Clitheroe Hospital

Clitheroe, Lancashire

A103492

NHS Property Services Limited and McDermott Developments Limited.
June 2017
Prepared on behalf of WYG Environment Planning Transport Limited.

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

WYG Environment Planning Transport Limited. Registered in England & Wales Number: 03050297
Registered Office: Arndale Court, Otley Road, Headingley, Leeds, LS6 2UJ

Document Control

Document:	Noise Assessment
Project:	Clitheroe Hospital
Client:	NHS Property Services Limited and McDermott Developments Limited
Job Number:	A103492
File Origin:	O:\Acoustics Air Quality and Noise\Active Projects\A103492

Revision:	1st Issue	
Date:	23rd May 2017	
Prepared by:	Checked by:	Approved By:
Jonathan Crowther	Sam Moran	Nigel Mann
Description of revision:		

Revision:	2nd Issue	
Date:	14th June 2017	
Prepared by:	Checked by:	Approved By:
Jonathan Crowther	Sam Moran	Nigel Mann
Description of revision:		
Client name updated		

Revision:		
Date:		
Prepared by:	Checked by:	Approved By:
Description of revision:		

Contents

1.0 Introduction

1.1 Purpose of this Report

This report presents the findings of a noise survey which was commissioned to establish the existing noise environment at and around a proposed residential development site at Clitheroe Community Hospital, Clitheroe.

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 noise monitoring location plan is presented in Appendix B.

1.2 Legislative Context (England)

PPG24 was replaced by NPPF on 27 March 2012. With regards 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, Planning Practice Guidance (PPG): Noise was launched in March 2014. 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 (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 PPG: Noise 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 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.

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 Residential Receptors	Noise levels are below: External Amenity Space: 50 $dBL_{Aeq,16hours}$	No action required Within BS8233 / WHO guideline criteria
Lowest Observed Adverse Effect Level (LOAEL)	Proposed Residential Receptors	Noise levels are below: *Bedrooms: 30 $dBL_{Aeq,8hours}$* *Living Rooms: 35 $dBL_{Aeq,16hours}$* *External Amenity Space:* *55 $dBL_{Aeq,16hours}$*	No action required Within BS8233 / WHO upper guideline criteria
Significant Observed Adverse Effect Level (SOAEL)	Proposed Residential Receptors	Noise levels are exceeded: Bedrooms: 30 $dBL_{Aeq,8hours}$ / 45 dBL_{AMax} Living Rooms: 35 $dBL_{Aeq,16hours}$ External Amenity Space: 55 $dBL_{Aeq,16hours}$	Mitigate and reduce to a achieve: Bedrooms: 30 $dBL_{Aeq,8hours}$ / 45 dBL_{AMax} Living Rooms: 35 $dBL_{Aeq,16hours}$ External Amenity Space: 55 $dBL_{Aeq,16hours}$
Unacceptable Observed Adverse Effect Level (UOAEL)	Proposed Residential Receptors	Internal noise levels exceed: Bedrooms: 51 $dBL_{Aeq,8hours}$ Living Rooms: 57 $dBL_{Aeq,16hours}$	Avoid

For the purpose of this assessment, the BS 8233 target noise level criteria is noted in italics in Table 2.1.

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} 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 – other areas	Ordnance Survey / topographical survey	OS 10m Panorama Contours and on site topographical survey
Barriers	McDermott Developments Ltd.	1.8m high garden fence barriers along north east and east development perimeter
Building heights	WYGE Observations	8 m height for two storey residential properties
Receptor positions	WYGE	Height of 1.5 m for living rooms, 4 m for bedrooms. 1.5 m and 4 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	McDermott Developments Ltd.	Drawing ref: PL1.0

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 (Road Traffic Noise)

The model was verified by modelling the monitoring locations for the 'existing' scenario. Road traffic noise along Chatburn Road and Pimlico Link Road were the dominant noise sources during both day and night periods. For Chatburn Road and Pimlico Link Road, 24hr Annual Average Daily Traffic (AADT) traffic data available from the DfT traffic statistics website (24hr AADT x 0.9 to derive the 18hr Annual Average Weekday Traffic Flow) has been used as a basis for the specific traffic levels on these links. In order to derive the reference $L_{Aeq,16hour}$ noise level for these links a correction of -2 dB has been applied.

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	58.7	57.3	-1.4
LT2	50.3	49.2	-1.1
LT3	52.2	50.5	-1.7

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	50.8	53.3	2.5
LT2	48.0	45.2	-2.8
LT3	48.6	46.5	-2.1

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

The verification points show a divergence between monitored and modelled results of less than 3 dB at all locations and are therefore considered suitably verified.

3.2.2 Model Input Data – Clitheroe Hospital Car Park

To present a worst case scenario, noise levels from this area have been determined based upon observations within existing retail car parks during busy daytime periods. L_{Aeq} noise levels, as follows, are modelled as area sources during the daytime period: $L_{Aeq,1hr}$ *Noise Level* = 54 dB at 1.5m height.

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:

Rion NL-52	Environmental Noise Analyser (WYG15)	s/n	620858
Rion NL-52	Environmental Noise Analyser (WYG16)	s/n	1221576
Rion NL-52	Environmental Noise Analyser (WYG23)	s/n	732146
Norsonic 1251	Sound Calibrator	s/n	31043

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 two locations from Friday 27th November 2015 to Friday 4th December 2015, and a third location from 8th April 2016 to 13th April 2016 (as specified in the following table and shown in SK01 of Appendix B). The noise survey was attended during daytime, evening and night periods on 3rd and 4th December 2015 with attended short term measurements undertaken at five locations during the daytime period on the 4th December. 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 wet with scattered showers. Anemometer readings confirmed that wind speeds were less than 5 ms^{-1} at all times during the attended survey with a predominant westerly wind direction. Following a review of the LT audio recordings and a review of weather data over the course of the period, noise data which has been clearly influenced by adverse weather conditions (high winds or heavy rain) has been excluded from the data set.

