High Street, Uxbridge

Demolition of existing buildings and redevelopment to provide a mixed-use development including hotel, co-Living, commercial floorspace and ancillary spaces

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1. INTRODUCTION

DNA (Uxbridge) Limited are seeking to obtain full planning permission for "Demolition of the existing buildings and comprehensive redevelopment of the site to provide a mixed use development comprising hotel (Class C2), co-Living (Class Sui Generis) and replacement commercial floorspace (Class E) alongside open space, landscaping and public realm improvements, basement parking and refuse storage" at a site bounded by High Street, Belmont Road, Bakers Road and Cocks Yard. Spectrum Acoustic Consultants have been engaged to prepare a noise impact assessment to accompany the planning application for the development.

This report describes the acoustic issues that have been investigated along with any noise mitigation measures required in order to ensure that the proposed development provides acceptable acoustical conditions for residents within the scheme and for the surrounding area.

2. SITE DESCRIPTION

The approx. 0.38ha site is currently occupied by commercial buildings up to three storeys in height and is located the town centre of Uxbridge, north of Uxbridge Underground and bus station. The site is bounded by Belmont Road, which is a vehicular route through Uxbridge; Bakers Road, which is not a through-route, but leads to the Uxbridge bus and underground terminuses; High Street a pedestrianised boulevard; and Cocks Yard, a narrow pedestrian link between High Street and Bakers Road.

The surrounding area is predominantly retail or commercial in nature, with some hotel and residential uses typical of a town centre in location in buildings of up to seven-eight storeys in height.

The main sources of environmental noise in the area are road traffic noise on Belmont Road, Bakers Road and other local roads, mechanical plant noise on nearby buildings and pedestrian activity in the general area. A significant amount of bus traffic accesses Bakers Road.

A location plan showing the existing site is included in Appendix A.

The proposal is for a single C-shaped building varying in height from 7 to 9 storeys plus basement with courtyard and footway improvements. The proposals comprise the demolition of the existing buildings and structures on site to provide a mixed-use development comprising Hotel (Class C1), Co-Living (Class Sui Generis) and replacement commercial floor space (Class E). The proposals include landscape improvements including the provision of a pocket park, car and cycle parking and associated infrastructure.

A selection of plan and elevation drawings showing the scheme proposals are shown in Appendix B.

3. GUIDELINES FOR ACCEPTABILITY

3.1 NOISE POLICY GUIDELINES - NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The **National Planning Policy Framework** (NPPF) sets out the government's guidance for local planning authorities and planning application decision-takers.

It says that the planning system should contribute to and enhance the environment by (among other things) preventing development from contributing to, being put at risk from, or being adversely affected by unacceptable levels of noise pollution. (Para. 180.e)

Paragraph 191 states:

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

- *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;*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."*

Paragraph 193 states that planning policies and decisions should ensure that:

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

The NPPF refers to the **Noise Policy Statement for England** (NPSE) which sets out the long term vision of Government noise policy as follows: *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 aims to clarify the principles and aims of existing policy documents, legislation and guidance that relate to noise. Its noise policy aims are to:

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

through the effective management and control of environmental, neighbour and neighbourhood noise.

These aims are developed by reference to the concepts NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level). NPSE also refers to SOAEL (Significant Observed Adverse Effect Level).

It recognises that there is no universally applicable threshold for these concepts. Consequently, the SOAEL is likely to vary with different noise sources, different receptors and at different times. Even so, significant effects should be avoided, taking account of sustainability aims.
Where noise impact is between LOAEL and SOAEL, the NPSE requires that all reasonable steps should be taken to mitigate adverse effects while taking account of sustainable development aims. It notes (para. 2.7) that *the NPSE should consider noise alongside other relevant issues and noise should not to be considered in isolation.*

In July, 2019, **Planning Practice Guidance on Noise[1] (**PPG-N) was updated. This provides advice on '*how planning can manage potential noise impacts in new development'*.

It confirms that neither the NPSE[2] nor the NPPF[3] *'expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of proposed development'.*

It also details the hierarchy of noise exposure, including the thresholds LOAEL and SOAEL, based on the likely average response, referred to within NPSE. The noise exposure categories are summarised below.

- No Observed Adverse Effect: noise can be heard but does not cause any change in behaviour or attitude.
- Observed Adverse Effect: noise can be heard and causes small changes in behaviour and/or attitude.
- Significant Observed Adverse Effect: noise causes a material change in behaviour and/or attitude.
- Unacceptable Adverse Effect: extensive and regular changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or psychological effects.

The guidance advises, in accordance with the first and second aims of the NPSE, that where there is no observed effect or no observed adverse effect, no specific measures are required to manage the acoustic environment. Where there is an observed adverse effect, consideration needs to be given to mitigating and minimising those effects. Where there are significant adverse effects, the planning process should be used to avoid these effects occurring, and where there are unacceptable adverse effects, the situation should be avoided / prevented.

It further states that, because of the subjective nature of noise, there is no simple relationship between noise level and its impact. This informs the values for LOAELs and SOAELs which represent the onset levels of adverse effects and significant adverse effects respectively. These will depend on a number of factors in a particular situation, such as:

- The source, its absolute level and the time of day.
- For intermittent sources, the number and duration of events
- The spectral frequency content of the noise

[1] *PPG - Noise, MHCLG, July, 2019*
[2] *Explanatory Note to the Noise Policy Statement for England, paragraphs 2.23 and 2.24 , DEFRA,15 March 2010)*
[3] *National Planning Policy Framework, MHCLG, July 2021*

Other factors will need to be considered in many cases, which are more fully described and detailed within the full PPG guidance, but include issues such as:

- Whether internal effects can be completely removed for example by closing windows (relevant with new residential development subject to ventilation being developed)
- Whether existing noise sensitive locations already experience high noise levels,
- The potential effect of a new residential or other sensitive development being located close to an existing noisy business or site, and for noise mitigation to be considered.

PPG-N does not provide any detail on the how assessment of these factors should be carried out. Instead, reference is usually made to existing British Standards and other guidance.

3.2 BS8233:2104 AND WHO GCN

BS 8233:2014 Guidance on sound insulation and noise reduction for buildings (BS8233) gives absolute limits for steady state noise inside residential properties for noise that does not have a specific character (an example of such noise is that from road traffic).

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

Table 1: Indoor ambient noise levels for dwellings recommended in BS8233:2014

BS 8233 also provides guidelines for noise levels in private amenity areas. It says:

> *For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.*
>
> *Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$, or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.*

These guidelines are in keeping with “Guidelines for Community Noise”, 1999 (GCN) published by the World Health Organization.

Area	Critical health effect	Noise level
Outdoor living area	Serious annoyance, daytime and evening	$L_{Aeq,16hr}$ 55 dB
	Moderate annoyance, daytime and evening	$L_{Aeq,16hr}$ 50 dB
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	$L_{Aeq,16hr}$ 35 dB
	Sleep disturbance, night-time	$L_{Aeq,8hr}$ 30 dB
		$L_{AFmax,typ}$ 45 dB

Table 2: WHO GCN guideline values for community noise

The values in Table 2 need further elaboration. There is a variability in individual response to environmental noise, with some people being more noise-sensitive than others. The levels given for outdoor living areas are the noise level below which ***few*** people will be moderately annoyed or seriously annoyed. They do not represent an onset of moderate / serious annoyance for the general population. In effect, the levels protect the more sensitive section of the population. In addition, the L_{Amax} value is not the highest single noisy event that occurs during any night, but rather the WHO guidelines note *For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10 to 15 times per night.*

Although there is a more recent document from the WHO on noise (Environmental Noise Guidelines for the European Region) much of the earlier guidance set out in 1999 guidance is now absent from it. While the more recent guidance was intended to supersede the older, it recognises this absence and states that *'indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid.'*

Spectrum recommend that although WHO guidance should be noted, it should not be relied upon in assessments without reference to other relevant, detailed guidance especially that in British Standards. These may align better with Planning Practice Guidance[4] in England.

$L_{Aeq,T}$ is the average noise level, measured over the time period T. BS8233 and WHO advise that the time period for the daytime should be a 16 hour average (0700-2300). The night period is defined as 2300-0700.

3.3 BS 4142

British Standard document BS 4142:2014 *Methods for rating and assessing industrial and commercial sound* describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes sound from mechanical plant and equipment as well as sound from the loading and unloading of goods and materials at industrial and / or commercial premises.

The principal of assessment under BS4142 is to compare the sound from the source under investigation (if appropriate, with adjustments for duration and character) with the background L_{A90} (the typical minimum sound level) in the absence of the sound to be assessed. The standard states (Section 11):

a) *Typically, the greater this difference, the greater the magnitude of the impact.*
b) *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
c) *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*

[4] *PPG - Noise, MHCLG, 6 March 2014*

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

BS4142 requires a 15 minute period L_{A90} level for assessments of night-time sound (7.00 am to 11.00pm) and a 1 hour period L_{A90} for daytime assessments.

