

20 High Street, Baldock

Planning noise assessment in relation to a proposed change of use to a mixed commercial and residential development

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1. INTRODUCTION

Intouch planning are involved in the proposed change of use of the existing Templars Hotel, 20 High Street, Baldock, to a mixed commercial and residential development.

Accordingly, Spectrum Acoustic Consultants has been instructed to carry out a noise assessment for development to support the planning application.

2. SITE DESCRIPTION AND PROPOSALS

The proposed development is located on the High Street in Baldock, in the centre of town, and is currently occupied by Templars Hotel. The surrounding area is typically a mix of commercial and residential development.

Adjacent to the development site to the north, and also west to the rear of the site, is Brown & Gammons Ltd, a specialist MG dealer with associated workshop.

The proposal is to convert the existing hotel to 1-2 shops at ground floor and 14 flats at part ground, first and second floors.

Plans and elevation drawings of the proposed development are presented in Appendix A.

3. RELEVANT GUIDANCE

3.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The National Planning Policy Framework (NPPF) was first published in March 2012 and revised in July 2018 and again in February 2019¹. It sets out the Government's planning policies for England and how these should be applied by establishing a framework within which locally prepared plans for development can be produced.

NPPF requires (170) that *"planning policies and decisions should contribute to and enhance the natural and local environment by: (.....) preventing new and existing development from contribution to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of (.....) noise pollution.*

In relation to noise (180) *'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:*

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life²;*
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason'*

¹ National Planning Policy Framework, MHCLG, February 2019

² See Explanatory Note to the Noise Policy Statement for England, paragraphs 2.23 and 2.24, DEFRA, 15 March 2010).



Planning policies and decisions should also (182) *'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'.*

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

3.2 NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

The Noise Policy Statement for England (NPSE)³ sets out the long term vision of government noise policy which is to *'Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.'*

The aims of the NPSE are to (2.23-2.25):

- 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

These aims are developed by reference (2.20-2.21) to the concepts of:

- NOEL (No Observed Effect Level). This is the level below which no effect can be detected.
- LOAEL (Lowest Observed Adverse Effect Level). This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL (Significant Observed Adverse Effect Level). This is the level above which significant adverse effects on health and quality of life occur.

It recognises that there is no universally applicable objective threshold for these concepts. Consequently, the NOEL, LOAEL and SOAEL are likely to be different for different noise sources and receptors and at different times (2.22).

Situations of significant adverse effect (SOAEL) should be avoided (2.23). Where the impact is between LOAEL and SOAEL reasonable steps should be taken to minimise and mitigate adverse effects on health and quality of life, but does not mean that such adverse effects cannot occur (2.24). It is also implied that situations of NOEL would be acceptable in noise terms.

3.3 PLANNING PRACTICE GUIDANCE

In March, 2014, Planning Practice Guidance on Noise⁴ (PPG-N) was released. This provides advice on *'how planning can manage potential noise impacts in new development'*.

³ Noise Policy Statement for England (NPSE), DEFRA, 15 March 2010

⁴ PPG - Noise, MHCLG, 6 March 2014



It confirms that neither the NPSE⁵ nor the NPPF⁶ *‘expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of proposed development’ (002).*

It also details the hierarchy of noise exposure, including the thresholds LOAEL and SOAEL, based on the likely average response, referred to within NPSE⁷. 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 is significant adverse effects, the planning process should be used to avoid these effects occurring; where there are unacceptable adverse effects, the situation should be prevented.

In establishing values for LOAELs and SOAELs which represent the onset levels of adverse effects and significant adverse effects respectively, the guidance advises because of the subjective nature of noise, there is no simple relationship between noise level and its impact. It will instead depend on a number of factors in a particular situation. These will include:

- *‘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*

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

- *The cumulative impacts with other sources*
- *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,*
- *Where Noise Action Plans, and, in particular Important Areas are identified nearby.*
- *The effect on fauna/wildlife especially on nationally designated sites.*
- *The use of external amenity spaces intrinsic to an overall design and including private gardens.*

⁵ Explanatory Note to the Noise Policy Statement for England, paragraphs 2.23 and 2.24 , DEFRA,15 March 2010)

⁶ National Planning Policy Framework, MHCLG, July 2018

⁷ Explanatory Note to the Noise Policy Statement for England, paragraphs 2.19 and 2.20 , DEFRA,15 March 2010)



- *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.*
- *Whether there are nearby areas of tranquility relatively undisturbed by noise from human caused sources that undermine the intrinsic character of the area and likely already valued for their tranquility.'*

It should be observed that the PPG guidance does not provide any detail on the how such assessment including these factors, should be carried out. Reference is generally therefore made to existing British Standards where possible and also to scientific exposure-response studies or reviews relating to noise and its health and other effects on human and, where appropriate, animal populations. In such circumstances, some justification may be necessary when using this information.

3.4 GUIDELINES FOR COMMUNITY NOISE - WORLD HEALTH ORGANIZATION (WHO), 1999

Guidelines for Community Noise (GCN) was published in 1999 with the aim of informing legislation and guidance produced at the national and regional levels for the purposes of minimising any potential adverse health effects resulting from noise in the community. It presents guideline noise level criteria for the avoidance of adverse effects such as sleep disturbance and annoyance in a range of specific environments. The preface to WHO states that community noise includes road, rail and air traffic, industries, construction and public work, and the neighbourhood.

New guidance from WHO titled Environmental Noise Guidelines for the European Region (ENG) was published in 2018. The document takes a very different approach to guidance set out in the previous document (GCN) by identifying separate thresholds for specific sources rather than for community noise as a whole. Consequently, much of the earlier guidance set out in GCN is now absent from ENG. While ENG was intended to supersede GCN, it recognises this absence and states that *'indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid.'*

It is recommended that all WHO guidance should be noted but that 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 Guidance⁸ in England.

3.5 BS 8233:2014 GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS

BS 8233:2014⁹ *'provides guidance for the control of noise in and around buildings. It is applicable to the design of new buildings, or refurbished buildings undergoing a change of use'. 'The Standard is not¹⁰ intended to be used routinely where noise sources are brought to existing noise sensitive buildings'.*

For residential use dwellings (7.7.1), *'the main considerations, for bedrooms, are the acoustic effect on sleep; and for other rooms, the acoustic effect on resting, listening and communicating' (7.7.1).*

Internal noise criteria are advised relating to sources of external noise *'without a specific character, previously termed "anonymous noise". (...). For simplicity, only noise without character is considered. Noise has a specific character if it contains features such as a distinguishable, discrete and continuous*

⁸ PPG - Noise, MHCLG, 6 March 2014

⁹ BS 8233:2014 Guidance on sound insulation and noise reduction for buildings

¹⁰ The word 'not' is omitted from the text in the Standard. The Institute of Acoustics advised 'not' to be added following a meeting of their London Branch in March 2015.

tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate'. (7.7.1)

'For steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values', which are set out in Table 1.

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

Table 1: Indoor ambient noise levels for dwellings

There are a number of notes to the table. These include:

Note 4: Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values.

BS 8233 does not give guidance on what might constitute a guideline value. However, as the standard does cross reference WHO, we suggest that the guideline value of L_{AFmax} 45dB, inside bedrooms, should not be exceeded during the night more than 10-15 times, which reflects the WHO position.

'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 facade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment'.

'Note 7: Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved'.

3.6 BS 4142:2014 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND

The principle of BS 4142¹¹ is to determine an initial estimate of impact of industrial/commercial sound on nearby residents by comparing the Rating Level (sound level from the industrial/commercial source, with a correction applied for any acoustic features that characterise the sound) with the Background Sound Level (L_{A90} as measured in absence of the industrial/commercial source).

Generally, the greater the difference by which the Rating Level exceeds the Background Sound Level, the greater the magnitude of impact. BS 4142 states that 'a difference of around +10 dB or more is likely to be an indication of a significant adverse impact [...]. A difference of around +5 dB is likely to be an indication of an adverse impact [...]. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.'

However, BS 4142 also advises that 'when making assessments and arriving at decisions [...] it is essential to place the sound in context' so in each case, the context in which the sound is placed must be considered and the initial estimate of impact should be modified accordingly. For example, it advises

¹¹ BS 4142:2014 Methods for rating and assessing industrial and commercial sound

'Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.' It also indicates that impacts estimated during *'the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes.'*

4. AMBIENT NOISE LEVELS AFFECTING THE SITE

To inform the noise assessment, the ambient noise levels affecting the proposed development site must first be determined. Typically, this is done by carrying out a noise measurement survey at the site.

A review of the site and surrounding uses indicates that the main noise sources affecting the site will be from road traffic, predominantly from the High Street, and potentially from activities at Brown & Gammons, adjacent to the site.

As a result of the current Coronavirus lockdown, it would not be possible to carry out a noise measurement survey that is representative of the typical noise environment, as there will be significantly reduced road traffic and commercial activity in the area. However, there is a good deal of historical information available from which typical ambient noise levels can be determined, such as:

- road traffic count data from the Department of Transport (DfT);
- England's road and rail noise maps presented on Extrium.co.uk;
- noise survey data from recent nearby planning applications; and
- Spectrum's detailed experience of noise in other similar environments.

4.1 ROAD TRAFFIC NOISE

Table 2 summarises the most recent historical road traffic count data available on the DfT website for the nearest roads to the proposed development site and the calculated Basic Noise Level (BNL), as calculated in accordance with CRTN¹². The DfT data is given as the annual average daily flow over a typical 24 hour period. CRTN's BNL calculation procedure considers flows over the 18 hour daytime period between 06:00 to 00:00. As a worst case, this assessment has taken the DfT data to be equal to the 18 hour flow.

Count point ref.	Year	Description	Annual average daily flow (total vehicles)	Percentage heavies (%)	Speed (km/h)	Basic Noise Level (BNL)
78229	2006	London Road	11758	13%	50	67
17178	2006	B656	17259	15%	50	69
37272	2006	B656	16673	23%	50	69

Table 2: Most recent historical road traffic count data from DfT

The measurement locations for each of the data points, as presented on the DfT website, are shown in Figure 1, below.

¹² Department of Transport, Welsh Office (1988). Calculation of Road Traffic Noise. HMSO, London.

