Barnsley College Construction Centre

Noise Assessment

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1.0 Introduction

1.1 Purpose of this Report

This report presents the findings of a baseline noise assessment undertaken with reference to the installation of mechanical services plant and machinery at the proposed new Construction Centre at Barnsley College. As details regarding the type and location of the proposed plant have not been finalised, this report establishes noise level criteria to be achieved at identified sensitive receptors.

A list of acoustic terminology and abbreviations used in this report is provided in Appendix A and the monitoring location plan and modelling results relevant to the assessment are presented in Appendix B.

2.0 Assessment Criteria

The effect of noise from proposed external plant will be assessed in accordance with BS 4142:1997 '*Rating Industrial Noise Affecting Mixed Residential and Industrial Areas*'.

This standard sets down the following guidelines for assessing the likelihood of complaints based upon the difference between the measured background noise level and the rating level of the source under consideration, as shown in Table 2.1 below.

Table 2.1 BS 4142 Assessment Criteria

Difference between Rating Noise Level and Background Noise Levels	Likelihood of Complaints
Greater than +10 dB	Likely
+5 dB	Marginal significance
More than 10 dB below	Unlikely

In addition to noise levels, the likelihood of complaints depends on the individuals affected and to the acoustic features present. Section 8 of BS 4142 recommends that a correction factor of +5dB be applied to the specific noise level if the noise contains certain acoustic features that can increase the likelihood of complaints. Such features of new or modified noise sources include:

- a distinguishable, discrete, continuous note (whine, hiss, screech, hum etc.)
- distinct impulses (bangs, clicks, clatters or thumps)
- irregular enough to attract attention

The guidance states that a rating noise level of around 35dB is very low.

For residential receptors, the noise criteria applied is a noise rating level of 5 dB below the background noise level whilst for non-residential receptors, a noise rating level equivalent to background is applied.

Should it be required, the specified criteria would adhere to the requirements of the BREEAM POL 5 Credit criteria.

2.1 Internal Noise Assessment Criteria

For nearby non-residential receptors, consideration may also be given to the 'reasonable' internal noise levels stated within BS8233 unless baseline noise levels are already greater. Examples of acceptable internal noise level criteria are as follows:

- Open Plan Offices (where privacy is important) - Design range 45-50 dB L_{Aeq}
- Cellular offices - 40dB L_{Aeq}
- Meeting rooms/Executive offices - 35dB L_{Aeq}

For teaching spaces, examples of acceptable internal noise level criteria comprise:

- Teaching Classrooms - 35dB L_{Aeq}
- Practical Spaces – 40dB L_{Aeq}

For nearby residential receptors consideration has been given to the following BS8233 targets:

These targets are:

		Good		Reasonable	
• Living rooms	L_{Aeq} =	30	–	40 dB	
• Bedrooms	L_{Aeq} =	30	–	35 dB,	L_{Amax}, night-time = 45 dB

3.0 Assessment Methodology

3.1 Sensitive Receptors

Table 3.1 below summarises receptor locations that have been selected to represent worst-case receptors with respect to direct noise from the proposed plant. The locations of the receptors are shown on SK02 in Appendix B.

Table 3.1 Sensitive Receptor Locations

Ref.	Description	Distance from nearest point of proposed building (m)
R1	Caxton Street	33
R2	Caxton Street	42
R3	Bridge Street	107
R4	Barnsley College Refectory	20
R5	Low Carbon Centre	49

4.0 Noise Survey

4.1 Noise Survey Methodology

A noise survey was undertaken to characterise baseline ambient noise levels currently experienced at positions representative of the facade of the proposed building as well as being representative of the closest receptors to the site.

Equipment used during the surveys included:

Norsonic 131	Environmental Noise Analyser	s/n	1312722
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.

Noise level data was collected at a positions representative of the facade of the proposed development on 27th and 28th November 2013. These measurements are considered to be representative of the background noise levels at the nearest properties to the site.

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 periods were observed as being dry. Wind speeds were less than 5 ms^{-1} at all times during the surveys.

Table 4.1 Noise Monitoring Location

Ref	Description	Approx Grid Reference	
		X	Y
LT1	On-site approx 5m from railway line opposite properties on Caxton Street	434391	407062.2

4.2 Noise Survey Results

Existing ambient noise levels around the site are dominated by rail noise from the railway line adjacent and to the east 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 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	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Day 07:00 - 23:00	27/11/2013 - 28/11/2013 14:31 – 23:00, 07:00 – 12:00	LT1	58.3	95.2	50.4	44.6
Night 23:00 – 07:00	27/11/2013 - 28/11/2013 23:00 - 07:00	LT1	59.4	96.0	42.2	37.8

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

5.0 Key Effects

5.1 Proposed Plant

Noise from proposed building services and machinery associated with such developments can be suitably controlled through appropriate design to achieve the required noise criteria.

Table 5.1 indicates the noise level at the nearest identified sensitive receptors during the day (07:00 – 23:00), night-time (23:00) – 07:00) periods which is required to be achieved to adhere to the criteria as set out in Section 2.1 of this report. It is anticipated that any plant associated with the proposed development will only operate during the typical opening hours of the college.

