Persimmon Homes

Proposed Residential Development, Wilthorpe Road, Barnsley

Noise Assessment
March 2014

Executive Park, Avalon Way, Anstey, Leicester, LE7 7GR
Tel: +44 (0)116 234 8000
Email: nigel.mann@wyg.com

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Prepared by:	Sam Moran *Senior Consultant*	Initialled:	SM
Reviewed by:	Nigel Mann *Director, Environmental Scientist*	Initialled:	NM
Verified by:	Nigel Mann *Director, Environmental Scientist*	Initialled:	NM

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1.0 Introduction

1.1 Purpose of this Report

This report presents the findings of a noise assessment for a proposed residential development off Wilthorpe Road, Barnsley**.**

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 effects of noise. The noise levels across the site have been predicted at proposed 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)

PPG24 was replaced by NPPF on 27 March 2012. With regard to noise and planning NPPF contains the following 4 short statements (section 123):

A. Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;

B. Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;

C. 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; and

D. 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.

In support of the NPPF, The National Planning Practice Guidance (NPPG) web-based resource was launched by the Department for Communities and Local Government (DCLG) on 6 March 2014 to support the National Planning Policy Framework and make it more accessible. The overall aim of this guidance, tying in with the principals 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 NPPG 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 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 (NOEL)	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 NPPG do not, however, present absolute noise level criteria which define SOAEL, LOAEL and NOEL 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 '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 NPPG 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.*

2.0 Assessment Criteria

In order 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.

Table 2.1 Noise Level Criteria and Actions

Effect Level	Assessment	Noise Level Criteria	Action / Justification
No Observed Adverse Effect Level (NOAEL)	Proposed Residents	Internal noise levels less than: Bedrooms (night-time) – 30 $dBL_{Aeq,8hours}$ / 45 dBL_{Amax} Living Rooms (daytime) – 30 $dBL_{Aeq,16hours}$ External Amenity Space (daytime) – 50 $dBL_{Aeq,16hours}$	No Action Required Within BS8233 / WHO /
Lowest Observed Adverse Effect Level (LOAEL)	Proposed Residents	Internal noise levels achieve: *Bedrooms (night-time) – 30 $dBL_{Aeq,8hours}$ / 45 dBL_{Amax}* Living Rooms (daytime) – 35 $dBL_{Aeq,16hours}$ External Amenity Space (daytime) – 50 $dBL_{Aeq,16hours}$	None Within BS8233 / WHO Criteria
Significant Observed Adverse Effect Level (SOAEL)	Proposed Residents	Internal noise levels exceed: Bedrooms (night-time)– 35 $dBL_{Aeq,8hours}$ / 45 dBL_{Amax} Living Rooms (daytime)– 40 $dBL_{Aeq,16hours}$ External Amenity Space (daytime) – 55 $dBL_{Aeq,16hours}$	Mitigate to achieve: Bedrooms – 35 $dBL_{Aeq,8hours}$ / 45 dBL_{Amax} *Living Rooms (With windows Open) – 40 $dBL_{Aeq,16hours}$* *External Amenity Space – 55 $dBL_{Aeq,16hours}$* Within BS8233 / WHO Reasonable Criteria
Unacceptable Observed Adverse Effect Level (UOAEL)	Proposed Residents	Internal noise levels exceed: Bedrooms (night-time) – 51 $dBL_{Aeq,8hours}$ Living Rooms (daytime) – 57 $dBL_{Aeq,16hours}$	Avoid Values correspond with PPG24 Category D (mixed sources), planning permission should normally be refused.

For the purpose of this assessment, the target noise level criteria is noted in *italics* in the above table.

3.0 Assessment Methodology

3.1 Noise Modelling Methodology

Three dimensional noise modelling has been undertaken based on the monitoring data to predict L_{Aeq} and L_{Amax} noise levels at a large number of locations both horizontally and vertically. CADNA noise modelling software has been used which is based on the Department of Transport Calculation of Road Traffic Noise (CRTN) and ISO 9613 noise propagation methodology.

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	2m contours
Ground levels – other areas	Site Observations and Ordnance Survey	2m contours
Traffic data surrounding roads	WYGE	Traffic flows for local roads based on WYGE observations and validated noise levels.
Building heights – around site	WYGE Observations	8 m height for two storey residential properties
Barrier heights	WYGE Observations	0.75m wall along boundary of site with Wilthorpe Road which has been partially removed for proposed development scenario. Walls and close boarded fences inserted as per the Proposed Planning Layout drawing
Receptor positions	WYGE	Height of 1.5 m for ground floor, 4 m for first floor receptors and 7m for second floor receptors. 1.5 m height for model grid and monitoring locations for validation.
Absorbent Ground	CADNA	Frequency dependant ground absorption has been applied based on values specified in VDI 2714/16 clause 6.3.
Plans	Vista	Planning layout (WIL-2014-02)

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.

