

5. New development near existing dwellings

The following sub-sections detail the mitigation measures to be employed to control noise breakout from the proposed development. This section is split into the following Sections:

- Predicted noise impact from road traffic [roads, deliveries and car parks]
- Control of noise breakout from A1/A3 units and Cinema
- Control of noise from fixed services plant

5.1 Existing noise sensitive properties

The site is within an established commercial / residential area. The following Figure highlights the existing residential areas surrounding the site in green:

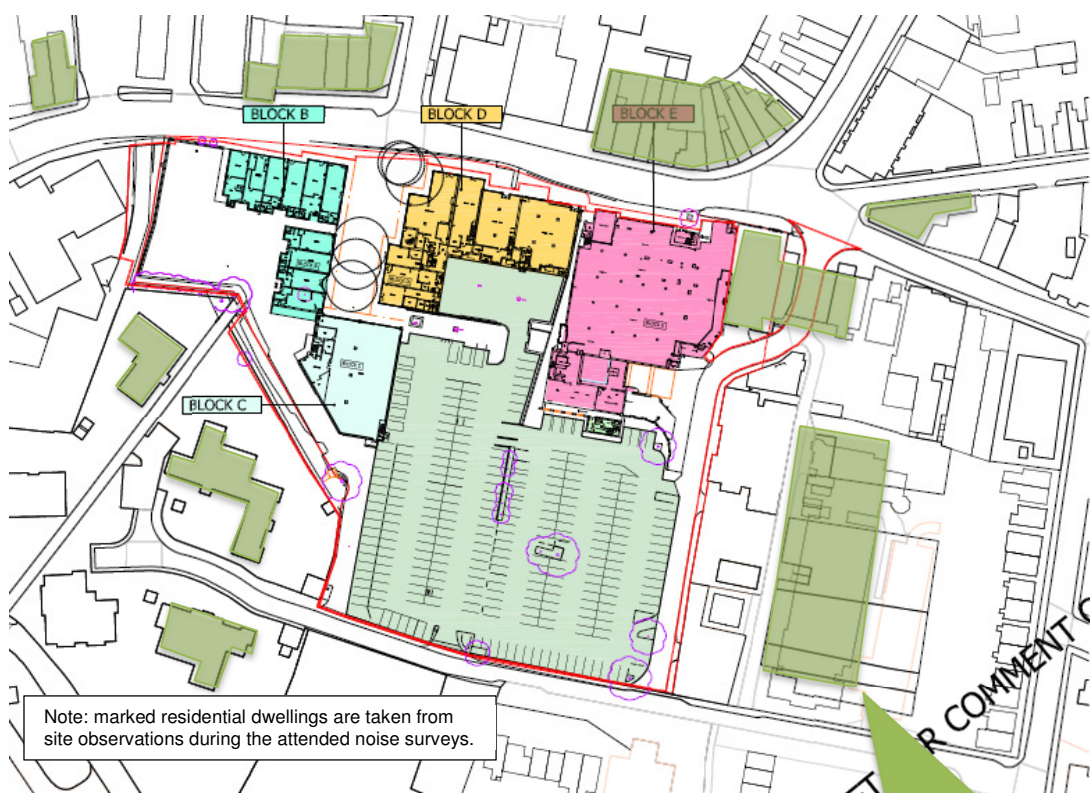


Figure 3 - Location of existing residential dwellings to the site

5.2 Predicted noise impact from road traffic

WYG have provided traffic flow data for the major roads surrounding the site. Data has been provided in the form of Annual Average Daily Traffic [AADT] figures for the following scenarios:

- 2014 Base – existing traffic levels around the site

- 2019 Base – projected traffic levels around the site with no development [based on natural increase in road traffic]
- 2019 With development – projected traffic levels around the site with the development [based on anticipated traffic flows due to natural increases in road traffic plus additional traffic attributable to the proposed development⁴]

In order to assess the potential noise impact from road traffic noise, four residential receptors have been assessed along the major routes into the precinct. These receptors are shown in the following Figure in green:

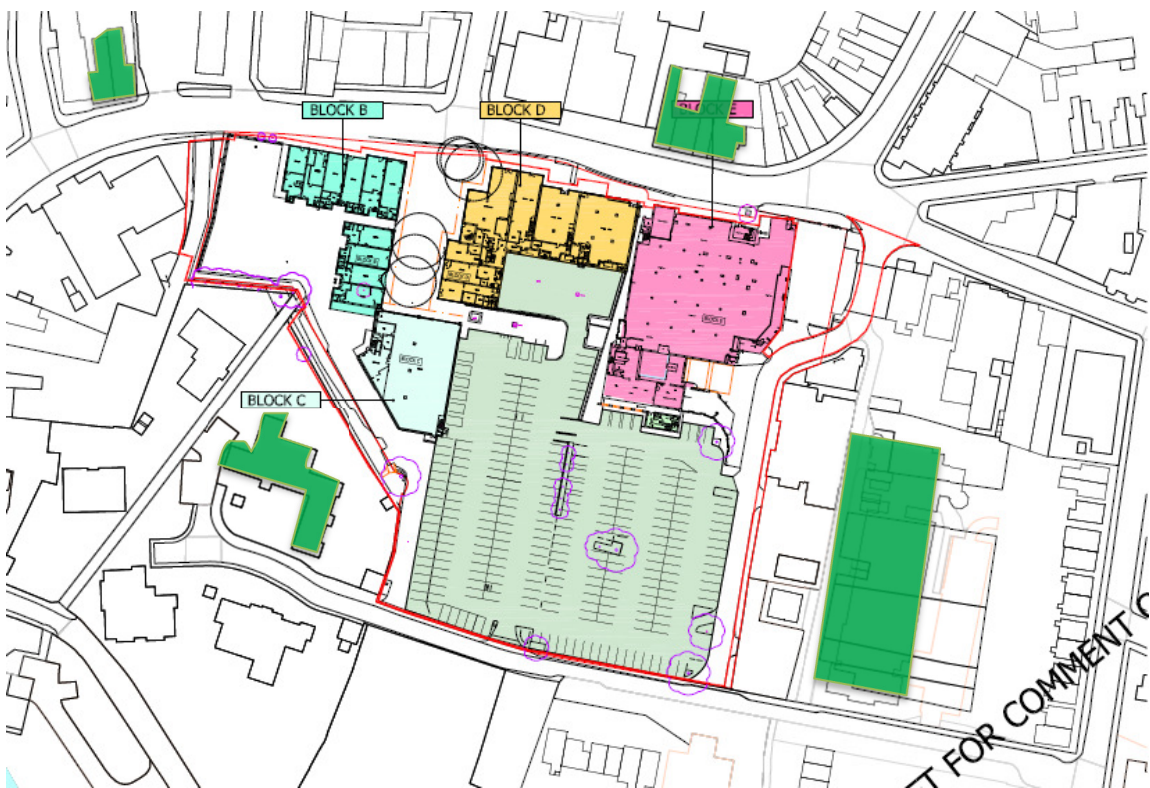


Figure 4 - Location of receivers for road traffic assessment

For each receptor highlighted above, the change in noise level has been assessed and these levels compared to the suggested significance criteria as set out in the Design Manual for Roads and Bridges [DMRB], Volume 11 Section 3.

For each receptor, the noise impact was assessed at each floor level, however, only the worst case change in noise level is shown. Usually, noise levels from a 3D noise model would be rounded to the nearest integer, however, for the purposes of comparing noise levels for a DMRB assessment, values to 0.1 dB are used.

