposed development site is located in an urban area. The site surroundings are mainly residential. To the south of the site and immediately to the west of Racine Block is Camberwell College of Arts. The site is bounded by local access streets; Dalwood Street, Sedgmoor Place, Muscatel Place, all with low traffic flows, and in the vicinity of Southampton Way and Peckham Road, the two major streets of the area.

The location and extent of the proposed development site is identified in Figure 1.

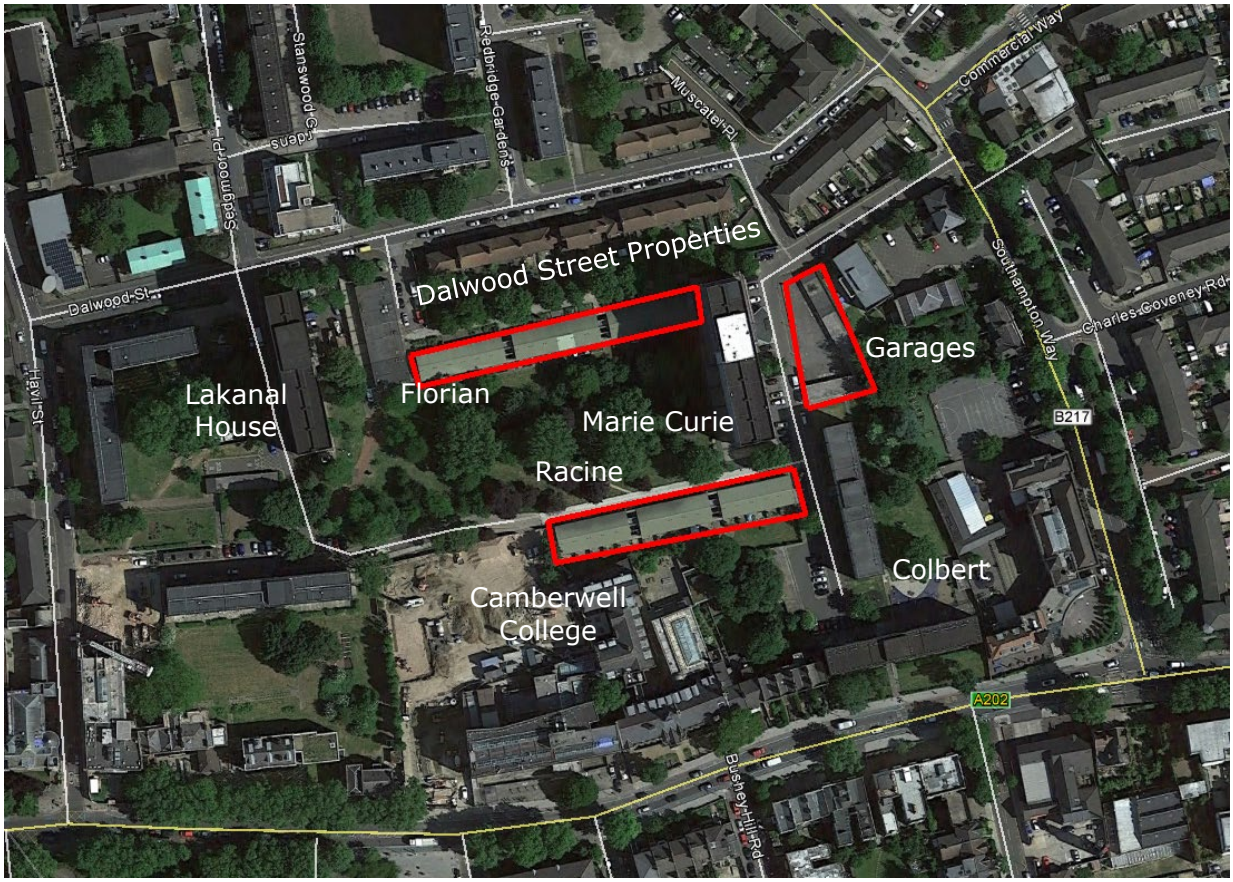


**Figure 1: Site Plan**

The nearest existing noise-sensitive receptors are the residential properties located along Dalwood Street, Marie Curie building, Colbert building, Lakanal House and Camberwell College.
The proposed development is located within an existing residential estate, the noise climate in the area is generally quiet for an urban area, being far from any significant noise source and benefitting from the shape of the existing surrounding residential

buildings providing acoustic screening of the noise road traffic noise from the major streets. As such, the environmental noise climate is dominated by distant road traffic noise, noise from aircraft flyovers and domestic noise from the current tenants.

Figures 2 to 4 below show the layout of the proposed buildings.