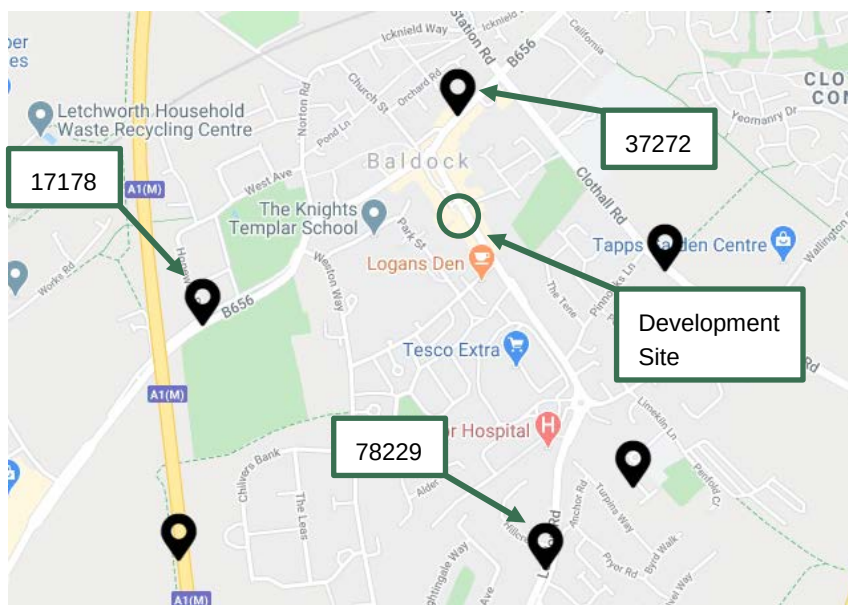


Figure 1: DfT traffic count data points

It should be noted that large changes in road traffic flows have a relatively small effect on the calculated noise level. For example, an increase in flow of 25% will typically lead to a 1dB increase in noise level and a doubling of the flow would lead to an increase of 3dB. Within this context, it is considered that the latest available traffic counts from 2006 will be representative of existing noise levels affecting the site, as any growth factors present over the last 14 years are likely to have had a negligible effect on noise. Likewise, the road traffic count data from London Road is considered to be representative of the High Street for the purpose of this assessment.

The BNL describes the noise level at 10m from the roadside edge in terms of the $L_{A10,18hr}$ metric. For the purposes of assessment under current UK Guidance and Standards, this must be converted to the $L_{Aeq,16hr}$ metric for the day (07:00-23:00) and $L_{Aeq,8hr}$ metric for the night (23:00-07:00). This assessment applies the methodology set out by DEFRA¹³ (Method 3), as advised by BS 8233, which assumes typical diurnal variations in flow over the day and night time periods. The results are summarised in Table 3.

Count point ref.	Year	Description	Basic Noise Level (BNL)	Daytime $L_{Aeq,16hr}$ 10m from roadside edge	Night time $L_{Aeq,8hr}$ 10m from roadside edge
78229	2006	London Road	67	65	57
17178	2006	B656	69	66	58
37272	2006	B656	69	66	58

Table 3: BNL conversion to $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ for the day and night, respectively

Typical night time L_{AFmax} levels in this environment would arise from road traffic movements on local roads. Spectrum's experience of L_{AFmax} events from road traffic affecting nearby residential dwellings is that regular night time L_{AFmax} levels (as described in WHO guidance as being more than 10-15 times per

¹³ Method for converting the UK road traffic noise index $L_{A10,18h}$ to the EU noise indices for road noise mapping (Defra 2006)



night) are typically around 15-20dB higher than the night time $L_{Aeq,8hr}$ level, depending on the flow, speed and type of traffic and the distance to affected dwellings. Spectrum's historical data from other similar sites indicates that for a 30mph road, such as the High Street in Baldock, a representative sound power level for these events is typically around L_{WA} 106dB. At 10m from the road side edge, this would produce an L_{AFmax} event level of 75dB. This is 18dB higher than the night time $L_{Aeq,8hr}$ level calculated using the CRTN methodology, given in Table 3.

The day and night time $L_{Aeq,T}$ and L_{AFmax} levels determined above using the DfT's road traffic count data are consistent with more recent noise level measurements carried out nearby in relation to other planning applications at 17-19 Hitchin Street, Baldock (B656) (January 2016), and 8 Whitehorse Street, Baldock (B656) (January 2018). With adjustments made for distance, the noise levels reported in the respective planning noise assessments are within 1dB of the levels determined above using DfT data. Therefore, the noise levels determined using the 2006 DfT data can be used as the basis for noise modelling to accurately calculate the existing noise levels as they propagate across the proposed development site.

4.2 COMMERCIAL NOISE

It is considered that the main source of commercial noise affecting the proposed development will be from workshop activities at Brown & Gammons. While it would not be possible to carry out a representative noise measurement survey of these activities under the current lockdown, as these activities are likely to be significantly reduced, Spectrum has measured noise levels within car workshops at other similar sites, which can be used to predict the likely noise level output from activities at Brown & Gammons.

Reverberant noise levels within car workshops can vary significantly depending on the type of work being carried out and may be relatively quiet for much of the time. However, typical noisy activities would include use of air-wrenches for taking off wheel nuts and removing tyres, use of pneumatic air-lines for inflating tyres, hammering of disc brakes, and manoeuvring of vehicles within the workshop. Over a typical 1-hour reference period of noisy activity, reverberant noise levels can typically be up to around $L_{Aeq,1hr}$ 70dB.

A site inspection has been carried out to determine the location of any roller shutters doors at the site, behind which there might be a workshop. There are five roller shutters at the Brown & Gammon site; however, it should be noted that some of these may provide access to indoor car storage or other quiet spaces not used for workshop activities.

As a worst case, however, this assessment assumes:

- that there could be noisy workshop activities being carried out behind each of the five roller shutters doors simultaneously;
- each shutter has an area 12m² (4m x 3m);
- all five roller shutters doors would be open for the full 1-hour reference period; and
- internal reverberant sound pressure levels within each space are $L_{Aeq,1hr}$ 70dB.

This represents very intensive use of the site for purely workshop activities, which is unlikely to occur in practice. However, where the assessment shows acceptable noise levels can be achieved for the occupants of the proposed development in this scenario, this will provide confidence that acceptable noise levels will be achieved for more typical operating scenarios.



5. NOISE MODEL

The road traffic noise levels established from DfT data, as detailed in Section 4.1, have been used to create a noise model such that the noise, as it propagates across the proposed development site, can be determined. Additionally, the potential noise breakout from workshop activities at Brown & Gammons has been included, as described in Section 4.2.

The particular prediction model that has been used for this analysis is Bruel & Kjaer's Type 7810 'Predictor' software. This acoustic model implements the procedures set out in ISO 9613-2:1996 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation to determine noise levels", and is Quality Assured to all parts of ISO 17534:2015 "Acoustics – Software for the calculation of sound outdoors". The Predictor model takes account of the following features in its calculation procedure:

- 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)

5.1 RESULTS

Details and results of the noise model are presented in Appendix B. The results are summarised in Table 4.

Receptor location	Daytime road traffic noise L_{Aeq} (dB)	Daytime commercial noise L_{Aeq} (dB)	Night time road traffic noise L_{Aeq} (dB)	Night time road traffic noise L_{AFMax} (dB)
Front façade	62	19	54	70
Rear façade	41	52	33	48
Rear yard	39	n/a	31	n/a

Table 4: Noise model results summary

6. ASSESSMENT

6.1 NOISE IMPACT FROM COMMERCIAL ACTIVITY

The results of the noise model indicate that noisy workshop activities at Brown & Gammons, carried out with all five roller shutters open, could generate noise levels up to $L_{Aeq,1hr}$ 52dB outside proposed residential windows, to the rear of the development, in the worst case.

Noise from workshop activities is likely to include impulsive events, which may be clearly audible. Accordingly, a +6dB character correction can be applied in determination of the rating level under BS 4142. The rating level is, therefore, $L_{A,r,Tr}$ 58dB.



Although it has not been possible to measure representative background sound levels directly, Spectrum has detailed experience of noise in similar environments. The background sound level at this site is likely to be controlled by local and distinct road traffic movements. Generally, where this is the case, the closer a receptor is to a road, the larger the difference between the ambient (L_{Aeq}) level and background sound (L_{A90}) level. Close to a road with regular traffic movements, this difference might be up to around 10dB. For more distant roads, this difference will be smaller, with background sound (L_{A90}) levels typically around 2-3dB below the ambient noise (L_{Aeq}) level.

At this site, the nearest receptor to commercial activities at Brown & Gammons is to the rear of the site, which is screened from the High Street; the dominant road traffic source affecting the site. It is estimated that, at this location, the background sound level will be around 5dB below the ambient road traffic noise level. Accordingly, the daytime background sound level is estimated to be L_{A90} 36dB.

The rating level, therefore, exceeds the background sound level by 22dB. This indicates a potential significant impact, depending on context, in accordance with BS 4142.

It should be noted that the above is an initial assessment of impact, subject to context, and contains a degree of uncertainty.

The estimated background sound level is based on calculations of road traffic noise, derived from DfT data, which have also been validated against more recent measurements at two nearby sites. The level has been determined based on Spectrum's detailed experience of how background sound levels correspond to road traffic noise levels in similar acoustic environments. Accordingly, the estimated background sound level is considered to provide a reasonably accurate representation of conditions at the site.

The estimated sound output from workshop activities at Brown & Gammons, however, is subject to a higher degree of uncertainty, as this has been based on a series of worst-case assumptions. As discussed in Section 4.2, noise levels within car workshops can vary significantly depending on the type of work being carried out and may be relatively quiet for much of the time. Additionally, it has been assumed that workshop activities are carried out within spaces behind each of the five roller shutters, simultaneously, with all roller shutters open, and at an intensity that is unlikely to occur in practice. It is more likely that noisy activities would occur perhaps behind just one or two of these shutters at any one time and at a lower intensity. Workshop noise levels are, therefore, likely to be lower in practice, perhaps by up to 10dB or more than predicted in this assessment.

In any case, given the relatively low background sound level at the site, even where workshop noise levels were 10dB lower than predicted, the assessment would still indicate a potential significant impact, subject to context.

In relation to context, BS 4142 advises that various factors should be considered, including the absolute level of sound, the relative character of the residual and specific sounds, and the sensitivity of the receptor.

Absolute workshop related noise levels are predicted to be up to L_{Aeq} 52dB in the worst case, although, as discussed above, are likely to be lower, and potentially in the low 40's for much of the time. These levels compare with the WHO guideline thresholds for disturbance in relation to community noise in external amenity areas of L_{Aeq} 50-55dB.

At the proposed development, there are no external amenity areas for the proposed flats and the sensitivity of these receptors will be determined by the level of façade sound insulation treatment to be installed. Given the relatively low absolute noise levels expected from nearby commercial activities, it is considered that any potential disturbance can be mitigated through an appropriately specified façade insulation treatment, such that workshop activity noise is reduced to an acceptable level. This is considered in more detail in Section 6.2, below.

6.2 NOISE INGRESS FROM EXTERNAL SOURCES

Calculations of the noise intrusion into a sample of sensitive habitable rooms have been carried out using the method set out in BS 8233:2014.

Incident noise levels have been taken from the results of the noise model described in Section 5.

Sound insulation data for the external walls has been taken from BS 8233:1999. Sound insulation data for windows and ventilation systems has been taken from manufacturers' data. Two trickle vents have been assumed per habitable room. The trickle vents should provide the required level of ventilation to the dwellings with windows closed.

The calculations assume typical internal finishes for habitable rooms, based on reverberation times that Spectrum have measured in a range of occupied dwellings at other sites, and on the room geometry and volumes taken from the floor plans and elevation drawings in Appendix A. The rooms that would be subject to the highest internal ambient noise level has been used to calculate noise ingress.

The detailed calculations are presented in Appendix C and summarised in Table 5.