Where the sound rating level is assessed to be 10 dB *above* the background sound level, this is generally taken to be a Significant Observed Adverse Effect Level (SOAEL). Where the sound rating level is assessed to be 10 dB *below* the background sound level, this is generally taken to be the No Observed Adverse Effect Level (NOAEL). The Lowest Observed Adverse Effect Level (LOAEL) occurs in a range of "sound rating level minus background sound level" between 0dB and 5 dB depending upon context.

3.4 PROFESSIONAL PRACTICE GUIDANCE ON PLANNING AND NOISE

Professional Practice Guidance on Planning and Noise (ProPG) was produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England.

The National Planning Policy Framework (NPPF) encourages improved standards of design. The CIEH, IOA and the ANC produced ProPG which is intended to encourage better acoustic design for new residential development and aims to protect people from the harmful effects of noise.

ProPG says '*Good acoustic design is about more than the numbers. It is a holistic design process that creates places that are both comfortable and attractive to live in, where acoustics is considered integral to the living environment. Good acoustic design can involve, for example, careful site layouts and better orientation of rooms within dwellings. Good acoustic design does not mean "gold plating" or significantly increasing costs. [ProPG] seeks to encourage and promote design outcomes that are proportionate and reasonable in the particular circumstances of each development site.*

ProPG provides advice for Local Planning Authorities (LPAs) and developers, and their respective professional advisers. It aims to complement Government planning and noise policy and guidance. In particular, it aims to:

- advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
- encourage the process of good acoustic design in and around new residential developments;
- outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- improve understanding of how to determine the extent of potential noise impact and effect; and
- assist the delivery of sustainable development.

ProPG notes that *This Professional Practice Guidance does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy on which users should take their own advice as appropriate.*

ProPG Supplementary Document 2 "Good Acoustic design notes: *It is acknowledged that the inherent challenge of introducing noise-sensitive development in noisy locations can limit the extent to which good acoustic design can be achieved in harmony with the other factors that influence the overall quality of a scheme and that compromises may need to be made e.g. accepting that it may not always be possible to achieve acoustic standards with windows open or accepting that noise levels in parts of the outdoor amenity areas may not be optimal…. A good acoustic design will be one that continues to minimise noise impacts and to avoid significant noise effects for the lifetime of the development or as long as is practicable taking into account other economic, environmental and social impacts.*

3.5 HILLINGDON COUNCIL LOCAL PLAN: DEVELOPMENT MANAGEMENT POLICIES ADOPTED MARCH 2012

Policy DME 5: *Hotels and Visitor Accommodation*
The Council will support a range of visitor accommodation, conference and related uses in accessible sustainable locations, as defined in the Site Allocations and Designations document, subject to:

No adverse impact on nearby land uses or on the amenity of either adjoining occupants or proposed occupants by virtue of noise, lighting, emissions, privacy, overlooking, any other potential nuisance, parking or traffic congestion.

Policy EM8: *Land, Water, Air and Noise*, is shown in full in Appendix C. It states (inter alia) *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.*

4. AMBIENT SOUND SURVEY AND RESULTS

Ambient sound measurements were carried out during a site survey between 8 and 13 February, 2024. This survey consisted of continuous, unattended sound measurements of ambient conditions at five locations on the subject site. The measurement positions were as follows:

Position LT1: At 6m above the rooftop plant room near Bakers Road. This location had the least obstructed aspect to more distant ambient noise sources in this area. The microphone was in free field conditions.

Position LT2: Overhanging the High Street parapet (2nd floor level roof) by 1.5m overlooking the pedestrianised area. This microphone will have experienced a degree of façade reflections.

Position LT3: Overhanging the Belmont Road parapet (2nd floor level roof) by 1.5m overlooking the road area. This microphone will have experienced a degree of façade reflections.

Position LT4: Overhanging the Bakers Road parapet (2nd floor level roof) by 1.5m overlooking the road area. This microphone will have experienced a degree of façade reflections.

Position LT5: at 2m above ground level centrally located within the loading bay to the rear of the building. The microphone was in free field conditions.

These locations are indicated in Appendix A. Photographs showing the measurement microphone positions are shown in Appendix D. The following equipment was used during the survey:

Position LT1
- 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 3030452
- Bruel & Kjaer Type UA 1404 Outdoor microphone attachment, and
- Bruel &Kjaer Type AO 0441 10m microphone extension cable

Position LT2
- Bruel & Kjaer Type 2250 Sound Level Meter s/n 2726905
- Bruel & Kjaer Type 4189 Microphone s/n 2710995
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 2730220
- Bruel & Kjaer Type UA 1404 Outdoor microphone attachment, and
- Bruel &Kjaer Type AO 0441 10m microphone extension cable

Position LT3
- Bruel & Kjaer Type 2250 Sound Level Meter s/n 3009933
- Bruel & Kjaer Type 4189 Microphone s/n 3043744
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 2115516
- Bruel & Kjaer Type UA 1404 Outdoor microphone attachment, and
- Bruel &Kjaer Type AO 0441 10m microphone extension cable

Position LT4
- Bruel & Kjaer Type 2250 Sound Level Meter s/n 3010857
- Bruel & Kjaer Type 4189 Microphone s/n 3060877
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 2291483
- Bruel & Kjaer Type UA 1404 Outdoor microphone attachment, and
- Bruel &Kjaer Type AO 0441 10m microphone extension cable

Position LT5
- Bruel & Kjaer Type 2250 Sound Level Meter s/n 3024396
- Bruel & Kjaer Type 4189 Microphone s/n 3349664
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 3021281
- Bruel & Kjaer Type UA 1404 Outdoor microphone attachment, and
- Bruel &Kjaer Type AO 0441 10m microphone extension cable

Before and after the survey, the sound level meters were field-calibrated in accordance with the manufacturer's guidelines, and no significant drift was observed. The meters, microphones and field calibrators are laboratory calibrated biennially in accordance with UKAS procedures or to traceable National Standards. Weather conditions were monitored throughout the survey. Wind speeds and precipitation were within acceptable limits for the type of measurements undertaken.

4.1 RESULTS OF NOISE MONITORING

Measurements have been summarised into contiguous 5-second periods to present the sound profile throughout the monitoring period. Measurement metrics included L_{AFmax}, $L_{Aeq,T,}$ and L_{A90} levels (the sound level exceeded for 90% of the individual measurement period). Overall A-weighted and octave band measurements were stored for later analysis.

The results of the measurements are shown graphically and in tabular form in Appendix E. A period of 1 hour 50 minutes starting at 4:20pm on Saturday 10 February exhibited uncharacteristically high noise levels at most locations. This period has been excluded from the results. A summary of the relevant results for the purposes of this assessment is shown in the following table.

	Measured level (dB)				
Noise Parameter	**LT1**	**LT2**	**LT3**	**LT4**	**LT5**
Daytime L_{Aeq}	60	62	66	64	57
Night-time L_{Aeq}	56	56	62	60	54
Night-time L_{AFmax}[1]	72	75	81	77	70
Night-time L_{A90}	56	54	58	57	50
Daytime L_{A90}	51	47	48	50	43

Table 3: Aggregated summary results of noise monitoring

Note 1: The numerical L_{AFmax} levels for each 8 hour night-time period have been sorted by value from highest to lowest. From this, it is possible to read off the 10-15th highest L_{AFmax} level for each night. The highest of these values is then taken as the representative LAmax at the monitoring location for subsequent use in calculating L_{AFmax} levels inside residences on the site. This is in accordance with the guidance in the WHO "Guidelines for community noise" document, which states that, for a good nights' sleep, the LAmax level should not exceed 45 dB more than 10 to 15 times. This is also the approach adopted in ProPG.

In Appendix E, L_{Aeq} and L_{A90} measured noise levels at each location show the normal diurnal variation consistent with greater and more regular activity during the daytime than at night-time, particularly in respect of road traffic noise. L_{A90} levels still generally exhibit the expected daytime and night-time profile.

5. PREDICTION OF ENVIRONMENTAL NOISE LEVELS ACROSS THE SITE

The measurement results obtained from the survey described in Section 4 are representative of the levels at the specific measurement locations. However, it is necessary to know how the noise exposure varies across the proposed development in order to assess how noise will affect the various noise-sensitive uses.

5.1 METHOD

The predominant noise source near the site which controls site noise exposure is road traffic on Belmont Road and Bakers Road. Noise exposure at the various parts of the proposed development is dependent on differing degrees of distance attenuation, ground attenuation, screening and angle of view to the road. Therefore, analysis has been undertaken to predict the noise levels across the various facades of the building, based on the measurement results and taking these effects into account.

