Barratt David Wilson Homes

Forty Acre Farm, Bedhampton

Noise Assessment

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1.0 Introduction

1.1 Noise Assessment Criteria

This report presents the findings of a noise assessment in support of a planning application for a proposed residential development on land adjacent to the A27 in Bedhampton at Forty Acre Farm. This version of the report has been updated following consultation responses received from Havant Borough Council regarding the proposed noise mitigation measures, which are addressed in Section 6.0 of this report.

A description of the existing noise environment in and around the site is provided. Noise surveys have been undertaken and the results used to verify predictions of the short-term and long-term effects of noise. The noise levels from the proposed development have been predicted at local representative receptors using CADNA noise modelling software which incorporates ISO 9613 and CRTN methodologies and calculations.

A list of acoustic terminology and abbreviations used in this report is provided in Appendix A and a set of location plans and noise contour plots relevant to the assessment are presented in Appendix B.

1.2 Legislative Context (England)

This report is intended to provide information relevant to the local planning authority and their consultees in support of a planning application for the above proposed development. Policy guidance with respect to noise is found in National Planning Policy Framework (NPPF), published on 24th July 2018 and updated in February 2019, which contains the following statement at paragraph 170:

"170. Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans

A further 2 short statements are presented at paragraph 180, which state:

"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 life*
b) *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational an amenity value for this reason."*

Furthermore, paragraphs 182 and 183 state:

> *"182. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.*
>
> *183. The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."*

Practice Guidance (PPG): Noise provides further guidance with regard to the assessment of noise within the context of Planning Policy. The overall aim of this guidance is, tying in with the principles of the NPPF and the Explanatory Note of the Noise Policy Statement for England, is to, *'identify whether the overall effect of noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.'*

A summary of the effects of noise exposure associated with both noise generating developments and noise sensitive developments is presented within the PPG and repeated as follows:

Table 1.1 Noise Exposure Hierarchy

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

The NPPF, NSPE and PPG: Noise do not, however, present absolute noise level criteria which define SOAEL, LOAEL and NOAEL which is applicable to all sources of noise in all situations. Therefore, within the context of the Proposed Development, national planning policy and appropriate guidance documents including the 'World Health Organisation Community Noise Guidelines' (1999) and BS 8233 'Guidance on Sound Insulation and Noise Reduction for Buildings' (2014), Section 2.0 presents the noise level criteria used as a basis of this assessment.

The PPG: Noise also states that *neither the NPSE nor the NPPF (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of the proposed development.*

1.3 Acoustic Consultants' Qualifications, Professional Memberships

The project Acoustic Consultant is Graham Davis. The report has been checked by Graham Davis and verified by Nigel Mann. Relevant qualifications, membership and experience are summarised below.

Table 1.2 Acoustic Consultants' Experience

Name	Education	Institute of Acoustics Post Graduate Diploma in Acoustic and Noise Control (Pass Date)	Experience in Undertaking Noise Assessments (Start date of working in noise & acoustics)	Attained Associate Membership of the Institute of Acoustics (date)	Attained Membership of the Institute of Acoustics (date)
Emma Aspinall	MGeol (2017)	-	July 2017	-	-
Graham Davis	BA (2008)	Nov 2013	Sep 2011	Jan 2014	-
Nigel Mann	BSc, (1997) MSc (1999)	Nov 2001	Nov 1998	Nov 2001	Jul 2005

1.4 Relevant Guidance (England)

ProPG Planning and Noise - New Residential Development

Professional Practice Guidance on Planning and Noise for new residential development (ProPG) was launched on 22 June 2017 by the Chartered Institute of Environmental Health (CIEH), the Association of Noise Consultants (ANC) and the Institute of Acoustics (IOA). The guidance has been published to provide practitioners with guidance on the management of noise within the planning system in England.

The guidance is specifically for 'new residential development that would be exposed predominantly to noise from existing transport sources' and reflects the Government's overarching Noise Policy Statement for England (NPSE), the National Planning Policy Framework (NPPF), and Planning Practice Guidance (including PPG-Noise), as well as other authoritative sources of guidance.

The guidance provides advice for Local Planning Authorities (LPAs) and developers, and their respective professional advisers which complements Government planning and noise policy and guidance and, in particular, aims to:

- Advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;

- Encourage the process of good acoustic design in and around new residential developments;
- Outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- Promote appropriate noise exposure standards; and
- Assist the delivery of sustainable development.

There are two stages of the overall approach outlined in the ProPG:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of 4 key elements which is underpinned by an Acoustic Design Statement (ADS).

With regard to Stage 1, ProPG provides guidance for the production of an initial site risk assessment, pre-mitigation, with regards to noise based on the prevailing daytime and night time noise levels across the site, from which the site (or areas thereof) can be allocated a Noise Risk as shown in Figure 1.1 below.

Figure 1.1 ProPG Stage 1, Noise Risk Assessment

Noise Risk Assessment	Potential Effect Without Noise Mitigation	Pre-Planning Application Advice
Indicative Daytime Noise Levels $L_{Aeq,16hr}$ / Indicative Night-Time Noise Levels $L_{Aeq,8hr}$ High: 70 dB / 60 dB Medium: 65 dB / 55 dB Low: 60 dB / 50 dB Negligible: 55 dB / 45 dB; 50 dB / 40 dB	Increasing risk of adverse effect	High noise levels indicate that there is an increased risk that development may be refused on noise grounds. The risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice. As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigate and minimised, and which clearly demonstrates that a significant adverse noise impact will be avoided in the finished development. At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.
	No adverse effect	These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.

2.0 Assessment Criteria

2.1 Internal Noise Assessment Criteria

In order to enable the assessment of the proposed development in terms of LOAEL and SOAEL, Table 2.1 presents equivalent noise levels and associated actions with the target noise level criteria identified. The noise level criteria detailed below have been derived from standards and design guidance:

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

World Health Organisation *'Guidelines on Community Noise' (1999)*

Table 2.1 Noise Level Criteria and Actions (Noise Intrusion Assessment)

Effect Level	Assessment	Noise Level Criteria	Action / Justification
No Observed Adverse Effect Level	Internal Noise intrusion assessment for proposed residential	Noise levels below: Bedrooms – 30 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax} Living Rooms – 35 dB $L_{Aeq,16hours}$ External Amenity Space – 50 dB $L_{Aeq,16hours}$	No Action Required Lower is an indication of the sound source having a low impact Within BS8233 / WHO
Lowest Observed Adverse Effect Level	Internal Noise intrusion assessment for proposed residential	Noise levels exceed: Bedrooms – 30 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax} Living Rooms – 35 dB $L_{Aeq,16hours}$ External Amenity Space – 55 dB $L_{Aeq,16hours}$	Mitigate to achieve: *Bedrooms – 30 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax}* *Living Rooms – 35 dB $L_{Aeq,16hours}$* *External Amenity Space – 55 dB $L_{Aeq,16hours}$* Open Plan Office (daytime) – 45 dB $L_{Aeq,16hours}$ Within BS8233 / WHO
Significant Observed Adverse Effect	Internal Noise intrusion assessment for proposed residential	Noise levels exceed: Bedrooms – 30 dB $L_{Aeq,8hours}$ Living Rooms – 35 dB $L_{Aeq,16hours}$ External Amenity Space – 55 dB $L_{Aeq,16hours}$	Mitigate to achieve: *Bedrooms – 30 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax}* *Living Rooms – 35 dB $L_{Aeq,16hours}$* *External Amenity Space – 55 dB $L_{Aeq,16hours}$* Within BS8233 / WHO criteria
Unacceptable Observed Adverse Effect	Internal Noise intrusion assessment for proposed residential	Noise levels with mitigation exceed: Bedrooms – 35 dB $L_{Aeq,8hours}$ Living Rooms – 40 dB $L_{Aeq,16hours}$ External Amenity Space – 60 dB $L_{Aeq,16hours}$	Prevent

3.0 Assessment Methodology

3.1 Noise Modelling Methodology

Three-dimensional noise modelling will be undertaken based on the monitoring data to predict source noise levels at a large number of locations both horizontally and vertically. CADNA noise modelling software has been used. This model is based on the Department of Transport Calculation of Road Traffic Noise (CRTN) and ISO 9613 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data, assumptions and model settings as given in the table below have been used.

