



# **Harron Homes**

## **Proposed Residential Development,**

## **Littleworth Lane**

## **Lundwood**

## **Noise Assessment**

## **September 2014**

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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 Littleworth Lane, Lundwood.

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)

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. With regard to noise and planning, NPPF contains the following 4 short statements (section 123):

- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- 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;
- 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
- 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 to 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 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 '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 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:<br>Bedrooms (night-time) – 30 dBL <sub>Aeq,8hours</sub> / 45 dBL <sub>Amax</sub><br>Living Rooms (daytime) – 30 dBL <sub>Aeq,16hours</sub><br><br>External Amenity Space (daytime) – 50 dBL <sub>Aeq,16hours</sub>          | No Action Required<br>Within BS8233 / WHO /                                                                                                                                                                                                                                                |
| Lowest Observed Adverse Effect Level (LOAEL)       | Proposed Residents | Internal noise levels achieve:<br><i>Bedrooms (night-time) – 30 dBL<sub>Aeq,8hours</sub> / 45 dBL<sub>Amax</sub></i><br><i>Living Rooms (daytime) – 35 dBL<sub>Aeq,16hours</sub></i><br><br>External Amenity Space (daytime) – 50 dBL <sub>Aeq,16hours</sub> | No Action Required<br>Within BS8233 / WHO Criteria                                                                                                                                                                                                                                         |
| Significant Observed Adverse Effect Level (SOAEL)  | Proposed Residents | Internal noise levels exceed:<br>Bedrooms (night-time)– 35 dBL <sub>Aeq,8hours</sub> / 45 dBL <sub>Amax</sub><br>Living Rooms (daytime)– 40 dBL <sub>Aeq,16hours</sub><br><br>External Amenity Space (daytime) – 55 dBL <sub>Aeq,16hours</sub>               | Mitigate to achieve:<br><i>Bedrooms – 35 dBL<sub>Aeq,8hours</sub> / 45 dBL<sub>Amax</sub></i><br><i>Living Rooms (With windows open) – 40 dBL<sub>Aeq,16hours</sub></i><br><br><i>External Amenity Space – 55 dBL<sub>Aeq,16hours</sub></i><br><br>Within BS8233 / WHO Reasonable Criteria |
| Unacceptable Observed Adverse Effect Level (UOAEL) | Proposed Residents | Internal noise levels exceed:<br><br>Bedrooms (night-time) – 51 dBL <sub>Aeq,8hours</sub><br>Living Rooms (daytime) – 57 dBL <sub>Aeq,16hours</sub>                                                                                                          | Avoid<br><br>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        | Harron Homes      | Topographical survey                                                                                        |
| Ground levels – other areas        | DTPC Ltd          | OS Panorama Contours                                                                                        |
| Traffic data surrounding roads     | DTPC Ltd          | 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                    | Harron Homes      | 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.                                            |
| Absorbent Ground                   | CADNA             | Frequency dependant ground absorption has been applied based on values specified in VDI 2714/16 clause 6.3. |
| Plans                              | Harron Homes      | Planning layout (Ref: 3623/10 Rev C)                                                                        |

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 Road Traffic Noise

Road traffic noise levels have been modelled based on 24hr AADT traffic data provided by DTPC. The 24hr AADT flows have been multiplied by 0.9 in order to derive the 18hr AAWT flows for noise modelling purposes. The 18hr AAWT traffic data used within the model is presented in the table below.

**Table 3.2 Traffic Data – 18 hr AAWT**

| Road                                 | With Development Scenario (2014) |      |
|--------------------------------------|----------------------------------|------|
|                                      | AAWT Flow                        | HGV% |
| Rotherham Road                       | 15719                            | 7    |
| Pontefract Road south                | 28261                            | 9    |
| Pontefract Road north                | 27218                            | 8    |
| Littleworth Road east of site access | 3825                             | 1    |
| Site access road                     | 937                              | 2    |
| Littleworth Road west of site access | 3825                             | 1    |

The noise model output establishes the  $L_{A10,18\text{hour}}$  noise level. Therefore, a correction of -2 dB has been made to the predicted noise levels in order to establish a  $L_{Aeq,16\text{ hour}}$  daytime noise level with receptor heights at 1.5m. Following the guidance provided within DMRB, a correction of  $0.9 \times L_{A10,18\text{hours}} - 3.77$  has been applied to the modelled  $L_{A10,18\text{hours}}$  noise levels, with receptors at 4m height, in order to derive the night-time  $L_{Aeq,8\text{hours}}$ .

### 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).



## 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 4231     | Calibrator                           | s/n | 2176211 |
| Norsonic 140 | Environmental Noise Analyser         | s/n | 1402987 |
| Rion NL-52   | Environmental Noise Analyser (WYG14) | s/n | 610212  |
| Rion NL-52   | Environmental Noise Analyser (WYG15) | s/n | 1221575 |

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 eleven locations (as specified in the following table and shown in SK01 of Appendix B) from Wednesday 16<sup>th</sup> July 2014 to Monday 21<sup>th</sup> July 2014. Attended short term measurements were undertaken at eight locations during the day, evening, peak and night-time periods with three additional locations being measured unattended over a 114 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<sup>-1</sup> at all times during the survey with a predominant westerly wind direction.

