

CLIENT:

Chase New Homes, Jasmine House, 8 Parkway, Welwyn Garden City, AL8 6HG

PROJECT:

Impact of Noise Sources on Proposed Residential Development in Support of Planning Application: Block X6.

SITE LOCATION: Xerox Campus, Bessemer Road, Welwyn Garden City, AL7 1BU

PREPARED BY: Rachel Grant Dip.H.E. MIOA
Principal Acoustic Consultant

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1. INTRODUCTION

This report has been produced by Grant Acoustics on behalf of Chase New Homes Ltd (The Client). It accompanies an application for the development of new apartment Block X6 on the Xerox campus site, Bessemer Road, Welwyn Garden City. Existing blocks on the site have already been granted planning permission and this additional Block is proposed for residential apartments. The survey method and criteria are based on those accepted previously for the original noise assessment for the wider development.

As part of the assessment the existing noise environment has been previously measured. The impact of the noise sources affecting the site have been assessed in accordance with BS8233:2014 [1] to predict internal noise levels. External noise levels have been predicted and compared with external amenity noise levels as defined by The World Health Organisation [2] Guidelines. Recommendations have been given with regards to the mitigation required for external amenity areas and in terms of glazing and ventilation to ensure that suitable internal criteria are not exceeded. Where there is plant noise and businesses of a commercial nature affecting the proposed residential block, then the guidance in BS4142:2014 [3] has been taken into account as necessary.

The previous survey results have been considered and the octave band noise calculations undertaken to give guidance on the mitigation required for proposed residential apartments in terms of noise from road / rail traffic and plant noise from the adjacent premises as necessary.

1.1 **SITE LOCATION:**

The site is located adjacent to Bessemer Road which gives access to commercial areas and businesses in the vicinity of the site. To the west of the site is the main line from Stevenage to the north going south to Hatfield with residential dwellings beyond. There are commercial premises such as Grace Foods which has refrigerated lorries collecting produce for delivery to the south of the site. There are offices to the east and north of the site with associated car parking space.

Figure 1 shows the location of the site in comparison to the rest of the site and surrounding area along with the noise monitoring positions of the previous survey.

1.2 PROPOSED DEVELOPMENT DESCRIPTION:

Block X6 is proposed to be built adjacent to the residential development that has already gained planning permission. The Block is adjacent to the railway line with new Blocks X3 and X2 to the south with private and communal landscaped amenity areas and parking.

Figure 2 shows the location of Block X6 in relation to the surrounding area.

2. LOCAL AUTHORITY CRITERIA AND GUIDANCE

2.1 LEGISLATION AND POLICY:

The Government's policies on noise related planning issues are set out within the National Planning Policy Framework (NPPF) [4] which makes reference to the Noise Policy Statement for England (NPSE) [5].

“Noise Policy Statement for England (NPSE)”

The NPSE provides clarification to the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. The principal aims of the NPSE are stated as follows in Section 1.7 of the document:

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- 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.”*

“National Planning Policy Framework (NPPF)”

The National Planning Policy Framework (NPPF) set out the Government’s planning policies for England and how they are expected to be applied. It provides a framework within which local authorities are to prepare local plans and use their planning powers to minimise the adverse impact of noise. It contains the following in relation to noise impacts found in Section 11, paragraph 123:

“Planning policies and decisions should aim to:

- *Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from a new development, including through the use of conditions;*
- *Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established;*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”*

Additional Relevant Guidance

In addition to the above-mentioned planning policy, the following British Standards and guidance documents are considered relevant to the assessment of noise in respect of this project:

“British Standard BS8233:2014, Sound Insulation and Noise Reduction for Buildings – Code of Practice.

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 or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate.

This standard suggests suitable internal noise levels within different types of buildings, including residential dwellings. It suggests that an internal noise level of 30 $\text{dBL}_{\text{Aeq,T}}$ within bedrooms is a ‘good’ standard. For living areas in the daytime, the standard recommends 35 $\text{dBL}_{\text{Aeq,T}}$ as a good standard in Living rooms and 40 $\text{dBL}_{\text{Aeq,T}}$ as being a good standard for dining rooms.

The new version of BS8233:2014 does not give limits as to maximum noise levels in bedrooms at night, but merely states the following note under Table 4 of the Guidance:

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 $L_{\text{Amax,P}}$ depending on the character and number of events per night. Sporadic noise events could require separate values.

Maximum noise criterion has therefore been referred to in The WHO as described below.

BS8233:2014 also refers to preferable levels of 55 dBL_{Aeq} or less in garden and amenity areas, but also understands that noise levels may be higher than this in urban areas. The context of the site should however be taken into account and BS8233:2014 states in relation to amenity noise levels that:

“It is desirable that the external noise level does not exceed 50 dB $L_{\text{Aeq,T}}$, with an upper guideline value of 55 dB $L_{\text{Aeq,T}}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport

network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.”

“World Health Organisation: Guidelines for Community Noise – 1999”

This document states that, in dwellings, the critical effects of noise are on sleep, annoyance and speech interference. According to this document, to protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55dB_{LAeq} for a steady, continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50dB_{LAeq}.

To avoid any possibility of sleep disturbance, indoor guideline values for bedrooms are 30dB_{LAeq} for continuous noise and 45dB_{LAmax} for single sound events. These indoor noise levels correspond to sound pressure levels at the outside façades of the living spaces of 45dB_{LAeq} and 60dB_{LAmax}. These values have been obtained by assuming that the noise reduction from outside to inside with the window partly open is 15dB(A).

“British Standard BS4142:2014, Methods for Rating and Assessing Industrial and Commercial Sound”

BS4142 provides guidance on the assessment of industrial sound affecting residential areas, and indicates the likelihood of complaints about such sound, by comparing the imposed sound with the pre-existing background sound conditions. The context of the sound source also has to be taken in to account in the revised 2014 version of the guidance.

The existing background sound level should be measured at the location of concern. The ‘specific’ sound level ($L_{Aeq,T}$) from plant is measured or predicted and should take into account distance correction and screening where necessary.

Once the 'specific' sound level is obtained, the 'rating' level needs to be determined. If the sound source in question has distinguishable, discrete, continuous note, contains distinct impulses or is irregular enough to attract attention, then various penalties needs to be added. These are described further later in the report.

The measured background sound level should then be taken away from the 'rating' level. The new BS4142 version still requires the difference between the Rating Sound Level and background sound level to be determined and defines the differences as follows:

- *Typically, the greater the difference, the greater the magnitude of the impact.*
- *A difference of around 10dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.*
- *The lower the Rating Level is relative to the measured background sound level, the less likely it is that the specific source will have an adverse impact or a significant adverse impact. Where the Rating Level does not exceed the background sound level; this is an indication of the specific sound source having a low impact, depending on the context.*

The context includes consideration of the absolute level of the sound as well as the level of the residual sound compared to the character and level of the specific sound. The sensitivity of the receptor and whether dwellings already incorporate design measures that secure good internal and / or outdoor acoustic conditions must be taken into account.

2.2 NOISE CRITERIA:

The following internal criteria have been adopted as required previously by the EHO to achieve a 'good' standard of internal noise level within all habitable rooms of the residential development:

Daytime Living / Dining rooms:	35dB _{L_{Aeq}} (0700-2300hrs)
Night time bedrooms:	30dB _{L_{Aeq}} (2300-0700hrs), 45dB _{L_{Amax}}

Mitigation in terms of glazing and ventilation will be given. External noise levels will be compared with the criterion set within the World Health Organisation guidelines of not to exceed 55dB_{L_{Aeq,16 hr}}.

It is recognised in BS4142:2014 that new residential development can be mitigated internally from plant and so glazing and ventilation will be considered to meet internal noise criteria where necessary from plant.

3. SURVEY DETAILS

3.1 PREVIOUS NOISE SURVEY RESULTS:

The survey results from the previous noise assessment have been analysed and are summarised in Table 3.1 below for ease of reference for day and night periods. Results have been rounded to the nearest whole dB(A).

Table 3.1: Summary of Survey Results – MP1 to MP3

Time Period	Log L _{Aeq}	Log Ave L _{Amax,F} (Range)	Ave L _{A10}	Ave L _{A90}
<u>MP1: East of site</u>				
Day	53	73	53	47
Night	47	61 (49-63)	48	44
<u>MP2: Railway</u>				
Day	66	88	57	46
Night	61	86 (52-92)	53	49
<u>MP3: Commercial</u>				
Day	57	75	58	53
Night	57	70 (57-80)	57	54

Previous sample survey results are shown in Table 3.2 below. These give an indication of noise levels to the southern boundary affected by lorry noise and external plant.

Table 3.2: Sample Noise Survey Results

Location	L _{Aeq}	L _{Amax,F}	L _{A10}	L _{A90}
a – Opposite lorry loading bays	64	78	65	61
b – Opposite plant	54, 61	64, 81	56, 60	51
c – Opposite Luvata entrance	61	77	61	51

The proposed development experiences noise predominantly from railway noise to the west with plant and lorry noise to the south.

4. NOISE MAPPING

For indicative purposes only the software programme SoundPlan has been utilised and L_{Aeq} noise contours for day and night periods (0700-2300hrs and 2300-0700hrs respectively) produced based on the survey measurements taken on site. **Figures 3 and 4** show the noise levels affecting Block X6 during day and night periods, which allows for some screening by the development itself from commercial noise sources. Day and night periods are shown at 1.5m above ground level.