Table 3.1 Modelling Parameters Sources and Assumptions

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	Ordnance Survey	Ordnance Survey
Ground levels – other areas	Site Observations and Ordnance Survey	OS 1:25,000 contours and OS 1:10,000 spot heights.
Traffic data – main surrounding roads	WYG	Traffic flows for local roads based on WYG observations and verification of measured noise levels.
Building heights – around site	WYGE Observations	8 m height for two storey residential properties, and 4 m for Bungalow. Barrier heights for the proposed development are 1.8m high.
Receptor positions	WYG	1 m from façade, height of 1.5 m for ground floor, 4 m for first floor properties with ground floor or bungalow dormer windows. 7 m for dormer windows on two storey properties. 1.5 m height for model grid and monitoring locations for validation.
Reflections	WYG	First order reflections have been applied based on mirror image sources
Absorbent Ground	CADNA	Frequency dependant ground absorption has been applied based on values specified in VDI 2714/16 clause 6.3.
Plans	IDPartnership Northern	Drawing Title: Proposed Residential Site Layout Plan Drawing Number: PL06J (Date: April 2018)

It is acknowledged that a number of these assumptions will affect the overall noise levels presented in this report. However, it should be noted that certain assumptions made, as identified above, are worst-case.

3.1.1 Model Verification (Monitored Noise Levels)

The model was verified by modelling the monitoring locations detailed in Section 4.0 of this report. The comparison between the monitoring and modelling results for L_{Aeq} daytime and night-time and L_{AMax} night-time scenarios are shown in Tables 3.2 – Table 3.4 below.

Table 3.2 Modelled vs. Monitored Results $L_{Aeq;\ daytime\ 07:00 – 23:00}$

Location	Monitored $L_{Aeq,\ 16hour}$	Modelled $L_{Aeq,\ 16hour}$	Difference between Monitored and Modelled Results
LT1	60.3	59.1	-1.2
LT2	64.0	63.9	-0.1
LT3	64.9	62.4	-2.5
ST1	72.2	59.3	-12.9
ST2	61.8	62.9	1.1
ST3	64.4	67.0	2.6
ST4	56.3	56.0	-0.3
ST5	73.8	66.5	-7.3
ST6	78.1	80.4	2.3

Table 3.3 Modelled vs. Monitored Results $L_{Aeq;\ night\text{-}time\ 23:00– 07:00}$

Location	Monitored $L_{Aeq,\ 8\ hour}$	Modelled $L_{Aeq,\ 8\ hour}$	Difference between Monitored and Modelled Results
LT1	56.1	53.1	-3.0
LT2	57.5	55.7	-1.8
LT3	59.2	52.4	-6.8
ST1	66.8	53.5	-13.3
ST2	56.2	57.6	1.4
ST3	55.2	57.1	1.9
ST4	48.1	49.4	1.3
ST5	64.4	60.1	-4.3
ST6	69.6	70.4	0.8

Table 3.4 Modelled vs. Monitored Results $L_{Amax;\ night\text{-}time\ 23:00– 07:00}$

Location	Monitored L_{Amax}	Modelled L_{Amax}	Difference between Monitored and Modelled Results
LT1	82.7	83.2	0.5
LT2	77.2	78.3	1.1
LT3	85.8	75.7	-10.1
ST1	86.9	83.9	-3.0
ST2	78.6	77.7	-0.9
ST3	77.4	80.3	2.9
ST4	70.0	65.2	-4.8
ST5	80.3	80.3	0.0
ST6	85.9	93.7	7.8

Within the verification exercise, greater weight and confidence has been given to the long-term measurements due to a longer exposure time. The verification points show a divergence between monitored and modelled results of no more than ±3.0 dB with the exception of locations ST1 and ST5 during the daytime L_{Aeq} scenario; this is considered to be attributable to a higher frequency of passing vehicles during the short-term 15 minute measurements than were recorded during the overall 16 hour daytime periods. Locations LT3, ST1 and ST5 also show a divergence during the night-time L_{Aeq} scenario, which is also attributable to a higher frequency of passing vehicles and trains during these readings.

Similarly, during the night-time L_{Amax} model, all points were considered verified, with the exception of locations LT3 and ST4 which are predicting a lower noise levels over an eight-hour period than were measured which is attributable to a higher frequency of passing road traffic and trains during monitoring periods. Location ST6 is predicting higher noise levels than were measured, which is attributable to a lower frequency of passing road traffic during short-term monitoring. Overall the models are considered to be suitably verified.

3.2 Sensitive Receptors

Proposed residential receptors have been assessed against the existing noise levels with respect to direct noise from road traffic noise surrounding the site. The locations of the receptors are described in Tables 3.5 and 3.6 below; whilst the locations of the receptors are shown illustratively on SK02 of Appendix B.

Table 3.5 Proposed Residential Receptors

Ref.	Description	Closest Source	Approximate Distance To Source (m)	Height (m) Daytime/Night-time
R01	West of site	Havant Road	88	1.5 / 4.0
R02	Southwest of site	A27/Train Line	185	1.5 / 4.0
R03	West of site	Havant Road	96	1.5 / 4.0
R04	West of site	Havant Road	146	1.5 / 4.0
R05	Southwest of site	A27/Train Line	214	1.5 / 4.0
R06	Southwest of site	A27/Train Line	171	1.5 / 4.0
R07	North of site	Havant Road	29	1.5 / 4.0
R08	Centre of site	Havant Road	124	1.5 / 4.0
R09	South of site	A27/Train Line	166	1.5 / 4.0
R10	Centre of site	Havant Road	126	1.5 / 4.0
R11	North of site	Havant Road	28	1.5 / 4.0
R12	Centre of site	Havant Road	86	1.5 / 4.0
R13	Centre of site	A27/Train Line	220	1.5 / 4.0
R14	North of site	Havant Road	25	1.5 / 4.0
R15	South of site	A27	150	1.5 / 4.0
R16	North of site	Havant Road	32	1.5 / 4.0
R17	South of site	A27/Train Line	184	1.5 / 4.0
R18	Northeast of site	Havant Road	45	1.5 / 4.0

Ref.	Description	Closest Source	Approximate Distance To Source (m)	Height (m) Daytime/Night-time
R19	East of site	Havant Road	106	1.5 / 4.0
R20	Southeast of site	A27/Train Line	125	1.5 / 4.0
R21	Northeast of site	Havant Road	41	1.5 / 4.0
R22	East of site	Havant Road	107	1.5 / 4.0
R23	Southeast of site	A27/Train Line	129	1.5 / 4.0
CH01	Care Home, North-west of site	Havant Road	44	1.4 / 4.0
CH02	Care Home, North-west of site	Havant Road	33	1.4 / 4.0