The procedure that has been followed is as summarised below:

- Generate a three-dimensional numerical noise model of the site conditions at the time of the surveys using Softnoise'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.*
- Validate the noise prediction model against actual noise measurement data taken at the survey positions. This validation is carried out in respect of daytime and night-time L_{Aeq} levels for road traffic and noise from the Business Centre, as well as L_{AFmax} noise levels at night-time.

The above procedure establishes the noise exposure for the site, prior to development taking place. In particular, it calibrates the source sound power level of the nearby roads / pedestrian areas. Subsequently, the noise model is used to calculate the noise environment that will affect the proposed development, as follows:

- Alter the daytime and night-time noise models to include the proposed building at the indicated location and height. Carry out predictions of noise levels at a representative number of locations around the façades at the window locations of the proposed habitable rooms as well as in private amenity spaces.
- Use these noise level predictions as the starting point for noise ingress calculations for key habitable room locations.
- Predict the indoor ambient noise level using the procedure described in Annex G2 of BS8233:2014.
- Compare predicted indoor noise levels against the guideline noise levels in terms of:
  - L_{eq} noise levels in studio rooms during the daytime (i.e. 35 dB), and
  - L_{eq} noise levels in studio rooms during the night-time (i.e. 30 dB)
  - $L_{AFmax,typ}$ noise levels in studio rooms during the night-time (i.e. 45 dB)
- Provide appropriate sound insulation specifications to the relevant façade components to ensure these guidelines are met.

Noise ingress predictions have been carried out at a number of the most affected proposed habitable rooms within the development.

5.2 RESULTS – PROPOSED DEVELOPMENT

Appendix F shows plan and axonometric views of the numerical noise model, indicating the height and location of the proposed building, the surrounding existing buildings and roads.

The numerical results of noise level predictions around the residential facades are shown in Appendix G. This indicates that areas closest to Belmont Road are the most noise-affected with predicted daytime façade levels up to 66 dBA. Noise levels for co-Living apartments in more screened location are predicted to be around 16 dB lower than this, although in reality, the effect of more distant noise sources is likely to mean that noise exposure for these 'screened' locations would likely be no lower than those measured at location LT5.

Similar calculations have been undertaken for night-time noise, both in terms of L_{Aeq} and L_{Amax} noise.

6. ANALYSIS OF INDOOR NOISE LEVELS FOR PROPOSED RESIDENCES

6.1 CALCULATION OF INTRUSIVE NOISE

BS 8233:2014 at Annex G2 describes a 'more rigorous calculation method' for determining internal noise levels, using octave band data (i.e. more rigorous than for single-number estimates). This is calculated from external octave band noise levels, given the size and sound insulation properties of the building façade elements including glazing and ventilation, as well as acoustic properties of the receiving room, such as the volume and reverberation time. Usually, it is the glazing and, depending upon the particular strategy, the ventilation apertures that admit most noise into residences. It is then a matter of providing façade elements with appropriate acoustic performance to achieve sufficient noise reduction to meet the internal noise target.

The analysis carried out for this development assumes typical internal finishes for habitable rooms, based on reverberation times that Spectrum have measured in a range of occupied dwellings. The general construction of the building envelope is likely to be brick cladding to insulated steel framed inner leaf.

Sound insulation data for the façade elements have been taken from sources such as standard data provided by BRE and DETR, Spectrum library of measurement data, calculations using Marshall Day's *Insul* software as well as manufacturer's data and the BRE/CIRIA publication 'Sound Control for Homes'.

Appendix H shows sample noise ingress calculations following the BS8233 method for the most noise-exposed residential locations, namely the first floor co-Living spaces in Belmont Road near the junction of Bakers Road. For all noise parameters, the combination of acoustic effects mean that predicted intrusive noise levels are greatest for rooms at this location. In other words, noise ingress levels at all other locations will be lower, given the same external building envelope materials.

The example calculations show that the daytime L_{Aeq} inside living rooms and the night-time L_{Amax} levels inside bedrooms meet BS8233 guidelines.

The minimum wall and window glazing acoustic specifications required for habitable rooms in order to meet the noise standards shown in Section 4 are:

Walls:	R_w 50 dB, R_w+C_{tr} 47 dB
Co-Living room windows:	R_w 35 dB, R_w+C_{tr} 29 dB

This level of performance can be achieved by standard forms of residential building construction. In the case of the flats, this is assumed to be:

- Brick cladding, insulated cavity and double boarded inner lining on light-gauge steel frame
- Typical room finishes and furnishing
- Ventilation strategy - as described below

Note the sound insulation performance of the selected building envelope elements must comply with BOTH of the R_w and R_w+C_{tr} parameters. Double glazed windows having the performance indicated are readily available commercially. These will be specified to ensure that the whole window performance, including frames, seals and furniture, achieve the requisite standard. This acoustic performance for the building envelope can be secured by the imposition of a suitably worded planning condition.

6.2 VENTILATION

Approved Document F of the Building Regulations (ADF) describes methods of providing adequate ventilation for people in a building. It focuses on performance-based guidance, suggesting what level of ventilation should be sufficient, rather than how it should be achieved. It recognises that in noisy locations, it may be appropriate to use either sound attenuating background ventilators or mechanical ventilation solutions, depending on the noise level and any planning conditions.

In habitable rooms, there is a requirement for whole dwelling ventilation (low-rate continuous fresh air ventilation), extract ventilation (to remove vapour or smells) and purge ventilation (for the rapid removal of pollutants, usually by open windows). Purge ventilation is required for a short time for a specific irregular occurrence such as to clear odours or smoke. At these times, residents won't require the same indoor

noise standards and accordingly the BS8233 indoor noise targets don't apply for these periods of purge ventilation.

Separately, Approved Document O has requirements for means of mitigating overheating in residential apartments. This includes noise level limits in bedrooms at night-time. At this development, in the co-Living apartments, overheating mitigation is to be provided by openable louvres in the external façade. This is discussed later in this section of the report.

Figure 1, below shows a summary of the ventilation strategies for the development, taken from Ridge and Partners LLP's report "Ventilation Strategy, Uxbridge" (Dec, 2023).

8. SUMMARY OF STRATEGIES

A strategic approach has been adopted to ascertain the most appropriate ventilation strategy for each building and type of space. This has taken account of environmental factors, energy efficiency and risk of overheating and the outcomes are summarised in the table below.

AREA	PART F (GENERAL)	OVERHEATING PURGE
Co Living	MVHR per apartment extract to wet areas (Bathroom & Kitchen)	Openable panels
Hotel bedrooms	Supply & Extract ventilation to bedroom with VRF for heating & cooling	Comfort cooling (VRV with ceiling concealed fan coil units)
Amenity Spaces (occupied)	MVHR (Local) to each demise	Comfort cooling (VRV with ceiling concealed fan coil units)
Plant Areas	To Part F (General natural vent louvre)	Assisted mechanical
Retail / Commercial	Mechanical ventilation with heat recovery	Comfort Cooling (VRV exposed fan coils)

Figure 1: Summary of ventilation strategies

6.2.1 Co-Living Apartments

The proposal for the co-Living apartments at this development is to use *System 3: Mechanical ventilation with heat recovery*.

With this system, fresh air is drawn into the dwelling through a louvre in an external wall and ducted directly to a mechanical ventilation heat recovery unit in an internal mechanical services cupboard. The air is then distributed via ductwork to the habitable rooms. Therefore, there is no direct air path from outside into any habitable rooms. Air in habitable rooms is extracted through wet rooms (kitchens & bathrooms) and discharged via a duct to an external louvre in the external façade. External environmental noise entering habitable rooms via this ventilation ducting route is negligible compared to the contribution of ambient noise entering through the room's external façade. Accordingly, no component of external intrusive noise through ventilation elements is included in the predictions in Appendix H.

MVHR room side noise levels will be suitably attenuated to ensure that indoor noise levels will be achieved with this equipment operating for whole dwelling ventilation purposes.

6.2.2 Hotel Bedrooms

The proposal for the hotel bedrooms at this development is to use central plant to provide ventilation.

Although this is a different method of ventilation to MVHR, acoustically, the same principle applies. That is, there are no air paths direct from the external façade into habitable spaces through which noise could enter. Accordingly, the window glazing specification shown in Section 6.1 will provide the requisite sound insulation against noise ingress and the ventilation system will be suitably attenuated to ensure indoor room levels from ventilation noise and intrusive noise is suitably low.

6.3 OVERHEATING CONDITION

As shown in Figure 1, the co-Living Apartments have a manually openable vent in the external façade, in addition to the windows that will admit outside air into the room when required, to mitigate overheating. Analysis of this situation has been undertaken to demonstrate compliance with the requirements of Approved Document O. This is as shown in Appendix I.

While further design development is required to ensure that these louvres are technically acceptable in all respects, the information in Appendix I demonstrates that suitable products are commercially available.

