
Noise Impact Assessment

Proposed Residential Development – Fountain House Hotel, Hayes

Client: Asmi Ali

Reference: 21.168.1.R1

Issue Date: 7 December 2021



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EXECUTIVE SUMMARY

This Assessment has been undertaken to identify any key surrounding noise sources within the vicinity of the Site which have the potential to produce noise impacts upon the Development. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance in addition to appropriate British Standards and guidance documents relevant to the assessment of noise impacts and these are detailed in Section 2.

This Assessment has relied upon a series of noise surveys completed on Site in order to measure off-Site noise sources.

This Assessment has shown that, with regards to road traffic noise, average noise levels at the Development fall below the internal and external noise criteria levels without the need for any specific noise mitigation. With regards to maximum noise levels during the night-time period, any bedroom window within 40m of Church Road with full or partial line of sight to Church Road will require alternative ventilation.

This Assessment has shown that, with regards to commercial noise, that the internal noise level criteria can be achieved in all habitable rooms except for any bedroom located on the north east façade of Block B, which exceeds the criteria by +3.7dB. This is below the exceedance caused by road traffic, therefore any mitigation measures used to protect against road traffic noise will also mitigate commercial sound.

Should the recommended noise mitigation measures be implemented in order to control noise levels as identified, then the sound climate which future occupiers of the Development will be exposed to will accord with the 'No Observed Adverse Effect Level' as detailed in the PPG and as such, noise should not be deemed to be a determining factor in the granting of planning permission for this Site.

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1 INTRODUCTION

1.1 Appointment

- 1.1.1 Professional Consult Limited was instructed by Asmi Ali ('the Applicant'), to prepare a Noise Impact Assessment ('the Assessment') in support of a proposed refurbishment and extension to the existing Fountain House Hotel ('the Development') on a parcel of land located at 116 – 118 Church Rd in Hayes UB3 2LW to be referred to hereafter as 'the Site'.

1.2 The Development

- 1.2.1 It is understood that proposals include for the refurbishment of the Fountain House Hotel. The following pre-application advice from London Borough of Hillingdon Council and the following has been stated with regards to noise:

'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.'

- 1.2.2 All acronyms used within this report are defined in the Glossary presented in Appendix 2.

1.1 Site Locality & Existing Soundscape

- 1.1.1 The Site is located in a predominantly residential area with existing residential dwellings to the north, west and East. Church Road borders that Site to the west with St Mary's Road to the south. A small bus depot and workshop is located to the north and Hayes Town Chapel Further is situated to the south.
- 1.1.2 The soundscape at the Site comprises predominantly of intermittent road traffic noise from vehicles using Church Road and intermittent commercial noise associated with yard area to the north.

1.2 Purpose of Assessment

- 1.2.1 This Assessment has been undertaken to identify any key surrounding noise sources within the vicinity of the Site which have the potential to produce noise impacts upon the Development. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance in addition to appropriate British Standards and guidance documents relevant to the assessment of noise impacts and these are detailed in Section 2.
- 1.2.2 This Assessment has relied upon a series of noise surveys completed on Site in order to measure off-Site noise sources.

1.3 Limitations

- 1.3.1 The limitations of this report are presented in Appendix 1.

1.4 Confidentiality

- 1.4.1 Professional Consult has prepared this report solely for the use of the Client. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Professional Consult; a charge may be levied against such approval.

2 POLICY & GUIDANCE

2.1 National Planning Policy Framework & National Planning Practice Guidance

- 2.1.1 The Government updated the National Planning Policy Framework (NPPF) on 20th July 2021 and its associated National Planning Practice Guidance (NPPG) on 24th June 2021. Together, the NPPF and NPPG set out what the Government expects of local authorities. The overall aim is to ensure the planning system allows land to be used for new homes and jobs, while protecting valuable natural and historic environments.
- 2.1.2 The NPPG adds further context to the NPPF and it is intended that the two documents should be read together.
- 2.1.3 Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.
- 2.1.4 Local planning authorities' plan-making and decision making should take account of the acoustic environment and in doing so consider:
- ② Whether or not a significant adverse effect is occurring or likely to occur;
 - ② Whether or not an adverse effect is occurring or likely to occur; and
 - ② Whether or not a good standard of amenity can be achieved.
- 2.1.5 In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.
- 2.1.6 The Observed Effect Levels are as follows:
- ② Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
 - ② Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
 - ② No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected.
- 2.1.7 Table 1 summarises the noise exposure hierarchy, based on the likely average response.

Table 1. Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not Noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
<i>Lowest Observed Adverse Effect Level</i>			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
<i>Significant Observed Adverse Effect Level</i>			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.1.8 The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.

2.1.9 These factors include:

- ② The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day - this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;
- ② For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- ② the spectral content of the noise and the general character of the noise. The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.

2.1.10 More specific factors to consider when relevant:

- ② where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;
- ② Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on

windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations; and

- ② If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.2 BS8233:2014 'Guidance on sound insulation and noise reduction for buildings'

Noise Criteria Limits

- 2.2.1 The scope of this standard is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.
- 2.2.2 The standard suggests suitable internal noise levels within different types of buildings, including dwellings, as shown in Table 2.

Table 2. BS8233:2014 Internal Target Noise Levels

Criterion	Typical Situation	Design $L_{Aeq,T}$ (dB)
Suitable resting / sleeping conditions	Living Room	35
	Bedroom*	30

*For a Reasonable standard in bedrooms at night, individual noise events (measured with fast time weighting) should not exceed 45dB L_{max}

- 2.2.3 BS8233 goes on to recommend noise levels for gardens as follows:

"It is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised 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 might be warranted".

- 2.2.4 BS8233 goes on to say:

"In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited".

- 2.2.5 With regards to external noise within balcony areas, BS8233: 2014 provides the following advice:

"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"

Ventilation Requirements

- 2.2.6 Where a partially open window cannot be relied upon to provide an adequate level of facade sound insulation performance, it is necessary to consider alternative ventilation for habitable rooms. Section 8.4.5.4 within BS8233 states:

“The Building Regulations’ supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant’s choice.

Alternatively, acoustic ventilation units (see 7.7.2 below) are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans.”

Section 7.7.2 states:

“NOTE 5 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.”

2.3 BS4142:2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’

- 2.3.1 This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- ② Sound from industrial and manufacturing processes;
- ② Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- ② Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and,
- ② Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

- 2.3.2 The procedure detailed in the standard compares the measured or predicted noise level 'the specific noise level' from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is 'typical.'

- 2.3.3 The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

- ② Daytime (07:00 - 23:00): 1 hour; and
- ② Night-time (23:00 - 07:00): 15 minutes.

- 2.3.4 There are a number of 'penalties' which can be attributed to the specific sound level, either subjectively or objectively, depending upon the 'acoustic features' of the sound level under investigation as follows. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows (with regards to the subject method):

Tonality

- ② +2dB: where the tonality is just perceptible;
- ② +4dB: where the tonality is clearly perceptible; and
- ② +6dB: where the tonality is highly perceptible.

Impulsivity

- ② +3dB: where the impulsivity is just perceptible;
- ② +6dB: where the impulsivity is clearly perceptible; and
- ② +9dB: where the impulsivity is highly perceptible.

Intermittency

- ② +3dB: where the intermittency is readily distinctive against the acoustic environment.

- 2.3.5 Where the assessment is carried out using the objective method, the tonality penalty is either 0dB or 6dB and the impulsivity penalty can range from 0dB up to 9dB in increments of 1dB, depending on the level of impulsivity identified.
- 2.3.6 In addition to the above acoustic features, there is a penalty for 'other sound characteristics' of +3dB where a sound exhibits characteristics that are neither tonal nor impulsive, though is readily distinctive against the acoustic environment.
- 2.3.7 BS4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.
- 2.3.8 Assessment of the rating level relative to the background noise level can yield the following commentary:
- ② Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact;
 - ② A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
 - ② A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and
 - ② 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. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.
- 2.3.9 Whilst the amended 2019 Standard does make various references to it not being intended to assess noise impacts at indoor locations, section 1.1 does state 'The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident'. Example 6 in the Standard states 'In addition to the rating/background sound level comparison shown in Table A.6, the primary concern is the potential for disturbance of residents who could be sleeping with open bedroom windows. Other guidance, such as BS 8233, might also be applicable in this instance'.