Table 3.6 Proposed Private External Amenity Area Receptor Locations

Ref.	Description	Closest Source	Approximate Distance To Source (m)	Height (m)
G01	West of site	Havant Road	95	1.2
G02	Southwest of site	A27/Train Line	199	1.2
G03	West of site	Havant Road	92	1.2
G04	West of site	Havant Road	157	1.2
G05	Southwest of site	A27/Train Line	192	1.2
G06	North of site	Havant Road	40	1.2
G07	Centre of site	Havant Road	139	1.2
G08	South of site	A27/Train Line	169	1.2
G09	North of site	Havant Road	28	1.2
G10	Centre of site	Havant Road	130	1.2
G11	South of site	A27/Train Line	162	1.2
G12	Northeast of site	Havant Road	51	1.2
G13	Southeast of site	A27/Train Line	156	1.2
G14	East of site	Havant Road	133	1.2
G15	Northeast of site	Havant Road	59	1.2
G16	Northeast of site	Havant Road	51	1.2
G17	East of site	Havant Road	119	1.2
G18	Southeast of site	A27/Train Line	151	1.2
G19	Southeast of site	A27/Train Line	149	1.2

3.3 Tranquillity Rating

An assessment of the existing tranquillity level of the site has been based on the mapping data published by Campaign to Protect Rural England (CPRE). This uses a colour coded system and a 500m assessment grid for the whole of England, and a tranquillity rating of between 1 and 10 is assigned (1 being least tranquil and 10 being most). By reference to these maps the development is assessed as falling into Zone 3.

4.0 Noise Survey

4.1 Noise Survey Methodology

A monitoring survey was undertaken to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background and traffic noise levels. Equipment used during the survey included:

Rion NL-52	Environmental Noise Analyser (WYG17)	s/n	1043466
Rion NL-52	Environmental Noise Analyser (WYG18)	s/n	264490
Rion NL-52	Environmental Noise Analyser (WYG20)	s/n	253702
Rion NL-52	Environmental Noise Analyser (WYG21)	s/n	1021331
Rion NL-52	Environmental Noise Analyser (WYG23)	s/n	732146
Rion NC-74	Sound Calibrator	s/n	35046823

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice and no drift was observed. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

A baseline monitoring survey was undertaken at nine locations (as specified in the following table and shown in SK01 of Appendix B) from Friday 1st July 2016 to Wednesday 6th July 2016. Attended short-term measurements were undertaken at six locations during the day, evening and night-time periods with three additional locations being measured unattended; one over an 80-hour period and two over a 120 hour period. The raw data collected from the long-term monitoring is available upon request.

Measurements were taken in general accordance with BS 7445-1:2003 *The Description and Measurement of Environmental Noise: Guide to quantities and procedures*.

Table 4.1 Noise Monitoring Locations

Ref	Description
LT1	On the northern boundary of the site opposite 31 Auriol Drive
LT2	On the eastern boundary of the site by the A27 exit slip road
LT3	Southwest corner of the site on boundary with rail track
ST1	A2030 opposite 30 Auriol Drive
ST2	Northeast corner of the site by A27 exit slip road and roundabout.
ST3	Southern boundary of the site bordering with rail track
ST4	At junction of St Andrews Road and First Avenue
ST5	On bridge over the A3(M) northeast of the site
ST6	On bridge over the A27 southeast of the site

4.2 Noise Survey Results

Existing ambient noise levels around the site are dominated by road traffic noise from the A27, the A3(M) and the A2030 as well as noise from trains passing on the rail track to the south of the site.

Ambient and background noise levels are usually described using the L_{Aeq} index (a form of energy average) and the L_{A90} index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the L_{A10} index (i.e. the level exceeded for 10% of the measurement period).

Table 4.2 Meteorological Conditions during the Survey

Survey Location	Date & Time	Temperature (ºC)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Daytime ST1	06/07/2016 11:40	18.0	0-1	NW	3	Road traffic noise from the A2030.
Daytime ST2	06/07/2016 11:48	18.0	0-1	NW	3	Road traffic noise from the A27 dominant. Road traffic noise from A3(M) and A2030 also audible.
Daytime ST3	06/07/2016 12:23	18.0	0-1	NW	3	Road traffic noise from A27 and trains passing on the rail track.
Daytime ST4	06/07/2016 12:03	18.0	0-1	NW	3	Distant road traffic noise, occasional car pass.
Daytime ST5	06/07/2016 11:09	17.0	1-2	N	4	Road traffic noise from the A3(M), occasional car pass on Portsdown Hill Road.
Daytime ST6	06/07/2016 11:05	17.0	1-2	N	4	Road traffic noise from the A27.
Evening ST1	05/07/2016 21:24	15.0	0-1	NW	1	Road traffic noise from the A2030.
Evening ST2	05/07/2016 21:34	15.0	0-1	NW	1	Road traffic noise from the A27, A3(M), roundabout and slip road traffic and A2030.
Evening ST3	05/07/2016 22:02	15.0	0-1	NW	1	Road traffic noise from the A27 and noise from trains passing on the rail track.
Evening ST4	05/07/2016 21:49	15.0	0-1	NW	1	Occasional car pass, distant road traffic noise.
Evening ST5	05/07/2016 22:36	15.0	1-2	NW	1	Road traffic noise from the A3(M).
Evening ST6	05/07/2016 22:30	15.0	1-2	NW	1	Road traffic noise from the A27.
Night-time ST1	05/07/2016 23:05	14.0	0-1	NW	1	Road traffic noise on the A2030.
Night-time ST2	05/07/2016 23:13	14.0	0-1	NW	1	Road traffic noise from the A27, A3(M) and slip road and roundabout and the A2030.
Night-time ST3	05/07/2016 23:40	14.0	0-1	NW	1	Road traffic noise from the A27, A3(M) and passing trains.
Night-time ST4	05/07/2016 23:29	14.0	0-1	NW	1	Distant road traffic noise.
Night-time ST5	06/07/2016 00:11	14.0	1-2	NW	1	Road traffic noise from the A3(M).
Night-time ST6	06/07/2016 00:06	14.0	1-2	NW	1	Road traffic noise from the A27.

The results of the statistical measurements and frequency measurements conducted during the survey are summarised in the following table. All values are sound pressure levels in dB (re: 2 x 10^{-5} Pa).