3.2 Model Input Data

3.2.1 Model Verification

The model was verified by modelling the monitoring locations for the 'existing' scenario. The daytime and night time L_{Aeq} scenarios have been verified. Based on a review of audio recordings collected for at the LT locations to identify the principal sources of noise which influenced the noise measurements, the night-time L_{Amax} scenario has been verified with regard to rail noise at LT2 and HGV movement along Redbrook at LT1. The comparison between the monitoring and modelling results are shown in the tables below.

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

Location	Monitored L_{Aeq}	Modelled L_{Aeq}	Difference between Monitored and Modelled Results
LT1	51.8	50.6	-1.2
LT2	55.0	55.0	0.0
LT3	68.3	68.3	0.0

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

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

Location	Monitored L_{Aeq}	Modelled L_{Aeq}	Difference between Monitored and Modelled Results
LT1	42.4	43.3	0.9
LT2	47.6	47.6	0.0
LT3	62.6	62.6	0.0

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

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	72.4	72.4	0.0
LT2	72.4	72.4	0.0

The verification points show a divergence between monitored and modelled results of no more than 3 dB, all models are assumed to be suitably verified.

3.2.2 Sensitive Receptors

The location of proposed receptor locations are presented in SK02 in Appendix B.

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 4.

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.

Equipment used during the survey included:

B&K 2260	Environmental Noise Analyser (WYG1)	s/n	2361273
Rion NL-52	Environmental Noise Analyser (WYG13)	s/n	620858
Rion NL-52	Environmental Noise Analyser (WYG14)	s/n	610212
Rion NL-52	Environmental Noise Analyser (WYG15)	s/n	1221575
Rion NL-52	Environmental Noise Analyser (WYG16)	s/n	1221576

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 eight locations (as specified in the following table and shown in SK01 of Appendix B) from Thursday 30th January 2014 to Wednesday 5th February 2014. Attended short term measurements were undertaken at five locations during the day, evening and night-time periods with three additional locations being measured unattended over a 141 hour period. Additional monitoring was undertaken at LT1 from Wednesday 12th February to Wednesday 19th February 2014 over a 169 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*. Weather conditions during the survey period were observed as being dry with scattered showers. Anemometer readings confirmed that wind speeds were less than 5 ms^{-1} at all times during the survey with a predominant westerly wind direction.

Table 4.1 Noise Monitoring Locations

Ref	Description	Grid Reference	
		X	Y
LT1	On western boundary of site, adjacent to the Redbrook Business Park	432955.4	408075.0
LT2	On tree line in the eastern part of the site approximately 65m from the railway	433477.8	408038.3
LT3	On the southern boundary of the site approximately 5m from Wilthorpe Road	433119.5	407742.9
ST1	In the southern part of the site 30 metres from Wilthorpe Road	433128.2	407766.7
ST2	Within central part of site	433122.0	407918.5

Ref	Description	Grid Reference	
		X	Y
ST3	Along the western boundary of the site	432978.0	407985.2
ST4	Along the western boundary of the site	432957.1	408092.7
ST5	On northern boundary of site, approximately 20m from the rail line	433201.4	408153.9

4.2 Noise Survey Results

Existing ambient noise levels around the site are dominated by road traffic noise from Wilthorpe Road, intermittent noise from trains using the railway to the north of the site and bird song. Infrequent vehicle movement was also audible along Redbrook to the west 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).

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 4.2 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)
Day 07:00 - 23:00	78 hours	30/01/2014 – 30/01/2014 13:42 - 23:00 & 14/02/2014 – 19/02/2014 07:00 – 11:32	LT1	51.8	84.3	32.0	50.0	44.7
Night 23:00 – 07:00	35 hours	30/01/2014 – 31/01/2014 23:00 - 06:28 & 12/02/2014 – 19/02/2014 23:00-07:00		42.4	74.0	24.0	40.5	36.7
Day 07:00 - 23:00	93 hours	30/01/2014 - 05/02/2014 14:26 - 23:00	LT2	55.0	84.9	35.0	51.8	46.3
Night 23:00 – 07:00	48 hours	30/01/2014 - 05/02/2014 23:00 - 07:00		47.6	84.4	26.5	44.0	38.5
Day 07:00 - 23:00	93 hours	30/01/2014 - 05/02/2014 13:06 - 23:00	LT3	68.3	97.0	35.4	71.4	55.6
Night 23:00 – 07:00	48 hours	30/01/2014 - 05/02/2014 23:00 - 07:00		62.6	87.4	27.6	58.4	39.6
Day 07:00 - 19:00	15 Mins	04/02/2014 09:19	ST1	57.5	77.1	35.9	61.9	42.6
	15 Mins	04/02/2014 09:37	ST2	36.8	52.6	31.0	38.8	33.8
	15 Mins	04/02/2014 09:54	ST3	37.1	51.7	30.4	39.6	32.6
	15 Mins	04/02/2014 10:11	ST4	37.7	51.7	31.7	39.8	34.1
	15 Mins	04/02/2014 10:30	ST5	46.9	72.3	29.8	37.8	32.6
Evening	15 Mins	03/02/2014 21:27	ST1	55.3	67.7	39.7	59.6	43.9