⁴ This includes increase in deliveries/collections associated with service yards [see Section 6.1.2 for details]

The following Table summarises the results from the assessment. In addition to the predicted noise impact, the magnitude of change in noise level is also shown in brackets. For ease of reference, the magnitude of change in noise level is also colour coded, as follows:

Change in noise level	Significance criteria ⁵
0	No change
0.1 – 0.9	Negligible
1.0 – 2.9	Minor
3.0 – 4.9	Moderate
5.0 +	Major

Figure 5 - Classification of magnitude of noise impact [short term]

Receptor	2014 Base [existing traffic levels around the site]		2019 Base [projected traffic levels around the site with NO development]		2019 With development [projected traffic levels around the site with the development]	
	Day	Night	Day	Night	Day	Night
Abbotsmead Place	67.9	61.0	68.1 [0.2]	61.5 [0.5]	68.1 [0.0]	61.5 [0.0]
14-16 Church Street	69.8	62.9	70.0 [0.2]	63.4 [0.5]	70.0 [0.0]	63.5 [0.1]
36a-40 Church Street	50.6	41.9	50.7 [0.1]	42.3 [0.4]	50.6 [0.0]	42.3 [0.0]
Crayshaw Court Retirement Village	50.6	43.0	50.7 [0.1]	43.3 [0.3]	52.1 [1.4]	43.6 [0.3]

Table 3 - Predicted increase in road traffic flow noise

The change in noise levels shown equate to:

- the difference between the 2014 and 2019 traffic levels, assuming natural increases in traffic around the site [No Development].
- the difference between the 2019 'No Development' and 2019 'With development' traffic levels

As can be seen from the above Table, the majority of receptor points show that the potential noise impact from increased traffic flows will be 'Negligible' or 'No change'. A 'Minor' change [+1.4 dB] is

⁵ Table 3.1 from DMRB

noted between the 2019 Base data [No Development] and the 2019 With Development data for Crayshaw Court Retirement Village. The predominant reason for this is the proposed changes to the car park to the rear of the development.

It is noted, with reference to the Grid Noise Maps below, that the noise impact on some residential dwellings will reduce due to the proposed Block A providing a barrier between Church Street and residential blocks to the south.

To put the change in noise levels above into context, traffic levels would have to double for a 3 dB increase in noise levels to be noted.

The following Figures show the predicted noise impact from changes in traffic flows from the 3D noise model. Each grid noise map is for daytime periods and at 1.5 m above ground level.

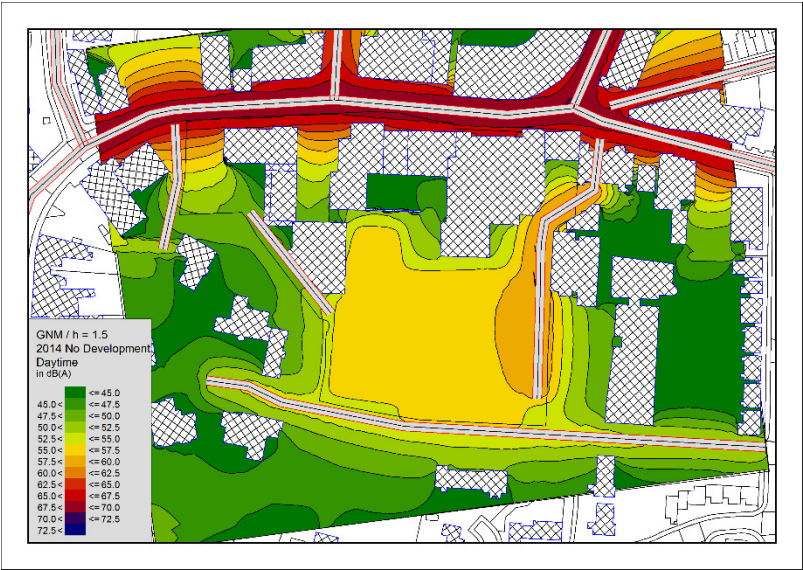


Figure 6 - Grid Noise Map showing noise propagation for 2014 No Development scenario



Figure 7 - Grid Noise Map showing noise propagation for 2019 No Development scenario

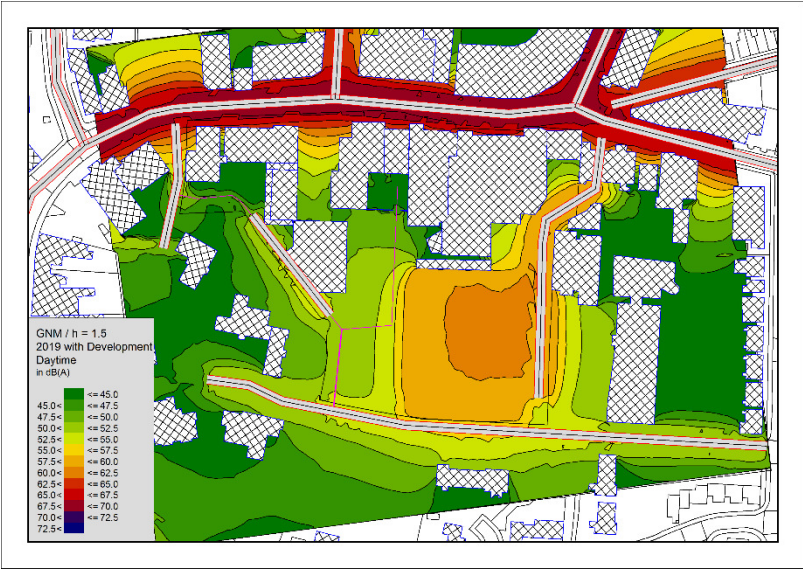


Figure 8 - Grid Noise Map showing noise propagation for 2019 With Development scenario

5.3 Control of noise breakout from A1/A3 units and Cinema

5.3.1 Cinema

At the time of writing, the cinema operator is unknown [Block C]. Experience has shown however, that most cinema operators have stringent requirements for the control of noise break-in to such an extent that noise break-out is adequately controlled. For example, typical noise intrusion into an auditorium would be $< \text{NR30 } L_{10}/L_{\text{max}}$ ⁶.

To see that noise breakout is adequately controlled however, the following Tables show:

- Typical internal noise level within auditoria [amplified film sound track⁷]

Octave band frequency, Hz	31	63	125	250	500	1000	2000	4000	8000
$L_{\text{Max,fast}}$	105	110	105	100	100	100	100	95	90
$L_{\text{eq,1hr}}$	85	95	85	85	85	85	80	80	75

Table 4 - Typical internal noise levels within Cinema Auditoria

- Noise level not to be exceeded [low frequency octave band and broad band values] at 1 m from the nearest residential dwelling [values based on measured background noise levels, refer to Table 2]

Octave band frequency, Hz	50	63	80	100	125	160	Broad band
Daytime $L_{90,5\text{min}}$	51	51	50	49	49	46	45
Night-time $L_{90,5\text{min}}$	47	47	46	45	45	42	41

Table 5 - Limiting noise levels for breakout noise from the cinema

5.3.2 A1 / A3 units

Further to discussions with Jodie Wilson, it is understood that there are few concerns for noise breakout from A1 / A3 units. This is based on the site currently in use with both A1 and A3 units, including other such units in the immediate vicinity.

It is recommended that a tiered approach to noise mitigation be adopted by future tenants, to see that the noise impact is adequately controlled. The following Table shows suggested mitigation measures, depending on the use and likely internal activity noise levels:

⁶ Example taken from two commercial cinema operators

⁷ Values taken from commercial cinema operator

A1 / A3 Internal activities	Mitigation measures
A1 or A3 units with no amplified music / background music, including patron noise	Any new glazing to shop frontages, including doors, to provide ≥ 25 dB R_w
A1 or A3 units with [louder] amplified music Amplified music limited to 90 dB $L_{Aeq,10mins}$ and 105 dB L_{Amax} during normal operation	Internal noise limiter for amplified music calibrated to the limits set Glazing and doors to shop frontages to provide ≥ 40 dB R_w
External seating areas	No amplified music Time restrictions from 08:00 to 23:00 hours Management policy per tenancy on the control of 'noisy/rowdy' behaviour

Table 6 - Suggested mitigation measures for control of noise breakout from A1/A3 units

5.4 Control of noise from fixed services plant

There will be a number of dedicated services plant rooms/locations associated with the development to serve the retail units and cinema, in addition to smaller plant to service the residential areas of the development.