Table 4.3 Results of Baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekday Daytime 07:00 - 23:00	48 Hours	01/07/2016 – 06/07/2016 07:00 - 23:00	LT1	60.3	95.3	39.5	61.9	54.7
Weekday Night-time 23:00 – 07:00	24 Hours	01/07/2016 – 06/07/2016 23:00 - 07:00		56.1	84.4	29.5	53.6	44.8
Weekend Daytime 07:00 - 23:00	32 Hours	01/07/2016 – 06/07/2016 07:00 - 23:00		60.4	91.6	44.9	61.8	56.6
Weekend Night-time 23:00 – 07:00	16 Hours	01/07/2016 – 06/07/2016 23:00 - 07:00		55.0	82.0	31.8	55.3	47.0
Weekday Daytime 07:00 - 23:00	22 Hours	01/07/2016 – 06/07/2016 07:00 - 23:00	LT2	64.0	90.9	48.7	65.2	61.0
Weekday Night-time 23:00 – 07:00	10 Hours	01/07/2016 – 06/07/2016 23:00 - 07:00		57.5	102.0	31.5	57.6	49.9
Weekend Daytime 07:00 - 23:00	32 Hours	01/07/2016 – 06/07/2016 07:00 - 23:00		62.9	81.8	48.8	64.1	59.9
Weekend Night-time 23:00 – 07:00	16 Hours	01/07/2016 – 06/07/2016 23:00 - 07:00		56.6	73.0	34.4	58.7	51.6
Weekday Daytime 07:00 - 23:00	48 Hours	01/07/2016 – 06/07/2016 07:00 - 23:00	LT3	64.9	102.9	44.4	61.7	58.0
Weekday Night-time 23:00 – 07:00	24 Hours	01/07/2016 – 06/07/2016 23:00 - 07:00		59.2	87.1	32.8	55.6	48.8
Weekend Daytime 07:00 - 23:00	32 Hours	01/07/2016 – 06/07/2016 07:00 - 23:00		65.2	94.2	47.6	64.1	60.4
Weekend Night-time 23:00 – 07:00	16 Hours	01/07/2016 – 06/07/2016 23:00 - 07:00		58.0	92.4	34.9	56.0	50.0
Daytime 07:00 - 19:00	15 Mins	06/07/2016 11:40	ST1	72.2	84.7	56.3	70.0	66.6
		06/07/2016 11:48	ST2	61.8	68.2	56.7	62.2	61.1
		06/07/2016 12:23	ST3	64.4	80.7	57.6	63.2	62.0
		06/07/2016 12:03	ST4	56.3	72.7	50.7	56.4	54.9
		06/07/2016 11:09	ST5	73.8	89.7	64.7	74.1	72.6
		06/07/2016 11:05	ST6	78.1	93.0	67.0	78.6	76.0
Evening 19:00 - 23:00	15 Mins	05/07/2016 21:24	ST1	68.5	86.4	45.4	61.0	58.4
		05/07/2016 21:34	ST2	56.0	72.2	49.8	56.4	54.8
		05/07/2016 22:02	ST3	57.1	77.6	49.2	54.4	53.4
		05/07/2016 21:49	ST4	47.6	66.7	36.8	45.8	44.0
		05/07/2016 22:36	ST5	69.6	82.2	55.0	69.1	67.0
		05/07/2016 22:30	ST6	72.5	83.6	58.9	71.4	68.6

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Night-time 23:00 - 07:00	15 Mins	05/07/2016 23:05	ST1	66.0	86.9	41.2	55.0	52.7
		05/07/2016 23:13	ST2	54.2	78.6	47.1	53.9	52.3
		05/07/2016 23:40	ST3	55.2	77.4	43.2	50.2	48.7
		05/07/2016 23:29	ST4	48.1	70.0	33.5	42.7	40.9
		06/07/2016 00:11	ST5	64.4	80.3	41.2	61.8	59.6
		06/07/2016 00:06	ST6	69.6	95.9	50.9	64.8	62.3

All values are sound pressure levels in dB re: $2x\ 10^{-5}$ Pa

5.0 Assessment of Effects

5.1 ProPG Stage 1 Assessment

Daytime $L_{Aeq, 16hour}$ noise levels range between 56 - 78 dB and night-time $L_{Aeq, 8hour}$ noise levels range between 48 – 69 dB, therefore the site falls within the Low to Medium Noise Risk Categories and as such good acoustic design measures may need to be incorporated into the design at the detailed design stage.

5.2 ProPG Stage 2 Assessment – Element 2 Internal Noise Levels

Internal noise levels within potential dwellings have been assessed both with windows open, where a reduction from a partially open window of 15 dB has been used, and with windows closed where an assumption of glazing with minimum specification $R_w + C_{tr}$ 30 dB (e.g 6/12/6mm double glazing or equivalent) has been used.

The results presented in tables 5.1 – 5.3 below show the predicted noise intrusion levels at properties across the site. The assessment also includes the proposed care home to the northwest of the site. The recommended WHO/BS 8233 internal noise levels are generally exceeded across the site during the daytime and night-time, assuming a windows-open scenario. In order to achieve the recommended internal noise criteria, a range of mitigation measures are outlined in Section 6.1 of this report, with SK05 in Appendix B showing the glazing and ventilation requirements for facades within the proposed development.

Table 5.1 Daytime Noise Intrusion Levels $L_{Aeq\ 16\ hour}$

Location	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R01	42.2	27.2	12.2	35
R02	58.3	43.3	28.3	35
R03	41.7	26.7	11.7	35
R04	51.3	36.3	21.3	35
R05	42.5	27.5	12.5	35
R06	59.3	44.3	29.3	35
R07	51.9	36.9	21.9	35
R08	49.4	34.4	19.4	35
R09	59.3	44.3	29.3	35
R10	48.4	33.4	18.4	35
R11	52.3	37.3	22.3	35
R12	42.8	27.8	12.8	35
R13	52.0	37.0	22.0	35
R14	53.2	38.2	23.2	35
R15	61.2	46.2	31.2	35
R16	52.6	37.6	22.6	35
R17	44.0	29.0	14.0	35

Location	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R18	51.2	36.2	21.2	35
R19	51.7	36.7	21.7	35
R20	62.5	47.5	32.5	35
R21	60.5	45.5	30.5	35
R22	55.0	40.0	25.0	35
R23	61.1	46.1	31.1	35
CH01	50.3	35.3	20.3	35
CH02	50.9	35.9	20.9	35

Table 5.2 Night-time Noise Intrusion Levels $L_{Aeq\ 8\ hour}$

Location	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R01	38.8	23.8	8.8	30
R02	49.4	34.4	19.4	30
R03	37.2	22.2	7.2	30
R04	43.7	28.7	13.7	30
R05	37.4	22.4	7.4	30
R06	50.3	35.3	20.3	30
R07	49.8	34.8	19.8	30
R08	41.7	26.7	11.7	30
R09	50.3	35.3	20.3	30
R10	41.9	26.9	11.9	30
R11	50.4	35.4	20.4	30
R12	38.9	23.9	8.9	30
R13	44.4	29.4	14.4	30
R14	51.1	36.1	21.1	30
R15	52.0	37.0	22.0	30
R16	51.6	36.6	21.6	30
R17	39.8	24.8	9.8	30
R18	45.0	30.0	15.0	30
R19	43.8	28.8	13.8	30
R20	53.3	38.3	23.3	30
R21	59.9	44.9	29.9	30
R22	52.8	37.8	22.8	30
R23	53.0	38.0	23.0	30
CH01	45.5	30.5	15.5	30
CH02	48.7	33.7	18.7	30

All values are sound pressure levels in dB re: 2x 10-5 Pa.

Table 5.3 Night-time Noise Intrusion Levels L_{Amax}

Location	External L_{Amax} at 1m from facade	Internal L_{Amax} with windows open	Internal L_{Amax} with windows closed	Criteria Internal L_{Amax}
R01	66.6	51.6	36.6	45
R02	72.7	57.7	42.7	45
R03	63.1	48.1	33.1	45
R04	67.1	52.1	37.1	45
R05	61.3	46.3	31.3	45
R06	73.5	58.5	43.5	45
R07	79.1	64.1	49.1	45
R08	65.7	50.7	35.7	45
R09	73.6	58.6	43.6	45
R10	65.3	50.3	35.3	45
R11	79.6	64.6	49.6	45
R12	64.0	49.0	34.0	45
R13	67.7	52.7	37.7	45
R14	78.6	63.6	48.6	45
R15	75.2	60.2	45.2	45
R16	78.1	63.1	48.1	45
R17	61.8	46.8	31.8	45
R18	73.0	58.0	43.0	45
R19	67.8	52.8	37.8	45
R20	76.4	61.4	46.4	45
R21	76.2	61.2	46.2	45
R22	73.0	58.0	43.0	45
R23	75.1	60.1	45.1	45
CH01	75.0	60.0	45.0	45
CH02	78.2	63.2	48.2	45

Alternative ventilation will be required for all properties across the proposed development; alternative ventilation can be provided in several ways from acoustic trickle vents (which need to have a minimum sound reduction equal to or greater than the glazing) to other passive ventilation systems.