**Table 4.1 Noise Monitoring Locations**

| Ref  | Description                                                             | Grid Reference |          |
|------|-------------------------------------------------------------------------|----------------|----------|
|      |                                                                         | X              | Y        |
| LT 1 | North-eastern site boundary adjacent to Littleworth Lane and MOT garage | 437157.4       | 406965.3 |
| LT 2 | North-western site boundary adjacent to the school playing fields       | 436930.3       | 407039.0 |
| LT 3 | South eastern corner of the site                                        | 437088.9       | 406773.9 |
| ST 1 | North-eastern site boundary adjacent to Littleworth Lane                | 437163.7       | 406955.9 |
| ST 2 | Northern site boundary adjacent to Littleworth Lane                     | 437100.4       | 407033.9 |
| ST 3 | North-eastern site boundary adjacent to schools playing fields          | 436990.3       | 407048.5 |



| Ref  | Description                                                       | Grid Reference |          |
|------|-------------------------------------------------------------------|----------------|----------|
|      |                                                                   | X              | Y        |
| ST 4 | North-western site boundary adjacent to the school playing fields | 436895.0       | 407071.2 |
| ST 5 | North-western site boundary behind the school                     | 436847.2       | 407114.4 |
| ST 6 | Southern site boundary                                            | 437011.7       | 406794.5 |
| ST 7 | Northern site boundary adjacent to Littleworth Lane               | 437105.0       | 407080.5 |
| ST 8 | Within proximity to the eastern site boundary of the site         | 437156.4       | 406791.1 |

## 4.2 Noise Survey Results

Existing ambient noise levels around the site are dominated by road traffic noise with noise from children playing within the school grounds, as well as when arriving and departing, was also audible. Adjacent to the school, noise data was collected at LT2, ST3, ST4 and ST5 during these periods. Long term noise measurements (LT3) were collected along the eastern boundary of the site adjacent to Littleworth Lane and an MOT garage. Road traffic noise and infrequent noise from revving engines engine influenced noise level at this location. During the night-time period bird song also contributed to measured noise levels at all LT locations.

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:  $2 \times 10^{-5}$  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<br>07:00 - 23:00   | 13.5 hours   | 16/07/2014 - 17/07/2014<br>17:13 - 14:33 | LT1      | 48.3             | 77.9              | 32.1              | 43.7             | 40.8             |
| Night<br>23:00 - 07:00 | 8 hours      | 16/07/2014 - 17/07/2014<br>23:00 - 07:00 |          | 43.8             | 73.2              | 27.3              | 37.9             | 35.0             |
| Day<br>07:00 - 23:00   | 114 hours    | 16/07/2014 - 21/07/2014<br>17:00 - 11:00 | LT2      | 49.3             | 97.8              | 30.5              | 42.6             | 39.2             |
| Night<br>23:00 - 07:00 | 40 hours     | 16/07/2014 - 21/07/2014<br>23:00 - 07:00 |          | 46.9             | 97.4              | 26.1              | 36.4             | 33.2             |
| Day<br>07:00 - 23:00   | 13.5 hours   | 17/07/2014 - 21/07/2014<br>14:46 - 11:01 | LT3      | 54.7             | 89.7              | 32.7              | 47.3             | 43.7             |
| Night<br>23:00 - 07:00 | 32 hours     | 17/07/2014 - 21/07/2014<br>23:00 - 07:00 |          | 44.5             | 73.2              | 26.3              | 38.8             | 35.3             |
| Day<br>07:00 - 19:00   | 15 Mins      | (17/07/2014 14:11)                       | ST1      | 48.3             | 69.4              | 36.1              | 50.5             | 39.9             |
|                        | 15 Mins      | (17/07/2014 14:29)                       | ST2      | 44.6             | 63.1              | 34.5              | 47.8             | 37.0             |
|                        | 15 Mins      | (17/07/2014 14:48)                       | ST3      | 44.1             | 54.8              | 35.6              | 46.6             | 39.4             |



| Period                   | Duration (T) | Monitoring Date and Times | Location | L <sub>Aeq,T</sub> (dB) | L <sub>Amax,T</sub> (dB) | L <sub>Amin,T</sub> (dB) | L <sub>A10,T</sub> (dB) | L <sub>A90,T</sub> (dB) |
|--------------------------|--------------|---------------------------|----------|-------------------------|--------------------------|--------------------------|-------------------------|-------------------------|
|                          | 15 Mins      | (17/07/2014 15:07)        | ST4      | 45.7                    | 58.6                     | 34.6                     | 49.0                    | 37.7                    |
|                          | 15 Mins      | (17/07/2014 15:22)        | ST4      | 49.5                    | 67.3                     | 39.1                     | 52.4                    | 42.4                    |
|                          | 15 Mins      | (17/07/2014 15:38)        | ST5      | 40.9                    | 57.1                     | 32.2                     | 44.6                    | 34.0                    |
|                          | 15 Mins      | (17/07/2014 16:00)        | ST6      | 38.6                    | 61.3                     | 33.4                     | 40.4                    | 35.9                    |
| Evening<br>19:00 - 23:00 | 15 Mins      | (17/07/2014 19:49)        | ST1      | 52.8                    | 74.0                     | 38.7                     | 55.1                    | 45.1                    |
|                          | 15 Mins      | (17/07/2014 20:06)        | ST2      | 49.8                    | 70.9                     | 38.6                     | 53.2                    | 43.4                    |
|                          | 15 Mins      | (17/07/2014 20:24)        | ST3      | 45.5                    | 59.6                     | 37.7                     | 48.3                    | 40.7                    |
|                          | 15 Mins      | (17/07/2014 20:44)        | ST4      | 44.5                    | 59.9                     | 38.2                     | 46.3                    | 41.9                    |
|                          | 15 Mins      | (17/07/2014 21:01)        | ST5      | 47.7                    | 63.4                     | 39.6                     | 50.0                    | 43.3                    |
|                          | 15 Mins      | (17/07/2014 21:22)        | ST6      | 45.7                    | 67.8                     | 36.6                     | 46.6                    | 39.4                    |
| Night<br>23:00 – 07:00   | 15 Mins      | (17/07/2014 23:14)        | ST 7     | 48.0                    | 69.7                     | 33.3                     | 45.8                    | 35.7                    |
|                          | 15 Mins      | (17/07/2014 23:38)        | ST 8     | 45.5                    | 61.7                     | 30.0                     | 49.0                    | 31.7                    |

