

Harworth Group

Rockingham Phases 2 & 3 Dearne Valley Parkway, Barnsley

Noise Assessment

December 2019

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

www.wyg.com

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Document Checking:

Prepared by:	Mark Smith MIOA <i>Senior Consultant</i>	Initialled:	MS
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Prepared by:	Sam Moran MIOA <i>Associate</i>	Initialled:	SM
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Prepared by:	Sam Moran MIOA <i>Associate</i>	Initialled:	SM
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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 employment development at land to the north and south of the Dearne Valley Parkway (Gateway 36 Phases 2 and 3 – Local Plan site references ES17 and ES15).

The proposed development includes the creation of 1.1 million sqft (102,193sqm) floorspace for employment uses (use classes B1/B2/B8), together with associated infrastructure and landscape works.

This report has been produced to support a hybrid application where detailed planning permission is sought for earthworks and access and outline planning permission sought for the employment development, internal access routes and landscaping and drainage.

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

In addition to the proposed development, the assessment also includes an assessment of the cumulative traffic impact associated with the the Hoyland Masterplan area. As well as the proposed development this also includes the following sites HS64, HS56, HS66 (allocated for residential development in the adopted Barnsley Local Plan) and ES14 (allocated for employment use in the adopted Barnsley Local Plan).

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 are presented in Appendix B. Long-term noise survey data statistical analysis is presented in Appendix C Report Conditions are presented in Appendix D.

1.2 Legislative Context (England)

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

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

- e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land*

instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans

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

"180. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) "mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life*
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."*

Furthermore, paragraphs 182 and 183 state:

"182. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

183. The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

Practice Guidance (PPG): Noise provides further guidance with regard to the assessment of noise within the context of Planning Policy. The overall aim of this guidance, 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	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

2.0 Assessment Criteria

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

BS 4142:2014, 'Methods for rating and assessing industrial and commercial sound'

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

Table 2.1 Noise Level Criteria and Actions

Effect Level	Assessment	Noise Level Criteria	Action / Justification
Lowest Observed Adverse Effect Level (LOAEL)	Building Services Plant Goods Deliveries	Noise Rating Level ($L_{Ar,Tr}$) between 0 – 5 dB above the background noise level ($L_{A90,T}$).	Action: None BS 4142 (2014) indication of low impact at up to +5 dB and adverse impacts at > 5 dB above the background noise level
	Absolute Criteria Goods Deliveries/Car Parking	Noise levels are below: <i>Bedrooms: 30 dBL_{Aeq,8hours} / 45 dBL_{Amax}</i> <i>Living Rooms: 35 dBL_{Aeq,16hours}</i>	Within BS8233 / WHO guideline criteria
Significant Observed Adverse Effect Level (SOAEL)	Building Services Plant Goods Deliveries	Noise Rating Level ($L_{Ar,Tr}$) $\geq$ 10 dB above the background noise level ($L_{A90,T}$)	Action: Mitigate as far as practicable: Justification: Depending on context, a difference of +10dB to be an indication of a significant adverse impact.
	Absolute Criteria Goods Deliveries/Car Parking	Noise levels are exceeded, depending on context: Bedrooms: 30 dBL _{Aeq,8hours} 45 dBL _{Amax} (More than 10 – 15 times per night) Living Rooms: 35 dBL _{Aeq,16hours}	Mitigate and reduce to a achieve: Bedrooms: 30 dBL _{Aeq,8hours} Living Rooms: 35 dBL _{Aeq,16hours}

In order to enable the assessment of road traffic impacts in terms of LOAEL and SOAEL, noise level criteria have been derived from DMRB (volume 11, Section 3, Chapter 3). The noise level criteria for the assessment of road traffic impacts is detailed in Table 2.2 and Table 2.3 below.

Table 2.2 Classification of Magnitude of Noise Impacts in the Short Term (Road Traffic)

Noise change, $L_{A10,18hour}$ dB	Magnitude of Impact
0.0	No Change
0.1 – 0.9	Negligible
1.0 – 2.9	Minor (LOAEL)
3.0 – 4.9	Moderate (SOAEL)

Noise change, $L_{A10,18\text{hour}}$ dB	Magnitude of Impact
5.0 +	Major

Table 2.3 Classification of Magnitude of Noise Impacts in the Long Term (Road Traffic)

Noise change, $L_{A10,18\text{hour}}$ dB	Magnitude of Impact
0.0	No Change
0.1 – 2.9	Negligible
3.0 – 4.9	Minor (LOAEL)
5.0 – 9.9	Moderate (SOAEL)
10.0 +	Major