7. NOISE LEVELS IN OUTDOOR AMENITY SPACES

7.1 PREDICTED NOISE LEVELS IN AMENITY SPACES

The outdoor amenity spaces included within the development are the ground floor courtyard space created by the surrounding buildings and an eighth floor roof terrace. The Courtyard space will be landscaped appropriately, although it is permanently accessible by the public via the walkway from Belmont Road and Cocks Yard. The Co-Living Terrace is accessed from the 8th floor internal amenity area. These are indicated in Figure 2, below.

Figure 2: Proposed outdoor amenity spaces (Left - Ground floor courtyard, Right – 8th floor roof terrace)

The numerical noise model described in Section 5.1 has been used to calculate noise levels at 1.5m height within the courtyard area. This is shown in Appendix J.

This shows that approximately half of the courtyard has noise levels at or below the BS8233 'upper limit' of $L_{Aeq,16hr}$ 55 dB. Nearer to the open arches which access onto Bakers Road and Belmont Road, courtyard noise levels increase to over 60 dB.

The 8th floor roof terrace will have noise levels that are controlled by more distant noise sources and would be an accumulation of many individual sources. Therefore, noise modelling of this space would not accurately predict likely noise levels in this area. Instead, it is expected that noise levels will likely be within the range of noise levels measured at locations LT1 and LT5, that is $L_{Aeq,16hr}$ 57 to 60 dB.

7.2 DISCUSSION

7.2.1 BS8233

This is a situation that BS8233 envisages, where it states:

However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted.

7.2.2 NPPF

There is further discussion in the National Planning Practice Guidance about this situation, in the form of 'question and answer' advice, as follows:

Are there further considerations relating to mitigating the impact of noise on residential developments?

Yes – the noise impact may be partially off-set if the residents of those dwellings have access to:

- *a relatively quiet facade (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).*

There are several, nearby outdoor amenity spaces nearby where acceptably low noise levels prevail and to which occupants of the development would have access. These include Fassnidge Park and Rockingham Recreation Ground which are within 5 to 10m walking time of the development.

7.2.3 Summary

Given:

- The guidance in BS 8233 regarding maximising mitigation but allowing excesses
- The guidance in the PPG-Noise regarding the availability of quiet amenity areas nearby, and
- The acceptability of the scheme in other respects, such as for internal noise levels

The proposals in respect of outdoor amenity space are considered acoustically acceptable.

8. SOUND INSULATION BETWEEN RESIDENTIAL AND NON-RESIDENTIAL / COMMUNAL PARTS OF THE DEVELOPMENT

The proposals include for a number of different residential to occupied non-residential adjacencies, including:

- The floor between the ground floor co-Living co-Working space and co-Living Apartments above
- The floor between the Belmont Road retail space and co-Living Apartments above
- The floor between the High Street mezzanine retail space and hotel bedrooms above
- The walls between co-Living internal amenity areas and co-Living Apartments
- The floors between 8th floor co-Living internal amenity area and co-Living Apartments above and below.
- The 8th floor roof terrace and the co-Living Apartments below

These adjacencies are shown annotated in Appendix K

8.1 GUIDELINES FOR ACCEPTABILITY

No detail is available at this stage (including likely operational noise levels) of the activities that will take place in the non-residential / communal occupied spaces. Use Class E allows for many different uses and any of the following uses could commence without consultation with the local authority.

The list below is some of the more typical uses for Use Class E.

- Shops (with some exceptions)
- Post Offices
- Cafés & Restaurants
- Banks & Building Societies
- Estate Agents
- Employment Agencies
- Gymnasiums, Indoor Sports & Recreation (not swimming pools or ice skating)
- Doctors Clinics & Health Centres
- Crèche
- Offices
- Research & Development
- Light Industrial

In any event, there is potential for noise levels in the occupied non-residential spaces to disturb the occupants of adjacent residential uses and, therefore, the proposals should include protection from undue noise impact as a result of this activity.

The Building Regulations Approved Document E (ADE) provides numerical sound insulation values that must be achieved between residences and between common areas and residences to prevent disturbance from the noise of normal domestic activities. However, it also states that a higher standard of sound insulation may be required between spaces used for normal domestic purposes and communal or non-domestic purposes. In these situations, the appropriate level of sound insulation will depend on the noise generated in the communal or non-domestic space. ADE states that specialist advice may be needed to establish whether a higher standard of sound insulation is required, and if so, to determine the appropriate level. These requirements are discussed below.

The level of intrusive noise inside residences which arises from the activity in adjoining non-residential units should be low. BS8233 whose guidelines are set out in Table 1 of this report, indicate that noise inside habitable rooms should be no more than 35 dBA during the day and no more than 30 dB during the night. These levels relate to an $L_{Aeq,T}$ parameter where the 'T' is 8 hours for night-time or 16 hours for daytime. However, these limits relate to 'anonymous noise' and activities in the list above, which is not characteristic of normal residential activity, would probably not be perceived as anonymous.

Disturbance from intrusive noise at 35 dBA could occur even if the duration were to be shorter than a full daytime period. Accordingly, we have used a much lower noise level over a shorter-term period to assess the suitability of sound insulation. That is, $L_{Aeq,5min}$ 25 dB or NR20 (L_{eq}). This is 10 dB lower than the BS8233 levels and has controls on the spectral content of the noise. For night-time noise into bedrooms, this is 5 dB lower at NR15.

In specifying the sound insulation of the building, Spectrum have also provided outline building construction elements (walls and floors) which have to potential to meet the performance required to achieve these standards, in order to provide a degree of comfort that acceptable noise conditions will be achieved within residences and taking account of any variability which may occur.

The sound insulation parameter applied here is the R_w+C_{tr} term which is mainly used for low frequency noise sources such as urban road traffic and 'disco music' (according to BS EN ISO 717-1:1997 *Acoustics – Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation)*. Also, an 'X-factor' of 5 dB is added to the required R_w+C_{tr} to account for the difference between laboratory and 'real life' sound insulation performance.

For an upper limit of sound within the occupied non-residential uses of L_{Aeq} 85 dB, this leads to a sound insulation performance requirement of R_w 70 dB, R_w+C_{tr} 65 dB for separating floors to residential uses spaces above. For separating walls to residential uses spaces on the same level, a sound insulation performance of R_w 70 dB, R_w+C_{tr} 60 dB is required.

Put another way, providing the separating walls and floors achieve this standard, 85 dBA of noise in the occupied non-residential uses will be reduced to NR15 in adjoining co-Living Apartments and hotel bedrooms of the development.

In respect of the 8th floor roof terrace, an impact sound insulation level 10 dB better than ADE requirements is considered appropriate. This leads to a L'_{nw} requirement of 50 dB.

8.2 PROPOSED CONSTRUCTION AND EXPECTED SOUND INSULATION PERFORMANCE

The proposals for the form of construction of the development are at an early stage and no firm decision has been made about the build-up of the separating floors between residential and non-residential uses.

However, the outline proposals are for a concrete framed, concrete column building with brick clad external walls to SFS internal leaf walls, with internal walls generally in lightweight steel, framed stud walls.

As an example, a floor comprising:

- 2-3mm Resilient layer
- 250mm In-situ concrete floor
- Metal framed ceiling having a minimum 300mm ceiling void.
- 1 layer of 15mm plasterboard.

The expected sound insulation of this construction is R_w+C_{tr} 65 dB.

Separately, a wall comprising:

- 2 layers of 15mm thick SoundBloc plasterboard on
- 50mm deep metal I-studs, both sides of
- A 200mm cavity fully filled with mineral fibre insulation

would have an expected sound insulation of R_w+C_{tr} 60 dB.

Finally, a roof comprising:

- Isolated roof floor finish (e.g. paving slabs separated from perimeter walls)
- Waterproof membrane
- Deep thermal insulation
- 200mm concrete slab
- Metal framed ceiling having a minimum 300mm ceiling void.
- 1 layer of 15mm plasterboard.

Would have an $L'_{n,w}$ of 45 to 50 dB

The above estimates of sound insulation performance take into account the various flanking sound paths that can diminish the performance of the underlying partition construction as described above. Spectrum have conducted numerous sound insulation tests in dwellings having similar constructions and confirm that these wall and floor designs have the capacity to achieve the performance indicated.

Accordingly, the expected construction of this development has the ability to reduce typical noise levels in a range of occupied non-residential spaces to below NR15 within the immediately adjoining residential space. This is considered acoustically acceptable.

This is an issue which can be controlled by a suitably worded planning condition.

9. PLANT NOISE ASSOCIATED WITH THIS DEVELOPMENT

9.1 PLANT DESCRIPTION

Mechanical plant proposals are at an early stage and significant design development is yet to be completed before a defined set of plant proposals can be finalised. However, at this stage, the expectation is that there will be plant located in the following areas:

- On the roof of the hotel
- At the south-western end of the 8th floor roof terrace
- On the roof of the 9th floor co-Living building
- Emerging from the car park entrance
- Ventilation from basement plant emerging from louvres located within the courtyard
- Ventilation near to the courtyard access to the hotel
- Substation and ventilation near to the Belmont Road access to the hotel
- High level louvres in the façade above the Belmont Road retail unit

It is possible to specify the limiting sound pressure level from the combined operation of all of this equipment to ensure that a plant noise level that is at or below the LOAEL is met. In this case, a rating level 5 dB below the representative background level is considered to be suitably low to prevent disturbance from plant noise at residential locations.