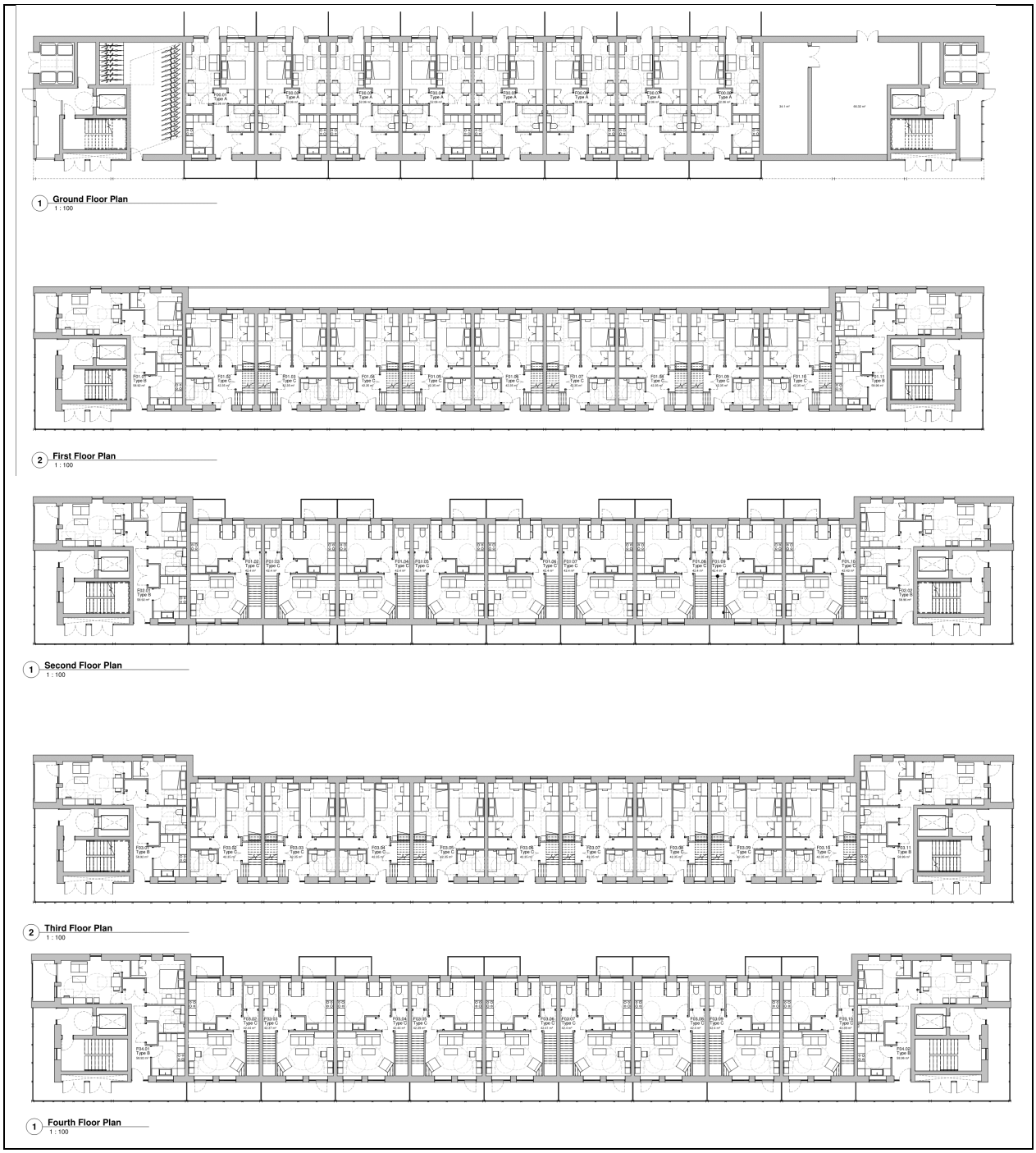


**Figure 2: Florian Block – General Arrangement Plans**

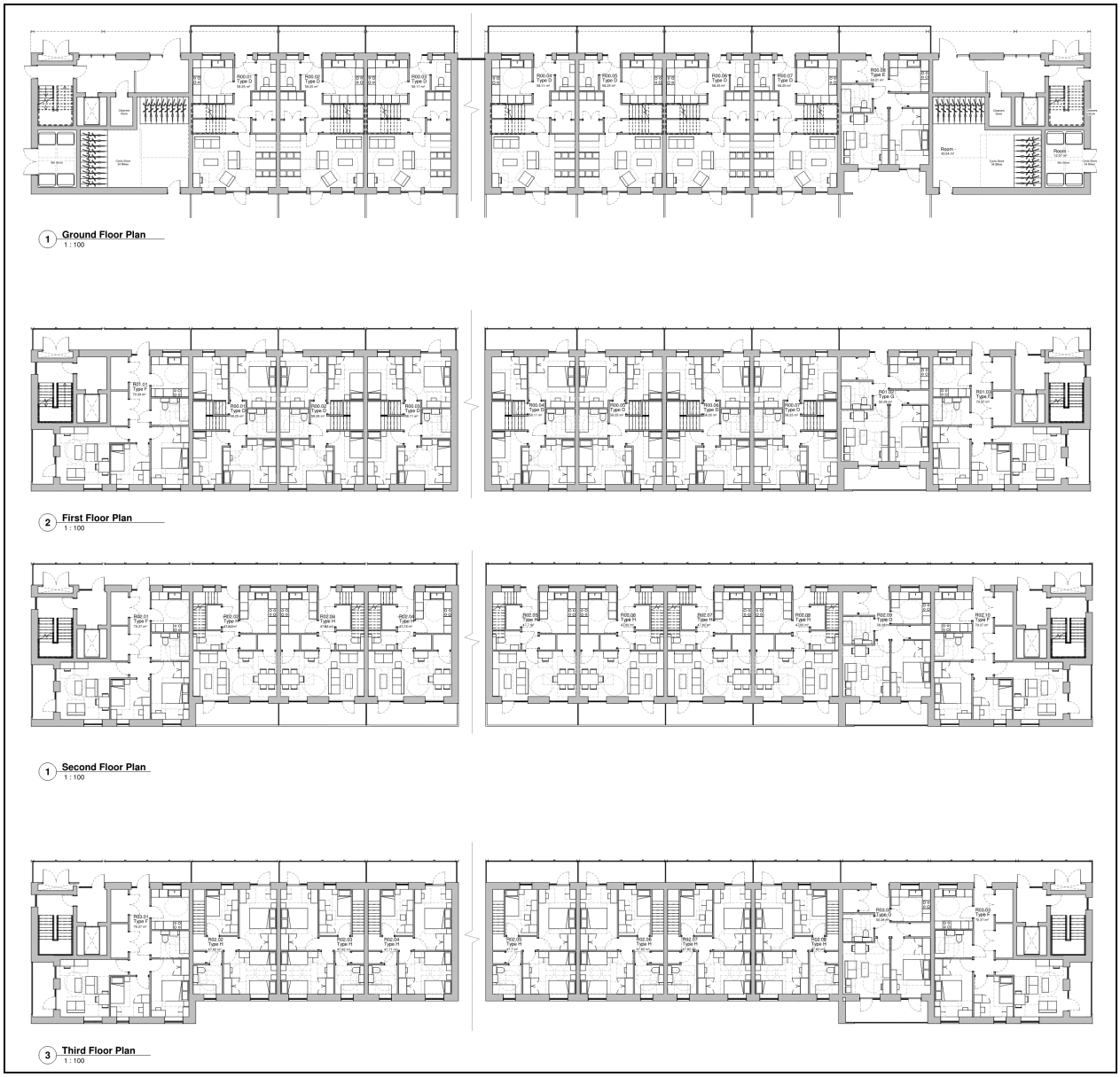


**Figure 3: Racine Block – General Arrangement Plans**

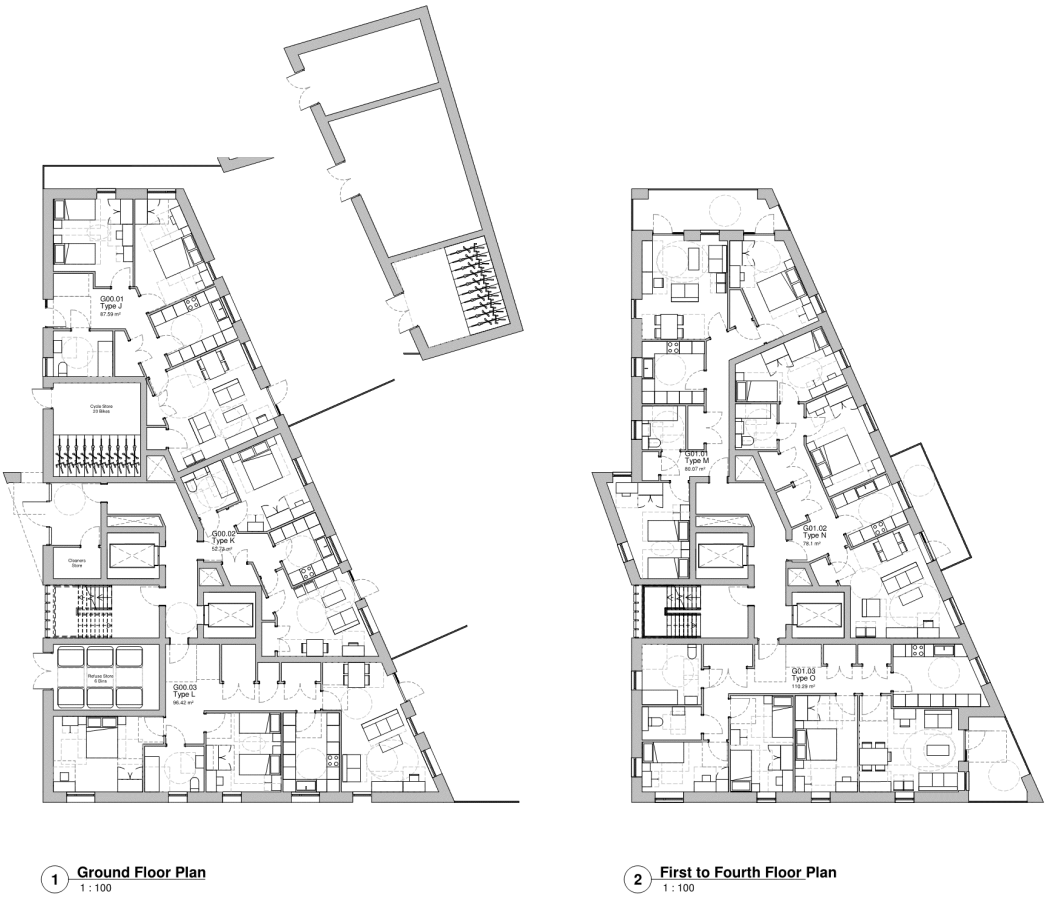


**Figure 4: Garage Block – General Arrangement Plans**

# 4 Noise Measurements

The prevailing noise conditions at the location of the proposed development has been determined by an environmental noise survey. The survey was undertaken over a typical mid-week period between 19 December 2016 and 20 December 2016, at four measurement positions representative of the noise levels within the site.

## 4.1 Noise Monitoring Methodology

All noise measurements were undertaken by a consultant certified as competent in environmental noise monitoring, and in accordance with the principles of BS 7445[2].

