Proposed Residential-Led Development
Hillingdon Gardens

Planning Application
Acoustic Assessment

Report ref.
NDT5882/17025/Rev. 9

Issued to
Inland Homes plc

Prepared by
N D Treby BEng (Hons) MIOA MAES
Principal Consultant

D Pauliuc BEng (Hons) AMIOA AMAES
Consultant

Version	Remarks	Date
Rev. 0	Report Issue	15.08.17
Rev. 1	Minor amendments	18.08.17
Rev. 2	BLP Comments Incorporated	31.08.17
Rev. 3	Updated Scheme July 2018 Incorporated	31.07.18
Rev. 4	Updated Scheme November 2018 Incorporated	28.11.18
Rev. 5	Corrected Calculation Sheets in Appendix C as discussed with the Environmental Health Officer	08.02.19
Rev: 6	Significantly revised scheme	06.09.19
Rev 7:	Minor amendments	17.09.19
Rev 8:	Minor amendments	03.10.19
Rev 9:	Amendments following comment on behalf of LB Hillingdon	22.01.20

SECTION	TITLE	PAGE
1.	SUMMARY	1
2.	INTRODUCTION	2
3.	SITE DESCRIPTION	2
4.	CONDITIONS AND CRITERIA FOR ACCEPTABILITY	3
4.1	PLANNING GUIDELINES	3
4.2	CRITERIA FOR ASSESSMENT	8
5.	MEASUREMENT SURVEY	13
5.1	MEASUREMENT PROCEDURE	13
5.2	RESULTS AND OBSERVATIONS	14
6.	ASSESSMENT	15
6.1	NEW RESIDENTIAL DEVELOPMENT	15
6.2	CONSTRUCTION NOISE	20
6.3	SITE GENERATED ROAD TRAFFIC	21
6.4	NOISE FROM COMMERCIAL UNITS	22
6.5	SUMMARY OF THE ASSESSMENT	22
7.	CONCLUSIONS	23

APPENDIX A: Site Location and Layout

APPENDIX B: Noise Measurements

APPENDIX C: Noise Ingress Calculations and Floor Plan Drawings Mark-Up

APPENDIX D: Noise Model

APPENDIX E: Site Generated Road Traffic

APPENDIX F: Ventilation of Car Park

1. SUMMARY

Inland Homes plc are intending to develop a site to known as Former Master Brewer Motel, Freezeland Way, Hillingdon. The site is a residential-led development to be known as Hillingdon Gardens.

As part of the planning application process, the Local Authority requires an acoustic assessment, in which the noise impact on future residents is assessed.

A noise survey and assessment has therefore been carried out. The most significant noise source affecting the site is road traffic noise from the A40 and A437 (Long Lane). To the north east of the site is RAF Northolt and to the west of the site is a railway line, but these affect the ambient noise levels to a lesser extent.

The assessment has carefully considered policy set out in the National Planning Policy Framework, the Noise Policy Statement for England (NPSE) and the Government's Planning Practice Guidance. Furthermore, the assessment has looked at specific methodologies detailed in BS 8233:2014 "Guidance on sound insulation and noise reduction for buildings", and "Guidelines for Community Noise -World Health Organization".

The report sets out the acoustic performance required by glazing and ventilation to meet national guidelines (BS8233) for internal noise, during the day and the night for the updated scheme.

The report provides general good practice advice relating to the control of construction noise.

The report assesses the impact of noise from site generated road traffic.

Subject to the mitigation measures outlined in the report existing noise levels at the site need not pose a constraint to residential development. As discussed these measures will be subject to further assessment as the schemes is progressed to detailed design.

2. INTRODUCTION

A residential development is being considered on land to the north of Freezeland Way, Hillingdon. Spectrum has been appointed by Inland Homes plc to carry out a noise survey and assessment.

This report sets out the relevant policies and technical guidance that should be followed by the LPA when considering the new scheme.

It details the acoustic surveys completed, and draws conclusions over the potential impact of noise on new residents, so that the planning application can be determined.

The report provides general good practice advice on the control of noise during the construction phase.

3. SITE DESCRIPTION

The site is a residential-led, mixed-use development comprising buildings of between 2 and 11 storeys containing 514 units (Use Class C3); flexible commercial units (Use Class B1/A1/A3/D1); associated car (164 spaces) and cycle parking spaces; refuse and bicycle stores; hard and soft landscaping including a new central space, greenspaces, new pedestrian links; biodiversity enhancement; associated highways infrastructure; plant; and other associated ancillary development. The site will be known as Hillingdon Gardens.

The site is currently disused. The noise climate of the site is dominated by noise from road traffic. The A40 is to the immediate north of the site, in a cutting. To the west of the site is Long Lane, a busy local road. To the immediate south of the site is Freezeland Way, and is significantly less busy.

The site location plan is shown in Appendix A.

4. CONDITIONS AND CRITERIA FOR ACCEPTABILITY

4.1 PLANNING GUIDELINES

4.1.1 National Planning Policy Framework (NPPF)

The NPPF was first published in March 2012 and was revised in July 2018. It sets out the Government's planning policies for England and how these should be applied by establishing a framework within which locally prepared plans for development can be produced.

Paragraph 170 of the NPPF states that *planning policies and decisions should contribute to and enhance the natural and local environment by […] preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of […] noise pollution.*

Paragraph 180 requires that planning policies and decisions take into account the likely effects (including cumulative effects) of development and in doing so should:

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

b) *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

Throughout the NPPF reference is made to other policies, such as the Noise Policy Statement for England (NPSE), which should also be applied as appropriate.

4.1.2 Noise Policy Statement for England (NPSE)

The NPPF refers to the Noise Policy Statement for England (NPSE) which sets out the long term vision of Government noise policy to be 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.*

The NPSE notes (para. 2.7) that the application of the NPSE should enable noise to be considered alongside other relevant issues and not be considered in isolation.

The NPSE aims to clarify the principles and aims in existing policy documents, legislation and guidance that relate to noise. Through the effective management and control of environmental, neighbour and neighbourhood noise it aims to:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life;*
- *where possible, contribute to the improvement of health and quality of life.*

These aims are developed by reference to the concepts of NOEL (No Observed Effect Level), LOAEL (Lowest Observed Adverse Effect Level – adverse effects on health and quality of life can be detected) and SOAEL (Significant Observed Adverse Effect Level – adverse effects on health and quality of life occur).

It recognises that there is no universally applicable objective threshold for these concepts. Consequently, the NOEL, LOAEL and SOAEL are likely to be different for different noise sources and receptors and at different times. Even so, significant effects should be avoided, taking account of sustainability aims.

Situations of significant adverse effect (SOAEL) should be avoided. Where the impact is between LOAEL and SOAEL reasonable steps should be taken to minimise and mitigate adverse effects on health and quality of life, but does not mean that such adverse effects cannot occur. It is implied that situations of NOEL would be acceptable in noise terms.

4.1.3 Planning Practice Guidance – Noise (PPG)

The PPG sets out government guidance on the role of noise in the planning process. This provides advice on issues such as when noise is relevant to planning, how to determine noise impact, discussion on the context of noise and how the impact of noise can be mitigated.

Of relevance to this scheme, it advises that *"Noise needs to be considered when …new developments would be sensitive to the prevailing acoustic environment."* Whilst it does advise that noise can override other planning concerns, it states that as with the NPSE and the NPPF it does not expect noise to be considered in isolation from other economic, social and environmental dimensions of a proposed development.

It asks an LPA to consider:

- *whether or not a significant impact is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur;*
- *whether or not a good standard of amenity can be achieved.*

This includes identifying whether the noise exposure is above or below SOAEL or LOAEL.

The PPG talks about "impact" and "effect". This is an important part of the context discussion, as a noise may have a significant impact for brief period of time, but because the impact is only brief, the overall "effect" in not significant, as it does not materially affect behaviour.

The PPG summarises examples of the perception of noise, with the outcome and the effect level:

- No observed effect: Noise is not noticeable, and no specific measures are required. This would correlate to NOEL of the NPSE;
- No observed adverse effect: Noise is noticeable and not intrusive, does not cause any change in behaviour or attitude, can affect the acoustic character of an area but not such that there is a perceived change in the quality of life. No specific measures are required;
- Observed adverse effect: Noise causes small changes in behaviour (eg closing windows for some of the time because of the noise), potential for some sleep disturbance, and there is a perceived change in the quality of life. In this case noise should be mitigated and reduced to a minimum as it represents the onset of the LOAEL as defined in the NPSE;

- Significant observed adverse effect: Noise causes a material change in behaviour and attitude (eg avoiding certain activities during periods of intrusion, or having to keep windows closed most of the time because of the noise where there is no alternative ventilation), potential for difficulty getting back to sleep, quality of life diminished. This correlates to a SOAEL as defined by the NPSE and should be avoided.
- Unacceptable adverse effect: Extensive and regular changes in behaviour and/or an inability to mitigate effects, leading to psychological stress and physiological effects (eg regular sleep deprivation, medically definable harm). This, the PPG advises, should be prevented.

It is of note that the examples given in the PPG relate to changes of behaviour, and changes to quality of life and changes in the character of an area. In the case of this development, residents would be moving into an existing situation, so behaviours would not change, as no pattern of behaviour is already established.

As stated in the NPSE, there is no simple relationship between noise levels and the effect of those noise levels. The NPSE lists a number of factors as relevant, and the following are those that apply to this scheme:

- Source and level of noise;
- Number of noise events, how often they occur, and the pattern;
- The spectral content of the noise and its character;
- Whether noise effects can be mitigated by closing windows, allowing for alternative ventilation to be provided;
- The acoustic environment in external amenity spaces where these are an intrinsic part of the overall design.

The PPG says that for development, mitigation can be considered in terms of engineering (reducing noise at source, or containing it), layout (orientating the layout to minimise impact), conditions (the use of planning conditions) and mitigation to the dwellings themselves.

Such mitigation techniques are therefore recognised by the PPG as normal practice in the case of noise sensitive schemes.

The noise impact can also be offset where residents have access to a quiet façade, a quiet external amenity space for their sole or shared use, or a public amenity space nearby.

4.1.4 Local Planning Authority Policy

Local Plan Part 1 Policy EM8 states:

Noise - The Council will investigate Hillingdon's target areas identified in the Defra Noise Action Plans, promote the maximum possible reduction in noise levels and will minimise the number of people potentially affected. The Council will seek to identify and protect Quiet Areas in accordance with Government Policy on sustainable development and other Local Plan policies. The Council will seek to ensure that noise sensitive development and noise generating development are only permitted if noise impacts can be adequately controlled and mitigated.

Policy OE1, saved from the UDP states:

OE1 Planning permission will not normally be granted for uses and associated structures which are, or are likely to become, detrimental to the character or amenities of surrounding properties or the area generally, because of:

(i) the siting or appearance;

(ii) the storage or display of vehicles, goods, equipment or other merchandise;

(iii) traffic generation and congestion;

(iv) noise and vibration or the emission of dust, smell or other pollutants,

unless sufficient measures are taken to mitigate the environmental impact of the development and ensure that it remains acceptable.

Policy OE5, saved from the UDP states:

OE5 Proposals for the siting of noise sensitive developments such as family housing, schools or certain forms of commercial activity where the occupiers may suffer from noise or vibration will not be permitted in areas which are, or are expected to become, subject to unacceptable levels of noise or vibration. where development is acceptable in principle, it will still be necessary to establish that the proposed building or use can be sited, designed, insulated or otherwise protected from external noise or vibration sources to appropriate national and local standards. account will be taken of any changes likely to occur in noise levels within a 10-15 year period following the date of submission of any application for planning permission.

Hillingdon have a Supplementary Planning Document (SPD) on noise. This was adopted in May 2006, so predates the national policies set out above.

Para 4.1 states

"Hillingdon's approach to noise and noise sensitive development is to seek their physical separation through the exercise of land use planning controls. If suitable separation cannot be achieved, Hillingdon will consider whether it is practicable to control or reduce noise levels, or to mitigate the impact of noise, through the use of conditions or planning obligations. This approach applies both where noise sensitive development (such as housing) is seeking to locate in a "noisy" area, and where "noisy" activities are proposed, or exist and proposed to expand, in noise sensitive locations."

Para 4.2 advisees

"Mitigation of the effects of noise can be achieved: (i) at the source (through technology to reduce noise emissions at source); (ii) at a distance (using for example noise barriers); or (iii) by controls over the operations that generate the noise (such as controls over the hours of operation). Further mitigation can be secured through the use of noise insulation measures which reduce the transmission of noise. The council will seek mitigation through one or more of these means where it will help reduce the effects of noise."

The SPD references guidance in Planning Policy Guidance 24: Planning and Noise, DCLG, 1994 (replaced by NPPF, 27.03.2012). This has now though been superseded.

In advising on detailed housing design measures, the SPD advocates mitigation by design, by consideration of:

- Location of buildings;
- Screening of site;
- Building form and orientation;
- Building envelope design

4.1.5 London Plan Policy

London Plan Policy 7.15 (Reducing and Managing Noise, Improving and Enhancing the Acoustic Environment and Promoting Appropriate Soundscapes) states:

The transport, spatial and design policies of this plan will be implemented in order to reduce and manage noise to improve health and quality of life and support the objectives of the Mayor's Ambient Noise Strategy. Development proposals should seek to manage noise by:

- *Avoiding significant adverse noise impacts on health and quality of life as a result of new development;*
- *Mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens on existing businesses;*
- *Improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity);*
- *Separating new noise sensitive development from major noise sources (such as road, rail, air transport and some types of industrial development) through the use of distance, screening or internal layout – in preference to sole reliance on sound insulation;*
- *Where it is not possible to achieve separation of noise sensitive development and noise sources, without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through the application of good acoustic design principles;*
- *Having particular regard to the impact of aviation noise on noise sensitive development;*
- *Promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver'.*

The Mayor's consolidated draft London Plan (July 2019) Policy D13 (Noise) Policy D13 Noise states:

In order to reduce, manage and mitigate noise to improve health and quality of life, residential and other non-aviation development proposals should manage noise by:

(v) avoiding significant adverse noise impacts on health and quality of life Draft London Plan – consolidated changes version – Clean July 2019

(vi) reflecting the Agent of Change principle as set out in Policy D12.

(vii) mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on existing noise-generating uses

(viii) improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity)

(ix) separating new noise-sensitive development from major noise sources (such as road, rail, air transport and some types of industrial use) through the use of distance, screening, layout, orientation, uses and materials – in preference to sole reliance on sound insulation

(x) where it is not possible to achieve separation of noise-sensitive development and noise sources without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through applying good acoustic design principles

(xi) promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver.

4.2 CRITERIA FOR ASSESSMENT

Neither the NPPF, the NPSE nor the PPG give objective quantified limits to define the NOEL, LOAEL and SOAEL categories.

Therefore, advice is taken from a series of British Standards and International Guidance, to inform an assessment and assist the decision maker in determining an application.

4.2.1 BS 8233:2014 Guidance on sound insulation and noise reduction for buildings

BS8233 provides guidance for the control of noise in and around buildings. It is applicable to the design of new buildings, so is helpful in considering the noise impact of existing noise sources on the new scheme.

For dwellings, the standard advises the main considerations are the acoustic effect on sleep in bedrooms, and the acoustic effect on resting, listening and communicating in other rooms.

Inside Dwellings

BS8233 gives guidelines values, and states that for steady external noise sources, it is desirable that the indoor ambient noise level does not exceed the guidelines values given below in table 1.

Activity	Location	0700-2300	2300-0700
Resting	Living room	35 dB $L_{Aeq,16\ hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16\ hour}$	30 dB $L_{Aeq,8\ hour}$

Table 1: Indoor ambient noise levels for dwellings

The standard also advises that *Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{AFmax} depending on the character and number of events per night. Sporadic noise events could require separate values.* It does not give guidance on what might constitute a guideline value.

It advises that *If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (eg trickle ventilators should be open) during assessment.* This therefore recognises that it is a normal mitigation practice to close windows, though in such circumstances the method of ventilation must also be considered.

Where development is considered necessary or desirable, the standard says that the internal target levels may be relaxed by up to 5 dB and reasonable conditions still achieved.

4.2.2 Acoustics Ventilation and Overheating – Residential Design Guide, January 2020

In January 2020 guidance *Acoustic Ventilation and Overheating – Residential Design Guide* (AVO) was been released. The guidance is not a formal part of planning policy, and does constitute official government advice. However, it is a document published by the Association of Noise Consultants and *"recommends an approach to acoustic assessments for new residential development that take due regard of the interdependence of provisions for acoustics, ventilation, and overheating"*.

AVO provides guidance for a two-level noise assessment procedure for overheating conditions. Assessment Level 1 relates to the external noise levels incident on the development, and the outcome of this indicates whether a Level 2 assessment is required. Level 2 provides a guideline for assessment of adverse effect based on internal noise levels in the living rooms and bedrooms, and the duration of exposure.

In summary, AVO indicates that where internal noise levels would be high due to open windows (i.e. > 50 dB during the daytime in living rooms and bedrooms and > 42 dB during the night time in bedrooms), open windows cannot be used for the mitigation of overheating and they would have to be kept closed. In quieter areas where internal noise levels with open windows would be low (i.e. ≤ 35 dB during the daytime in the living rooms and bedrooms and ≤ 30 dB during the night time in the bedrooms), open windows could be used for the mitigation of overheating.

There is a range in between the two situations mentioned above where AVO indicates that open windows may be acceptable as mitigation for overheating, but only for limited periods of time. AVO also states that *"The potential for adverse effect also depend on how frequently and for what duration the overheating condition occurs."*

4.2.3 Professional Practice Guidance on Planning & Noise (ProPG)

ProPG was published in May 2017 jointly by the Association of Noise Consultants, the Institute of Acoustics, and the Chartered Institute of Environmental Health, with the aim of providing 'guidance on a recommended approach to the management of noise within the planning system in England.' 'The approach encourages early consideration of noise issues, facilitates straightforward accelerated decision making for lower risk sites, and assists proper consideration of noise issues where the acoustic environment is challenging. However, it does not constitute an official government code of practice, is not a formal part of planning policy, and does constitute official government advice.

ProPG recommends a two-stage approach:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of four key elements.'

The four key elements of the Stage 2 assessment are based on existing National Policy, Guidelines and Standards, and are summarised as follows (2.4):

- Element 1 – demonstrating a "Good Acoustic Design Process";
- Element 2 – observing internal "Noise Level Guidelines";
- Element 3 – undertaking an "External Amenity Area Noise Assessment"; and
- Element 4 – consideration of "Other Relevant Issues".'

4.2.4 World Health Organisation – Guidelines for community noise, (CNG), 1999

The World Health Organisation (WHO) give guideline noise values for community noise in specific environments. The guideline levels of BS8233 (see section 4.2.1 above) are a reflection of those set out in WHO.

The preface to *Guidelines for Community Noise* – World Health Organization, 1999 (states that community noise includes road, rail and air traffic, industries, construction and public work, and the neighbourhood. WHO does not make the distinction that the guideline noise values apply to steady noise only. The limits it recommends are defined as limits for "community noise" which it specifically defines as including industries.

WHO guideline values for community noise inside dwellings are $L_{Aeq,8hr}$ 30 dB for bedrooms at night, and $L_{Aeq,16hr}$ 35 dB for living-rooms. Outside bedrooms at night it suggests $L_{Aeq,8hr}$ 45 dB, which represents typically a 15 dB reduction that would be achieved between the external and internal noise level if a window was open.

Whilst BS8233 did not give guidance on noise levels in terms of maximum noise (short term noise level form a sporadic event), WHO suggests L_{AFmax} 45 dB should not be exceeded inside a bedroom (L_{AFmax} 60 dB outside) more than 10-15 times per night.

These guideline levels correspond to the lowest effect level for general populations. This would suggest that these guideline values represent the boundary between NOEL and LOAEL.

4.2.5 World Health Organisation – Night Noise Guidelines for Europe, (NNG), 2009

Night Noise Guidelines for Europe (NNG) was published in 2009 as an extension to Guidelines for Community Noise (WHO) 1999. It provides additional guidance in relation to the observed adverse effects of noise on sleep and proposes two external noise level criteria for the purposes of limiting these effects. The lowest noise criterion is based on the LOAEL. However, it recognises that achieving LOAEL will not be feasible in many circumstances and suggests that a higher Interim Target (IT) may be used instead as a guideline. However, the IT is not related to health based observations and should not, therefore, be interpreted as a threshold for SOAEL, which may be higher.

The document states that '*all Member States are encouraged to gradually reduce the proportion of the population exposed to levels over the IT within the context of meeting wider sustainable development objectives*.*'* While the guidelines provide useful information relating to the effects of noise on sleep, they have not been adopted into UK legislation, standards or guidance. The suggested guideline night time noise levels presented should not therefore be applied as a standardised criteria for assessment but may be useful when interpreting the significance of the impact of noise within the wider context of the development. Based on empirical evidence, it suggests that the LOAEL is $L_{night,outside}$ 40dB. Below this level there would be no observable adverse effects. Therefore, there would be little value in setting limits below this level.

4.2.6 World Health Organisation – Environmental Noise Guidelines for the European Region, (ENG), 2018

In November 2018, the WHO published "Environmental Noise Guidelines for the European Region". The document takes a very different approach to guidance set out in the previous GCN by identifying separate thresholds for specific sources rather than for community noise as a whole. This focuses on guideline noise levels from individual sources, including road traffic.

Much of the earlier guidance set out in GCN is now absent from ENG. While ENG was intended to supersede GCN, it recognises this absence and states (at Section 2.6.3) that *indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid*.

ENG does not provide specific recommendations for noise in defined external amenity areas, or guidelines for internal noise levels. This assessment is focussed on internal noise levels and noise in the defined external amenity areas, and therefore relies on the guidance of the 1999 CNG.

4.2.7 Construction Noise - BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*

BS 5228-1[1] provides useful general advice together with a method for predicting noise from construction sites based on information provided on construction noise levels applicable to various plant and construction operations.

Construction Noise is a temporary activity and so of less significance than permanent noise sources. The closest sensitive receptors to the site are some distance away from the site boundary (to the south, across Freezeland Way). In view of this it is considered unlikely that construction noise would be a material factor in the determination of planning permission.

In any event, it would be expected that a standard planning condition, limiting hours of work to 0800-1800 Monday to Friday, and 0800-1300 Saturday would be sufficient to ensure construction noise is adequately controlled.