2.3.10 With the above in mind, and for a clear need to ensure that any potential commercial or industrial noise impacts at the building façade do not give rise to internal noise level which causes sleep disturbance in bedrooms, this Assessment will ensure that the predicted rating level (specific sound level including any character corrections) does not exceed 30dB in bedrooms.

2.4 Local Authority Guidance and Criteria – London Borough of Hillingdon Council's Environmental Health Department

2.4.1 Consultation was provided to London Borough of Hillingdon Council, as follows:

'We have been appointed by a client to complete a Noise Impact Assessment in support of a proposed refurbishment and extension to the existing Fountain House Hotel at 116 – 118 Church Rd in Hayes UB3 2LW.

It is understood that you have received pre-application planning advice from London Borough of Hillingdon Council and the following has been stated with regards to noise:

'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.'

Professional Consult will undertake a series of noise surveys at the Site will be completed which will include for the following noise measurements:

-  **Road Traffic Noise Survey:** A road traffic noise survey for Church Road will be completed in line with the guidance presented in Calculation of Road Traffic Noise;
-  **Commercial Noise Survey:** A commercial noise survey will be completed for the HGV depot to the north of the Site; and
-  **Background Sound Survey:** A background sound survey will be completed on the Site over a full 24-hr weekday period.

Professional Consult will undertake the following assessments:

-  **Road Traffic:** An assessment will be completed which assesses the noise impact from road traffic upon the proposed residential dwellings in line with the guidance presented in BS8233:2014; and
-  **Commercial Noise:** An assessment of noise from any existing operations at the HGV depot or any proposed mechanical plant, such as air handling units, will be completed in line with the guidance presented in BS4142:2014+A1:2019.

If you have any comments on the above, then please advise at your earliest convenience.'

3 NOISE SURVEYS

3.1 Survey Information

3.1.1 Professional Consult has completed a road traffic noise survey for Church Road and also noise generated by a commercial unit to the north.

3.2 Road Traffic Noise Survey for Church Road

3.2.1 Professional Consult has completed a noise measurement for Church Road in line with the guidance contained in Calculation of Road Traffic Noise (CRTN) as follows:

 **Noise Measurement Position 1:** 11:45 – 13:45 on Tuesday 30th November 2021. The microphone of the sound level meter was located in free-field conditions at a distance of 4m from the nearside kerbstone of Church Road.

3.2.2 Table 3 presents the measured road traffic noise levels.

Table 3. Summary of Measured Road Traffic Noise Levels

Road	Measurement Period	Measured Sound Pressure Level (dB)			Measurement Distance to Nearside Kerb (m)
		L _{Aeq,1hr}	L _{A10,1hr}	10 th Highest L _{Amax,fast}	
Church Road	30/11/2021 11:45	62.2	65.7	76.1	4
	30/11/2021 12:45	63.1	66.7		
	30/11/2021 13:45	63.0	66.3		

3.3 Commercial Noise & Background Sound Survey

3.3.1 Professional Consult has completed a 24- hour source noise measurement for the commercial unit to the north as follows:

 **Noise Measurement Position 2:** 12:00 Tuesday 30th November to 12:00 on Wednesday 1st December 2021. The microphone of the sound level meter was located on the railing of the fire exit overlooking that yard area at 1st floor level. The noise climate at this location consisted of distant road traffic on Church Road and intermittent commercial sound from the workshop and yard area.

3.3.2 Table 4 presents the measured noise levels. Through audio analysis it has been determined that the dominant noise source is that of vehicles in the yard area, switching the engines on, idling and diving off. The loudest periods were noted during the early morning period.

Table 4. Summary of Noise Levels – Commercial Source

Time Period	Noise Source	Measured Sound Pressure Level (dBA)	Measurement Distance (m)
16:00 - 17:00	Vehicle entering Yard, engine running, sawing from Workshop	51.9	9

17:00 - 18:00	Engine running in yard area	53.0	9
06:00 - 06:15	Vehicle engine on idling and driving off	55.8	9
06:15 - 06:30	Vehicle Engine on and driving off x2	57.2	9
06:30 - 06:45	Vehicle Engine on and driving off	52.2	9
07:00 - 08:00	Vehicle engine on idling and driving off	56.7	9

3.3.3 As there was no commercial noise discernible at the Site between the periods 18:00 – 19:00 and 05:45 – 06:00, these periods have been adopted for the background sound levels for the daytime and night-time periods respectively and Table 5 presents the measured background sound levels.

Table 5. Summary of Measured Background Sound Levels – NMP2

Period	Measured Background Sound Level, $L_{A90,t}$ Typical (Mode Average) (dB)
18:00 – 19:00	44.4
05:45 – 06:00	41.2

3.4 Background Sound Survey

3.4.1 Professional Consult has completed an additional background sound survey in order to determine the noise climate at the surrounding receptors, as follows:

 **Noise Measurement Position 3:** 15:15 Tuesday 30th November to 11:45 on Wednesday 1st December 2021. The microphone of the sound level meter was located out of a 1st floor window on the eastern façade, 1m from the building. The noise climate at this location consisted of distant road traffic on Church Road.

3.4.2 Table 6 summarises the measured background sound levels at the microphone location.

Table 6. Summary of Measured Background Sound Levels

Measurement Position	Period	Range of Measured Background Sound Levels, $L_{A90,15mins}$ (dB)	Calculated Typical (Mode) Background Sound Level, $L_{A90,15mins}$ (dB)
NMP3	Daytime (07:00 – 23:00)	41.2 – 47.5	44
	Night-time (23:00 – 07:00)	35.0 – 43.7	35

3.5 Noise Survey Equipment

3.5.1 The following equipment was used for the Noise Surveys.

Table 7. Noise Measurement Equipment

Measurement Position	Equipment Description	Manufacturer & Type No	Serial No.	Calibration Due Date
NMP1 & NMP3	Sound Level Meter	01dB Fusion	12211	23 January 2022
	Pre-amplifier	01dB PRE22	1915082	
	Microphone	GRAS 40CE	331766	
	Calibrator	01dB CAL-31	89095	30 June 2022
NMP2	Sound Level Meter	01dB Fusion	12586	24 June 2022
	Pre-amplifier	01dB PRE22	2004163	
	Microphone	GRAS 40CE	367351	
	Calibrator	01dB CAL-31	92222	30 June 2022

3.5.2 The sound level meter was field calibrated prior to and following the noise surveys and there was no drift beyond the allowable limit of 1dB.

3.5.3 During the noise surveys the weather conditions were conducive to the measurement of environmental noise, i.e. wind speeds of no more than 5m/s and dry conditions and Table 7 details the measured weather conditions.

Table 8. Range of Measured Wind Speeds

Period	Range of Measured Wind Speeds (m/s)	Rainfall Recorded?
Background Sound Survey	0.0 – 3.0	No

4 NOISE IMPACT ASSESSMENT

4.1 Road Traffic Noise

4.1.1 For the purposes of this assessment, the daytime and night-time average ($L_{Aeq,T}$) noise levels have been calculated based on the shortened measurement procedure detailed in CRTN. The respective daytime and night-time noise levels have been derived using the following calculations:

- Calculation of the $L_{A10,18hr}$ noise level by using the following formula:

$$L_{10,18hr} = L_{10,3hr} - 1dB$$

- Calculation of the $L_{Aeq,16hr}$ noise level by using the following formula:

$$L_{eq,16hr} = L_{10,18hr} - 2dB$$

- Derivation of the night-time $L_{Aeq,8hr}$ noise level by using the following formula:

$$L_{night} (L_{eq,8hr}) = 0.90 \times L_{10,18hr} - 3.77dB$$

4.1.2 Table 9 calculates the daytime and night-time noise levels for Church Road. The measurement distance was 4m from the nearside kerbstone of Church Road which equates to 7.5m from the centre of the road.

Table 9. Calculation of Road Traffic Noise Levels

Measurement Position	Period	Calculated $L_{Aeq,t}$ (dB)	10 th Highest Measured $L_{Amax,fast}$ (dB)	Distance from Centre of Road (m)
NMP1	Daytime (07:00 – 23:00)	63.2	-	7.5
	Night-time (23:00 – 07:00)	54.9	76.1	

4.1.3 For the purposes of this assessment, Professional Consult has used noise modelling software CadnaA to determine the impact of noise from Church Road at the proposed residential dwellings. A noise model has therefore been constructed in order to calculate façade noise levels and external noise levels in amenity areas.