Sample room	Period	External noise levels (dB)		Internal noise levels (dB)	
		Incident L_{Aeq}	Typical incident L_{Amax}	L_{Aeq}	Typical L_{Amax}
Flat 13 (overlooking the High Street)					
Living room	Day	62	-	35	-
Bedroom	Day	62	-	33	-
Bedroom	Night	54	70	25	41
Flat 10 (rear façade, commercial noise ingress)					
Living room	Day	51	-	17	-
Bedroom	Day	51	-	22	-

Table 5: Calculated indoor ambient noise levels

The calculations demonstrate that for habitable rooms on the front facing façade, which are subject to the highest incident noise levels, desirable resting and sleeping conditions can be achieved, in accordance with the criteria set out in BS 8233.

The calculations of commercial noise ingress to rear facing flats assume the same façade specifications as for the front facing flats. Accordingly, levels of commercial noise ingress that are significantly lower (by at least 13dB) than BS 8233 criteria for noise without a specific character, can be achieved. This is considered sufficient to mitigate the inherent acoustic character of this activity.

In order to ensure the calculated noise levels summarised in Table 5 are achieved, the mitigation to the external facades set out in Table 6 would need to be installed.

	Glazing		Ventilation	
	$R_w / R_w + C_{tr}$ (dB)	Example unit	$D_{n,e,w} / D_{n,e,w} + C_{tr}$ (dB)	Example unit
Living rooms	33 / 29	Pilkington 8/6-16/4	33 / 32	Greenwood 4000 SBW (Hit and miss)
Bedrooms	33 / 29	Pilkington 8/6-16/4	33 / 32	Greenwood 4000 SBW (Hit and miss)

Table 6: Mitigation to external facades

Glazing is specified using the weighted sound reduction index, R_w , with a correction applied to account for the acoustic character of road traffic noise, C_{tr} . Vents are specified using the normalised element weighted sound level difference, $D_{n,e,w}$, also corrected for traffic noise, C_{tr} . The acoustic specifications should be met both with and without the traffic noise correction term.

Additionally, the acoustic specification should apply to the window set as a whole, not just the glazing. For many windows, the influence of the frame materials on the composite sound reduction of the window set is largely negligible. However, for windows that must achieve R_w 40dB and $R_w + C_{tr}$ 34dB, or more, the influence of the frame becomes increasingly significant and must be taken into account. In these cases, it is recommended that compliance is demonstrated by comparing the results of supplier test data with the required specifications.

Given the noise levels incident on the proposed flats, the desirable internal ambient noise levels set out within BS 8233 guidance can only be achieved with windows closed. Trickle vents would, therefore, be required to provide whole dwelling ventilation, in accordance with the Building Regulations ADF, in absence of a full MVHR system.

Where an overheating assessment indicates that windows would need to be open for some of the time to deal with thermal comfort, internal ambient noise levels during the overheating condition would increase to up to L_{Aeq} 49dB during the day and L_{Aeq} 41dB during the night. At these levels, noise would be expected to cause a material change in behaviour (such as having to keep windows closed most of the time or potential sleep disturbance). In this case, an alternative ventilation strategy capable of providing thermal comfort would be required. An overheating assessment, however, is beyond the scope of this report.

7. CONCLUSIONS

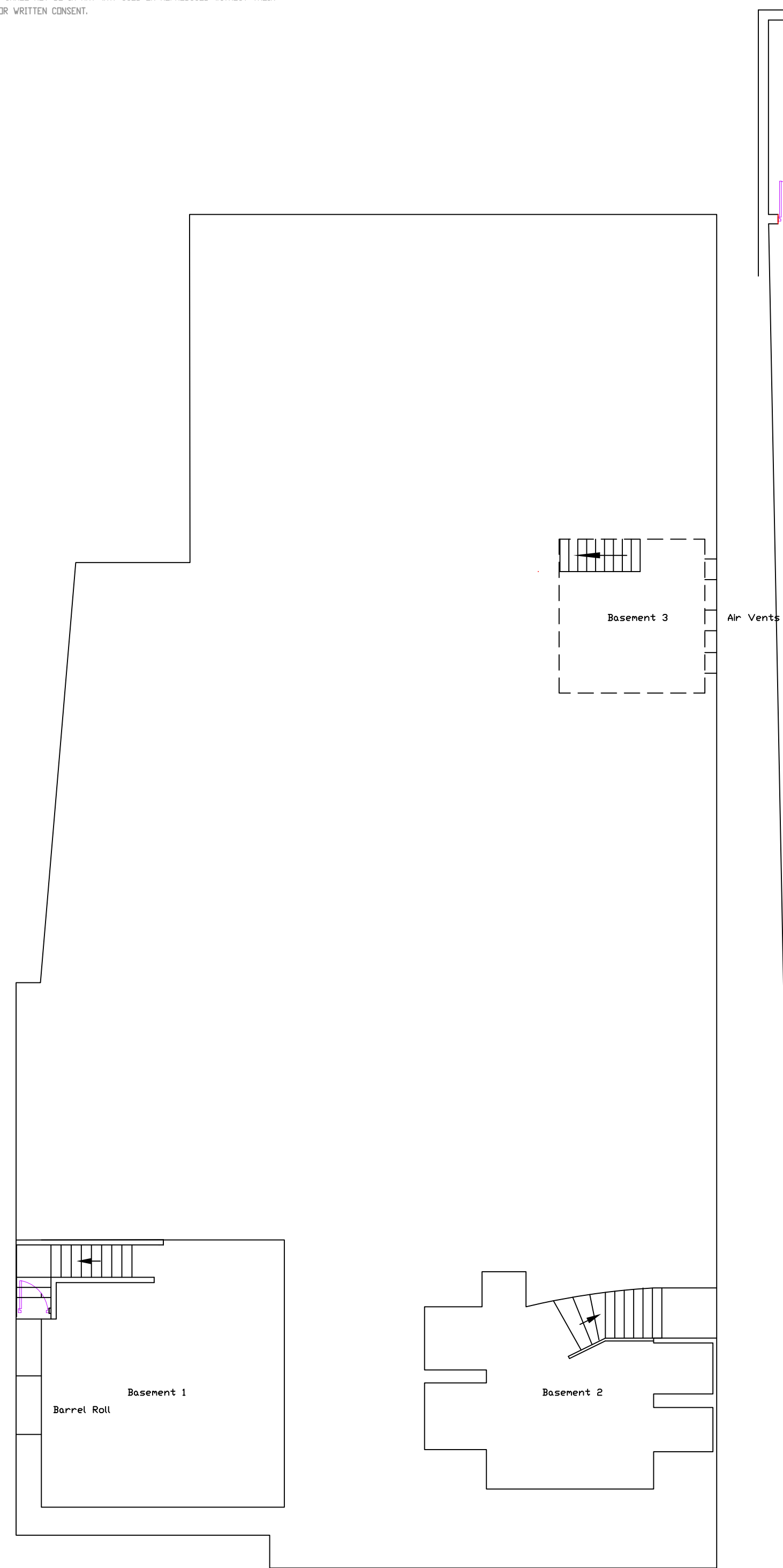
A noise assessment has been carried out to establish the impact of noise affecting the proposed residential development at 20 High Street, Baldock.

The assessment has demonstrated that acceptable internal ambient noise levels can be achieved at the site, as per the guidance and standards set out by WHO and BS 8233. Acceptable internal ambient noise levels can be achieved by implementing the proposed scheme of mitigation.