Therefore, it is our view that a detailed construction noise assessment need not be provided. However, general guidance is included, and it is expected that such guidance would form a part of the Construction Environmental Management Plan (CEMOP) in due course.

BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise

4.2.8 Site generated road traffic - Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7 – Noise and Vibration, Highways Agency, 01.11.2011

The scheme will generate road traffic as part of the normal use of the site. The change in noise level on existing roads, as a result of traffic associated with the site will be compared to baseline and existing committed developments.

This will follow the method set out in Calculation of Road Traffic Noise, Department of Transport and Welsh Office, 1988.

We will assess the impact of this noise change by considering advice in Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7 –Noise and Vibration, Highways Agency, 01.11.2011, and consider the effect of this impact using best practice.

DMRB recognises that subjective responses to changes in road traffic noise are different over short term and long term periods. The short term changes are assessed at the opening year of the development. Long term changes are assessed 10 years after the opening year, once the development has been fully built out.

Tables 2 and 3 show the relationships between noise change and magnitude of impact for short term and long term changes, as taken from DMRB Tables 3.1 and 3.2.

Short term noise change, $L_{A10,18hr}$	Magnitude of impact
0	No change
0.1 – 0.9	Negligible
1 – 2.9	Low
3 – 4.9	Medium
5+	High

Table 2: Classification of Magnitude of Road Traffic Noise Impacts in the Short Term

Long term noise change, $L_{A10,18hr}$	Magnitude of impact
0	No change
0.1 – 2.9	Negligible
3 – 4.9	Low
5 – 9.9	Medium
10+	High

Table 3: Classification of Magnitude of Road Traffic Noise Impacts in the Long Term

4.2.9 Noise from Mechanical Plant - BS 4142:2014 Methods for rating and assessing industrial and commercial sound

The proposed development includes flexible commercial units (Use Class B1/A1/A3/D1). It will be the responsibility of future tenants to specify and install mechanical plant to suit their requirements. This will include a requirement for them to consider noise impact, such that noise generated by any proposed mechanical plant does not have an adverse impact on future residents of the development.

The principle of BS 4142 is to determine an initial estimate of impact of industrial/commercial sound on nearby residents by comparing the Rating Level (sound level from the industrial/commercial source, with a correction applied for any acoustic features that characterise the sound) with the Background Sound Level (L_{A90} as measured in absence of the industrial/commercial source).

Generally, the greater the difference by which the Rating Level exceeds the Background Sound Level, the greater the magnitude of impact. BS 4142 states that *'a difference of around +10 dB or more is likely to be an indication of a significant adverse impact […]. A difference of around +5 dB is likely to be an indication of an 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.'*

However, BS 4142 also advises that ' *when making assessments and arriving at decisions […] it is essential to place the sound in context'* so in each case, the context in which the sound is placed must be considered and the initial estimate of impact should be modified accordingly. For example it advises '*Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night*.' It also indicates that impacts estimated during '*the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes.*'

5. MEASUREMENT SURVEY

5.1 MEASUREMENT PROCEDURE

Measurements were initially carried out during a site survey on 10th – 15th March 2017.

Noise levels were measured at a series of positions around the site boundary in consecutive 5 minute periods. The positions are shown in Appendix A as positions 1-4.

The following instrumentation was used:

- Bruel & Kjaer Type 2250 Sound Level Meter s/n 2739650
- Bruel & Kjaer Type 4189 Microphone s/n 2983518
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 2730221
- Bruel & Kjaer Type 2250 Sound Level Meter s/n 3000713
- Bruel & Kjaer Type 4189 Microphone s/n 2780512
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 3001598
- Bruel & Kjaer Type 2238 Sound Level Meter s/n 2654440
- Bruel & Kjaer Type 4188 Microphone s/n 2658551
- Bruel & Kjaer Type 2238 Sound Level Meter s/n 2654441
- Bruel & Kjaer Type 4188 Microphone s/n 2658552

A further survey was completed on 5th – 11th July 2019, again in consecutive 5 minute periods. Positions 1, 2 and 3 were repeated, with a further position 5 added as shown in Appendix A.

The following instrumentation was used:

- Bruel & Kjaer Type 2250 Sound Level Meter s/n 3024525
- Bruel & Kjaer Type 4189 Microphone s/n 3147699
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 3021285
- Bruel & Kjaer Type 2250 Sound Level Meter s/n 3027942
- Bruel & Kjaer Type 4189 Microphone s/n 3196081
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 2229957
- Bruel & Kjaer Type 2238 Sound Level Meter s/n 2654440
- Bruel & Kjaer Type 4188 Microphone s/n 2658551
- Bruel & Kjaer Type 2238 Sound Level Meter s/n 2774251
- Bruel & Kjaer Type 4188 Microphone s/n 2764264

The meter, microphone, and field calibrator are laboratory calibrated biennially in accordance with UKAS procedures or to traceable National Standards.

5.2 RESULTS AND OBSERVATIONS

The results of the noise measurement surveys are given in Appendix B.

The measured daytime noise levels at Positions 1 and 2 during the 2017 survey are $L_{Aeq,16hr}$ 83 dB (position 1) and 78 dB (position 2) and typical L_{AFmax} 90 dB (position 1) and 86 (position 2) considered to be due to road traffic noise, rather than railway or aircraft activity. At night these levels reduce to $L_{Aeq,8hr}$ 78 and 74 dB respectively, with typical L_{AFmax} 88 dB and 84 dB respectively. During the 2019 survey, noise levels had reduced a little to $L_{Aeq,16hr}$ 81 dB (position 1) and 76 dB (position 2) during the daytime, and $L_{Aeq,8hour}$ 77 dB (position 1) and 72 dB (position 2) during the night time.

At Position 3, adjacent to Long Lane, noise levels are lower. In 2017, the measured level was $L_{Aeq,16hr}$ 72 dB during then day and $L_{Aeq,8hr}$ 66 dB at night, and in 2019 it was 67 dB and 63 dB respectively. Typical L_{AFmax} levels during daytime are 94 dB and during night time 83 dB.

Position 4, measured only during 2017, to the southern side of the site, was $L_{Aeq,16hr}$ 61 dB during the day and $L_{Aeq,8hr}$ 58 dB at night. Typical L_{AFmax} during daytime were 79 dB and during night time 71 dB.

Position 5, measured only during 2019, to the southern side of the site, was $L_{Aeq,16hr}$ 60 dB during the day and $L_{Aeq,8hr}$ 56 dB at night.

At Positions 1-3, L_{AFmax} levels are relatively high due to the proximity to the road. However, at Position 4 L_{AFmax} levels are lower because this position was further away from the main roads and shielded from them. In general, it would be expected that aircraft movements at RAF Northolt would give much the same L_{AFmax} values at all positions, but this is not reflected in the results. This is a good indication that the most significant noise source affecting the site is road traffic.

6. ASSESSMENT

6.1 NEW RESIDENTIAL DEVELOPMENT

6.1.1 Noise model

The noise levels measured have been used to develop a site noise model. The particular prediction model that has been used for this analysis is Bruel & Kjaer's 'Predictor' software. This acoustic model implements the procedures set out in ISO 9613-2:1996 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation to determine noise levels". The Predictor model takes account of the following features in its calculation procedure:

- Source sound power level (for point, line and area sources) (Which we have determined by measurement described above)
- Reflection from nearby structures and source directivity
- Distance from noise source (geometric spreading)
- Atmospheric absorption
- Acoustic screening of intervening structures and topography
- Ground absorption
- Ground effects (which includes the height of ground relative to the noise source)
- Site layout as detailed in planning application

The noise model indicates the range of external levels expected around the site, varying by location and by height.

Buildings B2, B5 and B6 include car parks at ground floor. In order to ventilate these car parks, a natural ventilation system is proposed with acoustic louvres in various façades. The acoustic performance of the proposed acoustic louvres is shown in octave bands in Table 4 below.

	Octave Band Centre Frequency (Hz)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Acoustic performance of the proposed acoustic louvres (dB)	7.4	6.5	7.2	7.9	11.9	12.1	11.1	11.8

Table 4: Sound reduction index (SRI) of the proposed acoustic louvres (150 mm deep)

Road traffic noise transmitted from the adjacent main roads (A40 and A437) to the rear of the development through the car parks is also accounted for in the noise models. This has been done in a two-step process: noise ingress calculations were carried out to determine the reverberant internal noise levels in the car parks. Using the determined reverberant internal noise levels, noise breaking out from the car parks towards the rear of each building is modelled using emitting façade areas. Details of this are shown in Appendix F.

For the purposes of this assessment, the external noise levels have been rationalised to allow preliminary design advice to be issued. This rationalisation has considered the noisiest case for each façade zone. During detailed scheme development (RIBA Stages 3 and 4), this can be developed in more detail, and may allow a less onerous scheme of noise control than is detailed in this report. Nonetheless, this preliminary advice is considered to robustly represent the scheme.

6.1.2 General Assessment

As shown in the Design and Access Statement, the scheme layout has been developed mindful of the noise generated by the A40 to the north, and Long Lane to the west. The properties that overlook the main noise sources have significant acoustic mitigation to provide a good internal acoustic environment. This then allows the remaining properties, that are screened from these main noise sources, to experience lower levels and require lesser mitigation.

This also creates amenity areas within the site that are well screened, and quieter.

The following principle of acoustic design, which have been incorporated into the scheme to minimise noise impact on future residents should be noted:

- The massing of buildings alongside the primary noise sources of the A40 and Long Lane act as acoustic barriers to screen the remainder of the site.
- The north façade of Buildings 5-9 overlook the A40. However, the façade in Buildings 5-8 does not include any bedrooms, the overlooking rooms have been limited to bathrooms and living rooms.

  These living rooms are all dual aspect, with windows to the quieter (south) façade.

  Building 9 has just one dwelling on each floor (5 dwellings) with bedrooms in this façade. Again, living rooms are dual aspect, albeit to the east facade, rather than the south.
- Buildings 4, 10, 11 and 12 are centrally located, so screened from the roads.

This approach therefore is in keeping with the principles of ProPG Stage 2 Element 1, *demonstrating a good acoustic design process*. The assessment of the additional elements (2-4) are set out below, namely observing internal noise level guidelines, undertaking an external amenity area noise assessment; and considering other relevant issues.

6.1.3 Mitigation

The noise model indicates varying noise levels across the site. To determine the mitigation required by the building envelope, this has been split into 5 zones. Drawings marked up to show the different zones are attached in Appendix C.

6.1.3.1 Red zone

The calculation shows that noise levels would meet BS8233/WHO standards with the following glazing and ventilation strategy:

- Glazing that achieves $R_w(C_{tr})$ 51 (-4) dB. This can be achieved by using a standard double glazed outer unit (comprising 6 mm outer pane, 12mm cavity and 6mm inner pane), with as secondary 6mm sash on wide airspace (200 mm); or a double glazing unit comprising 12.8mm outer pane, 20mm cavity filled with argon and 16.8mm laminated inner pane.
- Ventilation provided by mechanical means, not through building façade.
- Façade comprising brick outer, 100 mm cavity containing mineral wool, and two layers of plasterboard inner ($R_w(C_{tr})$ 60 (-4)) dB.

6.1.3.2 Orange zone

The calculation shows that noise levels would meet BS8233/WHO standards with the following glazing and ventilation strategy:

- Double Glazing that achieves $R_w(C_{tr})$ 40 (-6) dB. This can be achieved by using a double glazed unit comprising 6mm outer pane, 16mm cavity filled with argon and 6.8mm laminated inner pane.
- Ventilation provided by mechanical means, not through building façade.
- Façade comprising brick outer, 100 mm cavity containing mineral wool, and two layers of plasterboard inner ($R_w(C_{tr})$ 60 (-4)) dB.

6.1.3.3 Green zone

The calculation shows that noise levels would meet BS8233/WHO standards with the following glazing and ventilation strategy:

- Double Glazing that achieves $R_w(C_{tr})$ 35 (-3) dB. This can be achieved by using a double glazed unit comprising a 10 mm outer pane, 6-16 mm cavity and 6mm inner pane.
- Ventilation provided by mechanical means, not through building façade. However, in this zone there is scope for using acoustically rated trickle ventilators (e.g. $D_{n,e,w}$ (C_{tr}) 45 (-3) dB) for continuous ventilation without compromising the acoustic amenity for residents. This may be developed during RIBA Stage 3 and 4.
- Façade comprising brick outer, 100 mm cavity containing mineral wool, and two layers of plasterboard inner ($R_w(C_{tr})$ 60 (-4)) dB

6.1.3.4 Blue zone

The calculation shows that noise levels during the day would meet BS8233/WHO standards with the following glazing and ventilation strategy:

- Double Glazing that achieves $R_w(C_{tr})$ 33 (-4) dB. This is can be achieved by using a double glazed unit comprising a 8 mm outer pane, 6-16 mm cavity and 4 mm inner pane.
- Ventilation provided by mechanical means, not through building façade. However, in this zone there is scope for using acoustically rated trickle ventilators (e.g. $D_{n,e,w}$ (C_{tr}) 42 (-4) dB) for continuous ventilation without compromising the acoustic amenity for residents. This may be developed during RIBA Stage 3 and 4.
- Façade comprising brick outer, 100 mm cavity containing mineral wool, and two layers of plasterboard inner ($R_w(C_{tr})$ 60 (-4)) dB

6.1.3.5 All unmarked façades

The calculation shows that noise levels would meet BS8233/WHO standards with the following glazing and ventilation strategy:

- Double Glazing that achieves $R_w(C_{tr})$ 29 (-4) dB. This can be achieved by using a double glazed unit comprising a 4 mm outer pane, 6-16 mm cavity and 4 mm inner pane.
- Ventilation provided by mechanical means, not through building façade. However, in this zone there is scope for using acoustically rated trickle ventilators (e.g. $D_{n,e,w}$ (C_{tr}) 39 (-2) dB) for continuous ventilation without compromising the acoustic amenity for residents. This may be developed during RIBA Stage 3 and 4.
- Façade comprising brick outer, 100 mm cavity containing mineral wool, and two layers of plasterboard inner ($R_w(C_{tr})$ 60 (-4)) dB

6.1.3.6 Amenity spaces

BS8233 advises that external noise level in gardens and balconies etc. should not exceed 50 dB $L_{Aeq,T}$ with an upper guideline of 55 dB $L_{Aeq,T}$. It recognises that this is not always possible, so development should be designed to achieve the lowest practicable levels in external amenity spaces, but should not be prohibited.

However, the Government's Planning Practice Guidance (DCLG 06/03/2014) states that the noise impact may be partially off-set if the residents of those dwellings have access to:

- a relatively quiet façade (containing windows to habitable rooms) as part of their dwelling, and/or;
- a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced with increasing noise exposure and could be such that significant adverse effects occur, and/or;
- a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings, and/or;
- a relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance).

This would therefore seem to suggest that noise impact on the balconies need not be a concern, as the central zone of the site represents a relatively quiet amenity space. Whilst noise levels in in part do exceed $L_{Aeq,T}$ 55, there are quieter areas which will be between $L_{Aeq,T}$ 50 and 55 dB.

- The rear (east) of building 1 will meet the BS8233 guideline levels
- The courtyard within buildings 2,3 and 4 will meet the BS8233 guideline levels
- The podium area between building 5 and 6 will exceed the BS8233 guidelines by a small margin
- The podium area behind building 6 and 7 will largely meet the BS8233 guidelines
- The podium area behind building 7 and 8 will meet the BS8233 guidelines in part
- The podium area between building 8 and 9 will exceed the BS8233 guidelines by a small margin
- The west side of building 10 will meet the BS8233 guideline levels
- The south and west side of building 11 will exceed the BS8233 guidelines by a small margin in part, and meet it in part

- The south side of Building 12 will meet the BS8233 guideline levels. The west side will exceed the BS8233 guidelines by a small margin in part, and meet it in part.
- The central area of the site will meet the BS8233 guidelines in part

This can be seen in more detail on the contour plots in Appendix D.

Building 1 contains 5 internal amenity areas. The noise level in these areas is expected to comfortably meet BS8233 guideline noise levels, assuming these are fully enclosed spaces.

6.1.4 Overheating Conditions

A detailed assessment of overheating, and the mitigation of overheating will be conducted at detailed design stage. Resolution of this can be required by Planning Condition.

However, in order to assist the overheating assessment for the proposed development, an indicative level of noise impact during overheating mitigation, if windows were opened has been determined following the guidance from AVO and is shown in Table 5 below. Note, the coloured zones relate to the marked-up drawings for façade specifications included in Appendix C.

Zone	Typical Internal Noise Levels $L_{Aeq,T}$ (dB) with windows partially open		Comment
	Daytime (Living Rooms and Bedrooms)	Night time (Bedrooms)	
Red	60 – 69	56 – 65	No openable windows.
Orange	49 – 59	45 – 55	No openable windows.
Green	45 – 53	41 – 49	Openable windows could be utilised as part of a strategy of mitigation of overheating, assuming only for limited periods in some areas. Noisier areas (above $L_{Aeq,T}$ 50 dB during daytime and 42 dB during night time) will require windows closed.
Blue	39 – 47	35 – 43	Openable windows could be utilised as part of a strategy of mitigation of overheating, assuming only for limited periods in some areas. Noisier areas (above $L_{Aeq,T}$ 42 dB during night time) will require windows to be closed.
Unmarked	36 – 41	32 – 37	Windows could be opened as part of a strategy of mitigation of overheating unless they are required for overheating for most of the time.

Table 5: Typical internal noise levels with windows open

The overheating analysis has recently been completed, and concluded the use of MVHR (mechanical ventilation with heat recovery) units in all apartments with closed windows can comply with the requirements of TM59.

However, the use of MVHR is to be minimised:

- In the red and orange zones, MVHR units will be used. In the green zone, it may be possible in some dwellings to utilise natural ventilation (open windows) but the expectation is that the majority of units will require MVHR.
- In the blue and unmarked zones, there is an expectation that the majority of dwellings will be able to have overheating mitigated with the use of open windows, though this is subject to further analysis of the overheating condition, including a consideration of the duration for which such mitigation is required.

A more detailed level of impact on the proposed residences due to opening windows for overheating mitigation will be determined following further work on the overheating assessment, which will determine the extent of overheating both in terms of duration, and location on the site, and taking account of air quality issues. This will in turn will determine the acceptability or otherwise of having open windows for a limited time.

6.2 CONSTRUCTION NOISE

Control and Management Measures – The works will adhere to the legislative requirements on noise and vibration contained within the Control of Pollution Act 1974 and the statutory nuisance provisions contained within the Environmental Protection Act 1990 (s79-82).

Within this context, the contractor will have consideration of BS 5228-1:2009+A1:2014 – "Code of practice for noise and vibration control on construction and open sites – Part 1: Noise" and BS 5228-2:2009+A1:2014 – "Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration".

Specific strategies for minimising noise and vibration from the works on site will be developed in accordance with BS 5228-1:2009+A1:2014 – "Code of practice for noise and vibration control on construction and open sites – Part 1: Noise" and BS 5228-2:2009+A1:2014 – "Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration". We set out below general mitigation measures which will be considered. The below is not held out to be an exhaustive list and additional mitigation measure will be incorporated where considered appropriate in accordance with the above mentioned BS 5228 (Parts 1 and 2):

- Installation of site hoardings
- Location of site access/haul roads away from residential properties together with the avoidance of steep gradients and obstructions to minimise the need for revving engines
- Encourage avoidance of unnecessary revving of engines and switching off of mechanical equipment when not in use
- Encourage sequential start-up of plant and vehicles rather than altogether
- In the event that generators are required then these will be within suitable sound and vibration attenuating enclosures
- Minimising drop height of materials to reduce impact noise and vibration
- Encouraging use of linings to skips, chutes etc through site based tool box talks to reduce impact noise
- Programming all construction activities, that have the potential to generate significant amounts of noise and/or vibration, during the daytime within normal working hours
- Implementation of two-way radio communication systems to reduce the need for shouting

- Limit the potential for noise and vibration arising from operation of Non-Road Mobile Machinery (NRMM) as follows:
    - All NRMM utilised on site will be in good condition
    - All NRMM will be well maintained
    - Where possible NRMM will be fitted with appropriate silencers in accordance with manufacturer's recommendations
    - NRMM will be shut down or throttled down to a minimum during periods of inactivity
    - Construction plant being used on public/private roads will be switched off when stationary to prevent excessive noise
- Incorporating use of enclosures to attenuate noise and vibration emanating from static plant
- Siting of static plant away from noise sensitive areas
- Management of daily site deliveries
- Minimising the need to carry out works beyond normal working hours and justifying in advance any need to do so
- Operation of "Quiet Hours of Working" to be applied where appropriate or specifically required in order to minimise noise and vibration levels at specific times during the day

Such measures to be considered as part of a Construction and Environmental Management Plan (CEMP), to be developed by the Main Contractor, and required by Condition.

6.3 SITE GENERATED ROAD TRAFFIC

The road traffic data provided by WSP, the traffic consultants and used in the calculated short and long term changes in BNL are presented in Appendix E.

The calculated change in noise levels have been determined by considering the increased traffic generated by the Hillingdon Gardens development, above the combined traffic of the existing (as counted in 2017) traffic and the committed development traffic.

4 locations are considered:

1 – Long Lane, north of the junction with Freezeland Way
2 – Long Lane, south of the junction with Freezeland Way
3 – Freezeland Way
4 – Western Avenue

Location	Change in noise level ΔL_F
1 – Long Lane (N)	0.03
2 – Long Lane (S)	0.02
3 – Freezeland Way	0.22
4 – Western Avenue	0.05

Table 4: Predicted change in noise level as a result of road traffic generated by Hillingdon Gardens development, over the existing traffic counts added to committed development

In comparison to the magnitude of impacts assessment, given in tables 2 and 3, this shows that at all locations, the magnitude of the impact is negligible.

6.4 NOISE FROM COMMERCIAL UNITS

As mentioned above in Section 4.2.9, future tenants would be responsible to specify and install mechanical plant to suit their requirements. In order to protect the future residents of the proposed scheme, noise generated by any mechanical plant at the commercial units should be assessed at the nearest noise sensitive receptor in accordance with BS 4142:2014. Where necessary, sufficient noise mitigation measures should be incorporated so that the outcome of any BS 4142:2014 assessment is that the Rating Level does not exceed the Background Sound Level representative of the nearest noise sensitive receptor.
Where there are separating structures between the commercial units and dwellings, the tenant will be responsible for ensuring their operation does not disturb adjoining or nearby uses. The structures between the commercial units and dwellings are a matter for detailed design.