5.3 ProPG Stage 2 Assessment – Element 3 External Amenity Spaces

Daytime noise levels in private external amenity spaces of the proposed development have been assessed. The scheme has been designed to reduce noise levels within garden areas through the use of solid garden fences and maximising the screening provided by the proposed dwellings; fences will be constructed from brick or solid timber panels with no gaps and be a minimum of 1.8 metres high, to protect external amenity spaces within the proposed development.

The locations of these receptors are illustratively shown in SK03 in Appendix B with the results of this assessment are presented below in Table 5.4.

Table 5.4 Private External Amenity Area Noise Levels $L_{Aeq,16hr}$

Ref	External $L_{Aeq,16hr}$ Daytime	BS 8233 Upper Limit Criteria L_{Aeq}
G01	49.0	55
G02	52.3	55
G03	47.4	55
G04	45.8	55
G05	53.5	55
G06	50.7	55
G07	49.7	55
G08	53.5	55
G09	50.9	55
G10	49.8	55
G11	54.7	55
G12	47.2	55
G13	54.8	55
G14	49.9	55
G15	47.2	55
G16	54.4	55
G17	54.6	55
G18	52.9	55
G19	54.1	55

All values are sound pressure levels in dB re: $2x\ 10^{-5}$ Pa

The results in the table above show that daytime L_{Aeq} noise levels within private external amenity areas are not predicted to exceed the BS 8233 upper guideline value (55 dB).

6.0 Acoustic Design Statement

6.1 Glazing and Ventilation Strategy

The mitigation measures below are sufficient to reduce the effects of any noticeable and disruptive noise from the surrounding environment by helping to prevent noise levels exceeding BS 8233 criteria for L_{Aeq} and L_{Amax} within all areas of the proposed development.

The glazing and ventilation strategy provided in SK05 has been designed to achieve internal daytime L_{Aeq} of 35 dB, an internal night-time L_{Aeq} of 30 dB and an internal night-time L_{Amax} of 45 dB in habitable rooms of the proposed development. Sensitive bedrooms and living rooms across the site will require an alternative means of ventilation which can be provided in several ways from acoustic trickle vents (which need to have a minimum sound reduction equal to or greater than the glazing) to other passive ventilation systems.

Enhanced glazing with a sound reduction of up to $R_w + C_{tr}$ 32-35 dB will need to be provided for facades facing Havant Road to the north and the A27 to the south. Following consultation responses from Havant Borough Council environmental health department, the glazing and ventilation specifications for the respective receptor locations are detailed in Tables 6.1-6.3, which demonstrate internal noise levels assuming a windows-closed scenario with the proposed glazing specifications (which is also shown illustratively on SK05 of Appendix B) achieve the target internal noise levels criteria within dwellings.

Table 6.1 Daytime Noise Intrusion Levels $L_{Aeq\ 16\ hour}$ with Proposed Glazing and Ventilation

Location	Description	Minimum Glazing / Ventilation Specification ($R_w + C_{tr}/D_{,n,e,w}$ to Achieve BS 8233 /WHO Target Levels	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R01	West of site	30	42.2	12.2	35
R02	South-west of site	30	58.3	28.3	35
R03	West of site	30	41.7	11.7	35
R04	West of site	30	51.3	21.3	35
R05	South-west of site	30	42.5	12.5	35
R06	South-west of site	30	59.3	29.3	35
R07	North of site	35	51.9	16.9	35
R08	Centre of site	30	49.4	19.4	35
R09	South of site	30	59.3	29.3	35
R10	Centre of site	30	48.4	18.4	35
R11	North of site	35	52.3	17.3	35
R12	Centre of site	30	42.8	12.8	35
R13	Centre of site	30	52.0	22.0	35
R14	North of site	35	53.2	18.2	35

Location	Description	Minimum Glazing / Ventilation Specification (R_w + C_{tr}/$D_{,n,e,w}$ to Achieve BS 8233 /WHO Target Levels	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R15	South of site	32	61.2	29.2	35
R16	North of site	35	52.6	17.6	35
R17	South of site	30	44.0	14.0	35
R18	North-east of site	30	51.2	21.2	35
R19	East of site	30	51.7	21.7	35
R20	South-east of site	32	62.5	30.5	35
R21	North-east of site	35	60.5	25.5	35
R22	East of site	30	55.0	25.0	35
R23	Southeast of site	32	61.1	29.1	35
CH01	Care Home, North-west of site	35	50.3	15.3	35
CH02	Care Home, North-west of site	35	50.9	15.9	35

Table 6.2 Night-time Noise Intrusion Levels $L_{Aeq\ 8\ hour}$ with Proposed Glazing and Ventilation

Location	Description	Minimum Glazing / Ventilation Specification (R_w + C_{tr}/$D_{,n,e,w}$ to Achieve BS 8233 /WHO Target Levels	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R01	West of site	30	38.8	8.8	30
R02	South-west of site	30	49.4	19.4	30
R03	West of site	30	37.2	7.2	30
R04	West of site	30	43.7	13.7	30
R05	South-west of site	30	37.4	7.4	30
R06	South-west of site	30	50.3	20.3	30
R07	North of site	35	49.8	14.8	30
R08	Centre of site	30	41.7	11.7	30
R09	South of site	30	50.3	20.3	30
R10	Centre of site	30	41.9	11.9	30
R11	North of site	35	50.4	15.4	30
R12	Centre of site	30	38.9	8.9	30
R13	Centre of site	30	44.4	14.4	30
R14	North of site	35	51.1	16.1	30
R15	South of site	32	52.0	20.0	30
R16	North of site	35	51.6	16.6	30
R17	South of site	30	39.8	9.8	30
R18	North-east of site	30	45.0	15.0	30
R19	East of site	30	43.8	13.8	30
R20	South-east of site	32	53.3	21.3	30
R21	North-east of site	35	59.9	24.9	30
R22	East of site	30	52.8	22.8	30

Location	Description	Minimum Glazing / Ventilation Specification (R_w + C_{tr}/$D_{,n,e,w}$ to Achieve BS 8233 /WHO Target Levels	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R23	Southeast of site	32	53.0	21.0	30
CH01	Care Home, North-west of site	35	45.5	10.5	30
CH02	Care Home, North-west of site	35	48.7	13.7	30

Table 6.3 Night-time Noise Intrusion Levels L_{Amax} with Proposed Glazing and Ventilation