3.0 Assessment Methodology

3.1 Noise Modelling Methodology

Three-dimensional noise modelling has been undertaken based on the monitoring data to predict source noise levels at a large number of locations both horizontally and vertically. CADNA noise modelling software has been used. This model is based on the Department of Transport Welsh Office 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	Ordnance Survey	Ordnance Survey
Topographical Data	EA	2m Lidar
Traffic data	Optima Highways & Transportation	18hr AAWT flows provided by Mosodi
Building heights – around site	WYGE Observations	8 m height for two storey residential properties, and 4 m for Bungalows Proposed buildings: set at 12m
Receptor positions	WYGE	1.5 m for daytime and single storey receptors. 4 m night-time / traffic two storey receptors.
Absorbent Ground	CADNA	Frequency dependant ground absorption has been applied based on values specified in VDI 2714/16 clause 6.3.

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 HGV Delivery Event Noise Data

Noise of a delivery event has been known to vary from site to site by as much as 22 dB L_{Aeq} at 3 m distance even with the same vehicle type. Similarly, individual events using the same vehicle and at the same location have been recorded to vary by as much as 14 dB.

As such, the following calculations have been based on worst-case measurements of refrigerated, articulated HGVs delivering consumables. All measurements were undertaken in free-field conditions. In addition to noise from the unloading process, the levels used in the assessment include noise from the vehicle pulling up to the unloading bay, manoeuvring into position and then pulling away once unloading/loading is complete, together with other sources such as trolleys and reversing alarms.

As the end users of the units are currently unknown, it is considered that the assessed scenarios for both daytime and night-time periods represent a reasonable worst-case scenario with regard to the proposed

source noise levels. Depending on the size of the units, the number of assessed events ranges from 2 to 13 per unit over a daytime 1 hour period and 1 to 7 per unit over a 15 minute night-time period.

Delivery Vehicle Docking and Unloading

- *Daytime $L_{Aeq,1hr}$ Noise Level*

5 minutes at L_p 75 dB at 3 m distance (vehicle arriving and manoeuvring)
 38 minutes at L_p 70 dB at 3 m distance (vehicle unloading)
 2 minutes at L_p 72 dB at 3 m distance (vehicle leaving)
 15 minutes of quiet (associated with documentation and waiting with engine off)

$$\begin{aligned} L_{Aeq}(60 \text{ mins}) &= 10\log(1/60 \text{ mins})(5\text{mins} \times 10^{0.1 \times 75\text{dB}} + 38\text{mins} \times 10^{0.1 \times 70\text{dB}} + 2\text{mins} \times 10^{0.1 \times 72\text{dB}}) \\ &= 69.8 \text{ dB at 3 m distance } [L_{WA} = 87.3 \text{ dB}] \end{aligned}$$

- *Night-time $L_{Aeq,15mins}$ Noise Level*

5 minutes at L_p 75 dB at 3 m distance (vehicle arriving and manoeuvring)
 10 minutes at L_p 70 dB at 3 m distance (vehicle unloading)

$$\begin{aligned} L_{Aeq}(15 \text{ mins}) &= 10\log(1/15 \text{ mins})(5\text{mins} \times 10^{0.1 \times 75\text{dB}} + 10\text{mins} \times 10^{0.1 \times 70\text{dB}}) \\ &= 72.4 \text{ dB at 3 m distance } [L_{WA} = 89.9 \text{ dB}] \end{aligned}$$

- *L_{Amax} Noise levels*

L_{Amax} used is as 85.4dB at 3 m distance [$L_{WA} = 102.9 \text{ dB}$]

Delivery Vehicle Arriving/Exiting along service yard access road

The following calculations have been used to represent this as a line source in the model.

- *Daytime $L_{Aeq,(60mins)}$ Noise Level (Per HGV)*

1 x 10 seconds $L_p = 69.3 \text{ dB}$ at 3 m distance (vehicle arriving and leaving)

$$\begin{aligned} L_{Aeq}(60 \text{ mins}) &= 10\log(1/60 \text{ mins})(10 \text{ sec} \times 10^{0.1 \times 69.3 \text{ dB}} + 10 \text{ sec} \times 10^{0.1 \times 69.3 \text{ dB}}) \\ &= 46.7 \text{ dB at 3 m distance} \end{aligned}$$