9.2 PLANT NOISE RATING LIMITS

In Section 9.1, BS4142 states:

Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level.

NOTE 2 The rating level is equal to the specific sound level if there are no such features present or expected to be present.

In Section 9.2, BS4142 states:

Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed.

Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.

In this case, the sound from the development will be an accumulation of individual, uncorrelated sources, none of which will be dominant in level or character. The potential for tonality from the development is considered low. Noise from some equipment may vary based on controls and settings (e.g. time of day, heat load, etc.), however this would not be abrupt or irregular. In addition, noise from the development will be masked by the existing acoustic environment, which comprises road traffic on nearby roads, nearby plant and other town centre commercial & pedestrian activity.

With these factors in mind, a character correction of +3 dB is used. Subjectively, this represents acoustic features which are just perceptible at the receptors and is considered to be the most cautious approach to the expected character of plant noise at the nearest noise-sensitive receptors.

For emergency operation, it is usual to adopt a criterion of the specific sound being equal to the background noise plus 10 dB.

Using the measured L_{A90} noise levels reported in Table 3 as a starting point, the plant noise limits at noise sensitive locations due to the simultaneous operation of all new plant items are shown in Table 4, below.

Operating period	Sound rating level not to exceed ($L_{Aeq,T(dB)}$)
Daytime	45
Night-time	40
Emergency	60

Table 4: Limiting sound rating level

9.3 AT-SOURCE SOUND POWER LIMITS

BS4142 states that an assessment should:

Determine the specific sound level by calculation alone if measurement is not practicable, for example if the source is not yet in operation. In such cases, report the method of calculation in detail and give the reason for using it.

NOTE 1 When calculating rather than measuring sound pressure levels, it is necessary to have appropriate representative data on source sound emission, for example as a source sound power level (including source directivity), and the position of any point source(s) creating the same sound pressure levels in the environment as the real source. Often, such data are given in established calculation models, but in other cases it is necessary that they be determined in each individual case.

NOTE 2 Using a suitable method for the sound propagation from source to receiver, the sound pressure level at the assessment point can be calculated. It is necessary to relate the sound propagation to well-defined meteorological and ground conditions. Most calculation models refer to neutral or favourable sound propagation conditions, as other propagation conditions are much more difficult to predict. The acoustic impedance of the ground is also important, in particular at large distances and low source and receiver heights.

In line with these recommendations, the approach to prediction of noise associated with the proposals is described below.

9.4 PLANT EQUIPMENT AND SPECIFICATION – APPROACH TO NOISE PREDICTION

The proposals for mechanical plant are at an early stage. Significant further design is required in order to correctly define the operational requirements for the plant and, following this, specify suitable equipment items to meet these requirements (e.g. manufacturer, model, setting, controls, etc.) Nevertheless, the general location of the plant is known.

Therefore, at this stage, it is not possible to calculate noise from the 'actual equipment to be installed' because this has not been identified. However, it is possible to set limits on the 'at-source' sound level for the equipment described in Section 9.1.

Accordingly, within this analysis, an external noise source is associated with all such plant items and areas for the purposes of specifying **limiting sound power levels**.

Typical operation of the mechanical plant at this site will result in sound sources that are distributed across the site, each subject to varying degrees of shielding, distance attenuation, directivity and reflection, relative to the nearest noise sensitive locations. Accordingly, the analysis method which will most accurately represent this situation is a numerical noise model of the proposed development and surrounding buildings.

The particular prediction model that has been used for this analysis is Softnoise's 'Predictor' software[5]. This acoustic model implements the procedures set out in ISO 9613-2:1996[6]. The noise model takes account of the following in its calculation procedures:

- Source sound power level (for point, line and area sources)
- 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)

The contribution of each individual noise source to combined noise levels at the receptor locations is then computed using the prediction method described in the ISO Standard.

Buildings have been modelled as solid bodies, around which sound can diffract. The intervening ground areas have been modelled as mostly reflective ground, according to the ISO 9613-2:1996 method.

The source sound power level of all of the proposed plant noise sources (including external plant and louvres to internal plant rooms / duct terminations) has then been scaled to ensure that the receptor noise levels predicted at all surrounding noise sensitive locations comply with the limits described in Table 4.

[5] *Softnoise GmbH – Predictor (Predictor-LimA) v2021.1 Environmental Noise Calculation Software Package, Type 7810*
[6] *ISO 9613-2:1996 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation to determine Noise Levels*

10. RESULTING SOUND POWER LIMITS

Table 5 sets out the resulting daytime, night-time and (where appropriate) emergency operation sound power level limits from each externally audible equipment item or louvre, in order to meet the specified limits.

Plant location	Day	Night	Emergency
On the roof of the hotel	77	72	92
At the south-western end of the 8th floor roof terrace	79	74	-
On the roof of the 9th floor co-Living building	82	77	94
Emerging from the car park entrance	62	57	77 [1]
Ventilation from basement plant emerging from louvres located within the courtyard	62	57	85 [1]
Ventilation near to the courtyard access to the hotel	44	39	-
Substation and ventilation near to the Belmont Road access to the hotel	47	42	-
High level louvres in the façade above the Belmont Road retail unit	44	39	-

Table 5: Sound power limits from all plant located in each location to meet Table 4 limits. (L_{wA} dB)
Note 1: Car park smoke-spill fan operation

The limits are specified in terms of an overall sound power level for the specific sound (i.e. without any BS4142 feature correction). If an equipment item operates on a 24 hour basis, then the lower, night-time limit will apply at all times. The 'emergency' limits apply to equipment, such as smoke spill fans which only operate in a fire situation of for brief test periods during the daytime.

Considering the likely type of equipment and the proposed locations, there is expected to be sufficient space to install effective noise control measures within the proposed mechanical plant scheme in order to achieve these limits. More detailed analysis of the precise noise control requirements will be undertaken when a full mechanical scheme is prepared. However, at this stage, the analysis shows that suitable noise conditions can be achieved for surrounding residences.

This information will be used within the detailed design of the plant noise control taking into account all relevant noise sources and operating modes to ensure that appropriate noise control design measures are included within the installation.

11. DISCUSSION ON PROPG

The following sections provide commentary on this development based on recommendations for an *Acoustic Design Statement*, as described in ProPG. The recommendations taken directly from ProPG are shown in *blue italics* and site-specific comments in normal text.

2.69 An Acoustic Design Statement (ADS) should provide sufficient evidence that the ProPG Stage 1 and Stage 2 Elements 1 to 4 have been followed.

An initial noise risk assessment has been carried out and general noise exposures indicate the site has a 'low to medium risk of adverse effect'. Daytime and night-time noise exposures nearer to the road indicate the site has a 'low to medium risk of adverse effect' with night-time noise levels near Belmont Road rated 'medium to high'.

2.70 An ADS should be proportionate to the scale of the development and to the degree of noise risk at the proposed development site. An ADS should not normally be necessary where the noise risk has been properly assessed as negligible during Stage 1. The level of detail provided in an ADS should increase with increasing level of risk.

Given the detail provided with the analysis (in particular, the use of long-term measured noise levels and comprehensive numerical noise modelling) the analysis carried out in this report is considered proportionate.

2.71 Applicants should always have regard to any local planning and noise policies and seek prior agreement from the LPA before deciding what level of detail is expected in an ADS to avoid misunderstanding and possible delays.

The local plan policies and guidelines for acceptability for this development have been properly taken into account within the assessment carried out in this report. The proposals are in accordance with relevant local and national policies.

2.72 In general terms an ADS should be expected to address the following issues:

a) Present the initial site noise risk assessment. This should include a description of the acoustic conditions prior to development and should determine the appropriate level of noise risk to the finished development were no additional noise mitigation measures undertaken. Particular care should be taken to ensure that any noise events (as quantified by L_{AFmax}) have been properly identified and assessed (see Appendix A). (Stage 1).

The site noise risk assessment identifies this site as a having medium generally, but that parts of the site have a medium -to-high risk of adverse impact, without further mitigation measures. The issue of L_{AFmax} levels affecting the site have been considered.

b) Describe the external noise levels that occur across the site (before and after any noise mitigation measures) in an appropriate level of detail that reflects the scale and height of the proposed development. The external post mitigation noise assessment should use an informed judgement of typical worst case conditions over the foreseeable future, but it should exclude atypical noise events. Noise mapping and modelling techniques are likely to be useful for more complex sites. (Stage 2).