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

## 5.0 Assessment of Key Effects

When applying the target noise level criteria presented within Table 2.1, these levels equate to external noise levels during the daytime of 55 dBL<sub>Aeq,16hours</sub> and 45 dBL<sub>Aeq,8hours</sub> during the night-time in the absence of mitigation. For internal noise levels, this assumes that windows would be open. When comparing the short term and long term measured noise levels as presented in Table 4.1, all measured noise levels fall within the SOAEL. This is with the exception of the night-time noise levels collected at LT2, where the slight exceedance is attributable to the influence of bird song. As a result significant effects are not predicted based on the existing noise climate. However, in order to take into account localised changes to the highway network, including the construction of a link road through the site, noise modelling has been undertaken to reflect the changes and is based on traffic flow data provided by DTPC Ltd (as described in Section 3.2.1).

### 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) resulting in a sound reduction by the building facade of 30 dB  $R_{tra}$  has been used. The predicted noise levels at the assessed receptor 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 and experience of similar types of projects, by addressing the  $L_{Aeq}$  in bedrooms, the required glazing and ventilation specification will be sufficient to address the majority of peak ( $L_{Amax}$ ) noise levels.

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

| 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  | 56.5                            | 41.5                                           | 26.5                                             | 35-40                             | No (Windows Open) | Yes See below and SK05 |
| R2  | 47.2                            | 32.2                                           | 17.2                                             | 35-40                             | Yes               | No                     |
| R3  | 54.4                            | 39.4                                           | 24.4                                             | 35-40                             | Yes               | No                     |
| R4  | 53.5                            | 38.5                                           | 23.5                                             | 35-40                             | Yes               | No                     |
| R5  | 51.7                            | 36.7                                           | 21.7                                             | 35-40                             | Yes               | No                     |
| R6  | 57.5                            | 42.5                                           | 27.5                                             | 35-40                             | No (Windows Open) | Yes See below and SK05 |
| R7  | 46.5                            | 31.5                                           | 16.5                                             | 35-40                             | Yes               | No                     |
| R8  | 53.9                            | 38.9                                           | 23.9                                             | 35-40                             | Yes               | No                     |
| R9  | 55.0                            | 40.0                                           | 25.0                                             | 35-40                             | Yes               | No                     |
| R10 | 40.6                            | 25.6                                           | 10.6                                             | 35-40                             | Yes               | No                     |

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

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

| 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    |
|-----|-----------------------------------|--------------------------------------------------|-------------------------------------------------|-----------------------------------|-------------------|------------------------|
| R1  | 49.6                              | 34.6                                             | 19.6                                            | 30                                | No (Windows Open) | Yes See below and SK06 |
| R2  | 43.2                              | 28.2                                             | 13.2                                            | 30                                | Yes               | No                     |
| R3  | 47.4                              | 32.4                                             | 17.4                                            | 30                                | No (Windows Open) | Yes See below and SK06 |
| R4  | 46.6                              | 31.6                                             | 16.6                                            | 30                                | No (Windows Open) | Yes See below and SK06 |
| R5  | 44.9                              | 29.9                                             | 14.9                                            | 30                                | Yes               | No                     |
| R6  | 50.0                              | 35.0                                             | 20.0                                            | 30                                | No (Windows Open) | Yes See below and SK06 |
| R7  | 46.1                              | 31.1                                             | 16.1                                            | 30                                | No (Windows Open) | Yes See below and SK06 |
| R8  | 47.0                              | 32.0                                             | 17.0                                            | 30                                | No (Windows Open) | Yes See below and SK06 |
| R9  | 47.5                              | 32.5                                             | 17.5                                            | 30                                | No (Windows Open) | Yes See below and SK06 |
| R10 | 37.7                              | 22.7                                             | 7.7                                             | 30                                | Yes               | No                     |

All values are sound pressure levels in dB re:  $2 \times 10^{-5}$  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 along the eastern and northern boundaries of the site exceed the target criteria. A small number of living rooms in the north eastern and south eastern corners of the site require alternative ventilation. The locations where alternative ventilation is required are presented in SK05 and SK06. 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.

## 5.2 External Amenity Assessment

Predicted noise levels in private external amenity space at selected receptors are presented in Table 5.3.

**Table 5.1 External Amenity Noise Levels  $L_{Aeq,16hr}$** 

| Ref | External $L_{Aeq,16hr}$ Daytime | BS 8233 Target Criteria $L_{Aeq}$ | Below SOAEL |
|-----|---------------------------------|-----------------------------------|-------------|
| G1  | 49.8                            | 55                                | Yes         |
| G2  | 48.8                            | 55                                | Yes         |
| G3  | 44.0                            | 55                                | Yes         |
| G4  | 41.3                            | 55                                | Yes         |
| G5  | 47.2                            | 55                                | Yes         |
| G6  | 48.8                            | 55                                | Yes         |
| G7  | 48.8                            | 55                                | Yes         |



| Ref | External $L_{Aeq,16hr}$<br>Daytime | BS 8233 Target<br>Criteria $L_{Aeq}$ | Below SOAEL |
|-----|------------------------------------|--------------------------------------|-------------|
| G8  | 41.0                               | 55                                   | Yes         |
| G9  | 40.5                               | 55                                   | Yes         |
| G1  | 49.8                               | 55                                   | Yes         |

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

It has been demonstrated that noise levels fall below the LOAEL ( $50 \text{ dBL}_{Aeq,16hr}$ ) in all gardens.