Table 4.1 Noise Monitoring Locations

Ref	Description	Grid Reference	
		X	Y
LT1	North West boundary of the site, approx 55m from Chatburn Road	375387	442986
LT2	South East boundary of the site, adjacent to Link 59 Business Park	375462	442914
LT3	South East boundary of the site, between Link 59 Business Park and Clitheroe Community Hospital	375518	442984
ST1	Lay-by on Pimlico Link Road, opposite entrance to Link 59 Business Park	375761	442951
ST2	South East boundary of the site, adjacent to Link 59 Business Park	375462	442914
ST3	North West boundary of the site, adjacent to hospital entrance	375467	443088
ST4	North East side of the site, approx 110m from Chatburn Road	375517	443014
ST5	North East side of the site, approx 70m from Chatburn Road	375509	443035

4.2 Noise Survey Results

Based on observations made during the attended site visits and a review of audio recordings at the long term (LT) monitoring locations, existing ambient noise levels around the site are dominated by road traffic noise from A671 (Pimlico Link Road) and Chatburn Road. In the absence of road traffic noise, a low distant drone from the Hanson Cement Works, located approx. 700m to the north east, was audible at the site. Noise from bird song was also audible on the audio recordings at the LT locations. Where noise from birds has significantly influenced the noise measurements, data during these periods has been omitted.

Ambient noise levels are usually described using the $L_{Aeq,T}$ index (equivalent A-weighted sound pressure level over the measurement period *T*) and background noise levels are usually described using the $L_{A90,T}$ index (A-weighted sound pressure level exceeded for 90% of the measurement period). Road traffic noise is generally described using the $L_{A10,T}$ index (A-weighted sound pressure level exceeded for 10% of the measurement period *T*).

Table 4.2 Metrological Conditions During the Survey

Survey Location/	Date & Time	Temperature	Wind Speed	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Day ST1	04/12/2015 11:56	10.0 ºC	3-5 m/s	W	8	RTN along Chatburn Road and Pimlico Link Road
Day ST2	04/12/2015 09:58	8.0 ºC	3-5 m/s	W	8	RTN along Chatburn Road and Pimlico Link Road
Day ST3	04/12/2015 10:56	8.0 ºC	3-5 m/s	W	8	RTN along Chatburn Road and Pimlico Link Road
Day ST4	04/12/2015 11:17	8.0 ºC	3-5 m/s	W	7	RTN along Chatburn Road and Pimlico Link Road
Day ST5	04/12/2015 10:30	8.0 ºC	3-5 m/s	W	7	RTN along Chatburn Road and Pimlico Link Road

The results of the statistical measurements and frequency measurements conducted during the baseline survey are summarised in Table 2.3.

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 07:00 - 23:00	78 hours	27/11/2015 – 04/12/2015 11:00 – 09:26	LT1	58.7	87.6	38.5	60.9	52.2
Weeknight 23:00 – 07:00	40 hours	27/11/2015 – 04/12/2015 23:00 - 06:56		50.8	75.2	34.8	50.4	44.4
Weekend Day 07:00 - 23:00	32 Hours	28/11/2015 – 29/11/2015 07:00 – 23:00		59.0	87.9	42.5	60.4	47.4
Weekend Night 23:00 – 07:00	16 Hours	28/11/2015 – 29/11/2015 00:00 - 23:56		50.3	69.6	40.8	55.0	44.0
Weekday 07:00 - 23:00	50 hours	08/04/2016 – 13/04/2016 09:55 – 12:50	LT2	50.3	87.4	35.0	49.4	43.9
Weeknight 23:00 – 07:00	24 hours	09/04/2016 – 10/04/2016 23:00 – 07:00		48.0	80.2	33.4	48.7	38.5
Weekend Day 07:00 - 23:00	32 Hours	08/04/2016 – 13/04/2016 07:00 – 23:00		46.4	84.0	32.4	47.5	41.0
Weekend Night 23:00 – 07:00	16 Hours	09/04/2016 – 10/04/2016 23:00 – 07:00		46.3	78.4	33.0	44.9	40.2
Weekday 07:00 - 23:00	81 hours	27/11/2015 – 04/12/2015 11:42 – 12:27	LT3	52.2	87.0	36.3	52.6	48.2
Weeknight 23:00 – 07:00	40 hours	27/11/2015 – 04/12/2015 23:00 - 06:56		48.6	76.8	33.1	46.3	42.3
Weekend Day 07:00 - 23:00	32 Hours	28/11/2015 – 29/11/2015 07:02 – 22:57		51.6	75.0	40.7	52.1	48.0
Weekend Night 23:00 – 07:00	16 Hours	28/11/2015 – 29/11/2015 00:02 - 23:57		46.3	67.0	39.3	48.5	43.2
Day 07:00 – 19:00	30 mins	04/12/2015 11:58	ST1	72.9	88.9	46.6	76.9	54.9
	15 mins	04/12/2015 11:19	ST2	49.6	66.7	45.1	51.6	49.5
	30 mins	04/12/2015 10:01	ST3	64.6	78.5	46.9	68.8	51.6
	15 mins	04/12/2015 10:58	ST4	50.0	73.4	44.9	51.6	49.5
	15 mins	04/12/2015 10:38	ST5	52.6	68.9	46.7	54.6	52.0

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

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. With windows closed where an assumption of double glazing (4mm / 16mm / 4mm) with a sound reduction of 26 dB R_{tra} has been used. The predicted noise levels at the assessed receptors locations (as presented in SK02a) are presented in the tables below. 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. The daytime and night-time L_{Aeq} noise contour plots are presented in SK03 and SK04.