The external noise levels affecting the site have been measured and described. Noise modelling techniques have been utilised.

c) Demonstrate how good acoustic design is integrated into the overall design and how the proposed acoustic design responds to the specific circumstances of the site (exploiting opportunities and reflecting constraints) (Stage 2 Element 1).
Considering the constraints of the site in terms of space and the number of dwellings yielded, maximum use of orientation and shielding has been included to protect dwellings from environmental noise.

The use of acoustically attenuated opening vents for overheating mitigation provides a coherent response to the risk of overheating.

d) Confirm how the internal noise level guidelines in Figure 2 will be achieved. Include, where relevant, full details of the design measures and building envelope specifications that will achieve the internal noise level guidelines. The LPA may request evidence of underlying calculations, in order to assist them in understanding any specific aspects of the assessment, which would need to be undertaken by a suitably qualified practitioner.
The level of building façade reduction and outline measures that provide these are described in Section 6.1.

e) A detailed assessment of the potential impact on occupants should be undertaken where individual noise events are expected to exceed 45 dB LAmax,F more than 10 times a night inside bedrooms (see Appendix A).
The building façade measures necessary to prevent this from occurring are also shown in section 6.1.

f) Priority should be given, as part of good acoustic design, to enable the use of openable windows as extensively as is practical across the development site. Where it is not considered practical to achieve the internal noise level guidelines with windows open a justification should be provided to the LPA setting out the reasons for this. Where it is proposed that windows need to be closed in order to meet the internal noise guidelines then full details of the proposed ventilation and thermal comfort arrangements must be provided.
As described in previous sections, the opportunity for acceptable indoor acoustic conditions with windows normally opened is maximised by the proposed layout of this site.

The use of acoustically attenuated opening vents for overheating mitigation provides a coherent response to the risk of overheating.

g) Where the LPA accepts that there is a justification that the internal L_{Aeq} target noise levels can only be practically achieved with windows closed, and provided care has been taken to design the accommodation so that it provides good living conditions (in respect of acoustics, ventilation and thermal comfort), then internal noise levels can be assessed with windows closed. In this scenario any systems used to provide "whole dwelling ventilation" (e.g. trickle ventilators) should be in the open position and the internal L_{Aeq} target noise levels should not generally be exceeded. It should also be noted that the internal noise level guidelines are generally not applicable when windows or other natural ventilators are open solely to provide "purge ventilation" as this should only occur occasionally.
The analysis in Section 6.1 indicates that internal noise targets can readily be achieved.

h) Reasonable steps should be taken to minimise overheating during summer months through good design. Where openable windows / ventilators are proposed to mitigate overheating and where the internal noise level guidelines are likely to be exceeded when they are open a more detailed assessment of the

potential impact on occupants during the overheating condition should be provided in the ADS. This more detailed assessment may include:

(i) the alternative design measures considered / applied to reduce noise impact on occupants,

(ii) the expected internal noise levels when windows / ventilators are opened to provide relief from overheating, and

(iii) an estimate of the amount of time that windows are likely to be open to provide relief from overheating

This element of the design would be undertaken at a later stage. The opening vents described in this report are intended to respond to the need for overheating mitigation by natural ventilation while still providing acceptable indoor noise levels, according to ADO.

i) Present the findings of the external amenity area noise assessment – applying the information on external noise from (b) above to a wider consideration of the effects of noise on external amenity areas. This assessment should be more detailed in medium and high noise risk sites because of the higher external noise levels on site prior to development (Stage 2 Element 3).

Section 7 of this report describes amenity area noise levels. Outdoor amenity areas / terraces will have outdoor noise levels generally around 55dB, although this will be up to 60 dB in some areas. Discussion within this report describes why this is considered an acceptable situation in accordance with guidance and standards.

j) Present the findings of the assessment of other relevant issues. Close liaison with the LPA is recommended to fully address any local issues and local policies that are of particular importance to the specific scheme and locality (Stage 2 Element 4).

The site is considered capable of providing a residential development that is consistent with national and local noise planning policies and guidelines. Taking into account other constraints upon residential development, it will be possible to achieve recommended internal noise levels in all cases and to maximise the extent of locations where this can occur with windows open. It is feasible to control sound transmission from non-residential to residential areas and to control mechanical plant noise. This can be secured by the imposition of suitably worded planning conditions.

k) Confirm, for a low noise risk site, how the adverse impacts of noise will be mitigated and minimised in the finished development (NPPF).

Transportation noise sources will be mitigated by a combination of site layout, internal layout, and façade sound insulation.

l) Confirm, for a medium or high noise risk site, how the adverse impacts of noise will be mitigated and minimised and clearly demonstrate that a significant adverse noise impact has been avoided in the finished development (NPPF).

The outline measures will be as described for k) above but, for the avoidance of doubt, wholly acceptable indoor and outdoor noise levels are achievable across the site with building measures that are commercially available and widely used in residential developments.

12. CONCLUSION

The acoustic issues associated with this proposed residential development have been assessed according to the appropriate guidance and standards and recommendations provided to ensure that acceptable standards of amenity will be provided for residents of this scheme. This includes indoor ambient noise levels within dwellings during the day- and night-times, as well as in outdoor amenity areas.

Analysis of the noise transmission from the occupied non-residential uses and from mechanical plant noise have been assessed appropriate to the level of design detail available at this stage. Suitably worded planning conditions can ensure no significant noise impact for the nearest affected dwellings from these noise sources.

Providing the facade sound insulation measures and plant noise limits described within this report are provided, the noise impact of the proposed development will be in accordance with the requirements of the local and national planning policies identified within this report.

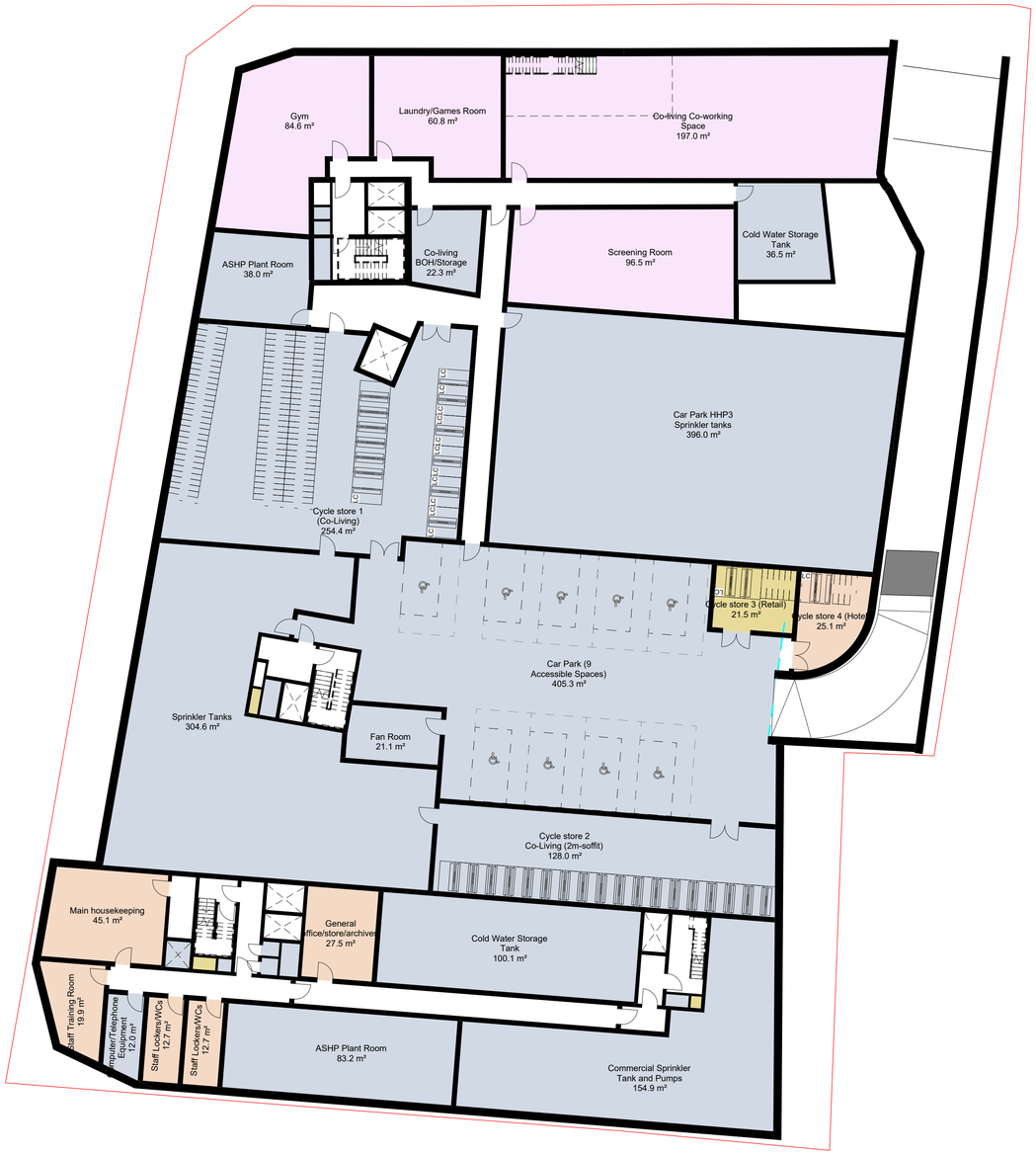
APPENDIX A

Location plan and noise monitoring locations


LT3
LT5
LT4
LT1
LT1
Belmont Rd
Bakers Rd
Bakers Rd
Cocks Yard
Cocks Yard
Uxbridge
Source - Google Earth