### 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 Zones 3 – 5, with the majority of the development being within Zone 3. Public Footpath 152 (Barnsley Council) runs along the western boundary of the site in a tranquillity Zone 5. However this footpath does not access any areas of a higher tranquillity rating and serves primarily as a public footpath between Littleworth Lane and the A633. Therefore, whilst the area has some tranquillity value, it is not considered that the development site will negatively affect any 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 ventilation strategy which is summarised below.

### *NPPF 123 C & D*

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 value in terms of noise.

### *Glazing and Ventilation Strategy*

A glazing and ventilation strategy has been provided which achieves both ventilation and internal ambient noise level requirements of  $L_{Aeq \text{ daytime}}$  of 35 dB (<40 dB with windows open) and  $L_{Aeq \text{ night-time}}$  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 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 than 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  $L_{A10, 1 \text{ hr}} = x \text{ dB}$ .
- 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

CRTN – Calculation of Road Traffic Noise

DMRB – Design Manual for Roads and Bridges

AAWT – Annual Average Weekday Traffic

HGV – Heavy Goods Vehicle

WYGE – WYG Environment

NPPF – National Planning Policy Framework

NPPG – National Planning Policy Guidance

NOAEL – No Observed Adverse Effect Level

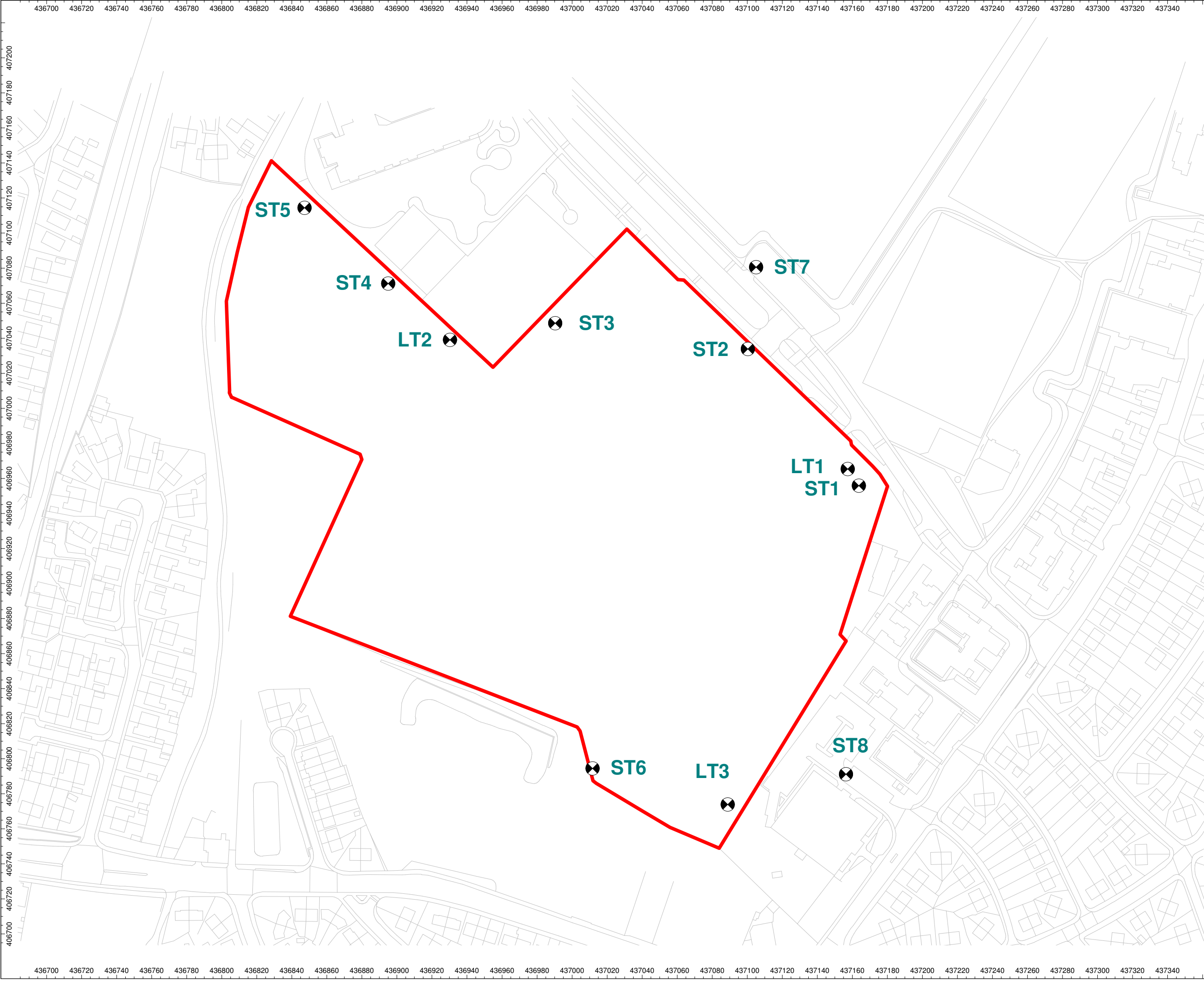
LOAEL – Lowest Observed Adverse Effect Level