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

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?
R1	57.4	42.4	31.4	35	No (Windows Open)	Yes (See Section 6)
R2	56.8	41.8	30.8	35	No (Windows Open)	Yes (See Section 6)
R3	55.0	40.0	29.0	35	No (Windows Open)	Yes (See Section 6)
R4	55.1	40.1	29.1	35	No (Windows Open)	Yes (See Section 6)
R5	54.9	39.9	28.9	35	No (Windows Open)	Yes (See Section 6)
R6	51.0	36.0	25.0	35	No (Windows Open)	Yes (See Section 6)
R7	52.9	37.9	26.9	35	No (Windows Open)	Yes (See Section 6)
R8	51.9	36.9	25.9	35	No (Windows Open)	Yes (See Section 6)
R9	50.0	35.0	24.0	35	Yes	No
R10	45.2	30.2	19.2	35	Yes	No
R11	37.1	22.1	11.1	35	Yes	No
R12	41.0	26.0	15.0	35	Yes	No
R13	47.7	32.7	21.7	35	Yes	No
R14	46.9	31.9	20.9	35	Yes	No

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

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

Ref	External $L_{Aeq,8hr}$ Night-time	Internal $L_{Aeq,8hr}$ Night-time (Windows Open)	Internal $L_{Aeq,8hr}$ Night-time (Windows Closed)	BS 8233 Target Criteria L_{Aeq}	Below SOAEL?	Mitigation Required?
R1	54.9	39.9	28.9	30	No (Windows Open)	Yes (See Section 6)
R2	54.5	39.5	28.5	30	No (Windows Open)	Yes (See Section 6)
R3	52.7	37.7	26.7	30	No (Windows Open)	Yes (See Section 6)

Ref	External $L_{Aeq,8hr}$ Night-time	Internal $L_{Aeq,8hr}$ Night-time (Windows Open)	Internal $L_{Aeq,8hr}$ Night-time (Windows Closed)	BS 8233 Target Criteria L_{Aeq}	Below SOAEL?	Mitigation Required?
R4	52.9	37.9	26.9	30	No (Windows Open)	Yes (See Section 6)
R5	52.9	37.9	26.9	30	No (Windows Open)	Yes (See Section 6)
R6	50.8	35.8	24.8	30	No (Windows Open)	Yes (See Section 6)
R7	50.1	35.1	24.1	30	No (Windows Open)	Yes (See Section 6)
R8	53.2	38.2	27.2	30	No (Windows Open)	Yes (See Section 6)
R9	50.3	35.3	24.3	30	No (Windows Open)	Yes (See Section 6)
R10	43.9	28.9	17.9	30	Yes	No
R11	35.8	20.8	9.8	30	Yes	No
R12	39.2	24.2	13.2	30	Yes	No
R13	47.3	32.3	21.3	30	No (Windows Open)	Yes (See Section 6)
R14	46.3	31.3	20.3	30	No (Windows Open)	Yes (See Section 6)

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

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

With windows open, internal noise levels in some bedrooms and living rooms, more predominantly towards the north of the site will exceed the target criteria. As a result, mitigation is considered in Section 6.

5.2 External Amenity Assessment

Predicted noise levels in private external amenity space at the proposed receptors are presented in the table below. The receptor locations are presented in SK02 and a daytime noise contour plot is presented in SK03.

Table 5.5 Day-time $L_{Aeq,16hr}$ dB Noise Levels in External Amenity Areas

Ref	External LAeq Day-time	BS 8233 Target Criteria LAeq,16hours	Below SOAEL?
G1	52.4	55	Yes
G2	48.6	55	Yes
G3	43.6	55	Yes
G4	40.1	55	Yes
G5	39.7	55	Yes
G6	53.9	55	Yes
G7	50.2	55	Yes
G8	47.9	55	Yes
G9	53.3	55	Yes
G10	48.1	55	Yes
G11	40.0	55	Yes
G12	41.7	55	Yes
G13	46.8	55	Yes

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

The assessment in Table 5.5 shows that noise levels are predicted to fall below 55 $dBL_{Aeq,16hours}$ which is below the LOAEL.

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 and is therefore considered to have some value of tranquillity. In addition, there are no current public rights of way within the proposed site. Therefore, the proposed development is not expected to have an adverse impact on access to areas of tranquillity.

6.0 Mitigation Strategy

As established in Section 5, the proposed standard double glazing with an example specification of 4mm/16mm/4mm will be acceptable throughout the site.

With windows open, internal noise levels in living rooms and bedrooms along the outer fringes of the site are predicted to exceed the internal target criteria level. Based on detailed BS 8233 calculations trickle vents with a $D_{,n,e,w}$ of 32 dB would maintain the performance of the double glazing specification referenced above. This configuration would be suitable for all living rooms and bedrooms within the site. The locations where alternative ventilation are required are presented in SK05 and SK06 in Appendix B.

Therefore, with a suitable glazing and ventilation strategy (or similar), noise levels in living rooms and bedrooms throughout the site will fall below the SOAEL.

7.0 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 the following measures. Mitigation comprises of a ventilation strategy for proposed residential dwellings which is summarised below. Noise levels in all gardens are predicted to fall below 55 $dBL_{Aeq,16hr}$ and no mitigation is required.

NPPF 123 C & D

An assessment of the existing tranquillity level of the site has been undertaken and identified that the site is not highly prized for its tranquillity and recreational value in terms of noise. The proposed development is considered to have a negligible effect on local access to areas of greater tranquillity. Short and long term noise measurements were undertaken within the south western and south eastern parts of the site opposite the nearby business park. It has been demonstrated that road traffic noise is the dominant noise source throughout the site and no businesses would be adversely affected by the proposed development.

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 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.

Planning Practice Guidance: Noise

The noise mitigation in Section 6 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) could 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.

Rw — 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.