4.1.4 The following inputs have been included in the model:

- Proposed Scheme Layout;
- Site elevations have been taken as existing using 1m LiDAR DTM data which have been converted into 1m contours;
- Existing buildings or features that provide shielding from the road have been included in the model;
- Noise Measurement Position 1 has been used in order to calibrate the noise model;
- A floor height of 2.5m has been assumed for all proposed dwellings which is a standard separation distance between ground and first floors in a typical dwelling;
- A reflection order of 2 and hard round has been used in all calculations; and

- ② Noise levels generated using ISO 9613-1 and ISO 9613-2 “Acoustics – Attenuation of sound during propagation outdoors” as incorporated into CadnaA software.

External Noise Impact in Garden Areas of Proposed Dwellings - Daytime

- 4.1.5 It is understood that there are not external amenity areas associated with the development.

Internal Noise Impact for Proposed Dwellings

- 4.1.6 For the purpose of the assessment the Hotel has been divided into Blocks A to G, as can be seen in Appendices 4 to 7.
- 4.1.7 With regards internal noise levels, BS8233:2014 suggests that standard thermal double glazing will afford 33dB R_w of sound reduction, however this is for the pink noise spectrum and the same configuration will afford 30dB R_w+C_{tr} for average noise levels from road traffic noise and so this value has been used to calculate internal noise levels. With regard to the maximum noise level ($L_{Amax,fast}$), the value of 33dB R_w has been used. BS8233:2014 also goes on to recommend that a partially open window provides approximately 15dB of attenuation.
- 4.1.8 Professional Consult uses a library database of glazing configurations issued by Saint Gobain and the glazing configuration 6mm glass / 12mm air space / 6mm glass affords 30dB $R_w + C_{tr}$ and 33dB R_w respectively.
- 4.1.9 Appendix 8 calculates the average daytime noise levels at the various facades of the plots and determines the requirement for upgraded glazing or alternative ventilation. Appendix 8 indicates that standard thermal double glazing will be adequate in controlling external noise to meet the internal noise criteria limits and with a partially open window, the internal noise criteria limit will also be met and so there is no requirement to consider noise mitigation measures.
- 4.1.10 Appendix 9 calculates the average night-time noise levels at the various facades of the plots and determines the requirement for upgraded glazing or alternative ventilation. Appendix 9 indicates that standard thermal double glazing will be adequate in controlling external noise to meet the internal noise criteria limits and with a partially open window, the internal noise criteria limit will also be met and so there is no requirement to consider noise mitigation measures.
- 4.1.11 It is also necessary to consider maximum noise levels for the night-time period in addition to the average noise levels. The measured 10th highest maximum noise level was 76.1.4dB $L_{Amax, fast}$ at 7.5m and the closest proposed dwelling to the road lies at 11m and so the calculated noise level at the closest dwelling 72.8dB. Allowing 33dB for a closed bedroom window gives an internal noise level of 39.8dB which falls below the internal noise criteria of 45dB $L_{Amax,fast}$ and so standard thermal glazing will be adequate in controlling maximum noise levels in bedrooms. Allowing 15dB for a partially open window will result in a maximum internal noise level of 57.8dB which is above the 45dB $L_{Amax,fast}$ criteria and so the following section considers appropriate noise mitigation for bedrooms.

4.2 Commercial Noise

- 4.2.1 The highest measured noise levels from commercial activity during the 1-hr period daytime and 15-min night-time has been used to inform the assessment which accords with the reference period specified in BS4142:2014+A1:2019. It is necessary to calculate a sound power level in order to build a noise model and Table 10 completes the calculations.

Table 10. Calculation of Sound Power Level, per Period

Time Period	Noise Source	Measured Sound Pressure Level (dBA)	Calculated Sound Power Level, L_{WA} (dB)
06:15 – 06:30	Vehicle engine on idling and driving off x2	57.2	83.3
07:00 – 08:00	Vehicle engine on idling and driving off	56.7	82.8

4.2.2 In order to calculate an accurate overall specific sound pressure level at the identified residential receptors, a noise model has been built using CadnaA and the following inputs have been included in the model:

- ② Proposed Scheme Layout;
- ② Site elevations have been taken as existing;
- ② A point source has been used at the centre of the yard area in order to represent the average measurement position, at a height of 2m above ground level;
- ② A reflection order of 2 and hard ground has been used in all calculations; and
- ② Noise levels generated using ISO 9613-1 and ISO 9613-2 "Acoustics - Attenuation of sound during propagation outdoors" as incorporated into CadnaA software.

4.2.3 Figure 1 in Appendices 6 & 7 detail the grid noise maps for the daytime and night-time periods respectively. It is understood that passed on the proposals that there will be no habitable rooms (bedroom / living Room) located on the northern façade of Blocks C, D & F, therefore only Blocks A, B & E have been assessed.

4.2.4 Analysis of the grid noise maps indicates the following calculated specific sound pressure levels.

Table 11. Calculated Specific Sound Pressure Level at Receptors – Daytime

Receptor	Façade	Calculated Overall Specific Noise Level, $L_{Aeq,1hr}$ (dB)
Block A	North West	27.9
Block B	North East	45.1
Block B	North West	35.3
Block E	South East	35.8

Table 12. Calculated Specific Sound Pressure Level at Receptors – Night-Time

Receptor	Façade	Calculated Overall Specific Noise Level, $L_{Aeq,1hr}$ (dB)
Block A	North West	28.5

Block B	North East	45.7
Block B	North West	35.9
Block E	South East	36.2

4.2.5 The following has been considered in determining if any acoustic features exist in the predicted noise level at the closest residential receptor:

- ② **Tonality:** In determining if any tones exist in the measured noise levels, the methodology set out in BS4142:2014 has been followed using the subjective method;
- ② **Impulsivity:** In determining if any impulsiveness is evident in the measured noise levels, the methodology set out in BS4142:2014 has been followed using the subjective method;
- ② **Intermittency:** Whether or not the measured operations turn on or off during the assessment reference periods; and
- ② **Other sound characteristics:** Where no penalties are allocated for the above features, but there will be an audible noise at the closest receptor.

4.2.6 Table 13 allocates the character corrections.

Table 13. Character Corrections

Noise Source	Tonality Correction (dB)	Impulsivity Correction (dB)	Intermittency Correction (dB)	Other Sound Characteristics Correction (dB)	Comments
Vehicle Movements	0	0	3	0	Intermittent vehicle movements in yard area
Highest Correction for Assessment Period	0	0	3	0	-
Overall Correction to be added to Specific Noise at Receptors	+3				-

4.2.7 Table 14 completes the BS4142 Assessment. The measured background levels between 18:00 – 19:00 and 05:45 – 06:00, these periods have been adopted for the background sound levels for the daytime and night-time periods respectively.

Table 14. BS4142 Assessment

Receptor	Period	Calculated Overall Specific Noise Level, $L_{Aeq,t}$ (dB)	Total Overall Character Correction (dB)	Calculated Rated Level, $L_{A,r}$ (dB)	Criteria Noise Level (dB)	Difference +/- (dB)
Block A – North West Façade	Daytime	27.9	3	30.9	44	-13.1
	Night-Time	28.5	3	31.5	41	-9.5
Block B – North East Façade	Daytime	45.1	3	48.1	44	4.1

	Night-Time	45.7	3	48.7	41	7.7
Block B – North West Façade	Daytime	35.3	3	38.3	44	-5.7
	Night-Time	35.9	3	38.9	41	-2.1
Block E – South East Façade	Daytime	35.8	3	38.8	44	-5.2
	Night-Time	36.2	3	39.2	41	-1.8

4.2.8 A review of Table 12 indicates that the rated level at the majority of the facades meet the background sound levels. There is an exceedance at the north east façade of Block B.

4.2.9 As there are no external amenity areas overlooking the yard area, it is more appropriate to consider noise levels within habitable rooms. Table 15 calculates the specific level of noise in the habitable rooms of the nearest dwelling.