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)
19:00 - 23:00	15 Mins	03/02/2014 21:27	ST2	46.2	60.1	39.9	48.8	42.3
	15 Mins	03/02/2014 22:02	ST3	48.2	63.0	40.1	50.7	43.3
	15 Mins	03/02/2014 22:19	ST4	49.6	61.0	39.6	52.3	43.4
	15 Mins	03/02/2014 22:39	ST5	40.9	54.5	36.2	42.8	38.2
Night 23:00 - 07:00	15 Mins	03/02/2014 23:06	ST1	50.5	66.2	34.1	55.0	36.5
	15 Mins	03/02/2014 23:24	ST2	39.4	59.0	33.0	42.3	34.9
	15 Mins	03/02/2014 23:42	ST3	41.1	55.3	35.4	43.9	37.1
	15 Mins	03/02/2014 23:42	ST4	44.8	68.0	37.1	47.1	40.3
	15 Mins	04/02/2014 00:19	ST5	38.2	54.6	33.3	39.9	35.5

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

5.0 Assessment of Key Effects

5.1 Noise Intrusion Assessment

Internal noise levels at the proposed development, based on the existing ambient noise climate, 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 standard double glazing (4mm / 16mm / 4mm) with a sound reduction of 26 dB R_{tra} has and, for properties where noise from the railway is the dominant source of noise (i.e. R1 – 6) 26 dB R_{RAIL} has been used. The predicted noise levels at the assessed receptors locations (as presented in SK02) are presented in Tables 5.1 and 5.2 below. The daytime and night-time L_{Aeq} noise contour plots are presented in SK03 and SK04. Following a review of the long term noise data, by addressing the L_{Aeq} in bedrooms, the required glazing and ventilation specification is sufficient to address peak (L_{Amax}) noise levels from vehicle drive-bys along Wilthorpe Road. The night-time L_{Amax} noise contour plot which addresses peak noise levels from the Redbrook Business Park and the railway is presented in SK05.

Table 5.1 Daytime Noise Intrusion Levels $L_{Aeq,16hr}$

Plot	Ref	External $L_{Aeq,16hr}$ Daytime	Internal $L_{Aeq,16hr}$ Daytime (Windows Open)	Internal $L_{Aeq,16hr}$ Daytime (Windows Closed)	BS 8233 Target Criteria L_{Aeq}	Below SOAEL	Mitigation Required
Plot 103	R1	53.8	24.8	38.8	35-40	Yes	No
Plot 215	R2	54.7	25.7	39.7	35-40	Yes	No
Plot 224	R3	48.3	19.3	33.3	35-40	Yes	No
Plot 306	R4	53.4	24.4	38.4	35-40	Yes	No
Plot 228	R5	49.8	20.8	34.8	35-40	Yes	No
Plot 15	R6	45.0	19.0	30.0	35-40	Yes	No
Plot 2	R7	53.3	27.3	38.3	35-40	Yes	No
Plot 5	R8	51.5	25.5	36.5	35-40	Yes	No

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

Table 5.2 Night-time Noise Intrusion Levels $L_{Aeq,8hr}$

Plot	Ref	External $L_{Aeq,8hr}$ Night-time	Internal $L_{Aeq,8hr}$ Night-time (Windows Open)	Internal $L_{Aeq,8hr}$ Daytime (Windows Closed)	BS 8233 Target Criteria L_{Aeq}	Below SOAEL	Mitigation Required
Plot 103	R1	47.4	18.4	32.4	30	No (Windows Open)	Yes See below and SK05
Plot 215	R2	48.3	19.3	33.3	30	No (Windows Open)	Yes See below and SK05
Plot 224	R3	47.2	18.2	32.2	30	No (Windows Open)	Yes See below and SK05
Plot 306	R4	47.0	18.0	32.0	30	No (Windows Open)	Yes See below and SK05
Plot 228	R5	43.8	14.8	28.8	30	Yes	No
Plot 15	R6	43.4	17.4	28.4	30	Yes	No
Plot 2	R7	50.7	24.7	35.7	30	No (Windows Open)	Yes See below and SK05
Plot 5	R8	49.0	23.0	34.0	30	No (Windows Open)	Yes See below and SK05