However, it is the intention of the developer to provide a lease condition for the tenants that makes it clear that they are responsible from noise from their own units. The shell construction to be provided will provide a reasonable degree of sound insulation, and tenants will be guided as to the level of noise that would be acceptable in their units, with no further fit out works. Should tenants want to conduct noisier activity, they will be responsible for providing suitable sound insulation measures as part of their fit out.

6.5 SUMMARY OF THE ASSESSMENT

When determining the noise aspect of a planning application, the PPG asks an LPA to consider:

- *whether or not a significant impact is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur;*
- *whether or not a good standard of amenity can be achieved.*

This assessment has shown potential for an adverse noise impact on the future residents on the site, so has offered mitigation as advised by BS8233. Following careful consideration of the scheme layout by the designers, acoustic mitigation includes the provision of noise attenuating glazing and ventilation.

The assessment sets out good practice guidance to be incorporated during the construction phase, to control noise from the construction activities.

The assessment has shown that noise from site generated road traffic is expected to be negligible.

7. CONCLUSIONS

This report sets out the results of a noise survey at the proposed residential site. The results of the survey have been used to develop an indication of the mitigation scheme that could be required, to include the treatment to the external façade of the building, and the design and layout of the site.

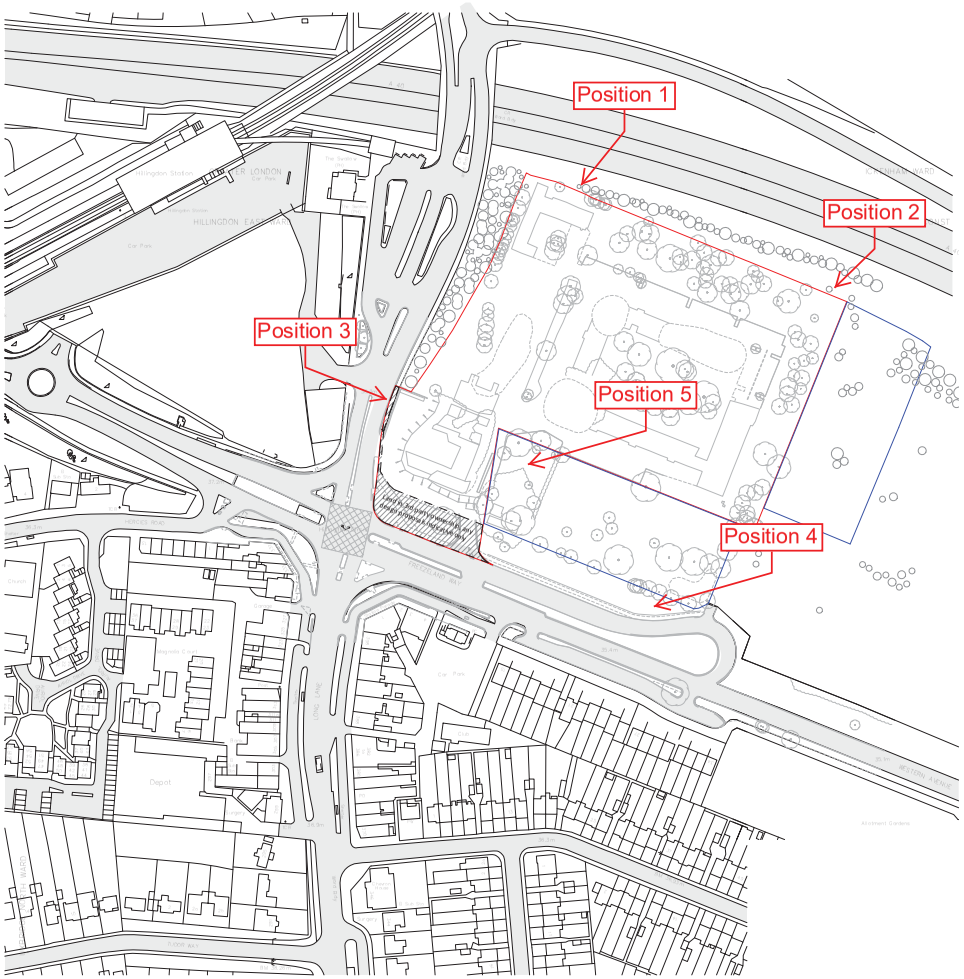
General guidance has been provided to control construction noise.

Noise from site generated road traffic is expected to be negligible.

Subject to the mitigation measures outlined in the report existing noise levels at the site need not pose a constraint to residential development. As the scheme is further developed, into RIBA Stages 3 and 4, the design can be confirmed, which may lead to some revision to the acoustic requirements. Therefore, the details of the sound insulation scheme can be submitted to the LPA under a planning condition that can be imposed on the development, to allow development of the design, and discharged following LPA approval, prior to commencement of the relevant work on site.

APPENDIX A

Site Location and Layout



NOTES
CONSULTANTS
- Refer to highways consultant's drawings for details
- Refer to landscape consultant's drawings for details
- Landscaping layout is indicative only

AREAS
- Refer to area schedule

N

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	PvB
P2	Issue For Planning	19-09-05		

Extent of application site
Including land in 3rd party ownership

Extent of leasehold site

Land in 3rd party ownership

0m 20m 40m 60m 80m 100m

VISUAL SCALE 1:1000 @ A1

ColladoCollins Architects

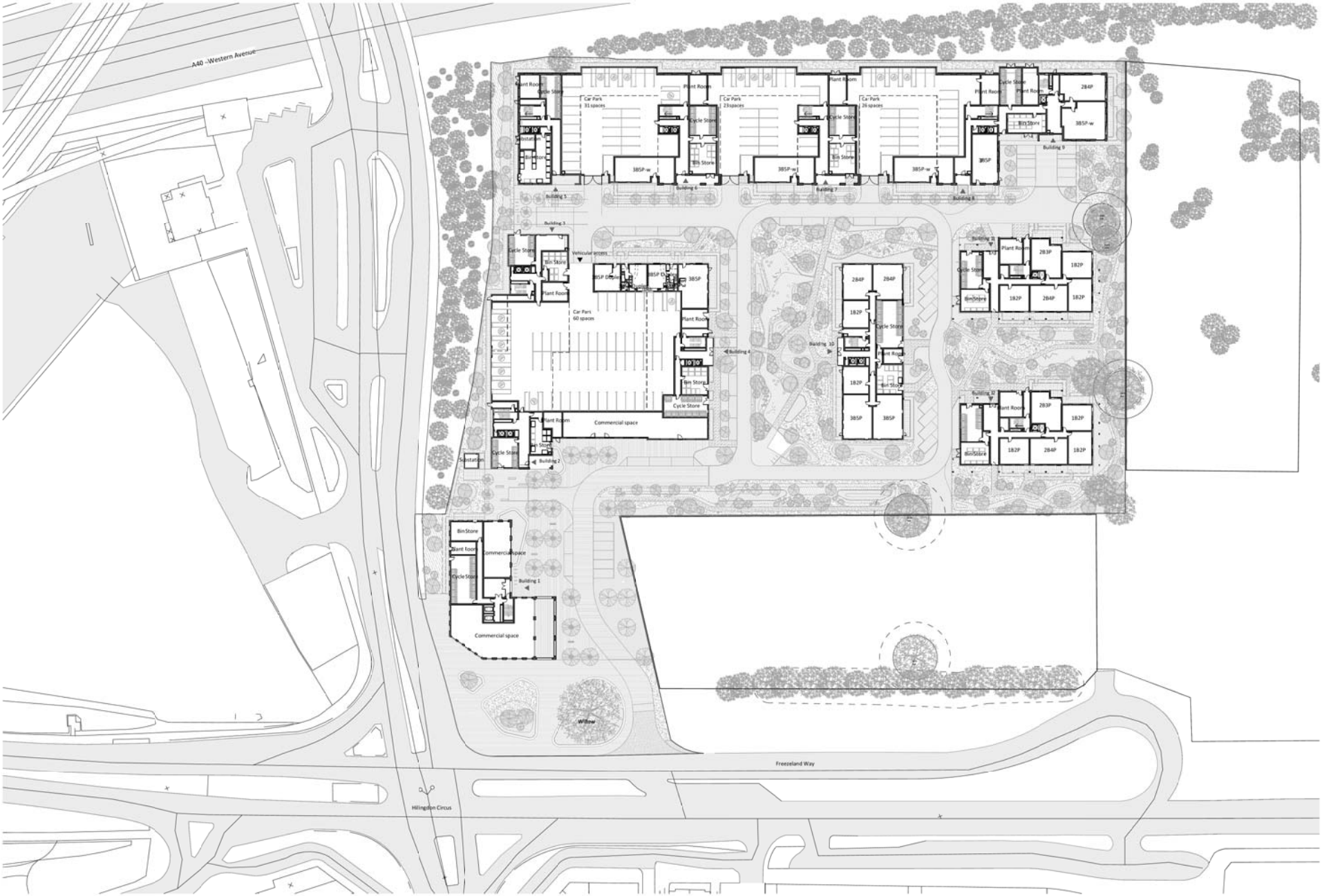
17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 30/06/17
Drawn By: BM
Checked by: JBC
Scale @ A1: As indicated
Scale @ A3: 1 : 2500
CAD File No:

Inland Homes
Hillingdon
Location Plan

PLANNING
19011 E0-001

P2
Revision



NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05		

Extent of application site

Extent of lease hold site

Notes

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects
17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 18/06/17
Drawn By: VC
Checked by: JBC
Scale @ A1: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Ground Floor Plan

PLANNING
19011 P0-100

P2
Revision

NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site

Extent of lease hold site

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects

17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 18/06/17
Drawn By: VC
Checked by: JBC
Scale @ A1: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
First Floor Plan

PLANNING
19011 P0-101

P2
Revision

NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site

Extent of lease hold site

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects

17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 18/06/17
Drawn By: VC
Checked by: JBC
Scale @ A1: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Second Floor Plan

PLANNING
19011 P0-102

P2
Revision

NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site

Extent of lease hold site

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects

17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 18/06/17
Drawn By: VC
Checked by: JBC
Scale @ A1: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Third Floor Plan

PLANNING
19011 P0-103

P2
Revision

NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site

Extent of leasehold site

PV Array

Brown Roof

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects

17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 18/06/17
Drawn By: VC
Checked by: JBC
Scale @ A1: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Fourth Floor Plan

PLANNING
19011 P0-104

P2
Revision

NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site

Extent of leasehold site

PV Array

Brown Roof

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects

17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 01/03/17
Drawn By: VC
Checked by: JBC
Scale @ A1: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Fifth Floor Plan

PLANNING
19011 P0-105

P2
Revision

NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site

Extent of leasehold site

PV Array

Brown Roof

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects

17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 01/03/17
Drawn By: VC
Checked by: JBC
Scale @ A1: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Sixth Floor Plan

PLANNING
19011 P0-106

P2
Revision

NOTES
CONSULTANTS
- Refer to highways consultant's drawings for details
- Refer to landscape consultant's drawings for details
- Landscaping layout is indicative only

AREAS
- Refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site
Extent of leasehold site
PV Array
Brown Roof

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects
17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 30/06/17
Drawn By: VC
Checked by: JBC
Scale @ A1: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Seventh Floor Plan

PLANNING
19011 P0-107

P2
Revision

NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site
Extent of leasehold site
PV Array
Brown Roof

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

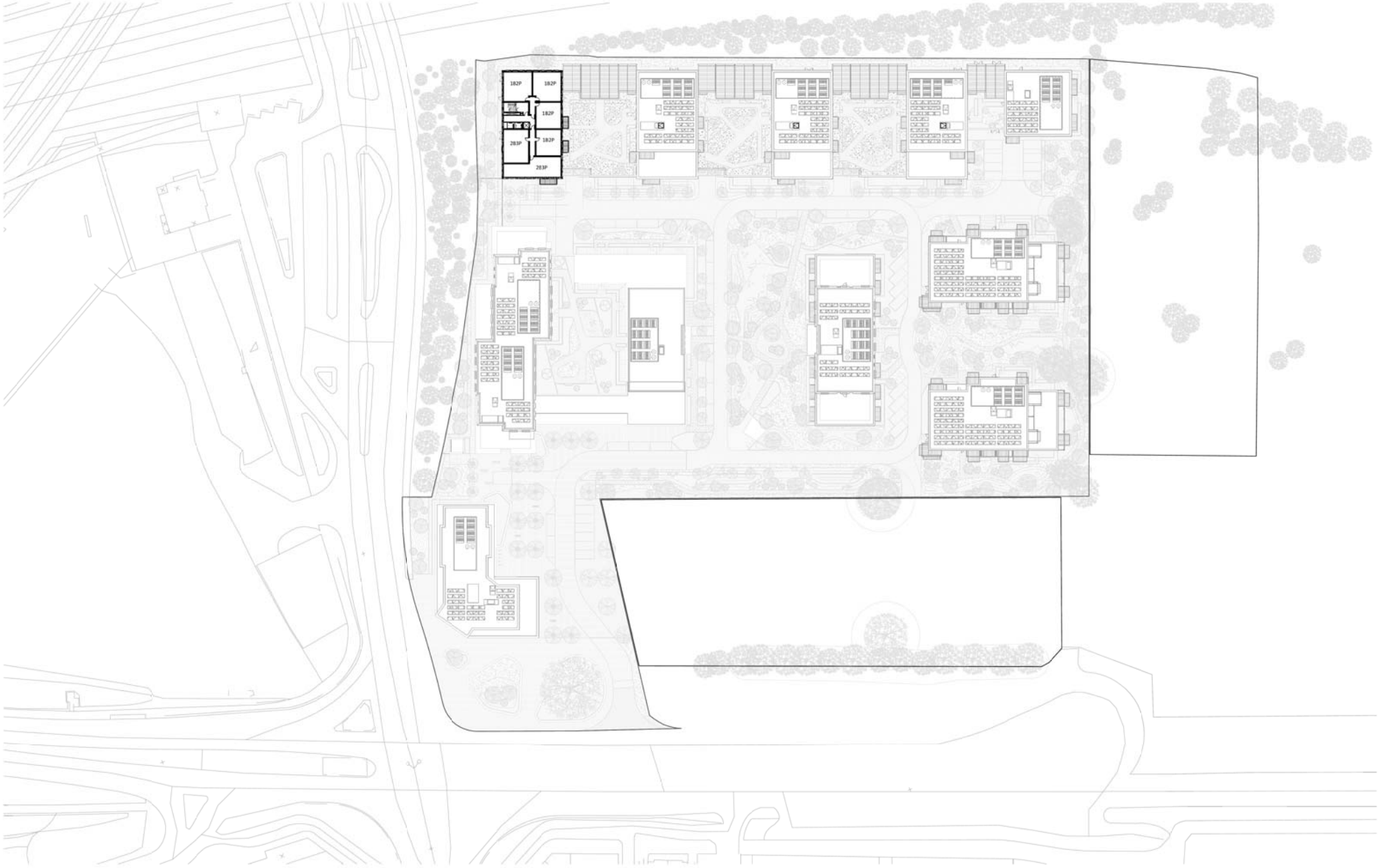
ColladoCollins Architects
17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 30/06/17
Drawn By: VC
Checked by: JBC
Scale @ A1: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Eighth Floor Plan

PLANNING
19011 P0-108

P2
Revision



NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site

Extent of leasehold site

PV Array

Brown Roof

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects

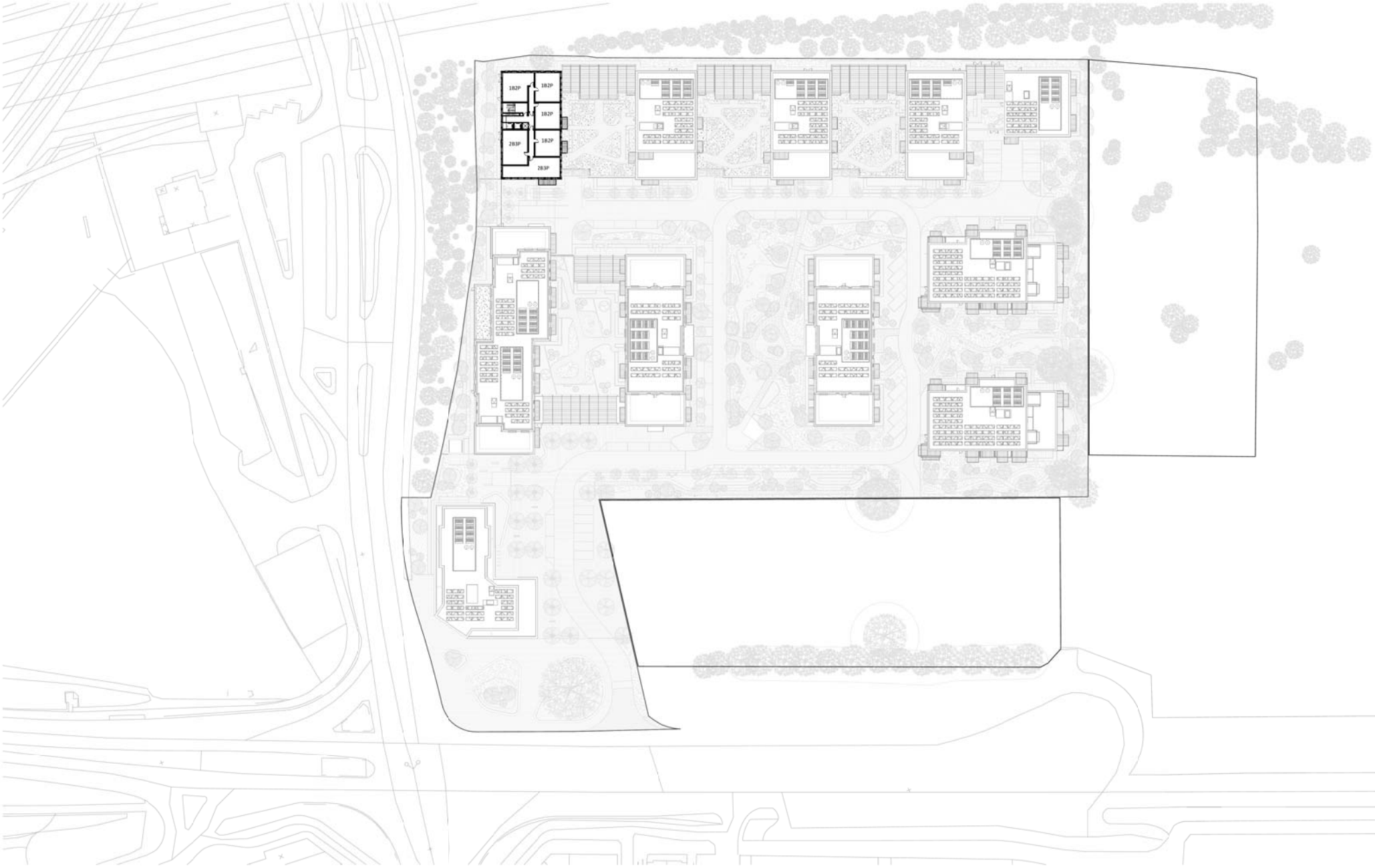
17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 07/02/19
Drawn By: Author
Checked by: Checker
Scale @ A1: As indicated
Scale @ A3:
CAD File No:

Inland Homes
Hillingdon
Ninth Floor Plan

PLANNING
19011 P0-109

P2
Revision



NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site

Extent of leasehold site

PV Array

Brown Roof

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects

17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 09/03/17
Drawn By: VC
Checked by: JBC
Scale @ A1: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Tenth Floor Plan

PLANNING
19011 P0-110

P2
Revision

NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site

Extent of leasehold site

PV Array

Brown Roof

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects

17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 07/02/19
Drawn By: Author
Checked by: Checker
Scale @ A1: As indicated
Scale @ A3:
CAD File No:

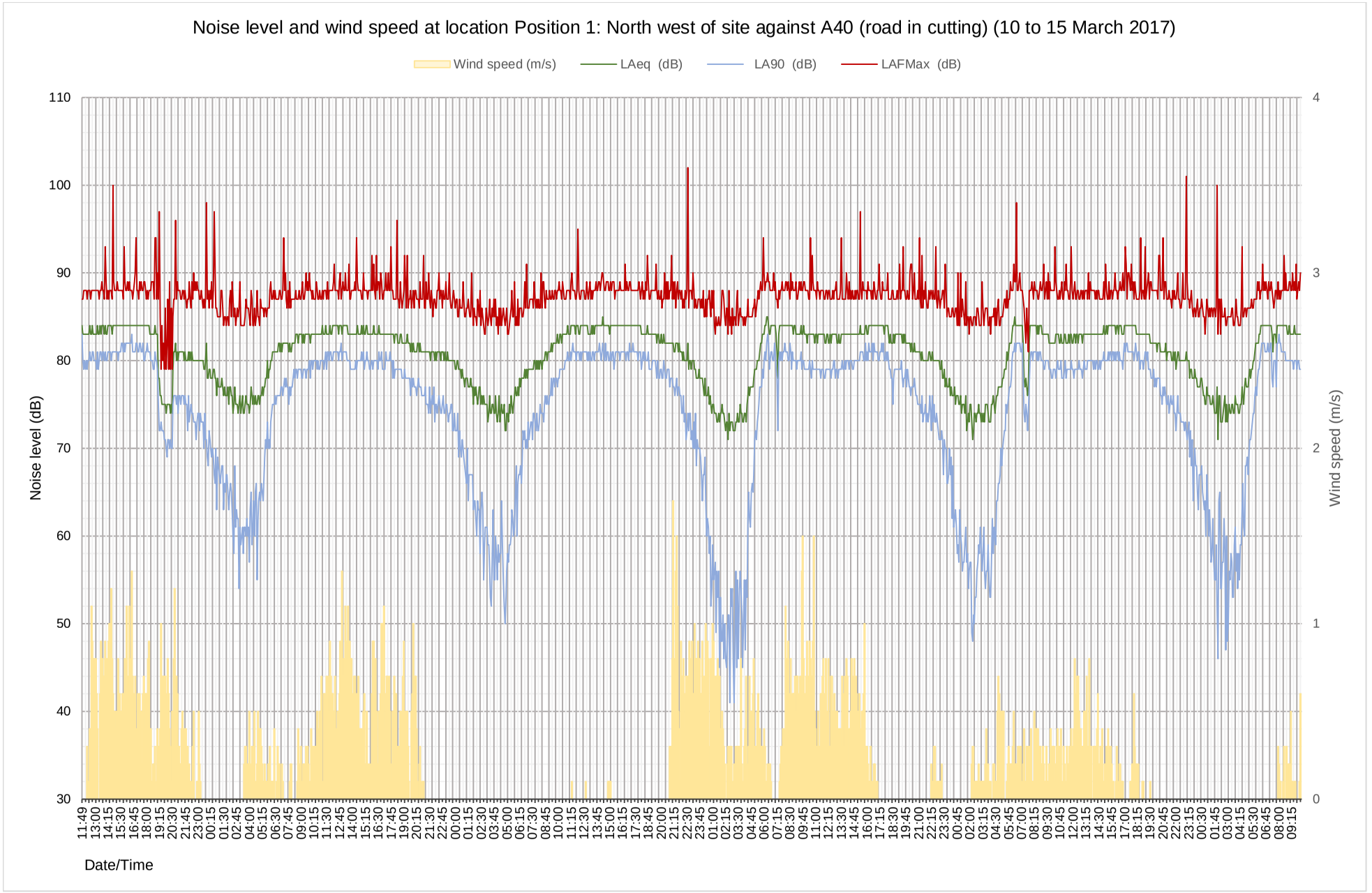
Inland Homes
Hillingdon
Roof Plan

PLANNING
19011 P0-111

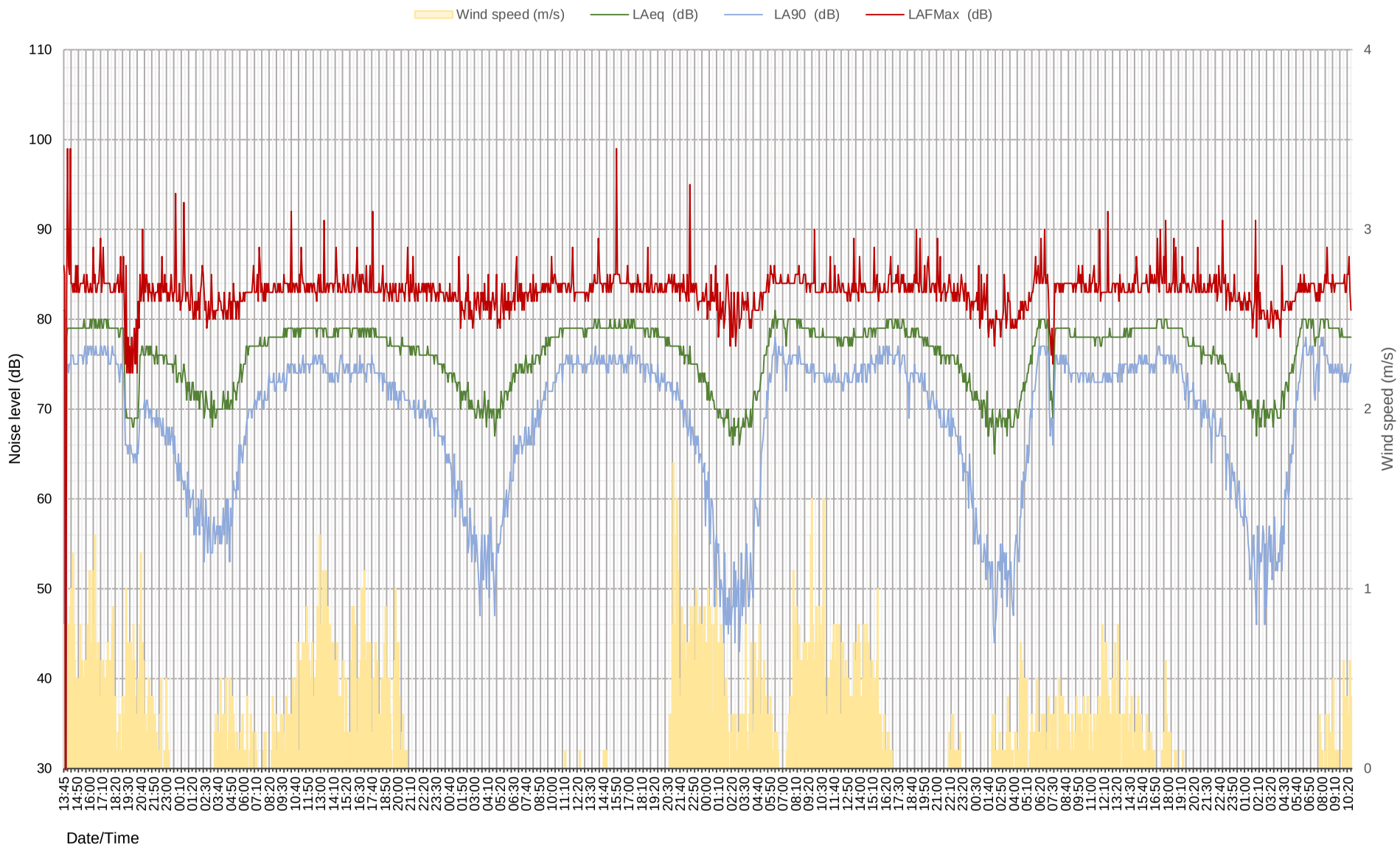
P2
Revision

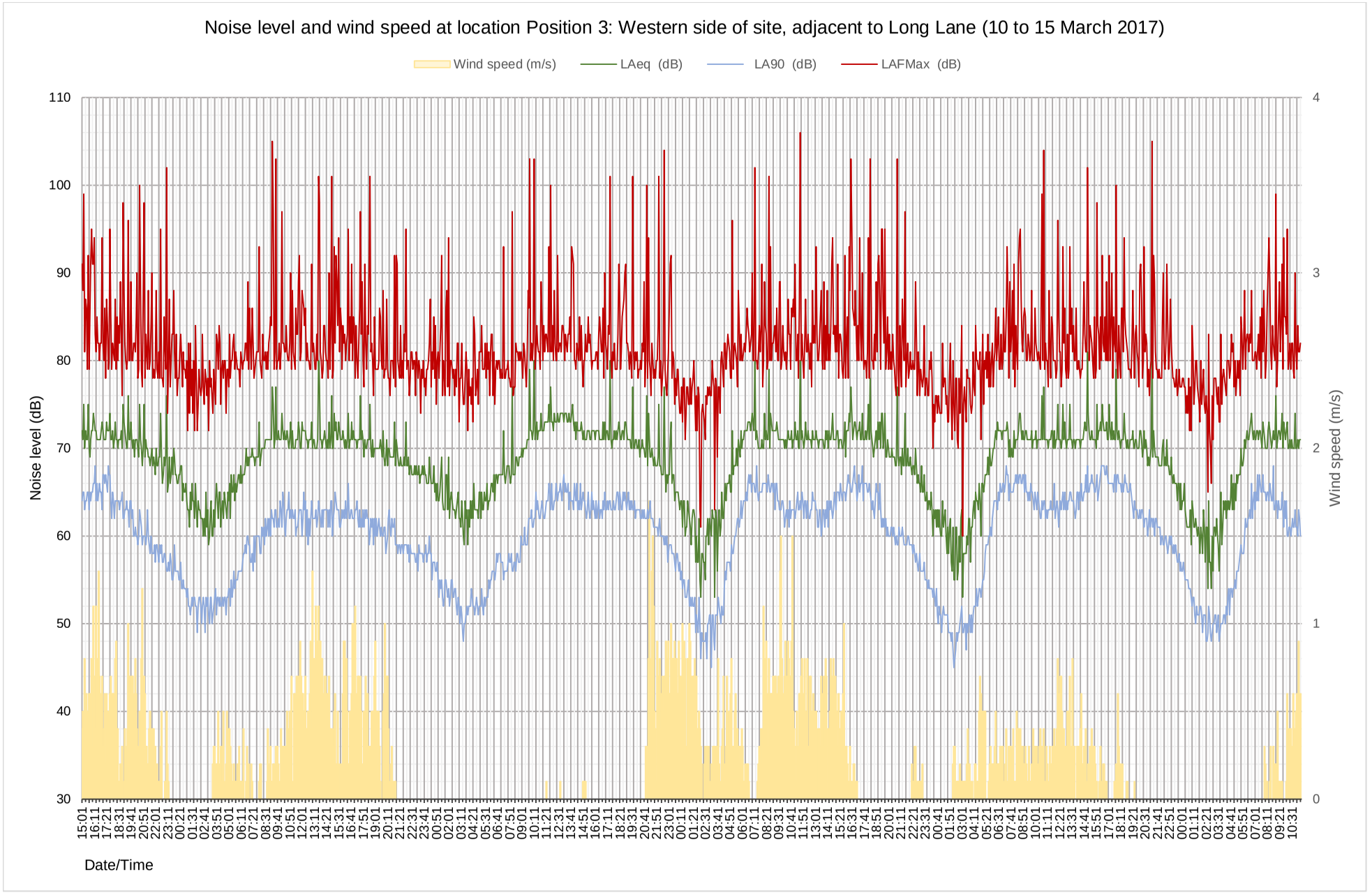
APPENDIX B

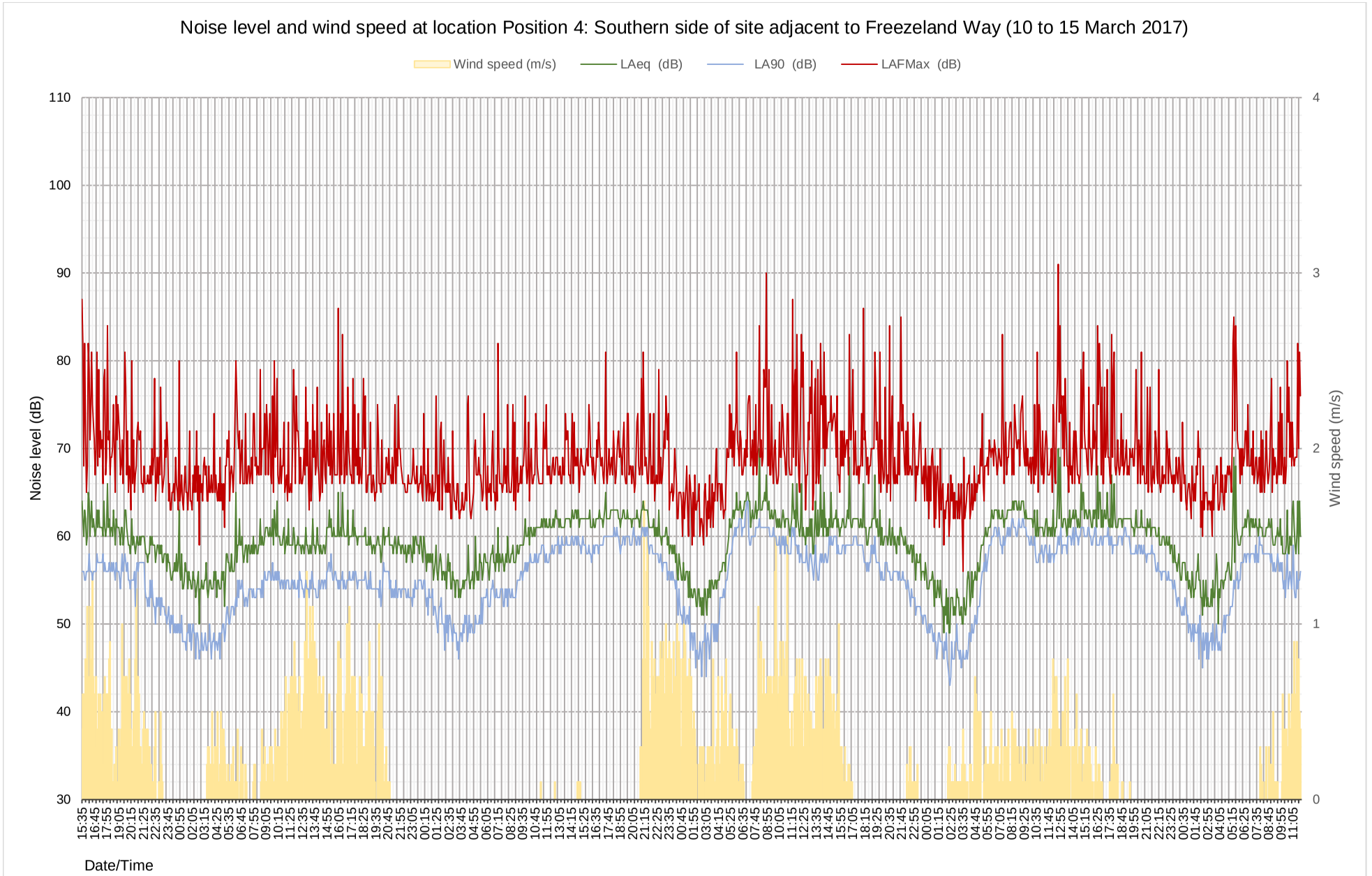
Noise Measurements

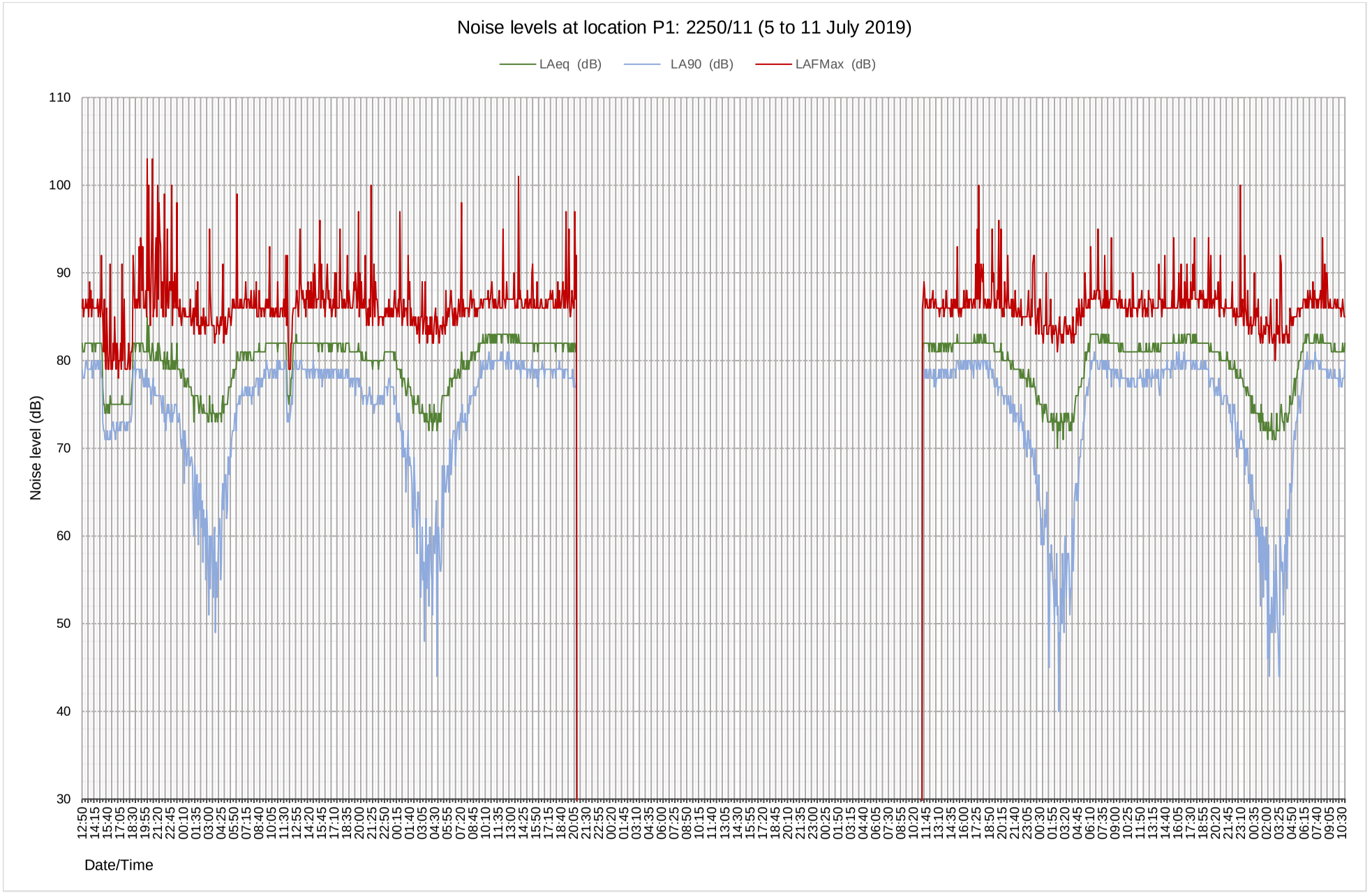

Noise level and wind speed at location Position 1: North west of site against A40 (road in cutting) (10 to 15 March 2017)
Wind speed (m/s)
LAeq (dB)
LA90 (dB)
LAFMax (dB)
Noise level (dB)
Wind speed (m/s)
Date/Time

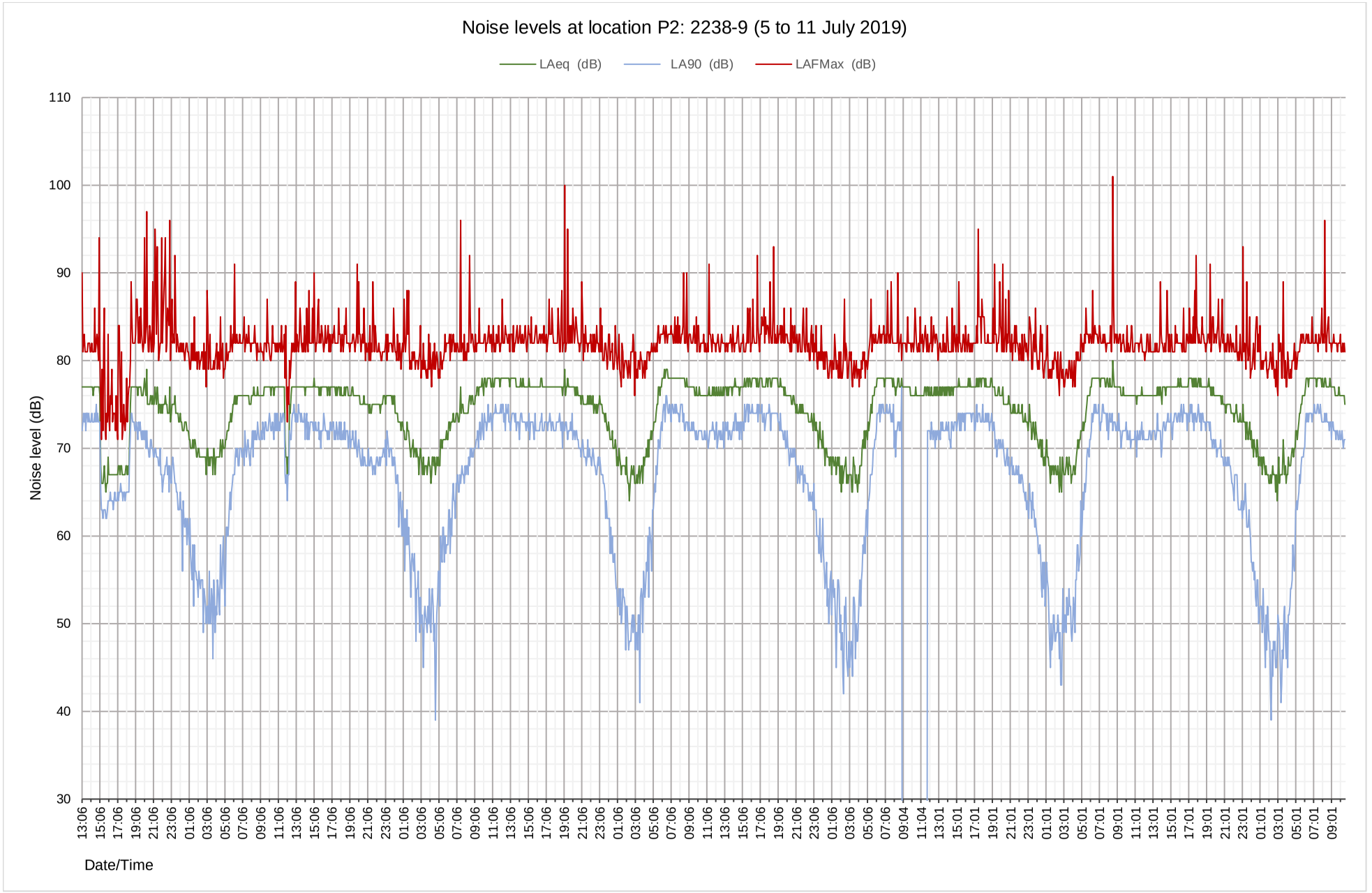
Noise level and wind speed at location Position 2: North east of site against A40 (road at simialr level to site) (10 to 15 March 2017)