Table 15. BS4142 Assessment – Internal

Receptor	Period	Calculated Rated Level, $L_{A,r}$ (dB)	Sound Reduction of a Partially Open Window	Calculated Internal Noise Level (dB)	Internal Criteria for Habitable Rooms	Difference +/- (dB)
Block A – North West Façade	Daytime	30.9	15	15.9	35	-19.1
	Night-Time	31.5	15	16.5	30	-13.5
Block B – North East Façade	Daytime	48.1	15	33.1	35	-1.9
	Night-Time	48.7	15	33.7	30	3.7
Block B – North West Façade	Daytime	38.3	15	23.3	35	-11.7
	Night-Time	38.9	15	23.9	30	-6.1
Block E – South East Façade	Daytime	38.8	15	23.8	35	-11.2
	Night-Time	39.2	15	24.2	30	-5.8

4.2.10 Table 15 indicates that the internal noise level criteria can be achieved in all habitable rooms except for any bedroom located on the north east façade of Block B, which exceeds the criteria by +3.7dB. This is below the exceedance caused by road traffic, therefore any mitigation measures used to protect against road traffic sound will also mitigate commercial sound.

4.3 Mechanical & Electrical Plant Noise Limits

4.3.1 At the time of issuing this report, no details for any proposed operating hours or details of any mechanical and electrical plant for the Hotel were known and so Table 16 has calculated maximum mechanical and electrical plant noise emission limits based on the existing background sound climate.

Table 16. Calculation of Noise Emission Limits

Period	Measured Background Sound Level, $L_{A90,t}$ (dB)	Criteria (dB)	Highest Permitted Cumulative Rated Level of Noise at Closest Proposed Receptor, $L_{A,r}$ (dB)
Day (07:00 – 23:00)	44	$L_{A,r} = L_{A90,t}$	44
Night-time (23:00 – 07:00)	35		35

4.3.2 Table 16 indicates the maximum rated level of noise for each period when mechanical and electrical plant may be able to operate. The rated level of noise is relative to the closest existing and/or proposed residential dwelling. It should be noted that the rated noise levels may contain acoustic character corrections for tonality, impulsivity or intermittency and so the actual (specific) level of noise measurable at the receptor may need to be lower than the above values.

5 MITIGATION

5.1 Internal Noise Impact for Proposed Dwellings

5.1.1 The previous Section has shown standard thermal double glazing will be sufficient for all habitable rooms based on the internal average level of sound.

5.1.2 However, with a partially open window, the internal maximum noise level for the bedrooms of the closest dwellings to Church Road will exceed the internal maximum noise level criteria. Accordingly, it is necessary to consider an alternative ventilation scheme which does not require the opening of windows to provide fresh air flow and background ventilation. Adequate background ventilation can be achieved by using a window-frame mounted acoustic trickle ventilator as follows:

② Greenwoods EAR42W (affords up to $42\text{dB } D_{n,e,w} + C_{tr}$).

5.1.3 Further calculation indicates that any bedroom window within 40m of Church Road with full or partial line of sight to Church Road will require the above trickle ventilator.

6 CONCLUSION

- 6.1.1 Professional Consult Limited was instructed by Asmi Ali, to prepare a Noise Impact Assessment in support of a proposed refurbishment and extension to the existing Fountain House Hotel on a parcel of land located at 116 – 118 Church Rd in Hayes UB3 2LW.
- 6.1.2 It is understood that proposals include for the refurbishment of the Fountain House Hotel. The Site is located in a predominantly residential area with existing residential dwellings to the north, west and East. Church Road Borders that Site to the west with St Mary's Road to the south. A small bus depot and workshop it located to the north and Hayes Town Chapel Further is situated to the south.
- 6.1.3 The soundscape at the Site comprises predominantly of intermittent road traffic noise from vehicles using Church Road and intermittent commercial noise associated with yard area to the north.
- 6.1.4 This Assessment has been undertaken to identify any key surrounding noise sources within the vicinity of the Site which have the potential to produce noise impacts upon the Development. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance in addition to appropriate British Standards and guidance documents relevant to the assessment of noise impacts and these are detailed in Section 2.
- 6.1.5 This Assessment has relied upon a series of noise surveys completed on Site in order to measure off-Site noise sources.
- 6.1.6 This Assessment has shown that, with regards to road traffic noise, average noise levels at the Development fall below the internal and external noise criteria levels without the need for any specific noise mitigation. With regards to maximum noise levels during the night-time period, any bedroom window within 40m of Church Road with full or partial line of sight to Church Road will require alternative ventilation.
- 6.1.7 This Assessment has shown that, with regards to commercial noise, that the internal noise level criteria can be achieved in all habitable rooms except for any bedroom located on the north east façade of Block B, which exceeds the criteria by +3.7dB. This is below the exceedance caused by road traffic, therefore any mitigation measures used to protect against road traffic sound will also mitigate commercial sound.
- 6.1.8 This Assessment has set mechanical and electrical plant noise emission limits for any proposed plant associated with the Hotel. The noise limits should not be exceeded at the closest proposed residential dwellings.
- 6.1.9 Should the recommended noise mitigation measures be implemented in order to control noise levels as identified, then the sound climate which future occupiers of the Development will be exposed to will accord with the 'No Observed Adverse Effect Level' as detailed in the PPG and as such, noise should not be deemed to be a determining factor in the granting of planning permission for this Site.

APPENDIX 1: LIMITATIONS

This report and its findings should be considered in relation to the terms of reference and objectives agreed between Professional Consult Limited and the Client.

The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

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APPENDIX 2: GLOSSARY OF ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 1: Typical Sound Pressure Levels

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

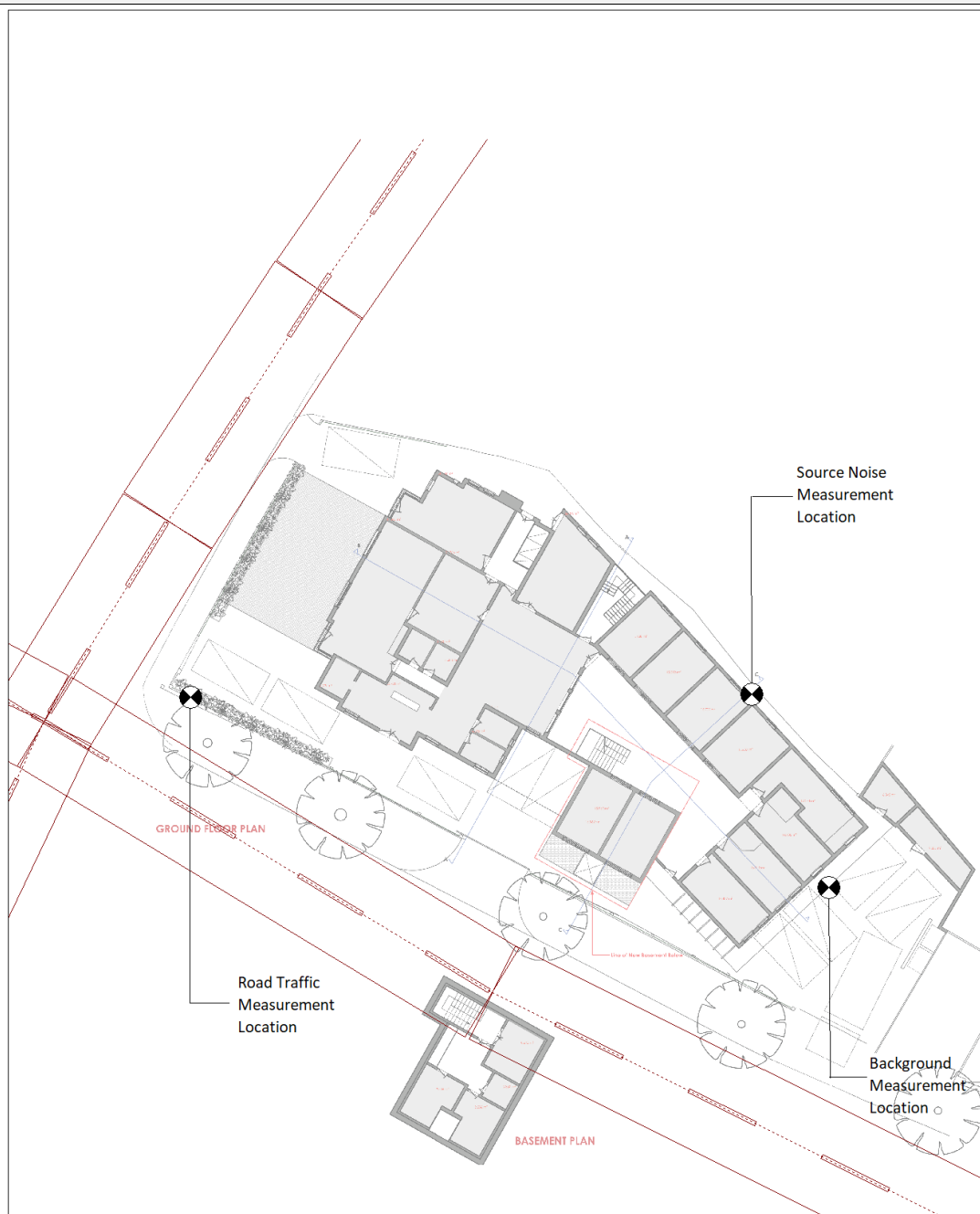
Table 2: Terminology

Descriptor	Explanation
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10 ⁻⁵ Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
L _{Aeq, T}	L _{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L _{Amax}	L _{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L _{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L ₁₀ & L ₉₀	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L ₁₀ is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L ₉₀ is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L ₁₀ index to describe traffic noise.
Free-field Level	2A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Fast	A time weighting used in the root mean square section of a sound level meter with a 125millisecond time constant.
Slow	A time weighting used in the root mean square section of a sound level meter with a 1000millisecond time constant.