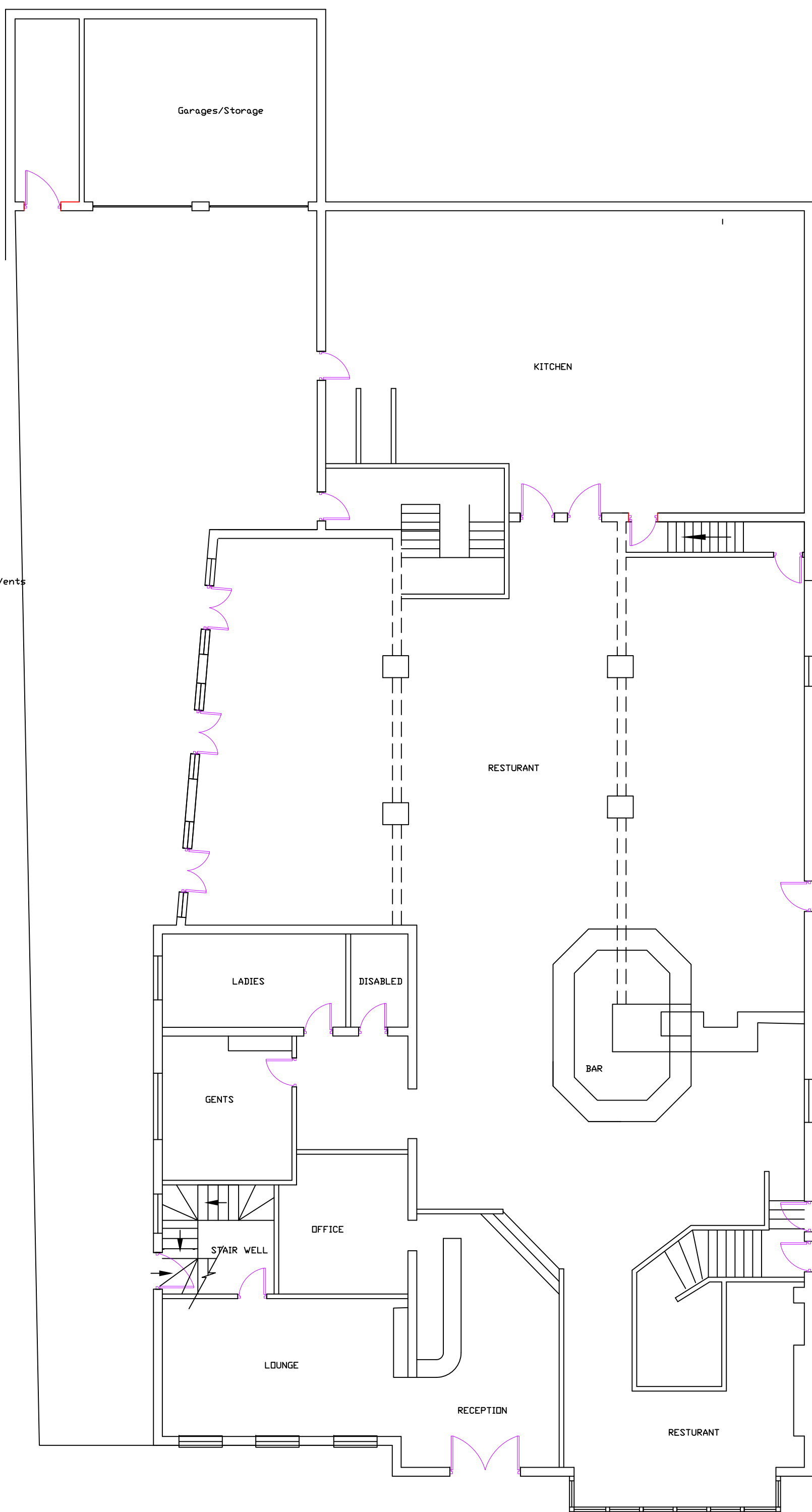
A P P E N D I X A

Proposed scheme

Contact The Architect/Engineer For Any Clarifications



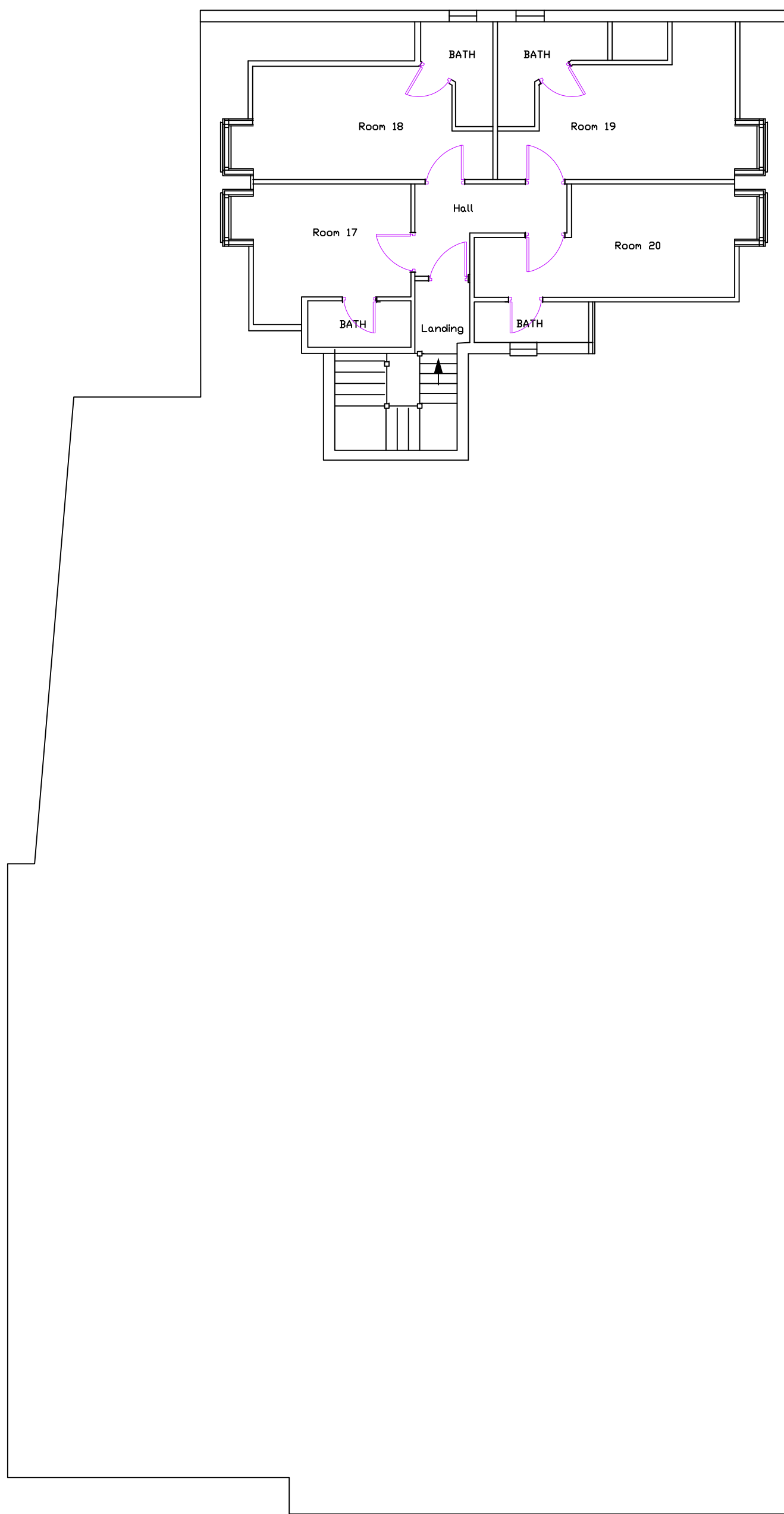
EXISTING BASEMENT



EXISTING GROUND FLOOR



EXISTING FIRST FLOOR



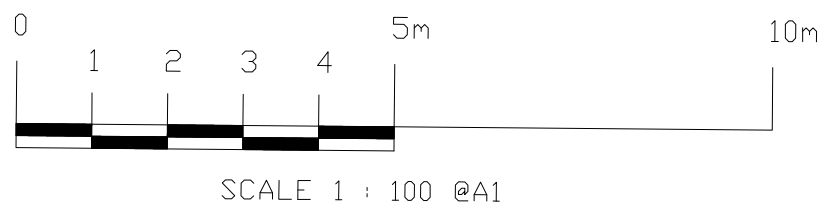
EXISTING SECOND FLOOR

Notes

Setting Out Dimensions
All dimensions and levels shown on drawings to be checked prior to commencement of work. Any discrepancies to be reported to the Architect/Engineer

Subject to Building Control Approval

Client to serve Party Wall Notices as required



Project/Site Location Templers 20/22, High Street Baldock Hertfordshire	Drawing Title Conversion of Commercial Property To Part Residential/Part Commercial.				C Jan '20 Planning Drawing MG			
					B Jan '19 Planning Drawing MKG			
					A Sept '19 Planning Drawing MKG			
					Rev Date Description Initial			
					Rev			
DMG architectural building design http://www.dmg.co.uk email: mark.gralinger@dmg.co.uk								
Drawn Mark Gralinger		Scale @ A1 1:100	Checked	Date Sept 2019	Drawing No. 2075 - 03		Rev. B	

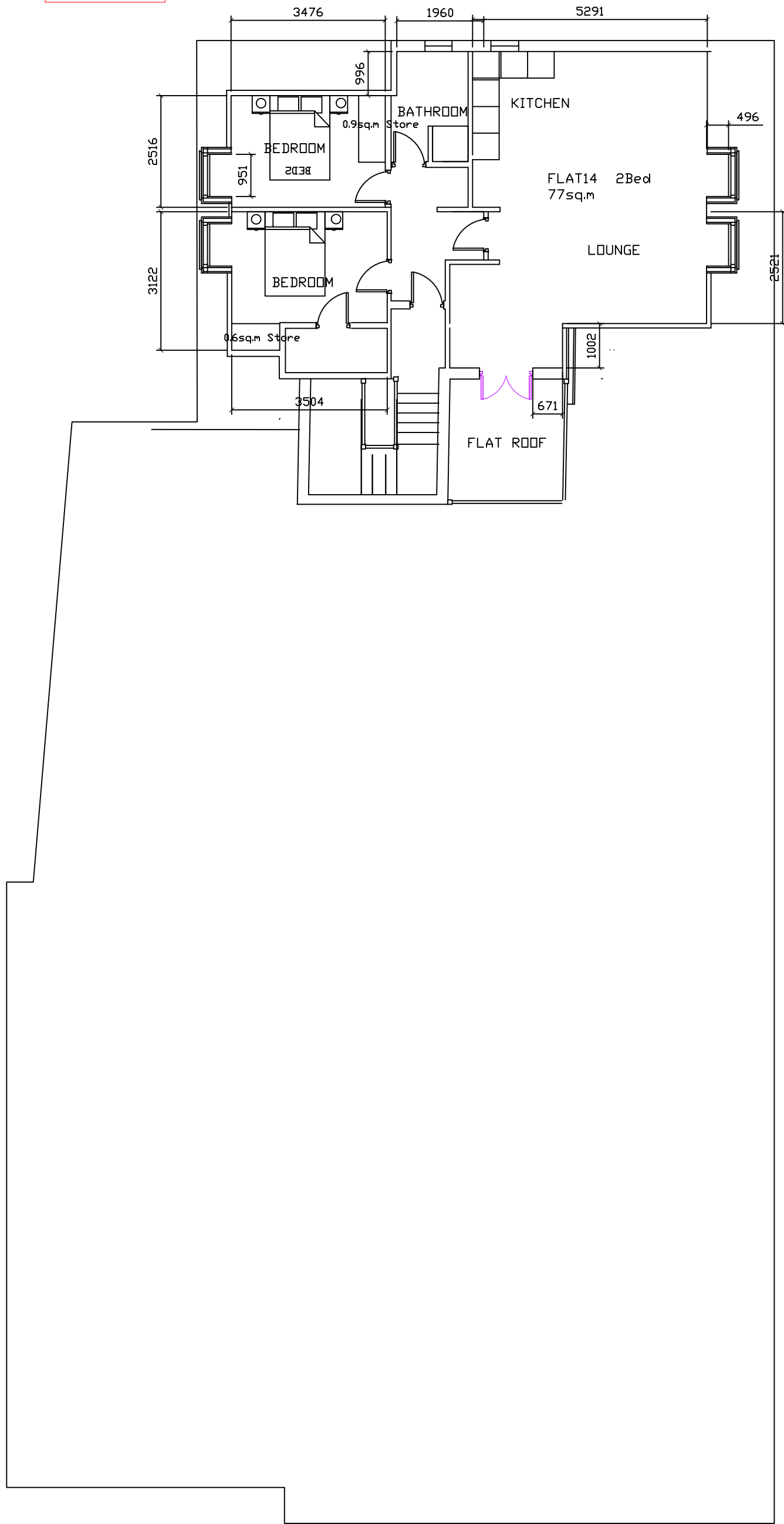
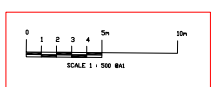
Contact The Architect/Engineer For Any Clarifications