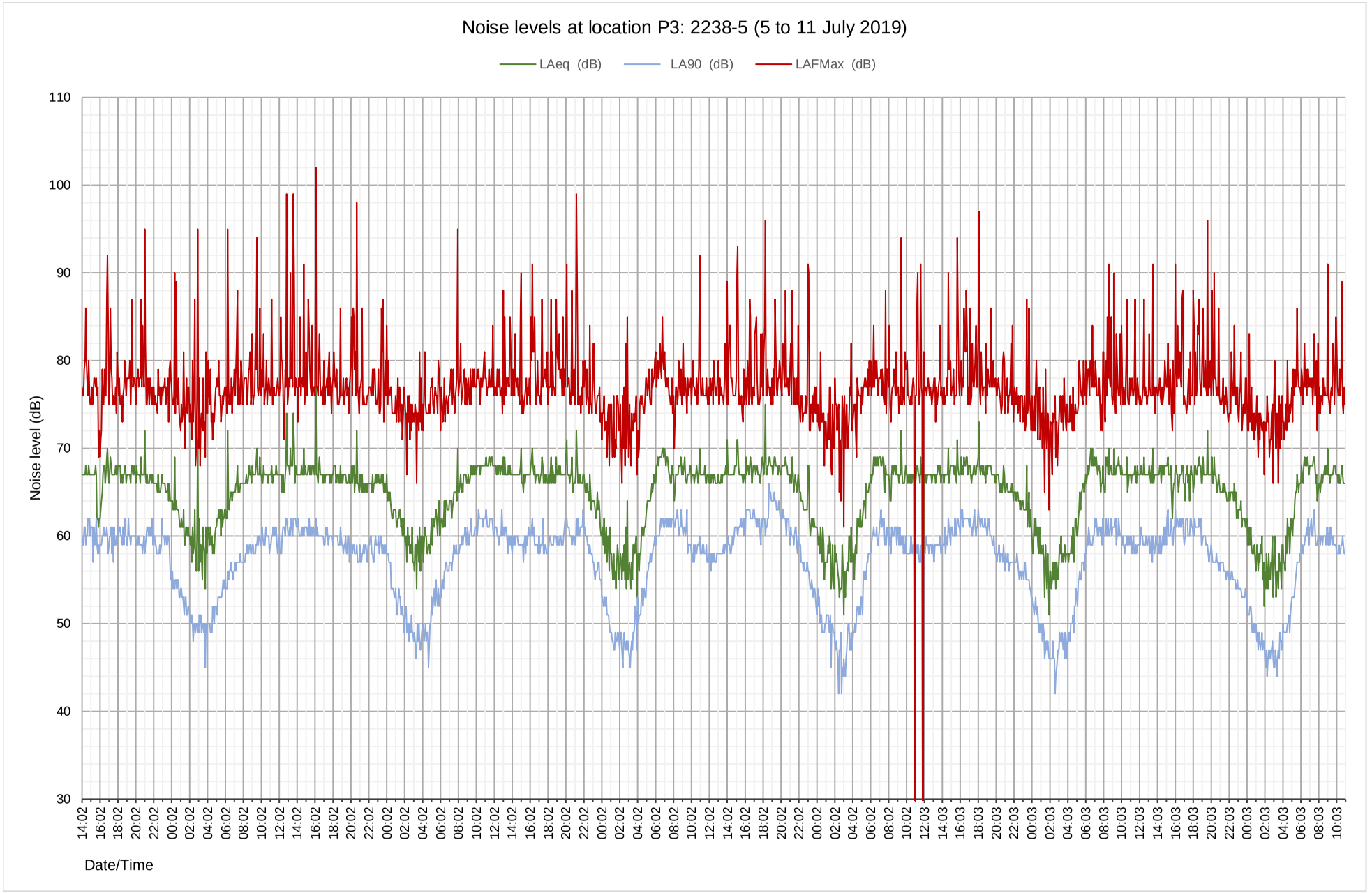


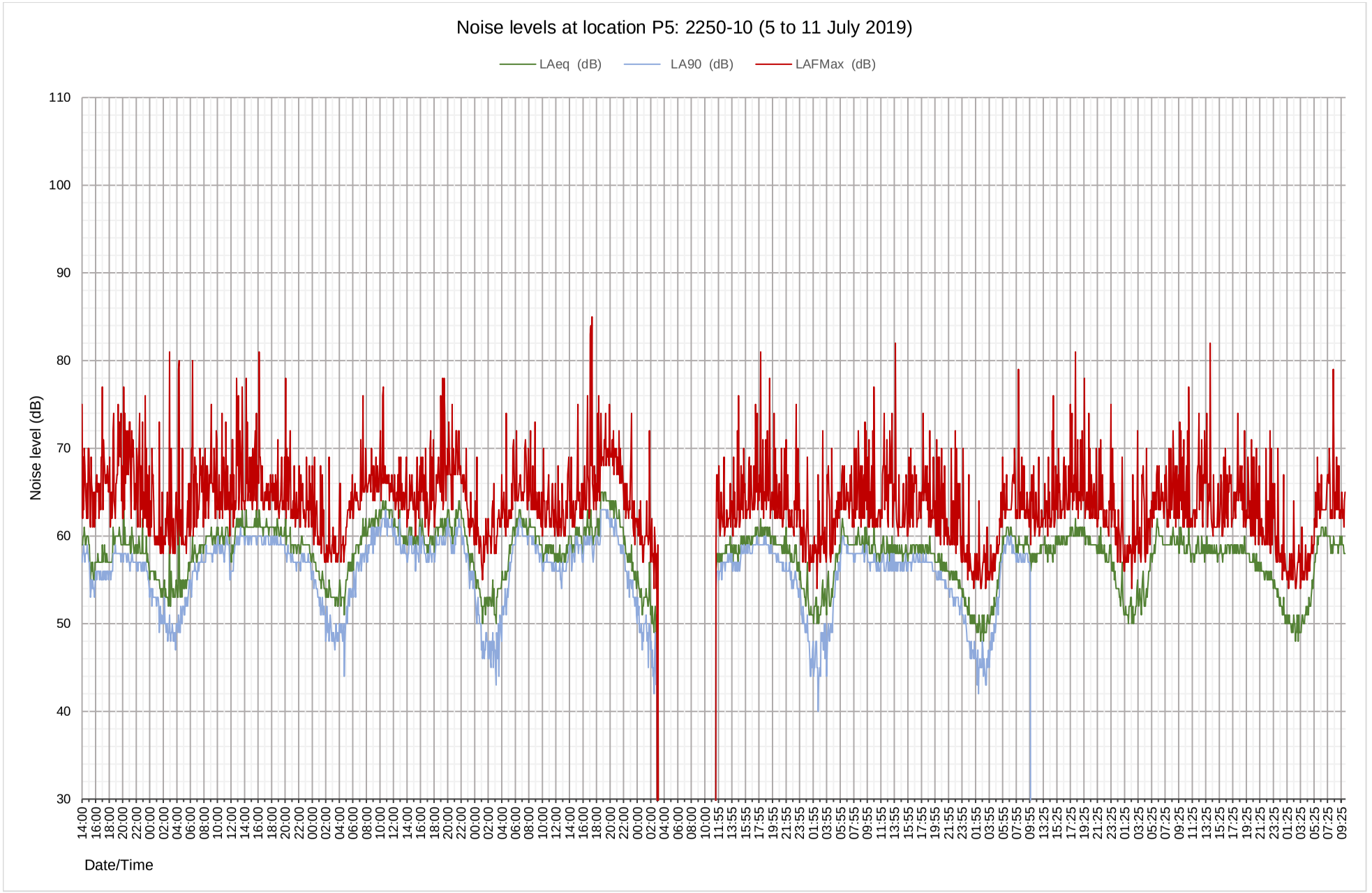

Noise level and wind speed at location Position 3: Western side of site, adjacent to Long Lane (10 to 15 March 2017)
Wind speed (m/s)
LAeq (dB)
LA90 (dB)
LAFMax (dB)
Noise level (dB)
Wind speed (m/s)
Date/Time


Noise level and wind speed at location Position 4: Southern side of site adjacent to Freezeland Way (10 to 15 March 2017)
Wind speed (m/s)
LAeq (dB)
LA90 (dB)
LAFMax (dB)
Noise level (dB)
Wind speed (m/s)
110
100
90
80
70
60
50
40
30
4
3
2
1
0
Date/Time


Noise levels at location P1: 2250/11 (5 to 11 July 2019)
LAeq (dB)
LA90 (dB)
LAFMax (dB)
Noise level (dB)
110
100
90
80
70
60
50
40
30
12:50
14:15
15:40
17:05
18:30
19:55
21:20
22:45
00:10
01:35
03:00
04:25
05:50
07:15
08:40
10:05
11:30
12:55
14:20
15:45
17:10
18:35
20:00
21:25
22:50
00:15
01:40
03:05
04:30
05:55
07:20
08:45
10:10
11:35
13:00
14:25
15:50
17:15
18:40
20:05
21:30
22:55
00:20
01:45
03:10
04:35
06:00
07:25
08:50
10:15
11:40
13:05
14:30
15:55
17:20
18:45
20:10
21:35
23:00
00:25
01:50
03:15
04:40
06:05
07:30
08:55
10:20
11:45
13:10
14:35
16:00
17:25
18:50
20:15
21:40
23:05
00:30
01:55
03:20
04:45
06:10
07:35
09:00
10:25
11:50
13:15
14:40
16:05
17:30
18:55
20:20
21:45
23:10
00:35
02:00
03:25
04:50
06:15
07:40
09:05
10:30
Date/Time


Noise levels at location P2: 2238-9 (5 to 11 July 2019)
LAeq (dB)
LA90 (dB)
LAFMax (dB)
Noise level (dB)
110
100
90
80
70
60
50
40
30
13:06
15:06
17:06
19:06
21:06
23:06
01:06
03:06
05:06
07:06
09:06
11:06
13:06
15:06
17:06
19:06
21:06
23:06
01:06
03:06
05:06
07:06
09:06
11:06
13:06
15:06
17:06
19:06
21:06
23:06
01:06
03:06
05:06
07:06
09:04
11:04
13:01
15:01
17:01
19:01
21:01
23:01
01:01
03:01
05:01
07:01
09:01
11:01
13:01
15:01
17:01
19:01
21:01
23:01
01:01
03:01
05:01
07:01
09:01
Date/Time


Noise levels at location P3: 2238-5 (5 to 11 July 2019)
LAeq (dB)
LA90 (dB)
LAFMax (dB)
Noise level (dB)
110
100
90
80
70
60
50
40
30
14:02
16:02
18:02
20:02
22:02
00:02
02:02
04:02
06:02
08:02
10:02
12:02
14:02
16:02
18:02
20:02
22:02
00:02
02:02
04:02
06:02
08:02
10:02
12:02
14:02
16:02
18:02
20:02
22:02
00:02
02:02
04:02
06:02
08:02
10:02
12:02
14:02
16:02
18:02
20:02
22:02
00:02
02:02
04:02
06:02
08:02
10:02
12:03
14:03
16:03
18:03
20:03
22:03
00:03
02:03
04:03
06:03
08:03
10:03
12:03
14:03
16:03
18:03
20:03
22:03
00:03
02:03
04:03
06:03
08:03
10:03
Date/Time


Noise levels at location P5: 2250-10 (5 to 11 July 2019)
LAeq (dB)
LA90 (dB)
LAFMax (dB)
Noise level (dB)
110
100
90
80
70
60
50
40
30
Date/Time

APPENDIX C

Noise Ingress Calculations and Floor Plan Drawings Mark-Up

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	10/09/2019
Plot:	Red Zone - Block 5 - 1st Floor - North Façade
Room:	LKD

Daytime ($L_{Aeq,16hr}$)					Octave band centre frequency									
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Façade 1	$L_{eq,1}$	70	71	73	75	80	74	61	51	$L_{Aeq,1}$	**82 dB**
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Façade 1	$L_{eq,ff}$	70	71	73	75	80	74	61	51	$L_{Aeq,ff}$	**82 dB**
ROOM DATA														
Room description and reverberation time	Volume	86.3	Living Room	RT60	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3		**s**
FAÇADE ELEMENTS (Façade 1)														
Glazing	Area	10.8	Pilkington Optiphon 12.8/20argon/16.8	Rw	30	35	45	49	50	54	65	70	**Rw / Rw+Ctr**	**51 / 47 dB**
Wall	Area	27.3	External Wall (As described in report)	Rw	24	46	57	53	59	64	73	70	**Rw / Rw+Ctr**	**60 / 56 dB**
None			--											
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	**50**	**37**	**27**	**28**	**29**	**19**	**-**	**-**	$L_{Aeq,2}$	**32 dB**

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	10/09/2019
Plot:	Red Zone - Block 5 - 1st Floor - North Façade
Room:	Bedroom 3

Daytime ($L_{Aeq,16hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Façade 1	$L_{eq,1}$	70	71	73	75	80	74	61	51	$L_{Aeq,1}$	**82 dB**
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Façade 1	$L_{eq,ff}$	70	71	73	75	80	74	61	51	$L_{Aeq,ff}$	**82 dB**
ROOM DATA														
Room description and reverberation time	Volume	20.8	Bedroom	RT_{60}	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2		**s**
FAÇADE ELEMENTS (Façade 1)														
Glazing	Area	4.0	Pilkington Optiphon 12.8/20argon/16.8	Rw	30	35	45	49	50	54	65	70	**Rw / Rw+Ctr**	**51 / 47 dB**
Wall	Area	12.8	External Wall (As described in report)	Rw	24	46	57	53	59	64	73	70	**Rw / Rw+Ctr**	**60 / 56 dB**
None			--											
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	**51**	**38**	**28**	**29**	**30**	**19**	**-**	**-**	$L_{Aeq,2}$	**33 dB**

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	10/09/2019
Plot:	Red Zone - Block 5 - 1st Floor - North Façade
Room:	Bedroom 3

Night time ($L_{Aeq,8hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Façade 1	$L_{eq,1}$	40	51	60	68	76	71	58	46	$L_{Aeq,1}$	**78 dB**
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Façade 1	$L_{eq,ff}$	40	51	60	68	76	71	58	46	$L_{Aeq,ff}$	**78 dB**
ROOM DATA														
Room description and reverberation time	Volume	20.8	Bedroom	RT_{60}	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2		**s**
FAÇADE ELEMENTS (Façade 1)														
Glazing	Area	4.0	Pilkington Optiphon 12.8/20argon/16.8	Rw	30	35	45	49	50	54	65	70	**Rw / Rw+Ctr**	**51 / 47 dB**
Wall	Area	12.8	External Wall (As described in report)	Rw	24	46	57	53	59	64	73	70	**Rw / Rw+Ctr**	**60 / 56 dB**
None			--											
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	**21**	**18**	**16**	**22**	**26**	**17**	**-**	**-**	$L_{Aeq,2}$	**27 dB**

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	10/09/2019
Plot:	Orange Zone - Block 11 - 3rd Floor - NE Corner
Room:	LKD

Daytime ($L_{Aeq,16hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Façade 1	$L_{eq,1}$	61	61	62	63	69	62	47	30	$L_{Aeq,1}$	**71 dB**
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Façade 1	$L_{eq,ff}$	61	61	62	63	69	62	47	30	$L_{Aeq,ff}$	**71 dB**
ROOM DATA														
Room description and reverberation time	Volume	62.4	Living Room	RT_{60}	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3		**s**
FAÇADE ELEMENTS (Façade 1)														
Glazing	Area	11.9	Pilkington Optiphon 6/16argon/6.8	Rw	20	21	28	37	48	48	54	57	**Rw / Rw+Ctr**	**40 / 34 dB**
Wall	Area	21.72	External Wall (As described in report)	Rw	24	46	57	53	59	64	73	70	**Rw / Rw+Ctr**	**60 / 56 dB**
None			--											
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	**45**	**42**	**34**	**27**	**21**	**14**	**-**	**-**	$L_{Aeq,2}$	**31 dB**

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	10/09/2019
Plot:	Orange Zone - Block 11 - 3rd Floor - NE Corner
Room:	Bedroom

Daytime ($L_{Aeq,16hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Façade 1	$L_{eq,1}$	61	61	62	63	69	62	47	30	$L_{Aeq,1}$	**71 dB**
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Façade 1	$L_{eq,ff}$	61	61	62	63	69	62	47	30	$L_{Aeq,ff}$	**71 dB**
ROOM DATA														
Room description and reverberation time	Volume	26	Bedroom	RT_{60}	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2		**s**
FAÇADE ELEMENTS (Façade 1)														
Glazing	Area	1.98	Pilkington Optiphon 6/16argon/6.8	Rw	20	21	28	37	48	48	54	57	**Rw / Rw+Ctr**	**40 / 34 dB**
Wall	Area	7.84	External Wall (As described in report)	Rw	24	46	57	53	59	64	73	70	**Rw / Rw+Ctr**	**60 / 56 dB**
None			--											
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	**41**	**37**	**29**	**22**	**17**	**9**	**-**	**-**	$L_{Aeq,2}$	**26 dB**

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	10/09/2019
Plot:	Orange Zone - Block 11 - 3rd Floor - NE Corner
Room:	Bedroom

Night time ($L_{Aeq,8hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Façade 1	$L_{eq,1}$	57	57	58	59	65	58	43	26	$L_{Aeq,1}$	**67 dB**
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Façade 1	$L_{eq,ff}$	57	57	58	59	65	58	43	26	$L_{Aeq,ff}$	**67 dB**
ROOM DATA														
Room description and reverberation time	Volume	26	Bedroom	RT_{60}	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2		**s**
FAÇADE ELEMENTS (Façade 1)														
Glazing	Area	1.98	Pilkington Optiphon 6/16argon/6.8	Rw	20	21	28	37	48	48	54	57	**Rw / Rw+Ctr**	**40 / 34 dB**
Wall	Area	7.84	External Wall (As described in report)	Rw	24	46	57	53	59	64	73	70	**Rw / Rw+Ctr**	**60 / 56 dB**
None			--											
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	**37**	**33**	**25**	**18**	**13**	**5**	**-**	**-**	$L_{Aeq,2}$	**22 dB**

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	10/09/2019
Plot:	Green Zone - Block 8 - 2nd Floor - South Façade
Room:	LKD

Daytime ($L_{Aeq,16hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Front façade	$L_{eq,1}$	48	53	56	56	61	55	40	20	$L_{Aeq,1}$	**63 dB**
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Front façade	$L_{eq,ff}$	48	53	56	56	61	55	40	20	$L_{Aeq,ff}$	**63 dB**
ROOM DATA														
Room description and reverberation time	Volume	72.8	Living Room	RT_{60}	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3		**s**
FAÇADE ELEMENTS (Front façade)														
Glazing	Area	8.8	Pilkington 10/6-16/6	Rw	23	24	24	32	37	37	44	47	**Rw / Rw+Ctr**	**35 / 32 dB**
Wall	Area	29	External Wall (As described in report)	Rw	24	46	57	53	59	64	73	70	**Rw / Rw+Ctr**	**60 / 56 dB**
Vent	No. off.	2	Greenwood 2500EAW.AC2 (Acoustic trickle)	Dn,e	32	42	40	37	46	53	56	55	**Dn,e,w / Dn,e,w+Ctr**	**45 / 42 dB**
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	**31**	**29**	**31**	**25**	**23**	**16**	**-**	**-**	$L_{Aeq,2}$	**28 dB**

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	10/09/2019
Plot:	Green Zone - Block 8 - 2nd Floor - South Façade
Room:	Bedroom

Daytime ($L_{Aeq,16hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Rear façade	$L_{eq,1}$	48	53	56	56	61	55	40	20	$L_{Aeq,1}$	**63 dB**
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Rear façade	$L_{eq,ff}$	48	53	56	56	61	55	40	20	$L_{Aeq,ff}$	**63 dB**
ROOM DATA														
Room description and reverberation time	Volume	30.4	Bedroom	RT_{60}	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2		**s**
FAÇADE ELEMENTS (Rear façade)														
Glazing	Area	9.68	Pilkington 10/6-16/6	Rw	23	24	24	32	37	37	44	47	**Rw / Rw+Ctr**	**35 / 32 dB**
Wall	Area	14.68	External Wall (As described in report)	Rw	24	46	57	53	59	64	73	70	**Rw / Rw+Ctr**	**60 / 56 dB**
Vent	No. off.	2	Greenwood 2500EAW.AC2 (Acoustic trickle)	Dn,e	32	42	40	37	46	53	56	55	**Dn,e,w / Dn,e,w+Ctr**	**45 / 42 dB**
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	**31**	**32**	**34**	**28**	**26**	**19**	**-**	**-**	$L_{Aeq,2}$	**31 dB**

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	10/09/2019
Plot:	Green Zone - Block 8 - 2nd Floor - South Façade
Room:	Bedroom

Night time ($L_{Aeq,8hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Rear façade	$L_{eq,1}$	44	49	52	52	57	51	36	16	$L_{Aeq,1}$	**59 dB**
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Rear façade	$L_{eq,ff}$	44	49	52	52	57	51	36	16	$L_{Aeq,ff}$	**59 dB**
ROOM DATA														
Room description and reverberation time	Volume	30.4	Bedroom	RT_{60}	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2		**s**
FAÇADE ELEMENTS (Rear façade)														
Glazing	Area	9.68	Pilkington 10/6-16/6	Rw	23	24	24	32	37	37	44	47	**Rw / Rw+Ctr**	**35 / 32 dB**
Wall	Area	14.68	External Wall (As described in report)	Rw	24	46	57	53	59	64	73	70	**Rw / Rw+Ctr**	**60 / 56 dB**
Vent	No. off.	2	Greenwood 2500EAW.AC2 (Acoustic trickle)	Dn,e	32	42	40	37	46	53	56	55	**Dn,e,w / Dn,e,w+Ctr**	**45 / 42 dB**
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	**27**	**28**	**30**	**24**	**22**	**15**	**-**	**-**	$L_{Aeq,2}$	**27 dB**

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	10/09/2019
Plot:	Blue Zone - Block 4 - 4th Floor - North Façade
Room:	LKD

Daytime ($L_{Aeq,16hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Front façade	$L_{eq,1}$	54	53	54	54	58	51	33	14	$L_{Aeq,1}$	**60 dB**
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Front façade	$L_{eq,ff}$	54	53	54	54	58	51	33	14	$L_{Aeq,ff}$	**60 dB**
ROOM DATA														
Room description and reverberation time	Volume	70.2	Living Room	RT_{60}	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3		**s**
FAÇADE ELEMENTS (Front façade)														
Glazing	Area	11.3	Pilkington 8/6-16/4	Rw	21	22	21	28	38	40	47	47	**Rw / Rw+Ctr**	**33 / 29 dB**
Wall	Area	25.2	External Wall (As described in report)	Rw	24	46	57	53	59	64	73	70	**Rw / Rw+Ctr**	**60 / 56 dB**
Vent	No. off.	2	Greenwood 5000EAW.AC2 (Acoustic trickle)	Dn,e	32	40	37	32	47	53	48	45	**Dn,e,w / Dn,e,w+Ctr**	**42 / 38 dB**
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	**37**	**32**	**33**	**28**	**20**	**10**	**-**	**-**	$L_{Aeq,2}$	**29 dB**

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	10/09/2019
Plot:	Blue Zone - Block 4 - 4th Floor - North Façade
Room:	Bedroom