Figures 6 to 11 show 3D façade noise levels to Block X6 which illustrate noise decay from rail, road and industrial sources for day L_{Aeq} and night L_{Aeq} periods. Again the whole development has been included as this provides screening to Block X6.

5. RESIDENTIAL NOISE PREDICTIONS

The mitigation required to achieve relevant internal noise criteria in apartments has been predicted based on all noise sources affecting Block X6 for day and night periods.

5.1 INTERNAL NOISE PREDICTIONS:

Internal noise levels have been predicted to typical facades on Block X6 in accordance with BS8233:2014 using the octave band methodology and compared with the requirements of the Local Authority. Based on the illustrative layout, room dimensions and window areas, calculations have been undertaken which also take into account the reverberation time within the habitable room. Internal noise levels have been predicted with windows closed and appropriate ventilation open.

Table 5.1 gives the predicted internal noise levels during the day and night. A typical maximum noise level at night of 86dB(A) at MP2 due to trains and 75dB(A) at MP3 due to road traffic has been taken into account. Distance corrections and screening have been included where relevant.

It is accepted that in an urban environment such as this, internal criteria will not be achieved with windows open. Background ventilation has therefore been recommended in the form of window trickle vents or airbricks, with MEV proposed as necessary to allow for a boost facility if windows have to be kept closed.

Table 5.1: Internal Noise Predictions - Windows Closed and Vents Open

Plot / Façade	Day		Night		
	L _{Aeq}	Mitigation	L _{Aeq}	L _{Amax}	Mitigation
Block X6: Ground Floor facing Railway.	32	Glazing: Type 2 Ventilation: Type B	26	45	Glazing: Type 2 Ventilation: Type C
Block X6: 4 th Floor facing Railway.	35	Glazing: Type 2 Ventilation: Type C	30	46	Glazing: Type 3 Ventilation: Type C
Block X6: 4th Floor Screened from Railway.	27	Glazing: Type 1 Ventilation: Type A	23	41	Glazing: Type 1 Ventilation: Type A
Block X6: 4th Floor Side on to Railway.	35	Glazing: Type 2 Ventilation: Type A	30	45	Glazing: Type 2 Ventilation: Type A
<i>Criteria</i>	35		30	45	

Internal noise levels during the day and night are predicted to fall within the Local Authority criterion of 35dB_{L_{Aeq,16hr}} and 30dB_{L_{Aeq,8hr}} not to be exceeded with the recommended glazing and ventilation types as indicated above. The worst-case facades requiring the highest specification of glazing and ventilation are those bedrooms in Block X6 facing towards the railway line and those side on to the railway line on the 3rd to 5th floors.

Table 5.2 shows the minimum glazing octave band requirements necessary across the site for each type indicated above.

Table 5.2: Glazing Requirements – 1/1 Octave Band Sound Reductions

SRI - Octave Band Centre Frequency (Hz)	125	250	500	1k	2k	4k
Standard glazing: Type 1 (e.g. 4/16/4mm)	21	17	25	35	37	31
Enhanced glazing: Type 2 (e.g. 10/12/6mm)	26	27	34	40	38	46
Enhanced glazing: Type 3 (e.g. 10.8/20/8.8mm)	26	34	40	48	48	50

To achieve the internal noise levels predicted, habitable rooms facing towards the railway line and the return of the habitable room, will require enhanced glazing and a higher specification of acoustic vent with MEV. Where possible outlets should be located to the quieter side of the façade. Table 5.3 shows the minimum octave band values required for different ventilation options where acoustic airbricks or trickle vents are acceptable.

Table 5.3: Ventilation Requirements – 1/1 Octave Band Frequencies

SRI - Octave Band Centre Frequency (Hz)	125	250	500	1k	2k	4k
Type A: Trickle vents / Airbricks	35	34	35	31	29	32
Type B: Trickle vents / Airbricks	36	36	37	31	37	40
Type C: Acoustic ventilation - Airbricks	40	30	32	53	57	63

It should be noted that the above octave band specifications should be given to the preferred manufacturer / supplier to enable them to select an appropriate product. As long as the octave band specifications above are achieved, ventilation types indicated above can be either an acoustic trickle vent or acoustic airbrick depending on other requirements of the development and Local Authority requirements for ventilation. **Figures 12** and **13** show the required mitigation for facades of Block X6 for ease of reference.

5.2 RESIDENTIAL EXTERNAL NOISE PREDICTIONS:

External noise levels have been predicted to typical amenity / balcony areas for Block X6. Daytime noise levels measured at MP2 have been taken into account along with samples where necessary. Where appropriate, screening has been included from the development itself along with a distance correction. Table 5.4 shows the predicted amenity noise levels to various plots. Noise levels are based on daytime levels between 0700-2300hrs as required by relevant British Standards.

Table 5.4: Predicted External Amenity Noise Levels – $L_{Aeq,16hr}$

Plot / Location	Daytime $L_{Aeq,16hr}$
<u>Block X6: Ground floor:</u> Balconies facing railway, unscreened	<51 dB(A)
<u>Block X6: 1st and 2nd Floors:</u> Balconies facing railway, unscreened	<63 dB(A)
<u>Block X6: 3rd and 4th Floors:</u> Balconies facing railway, unscreened	<66 dB(A)
<u>Block X6: Ground to 2nd Floors:</u> Balconies Side on to railway, part screened	<51 dB(A)
<u>Block X6: 3rd and 4th Floors:</u> Balconies Side on to railway, part screened	<57 dB(A)
<u>Block X6: All Floors:</u> Balconies screened from Railway Line	<51 dB(A)
<i>Criterion</i>	<55

The WHO states that for gardens and amenity areas, it is desirable that the steady noise level does not exceed 50dB $L_{Aeq,16 hr}$ and 55dB $L_{Aeq,16 hr}$ should be regarded as the upper limit.

BS8233:2014 also refers to preferable levels of 55dB L_{Aeq} or less, but also understands that noise levels may be higher than this in urban areas. Amenity noise levels are generally predicted to fall within the WHO criterion for plots screened from the railway line. There is an excess for balconies facing and side on to the railway line, however it should be noted that there is external communal amenity space available across the wider development area that is screened from the various sources and therefore fall within the criterion of not to exceed 55dB(A).

The context of the site should however be taken into account and BS8233:2014 states in relation to amenity noise levels that:

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

achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.”

6. PLANT NOISE

6.1 EXISTING PLANT NOISE: Grace Foods

The commercial premises, Grace Foods, to the south-western boundary of the development site have plant located externally at ground level. Noise from these sources were measured at sample monitoring position ‘a’ and ‘b’ and used in the assessment to determine the impact externally to the closest amenity area of Block X6, namely balconies facing east, screened from the railway line and side on to Bessemer Road. Block X6 is set back from the road and partly screened by Blocks X2 and X3 from plant.

Plant noise is obvious during the day when standing along the road and based on the night time audio recordings, plant noise was heard and was continuous throughout the night as well at position MP3. The measured noise level of 57dB(A) on the opposite side of Bessemer Road has therefore been taken into account during the day and at night.

Table 6.1 shows the BS4142 assessment for daytime external amenity only with noise from the external plant to the closest balcony of Block X6 which is taken as 100m away. This is therefore a worst-case scenario and it is considered that noise to other private external amenity areas on the Block will be less than predicted due to greater distance correction and screening.

The typical lowest background level measured across the site during the day is 46dB(A) at MP2. This has therefore been taken in to account in the assessment.

Table 6.1: BS4142 Plant Assessment: Day 1-hr to External Amenity Block X6

Results		Clause of BS4142:2014	Commentary
Background sound level - day	$L_{A90,T} = 46 \text{ dB(A)}$	8	Typical background level measured at MP2 unaffected by plant.
Assessment made during the day so reference time interval is 1-hour		7.2	
Specific sound level measured at MP3 with distance correction to 100m	$L_{Aeq,1hr} = 48 \text{ dB(A)}$	7.3.6	Source noise level measured at MP3 and corrected to 100m to Block X6 closest balcony.
Total on time in 1hr: corrections	0 dB(A)		100% on time for all sources
Acoustic feature correction: Tonal	+2 dB(A)	9.2	Plant noise just perceptible during the day.
Acoustic feature correction: Intermittent	0 dB(A)	9.2	Assumed plant is not intermittent as assumed 100% of time period
Acoustic feature correction: Impulsivity	0 dB(A)	9.2	No impulsive noise
Part screening from plant by new Blocks	-3 dB(A)		Assumed no line of sight to plant.
Cumulative Rating Sound Level	47 dB(A)		
Excess of Rating level over background sound level	$47-46 = +1 \text{ dB(A)}$		Rating Level – Block X6 amenity
Assessment of Impact: likelihood of low to adverse impact depending on context		11	Initial estimate
Context	The noise assessment relates to the impact of noise from existing plant adjacent to the proposed residential development. The Rating Sound Level is predicted to be 1dB(A) higher than the typical background level during the day. The area is urban in nature with rail traffic and noise from commercial premises.		
Uncertainty of the assessment	The predictions identify that the specific sound levels are likely to exceed the background level measured during the day by an insignificant amount of 1dB(A). Any uncertainty of the assessment may be that the plant was operating at full capacity due to the warm weather and may for the majority of the time be less than shown. This is therefore considered a worst-case scenario.		