SOAEL – Significant Observed Adverse Effect Level



## Appendix B – Sketches

- SK01 Noise Monitoring Location Plan
- SK02 Proposed Receptor Location Plan
- SK03 Noise Contour Plot Proposed  $L_{A10,18hr}$  1.5m
- SK04 Noise Contour Plot Proposed  $L_{A10,18hr}$  4m
- SK05 Required Mitigation – Living Rooms
- SK06 Required Mitigation – Bedrooms



Client:  
Harron Homes

Project:  
Lundwood

Project Number:  
A088513

Site Address:  
Littleworth Lane,  
Lundwood

Drawing Title / Scenario:  
Noise Monitoring  
Location Plan

Drawing Number:  
SK01

Key:

Site Boundary: 

Monitoring Locations: 

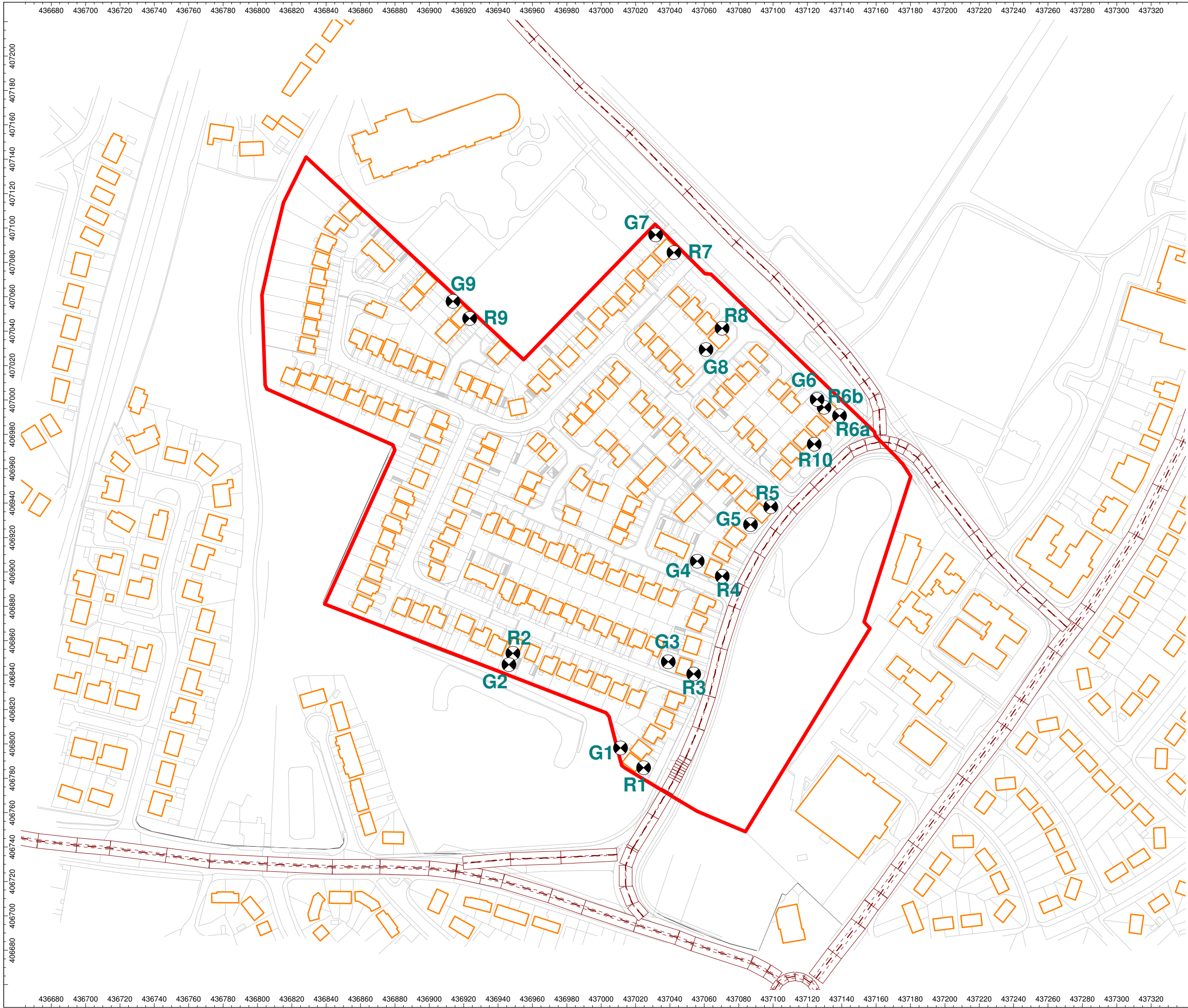
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Leicestershire  
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Client:  
Harron Homes

Project:  
Lundwood

Project Number:  
A088513

Site Address:  
Littleworth Lane,  
Lundwood

Drawing Title / Scenario:  
Receptor  
Location Plan

Drawing Number:  
SK02

Key:

Site Boundary: 

Receptor Locations: 