Location	Description	Minimum Glazing / Ventilation Specification (R_w + C_{tr}/$D_{,n,e,w}$ to Achieve BS 8233 /WHO Target Levels	External L_{Amax} at 1m from facade	Internal L_{Amax} with windows closed	Criteria Internal L_{Amax}
R01	West of site	30	66.6	36.6	45
R02	South-west of site	30	72.7	42.7	45
R03	West of site	30	63.1	33.1	45
R04	West of site	30	67.1	37.1	45
R05	South-west of site	30	61.3	31.3	45
R06	South-west of site	30	73.5	43.5	45
R07	North of site	35	79.1	44.1	45
R08	Centre of site	30	65.7	35.7	45
R09	South of site	30	73.6	43.6	45
R10	Centre of site	30	65.3	35.3	45
R11	North of site	35	79.6	44.6	45
R12	Centre of site	30	64.0	34.0	45
R13	Centre of site	30	67.7	37.7	45
R14	North of site	35	78.6	43.6	45
R15	South of site	32	75.2	43.2	45
R16	North of site	35	78.1	43.1	45
R17	South of site	30	61.8	31.8	45
R18	North-east of site	30	73.0	43.0	45
R19	East of site	30	67.8	37.8	45
R20	South-east of site	32	76.4	44.4	45
R21	North-east of site	35	76.2	41.2	45
R22	East of site	30	73.0	43.0	45
R23	Southeast of site	32	75.1	43.1	45
CH01	Care Home, North-west of site	35	75.0	40.0	45
CH02	Care Home, North-west of site	35	78.2	43.2	45

Within the finalised design of the buildings themselves, living rooms and bedrooms will ideally be located on shielded façades with non-sensitive spaces such as corridors, bathrooms, en-suite, utility rooms, window-

less gable ends and kitchens should ideally be located on the road facing façades of residential properties. However it should be noted that it is not always possible for sensitive spaces to be placed on shielded façades, as such, the glazing and ventilation strategy provided above has been designed on the assumption that sensitive spaces are directly facing road traffic noise from Havant Road, the A27 and railway.

Fences will be constructed from brick or solid timber panels with no gaps and be a minimum of 1.8 metres high, to protect external amenity spaces within the proposed development.

7.0 Conclusions

This report presents the findings of a noise assessment in support of a planning application for a proposed residential development on land adjacent to the A27 at Forty Acre Farm, Bedhampton. The NPPF (Section 180) gives two test points relating to noise; considering these the following conclusions can be drawn:

NPPF 180 A

The proposed development is not expected to have an 'adverse impact' on health or quality of life. Similarly it is considered that all 'adverse impacts on health and quality of life' (relating to noise) are mitigated by the following glazing and ventilation strategy:

Glazing & Ventilation Strategy

The recommended WHO/BS 8233 internal noise levels are generally exceeded across the site during the daytime and night-time, assuming a windows-open scenario. Standard double glazing with a sound reduction of R_w + C_{tr} 30 dB is sufficient across the majority of the site in order to achieve the target internal noise levels when windows are closed, however, enhanced glazing is required for plots facing Havant Road, the A27 and the train line. In order to meet internal targets for noise levels. Alternative ventilation (e.g. trickle vents) will be provided for all bedrooms and living rooms in dwellings across the site.

All private external amenity areas receptors are below BS 8233 upper guideline values for L_{Aeq} with fences constructed from brick or solid timber panels with no gaps and be a minimum of 1.8 metres high.

NPPF 180 B

Given that nearby the site is located adjacent to similarly sensitive residential properties, it is not considered that any nearby businesses would be restricted by the introduction of the sensitive use of the site. The development is situated in a CPRE Zone 3 area of tranquillity (Zone 1 being the least tranquil and Zone 10 being the most tranquil), as such is not considered to be an area of tranquillity and the development would have a negligible impact on the tranquillity of the area.

Planning Practice Guidance

Accordingly, the proposed development satisfies the relevant policy considerations set out in the NPPF and the PPG: Noise.

Appendices

Appendix A – Acoustic Terminology and Abbreviations

Acoustic Terminology

dB Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.

dB(A) Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result the single dBA value provides a good representation of how loud a sound is.

L_{Aeq} Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The $L_{Aeq,\ 07:00 - 23:00}$ for example, describes the equivalent continuous noise level over the 12 hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower that the $L_{Aeq,\ 07:00 - 23:00}$.

L_{Amin} The L_{Amin} is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.

L_{Amax} The L_{Amax} is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.

L_n Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the $L_{A10,\ 1\ hr}$ = x dB.

The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90}, the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.

R_w The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.