Table 5.1 BS 4142 Assessment for Proposed plant

Location	Representative Background Noise Level (L_{A90})	Required Noise Rating Level From Plant (L_{Aeq})*
	Daytime	Daytime
Residential receptors (R1 – R3)	44.6	39.6
Non Residential receptors (R4 – R5)	44.6	44.6

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

*It should be noted that depending on the specific receptor type (i.e. office, teaching spaces etc) the noise intrusion criteria specified in section 2.2, or other where justified, may be acceptable.

During the detailed design, an assessment should be undertaken to confirm that the noise level criteria can be achieved.

6.0 Conclusions

An assessment has been undertaken to establish the impact at the nearest sensitive receptors with regard to the installation of building services plant and machinery at the proposed development. A noise survey has been undertaken to establish baseline noise levels representative of the closest residential and non-residential sensitive receptors. Specific details regarding the plant are currently unknown; therefore at this stage required noise levels to be achieved from the plant/machinery have been set in accordance with relevant noise guidance including BS 4142 and BS 8233. During the detailed design an assessment should be undertaken to confirm that the set criteria (unless further justification can be provided with regard to varying the criteria in terms of internal noise levels within non-residential space) can be achieved.

Appendices

Appendix A – Acoustic Terminology and Abbreviations

An explanation of the specific acoustic terminology referred to within this report is provided below.

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.

An explanation of abbreviations used within this report is provided below.

CADNA – Computer Aided Noise Abatement

HGV – Heavy Goods Vehicle

NPPF – National Planning Policy Framework

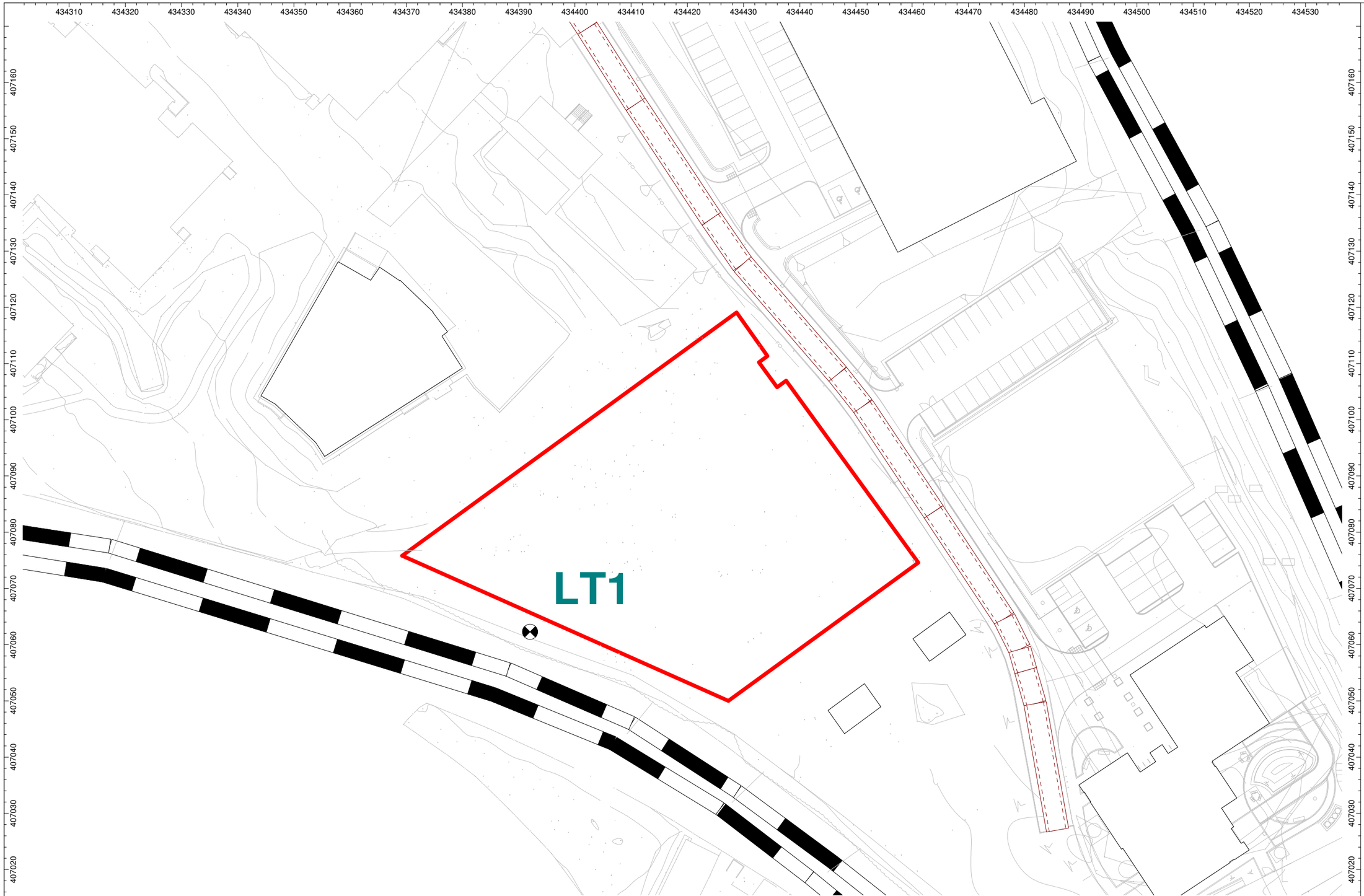
UKAS – United Kingdom Accreditation Service