All acoustic measurement equipment used during the noise survey conformed to Type 1 specification of BS 61672[3]. A full inventory of this equipment is shown in table below.

| **Table 3: Inventory Of Acoustic Measurement Equipment** | | |
|---|---|---|
| **Item** | **Make & Model** | **Serial Number** |
| 1-Sound Level Meter | Rion NA-28 | 00370297 |
| 1-Preamplifier | Rion NH-23 | 60306 |
| 1-Microphone | Rion UC-59 | 00386 |
| Calibrator | Rion NC-74 | 34315165 |

The noise measurement equipment used during the surveys was calibrated at the start and end of the measurement period. The calibrator used had itself been calibrated by an accredited calibration laboratory within the twelve months preceding the measurements. No significant drift in calibration was found to have occurred on the sound level meter.

The microphone was fitted with a protective windshield, with an appropriate correction applied on the sound level meter.

## 4.2 Weather Conditions

Weather conditions were dry with negligible wind during the entire duration of the noise monitoring period.

## 4.3 Noise Indices

The noise indices measured during the noise survey are shown below:

The equipment was set to record a continuous series of broadband sound pressure levels averaged over 15 minute measurement periods. Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T;
- $L_{Amax,T}$ The A-weighted maximum sound pressure level that occurred during a given measurement period. Measured using the fast time weighting in accordance with the requirements of BS8233:1999;
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background noise level.

[2] British Standard 7445: 2003: *Description and measurement of environmental noise*. BSI
[3] British Standard 61672: 2003: *Electroacoustics. Sound level meters*. Part 1 *Specifications.* BSI.

The $L_{A90}$ is considered most representative of the background noise level for the purposes of complying with the measurement protocol set out in BS4142:2014.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', e.g. $L_{Aeq}$) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445-1:2003 *Description and Measurement of Environmental Noise – Part 1: Guide to Quantities and Procedures*.

## 4.4 Measurement Details - Procedure and Measurement Positions

With the site being of a residential nature, and having no suitable and safe location for long-term unattended noise monitoring, the survey has been undertaken on the basis of attended spot measurements at a number of locations throughout the site.

Four monitoring positions have been selected on site, being representative of the noise climate at the various façade of the proposed developments. Three sets of 15-minute attended noise measurements has been undertaken within three consecutive hours daytime and three consecutive hours night-time, at each of the four measurement positions. The measurement positions are detailed below and can be seen in Figure 3.

**Measurement Position 1:**

The sound level meter was located to the north-west of the existing Florian building, within the estate access street, at approximately 15m from Dalwood Street and 15m from Florian building's façade. The microphone was mounted on a 1.5m high tripod, under free field conditions.

This position was selected as being representative of the ambient noise conditions impacting the north-west façade of Florian building and proposed new development.

The noise climate at this position has been found to be dominated by relatively low levels of road traffic noise from Dalwood Street, frequent aircraft flyovers, occasional pedestrians and birdsong. It should be noted that this position was also impacted by noise from temporary works on a nearby construction site during the day; however, periods with significant impact on the measurements have been discarded from the analysis. This position was also impacted by a continuous and distant plant noise from an unidentified equipment associated with the construction site during both daytime and night-time. This noise has been found to be dominating the background noise at this position during night-time.

**Measurement Position 2:**

The sound level meter was located within Sceaux Gardens Estate, at the northern corner of the proposed-to-be-demolished garages. This position was facing the access street of the estate and had a direct line of sight with Southampton Way. The microphone was mounted on a tripod, at a height of 1.5m above local ground floor, under free field conditions.

This position was selected as being representative of the ambient noise conditions arising at the proposed development site, at the existing-to-be-demolished garages.

The noise climate at this position was dominated by noise arising from car movements within the estate and along Southampton Way, frequent aircrafts, and pedestrians.

**Measurement Position 3:**

The sound level meter was located to the south-east of the existing-to-be-replaced Racine building, on an existing car park. The microphone was mounted on a tripod, at a height of 1.5m above local ground floor, under free field conditions.

This position was selected as being representative of the ambient noise conditions arising at the southern façade of the proposed residential development replacing the existing-to-be-demolished Racine building.

Noise climate at this position was dominated by periodic noise associated with Oliver Goldsmith Primary School, mainly with kids being out on the playground, distant noise arising from car movements along Peckham Road, frequent aircrafts, and pedestrians.

**Measurement Position 4:**

The sound level meter was located approximately 10m from the northern façade of the existing-to-be replaced Racine building, facing Sceaux Gardens landscape. The microphone was mounted on a tripod, at a height of 1.5m above local ground floor, under free field conditions.

This position was selected as being representative of the ambient noise conditions arising within Sceaux Gardens, the northern façade of the proposed development replacing Racing building and the southern façade of the proposed development replacing the existing Florian building.

The noise climate at this position has been found as relatively quiet and was dominated by aircraft flyovers, occasional pedestrians, distant and sporadic road traffic noise as well as distant pitch noise from an unidentified noise source at the nearby Marie Curie building.