- *Night-time $L_{Aeq,(15mins)}$ Noise Level (Per HGV)*

1 x 10 seconds $L_p = 69.3 \text{ dB}$ at 3 m distance (vehicle arriving or leaving)

$$\begin{aligned} L_{Aeq}(15 \text{ mins}) &= 10\log(1/15 \text{ mins})(10 \text{ sec} \times 10^{0.1 \times 69.3 \text{ dB}}) \\ &= 49.8 \text{ dB at 3 m distance} \end{aligned}$$

- *L_{Amax} Noise levels*

$L_{Amax} = 75.0 \text{ dB}$ at 3 m distance [$L_{WA} = 92.5 \text{ dB}$]

3.2.2 Proposed Commercial Uses - Car Park Noise Data

Noise levels from proposed car parking areas (as defined on the illustrative layout) have been determined based upon observations within an existing distribution centre during a staff changeover period. L_{Aeq} noise levels, as follows, are modelled as area sources across each car parking area.

- $L_{Aeq,1hr}$ Noise Level = 54 dB at 1.5m height
- L_{Amax} used is as 76 dB at 3 m distance [$L_w = 93.5$ dB]

3.3 Sensitive Receptors

Table 3.2 and Table 3.3 summarise the locations that have been selected to represent worst-case residential receptors with respect to direct noise from the Development and off-site development generated road traffic noise. Ground and first floor façades of the nearest noise sensitive properties have been represented. The locations of the receptors are shown on SK02a and SK02b in Appendix B.

With regard to receptors within the wider Hoyland North development site, these are not currently constructed. However, the assessment includes consideration of potential future receptors (PC) which are included within submitted planning applications which have either been approved or remain undetermined.

Table 3.2 Receptor Locations (On-Site Noise Generating Activities)

Ref.	Description	Height (m)
R1	Dalton Cottage	1.5/4
R2	Cottage Green Hay Road	1.5/4
R3	12 Shortwood Villas	1.5/4
R4	New Build off upper Hoyland Road	1.5/4
R5	132 Upper Hoyland Road	1.5/4
R6	112 Upper Hoyland Road	1.5/4
R7	87 Hawshaw Lane	1.5/4
R8	117 Hawshaw Lane	1.5/4
R9	Flats 18 to 28 Stoney Croft	1.5/4
R10	17 Rockingham Street	1.5/4
R11	31 Averley Way	1.5/4
R12	34 Chilcombe Place	1.5/4
PC1	Proposed Residential Development (Planning Application Ref: 2018/1268 (Underdetermined))	1.5/4
PC2	Proposed Residential Development (Planning Application Ref: 2016/1531)	1.5/4

Table 3.3 Receptor Locations (Road Traffic)

Ref.	Description	Height (m)
T1	132 Upper Hoyland Road	4
T2	12 Shortwood Villas	4
T3	53 Locksley Gardens	4
T4	29 Regent Street	4
T5	2 Sheffield Road	4
T6	70 Hoyland Road	4

3.4 Tranquillity Rating

An assessment of the existing tranquillity level of the Site and surrounding area 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 over two separate periods to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background. A noise survey was undertaken in 2018 with further noise measurements to reflect a wider area undertaken in 2019.

Equipment used during the survey included:

2018

Rion NL-32	Environmental Noise Analyser (WYG12)	s/n	213442
Rion NL-52	Environmental Noise Analyser (WYG16)	s/n	1221576
Rion NL-52	Environmental Noise Analyser (WYG22)	s/n	1021257
Rion NC-75	Sound Calibrator	s/n	35270131

2019

Norsonic 140	Environmental Noise Analyser	s/n	1402987
Norsonic 1251	Sound Calibrator	s/n	25010
Rion NL-52	Environmental Noise Analyser (WYG16)	s/n	1221576
Rion NL-52	Environmental Noise Analyser (WYG31)	s/n	1276552
Rion NC-75	Sound Calibrator	s/n	35270131

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice, a drift of 0 to 0.1 dB was observed. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

Baseline noise data was collected at 10 locations (as specified in the following table and shown in SK01 of Appendix B) from Thursday 9th August 2018 to Wednesday 15th August 2018 and Thursday 12th September 2019 to Wednesday 18th September 2019. Attended short term measurements were undertaken at five locations during day, evening and night-time periods with five additional locations being measured unattended over a 140-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. Anemometer readings confirmed that wind speeds were less than 5 ms⁻¹ at all times during the survey, with a predominant westerly wind direction during the survey.