Services will be split between general landlord's plant and tenant plant. At the time of writing, the plant selection is unknown, and therefore this report sets out the criteria to be achieved.

In accordance with Reading Borough Council's noise policy, services plant should be designed such that the 'rating'⁸ noise level is at least 10 dB below the existing ambient background noise levels when measured at the nearest noise sensitive receptors.

The background noise level [$L_{A90,T}$] was measured around the site at five locations, for both daytime and night-time periods. For each position, the 'typical' background noise level has been determined as the highest frequency density from plotting a histogram of measured noise levels.

The background noise levels around the site varied considerably. The following Figure therefore shows proposed limiting noise levels for services plant around the site, depending on the measured noise data.

The limiting noise levels should apply to all new items of service plant running simultaneously, including both landlord's and tenant's. More detailed calculations / division of noise limits will be applied when services plant locations and likely noise levels are determined.

⁸ The rating level, as described in BS 4142: 1997, is the specific noise level plus any adjustment for the characteristic features of the noise.

	Daytime	Night-time
Measured noise level	60 dBA	37 dBA
Limiting noise level	50 dBA	27 dBA

	Daytime	Night-time
Measured noise level	67 dBA	37 dBA
Limiting noise level	57 dBA	27 dBA



	Daytime	Night-time
Measured noise level	45 dBA	41 dBA
Limiting noise level	35 dBA	31 dBA

	Daytime	Night-time
Measured noise level	49	42
Limiting noise level	39	32

6. New dwellings proposed near existing noise sources

An assessment has been made of the required sound reduction properties for glazing and ventilation for proposed new build residential elements of the development.

The following Figure shows the proposed site plan with residential areas marked on.

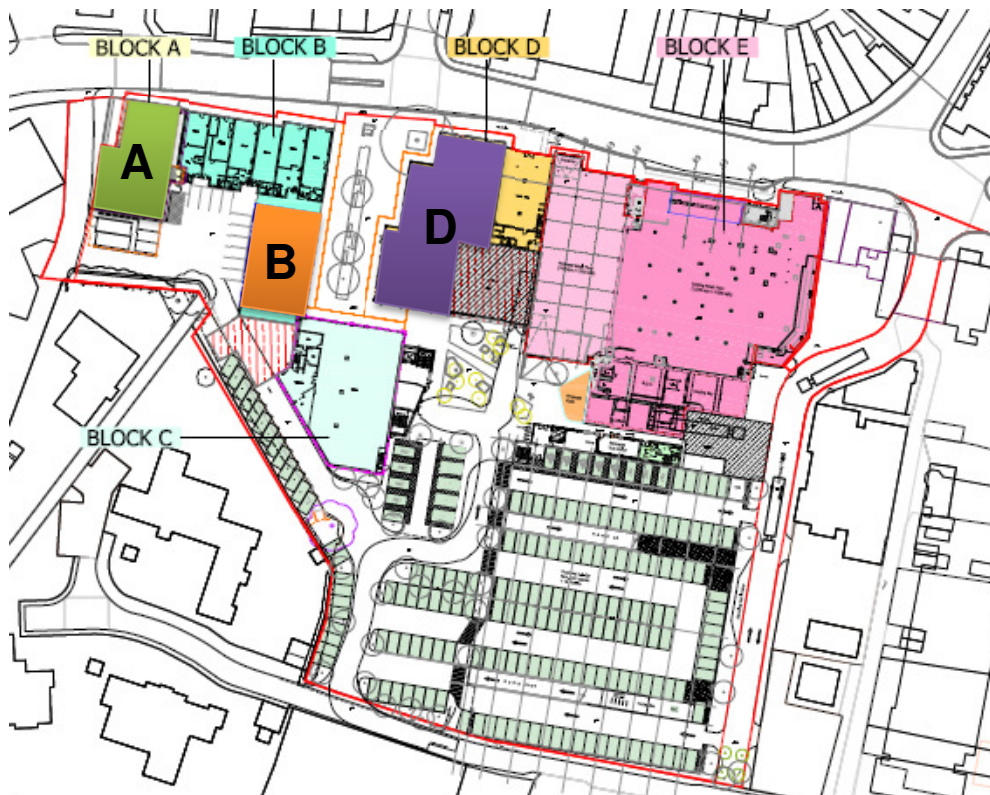


Figure 9 - Site plan showing location of proposed residential

6.1 Noise sources affecting proposed residential dwellings

The potential noise sources that will impact on the proposed residential elements of the development are road traffic [on the surrounding road network and within the car parks] and from service yard noise. These will be discussed below:

6.1.1 Vehicular noise

The predicted noise impact on proposed residential dwellings attributable to vehicular traffic has been assessed using the 3D noise model. Traffic data for the 2019 With Development scenario has been used, which will provide the worst case noise impact [i.e. the natural increase in road traffic over the next 5 years and the increase in traffic levels attributable to the development].

6.1.2 Service yards

The following Figure shows existing and proposed service yards associated with the development:

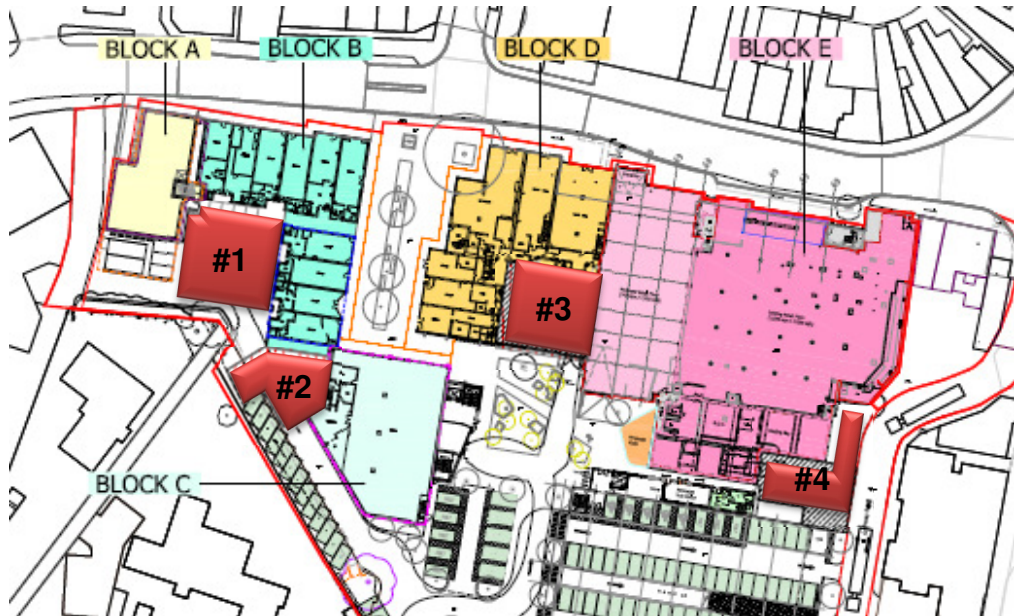


Figure 10 - Service yard locations

All of the above service yards are existing. As part of the development proposals, the following changes are proposed:

- **Service Yard #1** – this area is currently a car park and will predominantly be used as such under the proposed scheme. However, to service the proposed Pizza Express it is understood that a number of deliveries are required, including the following:
 - Fresh Food, 3 times per week, Mon-Sat, 18t vehicle, contractual delivery hours are Midnight to Noon but the majority of deliveries take place between Midnight and 6am.
 - Frozen/Drinks , twice per week, Mon-Sat, between the hours of 8am to 7pm, 18/26t vehicle
 - Waste Collection - 6 days per week, 10 am to 2 pm, 18t vehicle
 - Non Food, fortnightly, Mon-Fri, 8am to 6pm, 7.5t vehicle

This service yard will be accessed from Abbotsmead Place to the south, with egress onto Church Street to the north, as shown in the following Figure:



Figure 11 - Swept path analysis for Service Yard #1 [proposed Pizza Express]

Other items within service yard #1 would include bins and condenser units⁹.