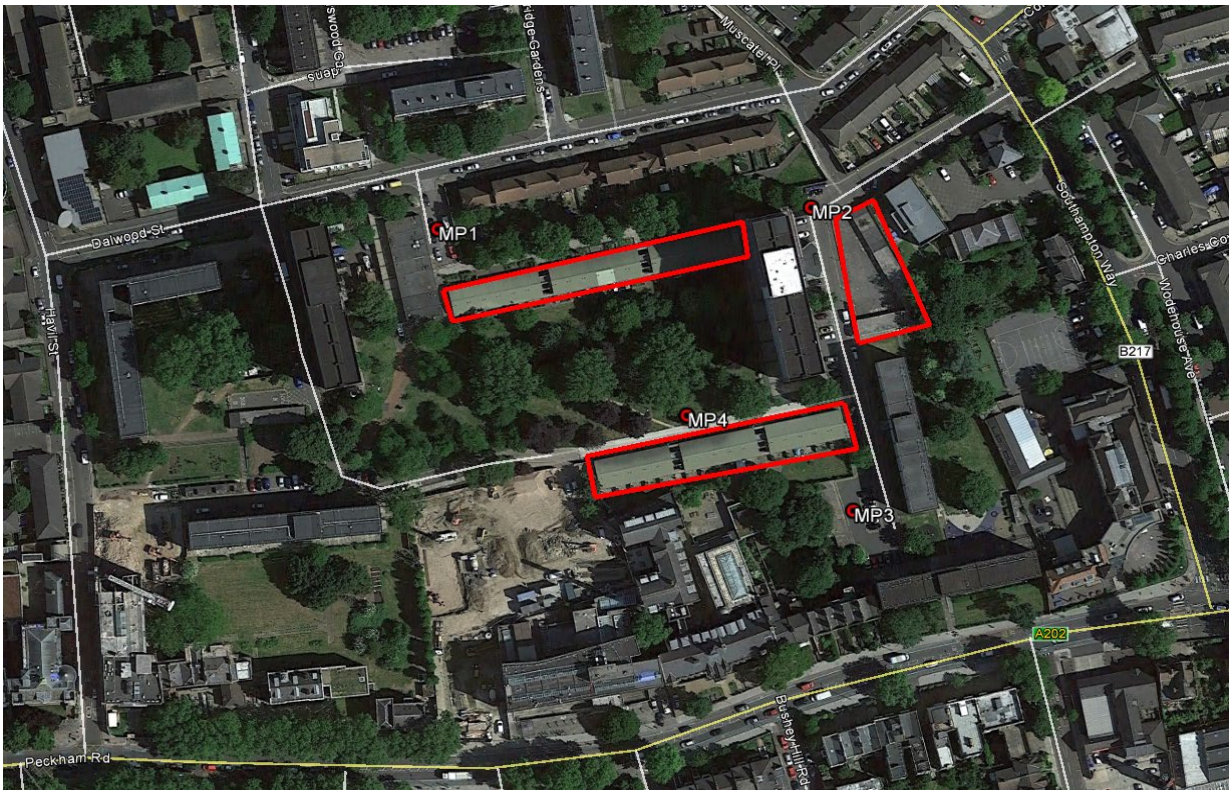


**Figure 5: Noise Measurement Positions**

## 4.5 Noise Context

During the entire duration of the monitoring period, the noise climate throughout the site has been found to be largely dominated by noise associated with road traffic on local road network, pedestrians and frequent aircraft flyovers.

The site has been found to be impacted by noise associated with two construction sites located adjacent to the estate. However the measurements have been undertaken with monitoring positions and periods selected to discard any significant impact on the measurements results.

## 4.6 Noise Survey Results

The results of environmental noise survey are presented in Table 4 below, and are set out in full in Appendix B.

**Table 4: Noise Survey Results-dB**

| Position | Period | Average $L_{Aeq\ 15min}$ | $L_{Amax}$ | Average $L_{A10\ 15min}$ | Minimum $L_{A90\ 15min}$ |
|---|---|---|---|---|---|
| MP1 | Daytime 14:00-17:00 | 55.6 | 74.5 | 58.3 | 42.3 |
| | Night-time 04:00-07:00 | 44.8 | 70.6 | 44.7 | 35.6 |
| MP2 | Daytime 14:00-17:00 | 55.8 | 73.5 | 58.1 | 46.7 |
| | Night-time 04:00-07:00 | 46.7 | 74.4 | 47.3 | 36.6 |
| MP3 | Daytime 14:00-17:00 | 52.3 | 70.8 | 56.4 | 42.8 |
| | Night-time 04:00-07:00 | 45.0 | 62.8 | 47.6 | 35 |
| MP4 | Daytime 14:00-17:00 | 51.8 | 68.1 | 54.8 | 42.8 |
| | Night-time 04:00-07:00 | 44.2 | 62.2 | 45.7 | 37 |

# 5 Noise Assessment

It is clear from the results of the noise monitoring exercise that the area of the proposed development site is exposed moderate-to-low environmental noise levels for an urban area, with the highest ambient noise levels in the order of 56dBA $L_{eq}$ daytime and 47dBA $L_{eq}$ night-time.

## 5.1 Internal Noise Levels and Façade Requirements

The key significance criteria adopted for this assessment are those contained within BS 8233: 2014, as summarised earlier in this report which requires internal noise levels of maximum 35 dB $L_{Aeq,16hour}$ daytime, 30 dB $L_{Aeq,8hour}$ night-time and 45dB $L_{Amax}$ night-time in habitable rooms.

In order to achieve the target daytime and night-time internal noise levels, it is necessary to determine the minimum acoustic performance requirements of the composite external building fabric. Table 5 sets out the broadband sound reduction requirements for the various facades of the proposed dwellings in these areas, in order to achieve the target criteria.