APPENDIX 3: SITE LOCATION PLAN & NOISE MEASUREMENT POSITION

Figure 1

Proposed Site Plan and Noise Measurement Position



Title : Proposed Layout and
Noise Measurement Positions

Project No: 21.168

Built by: MP

Figure 1

Checked by: JG

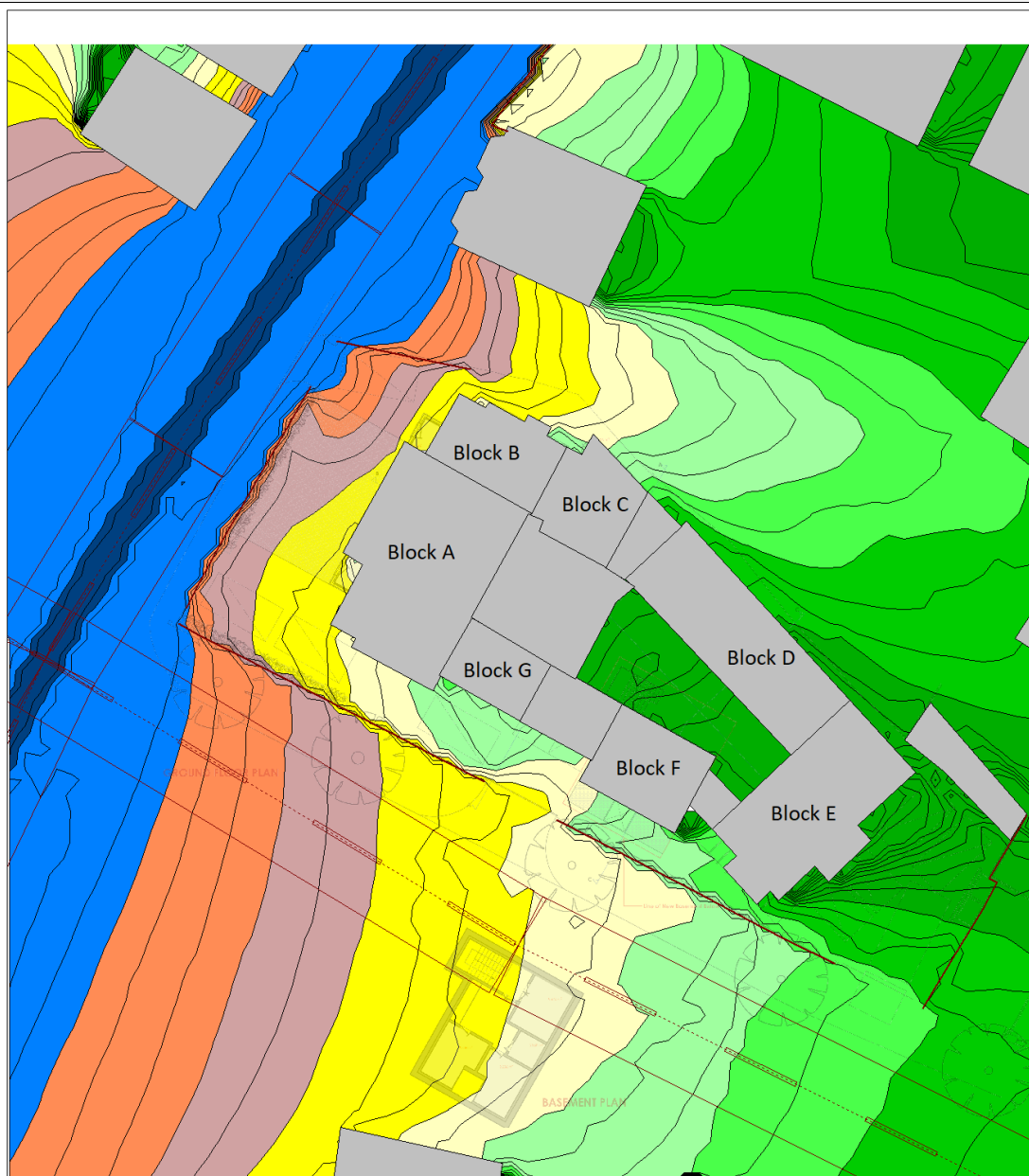
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APPENDIX 4: DAYTIME GRID NOISE MAP – ROAD TRAFFIC

Figure 1

Daytime Grid Noise Map



Noise Map Objects

- Point Source
- Road
- Building
- Barrier
- Receiver
- Calculation Area

Level LAeq 16 hour in dB(A)

- ... < 45.0
- 45.0 <= ... < 47.5
- 47.5 <= ... < 50.0
- 50.0 <= ... < 52.5
- 52.5 <= ... < 55.0
- 55.0 <= ... < 57.5
- 57.5 <= ... < 60.0
- 60.0 <= ... < 63.0
- 63.0 <= ... < 66.0
- 66.0 <= ... < 70.0
- 70.0 <= ... < 75.0
- 75.0 <= ...

Title:

Daytime Grid Noise Map
at 1.5m above ground level
- Road Traffic

Project No: 21.168

Figure 1

Date : 07/12/2021

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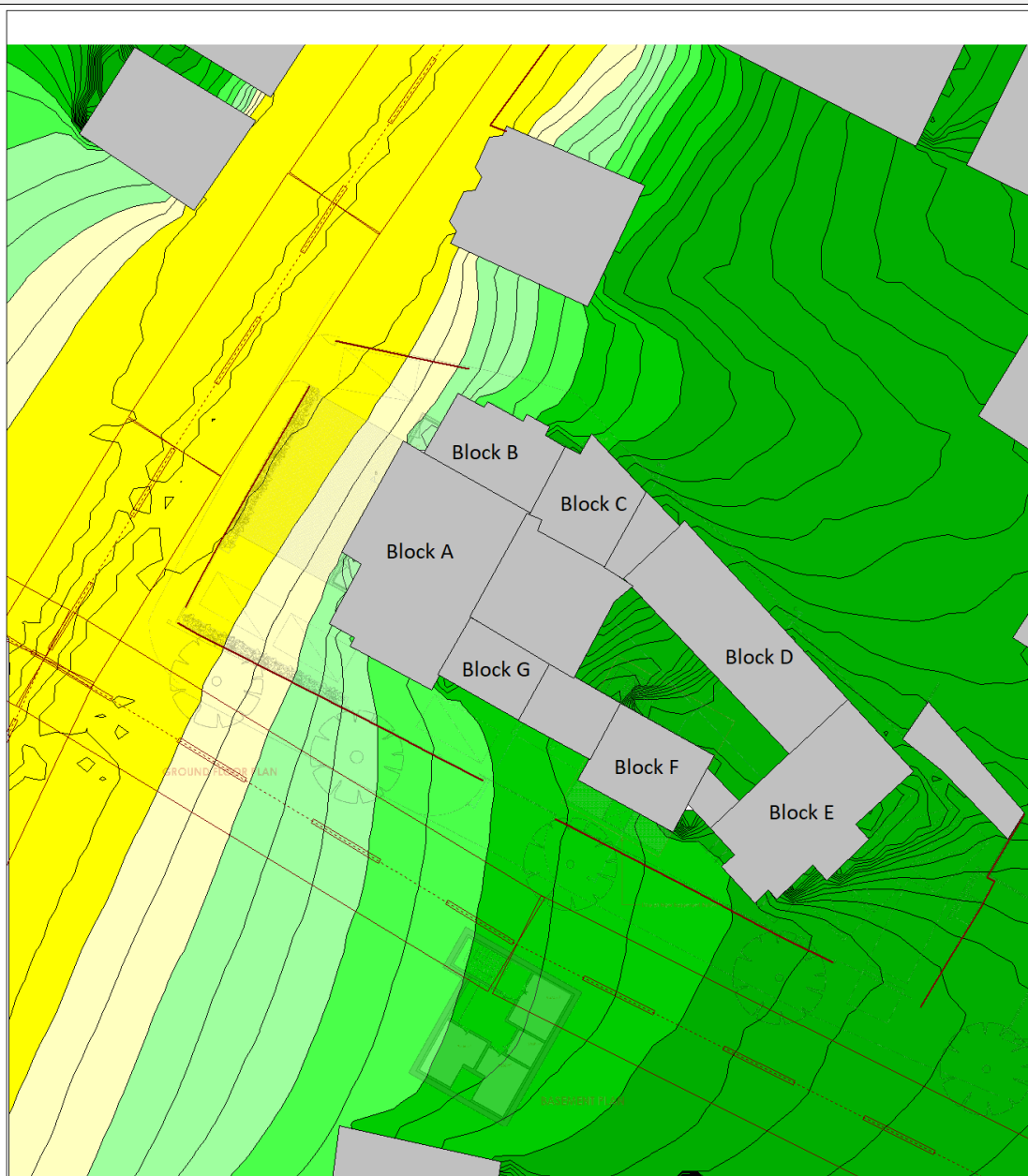
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APPENDIX 5: NIGHT-TIME GRID NOISE MAP – ROAD TRAFFIC