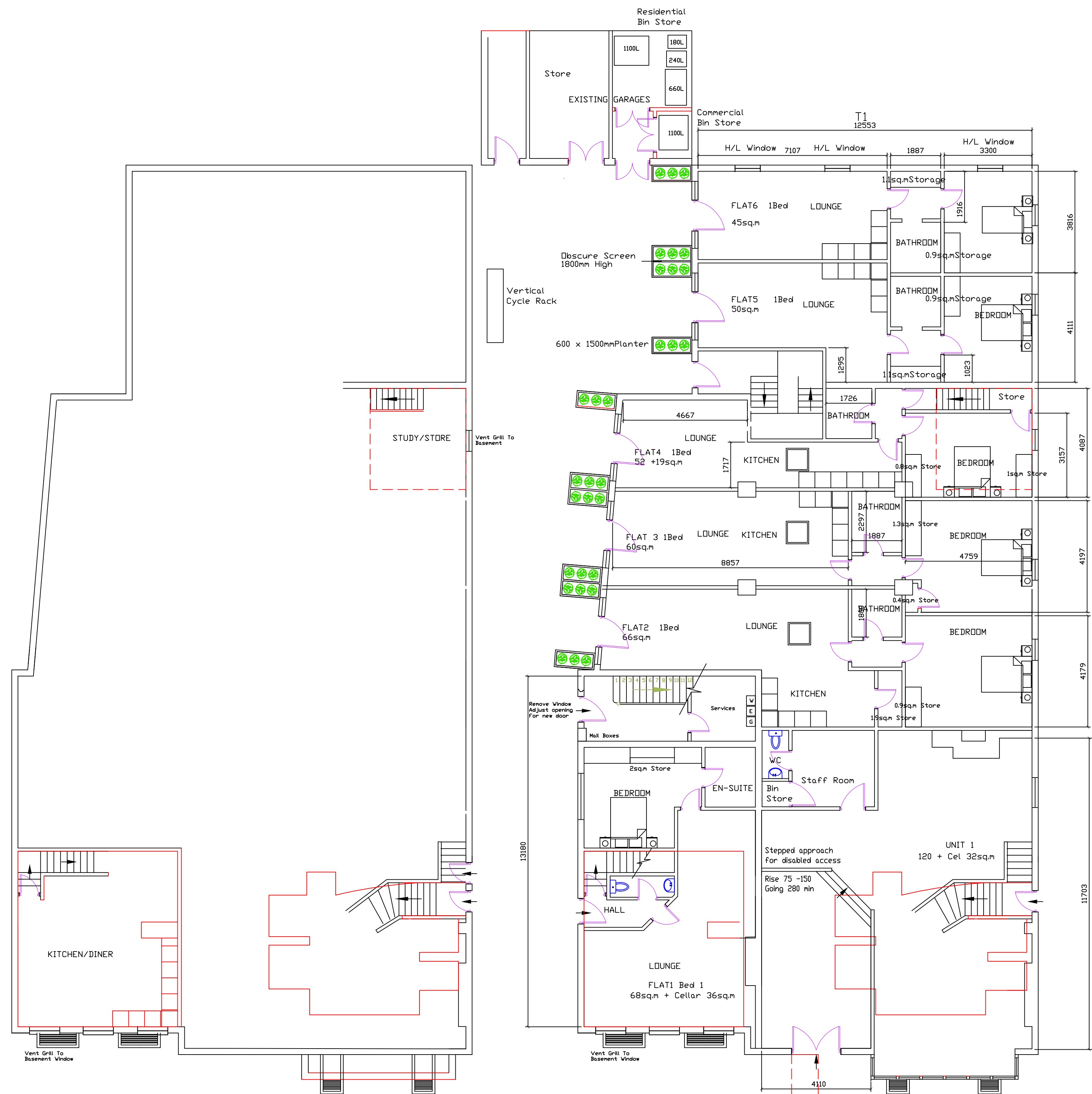
Site Location Plan
Scale 1 : 1250 @ A1



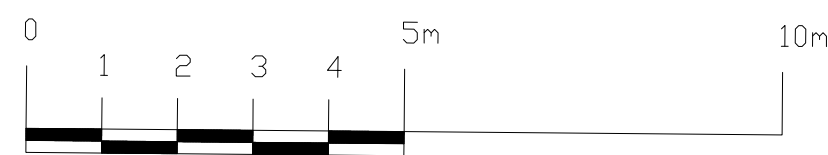
Block Plan
Scale 1 : 500 @ A1



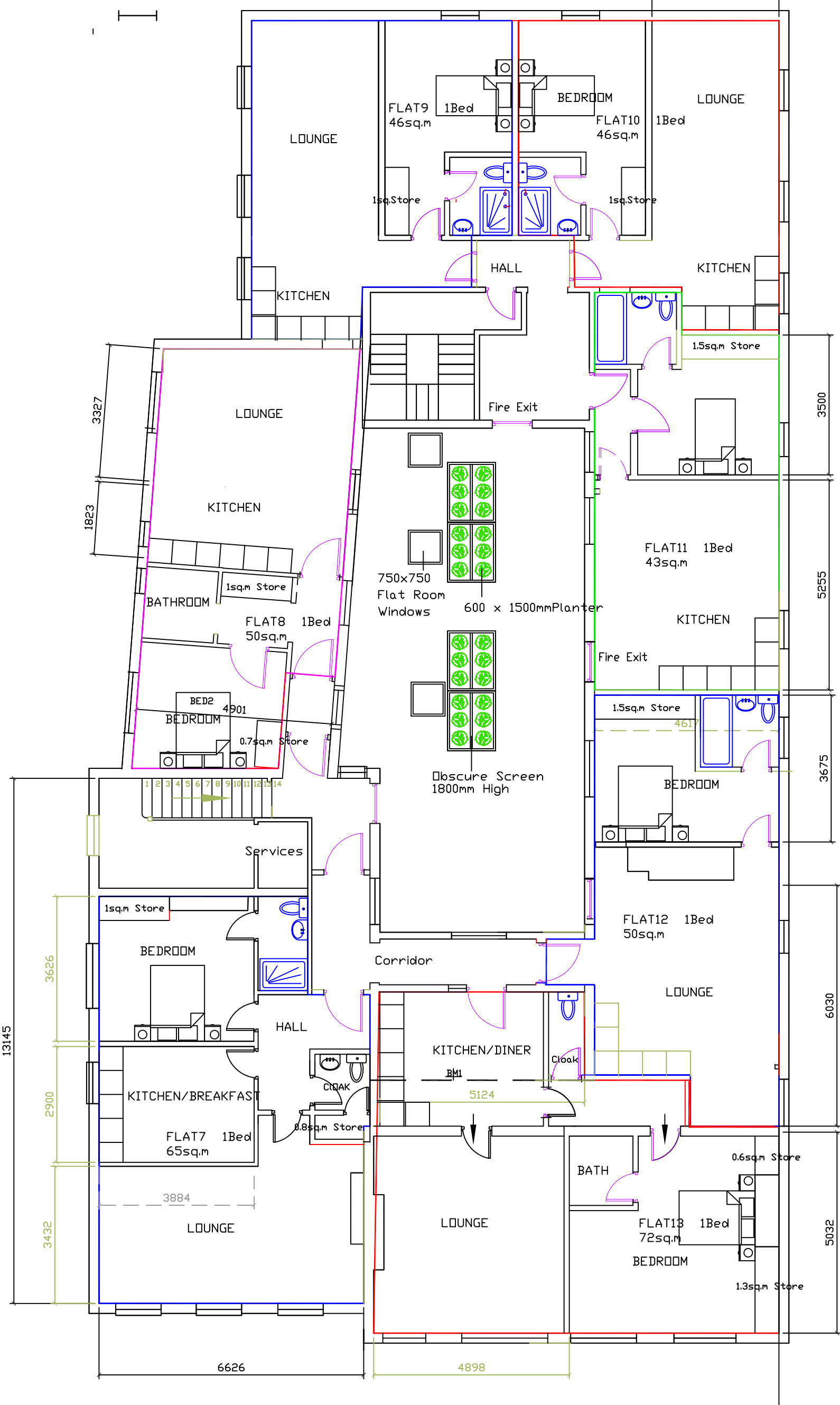
PROPOSED SECOND FLOOR



PROPOSED BASEMENT



PROPOSED GROUND FLOOR



PROPOSED FIRST FLOOR

Notes

Setting Out Dimensions
All dimensions and levels shown on drawings to be checked prior to commencement of work. Any discrepancies to be reported to the Architect/Engineer

Subject to Building Control Approval

Client to serve Party Wall Notices as required

Project/Site Location	Drawing Title	<table><tr><td>D</td><td>Apr '20</td><td>Planning Drawing</td><td>MG</td></tr><tr><td>C</td><td>Jan '20</td><td>Planning Drawing</td><td>MG</td></tr><tr><td>B</td><td>Dec '19</td><td>Planning Drawing</td><td>MG</td></tr><tr><td>A</td><td>Sept '19</td><td>Planning Drawing</td><td>MG</td></tr><tr><td>Rev</td><td>Date</td><td>Description</td><td>Initials</td></tr></table>				D	Apr '20	Planning Drawing	MG	C	Jan '20	Planning Drawing	MG	B	Dec '19	Planning Drawing	MG	A	Sept '19	Planning Drawing	MG	Rev	Date	Description	Initials
		D	Apr '20	Planning Drawing	MG																				
		C	Jan '20	Planning Drawing	MG																				
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		A	Sept '19	Planning Drawing	MG																				
		Rev	Date	Description	Initials																				
Tempmars 20/22, High Street Baldock Hertfordshire																									
Conversion of Commercial Property To Part Residential/Part Commercial.																									
 www.dmgarch.co.uk The Crown Copyright © 2019 email: mark.granger@dmga.co.uk																									
Drawn Mark Granger	Scale @ A1 1:100	Checked	Date Sept 2019	<table><tr><td>Drawing No.</td><td>2075 - 02</td><td>Revs.</td><td>D</td></tr></table>		Drawing No.	2075 - 02	Revs.	D																
Drawing No.	2075 - 02	Revs.	D																						

NOTES
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ANY QUERIES REGARDING DIMENSIONS TO BE REFERRED
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ALL DIMENSIONS OF EXISTING BUILDINGS TO BE VERIFIED ON SITE
THIS DRAWING IS THE COPYRIGHT OF DMG architectural building design
AND SHALL NOT BE IN ANY WAY USED OR REPRODUCED WITHOUT THEIR
PRIOR WRITTEN CONSENT.

Contact The Architect/Engineer For Any Clarifications



EXISTING FRONT ELEVATION



Renderd plinth painted black
EXISTING REAR ELEVATION



Renderd plinth painted black

EXISTING SIDE ELEVATION _ NORTH



EXISTING SIDE ELEVATION _ SOUTH



Vent Grill To Basement

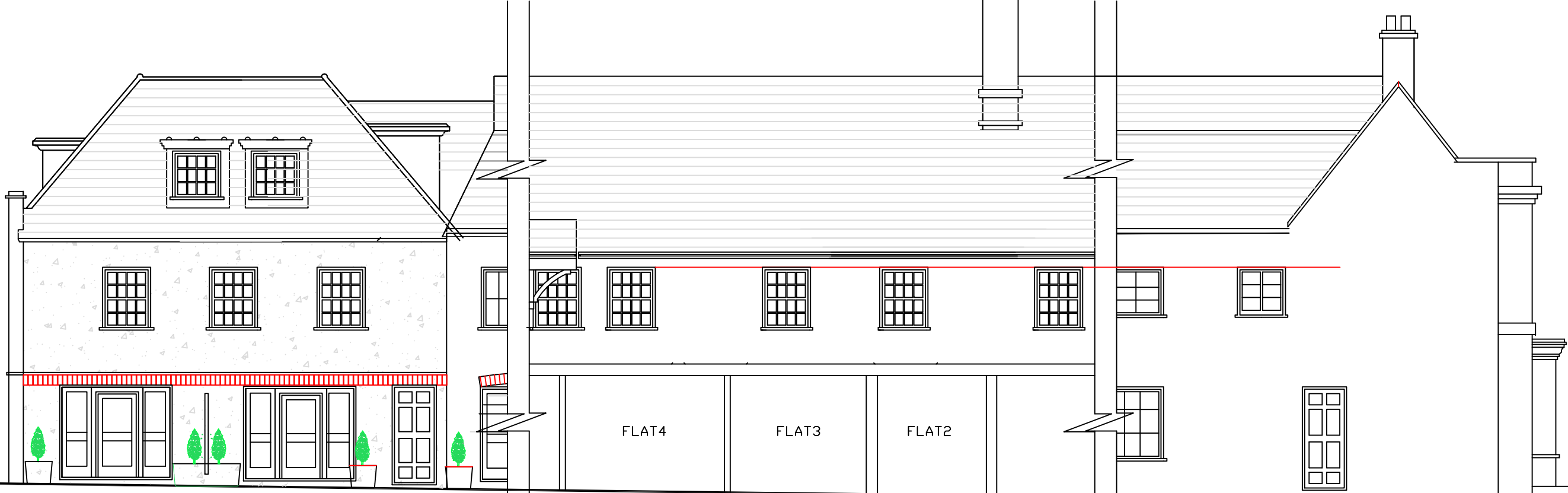
Vent Grill To Basement

PROPOSED FRONT ELEVATION



Renderd plinth painted black

PROPOSED REAR ELEVATION



PROPOSED SIDE ELEVATION _ SOUTH

PROPOSED SECTIONAL SIDE ELEVATION _ SOUTH

PROPOSED SIDE ELEVATION _ SOUTH



Renderd plinth painted black

Remove Existing Door
Add Window

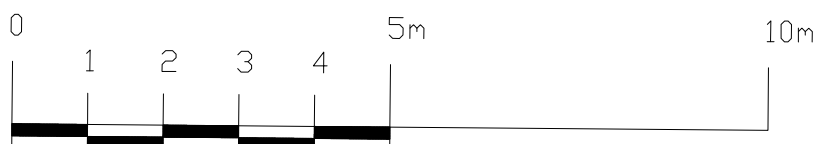
Remove blown render and replace with
two coat render painted white
Replace modern window with matching
Georgian window