**Table 5: Required Sound Level Difference Outside to Inside, dB**

| Location | Period | Predicted External Noise Level, dB | | Target Internal Noise Level, dB | | Required Sound Level Difference dB | |
|---|---|---|---|---|---|---|---|
| | | $L_{Aeq,T}$ | $L_{AFmax}$ | $L_{Aeq,T}$ | $L_{AFmax}$ | $L_{Aeq,T}$ | $L_{AFmax}$ |
| Florian Block - Northern and Western Facades | Day – 0700-2300 | ≤56 | - | 35 | - | 21 | - |
| | Night – 2300-0700 | ≤45 | ≤69 | 30 | 45 | 15 | 24 |
| Florian Block - Southern Facades | Day – 0700-2300 | ≤52 | - | 35 | - | 17 | - |
| | Night – 2300-0700 | ≤44 | ≤62 | 30 | 45 | 14 | 17 |
| Racine Building- All Facades | Day – 0700-2300 | ≤52 | - | 35 | - | 17 | - |
| | Night – 2300-0700 | ≤45 | ≤63 | 30 | 45 | 15 | 18 |
| Garage Block – Northern and Western Facades – Ground Floor and First Floor | Day – 0700-2300 | ≤56 | - | 35 | - | 26 | - |
| | Night – 2300-0700 | ≤47 | ≤72 | 30 | 45 | 17 | 27 |
| Garage Block – All Other Facades | Day – 0700-2300 | ≤53 | - | 35 | - | 23 | - |

| Table 5: Required Sound Level Difference Outside to Inside, dB | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location** | **Period** | **Predicted External Noise Level, dB** | | **Target Internal Noise Level, dB** | | **Required Sound Level Difference dB** | |
| | | **$L_{Aeq,T}$** | **$L_{AFmax}$** | **$L_{Aeq,T}$** | **$L_{AFmax}$** | **$L_{Aeq,T}$** | **$L_{AFmax}$** |
| | Night – 2300-0700 | ≤47 | ≤68 | 30 | 45 | 17 | 23 |

Table 5 identifies that the sound reduction performance requirements for the proposed development are driven by achieving the night-time $L_{AFMax}$ criteria.

## 5.2 Building Envelope Sound Reduction Requirements

### *5.2.1 Methodology*

To determine the sound reduction requirements of the building envelope, namely the external glazing, walls and roof, representative external noise levels have been considered at the façades of the Proposed Development, based on the results of the noise survey undertaken on site and the room and façade dimensions shown in the latest development drawings provided to MLM.

To achieve the required internal noise levels presented in Table 5, the minimum sound reductions are required as detailed in the following sections.

### *5.2.2 Minimum Glazing Sound Reduction Requirements*

The table below sets out the minimum sound reduction index requirements for the external glazing including window frames.

| Table 6: Minimum Sound Reduction Performance Requirements - External Glazing | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Façade** | **Room Type** | **Octave Band Centre Frequency, Hz** | | | | | | | **$R_w(C_{tr})$ (dB)** |
| | | **63** | **125** | **250** | **500** | **1000** | **2000** | **4000** | |
| | | **Sound Reduction Performance, R (dB)** | | | | | | | |
| Garage Block – Northern and Western Facades – Ground Floor and First Floor | Living room | 19 | 24 | 20 | 25 | 34 | 37 | 35 | 31(-4) |
| | Bedroom | 19 | 24 | 28 | 32 | 37 | 39 | 41 | 36(-3) |
| All other Facades | Living room and Bedroom | 19 | 24 | 20 | 25 | 34 | 37 | 35 | 31(-4) |

The performance specifications for the glazed sections apply to the system as a whole - inclusive of glazing, framing, opening lights, balcony doors, etc. The performance of the glazing system will depend on many factors, such as the configuration, size, frame quality, quality of sealing, etc.

The required weighted sound reduction performances are representative of double glazing with slightly enhanced acoustic performance for the bedrooms at the worst affected facades and representative of standard double glazing for all other facades.

### *5.2.1 Minimum External Wall and Roof Sound Reduction Requirements*

The table below sets out the minimum sound reduction index requirements for the external wall.

| **Table 7: Minimum Sound Reduction Performance Requirements - External Wall** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Façade** | **Room Type** | **Octave Band Centre Frequency, Hz** | | | | | | | **$R_w(C_{tr})$ (dB)** |
| | | **63** | **125** | **250** | **500** | **1000** | **2000** | **4000** | |
| | | **Sound Reduction Performance, R (dB)** | | | | | | | |
| All Facades | Living room and Bedroom | 31 | 36 | 40 | 41 | 45 | 52 | 52 | 46(-3) |

The required weighted sound reduction performance for the external wall is representative of a standard external brick wall construction.

The table below sets out the minimum sound reduction index requirements for the Roof.

| **Table 8: Minimum Sound Reduction Performance Requirements - Roof** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Façade** | **Room Type** | **Octave Band Centre Frequency, Hz** | | | | | | | **$R_w(C_{tr})$ (dB)** |
| | | **63** | **125** | **250** | **500** | **1000** | **2000** | **4000** | |
| | | **Sound Reduction Performance, R (dB)** | | | | | | | |
| All Facades | Living room and Bedroom | 22 | 27 | 37 | 43 | 48 | 52 | 52 | 46(-7) |

The required weighted sound reduction performance for the roof is representative of a tiled roof with a suspended ceiling comprising 2 layers of plasterboard and sound absorber material within the cavity.