Table 4.1 Noise Monitoring Locations

Ref	Description
LT1	South eastern boundary of the site
LT2	South western boundary of the site
LT3	Field boundary to the south of Hay Green Lane
LT4	South eastern corner of Birdwell Rec
LT5	To the south of Shortwood Villas
ST1	East of the site, at northern end of Upper Hoyland Road
ST2	East of the site, opposite 103 Upper Hoyland Road
ST3	West of the site, northern end of Tinker Lane
ST4	Western end Shortwood Villas
ST5	132 Upper Hoyland Road

4.2 Noise Survey Results

The dominant noise sources found in the area include road traffic noise from Dearne Valley Parkway and M1.

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

Table 4.2 Meteorological Conditions during the Survey

Survey Location	Date & Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Day ST1	13/09/2019 10:32	16	2 – 3	W	2	Road traffic noise Dearne Valley Parkway
Day ST1	13/09/2019 10:47	16	2 – 3	W	2	Road traffic noise Dearne Valley Parkway
Day ST2	13/09/2019 10:12	16	1 - 2	W	2	Road traffic noise Dearne Valley Parkway, occasional car pass, occasional aircraft
Day ST3	13/09/2019 09:34	15	2 – 3	W	1	Road traffic noise Dearne Valley Parkway/M1
Day ST3	13/09/2019 09:49	15	2 – 3	W	1	Road traffic noise Dearne Valley Parkway/M1
Day ST4	15/08/2018 11:00	21	1-2	SW	6	Traffic along A6195
Day ST5	15/08/2018 10:34	27	0-1	SW	6	Traffic along A6195
Evening ST1	12/09/2019 22:03	15	2 – 3	W	6	Road traffic noise Dearne Valley Parkway
Evening ST1	12/09/2019 22:18	15	2 – 3	W	6	Road traffic noise Dearne Valley Parkway
Evening ST2	12/09/2019 21:43	15	2 – 3	W	6	Road traffic noise Dearne Valley Parkway
Evening ST3	12/09/2019 21:03	17	2 – 3	W	6	Road traffic noise Dearne Valley Parkway
Evening ST3	12/09/2019 21:18	17	2 – 3	W	6	Road traffic noise Dearne Valley Parkway
Evening ST4	14/08/2018 21:21	18	0-1	SW	8	Traffic along A6195
Evening ST5	14/08/2018 20:52	18	0-1	SW	8	Traffic along A6195

Survey Location	Date & Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Night ST1	12/09/2019 23:04	15	2 – 3	W	6	Road traffic noise Dearne Valley Parkway
Night ST1	13/09/2019 00:08	14	2 – 3	W	4	Road traffic noise Dearne Valley Parkway
Night ST2	12/09/2019 23:22	15	2 – 3	W	6	Road traffic noise Dearne Valley Parkway
Night ST3	12/09/2019 23:46	14	2 – 3	W	6	Road traffic noise Dearne Valley Parkway
Night ST3	14/08/2018 23:55	17	1-2	SW	4	Traffic along A6195
Night ST4	14/08/2018 23:30	17	1-2	SW	6	Traffic along A6195

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: 2×10^{-5} Pa). For the long-term (LT) locations, the presented $L_{Aeq,T}$ and $L_{A10,T}$ are average noise levels whilst the L_{A90} is the modal noise level of each 5 minute measurement over the stated survey period.

Table 4.3 Results of Baseline Noise Monitoring Survey

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekday Daytime 07:00 - 23:00	60 Hours	12/09/2019 – 18/09/2019 16:13 – 12:03	LT1	59.4	83.5	34.1	60.2	58
Weekday Night-time 23:00 – 07:00	32 Hours	12/09/2019 – 18/09/2019 23:00 – 07:00		53.8	74.7	25.8	53.5	38
Weekend Daytime 07:00 - 23:00	32 Hours	14/09/2019 – 15/09/2019 07:00 – 23:00		57.6	81.3	35.1	58.8	56
Weekend Night-time 23:00 – 07:00	16 hours	14/09/2019 – 15/09/2019 23:00 – 07:00		52.7	75.4	24.7	54.2	46
Weekday Daytime 07:00 - 23:00	59 Hours	12/09/2019 – 18/09/2019 16:45 – 11:10	LT2	53.4	84.1	35.1	53.9	51
Weekday Night-time 23:00 – 07:00	32 Hours	12/09/2019 – 18/09/2019 23:00 – 07:00		50.2	73.5	26.1	48.6	40
Weekend Daytime 07:00 - 23:00	32 Hours	14/09/2019 – 15/09/2019 07:00 – 23:00		50.9	84.3	35.2	51.3	48
Weekend Night-time 23:00 – 07:00	16 hours	14/09/2019 – 15/09/2019 23:00 – 07:00		45.9	68.1	29.8	47.4	42
Weekday Daytime 07:00 - 23:00	61 Hours	08/08/2018 – 15/08/2018 07:00 – 23:00	LT3	46.4	85.3	33.1	46.9	44
Weekday Night-time 23:00 – 07:00	32 Hours	08/08/2018 – 15/08/2018 23:00 – 07:00		43.0	83.4	23.0	42.9	38
Weekend Daytime 07:00 - 23:00	32 Hours	11/08/2018 – 12/08/2018 07:00 – 23:00		47.6	83.9	34.5	48.6	46
Weekend Night-time 23:00 – 07:00	16 hours	11/08/2018 – 12/08/2018 23:00 – 07:00		42.4	74.3	29.7	43.8	38
Weekday Daytime 07:00 - 23:00	61 Hours	08/08/2018 – 15/08/2018 07:00 – 23:00	LT4	50.0	78.8	33.8	50.2	47