The impact of plant noise associated with Grace Foods has been assessed and is shown to exceed the typical background level at the closest Balcony of Block X6 by 1dB(A). This is a worst-case scenario and other balconies further away on the same block will be less than predicted. An excess of 1dB(A) is of a low to adverse impact in accordance with BS4142.

BS4142 recognises that new residential development can be mitigated at the façade to achieve acceptable internal criteria in accordance with BS8233:2014. To ensure that plant noise does not have an adverse impact internally to closest habitable rooms on Block X6, an assessment has been made of the glazing and ventilation requirements. The cumulative Rating Level has been predicted as 47dB_{L_{Aeq}} and so this has been taken into account to predict internal noise levels. The following basic calculation is shown for internal noise for day time habitable rooms with windows open assuming a sound reduction of -13dB(A) for a partially open window.

Table 6.2: Internal Plant Noise Predictions – Day Windows Open

Source	Day
Plant Rating Noise Level	47
dB(A) reduction of Glazing Open	-13
Internal noise level	34
Day time Internal Criteria:	35 dB _{L_{Aeq}}

Internal noise levels from adjacent plant are predicted to fall within relevant internal criteria to closest plots with windows open. The mitigation already proposed due to other sources during the day will therefore also be adequate to mitigate against plant noise.

The external Rating Sound Level has been predicted at night with the sound reduction of a closed window taken into account. Table 6.3 shows the BS4142 assessment for night time only with noise from the external plant to the facade of the closest residential block taken as X6. This is therefore a worst-case scenario and it is considered that noise to other facades will be less due to greater distance and screening effect.

The typical lowest background level measured across the site at night is 44dB(A) at MP2. This has therefore been taken on to account in the assessment.

Table 6.3: BS4142 Plant Assessment: Night 15-Minute to Façade of Block X6

Results		Clause of BS4142:2014	Commentary
Background sound level - day	$L_{A90,T} = 44 \text{ dB(A)}$	8	Typical background level measured at MP2.
Assessment made during the night so reference time interval is 15-minutes		7.2	
Specific sound level as measured at MP3 with distance to 100m	$L_{Aeq,1hr} = 48 \text{ dB(A)}$	7.3.6	Source noise level as measured at MP3 with distance correction to Block X6 at 100m.
Total on time in 15-min: corrections	0 dB(A)		100% on time for all sources
Acoustic feature correction: Tonal	+4 dB(A)	9.2	Plant noise perceptible during the night.
Acoustic feature correction: Intermittent	0 dB(A)	9.2	Assumed plant is not intermittent as assumed 100% of time period
Acoustic feature correction: Impulsivity	0 dB(A)	9.2	No impulsive noise
Part screening from plant by new Blocks	-3 dB(A)		Assumed no line of sight to plant.
Cumulative Rating Sound level	49 dB(A)		
Excess of Rating level over background sound level	$49-44 = +5 \text{ dB(A)}$		Rating Level – Block X6 Façade
Assessment of Impact: likelihood of adverse impact depending on context		11	Initial estimate
Context			The noise assessment relates to the impact of noise from existing plant adjacent to the proposed residential development. The Rating Sound Level is predicted to be 5dB(A) higher than the typical background level during the night. Façade mitigation will be considered to ensure that internal noise levels fall within relevant criteria.
Uncertainty of the assessment			The predictions identify that the specific sound levels are likely to exceed the background level measured during the night by no more than 5dB(A). Any uncertainty of the assessment may be that the plant was operating at full capacity due to the warm weather and may for the majority of the time be less than shown. This is considered a worst-case.

The impact of plant noise associated with Grace Foods has been assessed and is shown to exceed the typical background level at the closest façade of Block X6 by up to 5dB(A). Façade mitigation has therefore been proposed to ensure that internal criteria are met in accordance with BS8233:2014.

The Rating Sound Level has been predicted as 49dBL_{Aeq}. With windows open there will be an excess of +6 above the internal criterion. Windows will therefore need to be kept closed with alternative ventilation provided in line with L.A requirements. To determine the required façade mitigation the following basic calculation is shown for internal noise for night time habitable rooms. A minimum correction of +5dB(A) has been included to err on the side of caution for the effect of ventilation in the window frame.

Table 7.4: Internal Plant Noise Predictions - Night

Source	Day
Plant Rating Noise Level	49
dB(A) reduction of Glazing Type 1	-29
Correction for 2 x vents open in facade	+5
Internal noise level	25
Night time Internal Criteria:	30 dBL _{Aeq}

Internal noise levels from adjacent plant are predicted to fall within relevant internal criteria to closest plots with standard glazing and ventilation. This mitigation is already proposed to the rear façade of Block X6 due to other sources during the night such as trains and delivery vehicles. Enhanced glazing will still be required for the southern façade of Block X6 facing towards Bessemer Road and so this will supersede the standard requirement for plant noise reduction shown above.

Figures 12 and 13 give a full summary of the mitigation required taking into account all noise sources.

7. RECOMMENDATIONS AND CONCLUSIONS

A noise assessment has been undertaken to determine the impact of the existing noise environment on the proposed residential Block X6 at Xerox Campus, Bessemer Road, Welwyn Garden City. This assessment has been produced by Grant Acoustics in support of the planning application to be submitted by Chase New Homes Ltd. The mitigation measures that are required to enable the Local Authority criteria to be met have been given.

7.1 NOISE MAPPING OF SITE:

Noise contour maps have been created to better illustrate noise decay across the site with the proposed development. These have been based on the previous noise survey measurements undertaken over a typical weekday period on the site and show day and night time periods. Noise maps are for illustrative purposes only.

7.2 RESIDENTIAL INTERNAL NOISE PREDICTIONS:

Internal noise levels have been predicted to typical plots / facades for Block X6 based on the illustrative site layout, room dimensions and glazing areas.

Mitigation will consist of enhanced glazing and varying specifications of acoustic ventilation for habitable rooms facing and side on to the railway line. Those facades screened from the railway line will be adequate with standard glazing and ventilation. **Figures 12** and **13** and **Appendix 1** give full explanations of the mitigation requirements across the site.

7.3 RESIDENTIAL EXTERNAL NOISE PREDICTIONS:

External amenity noise levels are typically predicted to exceed the recommended criterion of $55\text{dB}_{\text{Leq,T}}$ for private balcony areas directly facing the railway line. Other amenity areas are predicted to fall within relevant criteria as well as communal amenity areas across the wider development area which are screened from various noise sources.

Based on the location and context of the site, the excess of noise above the external criteria is not considered detrimental to the development when considering the

location of the site which is in an urban environment and that there is alternative amenity provided which residents can use. It is also recognised within the guidance BS8233:2014, that the noise criterion of 55dB(A) may not always be met in urban environments.

7.4 EXISTING PLANT NOISE:

There is external plant associated with Grace Foods to the south west of the site that has been considered in a BS4142:2014 assessment. Noise from the plant was dominant along Bessemer Road for day and night periods.

A BS4142 assessment has been undertaken to assess the impact of plant noise to the closest proposed amenity space taken as the balconies to the rear of Block X6. Relevant penalties for various characteristics have been included where necessary.

A comparison of the Rating Level with the typical background level for day time has therefore been made as this is when amenity space is most likely to be used. It is predicted that cumulative plant will be 1dB(A) above the typical background level of 46dB(A). A low to adverse impact is therefore predicted. This impact is based on the closest balcony and so other amenity areas will be less than predicted and have a low adverse impact.

Internal noise levels from plant are predicted to fall within relevant criteria for day time periods with windows open. During the night time windows will need to be kept closed with standard glazing and ventilation which has already been recommended for other noise sources to the rear façade of Block X6.

7.5 CONCLUSIONS:

To conclude, appropriate mitigation can be provided to ensure internal noise levels are acceptable across the development and within relevant criteria as previously agreed with the Local Authority.