Abbreviations

CADNA – Computer Aided Noise Abatement

DMRB – Design Manual for Roads and Bridges

HGV – Heavy Goods Vehicle

PPG – Planning Practice Guidance

UDP – Unitary Development Plan

UKAS – United Kingdom Accreditation Service

WYGE – WYG Environment

Appendix B – Sketches

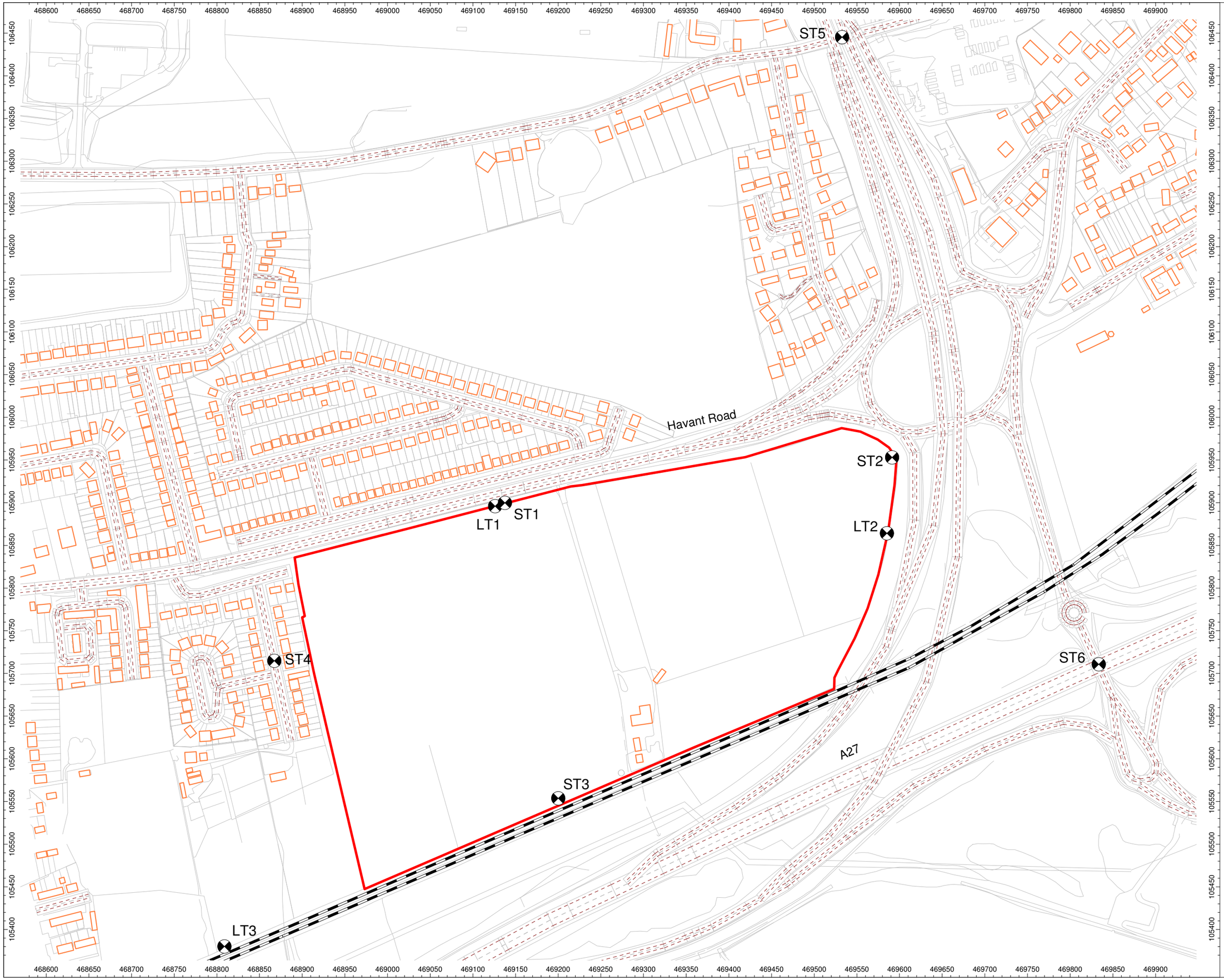
SK01 Noise Monitoring Locations

SK02 Proposed Receptors and External Amenity Receptor Locations

SK03 Existing Daytime $L_{Aeq,16hr}$ Noise Levels

SK04 Existing Night-time $L_{Aeq,8hr}$ Noise Levels

SK05 Glazing and Mitigation Strategy



Client:
Barratt David Wilson Homes Limited

Project:
Forty Acre Farm, Bedhampton

Project Number:
A098927

Drawing Title / Scenario:
Noise Monitoring Locations

Drawing Number:
SK01

Key:

Site Boundary:

Scale : Not to scale

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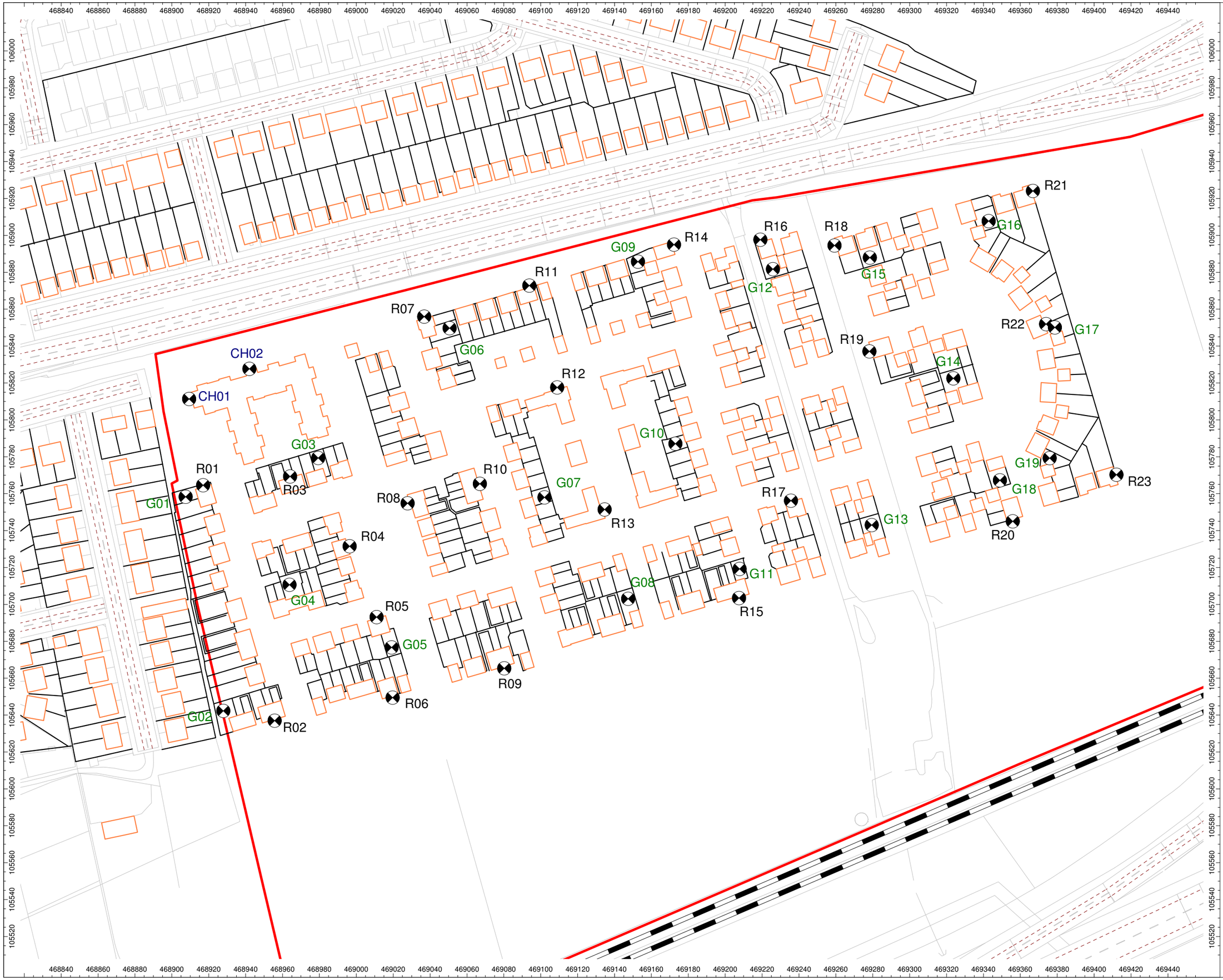

Client:
Barratt David Wilson Homes Limited

Project:
Forty Acre Farm, Bedhampton

Project Number:
A098927

Drawing Title / Scenario:
Proposed Sensitive Receptor and External Amenity Locations

Drawing Number:
SK02

Key:

Site Boundary:

Scale : Not to scale

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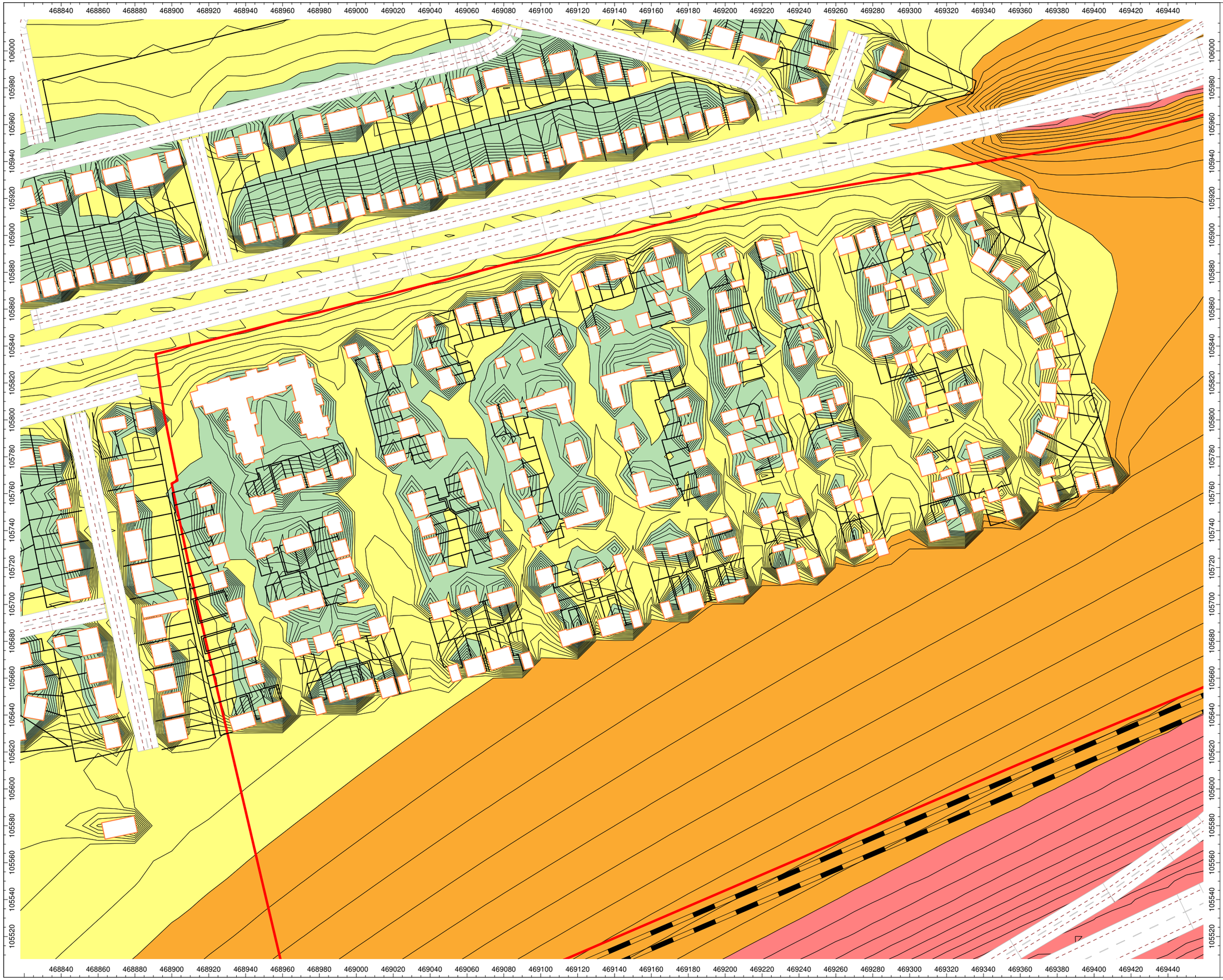

Client:

Barratt David Wilson Homes Limited

Project:

Forty Acre Farm, Bedhampton

Project Number:

A098927

Drawing Title / Scenario:

Indicative Worst-case Daytime LAeq 16 Hour Noise Levels

Drawing Number:

SK03

Key:

Site Boundary:

- 0.0 - 50.0 dB
- 50.0 - 60.0 dB
- 60.0 - 70.0 dB
- >70.0 dB

Scale : Not to scale

Please note: Noise contour plots are for illustrative purposes only

WYGE Leicester 26.11.18

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LE7 7GR
Tel 0116 234 8000

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Client:

Barratt David Wilson Homes Limited

Project:

Forty Acre Farm, Bedhampton

Project Number:

A098927

Drawing Title / Scenario:

Indicative Worst-case Night-time LAeq 8 Hour Noise Levels

Drawing Number:

SK04

Key:

Site Boundary:

- 0.0 - 50.0 dB
- 50.0 - 60.0 dB
- 60.0 - 70.0 dB
- >70.0 dB

Scale : Not to scale

Please note: Noise contour plots are for illustrative purposes only

WYGE Leicester 26.11.18

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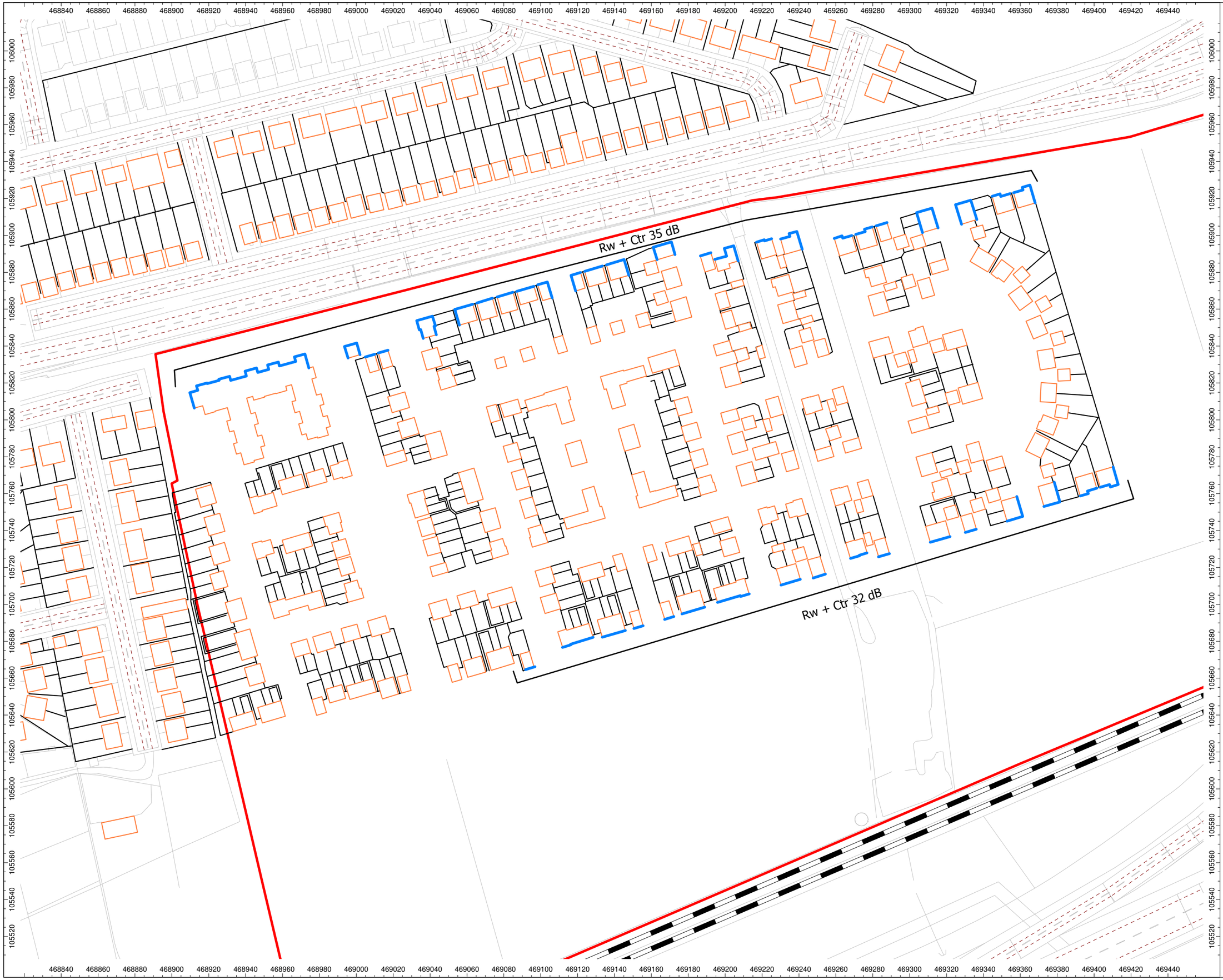

Client:
Barratt David Wilson Homes Limited

Project:
Forty Acre Farm, Bedhampton

Project Number:
A098927

Drawing Title / Scenario:
Glazing and Ventilation Strategy

Drawing Number:
SK05

Key:

Site Boundary:

Enhanced Glazing & Alternative Ventilation Rw + Ctr 32 - 35 dB:

All other facades will require alternative venitilation

Scale : Not to scale

WYGE Leicester 14.08.19

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Appendix C – Report Conditions

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The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. WYG accept no liability for issues with performance arising from such factors.