- **Service Yard #2** – this area is currently used to service Block C and includes deliveries and bins. The number of deliveries may increase due to the increase in commercial demises, however, as above, this is anticipated to be no greater than two vans or a single 7.5t lorry per day.
- **Service Yard #3** – this service yard is existing and currently enclosed by a 3 m solid boundary enclosure. It is understood¹⁰ that the existing equipment is to be retained, although rearranged as part of the development works. The anticipated number of vehicular deliveries is one fresh food 18t HGV three times a week (Mon-Sat), one 18/26t HGV twice a week (Mon-Sat) for frozen/drinks, one 18t waste collection lorry six days a week and one non-food 7.5t lorry fortnightly (Mon-Fri)¹¹.
- **Service Yard #4** – this service area is existing and will not undergo any known changes. There is potential for increased deliveries due to the increase in net area for the Waitrose Store, although due to its well shielded nature, this is not anticipated to have any impact on proposed residential dwellings.

6.2 Predicted noise impact

Since the daytime noise impact is considerably greater than the night-time impact, and the daytime and night-time noise criteria are the same, the glazing and ventilation attenuation requirements will be dictated by the daytime noise impact. The following Figures therefore show the predicted daytime noise impact on proposed residential elevations.

⁹ Refer to Section 5.4 for control of noise from fixed services plant

¹⁰ Based on discussion with the Highways Consultant

¹¹ Delivery durations have been modelled as taking up to 1 hour.

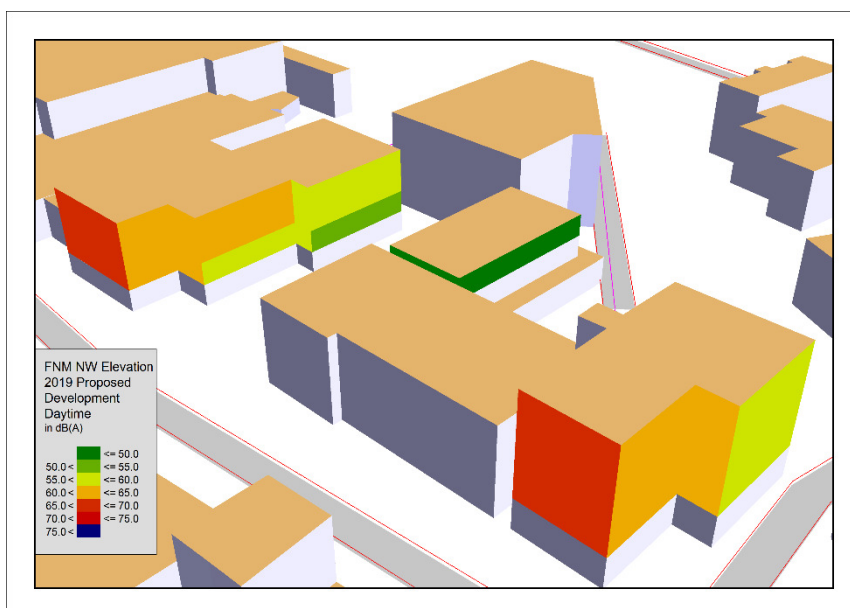


Figure 12 – Façade Noise Map showing predicted noise impact on proposed residential dwellings [view from north west]

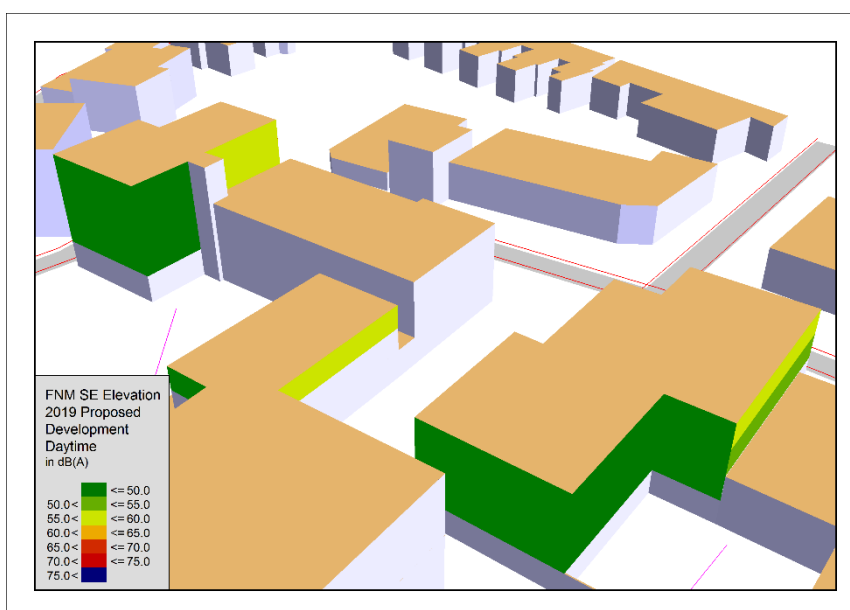


Figure 13 – Façade Noise Map showing predicted noise impact on proposed residential dwellings [view from south east]

The predicted noise impact shown in the above Figures is the daytime average [$L_{Aeq,18hr}$] noise level. As noted, this includes the projected 2019 With Development traffic flows and anticipated deliveries.

6.3 Glazing and ventilation attenuation requirements

Based on the predicted noise impacts above, the following Table shows the required glazing and ventilation sound attenuation requirements to achieve the 'good' internal noise criteria, as per BS 8233:1999. The glazing sound attenuation requirements are quoted in terms of $R_w + C_{tr}$, the C_{tr} providing a correction for road traffic noise which is the dominant noise source to affect façades. Ventilation attenuation requirements apply to all penetrations through the façade and are denoted $D_{n,e,w} + C_{tr}$.

Predicted noise impact on façade	Glazing sound attenuation	Suggested configuration	Ventilation
< 55 dB	$\geq 25 \text{ dB } R_w + C_{tr}$	Standard thermal double glazing	No acoustic rating
> 55 to $\leq 60 \text{ dB}$	$\geq 30 \text{ dB } R_w + C_{tr}$	10 mm pane 16 mm air gap 4 mm pane	36 dB $D_{n,e,w} + C_{tr}$
> 60 to $\leq 65 \text{ dB}$	$\geq 35 \text{ dB } R_w + C_{tr}$	6 mm pane 16 mm air gap 10.8 mm Pilkington Optiphon	41 dB $D_{n,e,w} + C_{tr}$
> 65 to $\leq 70 \text{ dB}$	$\geq 40 \text{ dB } R_w + C_{tr}$	8.8 mm Pilkington Optiphon 16 mm air gap 12.8 mm Pilkington Optiphon	46 dB $D_{n,e,w} + C_{tr}$

Table 7 - Glazing attenuation figures, based on noise impact

It is considered that if new build residential areas are provided with the above mitigation measures, internal noise levels in line with RBCs requirements will be achieved.

The proposed glazing and ventilation is discussed in more detail below.