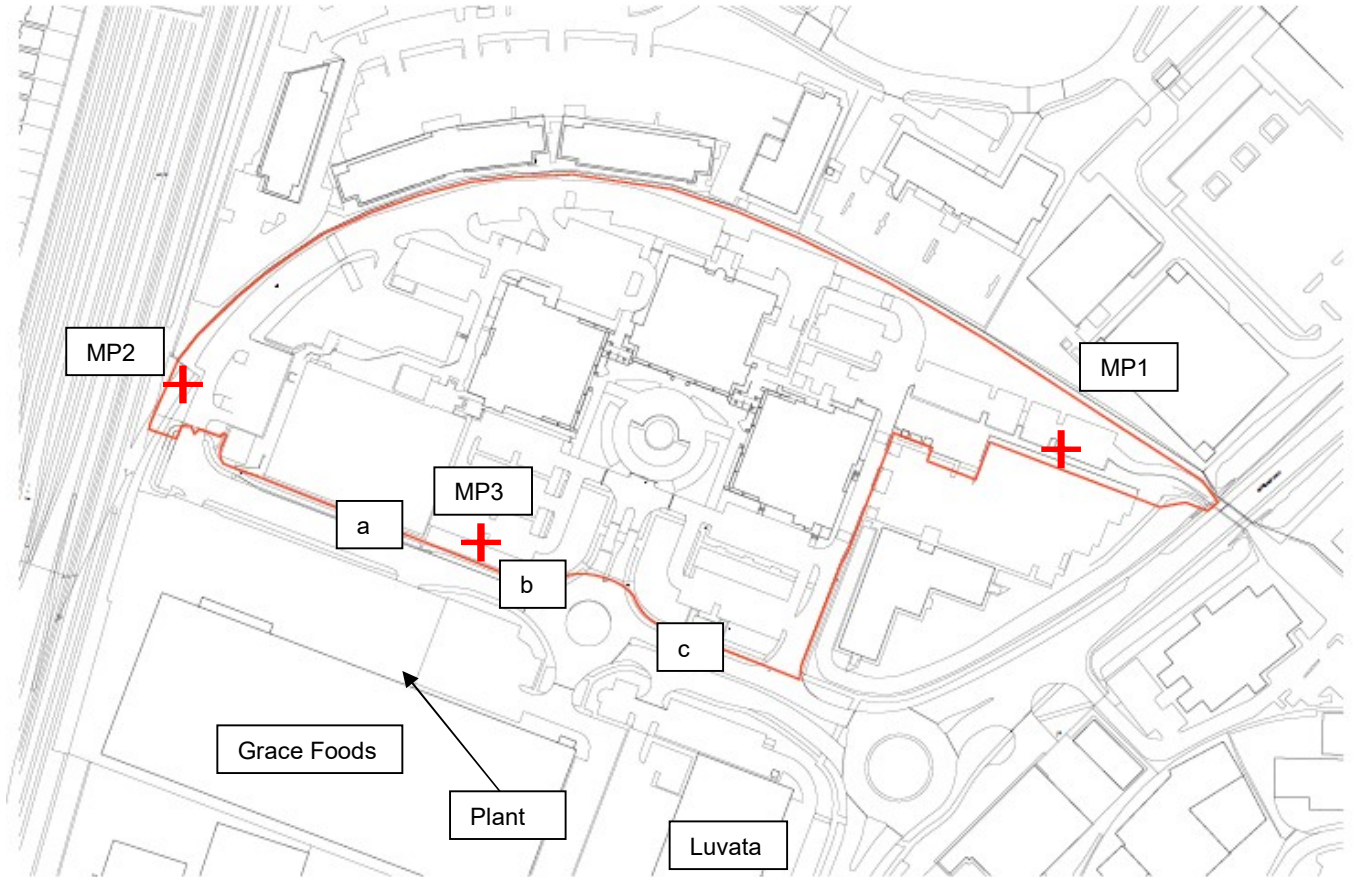
Although external amenity areas exceed the relevant criteria to certain facades, this is not considered detrimental as there is alternative quieter amenity space provided and public open space in the vicinity of the site. Consideration also needs to be given to the site location and its context as an urban location with good transport links.

It is therefore concluded that noise does not present a constraint to the granting of planning permission.

8. REFERENCES

- [1] BS8233:2014 – *Guidance on Sound Insulation and Noise Reduction for Buildings.*
- [2] The World Health Organisation – *Guidelines for Community Noise 1999.*
- [3] BS4142:2014 - *Methods for Rating and Assessing Industrial and Commercial Sound.*
- [4] National Planning Policy Framework – Defra. March 2012
- [5] NPSE – Noise Policy statement for England 2010

**Figure 1: Location of Site and Previous Noise Monitoring Positions
Relative to Surrounding Area**





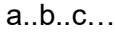
-  Approx. Site Boundary
-  MP1..MP2..MP3 24-hour Noise Monitoring Positions
-  a..b..c... Sample Noise Monitoring Positions

Figure 2: Block X6 Location and Layout:

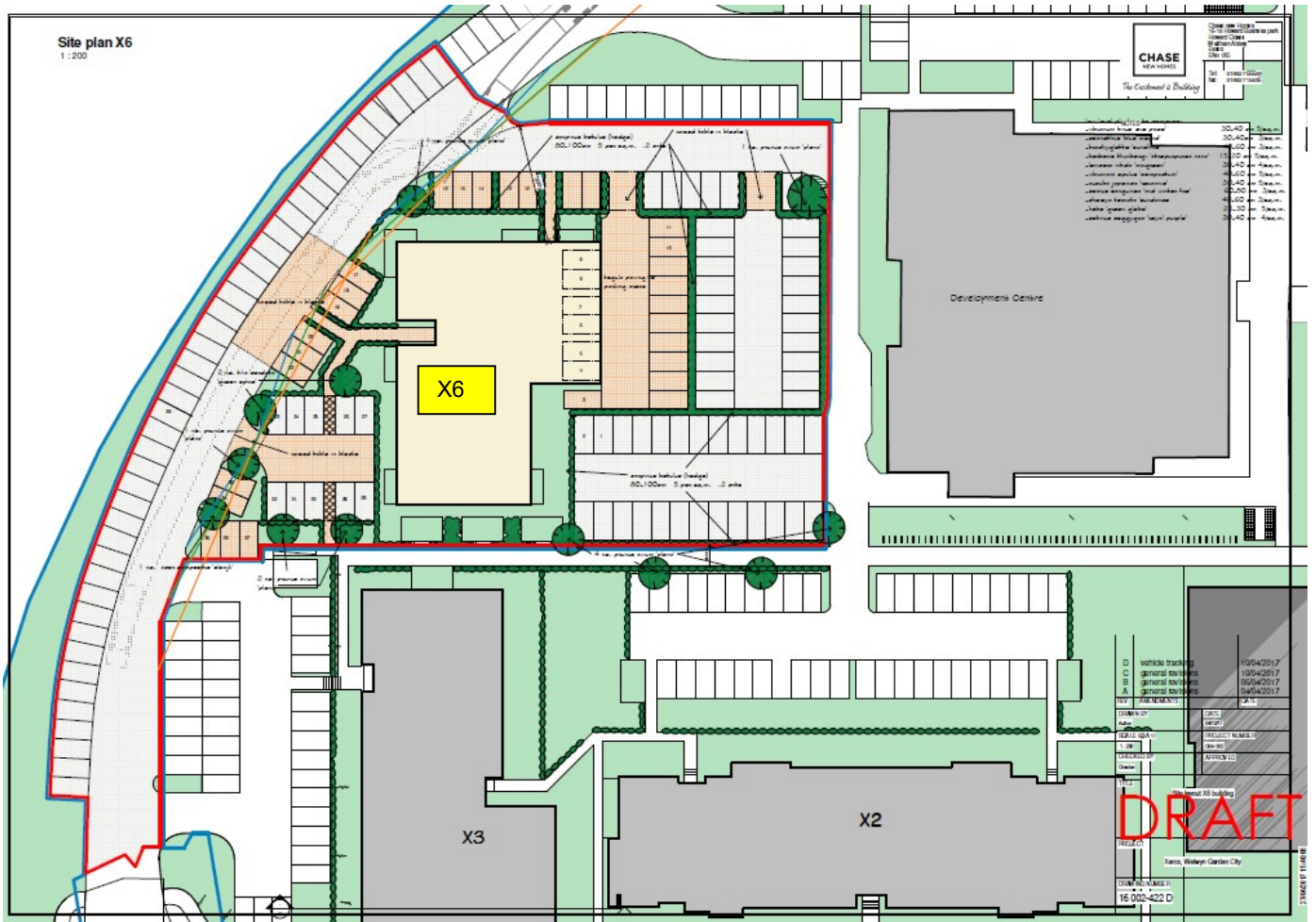


Figure 3: Illustrative Layout of Block X6:



Figure 4: Day time Noise Contours at 1.5m – Illustrative Site Layout



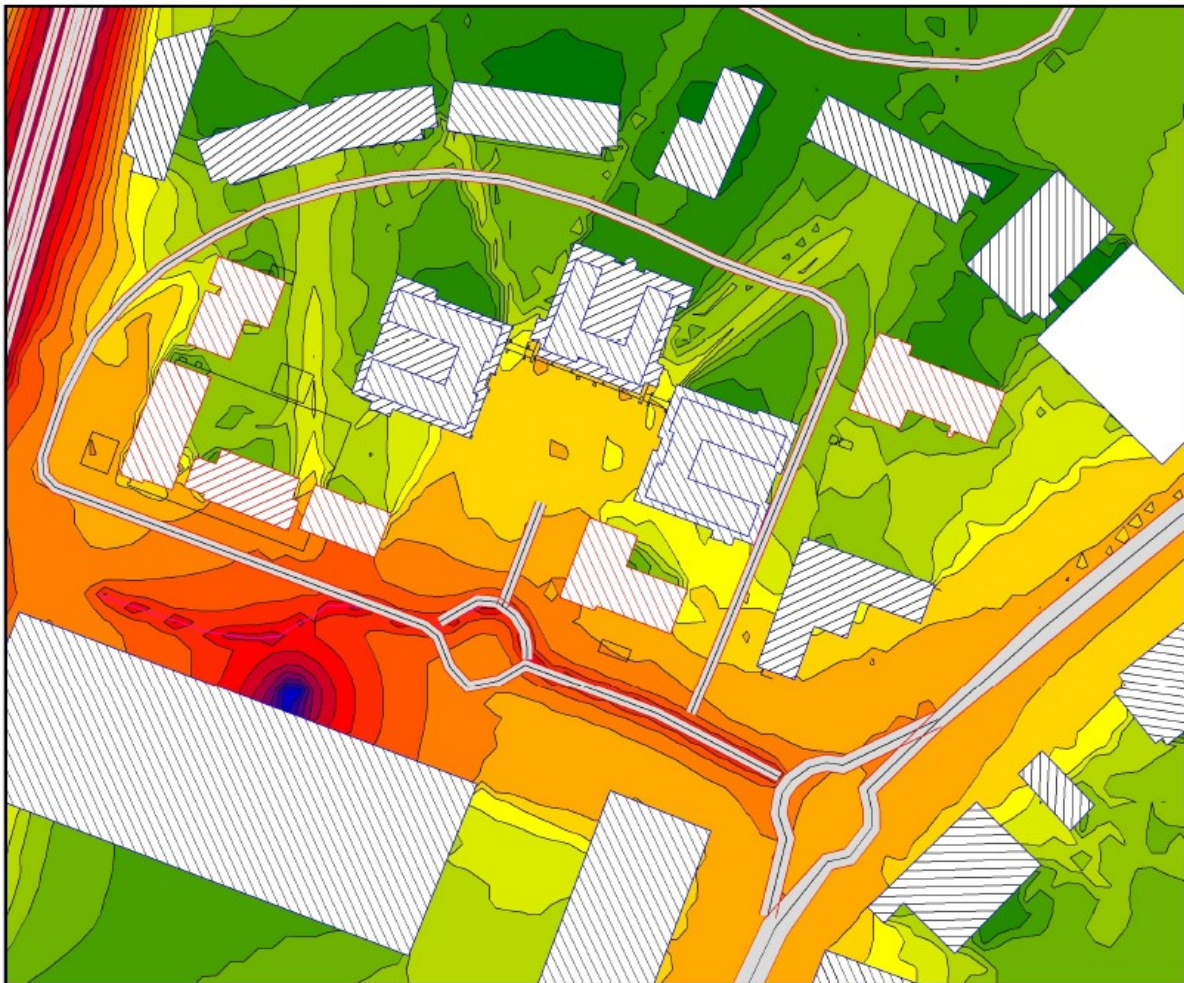
Noise level
 Lday
 in dB(A)

	≤ 30.0
30.0 <	≤ 33.0
33.0 <	≤ 36.0
36.0 <	≤ 39.0
39.0 <	≤ 42.0
42.0 <	≤ 45.0
45.0 <	≤ 48.0
48.0 <	≤ 51.0
51.0 <	≤ 54.0
54.0 <	≤ 57.0
57.0 <	≤ 60.0
60.0 <	≤ 63.0
63.0 <	≤ 66.0
66.0 <	≤ 69.0
69.0 <	≤ 72.0
72.0 <	≤ 75.0
75.0 <	≤ 78.0
78.0 <	≤ 81.0
81.0 <	≤ 84.0
84.0 <	

Signs and symbols

- Railway axis
- Existing building
- Proposed building
- Area source
- Road axis
- Emission line

Figure 5: Night time Leq Noise Contour at 1.5m – Illustrative Layout



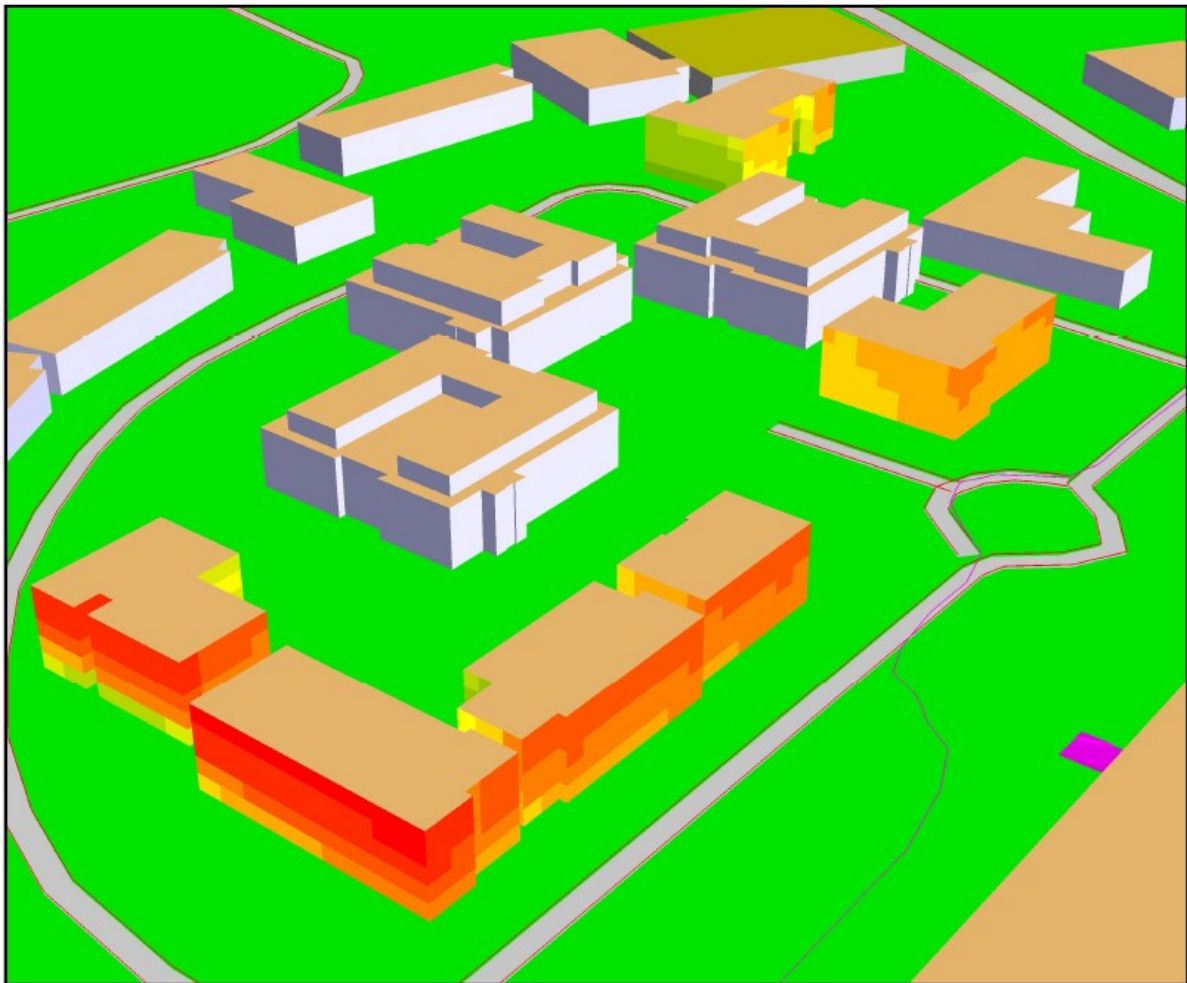
Noise level
 L_{night}
 in dB(A)

30.0 <	≤ 30.0
33.0 <	≤ 33.0
36.0 <	≤ 36.0
39.0 <	≤ 39.0
42.0 <	≤ 42.0
45.0 <	≤ 45.0
48.0 <	≤ 48.0
51.0 <	≤ 51.0
54.0 <	≤ 54.0
57.0 <	≤ 57.0
60.0 <	≤ 60.0
63.0 <	≤ 63.0
66.0 <	≤ 66.0
69.0 <	≤ 69.0
72.0 <	≤ 72.0
75.0 <	≤ 75.0
78.0 <	≤ 78.0
81.0 <	≤ 81.0
84.0 <	≤ 84.0

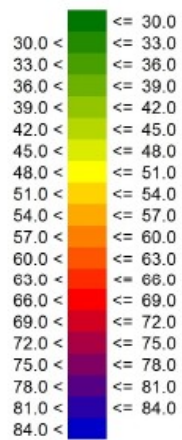
Signs and symbols

- Railway axis
- Existing building
- Proposed building
- Area source
- Road axis
- Emission line

Figure 6: Daytime 3D Leq Façade Noise Levels – SW



Noise level
 Lday
 in dB(A)