Daytime ($L_{Aeq,16hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Rear façade	$L_{eq,1}$	54	53	54	54	58	51	33	14	$L_{Aeq,1}$	**60 dB**
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Rear façade	$L_{eq,ff}$	54	53	54	54	58	51	33	14	$L_{Aeq,ff}$	**60 dB**
ROOM DATA														
Room description and reverberation time	Volume	22.1	Bedroom	RT_{60}	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2		**s**
FAÇADE ELEMENTS (Rear façade)														
Glazing	Area	1.98	Pilkington 8/6-16/4	Rw	21	22	21	28	38	40	47	47	**Rw / Rw+Ctr**	**33 / 29 dB**
Wall	Area	6.16	External Wall (As described in report)	Rw	24	46	57	53	59	64	73	70	**Rw / Rw+Ctr**	**60 / 56 dB**
Vent	No. off.	1	Greenwood 5000EAW.AC2 (Acoustic trickle)	Dn,e	32	40	37	32	47	53	48	45	**Dn,e,w / Dn,e,w+Ctr**	**42 / 38 dB**
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	**34**	**29**	**30**	**27**	**17**	**7**	**-**	**-**	$L_{Aeq,2}$	**27 dB**

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	10/09/2019
Plot:	Blue Zone - Block 4 - 4th Floor - North Façade
Room:	Bedroom

Night time ($L_{Aeq,8hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Rear façade	$L_{eq,1}$	50	49	50	50	54	47	29	9	$L_{Aeq,1}$	**56 dB**
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Rear façade	$L_{eq,ff}$	50	49	50	50	54	47	29	9	$L_{Aeq,ff}$	**56 dB**
ROOM DATA														
Room description and reverberation time	Volume	22.1	Bedroom	RT_{60}	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2		**s**
FAÇADE ELEMENTS (Rear façade)														
Glazing	Area	1.98	Pilkington 8/6-16/4	Rw	21	22	21	28	38	40	47	47	**Rw / Rw+Ctr**	**33 / 29 dB**
Wall	Area	6.16	External Wall (As described in report)	Rw	24	46	57	53	59	64	73	70	**Rw / Rw+Ctr**	**60 / 56 dB**
Vent	No. off.	1	Greenwood 5000EAW.AC2 (Acoustic trickle)	Dn,e	32	40	37	32	47	53	48	45	**Dn,e,w / Dn,e,w+Ctr**	**42 / 38 dB**
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	**30**	**25**	**26**	**23**	**13**	**3**	**-**	**-**	$L_{Aeq,2}$	**23 dB**

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	10/09/2019
Plot:	Unmarked Façades - Block 10 - 2nd Floor - SW Corner
Room:	LKD

Daytime ($L_{Aeq,16hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Façade 1	$L_{eq,1}$	41	38	41	42	47	41	25	1	$L_{Aeq,1}$	**49 dB**
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Façade 1	$L_{eq,ff}$	41	38	41	42	47	41	25	1	$L_{Aeq,ff}$	**49 dB**
ROOM DATA														
Room description and reverberation time	Volume	75.4	Living Room	RT_{60}	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3		**s**
FAÇADE ELEMENTS (Façade 1)														
Glazing	Area	11.25	Pilkington 4/6-16/4	Rw	20	21	17	25	35	37	31	36	**Rw / Rw+Ctr**	**29 / 25 dB**
Wall	Area	25.15	External Wall (As described in report)	Rw	24	46	57	53	59	64	73	70	**Rw / Rw+Ctr**	**60 / 56 dB**
Vent	No. off.	2	Greenwood 5000EAW.AC1 (Acoustic trickle)	Dn,e	32	38	37	31	43	43	40	40	**Dn,e,w / Dn,e,w+Ctr**	**39 / 37 dB**
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	**25**	**18**	**23**	**18**	**12**	**4**	**-**	**-**	$L_{Aeq,2}$	**19 dB**

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

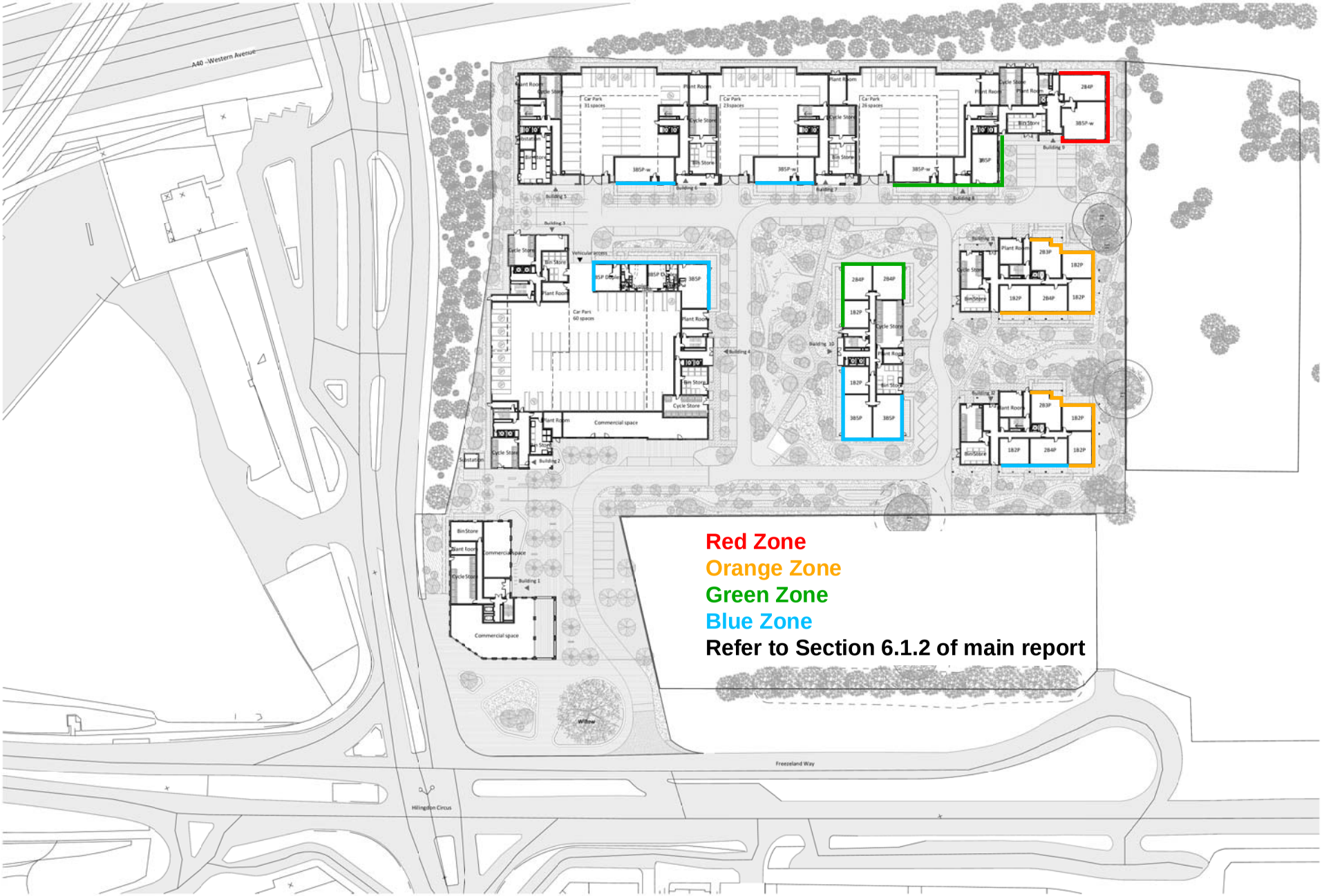
Project:	Hillingdon Gateway
Project number:	17025
Date:	10/09/2019
Plot:	Unmarked Façades - Block 10 - 2nd Floor - SW Corner
Room:	Bedroom

Daytime ($L_{Aeq,16hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Façade 1	$L_{eq,1}$	36	34	37	38	43	37	21	1	$L_{Aeq,1}$	**45 dB**
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Façade 1	$L_{eq,ff}$	36	34	37	38	43	37	21	1	$L_{Aeq,ff}$	**45 dB**
ROOM DATA														
Room description and reverberation time	Volume	31.2	Bedroom	RT_{60}	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2		**s**
FAÇADE ELEMENTS (Façade 1)														
Glazing	Area	4.5	Pilkington 4/6-16/4	Rw	20	21	17	25	35	37	31	36	**Rw / Rw+Ctr**	**29 / 25 dB**
Wall	Area	3.34	Brick and block external wall	Rw	34	40	44	45	51	56	60	63	**Rw / Rw+Ctr**	**50 / 47 dB**
Vent	No. off.	2	Greenwood 5000EAW.AC1 (Acoustic trickle)	Dn,e	32	38	37	31	43	43	40	40	**Dn,e,w / Dn,e,w+Ctr**	**39 / 37 dB**
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	**16**	**13**	**18**	**15**	**8**	**0**	**-**	**-**	$L_{Aeq,2}$	**15 dB**

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	10/09/2019
Plot:	Unmarked Façades - Block 10 - 2nd Floor - SW Corner
Room:	Bedroom

Night time ($L_{Aeq,8hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Façade 1	$L_{eq,1}$	36	34	37	38	43	37	21	1	$L_{Aeq,1}$	**45 dB**
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Façade 1	$L_{eq,ff}$	36	34	37	38	43	37	21	1	$L_{Aeq,ff}$	**45 dB**
ROOM DATA														
Room description and reverberation time	Volume	31.2	Bedroom	RT_{60}	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2		**s**
FAÇADE ELEMENTS (Façade 1)														
Glazing	Area	4.5	Pilkington 4/6-16/4	Rw	20	21	17	25	35	37	31	36	**Rw / Rw+Ctr**	**29 / 25 dB**
Wall	Area	3.34	Brick and block external wall	Rw	34	40	44	45	51	56	60	63	**Rw / Rw+Ctr**	**50 / 47 dB**
Vent	No. off.	2	Greenwood 5000EAW.AC1 (Acoustic trickle)	Dn,e	32	38	37	31	43	43	40	40	**Dn,e,w / Dn,e,w+Ctr**	**39 / 37 dB**
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	**16**	**13**	**18**	**15**	**8**	**0**	**-**	**-**	$L_{Aeq,2}$	**15 dB**



NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05		

Extent of application site

Extent of lease hold site

Notes

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects
17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 18/06/17
Drawn By: VC
Checked by: JBC
Scale @ A1: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Ground Floor Plan

PLANNING
19011 P0-100

P2
Revision

NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site

Extent of lease hold site

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects

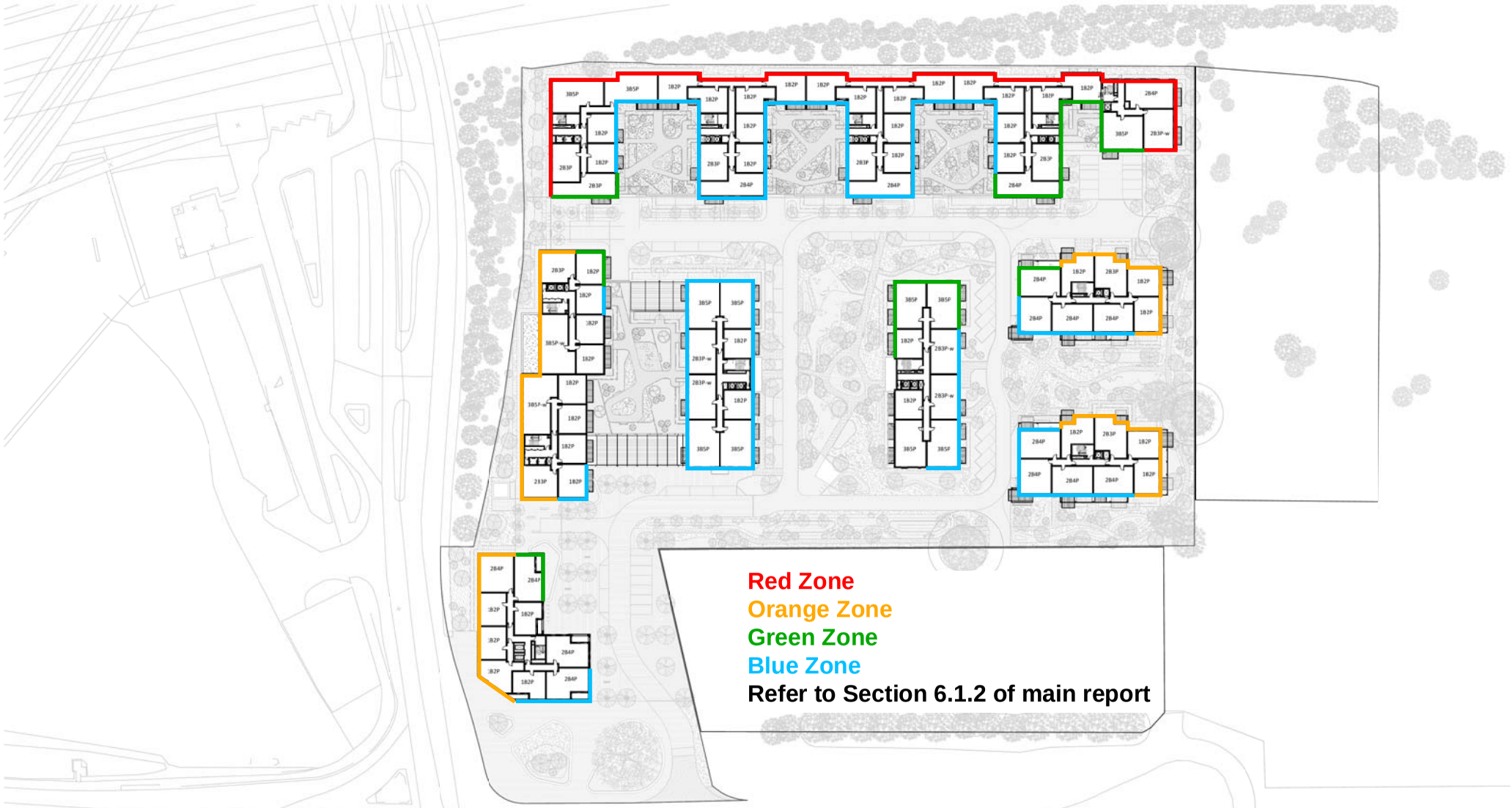
17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 18/06/17
Drawn By: VC
Checked by: JBC
Scale @ A3: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
First Floor Plan

PLANNING
19011 P0-101

P2
Revision



NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site

Extent of lease hold site

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects

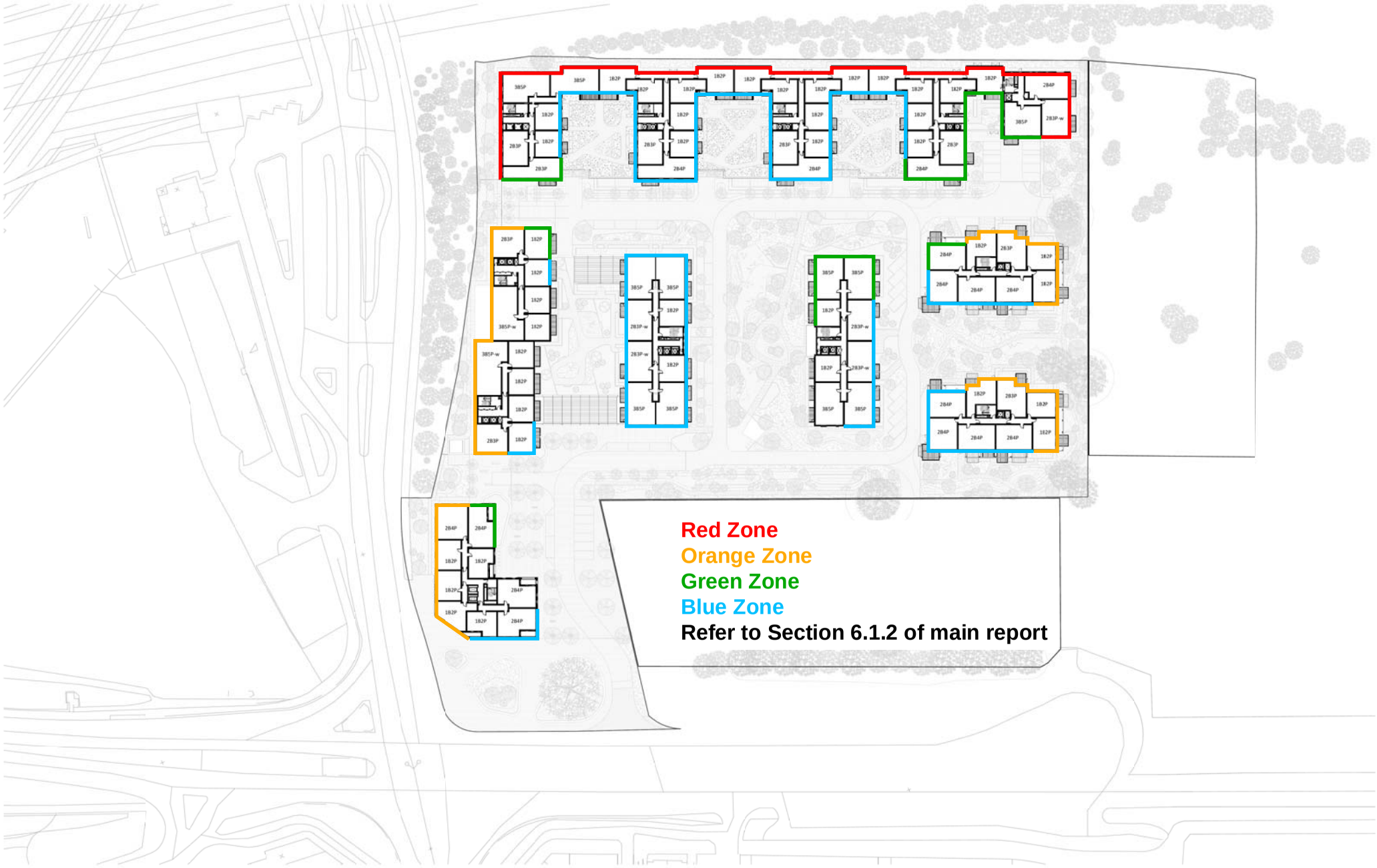
17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 18/06/17
Drawn By: VC
Checked by: JBC
Scale @ A3: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Second Floor Plan

PLANNING
19011 P0-102

P2
Revision



NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site

Extent of lease hold site

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects

17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 18/06/17
Drawn By: VC
Checked by: JBC
Scale @ A3: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Third Floor Plan

PLANNING
19011 P0-103

P2
Revision

NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site
Extent of leasehold site
PV Array
Brown Roof

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects
17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 18/06/17
Drawn By: VC
Checked by: JBC
Scale @ A3: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Fourth Floor Plan

PLANNING
19011 P0-104

P2
Revision

NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site
Extent of leasehold site
PV Array
Brown Roof

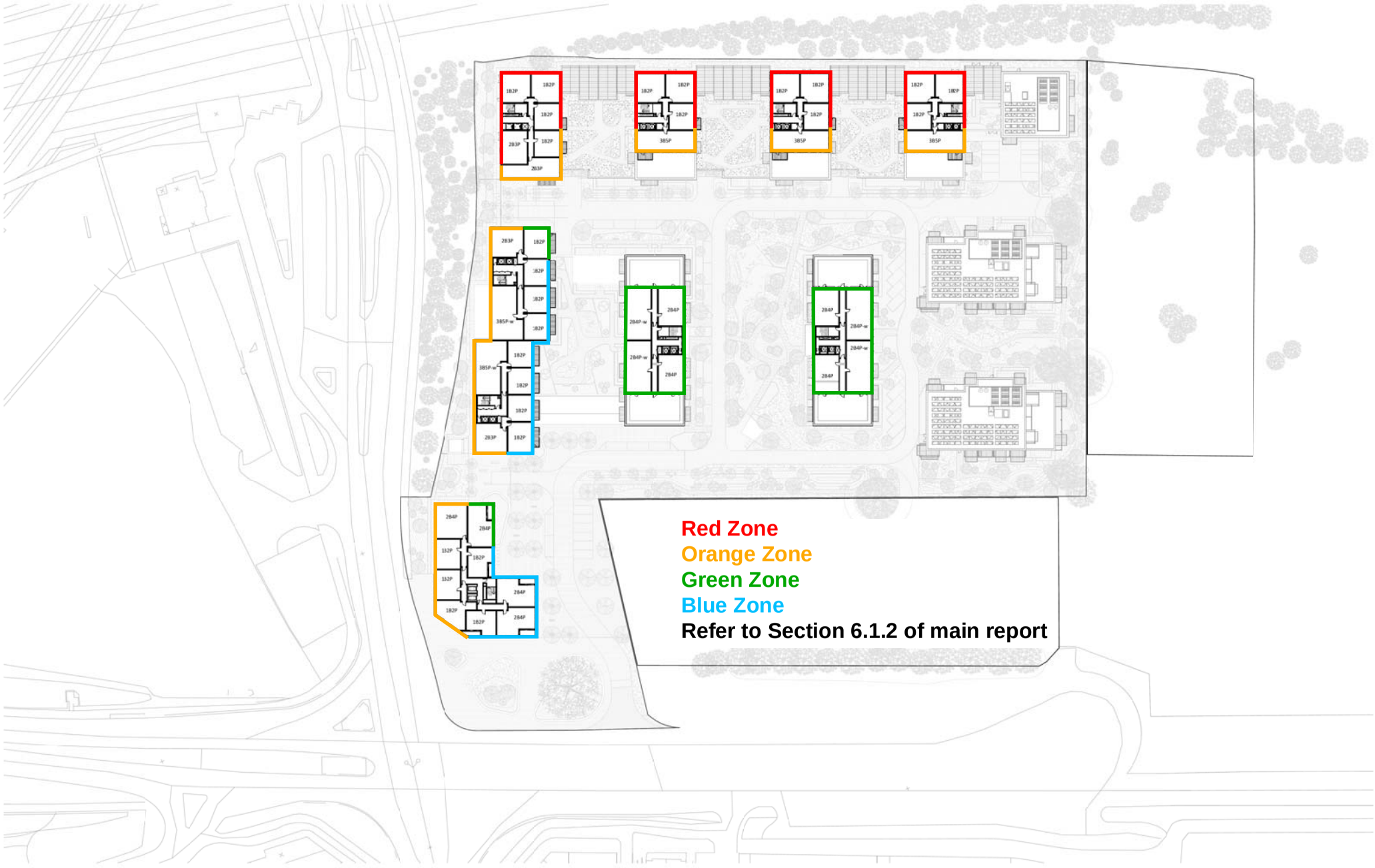
0m 10m 20m 30m 40m 50m
VISUAL SCALE 1:500 @ A1