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

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

Plot	Ref	External L_{Amax} Night-time	Internal L_{Amax} Night-time (Windows Open)	Internal L_{Amax} Daytime (Windows Closed)	BS 8233 Target Criteria L_{Aeq}	Below SOAEL	Mitigation Required
Plot 103	R1	71.8	42.8	56.8	45	No (Windows Open)	Yes See below and SK05
Plot 215	R2	72.6	43.6	57.6	45	No (Windows Open)	Yes See below and SK05
Plot 224	R3	70.9	41.9	55.9	45	No (Windows Open)	Yes See below and SK05
Plot 306	R4	71.3	42.3	56.3	45	No (Windows Open)	Yes See below and SK05
Plot 228	R5	67.7	38.7	52.7	45	No (Windows Open)	Yes See below and SK05
Plot 291	R9	59.4	30.4	44.4	45	Yes	No
Plot 287	R10	61.6	32.6	46.6	45	No (Windows Open)	Yes See below and SK05
Plot 267	R11	61.5	32.5	46.5	45	No (Windows Open)	Yes See below and SK05
Plot 273	R12	64.7	35.7	49.7	45	No (Windows Open)	Yes See below and SK05
Plot 76	R13	65.5	39.5	50.5	45	No (Windows Open)	Yes See below and SK05
Plot 90	R14	68.0	42.0	53.0	45	No (Windows Open)	Yes See below and SK05
Plot 99	R15	68.6	42.6	53.6	45	No (Windows Open)	Yes See below and SK05
Plot 137	R16	58.1	32.1	43.1	45	Yes	No

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

As shown in the tables above, with windows closed, standard double glazing will result in target criteria being met throughout the site. Therefore, all living rooms and bedrooms will fall below the SOAEL without the requirement for enhanced glazing.

With windows open, internal noise levels in some bedrooms positioned on façades along the extremities of the site exceed the target criteria. The locations where alternative ventilation is required are presented in SK06. Acoustic trickle vents / cowls or acoustic air bricks will be suitable in terms of providing sufficient acoustic attenuation. The sound insulation performance of the units installed should be comparable to the glazing specification. Noise levels in all living rooms fall below the SOAEL throughout the site with no mitigation.

5.2 External Amenity Assessment

As demonstrated in Table 5.1 above, noise levels at the boundaries of the site, established at receptors R8, R 3 and R13 amongst others, fall below the target noise level criteria of 55 $dBL_{Aeq,16hours}$. Additionally, data collected at LT1 and LT2 along the western and northern boundaries of where residential premises are proposed adjacent to the industrial estate and railway respectively achieve this target without any reduction from screening provided by proposed buildings or garden boundary treatments. As such, noise levels in all proposed gardens will fall below the SOAEL with the vast majority of gardens falling below the LOAEL. Therefore, no further mitigation is required.

5.3 Tranquillity Assessment

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 4. There are no public footpaths within the site, with the nearest public footpaths being to the north and east leading to paths around River Dearne. Whilst the area therefore has some tranquillity value there is currently no public access and would therefore be considered to be of less tranquillity value, in noise terms, than footpaths 46 and 18 leading to the River Dearne. As such the proposed development is considered to have a negligible effect on local access to areas of tranquillity.

6.0 Conclusions

NPPF 123 A & B

In considering the NPPF test in section 123, points A & B. The proposed development is not expected to have an 'adverse impact' on health or quality of life. Similarly, with regard to NPPF (123) point B, it is considered that all 'adverse impacts on health and quality of life' (relating to noise) are mitigated by the use of appropriate mitigation. Mitigation comprises a glazing and ventilation strategy which is summarised below.

NPPF 123 C & D

Noise levels at the site are governed by transportation noise sources. Based on the assessment undertaken, it is not considered that any existing businesses wanting to develop would be restricted by the proposals. An assessment of the existing tranquillity level of the site undertaken and identified that the site is not highly prized for its tranquillity and recreational value in terms of noise. There are no public footpaths within the site and therefore, the proposed development is considered to have a negligible effect on local access to areas of tranquillity.

Glazing and Ventilation Strategy

A glazing and ventilation strategy has been provided which achieves both ventilation and internal ambient noise level requirements of $L_{Aeq\ daytime}$ of 35 dB (<40 dB with windows open) and $L_{Aeq\ night\text{-}time}$ of 30 dB in all residential bedroom and living spaces of the proposed development. The recommended glazing and ventilation specifications are achievable.

Draft National Planning Practice Guidance

The noise mitigation in Section 5 of this report is sufficient to reduce the effects of identified sources of noise being currently emitted from the surrounding environment to prevent the adopted thresholds (within the context of BS 8233 and WHO Guidelines) of where the Significant Observed Adverse Effect Level (SOAEL) would be exceeded for future residents.