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 Night-time 23:00 – 07:00	32 Hours	08/08/2018 – 15/08/2018 23:00 – 07:00		45.9	75.6	23.0	45.8	41
Weekend Daytime 07:00 – 23:00	32 Hours	11/08/2018 – 12/08/2018 07:00 – 23:00		49.1	91.1	34.4	49.0	45
Weekend Night-time 23:00 – 07:00	16 hours	11/08/2018 – 12/08/2018 23:00 – 07:00		45.3	78.1	31.1	45.5	43
Weekday Daytime 07:00 – 23:00	61 Hours	08/08/2018 – 15/08/2018 07:00 – 23:00	LT5	49.5	82.8	32.7	50.0	46
Weekday Night-time 23:00 – 07:00	32 Hours	08/08/2018 – 15/08/2018 23:00 – 07:00		46.8	69.4	25.5	47.5	42
Weekend Daytime 07:00 – 23:00	32 Hours	11/08/2018 – 12/08/2018 07:00 – 23:00		51.9	87.6	33.6	53.6	48
Weekend Night-time 23:00 – 07:00	16 hours	11/08/2018 – 12/08/2018 23:00 – 07:00		46.2	77.4	31.2	47.6	38
Daytime 07:00 – 19:00	15 Mins	13/09/2019 10:32	ST1	59.1	71.6	48.3	61.8	54.1
	15 Mins	13/09/2019 10:47	ST1	59.3	73.3	50.3	61.9	54.7
	15 Mins	13/09/2019 10:12	ST2	57.0	77.9	40.9	54.7	44.2
	15 Mins	13/09/2019 09:34	ST3	63.3	86.4	42.8	59.1	46.7
	15 Mins	13/09/2019 09:49	ST3	49.7	69.9	44.0	51.3	46.3
	15 Mins	15/08/2018 11:00	ST4	51.2	65.3	42.5	54.2	45.9
	15 Mins	15/08/2018 10:34	ST5	60.6	70.2	52.6	62.8	56.9
Evening 19:00 – 23:00	15 Mins	12/09/2019 22:03	ST1	58.7	70.4	40.4	61.9	51.1
	15 Mins	12/09/2019 22:18	ST1	56.2	68.4	39.6	60.2	46.7
	15 Mins	12/09/2019 21:43	ST2	52.6	75.5	37.2	50.3	41.2
	15 Mins	12/09/2019 21:03	ST3	49.0	69.2	42.2	50.8	44.7
	15 Mins	12/09/2019 21:18	ST3	48.5	66.2	42.0	50.3	44.1
	15 Mins	14/08/2018 21:21	ST4	45.2	57.5	34.9	48.0	40.7
	15 Mins	14/08/2018 20:52	ST5	54.2	73.8	44.4	56.3	49.3
Night-time 23:00 – 07:00	15 Mins	12/09/2019 23:04	ST1	53.5	69.1	40.6	57.0	44.6
	15 Mins	13/09/2019 00:08	ST1	51.0	67.3	37.8	54.8	40.7
	15 Mins	12/09/2019 23:22	ST2	43.5	60.2	35.5	46.2	38.4
	15 Mins	12/09/2019 23:46	ST3	44.5	56.3	38.8	46.5	41.8
	15 Mins	14/08/2018 23:55	ST4	42.9	59.3	33.9	45.9	36.2
	15 Mins	14/08/2018 23:30	ST5	53.8	63.7	36.0	57.5	43.4

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

5.0 Assessment of Key Effects

Assessments have been undertaken in the following sections with regard to:

- Noise generating sources associated with the proposed industrial units including Building Services Plant (BSP), car parking and deliveries.
- Development generated road traffic noise.