Appendix B – Sketches

SK01 Noise Monitoring Location Plan

SK02a Proposed Receptor Location Plan (Facades)

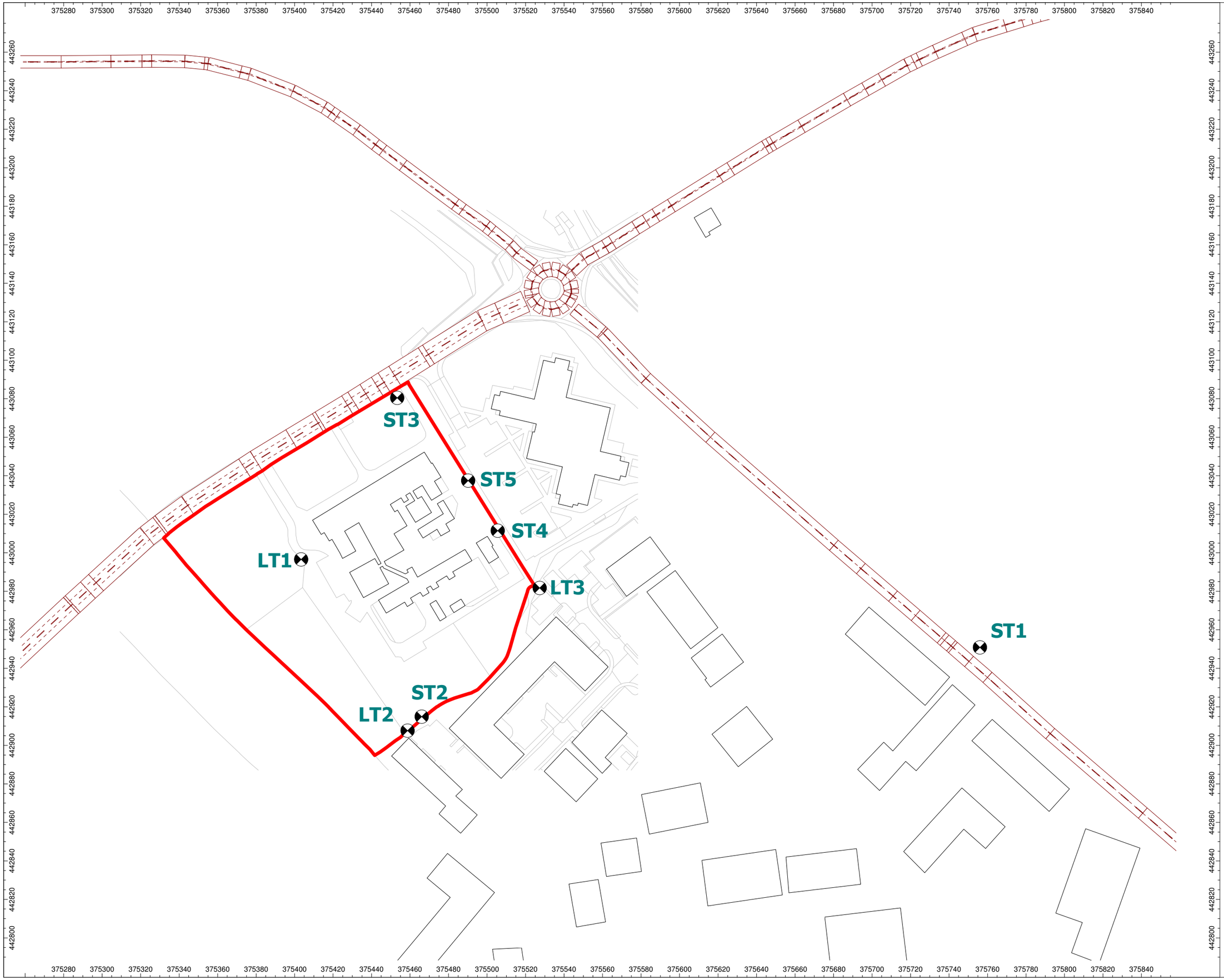
SK02b Proposed Receptor Location Plan (Gardens)

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

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

SK05 Mitigation Strategy Living Rooms

SK06 Mitigation Strategy Bedrooms



Client:
McDermott Developments Ltd.

Project:
Clitheroe Hospital

Project Number:
A103492

Site Address:
Clitheroe, Lancashire

Drawing Title / Scenario:
Noise Monitoring Location Plan

Drawing Number:
SK01

Key:

Site Boundary:

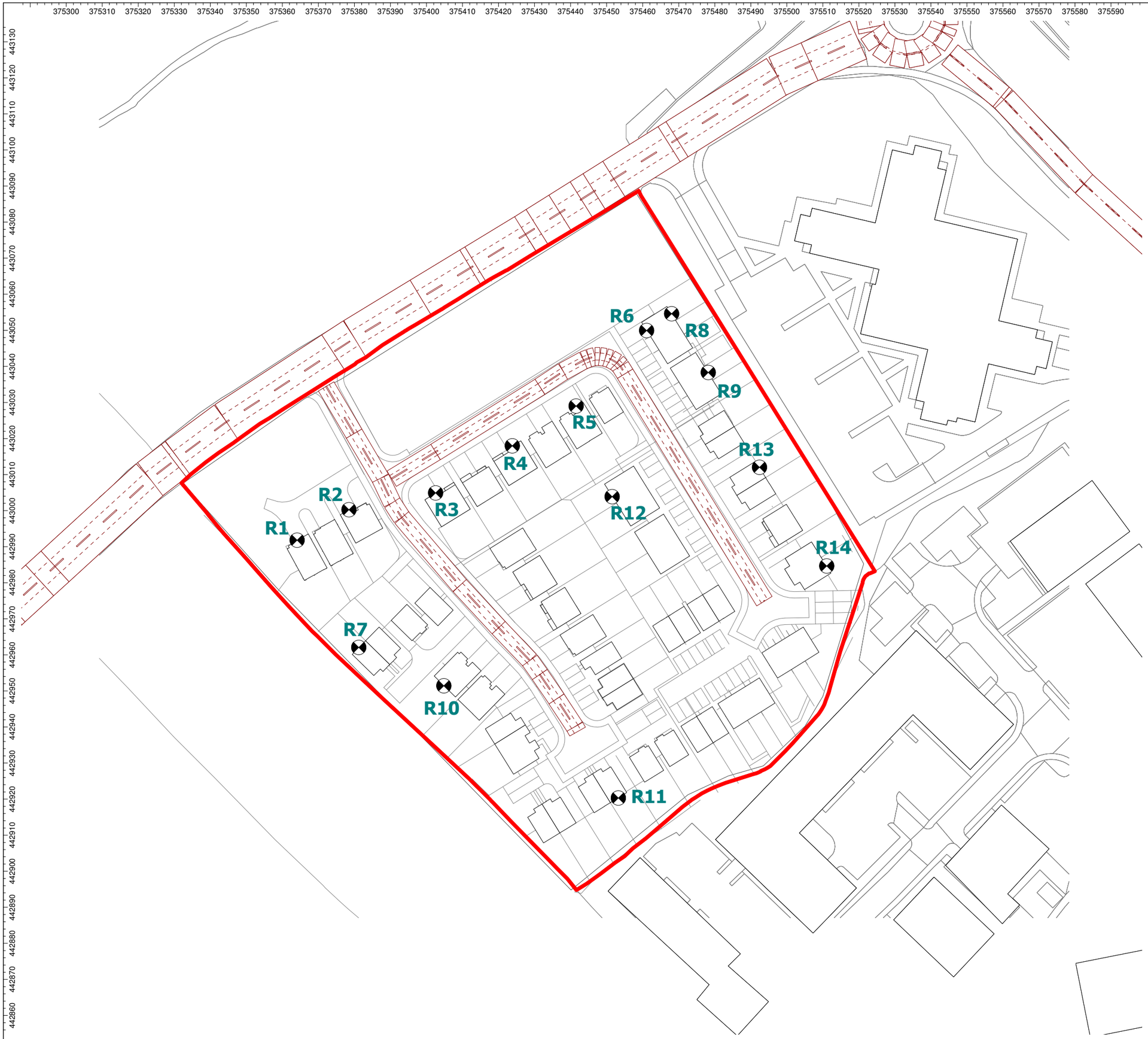
Monitoring Position:

Scale : Not to scale

WYGE Leicester 23.05.17

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

© WYG Environment



Client:
McDermott Developments Ltd.

Project:
Clitheroe Hospital

Project Number:
A103492

Site Address:
Clitheroe, Lancashire

Drawing Title / Scenario:
Proposed Receptor Location Plan (Facade)

Drawing Number:
SK02a

Key:

Site Boundary:

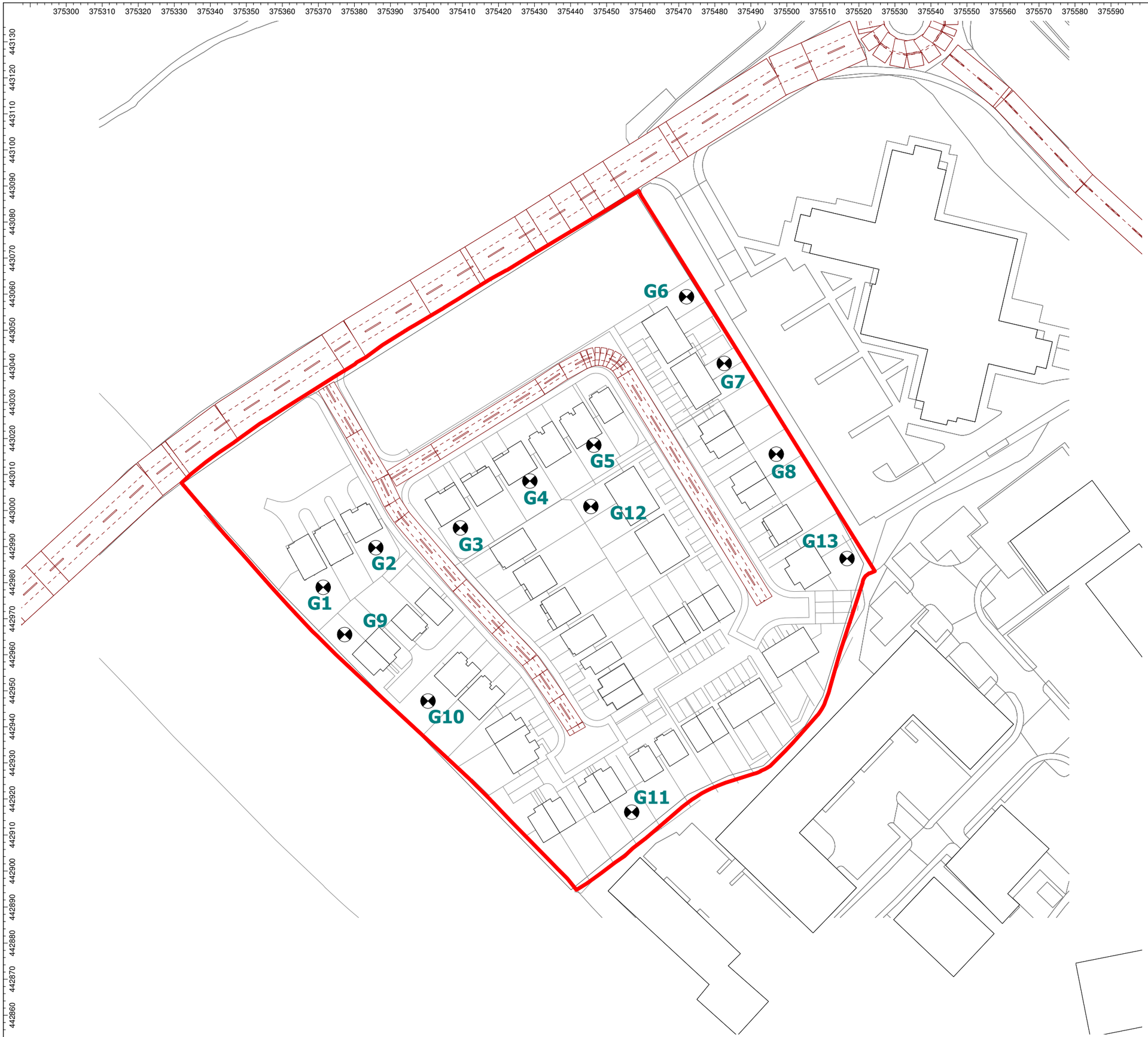
Receptor Location:

Scale : Not to scale

WYGE Leicester 23.05.17

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

© WYG Environment



Client:
McDermott Developments Ltd.