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

PPG24 – Planning Policy Guidance

UDP – Unitary Development Plan

UKAS – United Kingdom Accreditation Service

WYGE – WYG Environment

Appendix B – Sketches

SK01 Noise Monitoring Location Plan

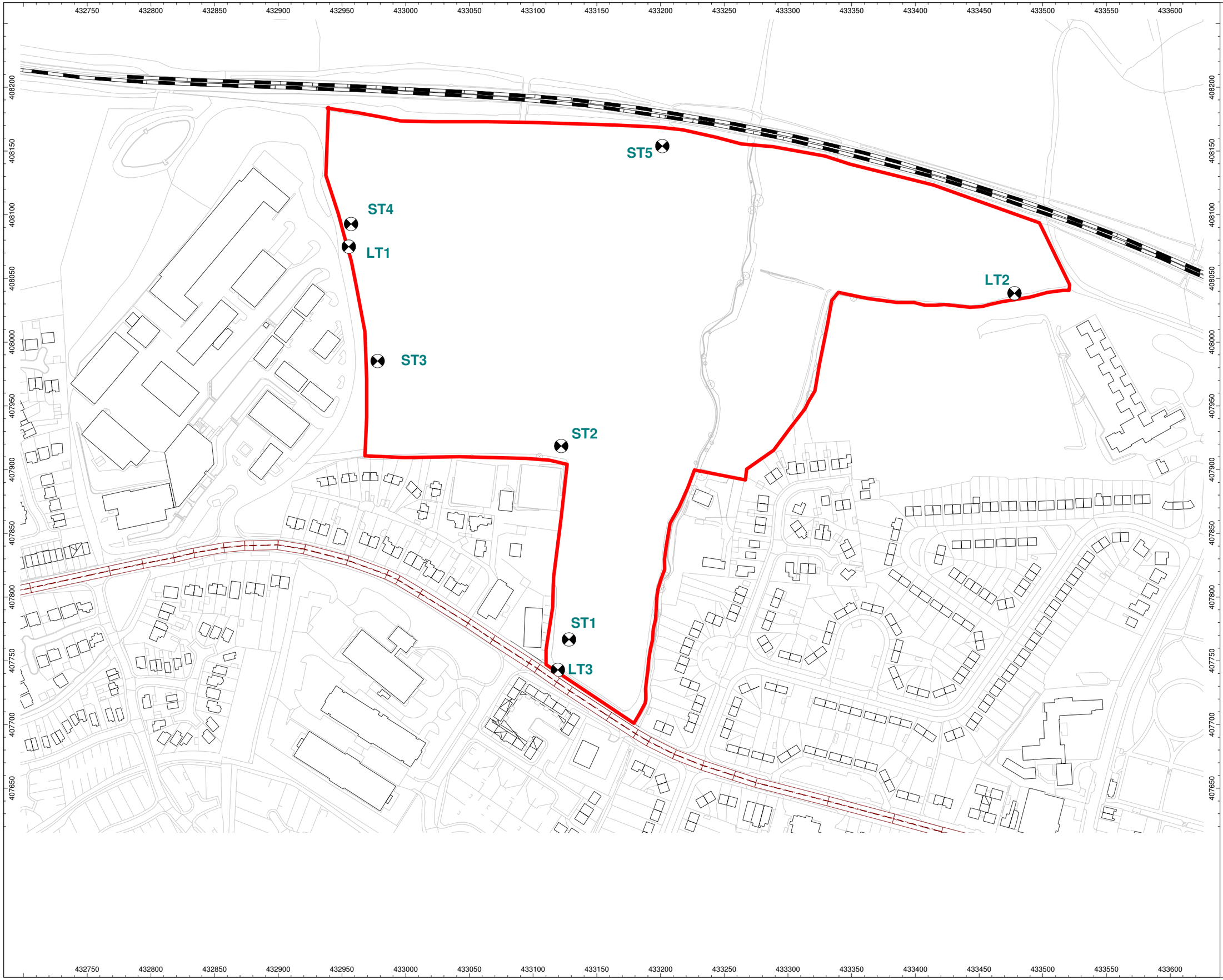
SK02 Proposed Receptor Location Plan

SK03 Noise Contour Plot Proposed Daytime $L_{Aeq,16hr}$

SK04 Noise Contour Plot Proposed Night-time $L_{Aeq,8hr}$

SK05 Noise Contour Plot Proposed Night-time L_{Amax}

SK06 Required Mitigation – Bedrooms



Client:
Persimmon Homes

Project:
Wilthorpe Road

Project Number:
A085476

Site Address:
Wilthorpe Road, Barnsley

Drawing Title / Scenario:
Noise Monitoring Location Plan

Drawing Number:
SK01

Key:

Site Boundary:

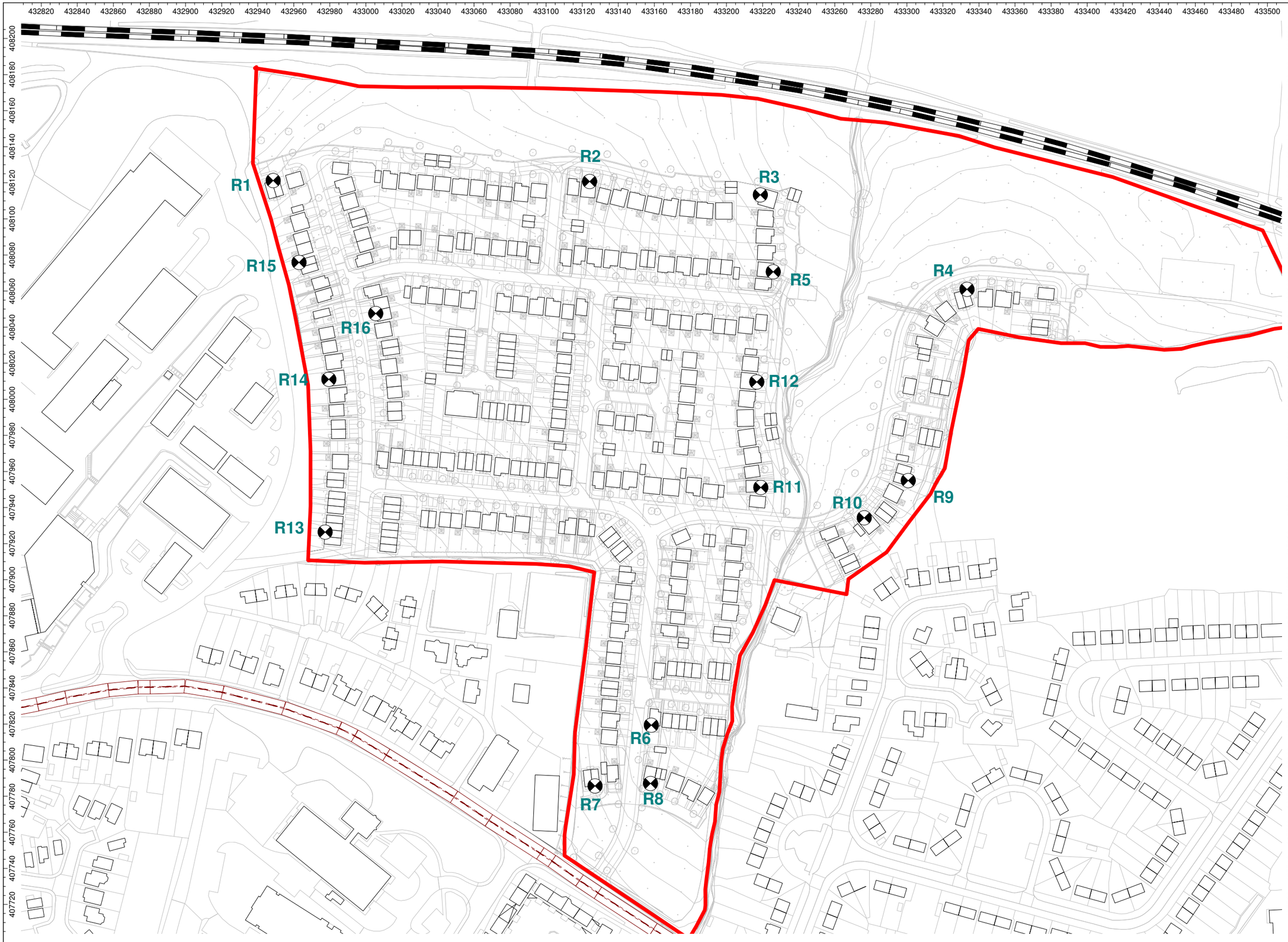
Monitoring Locations:

Scale : Not to scale

WYGE Leicester 26.03.14

Executive Park
Avalon Way
Anstey
Leicestershire
LE7 7GR
Tel 0116 234 8000

© WYG Environment



Client:
Persimmon Homes

Project:
Wilthorpe Road

Project Number:
A085476

Site Address:
Wilthorpe Road, Barnsley

Drawing Title / Scenario:
Proposed Receptor Location Plan

Drawing Number:
SK02

Key:

Site Boundary:

Receptor Locations:

Scale : Not to scale

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Anstey
Leicestershire
LE7 7GR
Tel 0116 234 8000