Figure 1

Night-time Grid Noise Map



Noise Map Objects

- Point Source
- Road
- Building
- Barrier
- Receiver
- Calculation Area

Level LAeq 8 hour in dB(A)

- ... < 45.0
- 45.0 <= ... < 47.5
- 47.5 <= ... < 50.0
- 50.0 <= ... < 52.5
- 52.5 <= ... < 55.0
- 55.0 <= ... < 57.5
- 57.5 <= ... < 60.0
- 60.0 <= ... < 63.0
- 63.0 <= ... < 66.0
- 66.0 <= ... < 70.0
- 70.0 <= ... < 75.0
- 75.0 <= ...

Title :
Night-Time Grid Noise Map
at 4.5m above ground level
- Road Traffic

Project No: 21.168

Figure 1

Date : 07/12/2021

Built by: MP

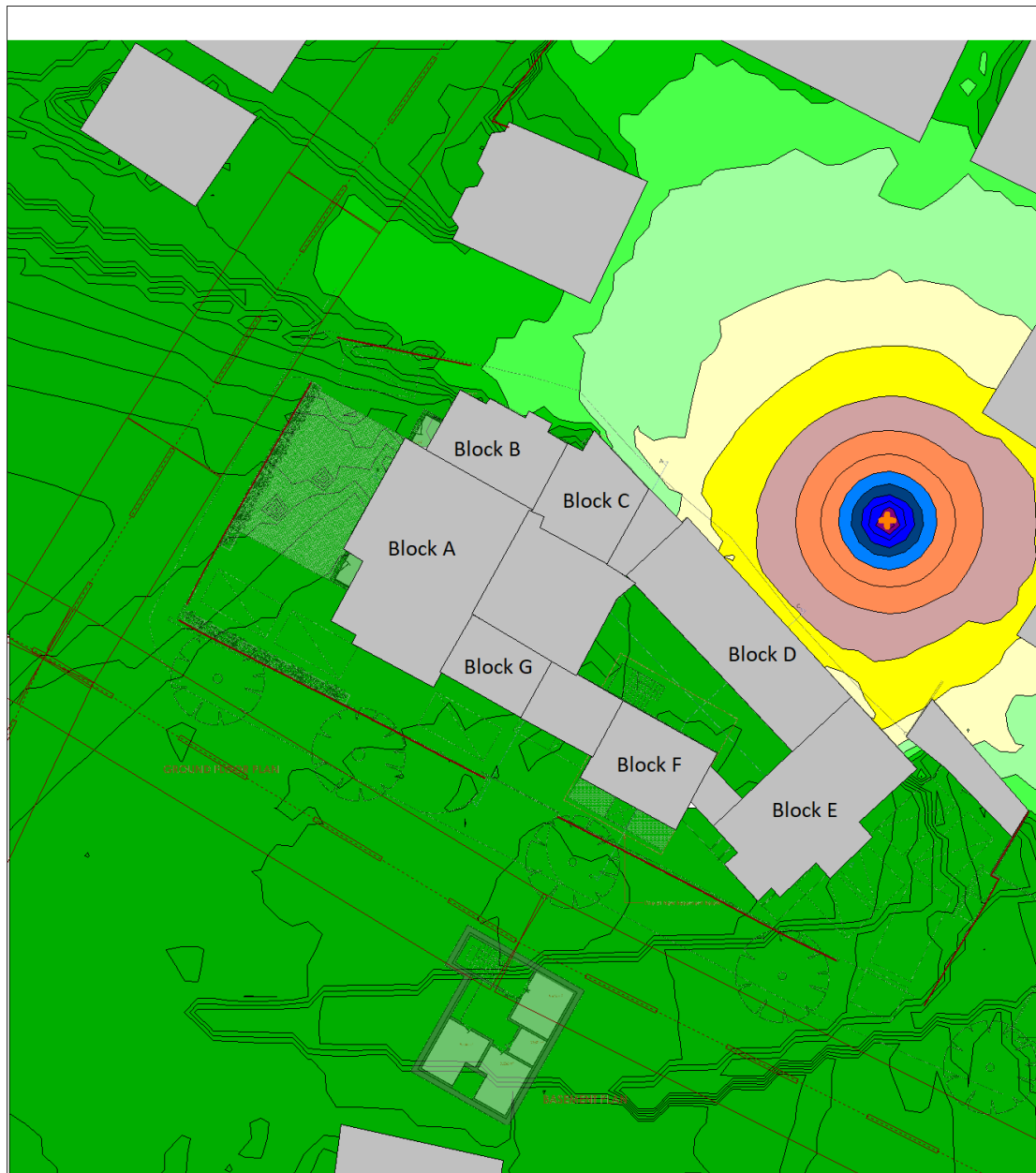
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APPENDIX 6: DAYTIME GRID NOISE MAP – COMMERCIAL NOISE