The assessment of on-site industrial noise sources and car parking has been undertaken based on the layout as presented within the illustrative masterplan. This is considered to present a reasonable worst-case assessment in relation to operational development generated noise.

5.1 Building Services Plant Noise Assessment

As outline planning permission sought for the employment development and the location and positioning of proposed buildings and noise generating sources is not yet known, a design criteria of a noise rating level of 5 dB below the background levels during the period when the plant could be operational is proposed.

The proposed design noise limits at the receptor locations are shown in Table 5.1. These have been established from a review of the ST data and a statistical analysis of the LT noise survey data. The statistical analysis of the LT data is presented in Appendix C.

Table 5.1 Proposed BSP Assessment

Location	Existing Measured Background L_{A90}		Proposed External Plant Noise Rating Level Design Limit at Receptors ($L_{A,Tr}$)	
	Daytime	Night-time	Daytime	Night-time
R1	44	38	39	33
R2	44	38	39	33
R3	46	38	41	33
R4	51	41	46	36
R5	51	41	46	36
R6	46	38	41	33
R7	46	38	41	33
R8	46	38	41	33
R9	46	38	41	33
R10	46	38	41	33
R11	45	41	40	36
R12	45	41	40	36
PC1	46	38	41	33
PC2	46	38	41	33

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

All calculations used to derive the above tables (including averaging of background noise levels and predicted source noise levels) have been undertaken to 1 decimal place to avoid perpetuation of rounding errors. However, in accordance with BS4142 Para 8.6, the levels are expressed as integers (with 0.5 dB being rounded up). This may mean that the arithmetic in the above table may appear to be up to 1 dB incorrect due to this rounding.

5.2 Delivery / Servicing Noise Assessment

5.2.1 BS4142 Assessment

The assessment presented in the table below compares existing typical background noise levels (L_{A90}) with predicted delivery / servicing noise at the nearest residential dwellings. The approach to establish the representative existing measured background noise level for each receptor has been presented in Section 5.1. Given the large number of assessed noise sources and low predicted absolute noise levels, it is considered that applying a character correction of +3dB would be reasonable to account for potential impulsive characteristics of the proposed delivery / servicing events being 'just perceptible'. The assessment is based on the model input data presented in Section 3.2.

Table 5.2 Delivery and Goods Handling Assessment

Location	Existing Measured Background L_{A90}		Predicted noise rating level from deliveries ($L_{A1,Tf}$)		Difference between background and predicted noise level	
	Day time	Night-time	Daytime	Night-time	Day time	Night-time
R1	44	38	37	38	-7	0
R2	44	38	37	38	-7	0
R3	46	38	40	40	-6	2
R4	51	41	38	39	-13	-2
R5	51	41	40	42	-11	1
R6	46	38	40	41	-6	3
R7	46	38	35	35	-11	-3
R8	46	38	34	35	-12	-3
R9	46	38	33	35	-13	-3
R10	46	38	40	43	-6	5
R11	45	41	34	38	-11	-3
R12	45	41	36	39	-9	-2
PC1	46	38	37	37	-9	-1
PC2	46	38	36	37	-10	-2

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

The assessment in Table 5.2 above shows that delivery noise rating levels are predicted to be below background noise levels during the daytime and within + 5 dB during the night-time. Therefore, the anticipated impacts of on-site delivery noise sources during the daytime and night-time are below the Lowest Observed Adverse Effect Level (LOAEL).

It is considered that due to the reasonable worst-case assessment undertaken with a significant number of noise sources assumed to be occurring simultaneously, a reasonable degree of uncertainty has been factored into the assessment. It should also be further noted that there are periods of higher noise levels attributable to the adjacent industrial and commercial premises occurring within the area around the site. On this basis, the assessment of noise impacts against the L_{A90} , as prescribed in BS 4142, presents a more onerous worst-case in this context.

5.2.2 Delivery Noise Assessment – Absolute Noise Levels

Internal ambient noise levels at nearby sensitive receptors from deliveries / services to the Development (on the basis of worst case assumptions) 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 single glazing with a sound reduction of 30 dB has been used.