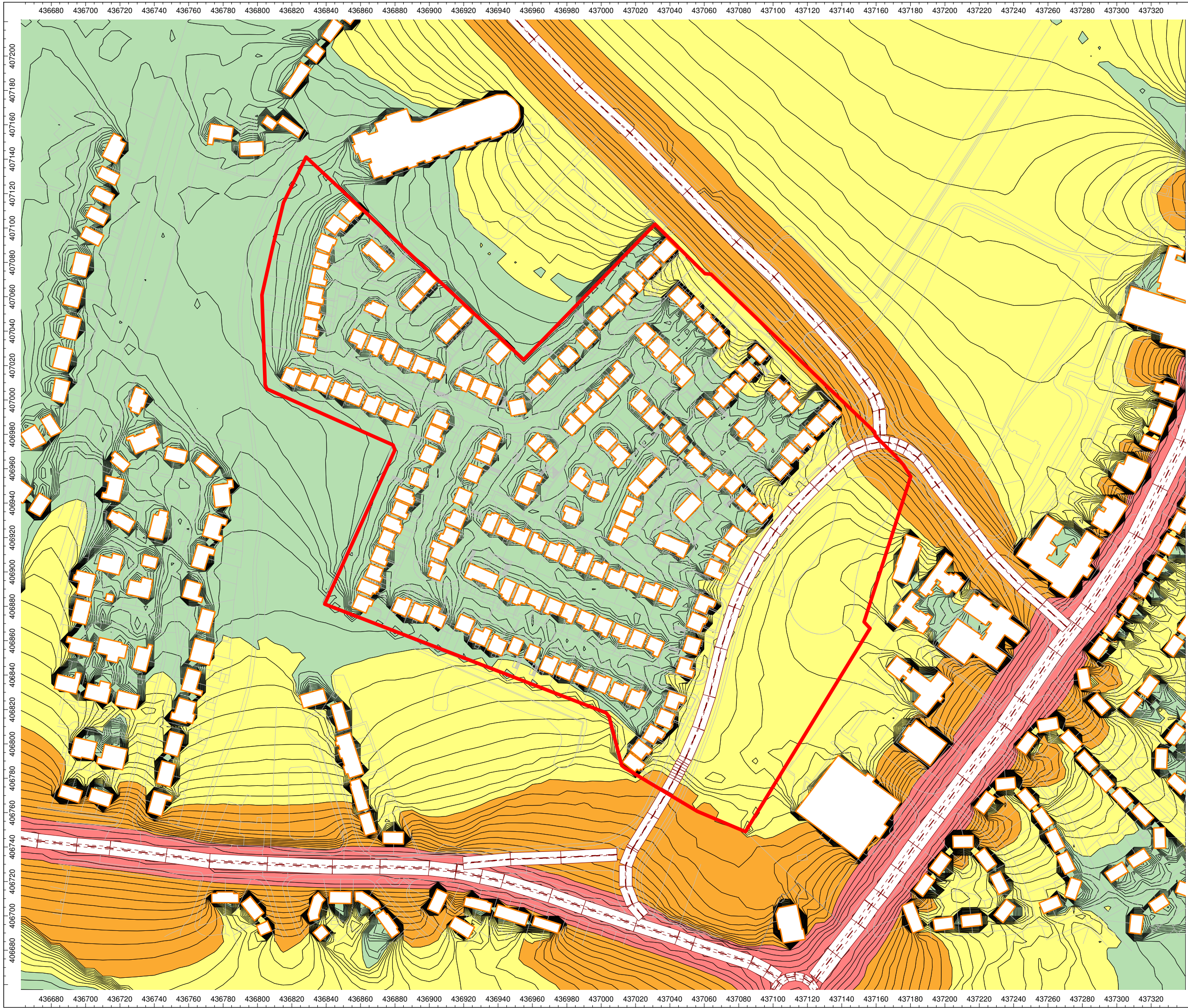
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Harron Homes

Project:  
Lundwood

Project Number:  
A088513

Site Address:  
Littleworth Lane,  
Lundwood

Drawing Title / Scenario:  
Noise Contour Plot  
Proposed 1.5m height  
LA10,18hr