Window moved to
Other side of chimney

New windows added
To match existing

Vent Grill To Basement

PROPOSED SIDE ELEVATION _ NORTH



SCALE 1 : 100 @A1



PROPOSED SIDE ELEVATION _ SOUTH

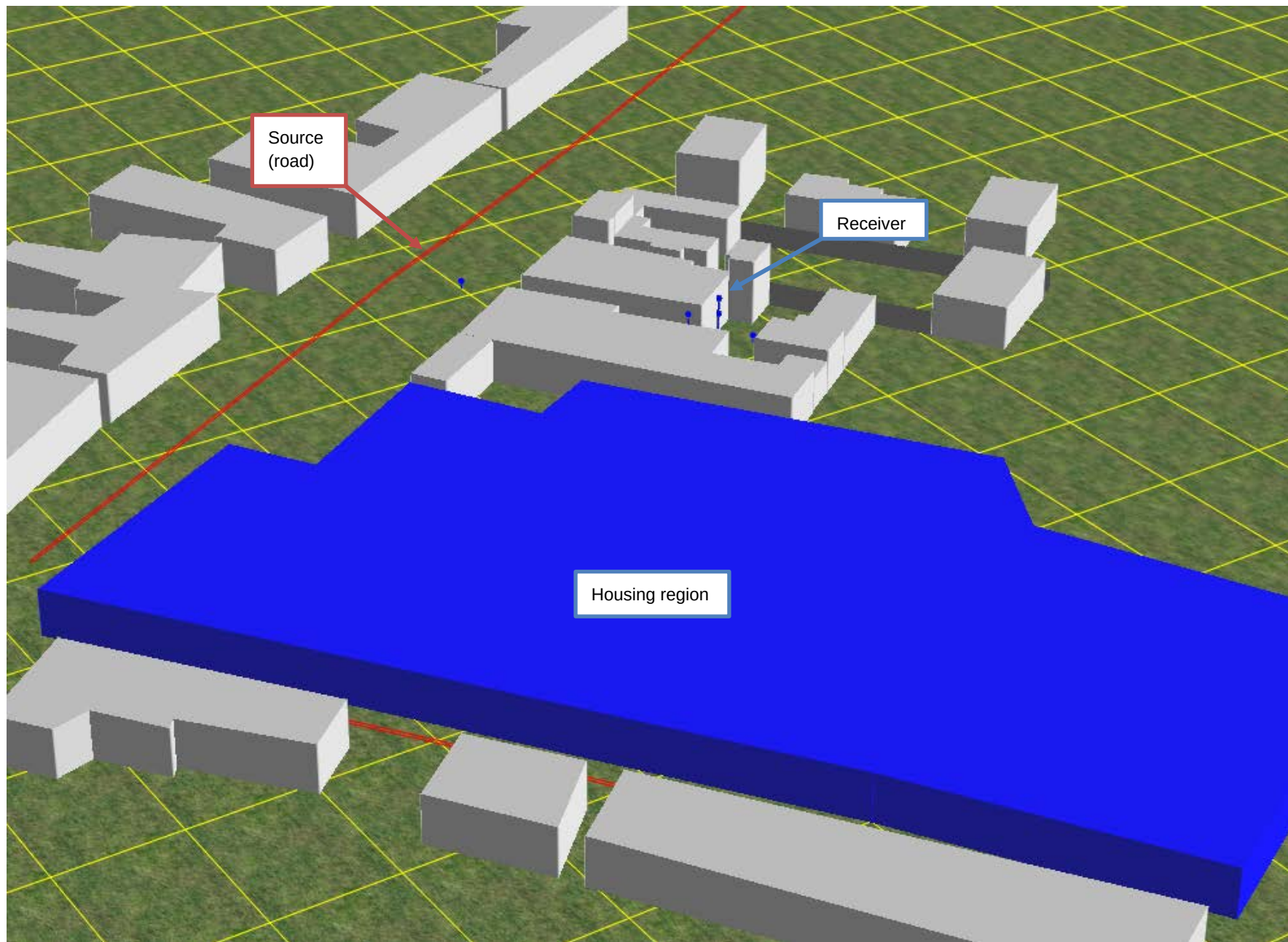
Notes
Setting Out Dimensions
All dimensions and levels shown on drawings to be checked prior to commencement of work. Any discrepancies to be reported to the Architect/Engineer
Subject to Building Control Approval
Client to serve Party Wall Notices as required

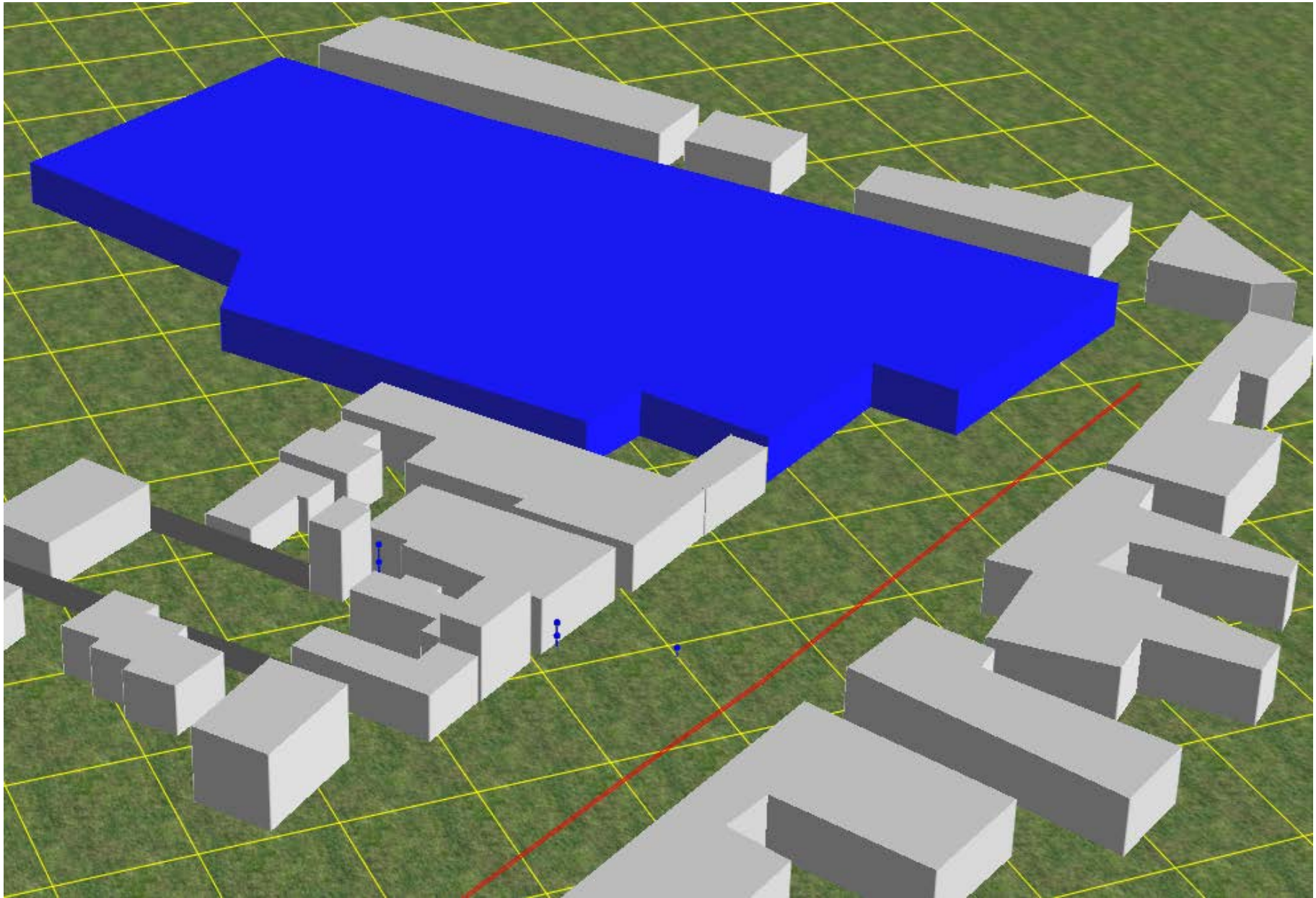
Project/Site Location		Drawing Title	
Templars 20/22, High Street Baldock Hertfordshire		Conversion of Commercial Property To Part Residential/Part Commercial.	
Drawn Mark Grainger		Scale @ A1 1:100	Checked Date Sept 2019
Drawing No. 2075 - 01		Rev. D	
D		Jan '20	Planning Drawing
C		Jan '20	Planning Drawing
B		Dec '19	Planning Drawing
A		Sept '19	Planning Drawing
Rev		Date	Description
© DMG architectural building design		JRM/MB	
Tel: 07550 079834		email: mark.grainger@baldock.net	