Project:
Clitheroe Hospital

Project Number:
A103492

Site Address:
Clitheroe, Lancashire

Drawing Title / Scenario:
Proposed Receptor Location Plan (Gardens)

Drawing Number:
SK02b

Key:

Site Boundary:

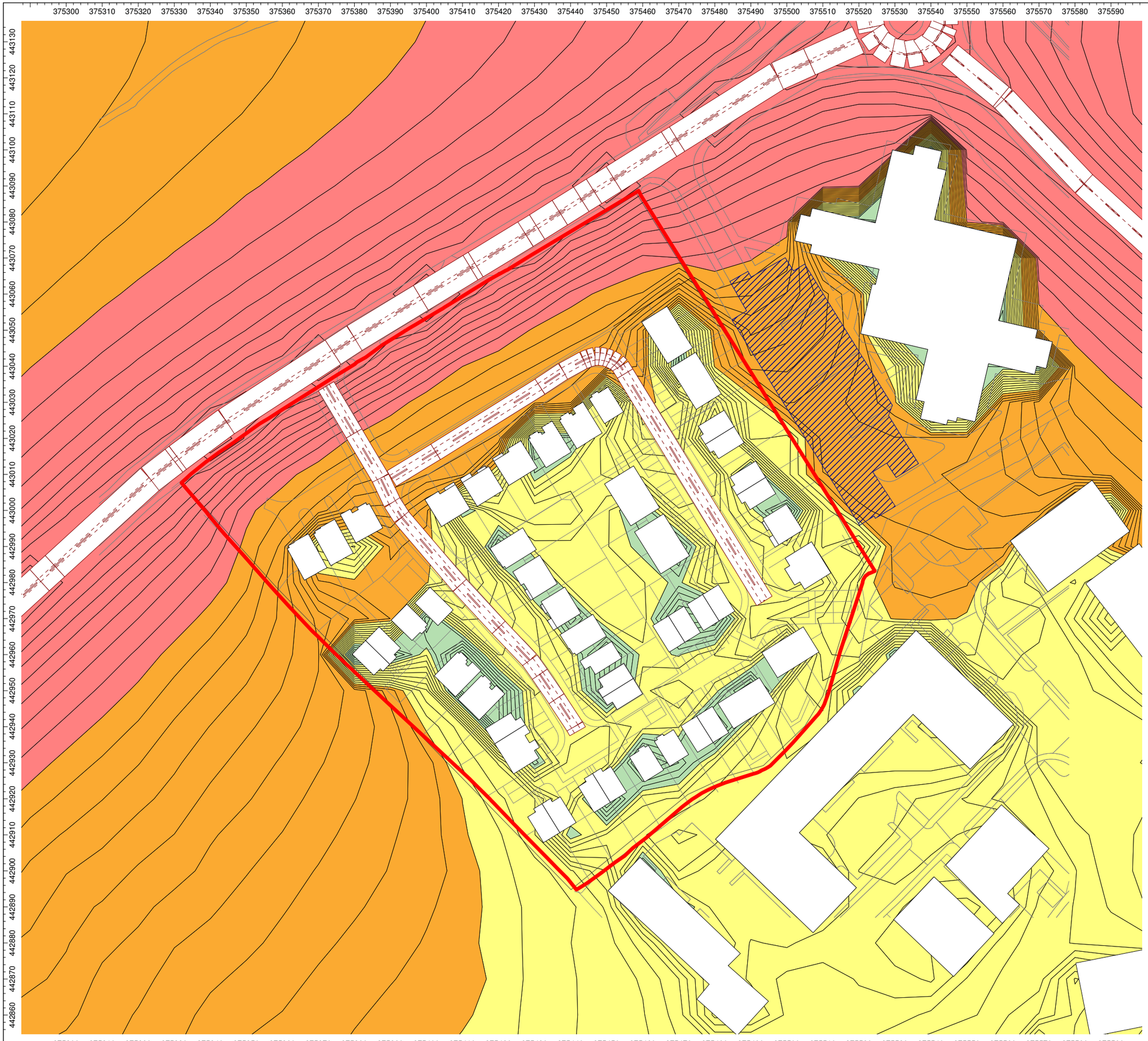
Receptor Location:

Scale : Not to scale

WYGE Leicester 23.05.17

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

© WYG Environment



Client:
McDermott Developments Ltd.

Project:
Clitheroe Hospital

Project Number:
A103492

Site Address:
Clitheroe, Lancashire

Drawing Title:
Proposed Daytime Noise Contour Plot LAeq,16hour

Drawing Number:
SK03

Key:

Site Boundary:

- 0.0 - 40.0 dB
- 40.0 - 50.0 dB
- 50.0 - 60.0 dB
- >60.0 dB

Contour Plot Presented for Indicative Purposes Only

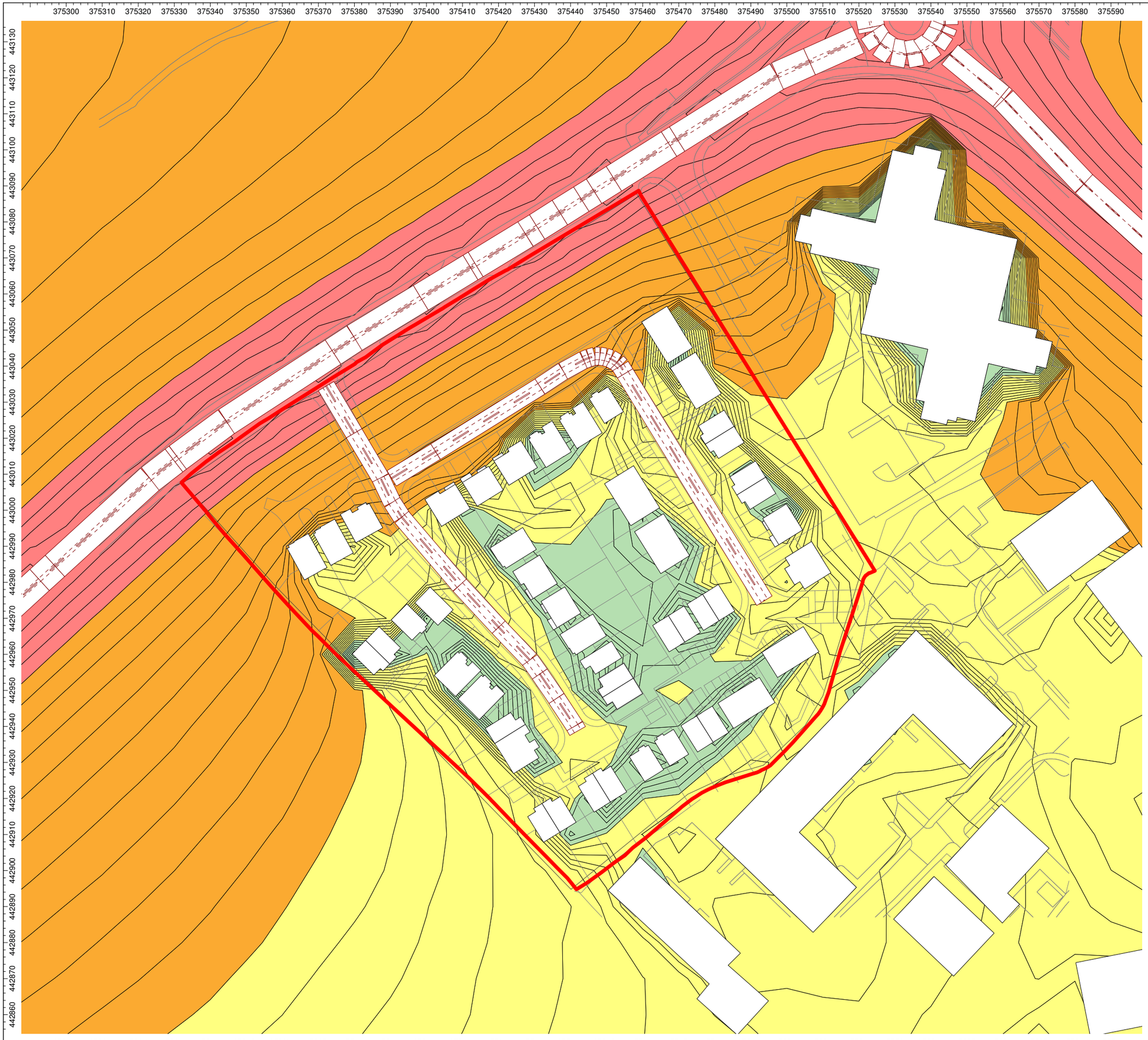
Scale : Not to scale

WYGE Leicester 23.05.17

Scale : Not to scale

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

© WYG Environment



Client:
McDermott Developments Ltd.

Project:
Clitheroe Hospital

Project Number:
A103492

Site Address:
Clitheroe, Lancashire

Drawing Title:
Proposed Night-time Noise Contour Plot LAeq,8hour

Drawing Number:
SK04

Key:

Site Boundary:

- 0.0 -40.0 dB
- 40.0 - 50.0 dB
- 50.0 - 60.0 dB
- >60.0 dB

Contour Plot Presented for Indicative Purposes Only

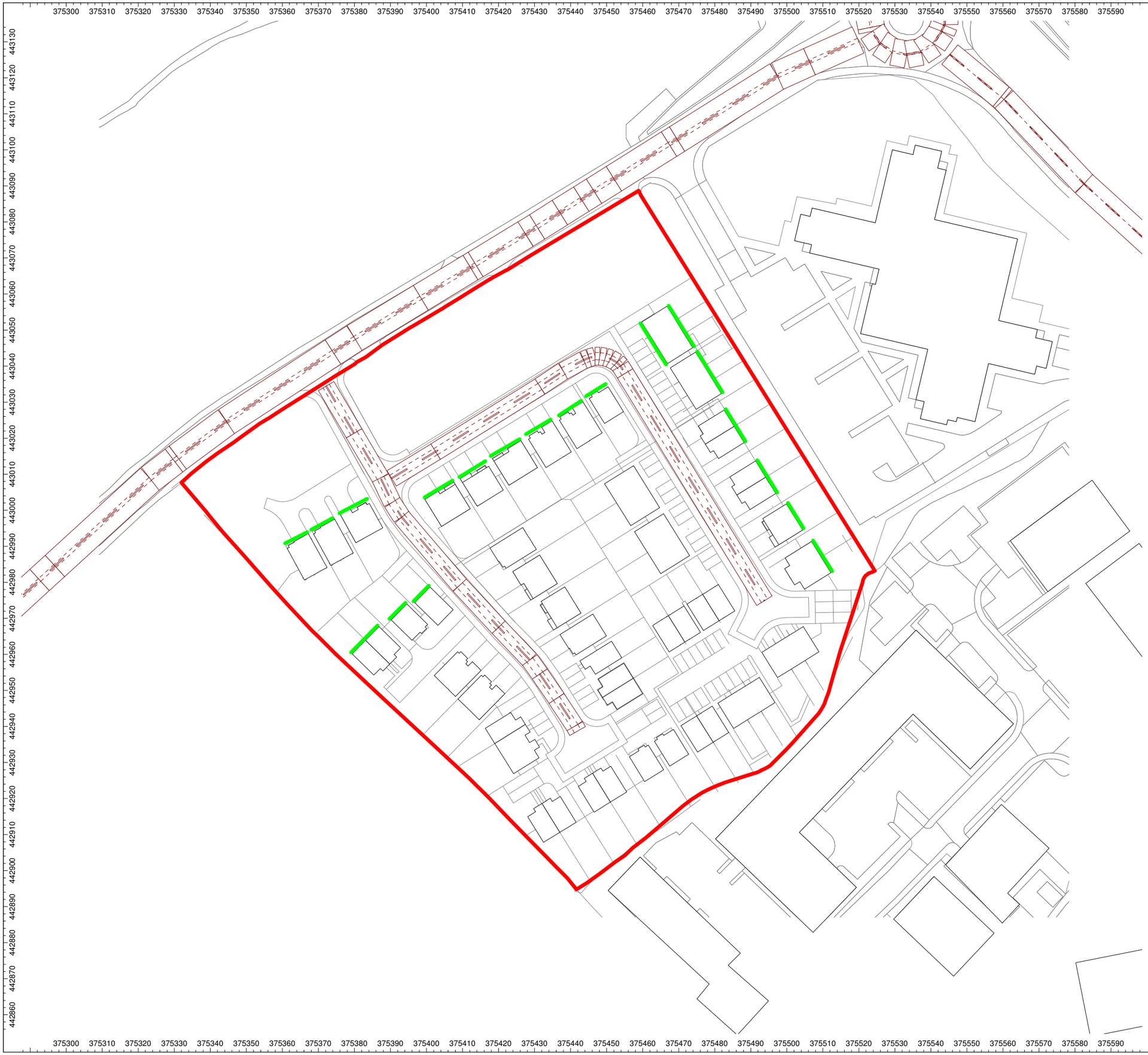
Scale : Not to scale

WYGE Leicester 23.05.17

Scale : Not to scale

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

© WYG Environment



Client:
McDermott Developments Ltd.

Project:
Clitheroe Hospital

Project Number:
A103492

Site Address:
Clitheroe, Lancashire

Drawing Title / Scenario:
Mitigation Strategy Living Rooms

Drawing Number:
SK05

Key:

Site Boundary:

Standard glazing & standard trickle vents:

Standard glazing & openable windows acceptable For all other properties

Example specifications:
Glazing: 4mm/16mm/4mm
Trickle vents: 32 dB D,n,e,w

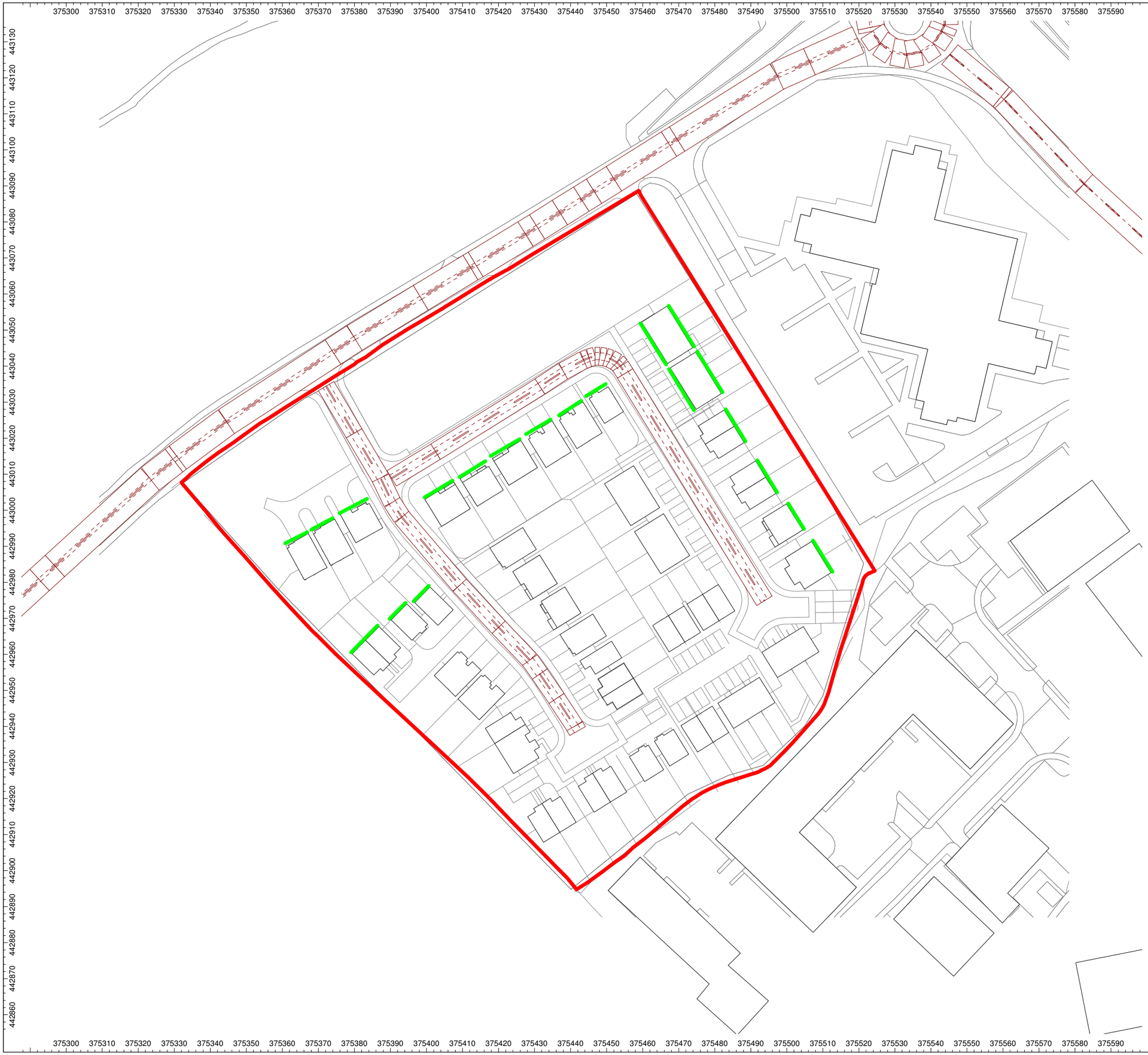
Scale : Not to scale

Scale : Not to scale

WYGE Leicester 23.05.17

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

© WYG Environment



Client:
McDermott Developments Ltd.

Project:
Clitheroe Hospital

Project Number:
A103492

Site Address:
Clitheroe, Lancashire

Drawing Title / Scenario:
Mitigation Strategy Bedrooms

Drawing Number:
SK06

Key:

Site Boundary:

Standard glazing & standard trickle vents:

Standard glazing & openable windows acceptable For all other properties

Example specifications:
Glazing: 4mm/16mm/4mm
Trickle vents: 32 dB D,n,e,w

Scale : Not to scale

Scale : Not to scale

WYGE Leicester 23.05.17

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

© WYG Environment