### *5.2.2 Minimum Ventilation Requirements*

To achieve appropriate internal ambient noise levels within habitable rooms, the standard ventilation rates for the whole dwelling ventilation condition should be achieved with windows closed. This is typical for developments in urban areas. A natural ventilation strategy based on the use of a passive ventilation system such as trickle ventilators or wall mounted vents is expected to ensure acceptable internal sound conditions

The following table presents the minimum insertion loss performances required for the ventilators.

| Table 9: Minimum Insertion Losses Requirements – Trickle Ventilators | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Façade** | **Room Type** | **Octave Band Centre Frequency, Hz** | | | | | | | **$D_{new}$ (dB)** |
| | | **63** | **125** | **250** | **500** | **1000** | **2000** | **4000** | |
| | | **Insertion Loss Performance, D (dB)** | | | | | | | |
| Garage Block – Northern and Western Facades – Ground Floor and First Floor | Living room | 26 | 31 | 30 | 30 | 34 | 28 | 30 | 30 |
| | Bedroom | 28 | 33 | 34 | 33 | 41 | 29 | 32 | 34 |
| All other Facades | Living room and Bedroom | 26 | 31 | 30 | 30 | 34 | 28 | 30 | 30 |

The calculations assume one trickle ventilator for bedrooms and two trickle ventilators for the living rooms. Variations in the numbers of ventilators would results in changes to the minimum requirements.

The required sound reduction performances are representative of standard trickle ventilators in all spaces.

Windows may be openable for purge ventilation purposes at the user's discretion in all rooms and on all facades; this is applicable only to uncommon occurrences, such as to remove smoke from burnt food.

Where applicable, mechanical ventilation systems should be designed to achieve appropriate internal ambient noise levels as defined in the table below.

| Table 10: Building Services Internal Noise Limits | |
|---|---|
| **Room Type** | **Noise Rating Limit (dB)** |
| Bedrooms | NR25 |
| Living Rooms | NR30 |
| Dining Rooms | NR35 |

# 6 External Amenity

The key significance criteria adopted for this assessment are those contained within BS 8233: 2014, as summarised earlier in this report.

It is understood that the proposed buildings will incorporate balconies. Therefore, consideration needs to be given to environmental noise levels in external amenity areas. Therefore, for the purpose of this assessment, the external noise climate at the façade of the future development, has being assessed in line with the guidance provided by BS8233.

Where balconies are proposed for dwellings at the most exposed areas of the site to external sound, external sound conditions are expected to marginally exceed the sound limit required by BS8233. However, it should be noted that BS8233 recognizes that such limits may not be always achievable especially in situations where the proposed development is located in an urban area, close to transport infrastructures. Alternatively, future tenants of dwellings with balconies exceeding the guidline level will have the opportunity to use the existing communal Sceaux Gardens, in which existing ambient noise levels have been measured to be 52dB $L_{Aeq,T}$ daytime, which will provide acceptable sound conditions. Therefore, no additional mitigation measures are considered necessary to reduce external noise levels on the proposed balconies.

# 7 Building Services Noise Emission

It is understood that the future development will comprise an Energy Centre, however, the project being at an early stage, the proposed plant equipment is not currently known. Therefore this assessment only sets up the relevant noise limits for the overall future plant noise emissions associated with proposed development.

**Nearest Noise Sensitive Receivers (NNSR)**

The nearest existing noise-sensitive receptors are the residential properties located along Dalwood Street, Marie Curie building, Colbert building, Lakanal House and Camberwell College.

**External Sound Level Criteria**

In order to comply with BS4142 requirements, the noise criteria set out in Table 11 are proposed. These limits are based on minimum background sound levels measured in the vicinity of the nearest noise sensitive receptor, during a typical week day period, as detailed in Table 4. Those limits apply to operating hours of the installation which may have the potential to be day and night.

**Table 11: Proposed Plant sound Emission Limits during extended opening hours**

| Operating Period | Minimum Measured Background Sound Level $L_{A90,15min}$ | Proposed Plant "Rating Level" At The Nearest Noise Sensitive Receptor |
|---|---|---|
| Daytime (07:00-23:00) | 42 | 32 |
| Night-time (23:00-07:00) | 35 | 30* |

(*): The existing sound climate at the nearby residential properties is low, with a typical night-time background sound level in the order of 35dB $L_{A90,15min}$. It is common practice, as required by the Local Authority and BS4142 to design noise mitigation such that sound from new plant is below existing background sound levels (10dB below in that case). Any plant which is operational during night-time periods will require careful design to reduce the likelihood of complaints. However, as the background sound level is so low, designing for a plant "rating level" of 10dB below background sound level may impose unnecessary constraints to the building services design. We would recommend limiting the night time plant "rating level" to 30 dB $L_{A,Tr}$. i.e. 5dB below the night-time background sound level. This would be in line with the recommendation provided in BS4142, where it is stated that "where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

This must be confirmed with the Local Authority during the next stages of the design process.

The above limits apply to the total sound emission level from all static plant and processes within the proposed development. Individual plant items may need to be designed to a lower limit such that the overall total achieves the stated criteria above. Should the proposed plant items be found to be tonal, or impulsive in nature (so as to attract attention), a penalty should be applied to the above limits.

Compliance with the above limiting noise levels would result in a negligible impact at existing receptors.

**Practical Control Measures**

Screening of any external plant as well as provision of sound attenuators to items of plant may be necessary to control the transmission of sound and achieve the above criteria as well as to reduce the sound level produced by the plant to a reasonable extend around the footprint of the building itself.

Environmental attenuators and possibly other means of sound mitigation such as acoustic louvres or acoustic screens may be required to control sound emanating from the plantrooms, air intake and discharge points or from externally mounted plant.

Locating the future plant installation as far as possible from the NNSR and using the proposed building to screen any future plant items would to ensure compliant emissions sound levels.