ColladoCollins Architects
17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 01/03/17
Drawn By: VC
Checked by: JBC
Scale @ A3: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Fifth Floor Plan

PLANNING
19011 P0-105
P2 Revision



NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site
Extent of leasehold site
PV Array
Brown Roof

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

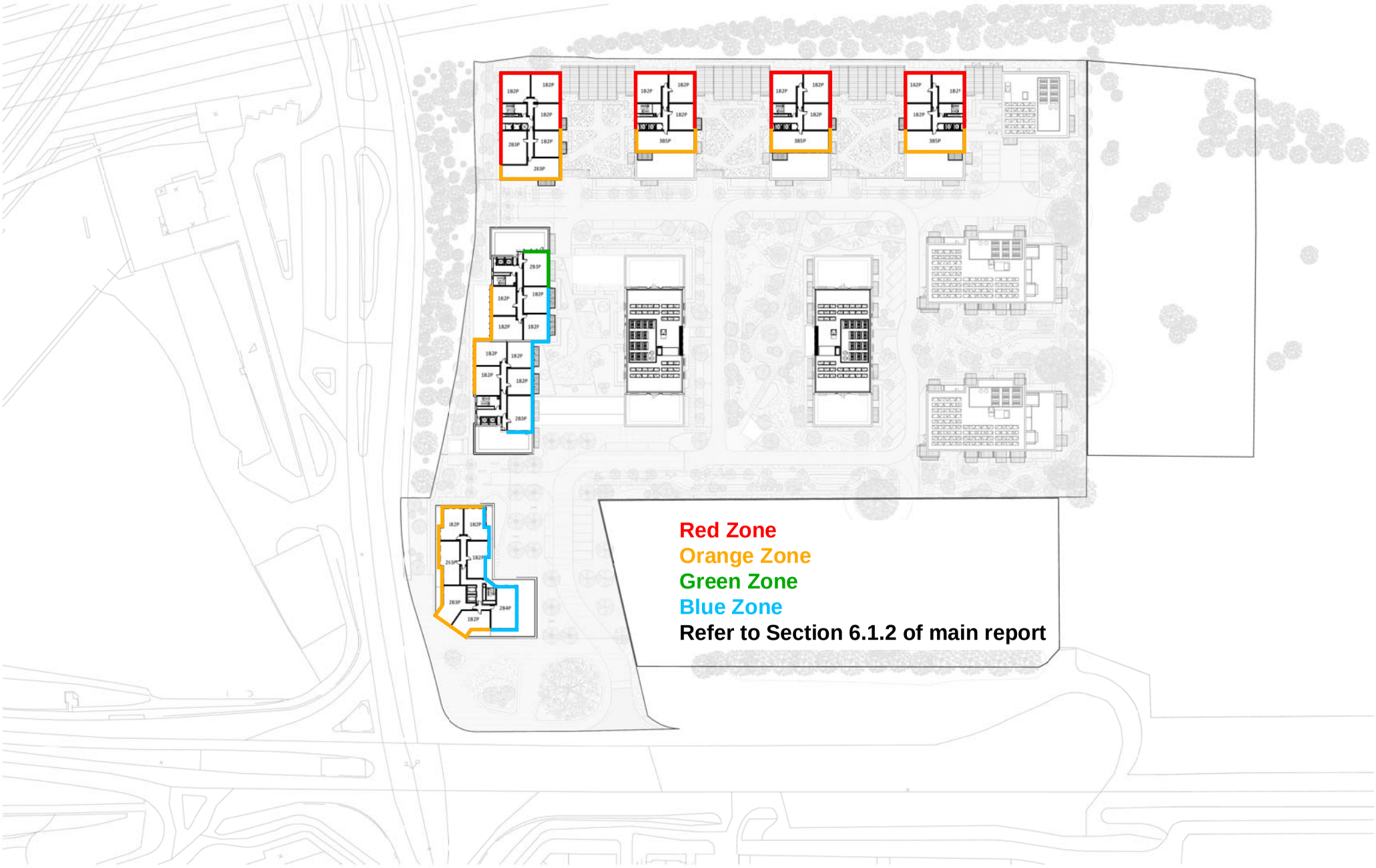
ColladoCollins Architects
17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 01/03/17
Drawn By: VC
Checked by: JBC
Scale @ A3: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Sixth Floor Plan

PLANNING
19011 P0-106

P2
Revision



NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site
Extent of leasehold site
PV Array
Brown Roof

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

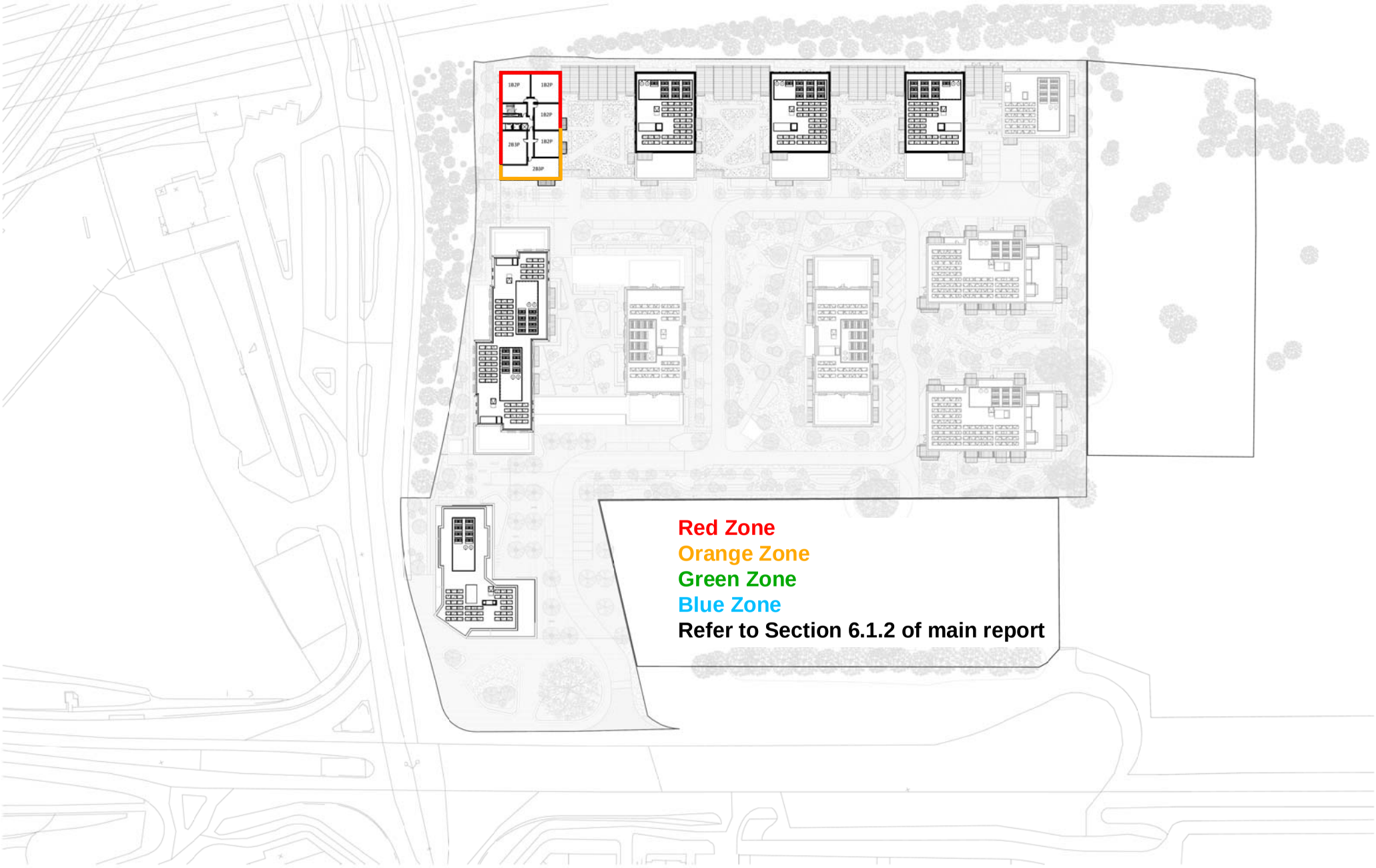
ColladoCollins Architects
17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 30/06/17
Drawn By: VC
Checked by: JBC
Scale @ A3: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Seventh Floor Plan

PLANNING
19011 P0-107

P2
Revision



NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site
Extent of leasehold site
PV Array
Brown Roof

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

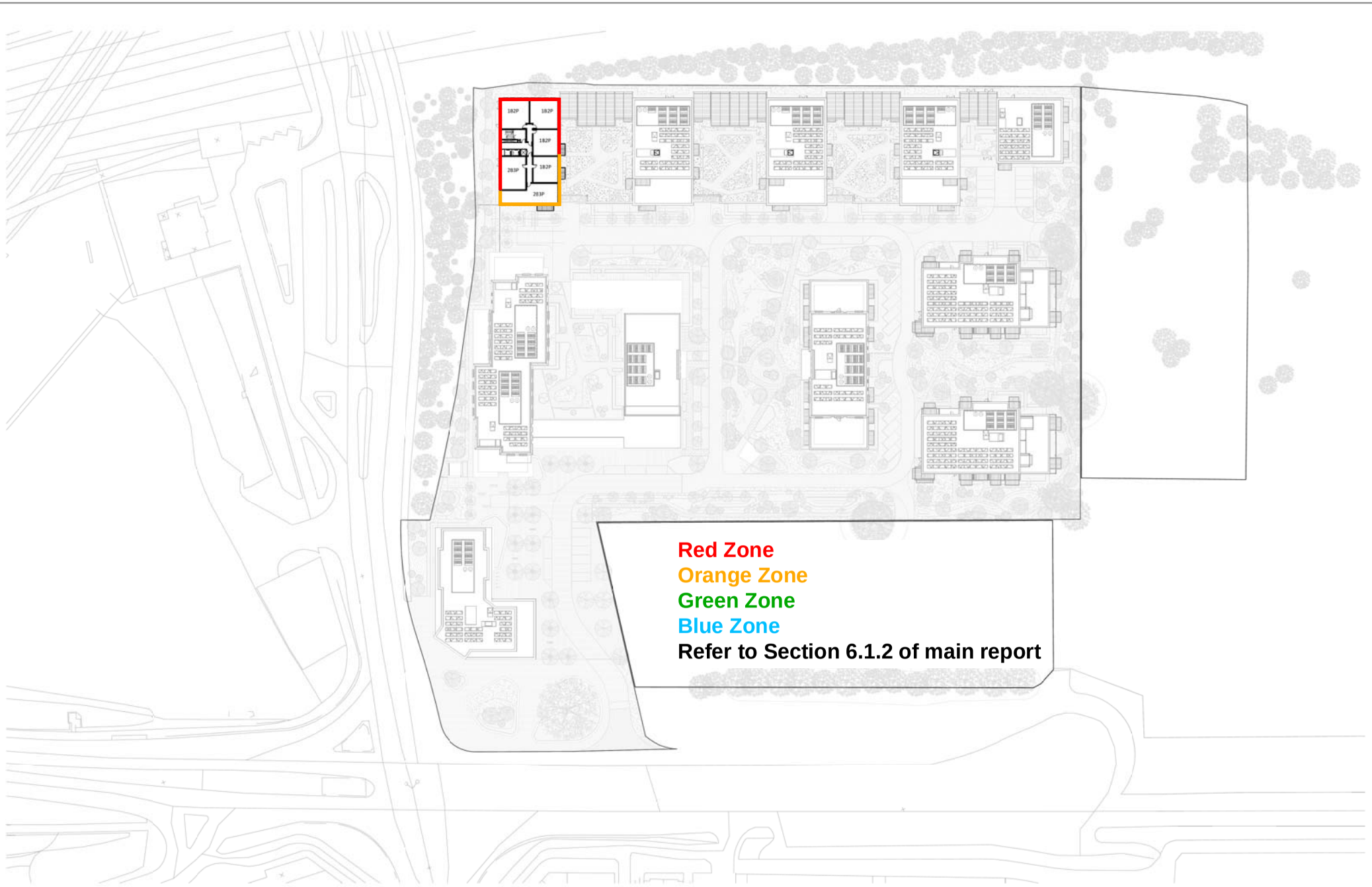
ColladoCollins Architects
17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 30/06/17
Drawn By: VC
Checked by: JBC
Scale @ A1: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Eighth Floor Plan

PLANNING
19011 P0-108

P2
Revision



NOTES
CONSULTANTS
- refer to highways consultant's drawings for details
- refer to landscape consultant's drawings for details
- landscaping layout is indicative only

AREAS
- refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site
Extent of leasehold site
PV Array
Brown Roof

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

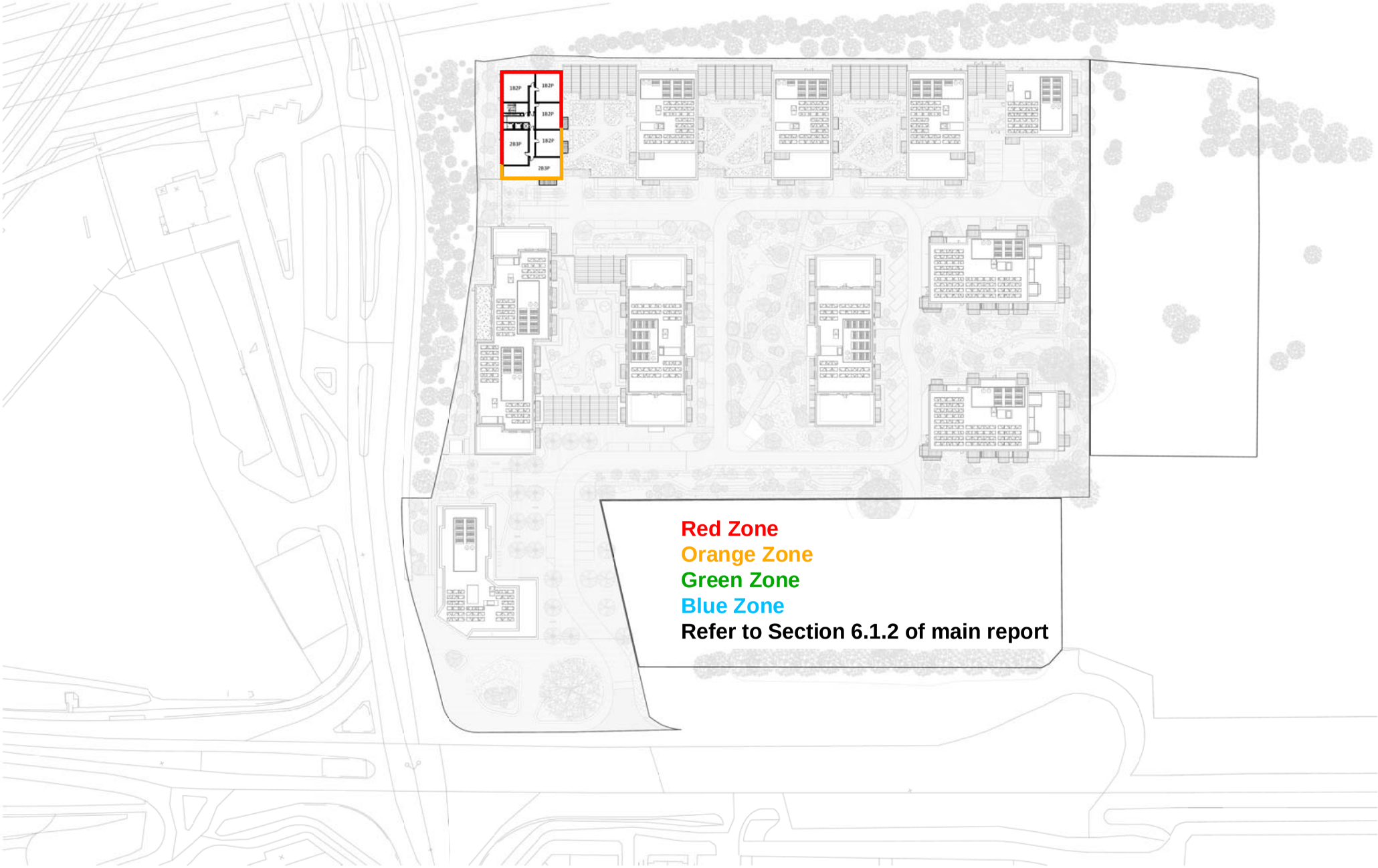
ColladoCollins Architects
17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 07/02/19
Drawn By: Author
Checked by: Checker
Scale @ A1: As indicated
Scale @ A3:
CAD File No:

Inland Homes
Hillingdon
Ninth Floor Plan

PLANNING
19011 P0-109

P2
Revision



NOTES
CONSULTANTS
- Refer to highways consultant's drawings for details
- Refer to landscape consultant's drawings for details
- Landscaping layout is indicative only

AREAS
- Refer to area schedule

Rev	Notes	Date	By	Auth
P1	DRAFT Planning Issue	30-08-19	CS	FvB
P2	Issue for Planning	19-09-05	CS	FvB

Extent of application site
Extent of leasehold site
PV Array
Brown Roof

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

ColladoCollins Architects
17-19 Foley Street
London W1W 6DW
T 020 7580 3490
F 020 7580 2917
info@colladocollins.com
www.colladocollins.com

Date: 09/03/17
Drawn By: VC
Checked by: JBC
Scale @ A1: As indicated
Scale @ A3: 1 : 1000
CAD File No:

Inland Homes
Hillingdon
Tenth Floor Plan

PLANNING
19011 P0-110

P2
Revision

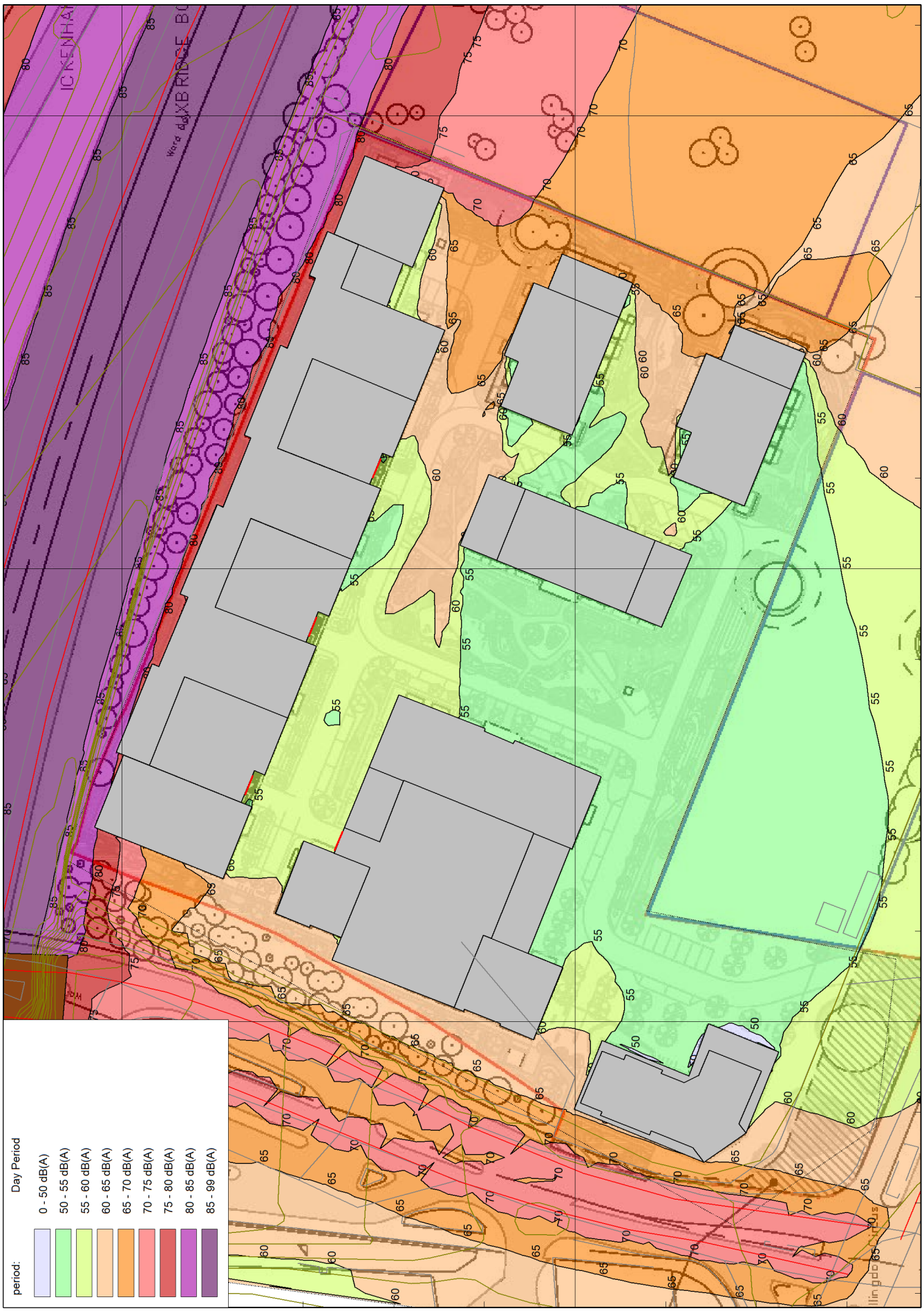
APPENDIX D

Noise Model

Hillingdon Gardens

Spectrum Acoustic Consultants Ltd

Predicted Daytime LAeq Noise Levels @ 1.5m height

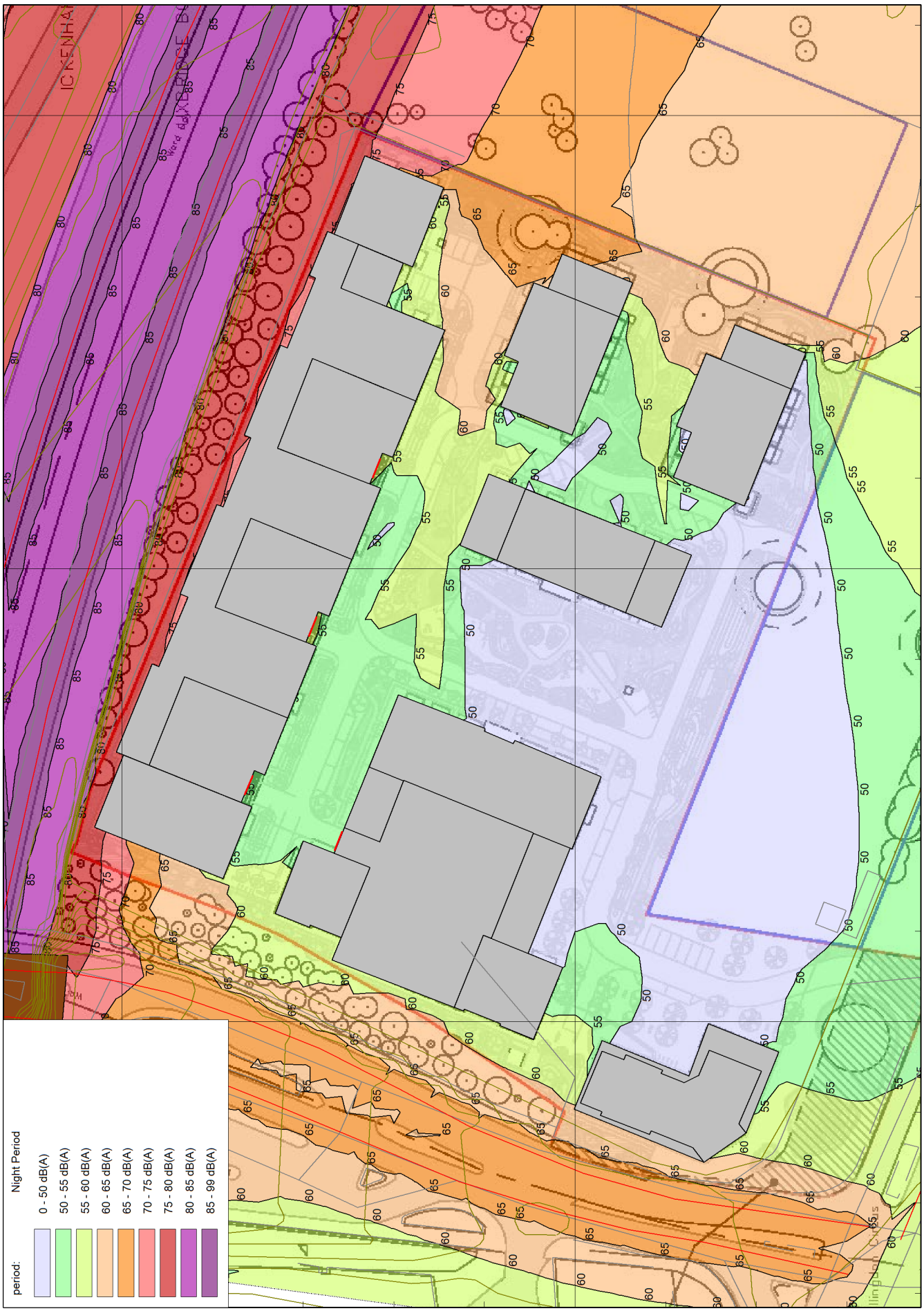


Industrial noise - LimA - ISO 9613.1/2, [17025 - Hillingdon Gateway - Rev. 2 (Jan 2020) - with Natural Car Park Ventilation - As proposed - Daytime @ 1.5m With Acoustic Louvres], Predictor V2019.3

Hillingdon Gardens

Spectrum Acoustic Consultants Ltd

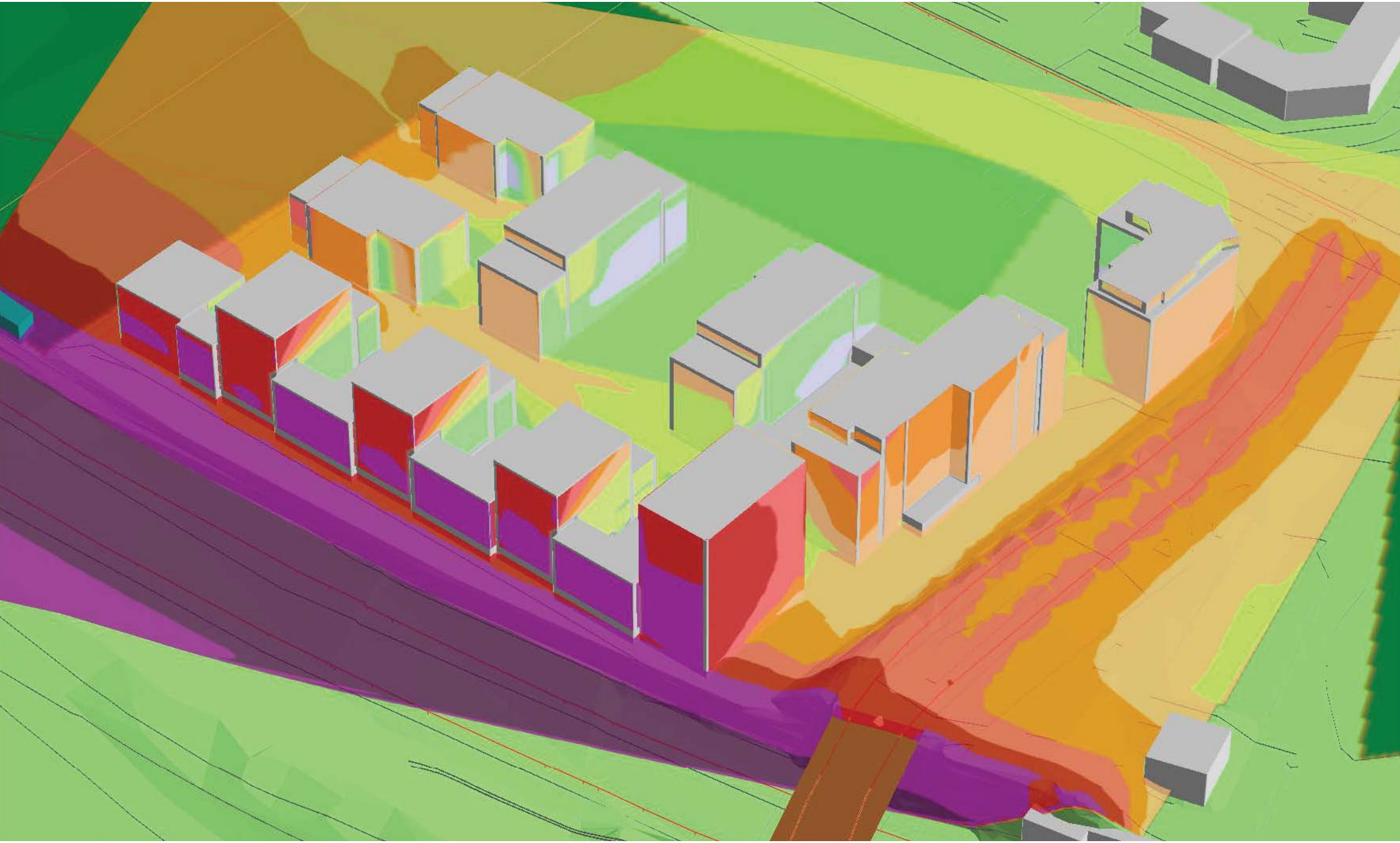
Predicted Night time LAeq Noise Levels @ 1.5m height



Industrial noise - LimA - ISO 9613.1/2, [17025 - Hillingdon Gateway - Rev. 2 (Jan 2020) - with Natural Car Park Ventilation - As proposed - Night time @ 1.5m - With Acoustic Louvres] , Predictor V2019.3

Predicted Daytime LAeq Noise Levels on the Podium at @ 5m height

Noise Model - 3D Isometric View



APPENDIX E

Site Generated Road Traffic

Hillingdon Gardens - Environmental Traffic Flows - 2017 Baseline

Link No.	Link Name	24 Hour AADT			18 Hour AAWT			Speed	
		Total Vehicles	HGVs	HGV %	Total Vehicles	HGVs	HGV %	Mean (mph)	Speed Limit (mph)
1	Long Lane (N) - NB	14,285	1196	8.4%	14,897	1,413	9.5%	25.9	30
	Long Lane (N) - SB	7,440	733	9.9%	7,759	866	11.2%	28.6	30
2	Long Lane (S) - NB	8,937	645	7.2%	9,320	762	8.2%	25.0	30
	Long Lane (S) - SB	10,705	820	7.7%	11,164	969	8.7%	25.6	30
3	Freezeland Way - WB	8,453	869	10.3%	8,816	1027	11.6%	33.1	30
	Freezeland Way - EB	200	10	5.0%	200	10	5.0%	30.0	30
4	Western Avenue - WB	7,947	756	9.5%	8,288	893	10.8%	25.0	30
	Western Avenue - EB	7,458	804	10.8%	7,778	950	12.2%	23.4	30

Hillingdon Gardens - Environmental Traffic Flows - Baseline + Committed

Link No.	Link Name	24 Hour AADT			18 Hour AAWT			Speed	
		Total Vehicles	HGVs	HGV %	Total Vehicles	HGVs	HGV %	Mean (mph)	Speed Limit (mph)
1	Long Lane (N) - NB	15,064	1,262	8.4%	15,064	1,262	8.4%	25.9	30
	Long Lane (N) - SB	8,285	816	9.9%	8,285	816	9.9%	28.6	30
2	Long Lane (S) - NB	9,969	719	7.2%	9,969	719	7.2%	25.0	30
	Long Lane (S) - SB	11,628	891	7.7%	11,628	891	7.7%	25.6	30
3	Freezeland Way - WB	9,097	936	10.3%	9,097	936	10.3%	33.1	30
	Freezeland Way - EB	200	10	5.0%	200	10	5.0%	30.0	30
4	Western Avenue - WB	9,117	868	9.5%	9,117	868	9.5%	25.0	30
	Western Avenue - EB	7,939	856	10.8%	7,939	856	10.8%	23.4	30

Hillingdon Gardens - Environmental Traffic Flows - Baseline + Committed + Development

Link No.	Link Name	24 Hour AADT			18 Hour AAWT			Speed	
		Total Vehicles	HGVs	HGV %	Total Vehicles	HGVs	HGV %	Mean (mph)	Speed Limit (mph)
1	Long Lane (N) - NB	15,241	1,265	8.3%	15,241	1,265	8.3%	25.9	30
	Long Lane (N) - SB	8,375	818	9.8%	8,375	818	9.8%	28.6	30
2	Long Lane (S) - NB	10,059	721	7.2%	10,059	721	7.2%	25.0	30
	Long Lane (S) - SB	11,716	893	7.6%	11,716	893	7.6%	25.6	30
3	Freezeland Way - WB	9,540	945	9.9%	9,540	945	9.9%	33.1	30
	Freezeland Way - EB	552	18	3.2%	552	18	3.2%	30.0	30
4	Western Avenue - WB	9,295	871	9.4%	9,295	871	9.4%	25.0	30
	Western Avenue - EB	8,120	860	10.6%	8,120	860	10.6%	23.4	30

Noise from road traffic calculations, following CRTN method

2028 with development and cumulative developments compared to 2028 baseline

Location

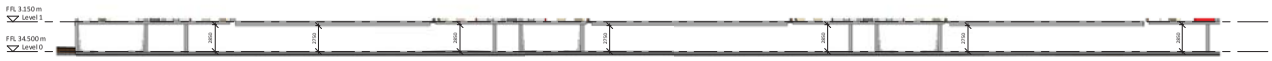
	2017 baseline			Baseline + Committed			Baseline+Committed+Development		
	Q	**p**	**V**	**Q**	**p**	**V**	**Q'**	**p'**	**V'**
1	22656	10.1	43.9	23349	8.9	43.9	23616	8.8	43.9
2	20484	8.5	40.7	21597	7.5	40.7	21775	7.4	40.7
3	9016	11.5	50.9	9297	10.2	50.9	10092	9.5	50.9
4	16066	11.5	38.9	17056	10.1	38.9	17415	9.9	38.9

With development, change re Baseline+Committed:			ΔL_F
10Log(Q'/Q)	**33Log(V & V' Term)**	**p / V term**	
0.05	0.00	-0.02	**0.03**
0.04	0.00	-0.01	**0.02**
0.36	0.00	-0.14	**0.22**
0.09	0.00	-0.04	**0.05**

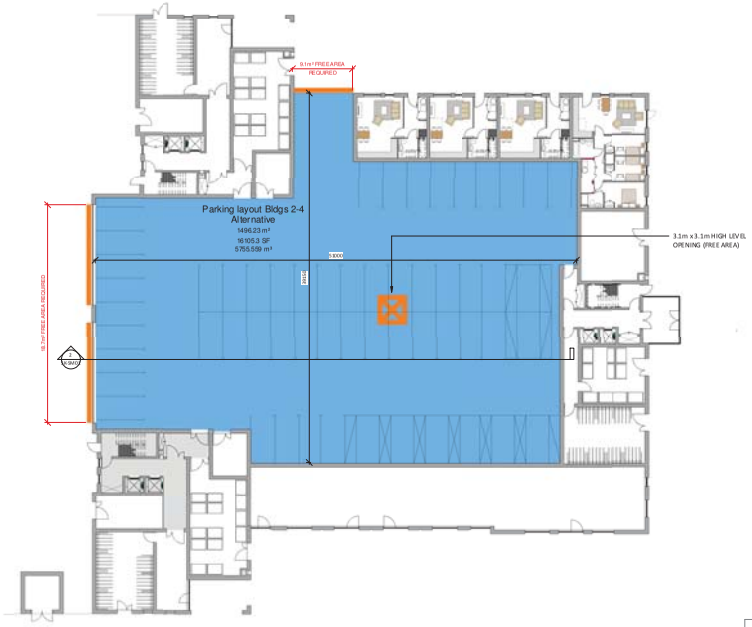
Calculations based on traffic data issued by WSP on 23 July 2019
Calculations are two way

APPENDIX F

Ventilation of Car Park



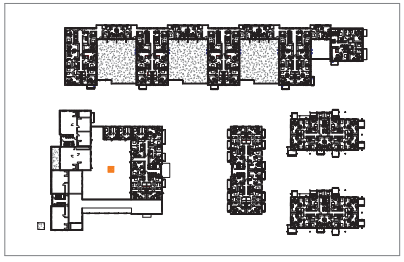
1 Section 1
1 : 200



By Room Name Legend

- A2
- B2
- C2
- D3
- L-C13
- Parking layout Bldg 5
- Parking layout Bldg 6 - 1
- Parking layout Bldg 6 - 2
- Parking layout Bldgs 2-4 Alternative
- Room

2 Section 2
1 : 200



LOCATION OF HIGH LEVEL NATURAL VENTILATION AT PODIUM LEVEL

General Notes

This drawing to be read in conjunction with all standard details and specifications.
All dimensions to be verified on site.
All works to comply with current building regulations.

NOTES

1. CAR PARK OPENINGS ARE INDICATED AT 100% FREE AREA OPENINGS E.G. LOUVRES WITH A 50% FREE AREA WILL DOUBLE THE OPENING REQUIREMENT
2. NATURAL OPENING BASED ON 1/40 OF THE FLOOR AREA STRUCTURE TO BE FIRE RATED TO SUIT
3. OMEGA FIRE TO AGREE STRATEGY

PRELIMINARY

Cudd Bentley Consulting
www.cuddbentley.co.uk
Cudd Bentley Consulting Ltd.
Ashurst Manor, Church Lane, Ascot, Berkshire, SL5 7DD
(t) 01344 628801 (f) 01344 625448 (e) ris.0cuddbentley.co.uk
Cudd Bentley Consulting Ltd.
Suite 1, Shelly Crescent Centre, 20 Farmhouse Way, Solihull, B90 4BH
(t) 0121 7114343 (f) 0121 711 5535 (e) info@cuddbentley.co.uk
Cudd Bentley Consulting Ltd.
12 Devonshire Street, London, W1G 7AB
(t) 0203 393 6446 (e) info@cuddbentley.co.uk

Client: Inland Homes

Project Title / Location: Hillingdon

Drawing Title: NATURAL SMOKE VENTILATION PROPOSALS

Scale	Author	Engineer	Approved	Date
As indicated	PH	GG	GG	Nov'19

Drawing No. SK-SM01 — Revision P1

Sheet Size A0

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	23/01/2020
Plot:	Block B2
Room:	Car Park

Daytime ($L_{Aeq,16hr}$)					Octave band centre frequency									
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Façade 1	$L_{eq,1}$	54	54	54	55	60	54	40	29	$L_{Aeq,1}$	62 dB
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Façade 1	$L_{eq,ff}$	54	54	54	55	60	54	40	29	$L_{Aeq,ff}$	62 dB
ROOM DATA														
Room description and reverberation time	Volume	1790	Car Park	RT_{60}	7.0	7.0	6.5	5.9	4.4	4.1	3.5	3.4		s
FAÇADE ELEMENTS (Façade 1)														
Glazing	Area	19	Soundex L150G	Rw	7	7	7	8	12	12	11	12	Rw / Rw+Ctr	/ dB
None			--											
None			--											
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	46	47	46	46	46	39	25	14	$L_{Aeq,2}$	49 dB

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	23/01/2020
Plot:	Block B5
Room:	Car Park

Daytime ($L_{Aeq,16hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Façade 1	$L_{eq,1}$	68	70	71	72	78	72	58	48	$L_{Aeq,1}$	80 dB
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Façade 1	$L_{eq,ff}$	68	70	71	72	78	72	58	48	$L_{Aeq,ff}$	80 dB
ROOM DATA														
Room description and reverberation time	Volume	2010	Car Park	RT_{60}	7.0	7.0	6.5	5.9	4.4	4.1	3.5	3.4		s
FAÇADE ELEMENTS (Façade 1)														
Glazing	Area	9	Soundex L150G	Rw	7	7	7	8	12	12	11	12	Rw / Rw+Ctr	/ dB
None			--											
None			--											
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	57	59	59	59	60	53	40	29	$L_{Aeq,2}$	63 dB

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	23/01/2020
Plot:	Block B6
Room:	Car Park

Daytime ($L_{Aeq,16hr}$)					Octave band centre frequency									
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Façade 1	$L_{eq,1}$	67	68	70	71	76	70	56	44	$L_{Aeq,1}$	78 dB
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Façade 1	$L_{eq,ff}$	67	68	70	71	76	70	56	44	$L_{Aeq,ff}$	78 dB
ROOM DATA														
Room description and reverberation time	Volume	1790	Car Park	RT_{60}	7.0	7.0	6.5	5.9	4.4	4.1	3.5	3.4		s
FAÇADE ELEMENTS (Façade 1)														
Glazing	Area	8	Soundex L150G	Rw	7	7	7	8	12	12	11	12	Rw / Rw+Ctr	/ dB
None			--											
None			--											
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	56	57	58	58	58	51	38	25	$L_{Aeq,2}$	61 dB

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	23/01/2020
Plot:	Block B2
Room:	Car Park

Night time ($L_{Aeq,8hr}$)					Octave band centre frequency									
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Façade 1	$L_{eq,1}$	51	51	51	52	56	50	37	25	$L_{Aeq,1}$	58 dB
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Façade 1	$L_{eq,ff}$	51	51	51	52	56	50	37	25	$L_{Aeq,ff}$	58 dB
ROOM DATA														
Room description and reverberation time	Volume	1790	Car Park	RT_{60}	7.0	7.0	6.5	5.9	4.4	4.1	3.5	3.4		s
FAÇADE ELEMENTS (Façade 1)														
Glazing	Area	19	Soundex L150G	Rw	7	7	7	8	12	12	11	12	Rw / Rw+Ctr	/ dB
None			--											
None			--											
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	43	44	43	43	42	35	22	10	$L_{Aeq,2}$	45 dB

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	23/01/2020
Plot:	Block B5
Room:	Car Park

Night time ($L_{Aeq,8hr}$)	Unit	Value	Description	Term	Octave band centre frequency 63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Façade 1	$L_{eq,1}$	65	66	67	69	74	68	55	44	$L_{Aeq,1}$	76 dB
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Façade 1	$L_{eq,ff}$	65	66	67	69	74	68	55	44	$L_{Aeq,ff}$	76 dB
ROOM DATA														
Room description and reverberation time	Volume	2010	Car Park	RT_{60}	7.0	7.0	6.5	5.9	4.4	4.1	3.5	3.4		s
FAÇADE ELEMENTS (Façade 1)														
Glazing	Area	9	Soundex L150G	Rw	7	7	7	8	12	12	11	12	Rw / Rw+Ctr	/ dB
None			--											
None			--											
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	54	55	55	56	56	49	37	25	$L_{Aeq,2}$	59 dB

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Hillingdon Gateway
Project number:	17025
Date:	23/01/2020
Plot:	Block B6
Room:	Car Park

Night time ($L_{Aeq,8hr}$)					Octave band centre frequency									
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k	Broadband term	
EXTERNAL NOISE LEVEL														
External noise level			Façade 1	$L_{eq,1}$	63	64	66	67	72	66	52	40	$L_{Aeq,1}$	74 dB
Façade correction factor				C	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL														
Incident noise level			Façade 1	$L_{eq,ff}$	63	64	66	67	72	66	52	40	$L_{Aeq,ff}$	74 dB
ROOM DATA														
Room description and reverberation time	Volume	1790	Car Park	RT_{60}	7.0	7.0	6.5	5.9	4.4	4.1	3.5	3.4		s
FAÇADE ELEMENTS (Façade 1)														
Glazing	Area	8	Soundex L150G	Rw	7	7	7	8	12	12	11	12	Rw / Rw+Ctr	/ dB
None			--											
None			--											
None			--											
RESULTS														
Total calculated indoor noise level				$L_{eq,2}$	52	53	54	54	54	47	34	21	$L_{Aeq,2}$	57 dB

Head Office
Spectrum Acoustic Consultants Ltd
27-29 High Street
Biggleswade
Bedfordshire
SG18 0JE
UNITED KINGDOM

+44 (0)1767 318871
enquiries@spectrumacoustic.com
www.spectrumacoustic.com