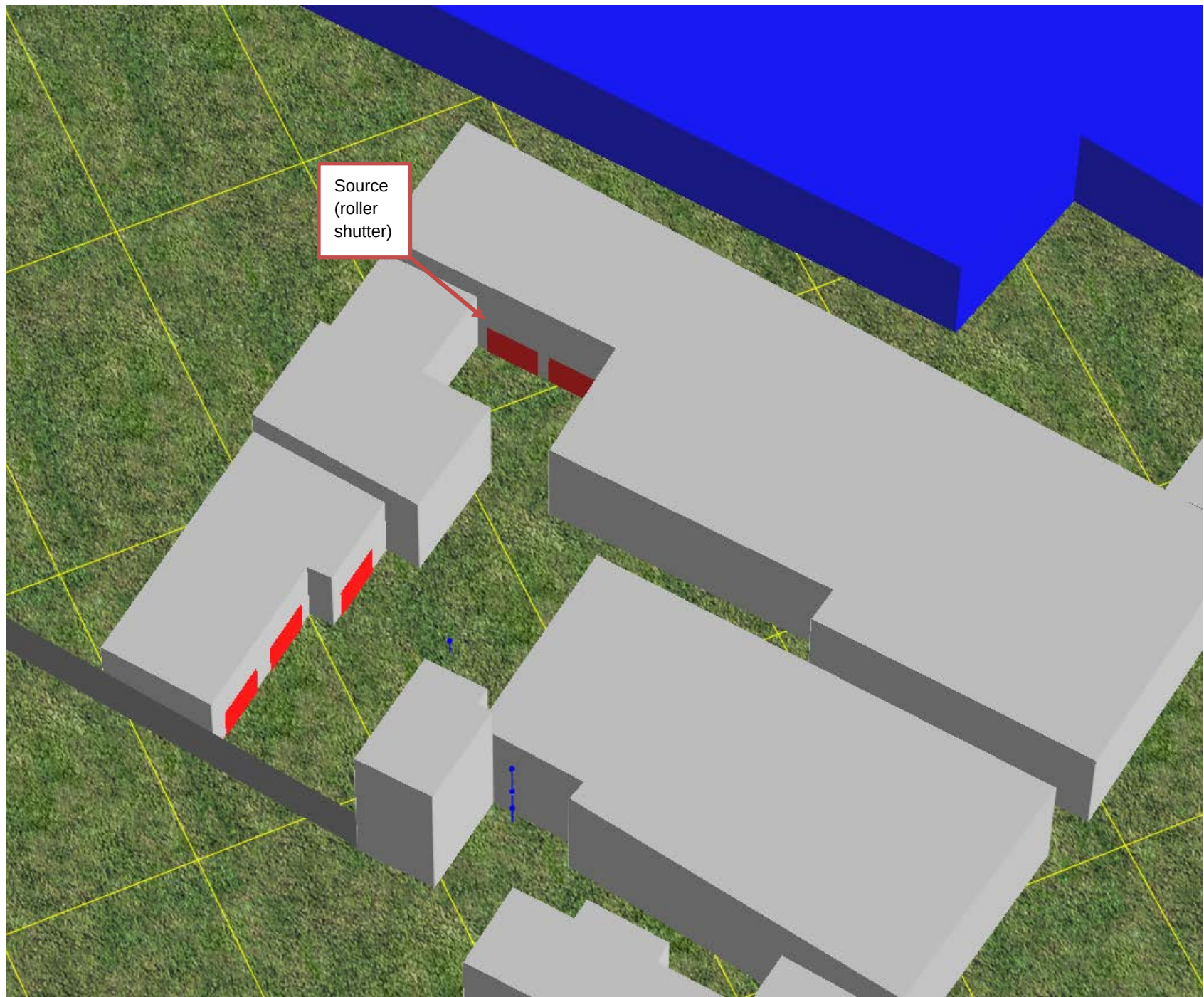
A P P E N D I X B

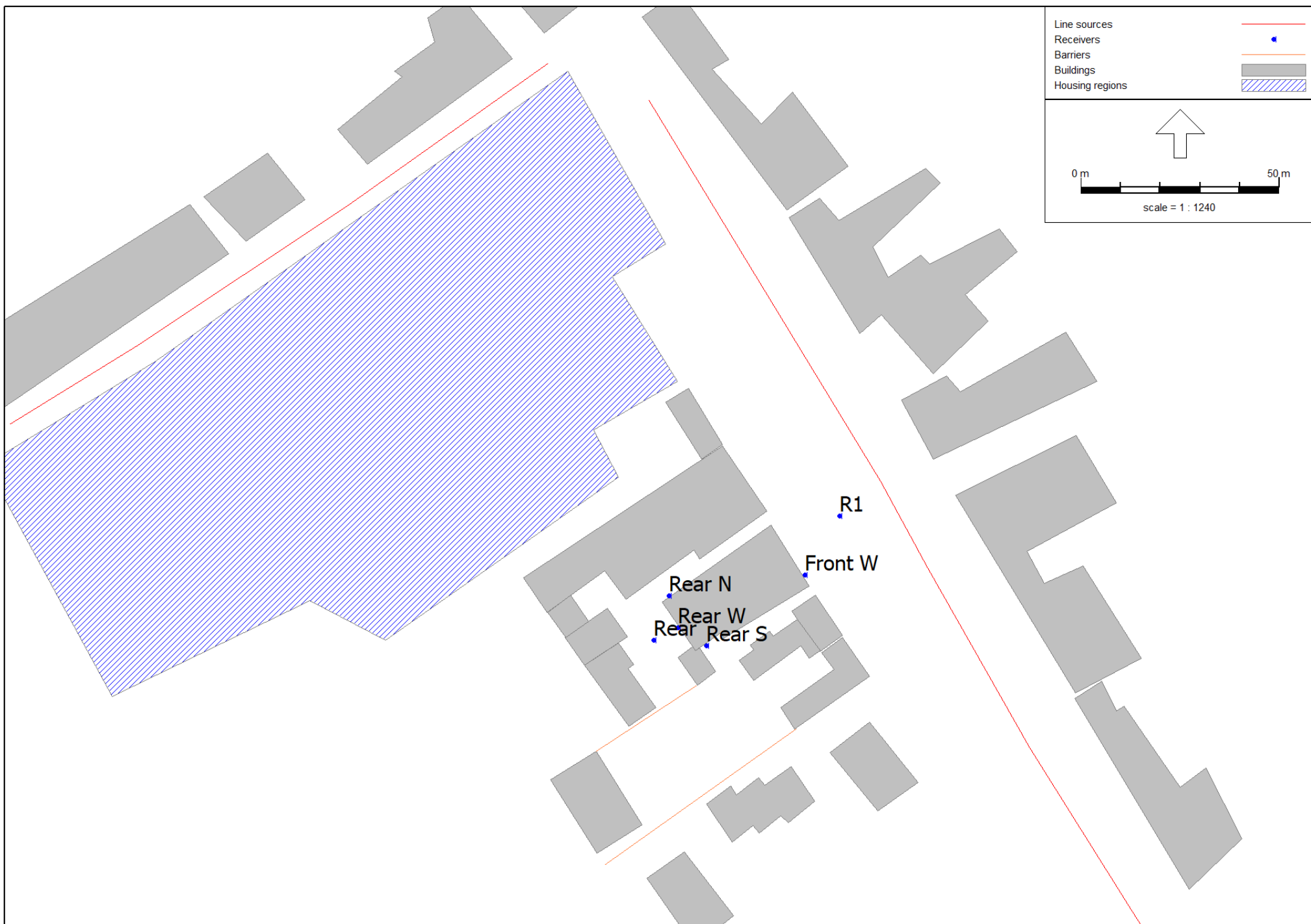
Noise model details and results

3D view of noise model









20 High Street, Baldock
Road traffic noise levels

Daytime

Report: Table of Results
Model: Day
LAeq per octave: total results for receivers
Group: (main group)
Group Reduction: No

Name			Day								
Receiver	Description	Height	Total	63	125	250	500	1000	2000	4000	8000
Front W_A	Facade	1.80	62	42	48	52	55	58	56	49	37
Front W_B	Facade	4.00	62	42	48	52	55	58	56	49	37
R1_A	BNL position	1.50	66	46	52	55	59	62	60	53	42
R2_A	BNL ref pos	1.50	65	44	51	54	57	60	59	52	41
Rear N_A	Facade	1.80	48	29	34	37	40	44	42	35	21
Rear N_B	Facade	4.00	48	30	34	37	40	44	42	34	21
Rear N_C	Facade	7.00	48	32	36	38	41	44	42	34	21
Rear S_A	Facade	1.80	43	29	32	34	36	38	35	27	16
Rear S_B	Facade	4.00	43	29	33	34	36	38	36	28	16
Rear S_C	Facade	7.00	46	31	36	37	39	41	38	29	16
Rear W_A	Facade	4.00	38	25	29	30	31	33	30	21	5
Rear W_B	Facade	7.00	41	28	32	33	35	35	32	22	5
Rear_A	Yard	1.50	39	28	31	32	32	34	31	23	6

All shown dB values are A-weighted

20 High Street, Baldock
Commercial noise levels

Daytime

Report: Table of Results
Model: Commercial (potential worst case)
LAeq per octave: total results for receivers
Group: (main group)
Group Reduction: No

Name			Day								
Receiver	Description	Height	Total	63	125	250	500	1000	2000	4000	8000
Front W_A	Facade	1.80	19	--	--	9	12	15	14	9	--
Front W_B	Facade	4.00	19	--	--	10	12	15	14	9	--
Rear N_A	Facade	1.80	45	11	27	35	37	40	39	35	29
Rear N_B	Facade	4.00	45	11	27	35	37	40	39	35	29
Rear N_C	Facade	7.00	45	12	29	36	38	40	39	35	29
Rear S_A	Facade	1.80	27	--	14	18	19	22	20	16	10
Rear S_B	Facade	4.00	27	--	14	19	20	22	21	16	9
Rear S_C	Facade	7.00	28	--	16	20	20	22	21	17	10
Rear W_A	Facade	4.00	52	18	33	41	43	47	46	42	37
Rear W_B	Facade	7.00	51	18	33	41	43	46	45	42	36
Rear_A	Yard	1.50	56	23	38	45	48	51	50	47	42

All shown dB values are A-weighted

20 High Street, Baldock
Road traffic noise levels

Night time

Report: Table of Results
Model: Night
LAeq per octave: total results for receivers
Group: (main group)
Group Reduction: No

Name			Night								
Receiver	Description	Height	Total	63	125	250	500	1000	2000	4000	8000
Front W_A	Facade	1.80	54	34	40	44	47	50	48	41	29
Front W_B	Facade	4.00	54	34	40	44	47	50	48	41	29
R1_A	BNL position	1.50	58	38	44	47	51	54	52	45	34
R2_A	BNL ref pos	1.50	57	36	43	46	49	52	51	44	33
Rear N_A	Facade	1.80	40	21	26	29	32	36	34	27	13
Rear N_B	Facade	4.00	40	22	26	29	31	36	34	26	13
Rear N_C	Facade	7.00	40	24	28	30	33	36	34	26	13
Rear S_A	Facade	1.80	35	21	24	26	28	30	27	19	8
Rear S_B	Facade	4.00	35	21	25	26	28	30	28	20	8
Rear S_C	Facade	7.00	38	23	28	29	31	33	30	21	8
Rear W_A	Facade	4.00	30	17	21	22	23	25	22	13	--
Rear W_B	Facade	7.00	33	20	24	25	26	27	24	14	--
Rear_A	Yard	1.50	31	20	23	24	24	26	23	15	--

All shown dB values are A-weighted

20 High Street, Baldock

Road traffic noise levels

Night time LAFMax

Report: Table of Results
 Model: Night LAFMax
 LAeq per octave: by Source for receiver Front W_A - Facade
 Group: (main group)
 Group Reduction: No