6.3.1 Glazing – L_{AFmax} levels from road traffic on Church Street

Based on measured noise data at Position 2, the most representative for road traffic along Church Street, maximum noise levels typically ranged from 46 – 78 dBA L_{AFmax} , with the highest recorded value being 92 dBA. The following Graph shows range of measured L_{AFmax} noise levels:

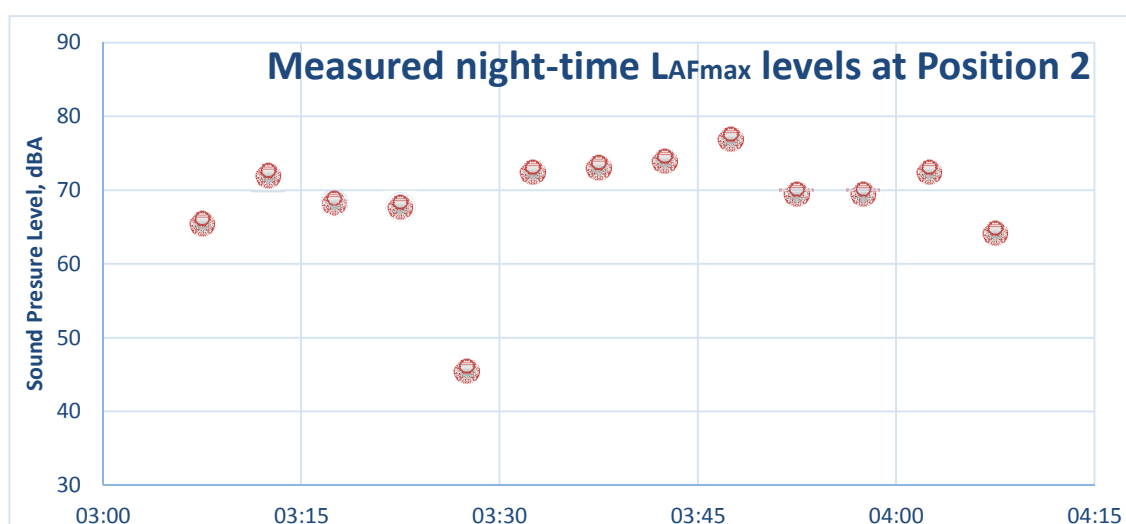


Figure 14 - Graph showing measured L_{AFmax} noise levels at Position 2

As can be seen, the maximum noise level measured at Position 2 are relatively high, which is to be expected adjacent to the very busy Church Street, which carries large volumes of traffic, including buses, HGVs etc.

Assuming the actual L_{AFmax} noise impact on the proposed residential façades will be between 3 dB lower than measured noise level, due to distance attenuation [measured noise levels were adjacent on the kerb adjacent to the road], it is anticipated that maximum noise levels, would be typically < 75 dBA. Based on the glazing attenuation above [40 dB $R_w + C_{tr}$], this would therefore result in L_{Amax} levels of < 35 dB within residential dwellings, which is significantly less than the 45 dB L_{AFmax} criteria set out in BS 8233:1999¹².

6.3.2 Glazing – L_{AFmax} levels from deliveries / collections

The predicted noise impact above included the anticipated number of deliveries and collections, as detailed in Section 6.1.2 above. The predicted noise impact however, is an average noise level, the $L_{Aeq,16hour}$. Based on only a few deliveries expected per day therefore, averaged over the 16-hour period, delivery noise should have no significant impact on the overall noise exposure.

However, each delivery will create a transient increase in the noise impact on nearby existing and proposed residential façades, as shown in the following Figure. Based on the information in Section 6.1.2, a worst case scenario may result in a maximum of five deliveries within a 24-hour period, although most days, this would only be 2-3 [up to one within the night-time period]. These instantaneous noise events would be limited to 20-30 second durations. To minimise the noise impact, it is recommended that vehicles making deliveries within Service Yard #1 do not have their engines idling during the loading/off-loading period.

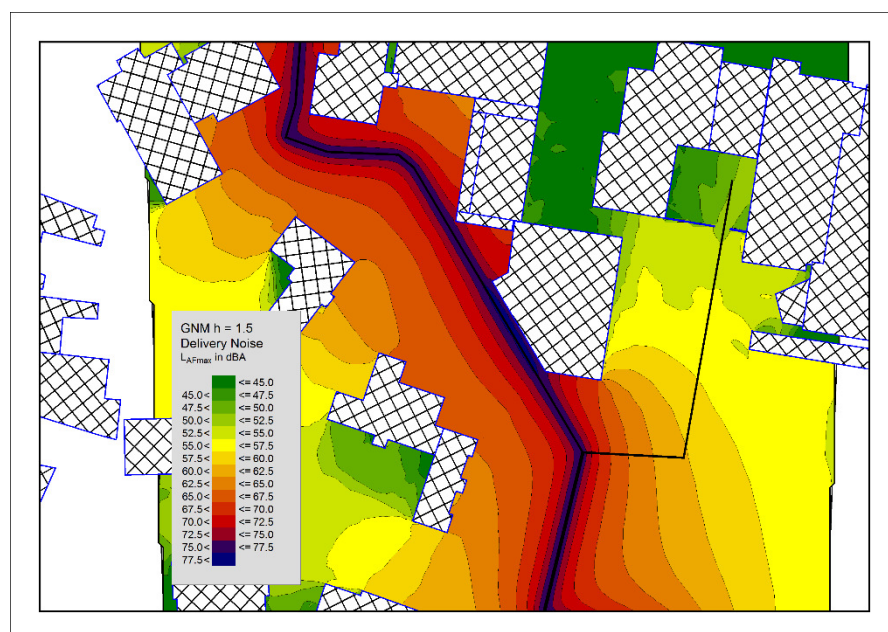


Figure 15 - Predicted L_{AFmax} noise level for delivery vehicles

¹² As noted above, BS 8233: 1999 has been superseded in February 2014. The 2014 version does not include a L_{AFmax} criteria for residential dwellings.

It is noted that a number of small van deliveries already use this route for loading/unloading Service Yard #2.

6.3.3 Ventilation details

In relation to meeting the requirements of Part F¹³ of the Building Regulations, proposals are for the minimum fresh air requirements [whole building / dwelling ventilation and extract ventilation from wet rooms] to be met through mechanical ventilation [e.g. Whole House Ventilation or Mechanical Ventilation Heat Recovery (MVHR)].

Purge ventilation¹⁴ and the control of summertime overheating would be met through openable windows.

¹³ Building Regulations Approved Document F: Means of Ventilation

¹⁴ Purge ventilation is described in AD-F as “...to aid the removal of high concentrations of pollutants and water vapour released from occasional activities such as painting and decorating or accidental releases such as smoke from burnt food or spillage of water. Purge ventilation is intermittent, i.e. required only when such occasional activities occur.”

7. Conclusions

An assessment has been carried out to assess the potential noise impact the proposed regeneration of the St Martin's Precinct will have on nearby noise sensitive premises. The assessment also addresses the noise impact on proposed new residential dwellings.

Noise levels have been measured around the site and these, in conjunction with traffic count data, have been used to create a 3D noise model of the site to accurately predict noise propagation across the complex site from numerous noise sources.

Based on anticipated increases in traffic flows for the year 2019, with and without the development, there are no significant increases in noise levels anticipated that would adversely affect existing nearby residential dwellings.

Glazing and ventilation attenuation requirements for new build residential dwellings have been set, with suggested glazing specifications and ventilation solutions.

Limiting noise levels for new items of services plant have been set, based on the 'typical' background noise levels measured around the site.

The noise assessment for the regeneration of the St Martin's precinct has not highlighted any significant new noise sources, and it is considered that the existing noise climate [and predicted future vehicular noise], does not preclude residential development within this areas, provided the appropriate mitigation measures set out herein are included.

8. Detailed measured noise data

The following Tables show detailed measurement results [L_{AFmax} , $L_{Aeq,5mins}$, $L_{A90,5mins}$] for each Position.