WYGE – WYG Environment

Appendix B – Sketches

SK01 Noise Monitoring Location Plan

SK02 Receptor Location Plan



Client:
Barnsley College

Project:
Barnsley College Construction Centre, Barnsley

Project Number:
A083943

Site Address:
Honeywell Lane, Barnsley

Drawing Title / Scenario:
Noise Monitoring Location Plan

Drawing Number:
SK01

Key:

Approximate Building Outline:

Noise Monitoring Location:

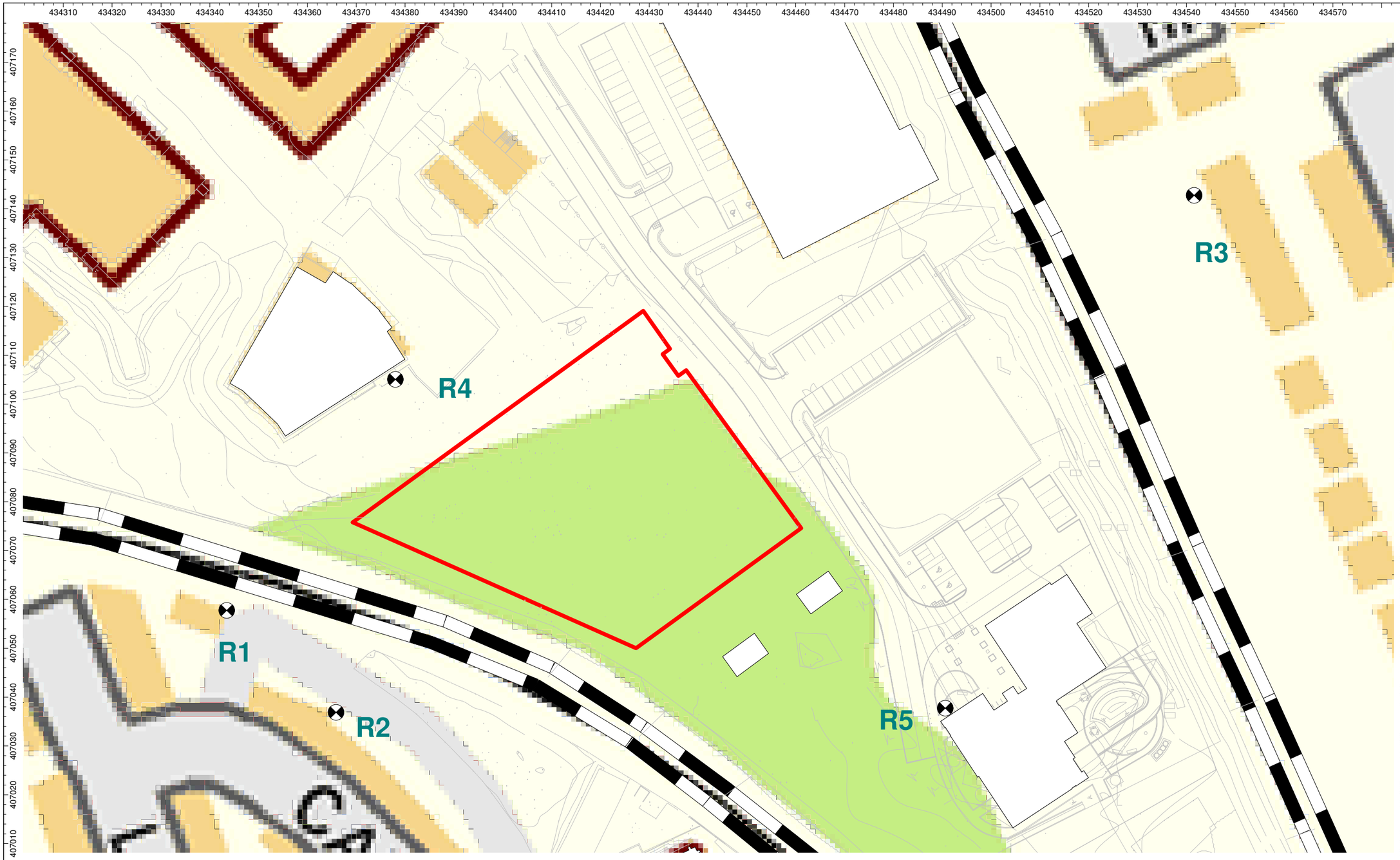
Scale : Not to scale

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Client:
Barnsley College

Project:
Barnsley College Construction Centre, Barnsley

Project Number:
A083943

Site Address:
Honeywell Lane, Barnsley

Drawing Title / Scenario:
Receptor Location Plan

Drawing Number:
SK02

Key:

Approximate Building Outline:

Receptor Monitoring Location:

Scale : Not to scale

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