Figure 1

Daytime Grid Noise Map – Commercial Noise

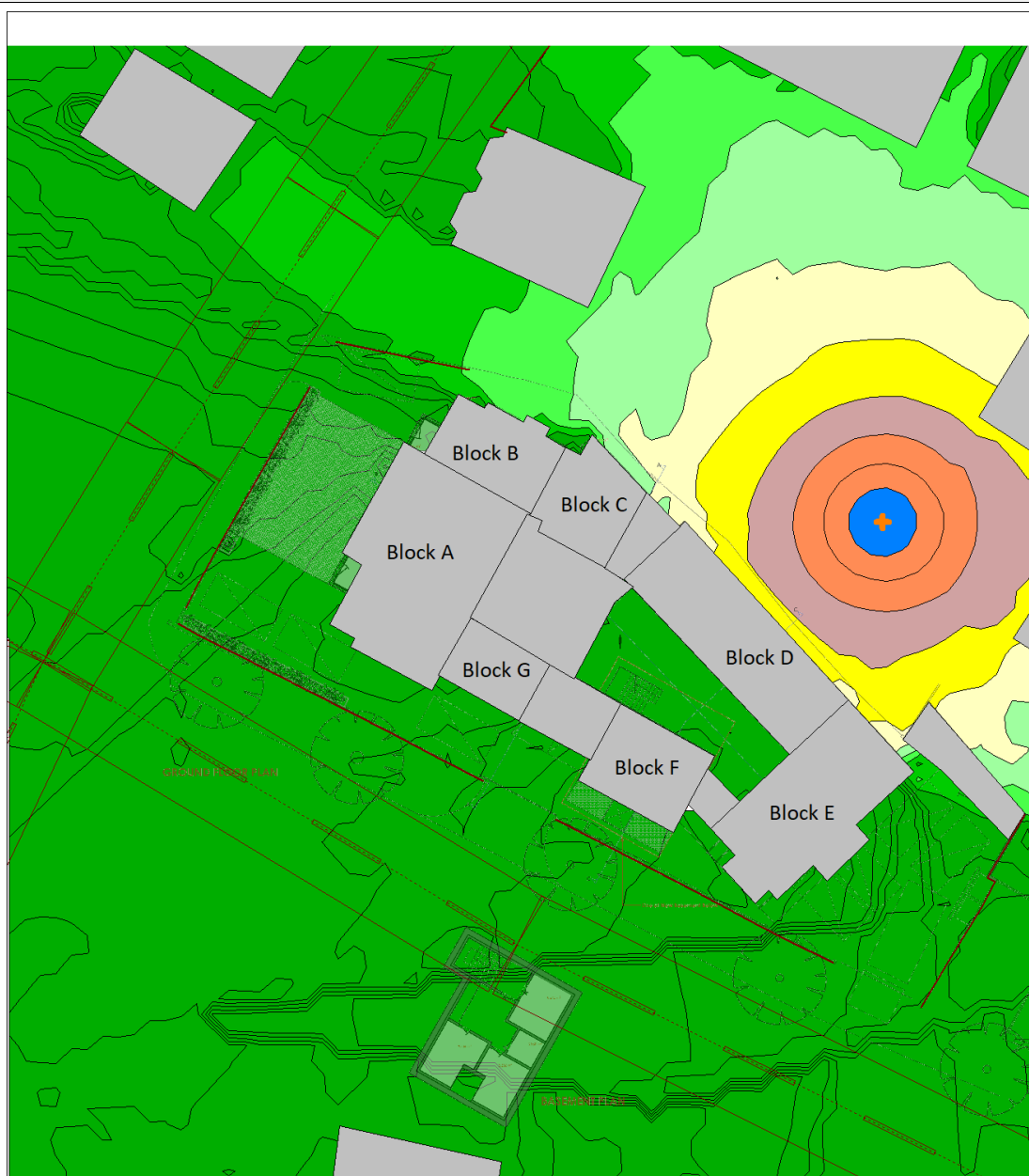


Noise Map Objects	Level LAeq 1hr in dB(A)	Title: Daytime Grid Noise Map 1.5m above ground level - Commercial	
- Point Source - Road - Building - Barrier - Receiver - Calculation Area	< 45.0 45.0 <= ... < 47.5 47.5 <= ... < 50.0 50.0 <= ... < 52.5 52.5 <= ... < 55.0 55.0 <= ... < 57.5 57.5 <= ... < 60.0 60.0 <= ... < 63.0 63.0 <= ... < 66.0 66.0 <= ... < 70.0 70.0 <= ... < 75.0 75.0 <= ...	Project No: 21.168 Figure 1 Date : 07/12/2021	Built by: MP Checked by: JG PROFESSIONAL CONSULT FUTURE ENVIRONMENTS

APPENDIX 7: NIGHT-TIME GRID NOISE MAP – COMMERCIAL NOISE

Figure 1

Night-Time Grid Noise Map – Commercial Noise



Noise Map Objects	Level LAeq 15min in dB(A)	Title: Night-Time Grid Noise Map 4.5m above ground level - Commercial	
- Point Source - Road - Building - Barrier - Receiver - Calculation Area	... < 45.0 45.0 <= ... < 47.5 47.5 <= ... < 50.0 50.0 <= ... < 52.5 52.5 <= ... < 55.0 55.0 <= ... < 57.5 57.5 <= ... < 60.0 60.0 <= ... < 62.5 62.5 <= ... < 65.0 65.0 <= ... < 70.0 70.0 <= ... < 75.0 75.0 <= ...	Project No: 21.168	Built by: MP
		Figure 1	Checked By: JG
		Date : 07/12/2021	PROFESSIONAL CONSULT FUTURE ENVIRONMENTS

APPENDIX 8: DAYTIME FAÇADE ROAD TRAFFIC NOISE LEVELS

Plot	Floor	Façade Direction	Calculated LAeq,16hr at Façade (dB)	Glazing Sound Reduction Index (Rw) (Standard Thermal)	Calculated Noise Level Inside Room (dB)	Criteria (dB)	Difference +/- (dB)	Required Sound Insulation Performance for Glazing (Rw + Ctr) (dB)	Example Glazing Specification (6/12/6 = standard thermal as minimum)	Calculated Internal Noise Level with a Partially Open Window (dB)	Alternative Ventilation Required?	Acoustics Ventilation & Overheating Assessment - Appropriate AD-F System if Required
Block A	Ground	NW	59.3	30	29.3	35	-5.7	24.3	6/12/6	46.3	Yes	ADF Systems 3 or 4
Block A	1st	NW	61.8	30	31.8	35	-3.2	26.8	6/12/6	48.8	Yes	ADF Systems 3 or 4
Block A	Ground	SW	56.3	30	26.3	35	-8.7	21.3	6/12/6	43.3	Yes	ADF Systems 3 or 4
Block A	1st	SW	57.6	30	27.6	35	-7.4	22.6	6/12/6	44.6	Yes	ADF Systems 3 or 4
Block A	1st	SE	41.6	30	11.6	35	-23.4	6.6	6/12/6	28.6	No	ADF Systems 1 or 2
Block B	Ground	NE	55.5	30	25.5	35	-9.5	20.5	6/12/6	42.5	Yes	ADF Systems 3 or 4
Block B	1st	NE	56.9	30	26.9	35	-8.1	21.9	6/12/6	43.9	Yes	ADF Systems 3 or 4
Block B	Ground	NW	58.4	30	28.4	35	-6.6	23.4	6/12/6	45.4	Yes	ADF Systems 3 or 4
Block B	1st	NW	60.4	30	30.4	35	-4.6	25.4	6/12/6	47.4	Yes	ADF Systems 3 or 4
Block C	Ground	NE	48.2	30	18.2	35	-16.8	13.2	6/12/6	35.2	Yes	ADF Systems 1 or 2
Block C	1st	NE	49.4	30	19.4	35	-15.6	14.4	6/12/6	36.4	Yes	ADF Systems 1 or 2
Block C	1st	SW	42.8	30	12.8	35	-22.2	7.8	6/12/6	29.8	No	ADF Systems 1 or 2
Block D	Ground	SW	40.9	30	10.9	35	-24.1	5.9	6/12/6	27.9	No	ADF Systems 1 or 2
Block D	1st	SW	46.3	30	16.3	35	-18.7	11.3	6/12/6	33.3	No	ADF Systems 1 or 2
Block D	Ground	NE	43.8	30	13.8	35	-21.2	8.8	6/12/6	30.8	No	ADF Systems 1 or 2
Block D	1st	NE	45.3	30	15.3	35	-19.7	10.3	6/12/6	32.3	No	ADF Systems 1 or 2
Block E	Ground	NW	38.4	30	8.4	35	-26.6	3.4	6/12/6	25.4	No	ADF Systems 1 or 2
Block E	1st	NW	41.9	30	11.9	35	-23.1	6.9	6/12/6	28.9	No	ADF Systems 1 or 2
Block E	Ground	SW	52.5	30	22.5	35	-12.5	17.5	6/12/6	39.5	Yes	ADF Systems 1 or 2
Block E	1st	SW	53.4	30	23.4	35	-11.6	18.4	6/12/6	40.4	Yes	ADF Systems 3 or 4
Block E	Ground	SE	37.7	30	7.7	35	-27.3	2.7	6/12/6	24.7	No	ADF Systems 1 or 2
Block E	1st	SE	41.4	30	11.4	35	-23.6	6.4	6/12/6	28.4	No	ADF Systems 1 or 2
Block E	Ground	NE	41.8	30	11.8	35	-23.2	6.8	6/12/6	28.8	No	ADF Systems 1 or 2
Block E	1st	NE	43.2	30	13.2	35	-21.8	8.2	6/12/6	30.2	No	ADF Systems 1 or 2
Block F	Ground	NE	38.5	30	8.5	35	-26.5	3.5	6/12/6	25.5	No	ADF Systems 1 or 2
Block F	1st	NE	41.7	30	11.7	35	-23.3	6.7	6/12/6	28.7	No	ADF Systems 1 or 2
Block F	Ground	SW	53.8	30	23.8	35	-11.2	18.8	6/12/6	40.8	Yes	ADF Systems 3 or 4
Block F	1st	SW	54.6	30	24.6	35	-10.4	19.6	6/12/6	41.6	Yes	ADF Systems 3 or 4
Block F	1st	NW	54.6	30	24.6	35	-10.4	19.6	6/12/6	41.6	Yes	ADF Systems 3 or 4
Block G	Ground	SW	54.3	30	24.3	35	-10.7	19.3	6/12/6	41.3	Yes	ADF Systems 3 or 4
Block G	1st	SW	55.9	30	25.9	35	-9.1	20.9	6/12/6	42.9	Yes	ADF Systems 3 or 4
Block G	1st	SE	41.7	30	11.7	35	-23.3	6.7	6/12/6	28.7	No	ADF Systems 1 or 2
Block G	1st	NE	42.5	30	12.5	35	-22.5	7.5	6/12/6	29.5	No	ADF Systems 1 or 2