APPENDIX B

Sample plan and elevation drawings of proposed development



1 **Basement Option Plan**
1 : 200

0 10 20 m

Rev	Date	By	Description
J	19.03.2024	AD	Updates to internal layouts
I	14.03.2024	AD	Updates to address fire statement
H	08.03.2024	AD	Minor amendment to basement outline
G	05.03.2024	AD	Basement reconfigured for hotel uses and reduced cycle parking
F	23.02.2024	AD	Cycle parking/ramp updates
E	21.02.2024	AD	Design Freeze Issue
D	15.02.2024	AD	Core updates, re-arrangement of plans on sheets, hotel reconfiguration, mezzanine plan added
C	14.02.2024	AD	General core and hotel layout updates
B	01.02.2024	AD	Scale bar and intial furniture layouts added
A	29.01.2024	AD	Amendments to co-living amenity, lightwell, car spaces and cycle parking
-	12.01.2024	AD	Updated in line with latest preapp

Project
Uxbridge High Street
LONDON BOROUGH OF HILLINGDON
Co-Living

Drawing Title
Basement Plan

Project Status
PRELIMINARY

Client Logo

MODA

DNA | REAL ESTATE

Client
MODA

Contract Number
n/a

Project Number
P23-110

Scale @ A1
1 : 200

Date
11/12/2023

Drawn By
SM

Checked By
AD

Drawing Number Identifer
SK0104

Revision
J

Drawing Number
CGL-ZZ-ZZ-DR-A-SK0104

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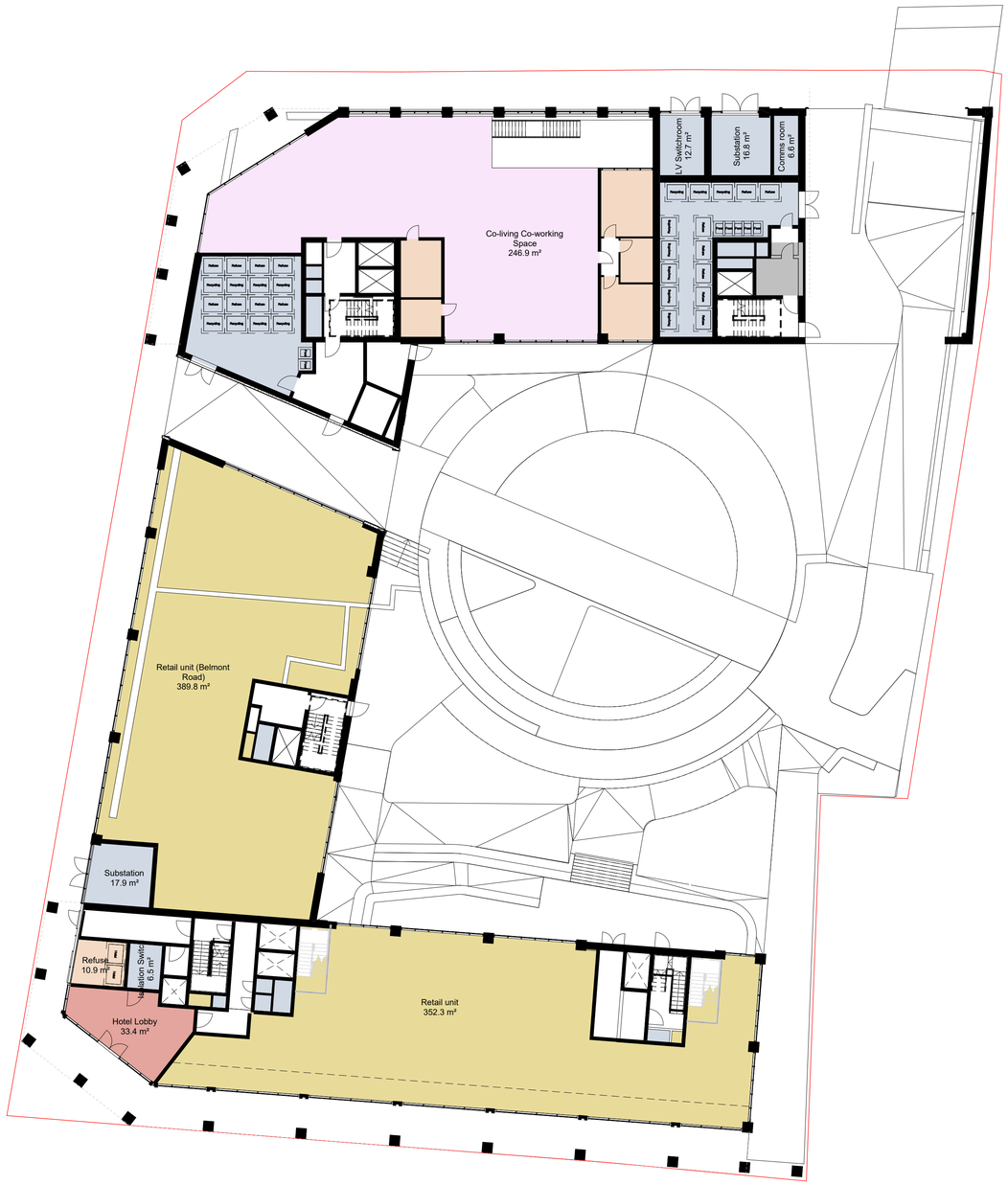

1 Ground Floor Plan
1:200

2 Mezzanine floor plan
1:200

0 10 20 m

Key

- Ancillary
- BOH
- Co-Living Accessible
- Co-Living Amenity
- Co-Living Bedrooms
- Co-Living BOH
- Family Bedroom
- FOH
- Hotel Ancillary
- Retail
- Smart Bedroom
- Standard Bedroom

Rev	Date	By	Description
M	19.03.2024	AD	Updates to internal layouts
L	14.03.2024	AD	Updates to address fire statement
K	05.03.2024	AD	Lobby addedd to switchroom
J	04.03.2024	AD	Hotel ground floor amended
I	29.02.2024	AD	Hotel switchroom amendments option
H	28.02.2024	AD	Draft hotel entrance option
G	21.02.2024	AD	Design Freeze Issue
F	15.02.2024	AD	Core updates, re-arrangement of plans on sheets, hotel reconfiguration, mezzanine plan added
E	14.02.2024	AD	General core and hotel layout updates
D	01.02.2024	AD	Scale bar and intial furniture layouts added
C	29.01.2024	AD	Amendments to co-living amenity, lightwell, car spaces and cycle parking
B	12.01.2024	AD	Updated in line with latest preapp
A	02.01.2024	AD	Draft issue for comment on Option
-	19.12.2023	AD	First issue

Project
Uxbridge High Street
LONDON BOROUGH OF HILLINGDON
Co-Living

Drawing Title
Lower Floor Plans

Project Status
PRELIMINARY

Client Logo
MODA
DNA | REAL ESTATE

Client
MODA

Contract Number
n/a

Project Number
P23-110

Scale @ A1
1 : 200

Date
11/12/2023

Drawn By
SM

Checked By
AD

Drawing Number Identifer
SK0105

Revision
M

Drawing Number
CGL-ZZ-ZZ-DR-A-SK0105

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London, EC3A 7LP
020 7539 1200
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Child Graddon Lewis

1 Typical Upper Floor Plan Option
1:200

2 Eighth Floor Option Pan
1:200

0 10 20 m

Key

- Ancillary
- BOH
- Co-Living Accessible
- Co-Living Amenity
- Co-Living Bedrooms
- Co-Living BOH
- Family Bedroom
- FOH
- Hotel Ancillary
- Retail
- Smart Bedroom
- Standard Bedroom

Rev	Date	By	Description
H	19.03.2024	AD	Updates to internal layouts
G	04.03.2024	AD	Hotel ground floor amended
F	21.02.2024	AD	Design Freeze Issue
E	15.02.2024	AD	Core updates, re-arrangement of plans on sheets, hotel reconfiguration, mezzanine plan added
D	14.02.2024	AD	General core and hotel layout updates
C	01.02.2024	AD	Scale bar and intial furniture layouts added
B	30.01.2024	AD	Reconfiguration of studios
A	12.01.2024	AD	Updated in line with latest preapp
-	02.01.2024	AD	Draft issue for comment on Option