Table 5.3 Daytime Noise Intrusion Levels $L_{Aeq,1hr}$ (Deliveries Only)

Location	External L_{Aeq} Noise Level	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria (Internal L_{Aeq} dB)
R1	34.3	24.3	4.3	35
R2	33.8	23.8	3.8	35
R3	36.9	26.9	6.9	35
R4	35.2	25.2	5.2	35
R5	37.0	27.0	7.0	35
R6	37.0	27.0	7.0	35
R7	31.7	21.7	1.7	35
R8	31.3	21.3	1.3	35
R9	30.4	20.4	0.4	35
R10	37.1	27.1	7.1	35
R11	31.3	21.3	1.3	35
R12	33.2	23.2	3.2	35
PC1	33.8	23.8	3.8	35
PC2	32.6	22.6	2.6	35

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

Table 5.4 Night-time Noise Intrusion Levels $L_{Aeq,1hr}$ (Deliveries Only)

Location	External L_{Aeq} Noise Level	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria (Internal L_{Aeq} dB)
R1	34.9	19.9	4.9	30
R2	34.7	19.7	4.7	30
R3	37.2	22.2	7.2	30
R4	35.7	20.7	5.7	30
R5	39.0	24.0	9.0	30
R6	37.6	22.6	7.6	30
R7	32.0	17.0	2.0	30
R8	31.9	16.9	1.9	30
R9	32.0	17.0	2.0	30
R10	39.7	24.7	9.7	30
R11	35.3	20.3	5.3	30
R12	36.0	21.0	6.0	30
PC1	34.3	19.3	4.3	30
PC2	33.5	18.5	3.5	30

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

Table 5.5 Night-time Noise Intrusion Levels L_{Amax} (Deliveries Only)

Location	External L_{Amax} Noise Level	Internal L_{Amax} with windows open	Internal L_{Amax} with windows closed	Criteria (Internal L_{Amax} dB)
R1	38.3	23.3	8.3	45
R2	38.7	23.7	8.7	45
R3	44.4	29.4	14.4	45
R4	42.0	27.0	12.0	45
R5	48.2	33.2	18.2	45
R6	41.0	26.0	11.0	45
R7	35.2	20.2	5.2	45
R8	33.2	18.2	3.2	45
R9	39.5	24.5	9.5	45
R10	46.5	31.5	16.5	45
R11	39.6	24.6	9.6	45
R12	40.2	25.2	10.2	45
PC1	40.4	25.4	10.4	45
PC2	36.8	21.8	6.8	45

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

The assessment shown in the Table 5.3 to Table 5.5 demonstrate that internal L_{Aeq} and L_{Amax} noise levels from the proposed delivery operations, during both day time and night time periods with windows open or closed, are predicted to be within the BS 8233 criteria at all sensitive receptor locations. Therefore, noise levels at all receptors fall below the LOAEL.

5.2.3 Uncertainty

With regard to the BS 4142 assessment associated with industrial sources of noise, it is considered that uncertainty in the assessment approach has been reasonably factored into the assessment because:

- There is unlikely to be significant uncertainty in the reference background noise level, particularly given the duration of the survey including weekday and weekend daytime and night-time periods.
- The use of Cadna noise modelling software which incorporates the method of ISO 9613 – 2 "Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation.
- Source noise levels are based on reasonable worst-case measurements undertaken by WYG at existing industrial and distribution premises which are comparable to those proposed.
- A large number of noise sources have been considered to be occurring simultaneously.

5.3 Car Park Noise Assessment

Internal daytime ambient noise levels, at nearby sensitive receptors, from proposed car parking 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 a glazing with a sound reduction of 30 dB (e.g. single glazing) has been used.

Table 5.6 Daytime Noise Intrusion Levels $L_{Aeq,1hour}$ (Car Parking Only)

Location	External L_{Aeq} Noise Level	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria (Internal L_{Aeq} dB)
R1	19.6	9.6	0.0	35
R2	21.1	11.1	0.0	35
R3	24.7	14.7	0.0	35
R4	20.1	10.1	0.0	35
R5	21.7	11.7	0.0	35
R6	21.1	11.1	0.0	35
R7	18.0	8.0	0.0	35
R8	19.1	9.1	0.0	35
R9	18.1	8.1	0.0	35
R10	18.9	8.9	0.0	35
R11	17.0	7.0	0.0	35
R12	19.6	9.6	0.0	35
PC1	17.4	7.4	0.0	35
PC2	20.8	10.8	0.0	35

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

Table 5.7 Night-time Noise Intrusion Levels $L_{Aeq,1hour}$ (Car Parking Only)