Signs and symbols




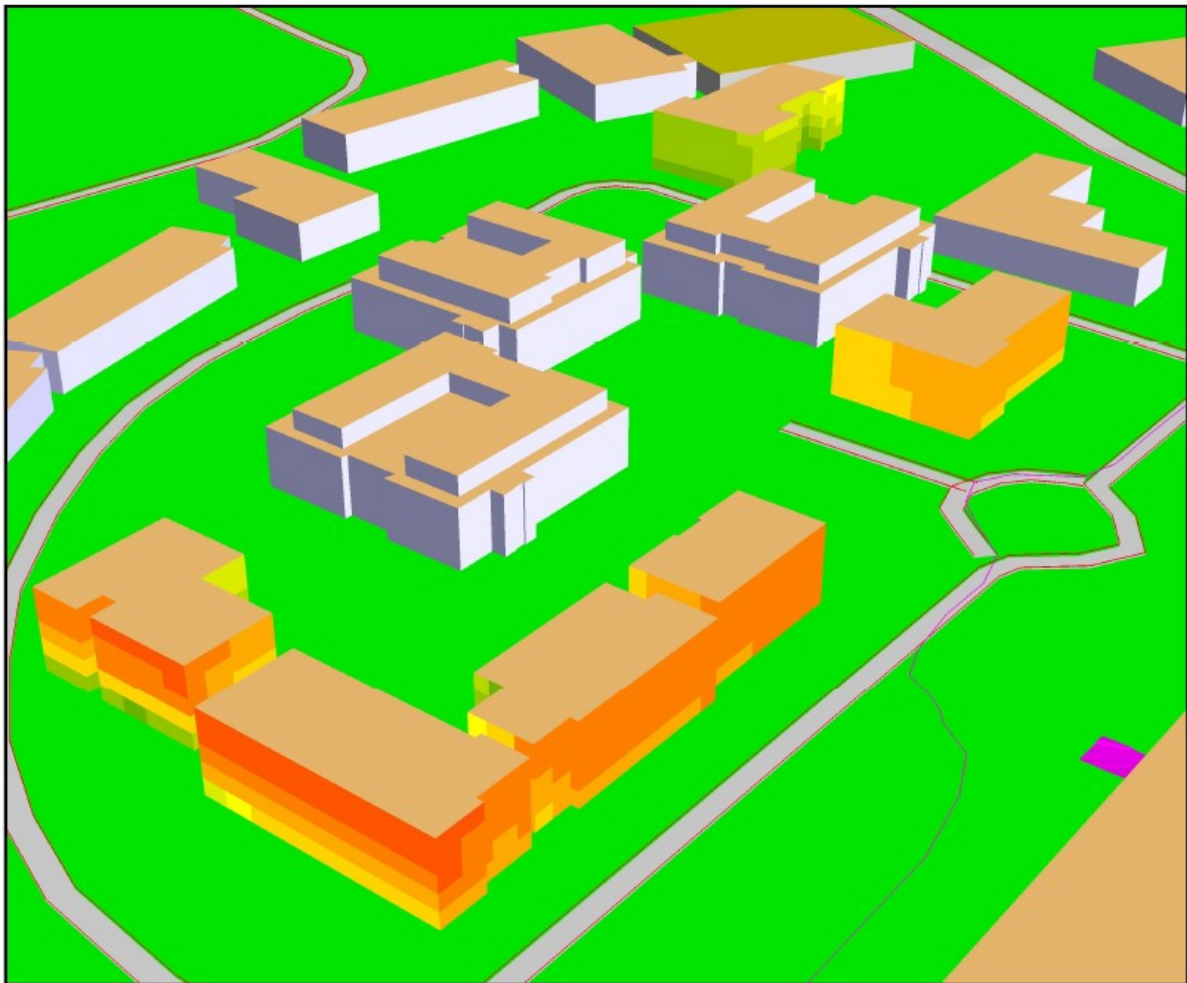
- Railway axis
-  Existing building
-  Proposed building
-  Area source
- Road axis
- Emission line

Figure 7: Night time 3D Leq Façade Noise Levels – SW



Noise level
 L_{night}
 in dB(A)

<= 30.0
30.0 < <= 33.0
33.0 < <= 36.0
36.0 < <= 39.0
39.0 < <= 42.0
42.0 < <= 45.0
45.0 < <= 48.0
48.0 < <= 51.0
51.0 < <= 54.0
54.0 < <= 57.0
57.0 < <= 60.0
60.0 < <= 63.0
63.0 < <= 66.0
66.0 < <= 69.0
69.0 < <= 72.0
72.0 < <= 75.0
75.0 < <= 78.0
78.0 < <= 81.0
81.0 < <= 84.0
84.0 <

Signs and symbols




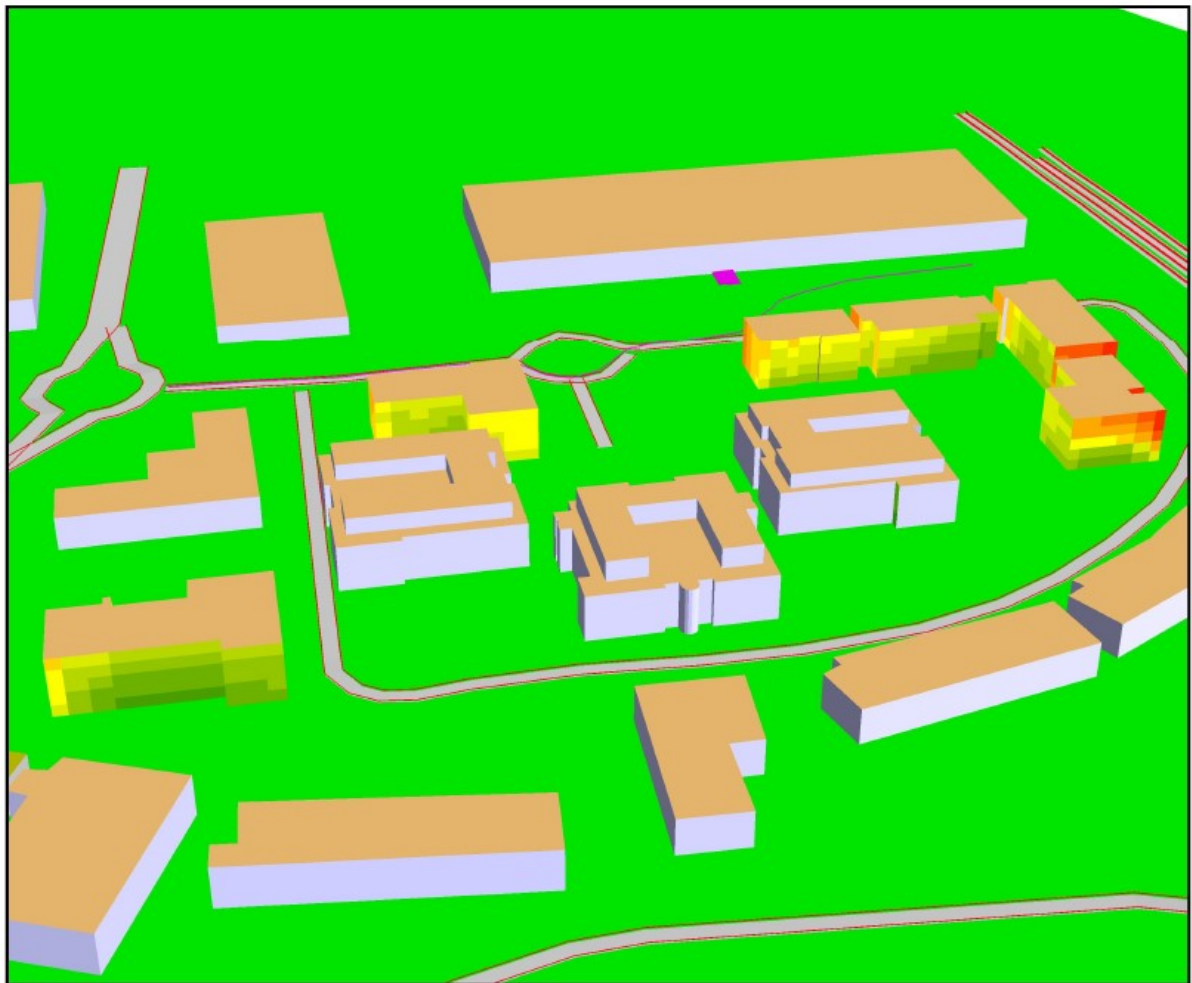
- Railway axis
-  Existing building
-  Proposed building
-  Area source
- Road axis
- Emission line