Drawing Number:  
SK03

Key:  
Site Boundary: —

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

LAeq,16hour derived by  
LA10,18hr - 2

Contour Plot Presented For  
Indicative Purposes Only

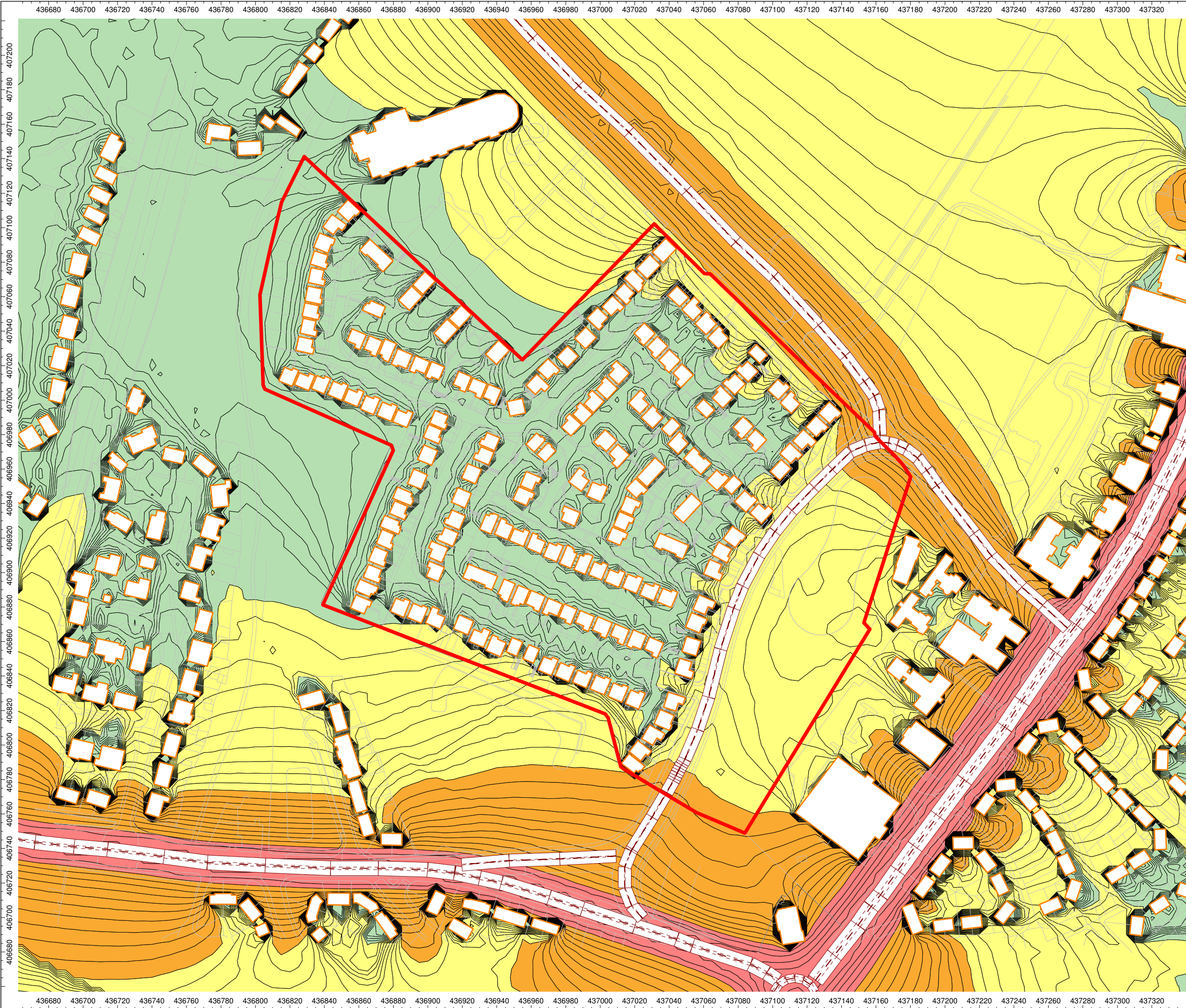
Scale : Not to scale

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Project:  
Lundwood

Project Number:  
A088513

Site Address:  
Littleworth Lane,  
Lundwood

Drawing Title / Scenario:  
Noise Contour Plot  
Proposed 4m height  
LA10,18hr

Drawing Number:  
SK04

Key:

Site Boundary: —

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

LAeq,8hour derived by  
 $0.0 \times LA_{10,18hr} - 3.77$

Contour Plot Presented For  
Indicative Purposes Only

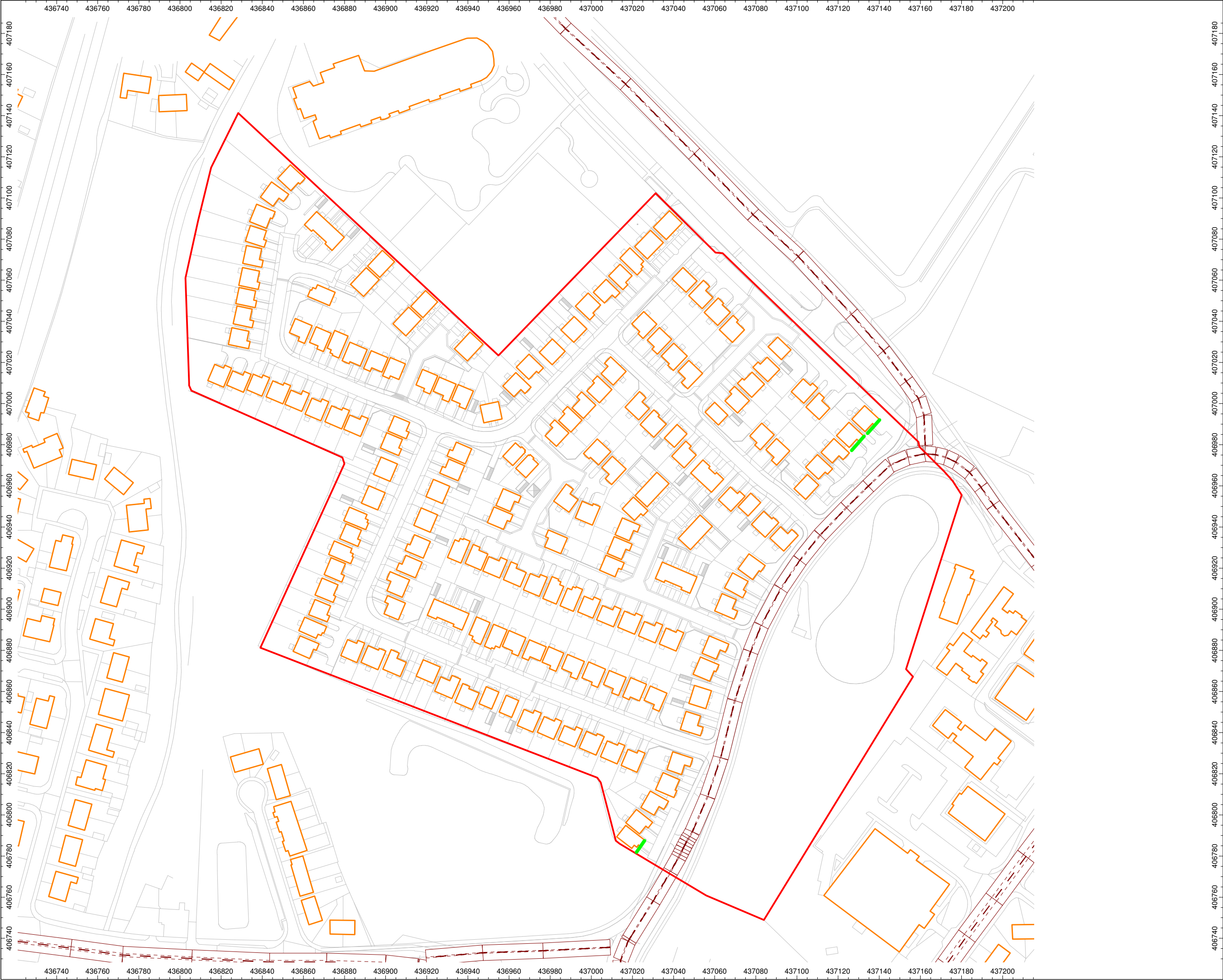
Scale : Not to scale

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Client:  
Harron Homes

Project:  
Lundwood

Project Number:  
A088513

Site Address:  
Littleworth Lane,  
Lundwood

Drawing Title / Scenario:  
**Required Mitigation  
Strategy - Living Rooms**

Drawing Number:  
**SK05**

Key:

Site Boundary: 

Alternative Ventilation  
Required: 

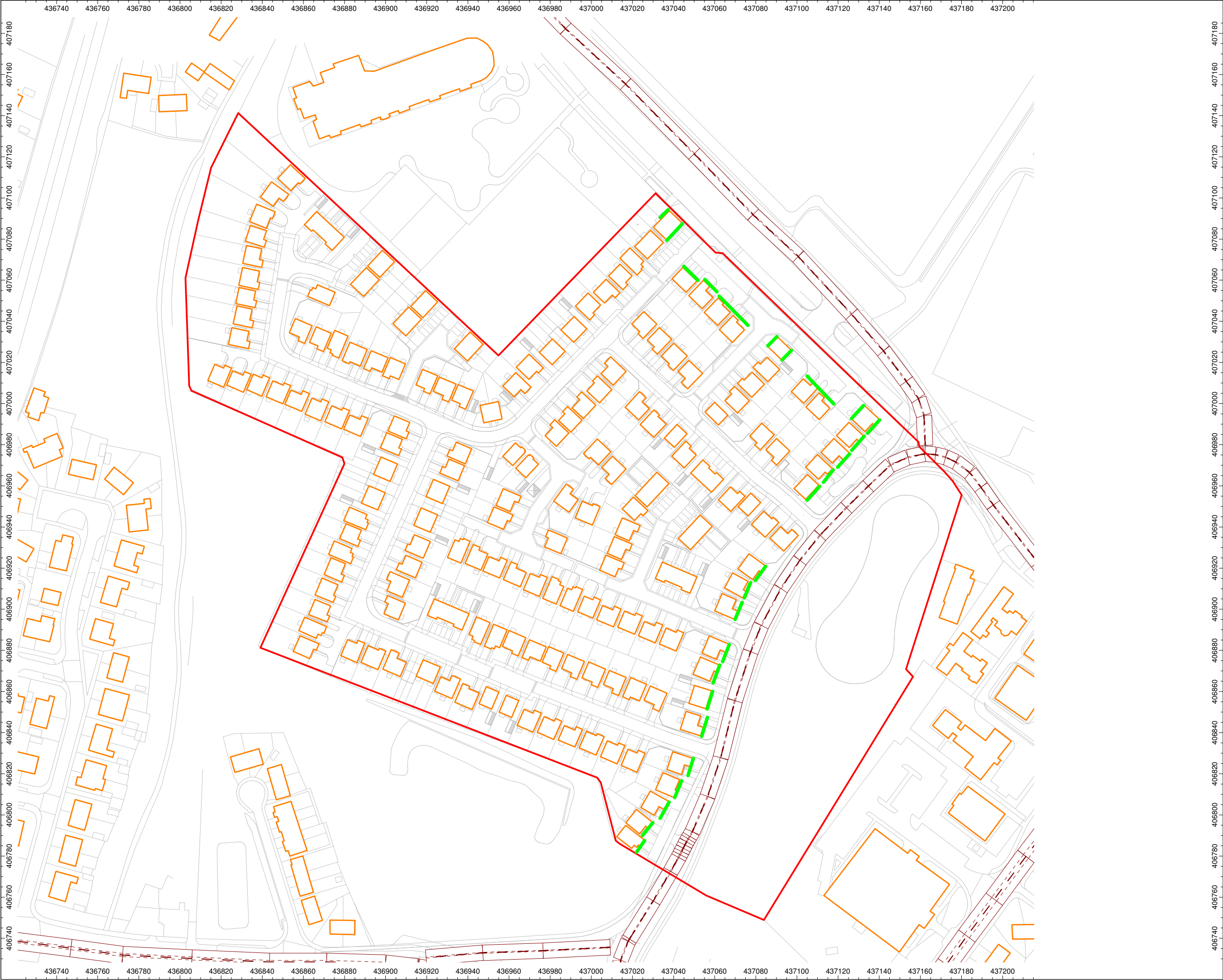
Scale : Not to scale

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**Harron Homes**

Project:  
**Lundwood**

Project Number:  
**A088513**

Site Address:  
**Littleworth Lane,  
Lundwood**

Drawing Title / Scenario:  
**Required Mitigation  
Strategy - Bedrooms**

Drawing Number:  
**SK06**

Key:

Site Boundary: 

Alternative Ventilation  
Required: 

Scale : Not to scale

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