APPENDIX 9: NIGHT-TIME FAÇADE ROAD TRAFFIC NOISE LEVELS

Plot	Floor	Façade Direction	Calculated LAeq,8hr at Façade (dB)	Glazing Sound Reduction Index (Rw) (Standard Thermal)	Calculated Noise Level Inside Room (dB)	Criteria (dB)	Difference +/- (dB)	Required Sound Insulation Performance for Glazing (Rw + Ctr) (dB)	Example Glazing Specification (6/12/6 = standard thermal as minimum)	Calculated Internal Noise Level with a Partially Open Window (dB)	Alternative Ventilation Required?	Acoustics Ventilation & Overheating Assessment - Appropriate AD-F System if Required
Block A	Ground	NW	50.9	30	20.9	30	-9.1	20.9	6/12/6	37.9	Yes	ADF Systems 3 or 4
Block A	1st	NW	53.5	30	23.5	30	-6.5	23.5	6/12/6	40.5	Yes	ADF Systems 3 or 4
Block A	Ground	SW	47.9	30	17.9	30	-12.1	17.9	6/12/6	34.9	Yes	ADF Systems 1 or 2
Block A	1st	SW	49.3	30	19.3	30	-10.7	19.3	6/12/6	36.3	Yes	ADF Systems 3 or 4
Block A	1st	SE	33.3	30	3.3	30	-26.7	3.3	6/12/6	20.3	No	ADF Systems 1 or 2
Block B	Ground	NE	47.2	30	17.2	30	-12.8	17.2	6/12/6	34.2	Yes	ADF Systems 1 or 2
Block B	1st	NE	48.5	30	18.5	30	-11.5	18.5	6/12/6	35.5	Yes	ADF Systems 3 or 4
Block B	Ground	NW	50	30	20	30	-10	20	6/12/6	37	Yes	ADF Systems 3 or 4
Block B	1st	NW	52.1	30	22.1	30	-7.9	22.1	6/12/6	39.1	Yes	ADF Systems 3 or 4
Block C	Ground	NE	39.8	30	9.8	30	-20.2	9.8	6/12/6	26.8	No	ADF Systems 1 or 2
Block C	1st	NE	41	30	11	30	-19	11	6/12/6	28	No	ADF Systems 1 or 2
Block C	1st	SW	34.4	30	4.4	30	-25.6	4.4	6/12/6	21.4	No	ADF Systems 1 or 2
Block D	Ground	SW	32.6	30	2.6	30	-27.4	2.6	6/12/6	19.6	No	ADF Systems 1 or 2
Block D	1st	SW	38	30	8	30	-22	8	6/12/6	25	No	ADF Systems 1 or 2
Block D	Ground	NE	35.4	30	5.4	30	-24.6	5.4	6/12/6	22.4	No	ADF Systems 1 or 2
Block D	1st	NE	37	30	7	30	-23	7	6/12/6	24	No	ADF Systems 1 or 2
Block E	Ground	NW	30	30	0	30	-30	0	6/12/6	17	No	ADF Systems 1 or 2
Block E	1st	NW	33.5	30	3.5	30	-26.5	3.5	6/12/6	20.5	No	ADF Systems 1 or 2
Block E	Ground	SW	44.1	30	14.1	30	-15.9	14.1	6/12/6	31.1	Yes	ADF Systems 1 or 2
Block E	1st	SW	45	30	15	30	-15	15	6/12/6	32	Yes	ADF Systems 1 or 2
Block E	Ground	SE	29.3	30	-0.7	30	-30.7	-0.7	6/12/6	16.3	No	ADF Systems 1 or 2
Block E	1st	SE	33.1	30	3.1	30	-26.9	3.1	6/12/6	20.1	No	ADF Systems 1 or 2
Block E	Ground	NE	33.5	30	3.5	30	-26.5	3.5	6/12/6	20.5	No	ADF Systems 1 or 2
Block E	1st	NE	34.8	30	4.8	30	-25.2	4.8	6/12/6	21.8	No	ADF Systems 1 or 2
Block F	Ground	NE	30.2	30	0.2	30	-29.8	0.2	6/12/6	17.2	No	ADF Systems 1 or 2
Block F	1st	NE	33.4	30	3.4	30	-26.6	3.4	6/12/6	20.4	No	ADF Systems 1 or 2
Block F	Ground	SW	45.5	30	15.5	30	-14.5	15.5	6/12/6	32.5	Yes	ADF Systems 1 or 2
Block F	1st	SW	46.2	30	16.2	30	-13.8	16.2	6/12/6	33.2	Yes	ADF Systems 1 or 2
Block F	1st	NW	46.2	30	16.2	30	-13.8	16.2	6/12/6	33.2	Yes	ADF Systems 1 or 2
Block G	Ground	SW	45.9	30	15.9	30	-14.1	15.9	6/12/6	32.9	Yes	ADF Systems 1 or 2
Block G	1st	SW	47.6	30	17.6	30	-12.4	17.6	6/12/6	34.6	Yes	ADF Systems 1 or 2
Block G	1st	SE	33.3	30	3.3	30	-26.7	3.3	6/12/6	20.3	No	ADF Systems 1 or 2
Block G	1st	NE	34.2	30	4.2	30	-25.8	4.2	6/12/6	21.2	No	ADF Systems 1 or 2

APPENDIX 10: MEASURED BACKGROUND SOUND LEVELS NMP2

Start Date & Time	Measured Sound Pressure Level	
	L _{Aeq,t}	L _{A90,t}
30/11/2021 12:00	50.6	44.4
30/11/2021 13:00	50.8	44.9
30/11/2021 14:00	51.5	44.5
30/11/2021 15:00	49	45
30/11/2021 16:00	51.9	45.5
30/11/2021 17:00	53	44.1
30/11/2021 18:00	49.4	44.4
30/11/2021 19:00	48.9	44.5
30/11/2021 20:00	49.5	41.7
30/11/2021 21:00	46	40.8
30/11/2021 22:00	45.2	39.7
30/11/2021 23:00	51.6	43.1
30/11/2021 23:15	51	40.4
30/11/2021 23:30	45	38.6
30/11/2021 23:45	44	38.5
01/12/2021 00:00	44.5	37.6
01/12/2021 00:15	42.6	36
01/12/2021 00:30	43	35.8
01/12/2021 00:45	41.2	35.3
01/12/2021 01:00	42.5	35.3
01/12/2021 01:15	45.1	36.3
01/12/2021 01:30	41.8	34.9
01/12/2021 01:45	39.5	34.1
01/12/2021 02:00	40.3	33.5
01/12/2021 02:15	40.6	33.7
01/12/2021 02:30	41.6	32.8
01/12/2021 02:45	40	34
01/12/2021 03:00	40	33.1
01/12/2021 03:15	38.8	32.9
01/12/2021 03:30	41.8	34.1
01/12/2021 03:45	41.7	35.2
01/12/2021 04:00	40.9	33.7
01/12/2021 04:15	44.5	34.7
01/12/2021 04:30	46.3	36
01/12/2021 04:45	48.1	36.2
01/12/2021 05:00	47.4	38.6
01/12/2021 05:15	45.6	38.7
01/12/2021 05:30	48.9	40.3
01/12/2021 05:45	48.8	41.2
01/12/2021 06:00	55.8	44.8
01/12/2021 06:15	57	44.2
01/12/2021 06:30	52.2	45.1
01/12/2021 06:45	50.7	44.9
01/12/2021 07:00	56.7	46.2

Reference: 21.168.1.R1
Date: 7 December 2021
Project: Proposed Residential Development – Fountain House Hotel, Hayes

01/12/2021 08:00	51.1	47.7
01/12/2021 09:00	50.2	45.5
01/12/2021 10:00	50.9	45.9
01/12/2021 11:00	51.2	44.9