Figure 8: Day Time 3D Leq Façade Noise Levels – N



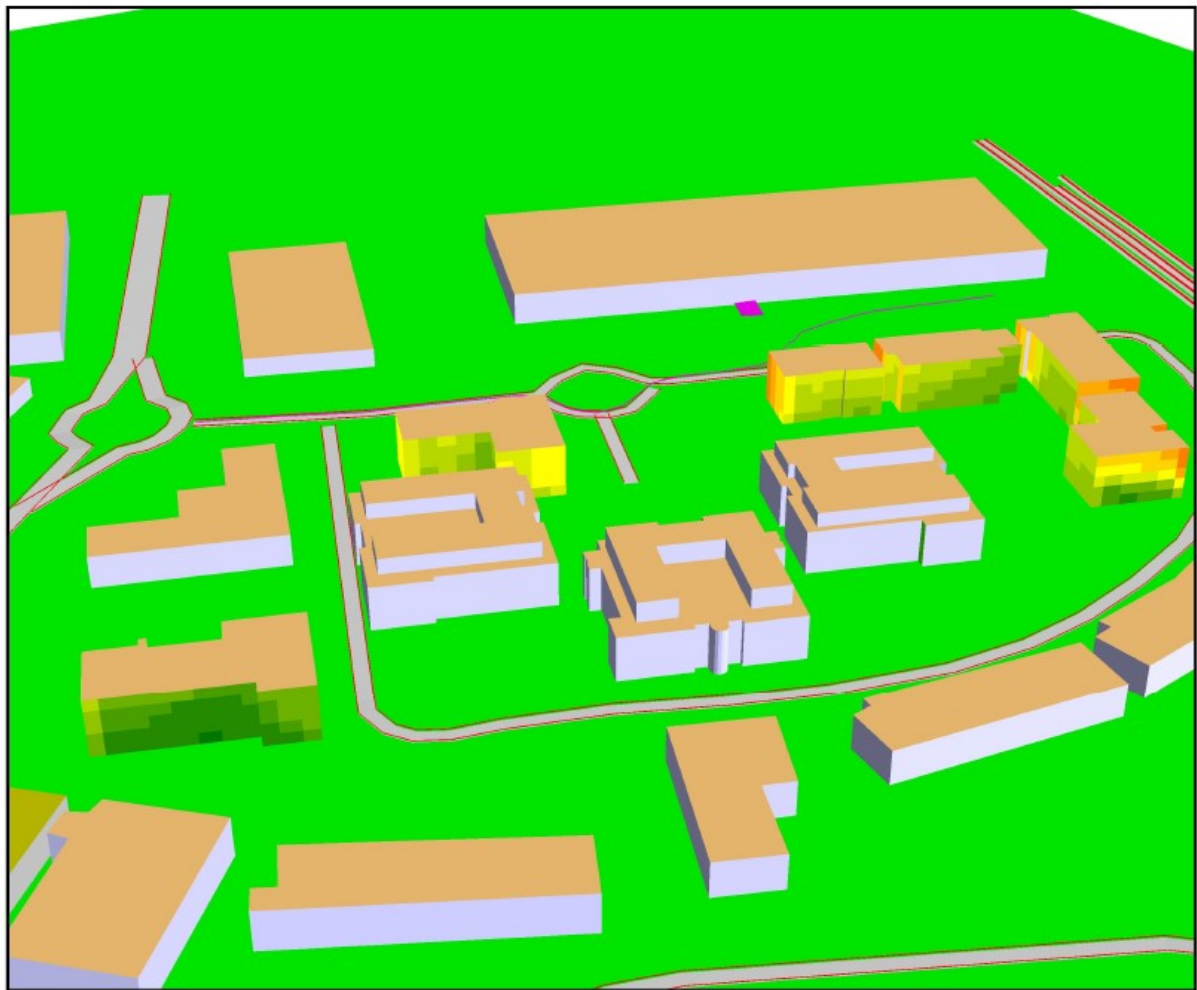
Noise level
 Lday
 in dB(A)

30.0 <	<= 30.0
33.0 <	<= 33.0
36.0 <	<= 36.0
39.0 <	<= 39.0
42.0 <	<= 42.0
45.0 <	<= 45.0
48.0 <	<= 48.0
51.0 <	<= 51.0
54.0 <	<= 54.0
57.0 <	<= 57.0
60.0 <	<= 60.0
63.0 <	<= 63.0
66.0 <	<= 66.0
69.0 <	<= 69.0
72.0 <	<= 72.0
75.0 <	<= 75.0
78.0 <	<= 78.0
81.0 <	<= 81.0
84.0 <	<= 84.0

Signs and symbols

- Railway axis
-  Existing building
-  Proposed building
-  Area source
- Road axis
- Emission line

Figure 9: Night time 3D Leq Façade Noise Levels – N



Noise level
 Lnight
 in dB(A)

<= 30.0	<= 30.0
30.0 <	<= 33.0
33.0 <	<= 36.0
36.0 <	<= 39.0
39.0 <	<= 42.0
42.0 <	<= 45.0
45.0 <	<= 48.0
48.0 <	<= 51.0
51.0 <	<= 54.0
54.0 <	<= 57.0
57.0 <	<= 60.0
60.0 <	<= 63.0
63.0 <	<= 66.0
66.0 <	<= 69.0
69.0 <	<= 72.0
72.0 <	<= 75.0
75.0 <	<= 78.0
78.0 <	<= 81.0
81.0 <	<= 84.0
84.0 <	

Signs and symbols




- Railway axis
-  Existing building
-  Proposed building
-  Area source
- Road axis
- Emission line

Figure 10: Day Time 3D Leq Façade Noise Levels – SE



Noise level
 Lday
 in dB(A)

<= 30.0
30.0 < <= 33.0
33.0 < <= 36.0
36.0 < <= 39.0
39.0 < <= 42.0
42.0 < <= 45.0
45.0 < <= 48.0
48.0 < <= 51.0
51.0 < <= 54.0
54.0 < <= 57.0
57.0 < <= 60.0
60.0 < <= 63.0
63.0 < <= 66.0
66.0 < <= 69.0
69.0 < <= 72.0
72.0 < <= 75.0
75.0 < <= 78.0
78.0 < <= 81.0
81.0 < <= 84.0
84.0 <

Signs and symbols




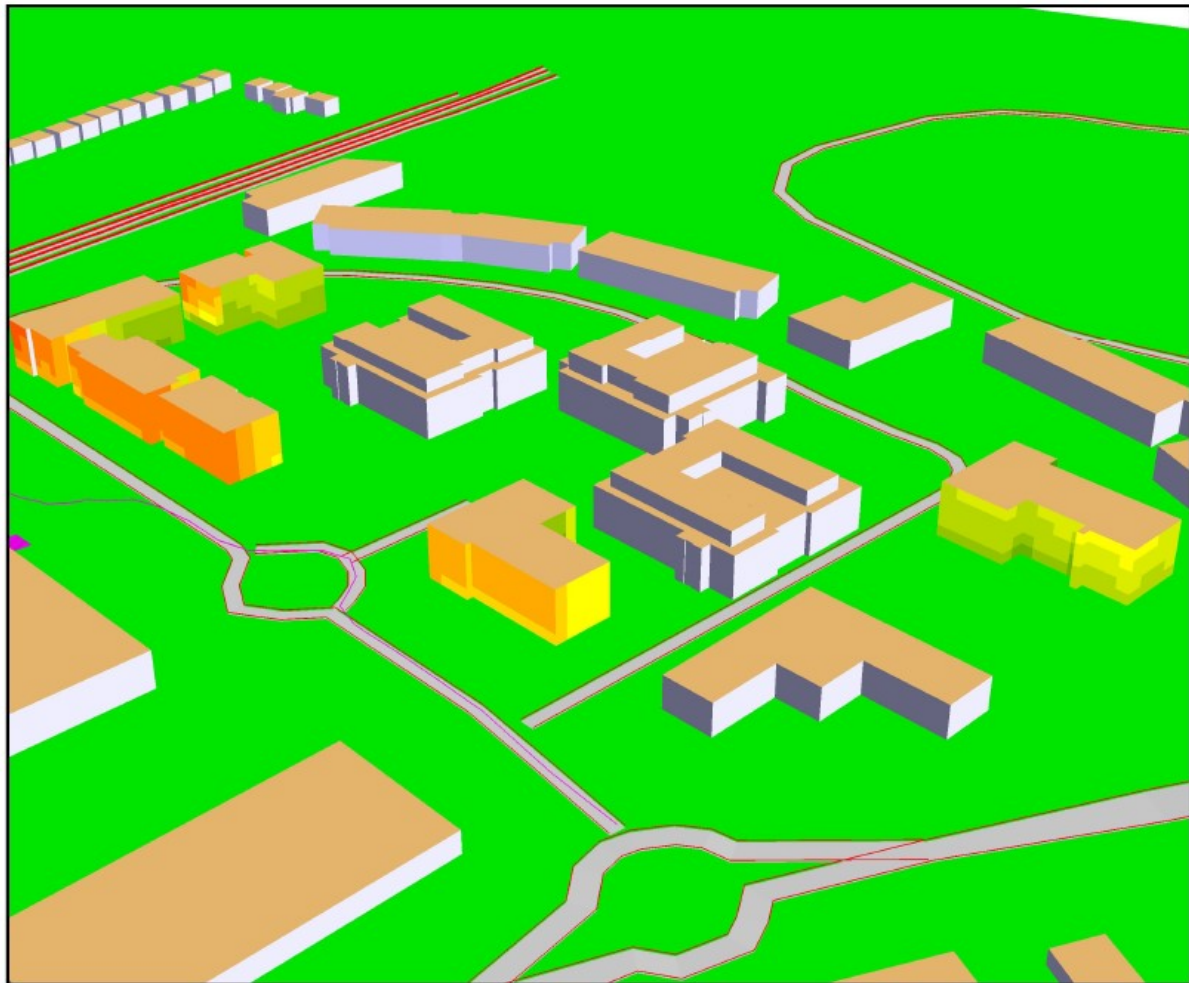
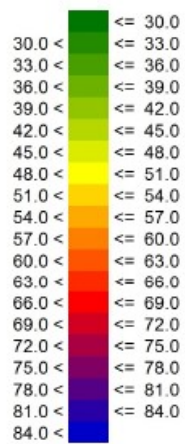
- Railway axis
-  Existing building
-  Proposed building
-  Area source
- Road axis
- Emission line

Figure 11: Night Time 3D Leq Façade Noise Levels – SE



Noise level
 L_{night}
 in dB(A)