© WYG Environment



Client:
Persimmon Homes

Project:
Wilthorpe Road

Project Number:
A085476

Site Address:
Wilthorpe Road, Barnsley

Drawing Title / Scenario:
Noise Contour Plot
Proposed Daytime
LAeq,16hr

Drawing Number:
SK03

Key:

Site Boundary:

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

Contour Plot Presented For Indicative Purposes Only

Scale : Not to scale

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Leicestershire
LE7 7GR
Tel 0116 234 8000

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Client:
Persimmon Homes

Project:
Wilthorpe Road

Project Number:
A085476

Site Address:
Wilthorpe Road, Barnsley

Drawing Title / Scenario:
Noise Contour Plot
Proposed Night-time
LAeq,8hr

Drawing Number:
SK04

Key:

Site Boundary:

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

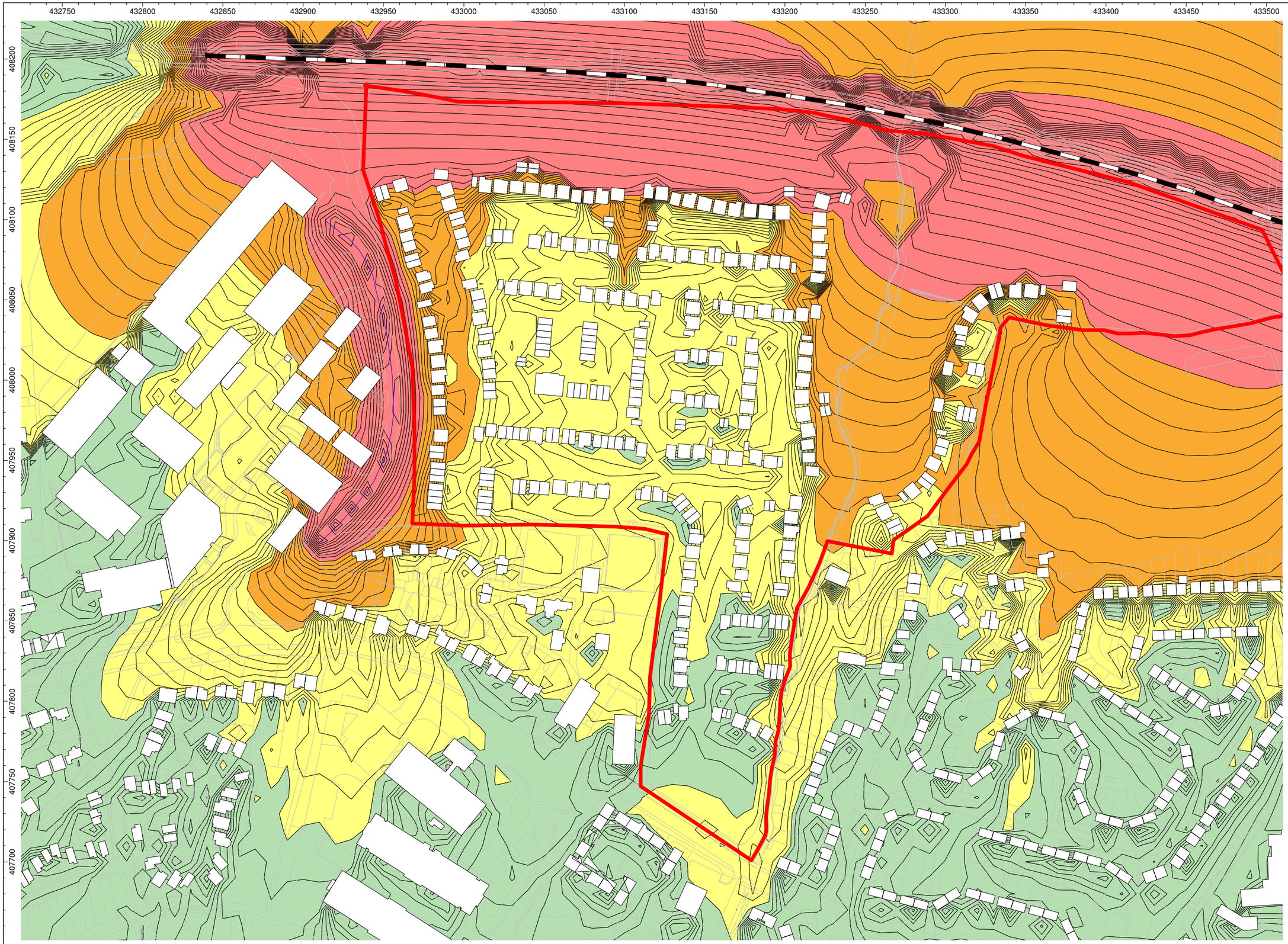
Contour Plot Presented For Indicative Purposes Only