Project
Uxbridge High Street
LONDON BOROUGH OF HILLINGDON
Co-Living

Drawing Title
Upper Floor Plans

Project Status
PRELIMINARY

Client Logo

MODA
DNA | REAL ESTATE

Client
MODA

Contract Number
n/a

Project Number
P23-110

Scale @ A1
1 : 200

Date
11/12/2023

Drawn By
SM

Checked By
AD

Drawing Number Identifer
SK0106

Revision
H

Drawing Number
CGL-ZZ-ZZ-DR-A-SK0106

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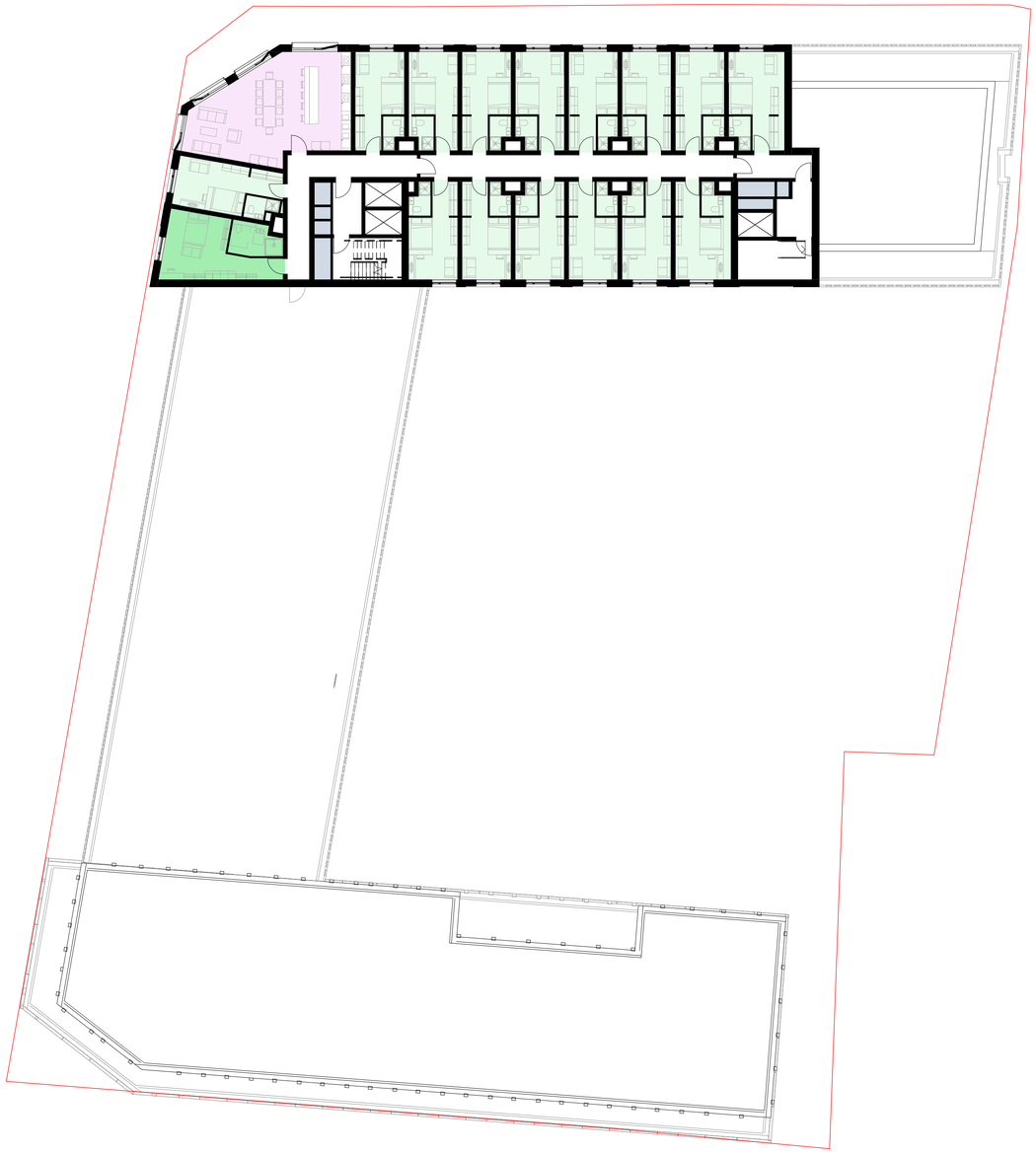
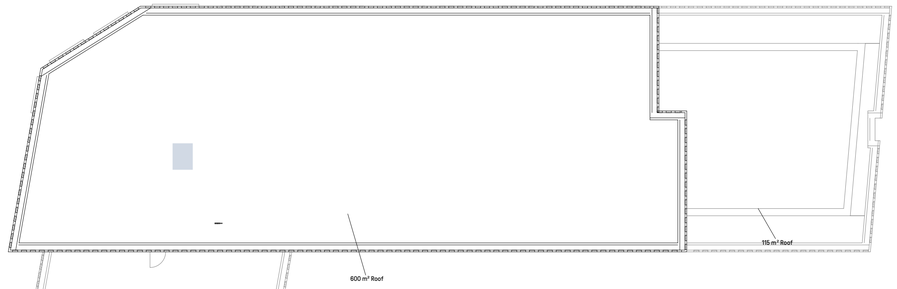
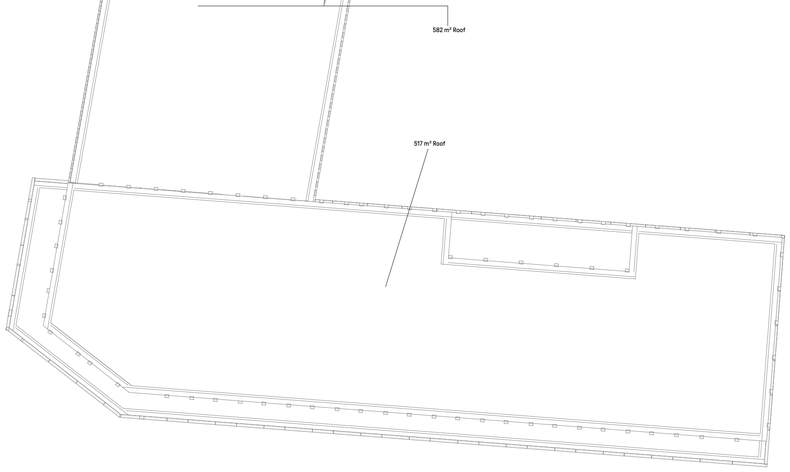


1 Ninth Floor Plan
1:200





2 Roof Plan
1:200

Key

- Ancillary
- BOH
- Co-Living Accessible
- Co-Living Amenity
- Co-Living Bedrooms
- Co-Living BOH
- Family Bedroom
- FOH
- Hotel Ancillary
- Retail
- Smart Bedroom
- Standard Bedroom

Rev	Date	By	Description
E	19.03.2024	AD	Updates to internal layouts
D	04.03.2024	AD	Hotel ground floor amended
C	21.02.2024	AD	Design Freeze Issue
B	15.02.2024	AD	Core updates, re-arrangement of plans on sheets, hotel reconfiguration, mezzanine plan added
A	14.02.2024	AD	General core and hotel layout updates
-	02.01.2024	AD	Draft issue for comment on Option

Project
Uxbridge High Street
LONDON BOROUGH OF HILLINGDON
Co-Living

Drawing Title
Top Floor Plans

Project Status
PRELIMINARY

Client Logo

MODA

DNA | REAL ESTATE

Client
MODA

Contract Number
n/a

Project Number
P23-110

Scale @ A1
1 : 200

Date
11/12/2023

Drawn By
SM

Checked By
AD

Drawing Number Identifer
SK0108

Revision
E

Drawing Number
CGL-ZZ-ZZ-DR-A-SK0108

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1 East Elevation
1:100

0 5 10m

Rev	Date	By	Description
C	2024.02.22	AD	Draft design freeze update
B	2024.02.14	AD	Updated to reflect massing changes
A	2024.02.01	AD	Scale bars added
-	03.01.24	DJ	First Issue

Project
Uxbridge High Street
LONDON BOROUGH OF HILLINGDON
Co-living & Hotel

Drawing Title
EAST ELEVATION

Project Status
PRELIMINARY

Client Logo

MODA

DNA | REAL ESTATE

Client
CADDICK, MODA

Contract Number
n/a

Project Number
P23-110

Scale @ A1
1 : 100

Date
03/21/22

Drawn By
DJ

Checked By
AD

Drawing Number Identifer
SK0302

Revision
C

Drawing Number
CGL-CL-ZZ-DR-A-SK0302

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