Position 1				Position 2			
Time	L_{AFmax}	$L_{Aeq,15mins}$	$L_{A90,5mins}$	Time	L_{AFmax}	$L_{Aeq,15mins}$	$L_{A90,5mins}$
14:12	63.2	48.3	47.0	14:46	81.6	69.2	66.5
14:17	59.4	47.6	47.0	14:51	86.7	68.0	65.5
14:22	68.1	49.8	46.5	14:56	87.0	71.0	67.5
14:27	53.9	46.6	46.5	15:01	83.8	71.0	68.0
14:32	63.3	47.6	46.5	15:06	87.7	69.8	66.0
14:37	68.9	47.9	46.0	15:11	92.3	71.0	67.0
15:23	71.1	54.0	50.0	15:58	81.3	65.4	58.5
15:28	66.1	52.3	50.0	16:03	90.6	67.1	57.0
15:33	77.3	54.8	50.0	16:08	75.2	64.7	58.0
15:38	64.6	52.4	50.5	16:13	76.7	64.4	58.0
15:43	76.1	57.4	50.0	16:18	84.1	67.4	60.0
15:48	56.1	47.0	44.5	16:23	83.4	67.4	59.5
17:04	70.6	52.0	49.0	17:36	81.3	69.3	68.0
17:09	58.8	48.5	48.0	17:41	78.0	68.7	67.5
17:14	76.0	55.7	47.0	17:46	86.4	70.0	66.5
17:19	59.9	49.0	47.0	17:51	89.1	70.1	68.0
17:24	65.1	48.9	48.0	17:56	84.9	69.4	68.0
17:29	69.1	53.0	48.0	18:01	80.2	68.8	67.5
18:26	58.1	49.1	45.5	18:59	80.4	67.7	61.0
18:31	64.9	47.8	45.5	19:04	78.1	68.1	57.0
18:36	61.4	47.1	45.5	19:09	78.5	67.7	59.5
18:41	60.4	48.6	46.5	19:14	75.1	67.5	61.5
18:46	65.2	48.5	47.0	19:19	89.4	70.5	60.5
18:51	58.4	48.9	45.5	19:24	79.1	67.8	60.5

Position 3				Position 4			
Time	L _{AFmax}	L _{Aeq,15mins}	L _{A90,5mins}	Time	L _{AFmax}	L _{Aeq,15mins}	L _{A90,5mins}
15:20	86.2	70.3	68.0	14:14	75.3	59.1	48.5
15:25	85.5	69.5	67.0	14:19	69.4	58.2	49.0
15:30	87.2	68.1	66.0	14:24	68.7	57.7	48.5
15:35	80.0	67.8	66.5	14:29	69.6	55.7	47.5
15:40	78.7	67.1	66.0	14:34	68.2	57.1	47.5
15:45	78.3	66.9	65.0	14:39	75.8	60.7	48.5
16:34	83.0	69.1	64.0	15:55	75.6	60.3	53.5
16:39	84.0	68.3	63.0	16:00	77.2	61.2	53.0
16:44	81.5	66.9	61.0	16:05	72.6	59.5	53.5
16:49	79.0	66.9	62.0	16:10	75.6	61.0	55.5
16:54	79.3	66.5	62.5	16:15	76.6	60.9	52.5
16:59	96.7	70.7	61.0	16:20	77.5	61.1	54.0
18:11	85.5	69.4	67.0	17:17	68.4	56.8	48.0
18:16	84.9	67.2	66.5	17:22	66.2	55.4	48.5
18:21	79.0	68.0	66.5	17:27	69.8	57.3	49.5
18:26	77.3	67.4	66.5	17:32	70.9	57.7	49.5
18:31	80.2	68.7	67.0	17:37	68.9	56.0	47.5
18:36	87.9	70.2	66.0	17:42	68.4	58.4	48.5
19:33	81.7	68.5	61.5	18:43	77.5	61.7	55.0
19:38	84.4	67.5	62.5	18:48	74.2	59.4	54.0
19:43	75.9	65.7	60.0	18:53	79.6	62.1	55.5
19:48	74.4	64.8	58.5	18:58	75.3	59.2	53.0
				19:03	76.4	61.6	55.0
				19:08	80.3	60.4	55.0

Position 5			
Time	L _{AFmax}	L _{Aeq,15mins}	L _{A90,5mins}
14:48	64.2	52.9	45
14:53	64	52.5	44.5
14:58	67.3	53.4	45
15:03	64.5	51.4	45
15:08	70.8	55.5	48
15:13	64.5	52.3	45.5
16:32	73.8	57.1	50.5
16:37	69.5	56.1	52.5
16:42	73.8	53.5	50.5
16:47	74.3	55.7	50.5
16:52	68.8	54.6	48.5
16:57	66.4	54.4	50
17:52	71.1	54.9	45.5
17:57	64.9	52.2	45.5
18:02	72.6	55.5	46.5
18:07	63.7	50.2	44
18:12	69.6	53.8	45
18:17	70.4	52.5	44.5
19:14	67.6	54.1	48.5
19:19	75.3	56.8	49
19:24	67.4	53.1	47.5
19:29	73.1	54.2	48
19:34	61.7	51.2	49
19:39	65.4	54.4	51.5

9. Local Authority Liaison

The following internal email has been received which sets out the requirements for the noise assessment.



INTERNAL MEMORANDUM

To:	Stephen Vigar	Your Ref:	131711
From:	Jodie Wilson - Senior Environmental Health Officer	My Ref:	EP /481074
Date consultation received:	Date: 24 December 2013		

Application Number: 131711

Premises Address: St Martins Precinct, Church Street, Caversham

Application For: A comprehensive package of development and improvements to St Martin's Centre

Environmental Protection concerns

- Noise impact on development
- Noise arising from development
- Delivery hours
- Air Quality impact - increased exposure / new receptors
- Contaminated Land
- Light - external
- Odour and noise - kitchen extraction
- Construction and Demolition phase

Noise impact on development

I have concerns about noise impact on residents of the proposed development and would recommend a noise assessment to predict the impact of the development and the external environment on residents. Applications for proposed residential developments where there are obvious noise sources, such as road, rail, industry, town centre location etc should be accompanied by a noise assessment of the external noise environment, identifying noise mitigation measures as necessary. The noise sources of concern include road traffic, pedestrians, extraction and ventilation plant, cinema, car park, recycling bins / refuse bins and deliveries.

The noise assessment should identify the external noise levels impacting on the façade of the proposed dwellings. The external noise levels can be used to ensure that the design, particularly in terms of glazing and ventilation would control noise levels sufficiently to provide a good quality living environment.

We refer to BS 8233:1999 and the WHO guidelines for community noise which provide guidance on acceptable noise levels. We look at noise levels within bedrooms at night (23:00hrs-07:00hrs) and living rooms during the

day (07:00hrs to 23:00hrs) and external amenity space (gardens / balconies, etc). For new build, we expect that the design will meet the 'good' standard. Where a building is being renovated and/or is listed, the 'reasonable' standard might be acceptable, where the 'good' standard cannot be met.

Room	Design criteria (good)	Upper limit (reasonable)
Bedrooms	<30dB	<35dB
Living rooms	<30dB	<40dB
Gardens & Balconies	<50dB	<55dB

Noise mitigation is likely to focus on the weak point in the structure; glazing. Given that the acoustic integrity would be compromised should the windows be opened, ventilation details must also be provided, where mitigation relies on closed windows. Ventilation measures should be selected which do not allow unacceptable noise ingress and should provide sufficient ventilation to avoid the need to open windows in hot weather, however non-openable windows are not considered an acceptable solution due to the impact on living standards.

The design should reflect the findings of the noise assessment and incorporate the recommendations of the noise assessment, or equivalent, in terms of glazing and ventilation.

Noise arising from development

I have concerns about the impact of noise from the proposed development on nearby noise sensitive receptors. Potential noise sources include, extraction and ventilation plant associated with the commercial uses, noise breakout from the cinema and other leisure uses, and delivery noise.

We refer to BS4142:1997 when looking at the introduction of proposed noise generating equipment. BS4142:1997 is designed to assess the likelihood of noise complaints resulting from new plant, if permitted.