Scale : Not to scale

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Leicestershire
LE7 7GR
Tel 0116 234 8000

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Client:
Persimmon Homes

Project:
Wilthorpe Road

Project Number:
A085476

Site Address:
Wilthorpe Road, Barnsley

Drawing Title / Scenario:
Noise Contour Plot
Proposed Night-time
LAmax

Drawing Number:
SK05

Key:

Site Boundary:

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

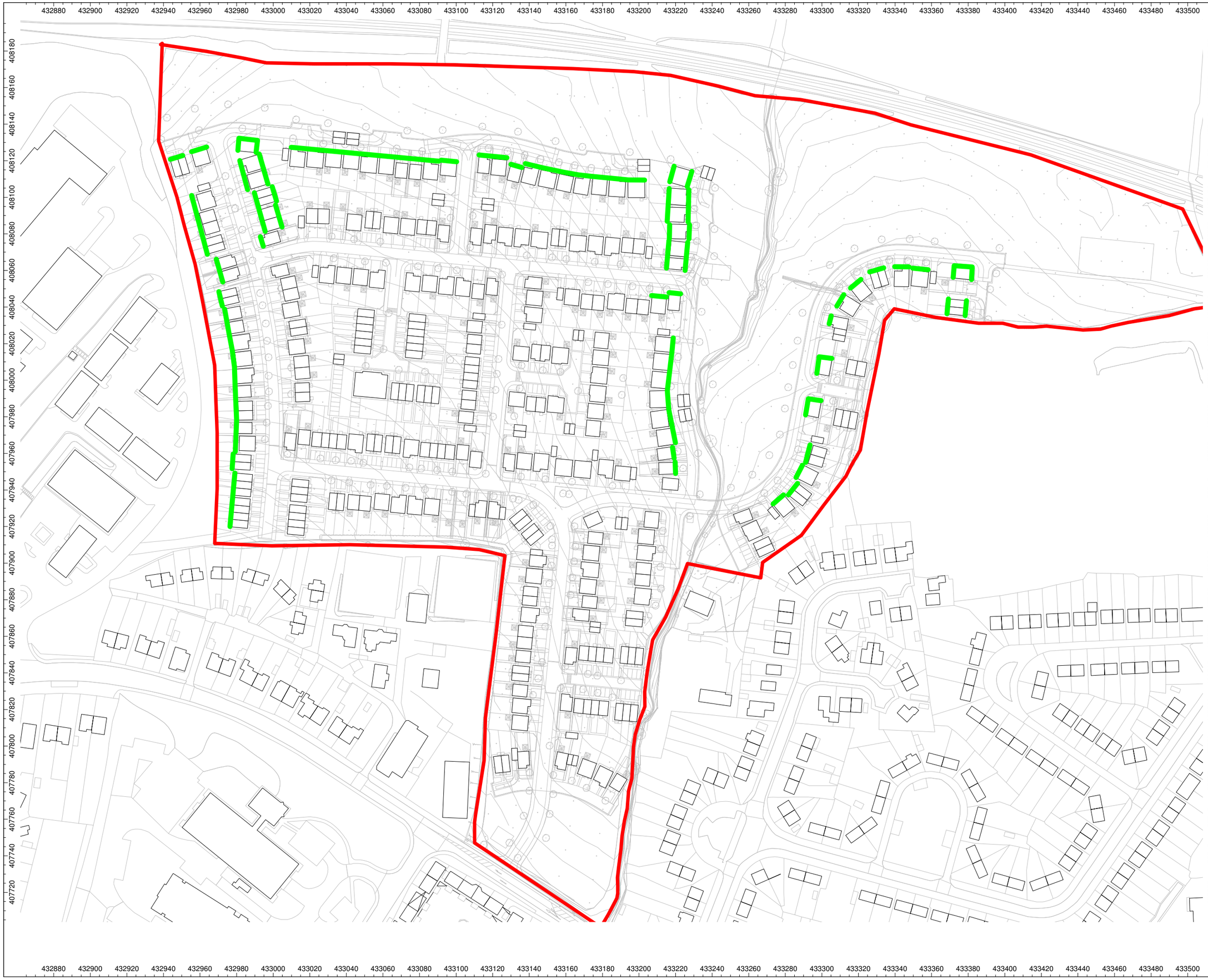
Contour Plot Presented For Indicative Purposes Only

Scale : Not to scale

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Client:
Persimmon Homes

Project:
Wilthorpe Road

Project Number:
A085476

Site Address:
Wilthorpe Road, Barnsley

Drawing Title / Scenario:
Required Mitigation Strategy - Bedrooms

Drawing Number:
SK06

Key:

Site Boundary:

Alternative Ventilation Required:

Scale : Not to scale

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