Signs and symbols







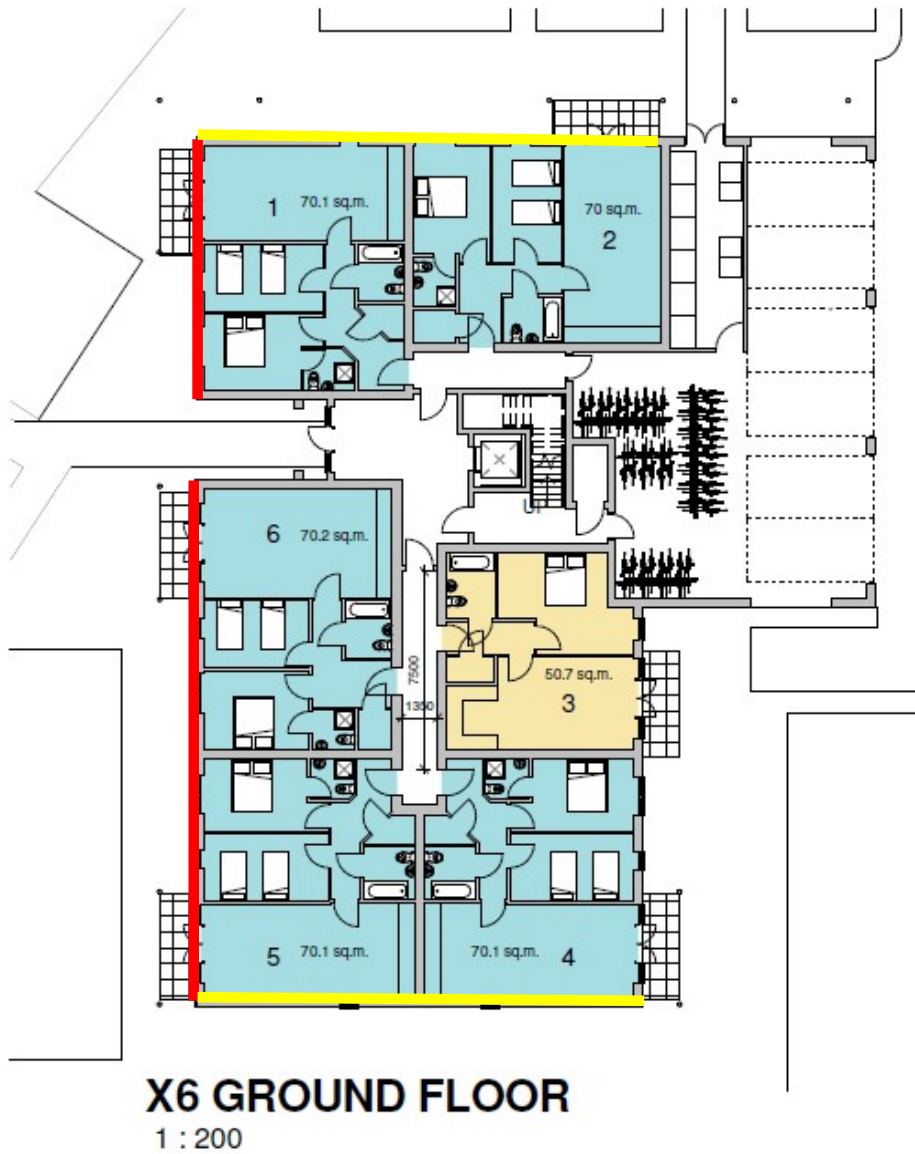
-  Railway axis
-  Existing building
-  Proposed building
-  Area source
-  Road axis
-  Emission line

Figure 12: Required Mitigation – Ground Floor

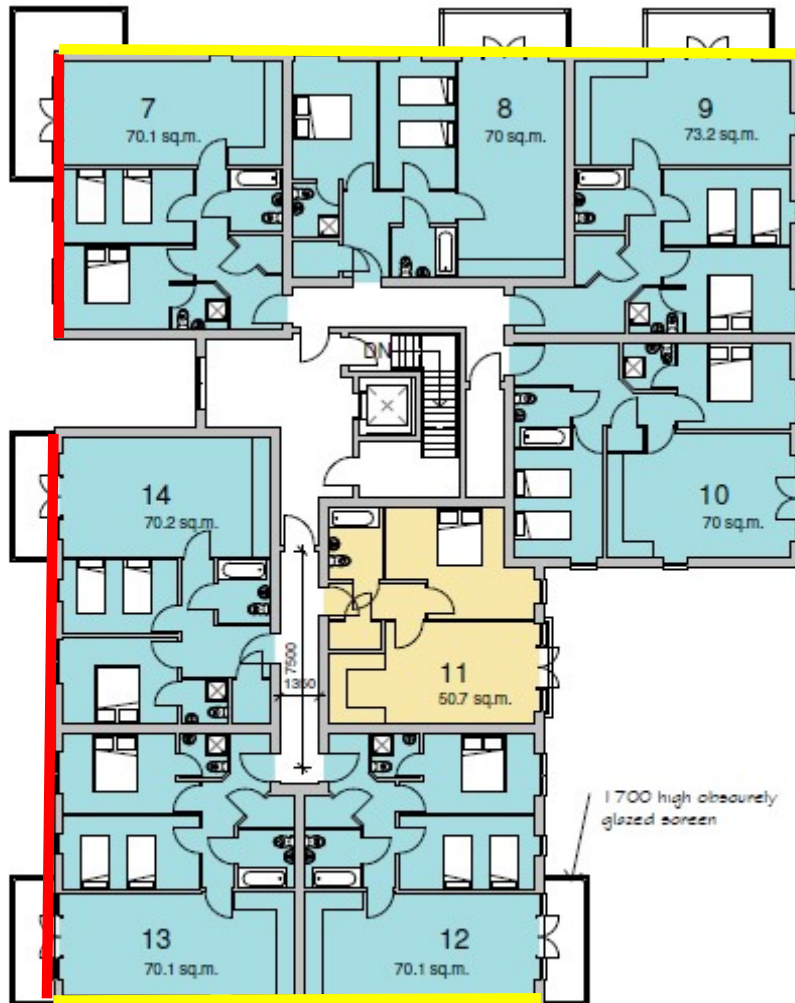


— **All Habitable Rooms: Gnd Floor**
 Glazing: Type 2
Daytime Habitable Rooms:
 Vent: Type A
Bedrooms:
 Vent: Type B

— **All Habitable Rooms: Gnd Floor**
 Glazing: Type 2
Daytime Habitable Rooms:
 Vent: Type B
Bedrooms:
 Vent: Type C

All other ground floor facades not marked will be adequate with standard Type 1 glazing and Type A vents

Figure 13: Required Mitigation – 1st Floor and Above Inc.



X6 UPPER FLOORS

1 : 200

<p>All Habitable Rooms: Glazing: Type 2 Vent: Type A</p>	<p>Daytime Habitable Rooms: Glazing: Type 2 Vent: Type C <u>Bedrooms:</u> Glazing: Type 3 Vent: Type C</p>
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All other ground floor facades not marked will be adequate with standard Type 1 glazing and Type A vents




Appendix 1: Technical Summary for Mitigation – Xerox Site, Block X6.

Please refer to Figures 12 and 13 of the noise report when reading this technical note.

Glazing Requirements:

SRI - Octave Band Centre Frequency (Hz)	125	250	500	1k	2k	4k
Standard glazing: Type 1	21	17	25	35	37	31
Enhanced glazing: Type 2	26	27	34	40	38	46
Enhanced glazing: Type 3	26	34	40	48	48	50

A summary of requirements for glazing is shown below. Where an 'x' is placed, this denotes that the option is suitable for that specific façade or plot.

Façade / Plot (See Figures 12 & 13)	Glazing Type 1	Glazing Type 2	Glazing Type 3
All habitable rooms and facades not marked	X	-	-
 Daytime all habitable rooms,  All floors	-	X	-
 Bedrooms 1 st floor and above	-	-	X




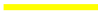


Other glazing configurations can be used as long as the octave band noise reduction for enhanced glazing above is achieved. The octave band frequency specification above must be provided to the supplier to enable an appropriate product to be selected.

Ventilation Requirements:

The following octave band reductions for vents are therefore required. Acoustic trickle vents or acoustic air bricks should be selected to meet the frequency reduction shown.

SRI - Octave Band Centre Frequency (Hz)	125	250	500	1k	2k	4k
Type A: Trickle vents / Airbricks	35	34	35	31	29	32
Type B: Trickle vents / Airbricks	36	36	37	31	37	40
Type C: Acoustic ventilation - Airbricks	40	30	32	53	57	63
Type D: Acoustic ventilation - Airbricks	42	35	35	53	59	65

The following table gives the requirements of ventilation required for each façade of the development. Where an 'x' is placed, this denotes that the option is suitable for that specific façade or plot.

Façade / Plot (See Figures 14 & 15)	Type A	Type B	Type C
	Trickle-vents / Airbricks	Acoustic T-Vents / Airbricks	Acoustic Airbricks
All habitable rooms / facades not marked	X	-	-
 Daytime Habitable rooms Ground floor only	-	X	
 Daytime Habitable rooms Ground floor only	X		-
 Bedrooms Ground floor only	-	-	X
 Bedrooms Ground floor only	-	X	-
 All habitable rooms 1 st floor and above	X	-	-
 All habitable rooms 1 st floor and above	-	-	X

Manufacturers / suppliers should be given the ventilation octave band specifications above to enable an appropriate product to be selected.