A noise assessment should be carried out following the methodology of BS4142:1997 and submitted with the application. The noise assessment would be carried out for the nearest noise sensitive receptor (usually a residential dwelling). In this case as there are potentially several potential receptor locations for several potential sources, the noise assessment should cover the worst affected resident for each location where noise sources are proposed to be placed.

The assessment provides the following classifications:

	Source 'rating' level (dB L _{Aeq})
Complaints likely	>10dB above background*
Marginal significance	5dB above background*
Complaints unlikely	>10dB below background*

'Background' refers to the background noise level without the noise source operating (dB L_{A90})

We would like to see the applicants demonstrate that complaints will be unlikely. In order to do this the applicants would have to ensure that the noise rating level was at least 10dB below the existing background level as measured at the nearest noise sensitive receptor.

Where the noise source is within 10dB of the existing background noise, the resulting background noise will increase. In a densely occupied area such as there in Caversham, it is important to ensure that new developments do not increase background noise levels. Increasing background noise levels results in an increasing benchmark against which new plant is introduced. Gradually the noise in an area could each time new plant is introduced. If all developments involving noise generating equipment achieve 'complaints unlikely', background noise levels would not be increased.

In order to meet the 'complaints unlikely' criteria, noise mitigation measures should be recommended and the noise assessment updated to reflect the mitigated noise source rating level.

A noise assessment should be submitted with the application to show that 'complaints unlikely' criteria will be met if the plant assessed is installed and detailing the mitigation measures required to achieve this.

The following confirmation email was sent from Tom Nightingale [Cundall] to Jodie Wilson, Senior Environmental Health Office at Reading Borough Council.

Nightingale, Tom

From: Nightingale, Tom
Sent: 27 May 2014 11:28
To: 'jodie.wilson@reading.gov.uk'
Cc: david.baker@workman.co.uk; Willcocks, Jake; Parkin, Andrew
Subject: St Martins Precinct, Caverham - Acoustic assessment

27/05/2014

Acoustic Report for St Martins Precinct, Caverham

Dear Jodie,

Thank you for the time last Friday to chat through the requirements for the acoustics report for the St Martins Precinct development.

We are in receipt of your comments to Stephen Vigar, dated 24/12/2013, which highlight the potential noise sources and your requirements for the assessment. In summary, please find below a schedule of our proposals, taking on board your comments to Stephen and our discussions.

We have completed the noise surveys at the site. The daytime noise surveys were carried out on 7th November [Thursday] 2013 approximately between 14:00 and 20:00 hours, i.e. daytime, rush-hour and early evening hours. The night-time survey was carried out more recently, on 9th May 2014, between approximately 01:00 and 04:15 hours.

With regards new build residential areas, the measured noise levels and traffic count data will be used in a 3D noise model of the site to predict the noise impact on each façade so that suitable glazing and ventilation can be proposed. The model will include 'typical' service yard activity noise to provide an average noise impact.

We note your criteria for new build residential as follows:

- Glazing to attenuate sound such that internal noise levels within bedrooms and living rooms are < 30 dBA $L_{Aeq,T}$
- Ventilation to be provided which does not compromise the external façade attenuation. Where the exposure dictates, ventilation to meet the minimum fresh air requirements of Part F [whole building/dwelling ventilation and extract ventilation to wet rooms] would be met through mechanical ventilation, such as MVHR. However, Purge ventilation and the control of summertime overheating would be met through openable windows.

New items of services plant will be designed to achieve 10 dB below existing typical background [$L_{A90,T}$] noise levels, as per your guidance.

With regards noise breakout from commercial/entertainment parts of the development, we note the following:

- Typically, cinema specifications require a high level of sound attenuation against noise break-in which conversely provides good protections against noise break-out, however, this will be addressed in the report.
- With regards noise breakout from retail/restaurant etc. we will address the potential for noise breakout in relation to the nearest noise sensitive receptors, control of amplified music and management control [music and patrons etc.].

We welcome any additional comments you may have and trust that the above accurately reflects our conversation.

Best regards,

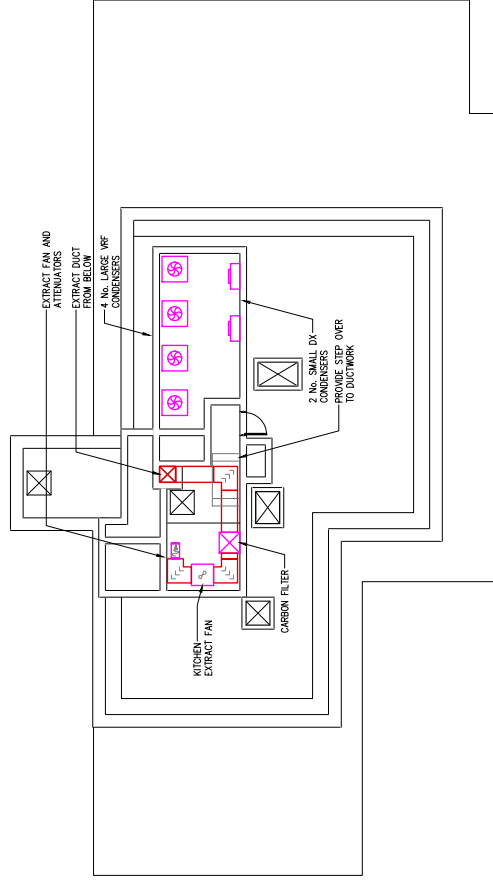
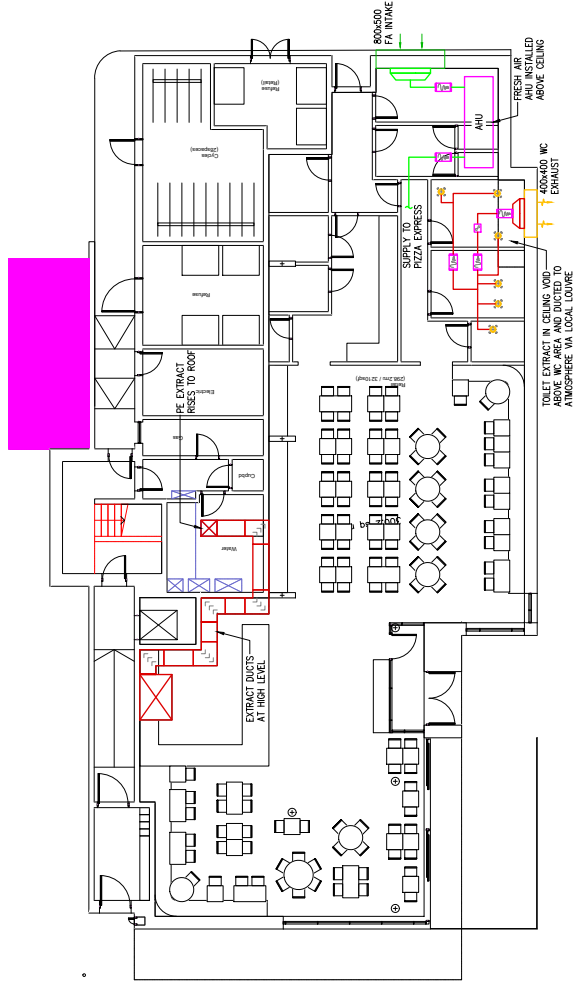
Tom