Name			Night								
Source	Description	Height	Total	63	125	250	500	1000	2000	4000	8000
Front W_A	Facade	1.80									
LAFMax		0.50	70	50	56	59	63	66	64	57	46
LAFMax		0.50	70	49	56	59	62	65	64	57	46
LAFMax		0.50	69	49	55	59	62	65	63	56	45
LAFMax		0.50	69	49	55	59	62	65	63	56	46
LAFMax		0.50	69	49	55	58	62	65	63	56	45
LAFMax		0.50	69	49	55	58	61	65	63	56	44
LAFMax		0.50	69	48	55	58	61	64	63	56	44
LAFMax		0.50	69	48	54	58	61	64	62	56	45
LAFMax		0.50	68	48	54	58	61	64	62	55	44
LAFMax		0.50	68	48	54	57	61	64	62	55	43
LAFMax		0.50	68	47	53	57	60	63	61	54	43
LAFMax		0.50	67	47	53	57	60	63	61	54	43
LAFMax		0.50	67	47	53	56	60	63	61	54	42
LAFMax		0.50	67	47	53	56	59	63	61	54	42
LAFMax		0.50	66	46	52	56	59	62	60	53	41
LAFMax		0.50	66	46	52	56	59	62	60	53	41
LAFMax		0.50	66	46	52	55	58	61	59	52	40
LAFMax		0.50	66	45	52	55	58	61	59	52	40
LAFMax		0.50	65	45	51	54	58	61	59	52	39
LAFMax		0.50	64	44	50	54	57	60	58	51	38
LAFMax		0.50	63	42	49	52	55	58	56	49	36
LAFMax		0.50	62	42	48	51	55	58	56	48	35

All shown dB values are A-weighted

A P P E N D I X C

Noise ingress calculations

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



Project:	20 High Street, Baldock
Project number:	20074
Date:	20/04/2020

Plot:	Flat 13
Room:	Lounge

Daytime ($L_{Aeq,16hr}$)				Octave band centre frequency										Broadband term	
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k			
EXTERNAL NOISE LEVEL															
External noise level			Façade 1	$L_{eq,1}$	68	64	61	58	58	55	48	38		$L_{Aeq,1}$	62 dB
Façade correction factor				C	0	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL															
Incident noise level			Façade 1	$L_{eq,ff}$	68	64	61	58	58	55	48	38		$L_{Aeq,ff}$	62 dB
ROOM DATA															
Room description and reverberation time	Volume	58	Living Room	RT60	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3			s
FAÇADE ELEMENTS (Façade 1)															
Glazing	Area	5.4	Pilkington 8/6-16/4	Rw	21	22	21	28	38	40	47	47		Rw / Rw+Ctr	33 / 29 dB
Wall	Area	6.9	Brick and block external wall	Rw	34	40	44	45	51	56	60	63		Rw / Rw+Ctr	50 / 47 dB
Vent	No. off.	2	Greenwood 4000 SBW (Hit and miss)	Dn,e	38	38	37	34	30	34	37	46		Dn,e,w / Dn,e,w+Ctr	33 / 32 dB
None			--												
RESULTS															
Total calculated indoor noise level				$L_{eq,2}$	46	41	38	31	30	23	13	-		$L_{Aeq,2}$	35 dB

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



Project:	20 High Street, Baldock
Project number:	20074
Date:	20/04/2020

Plot:	Flat 13
Room:	Bedroom

Daytime ($L_{Aeq,16hr}$)				Octave band centre frequency											
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k	Broadband term		
EXTERNAL NOISE LEVEL															
External noise level			Façade 1	$L_{eq,1}$	68	64	61	58	58	55	48	38		$L_{Aeq,1}$	62 dB
Façade correction factor				C	0	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL															
Incident noise level			Façade 1	$L_{eq,ff}$	68	64	61	58	58	55	48	38		$L_{Aeq,ff}$	62 dB
ROOM DATA															
Room description and reverberation time	Volume	56	Bedroom	RT60	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2			s
FAÇADE ELEMENTS (Façade 1)															
Glazing	Area	3.6	Pilkington 8/6-16/4	Rw	21	22	21	28	38	40	47	47		Rw / Rw+Ctr	33 / 29 dB
Wall	Area	21.9	Brick and block external wall	Rw	34	40	44	45	51	56	60	63		Rw / Rw+Ctr	50 / 47 dB
Vent	No. off.	2	Greenwood 4000 SBW (Hit and miss)	Dn,e	38	38	37	34	30	34	37	46		Dn,e,w / Dn,e,w+Ctr	33 / 32 dB
None			--												
RESULTS															
Total calculated indoor noise level				$L_{eq,2}$	44	39	35	29	29	22	12	-		$L_{Aeq,2}$	33 dB

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



Project:	20 High Street, Baldock
Project number:	20074
Date:	20/04/2020

Plot:	Flat 13
Room:	Bedroom

Night time ($L_{Aeq,8hr}$)				Octave band centre frequency											
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k	Broadband term		
EXTERNAL NOISE LEVEL															
External noise level			Façade 1	$L_{eq,1}$	60	56	53	50	50	47	40	30		$L_{Aeq,1}$	54 dB
Façade correction factor				C	0	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL															
Incident noise level			Façade 1	$L_{eq,ff}$	60	56	53	50	50	47	40	30		$L_{Aeq,ff}$	54 dB
ROOM DATA															
Room description and reverberation time	Volume	56	Bedroom	RT60	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2			s
FAÇADE ELEMENTS (Façade 1)															
Glazing	Area	3.6	Pilkington 8/6-16/4	Rw	21	22	21	28	38	40	47	47		Rw / Rw+Ctr	33 / 29 dB
Wall	Area	21.9	Brick and block external wall	Rw	34	40	44	45	51	56	60	63		Rw / Rw+Ctr	50 / 47 dB
Vent	No. off.	2	Greenwood 4000 SBW (Hit and miss)	Dn,e	38	38	37	34	30	34	37	46		Dn,e,w / Dn,e,w+Ctr	33 / 32 dB
None			--												
RESULTS															
Total calculated indoor noise level				$L_{eq,2}$	36	31	27	21	21	14	4	-		$L_{Aeq,2}$	25 dB

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



Project:	20 High Street, Baldock
Project number:	20074
Date:	20/04/2020

Plot:	Flat 13
Room:	Bedroom

Night time ($L_{A\text{Max}}$)				Octave band centre frequency											
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k	Broadband term		
EXTERNAL NOISE LEVEL															
External noise level			Façade 1	$L_{\text{Max},1}$	76	72	68	66	66	63	56	47		$L_{A\text{Max},1}$	70 dB
Façade correction factor				C	0	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL															
Incident noise level			Façade 1	$L_{\text{Max},\text{ff}}$	76	72	68	66	66	63	56	47		$L_{A\text{Max},\text{ff}}$	70 dB
ROOM DATA															
Room description and reverberation time	Volume	56	Bedroom	RT60	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2			s
FAÇADE ELEMENTS (Façade 1)															
Glazing	Area	3.6	Pilkington 8/6-16/4	Rw	21	22	21	28	38	40	47	47		Rw / Rw+Ctr	33 / 29 dB
Wall	Area	21.9	Brick and block external wall	Rw	34	40	44	45	51	56	60	63		Rw / Rw+Ctr	50 / 47 dB
Vent	No. off.	2	Greenwood 4000 SBW (Hit and miss)	Dn,e	38	38	37	34	30	34	37	46		Dn,e,w / Dn,e,w+Ctr	33 / 32 dB
None			--												
RESULTS															
Total calculated indoor noise level				$L_{\text{Max},2}$	52	47	42	37	37	30	20	1		$L_{A\text{Max},2}$	41 dB

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



Project:	20 High Street, Baldock
Project number:	20074
Date:	20/04/2020

Plot:	Flat 10
Room:	Lounge (commercial noise ingress)

Daytime ($L_{Aeq,16hr}$)				Octave band centre frequency										Broadband term	
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k			
EXTERNAL NOISE LEVEL															
External noise level			Façade 1 (west)	$L_{eq,1}$	44	49	50	46	46	44	41	37	$L_{Aeq,1}$	51 dB	
Façade correction factor				C	0	0	0	0	0	0	0	0			
External noise level			Façade 2 (north)	$L_{eq,1}$	38	45	45	41	40	38	34	30	$L_{Aeq,1}$	45 dB	
Façade correction factor				C	0	0	0	0	0	0	0	0			
INCIDENT FAÇADE NOISE LEVEL															
Incident noise level			Façade 1 (west)	$L_{eq,ff}$	44	49	50	46	46	44	41	37	$L_{Aeq,ff}$	51 dB	
Incident noise level			Façade 2 (north)	$L_{eq,ff}$	38	45	45	41	40	38	34	30	$L_{Aeq,ff}$	45 dB	
ROOM DATA															
Room description and reverberation time	Volume	65	Living Room	RT60	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3	s		
FAÇADE ELEMENTS (Façade 1 (west))															
None	Area	8.0	--	Rw	34	40	44	45	51	56	60	63	Rw / Rw+Ctr	50 / 47 dB	
Wall			Brick and block external wall												
None			--												
None			--												
FAÇADE ELEMENTS (Façade 2 (north))															
Glazing	Area	4.7	Pilkington 8/6-16/4	Rw	21	22	21	28	38	40	47	47	Rw / Rw+Ctr	33 / 29 dB	
Wall	Area	14.7	Brick and block external wall	Rw	34	40	44	45	51	56	60	63	Rw / Rw+Ctr	50 / 47 dB	
Vent	No. off.	2	Greenwood 4000 SBW (Hit and miss)	Dn,e	38	38	37	34	30	34	37	46	Dn,e,w / Dn,e,w+Ctr	33 / 32 dB	
None			--												
RESULTS															
Contribution from Façade 1 (west)				$L_{eq,2}$	10	9	4	-	-	-	-	-	$L_{Aeq,2}$	1 dB	
Contribution from Façade 2 (north)				$L_{eq,2}$	15	21	21	13	12	6	-	-	$L_{Aeq,2}$	17 dB	
Total calculated indoor noise level				$L_{eq,2}$	16	21	21	13	12	6	-	-	$L_{Aeq,2}$	17 dB	

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



Project:	20 High Street, Baldock
Project number:	20074
Date:	20/04/2020

Plot:	Flat 10
Room:	Bedroom (commercial noise ingress)

Daytime ($L_{Aeq,16hr}$)				Octave band centre frequency										Broadband term	
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k			
EXTERNAL NOISE LEVEL															
External noise level			Façade 1	$L_{eq,1}$	44	49	50	46	46	44	41	37		$L_{Aeq,1}$	51 dB
Façade correction factor				C	0	0	0	0	0	0	0	0	0		
INCIDENT FAÇADE NOISE LEVEL															
Incident noise level			Façade 1	$L_{eq,ff}$	44	49	50	46	46	44	41	37		$L_{Aeq,ff}$	51 dB
ROOM DATA															
Room description and reverberation time	Volume	43	Bedroom	RT60	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2			s
FAÇADE ELEMENTS (Façade 1)															
Glazing	Area	1.6	Pilkington 8/6-16/4	Rw	21	22	21	28	38	40	47	47		Rw / Rw+Ctr	33 / 29 dB
Wall	Area	6.4	Brick and block external wall	Rw	34	40	44	45	51	56	60	63		Rw / Rw+Ctr	50 / 47 dB
Vent	No. off.	2	Greenwood 4000 SBW (Hit and miss)	Dn,e	38	38	37	34	30	34	37	46		Dn,e,w / Dn,e,w+Ctr	33 / 32 dB
None			--												
RESULTS															
Total calculated indoor noise level				$L_{eq,2}$	17	22	22	17	18	12	6	-		$L_{Aeq,2}$	22 dB

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