# 8 Conclusion

MLM Acoustics has been commissioned by Calfordseaden LLP on behalf of Southwark Council to assess the impact of noise at Sceaux Gardens, Southwark SE5, in respect of the site's suitability for residential use.

The assessment has been based on detailed environmental noise measurements made at the proposed development site.

The suitability of the site for residential development has been assessed based on the current development proposals and the measured noise levels, which has shown that noise conditions suitable for residential development can be comfortably achieved by incorporating mitigation measures which are typical for this development type.

In the light of the findings of this report, it is considered that noise should not present a constraint to the granting of planning permission for residential development at this site.

# Appendices

Appendix A - Acoustic Terminology
Appendix B - Noise Measurement Results

# Appendix A

## Appendix A – Glossary of Acoustic Terminology

| | |
|---|---|
| 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 20μPa (20x10-6 Pascal's) 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 s1 and s2 is given by 20 log10 ( s1 / s2 ). 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 20μPa. |
| 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. |
| $L_{eq,T}$ | 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 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. |
| $L_{90,T}$ | A noise level index. The noise level exceeded for 90% of the time over the 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 3.5m |
| Facade | At a distance of 1m in front of a large sound reflecting object such as a building façade. |
| Fast Time Weighting | An averaging time used in sound level meters. Defined in BS 5969. |

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

**Table A1: Typical Sound Levels found in the Environment**

| Sound Level | Location |
|---|---|
| 0dB(A) | Threshold of hearing |
| 20 to 30dB(A) | Quiet bedroom at night |
| 30 to 40dB(A) | Living room during the day |
| 40 to 50dB(A) | Typical office |
| 50 to 60dB(A) | Inside a car |
| 60 to 70dB(A) | Typical high street |
| 70 to 90dB(A) | Inside factory |
| 100 to 110dB(A) | Burglar alarm at 1m away |
| 110 to 130dB(A) | Jet aircraft on take off |
| 140dB(A) | Threshold of Pain |

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

In accordance with logarithmic addition, combining two sources with equal noise levels would result in an increase of 3 dB(A) in the noise level from a single source.

A change of 3 dB(A) is generally regarded as the smallest change in broadband continuous noise which the human ear can detect (although in certain controlled circumstances a change of 1 dB(A) is just perceptible). Therefore, a 2 dB(A) increase would not be normally be perceptible. A 10 dB(A) increase in noise represents a subjective doubling of loudness.

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs.

For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest. In the UK, traffic noise is measured as the $L_{A10}$, the noise level exceeded for 10% of the measurement period. The $L_{A90}$ is the level exceeded for 90% of the time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, $L_{Aeq}$.
This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound.

To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1 dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS 4142 specifies background noise measurement periods of 1 hour during the day and 5 minutes during the night. The noise levels are commonly symbolised as $L_{A90,1hour}$ dB and $L_{A90,5mins}$ dB. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125 ms.

# Appendix B

## Appendix B – Noise Measurements Results

### Noise Survey Results

| Start Time | Position | $L_{Aeq,T}$ | $L_{Amax,T}$ | $L_{A10,T}$ | $L_{A90,T}$ |
|---|---|---|---|---|---|
| 19/12/16 14:48 | MP1 | 55.8 | 72.4 | 60.4 | 43.7 |
| 19/12/16 15:04 | MP2 | 56.2 | 72.8 | 59.7 | 49.3 |
| 19/12/16 15:21 | MP3 | 51.8 | 64.8 | 55.2 | 45.8 |
| 19/12/16 15:34 | MP4 | 52.2 | 65.5 | 56.4 | 42.8 |
| 19/12/16 15:47 | MP1 | 57.3 | 74.5 | 61.4 | 43.4 |
| 19/12/16 16:06 | MP3 | 52.7 | 70.8 | 57.6 | 42.8 |
| 19/12/16 16:19 | MP4 | 51.4 | 68.1 | 53.2 | 43.5 |
| 19/12/16 16:30 | MP1 | 52.6 | 72.1 | 53.2 | 42.3 |
| 20/12/16 04:07 | MP1 | 40.7 | 58.5 | 43.4 | 35.6 |
| 20/12/16 04:22 | MP2 | 42.1 | 59.7 | 44.6 | 36.6 |
| 20/12/16 04:34 | MP3 | 43.1 | 57.4 | 46.6 | 35.0 |
| 20/12/16 04:46 | MP4 | 39.6 | 56.6 | 40.8 | 37.0 |
| 20/12/16 05:00 | MP1 | 41.6 | 61.8 | 41.5 | 36.8 |
| 20/12/16 05:12 | MP2 | 48.5 | 74.4 | 47.4 | 39.2 |
| 20/12/16 05:30 | MP3 | 44.5 | 59.7 | 47.2 | 37.4 |
| 20/12/16 05:51 | MP4 | 42.8 | 56.4 | 45.6 | 38.5 |
| 20/12/16 06:05 | MP1 | 48.1 | 70.6 | 49.2 | 39.5 |
| 20/12/16 06:18 | MP2 | 47.2 | 62.4 | 49.9 | 43.4 |
| 20/12/16 06:31 | MP3 | 46.6 | 62.8 | 49.0 | 41.0 |
| 20/12/16 06:43 | MP4 | 47.1 | 62.2 | 50.6 | 40.0 |
| 20/12/16 07:30 | MP2 | 57.0 | 73.5 | 59.5 | 46.7 |
| 20/12/16 07:41 | MP2 | 53.6 | 71.0 | 55.1 | 47.5 |