APPENDIX

E PROPOSED MECHANICAL SERVICES LAYOUTS

NOTES

1. DO NOT SCALE FROM THIS DRAWING. WORK TO MEASURED DIMENSIONS.
2. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
3. BUILDING SERVICES DESIGN HAVE NO RESPONSIBILITY FOR ANY USE MADE OF THIS DRAWING OTHER THAN THAT FOR WHICH IT WAS PREPARED AND ISSUED.
4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OF THE MECHANICAL AND ELECTRICAL SERVICES DRAWINGS, AND ALL DRAWINGS AND DOCUMENTS WHICH FORM PART OF THE BUILDING SERVICES DESIGN TEAM.
5. THE INFORMATION ON THIS DRAWING IS INCLUSIVE OF THE DESIGN TEAM'S DESIGN RESPONSIBILITY. IT SHOULD USE THIS AS A BASIS ONLY FOR HIS/HER DESIGN DEVELOPMENT AND THE PRODUCTION OF FULLY DEVELOPED DRAWINGS. THE INFORMATION ON THIS DESIGN DRAWING MUST NOT BE USED ON SITE FOR INSTALLATION PURPOSES.
6. ANY DISCREPANCIES, ERRORS OR OMISSIONS ARE TO BE CLARIFIED WITH THE RELEVANT ENGINEER AT THE EARLIEST OPPORTUNITY.
7. ALL WORKS ARE TO BE IN ACCORDANCE WITH THE CURRENT RELEVANT STATUTORY REGULATIONS, STANDARDS, SPECIFICATIONS, CODES, BYELAWS, ACCEPTED CODES OF PRACTICE AND TRADE REQUIREMENTS.
8. IT IS THE CONTRACTORS RESPONSIBILITY TO LAISE WITH THE MAIN CONTRACTOR AND ALL OTHER TRADES TO ENSURE THE CORRECT CO-ORDINATION OF WORKS TO SUIT PROGRAMME REQUIREMENTS, AND TO AVOID CLASHES.
9. DRAWING ISSUE STATUS/STATUS AS FOLLOWS:
PRELIMINARY STAGE ISSUE:- DRAWINGS ISSUED FOR INFORMATION PURPOSES ONLY, TO ASSIST OTHER DESIGNERS IN DEVELOPING THEIR DESIGNS.
DESIGN INTENT STAGE ISSUE:- DRAWINGS ISSUED FOR DESIGN INTENT PURPOSES FOR THE PURPOSE OF OBTAINING COMPETITIVE TENDER PRICES FOR THE WORKS SHOWN AND AS DESCRIBED IN THE CONSTRUCTION STAGE ISSUE:- DRAWINGS ISSUED TO DESIGN INTENT DRAWINGS UPDATED TO DESIGN INTENT DRAWINGS FOR THE PURPOSE OF DEVELOPMENT AND CO-ORDINATED WORKING DRAWING PRODUCTION. CONSTRUCTION STAGE ISSUE DRAWINGS MUST NOT BE USED ON SITE FOR INSTALLATION PURPOSES.



EH	INFORMATION	ISSUE	EH
REV	DATE		RY

BSD Building Services Design
Consulting Engineers
Website: www.bsd.co.uk

First Floor, Boundary House
74-77, Ainslie Road
Edinburgh EC3N 2EX
Tel: (0207) 377 9007 Fax: (0207) 377 9111
Email: jordan@bsd.co.uk

 **BSI** Registered
122, Market Street
Birmingham B3 3YF
Tel: 0121 309 9001
Fax: 0121 309 9002
Email: bsi@bsi.co.uk

Client:

HERMES

Project:
CHURCH ROAD
CAVERSHAM

Title:
MECHANICAL SERVICES
GROUND FLOOR AND ROOF LEVEL
DUCT SKETCH

Scale at At:	Date:	Designed:	Drawn:	Design:
1:100	Dec-16	EH	AJL	CAD:
Drawing No:				Rev:

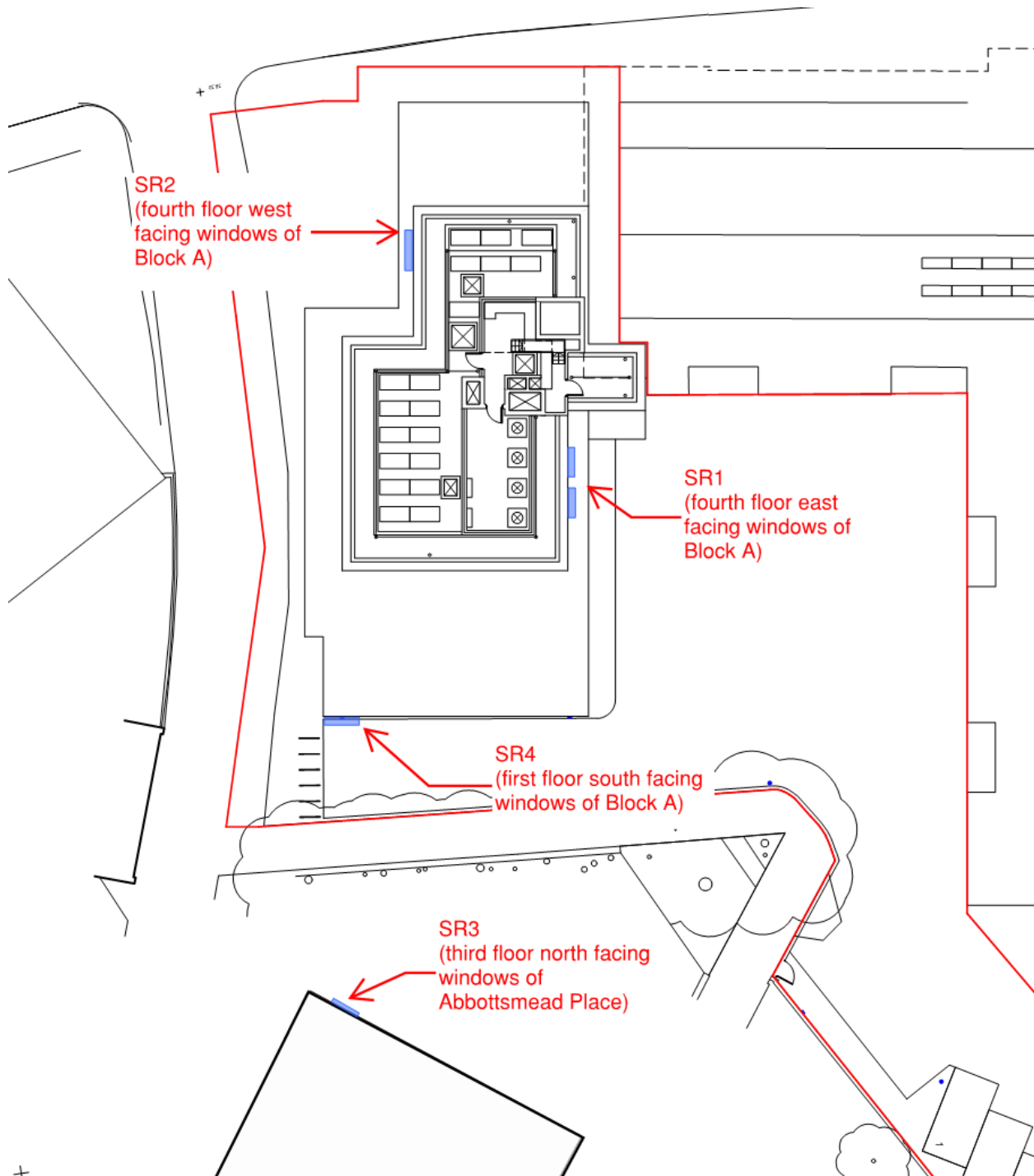
INFORMATION

APPENDIX

F SITE PLAN WITH PROPOSED SENSITIVE RECEPTORS

APPENDIX

Figure F-1: Proposed site plan with noise sensitive receptors highlighted



APPENDIX

G LIMITATIONS TO THIS REPORT



APPENDIX

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorisation of WSP UK Limited. WSP UK Limited accepts no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/ or WSP UK Limited and agree to indemnify WSP UK Limited for any and all loss or damage resulting therefrom. WSP UK Limited accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned.

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