Location	External L_{Aeq} Noise Level	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria (Internal L_{Aeq} dB)
R1	20.2	5.2	0.0	30
R2	21.6	6.6	0.0	30
R3	25.3	10.3	0.0	30
R4	20.9	5.9	0.0	30
R5	23.3	8.3	0.0	30
R6	22.1	7.1	0.0	30
R7	18.4	3.4	0.0	30
R8	19.5	4.5	0.0	30
R9	18.7	3.7	0.0	30
R10	21.1	6.1	0.0	30
R11	20.0	5.0	0.0	30
R12	20.1	5.1	0.0	30
PC1	18.6	3.6	0.0	30
PC2	21.9	6.9	0.0	30

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

Table 5.8 Night-time Noise Intrusion Levels L_{Amax} (Car Parking Only)

Location	External L_{Amax} Noise Level	Internal L_{Amax} with windows open	Internal L_{Amax} with windows closed	Criteria (Internal L_{Amax} dB)
R1	27.4	12.4	0.0	45
R2	28.6	13.6	0.0	45
R3	36.6	21.6	6.6	45
R4	33.2	18.2	3.2	45

Location	External L_{Amax} Noise Level	Internal L_{Amax} with windows open	Internal L_{Amax} with windows closed	Criteria (Internal L_{Amax} dB)
R5	38.4	23.4	8.4	45
R6	36.3	21.3	6.3	45
R7	25.1	10.1	0.0	45
R8	24	9.0	0.0	45
R9	22.8	7.8	0.0	45
R10	34.2	19.2	4.2	45
R11	27.5	12.5	0.0	45
R12	27.2	12.2	0.0	45
PC1	25.4	10.4	0.0	45
PC2	26.2	11.2	0.0	45

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

The assessment shown in the Table 5.6 and Table 5.8 demonstrate internal L_{Aeq} and L_{Amax} noise levels from proposed car parking areas, during both day time and night time periods with windows open or closed, are predicted to be significantly below the BS 8233 criteria at all sensitive receptor locations. With regard to peak events, internal L_{Amax} noise levels fall below 45 dB L_{Amax} at all receptors with windows open. Noise levels at all receptors fall below the LOAEL.

5.4 Cumulative Noise Assessment

An assessment has been undertaken to compare worst case noise levels from the 'existing noise levels' ($L_{Aeq,T}$) to the 'proposed scheme' noise at identified existing residential receptors. The differences between the 'existing' and the 'proposed' development scenarios including, as identified in Section 3.2, deliveries / servicing within the site and car parking are presented in the following tables. For indicative purposes, the daytime and night-time noise contour plots are presented as SK03 and SK04 in Appendix B.

Table 5.9 Difference between Existing Conditions and Contribution from Development (Daytime)

Location	Existing L_{Aeq} (monitored)	Proposed L_{Aeq} (modelled)	Combined L_{Aeq}	Contribution from Proposed Scheme
R1	46.4	34.5	46.7	0.3
R2	46.4	34.0	46.6	0.2
R3	49.9	37.1	50.1	0.2
R4	56.2	35.3	56.2	0.0
R5	56.2	37.1	56.3	0.1
R6	54.2	37.1	54.3	0.1
R7	48.5	31.9	48.6	0.1
R8	48.5	31.6	48.6	0.1
R9	48.5	30.7	48.6	0.1
R10	48.5	37.1	48.8	0.3
R11	49.1	31.5	49.2	0.1
R12	49.1	33.4	49.2	0.1
PC1	48.5	33.9	48.6	0.1
PC2	48.5	32.8	48.6	0.1

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

Table 5.10 Difference between Existing Conditions and Contribution from Development (Night-time)

Location	Existing L_{Aeq} (monitored)	Proposed L_{Aeq} (modelled)	Combined L_{Aeq}	Contribution from Proposed Scheme
R1	42.4	35.0	43.1	0.7
R2	42.4	34.9	43.1	0.7
R3	46.2	37.5	46.7	0.5
R4	51.0	35.9	51.1	0.1
R5	51.0	39.2	51.3	0.3
R6	51.0	37.7	51.2	0.2
R7	44.5	32.2	44.7	0.2
R8	44.5	32.2	44.7	0.2
R9	44.5	32.2	44.7	0.2
R10	44.5	39.7	45.7	1.2
R11	45.3	35.4	45.7	0.4
R12	45.3	36.1	45.8	0.5
PC1	44.5	34.4	44.9	0.4
PC2	44.5	33.8	44.9	0.4

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

The results presented, in Table 5.9 and Table 5.10, above show the change in noise levels between the existing modelled day time and night time L_{Aeq} noise levels and the contribution from the Development. The differences between the 'existing' and 'proposed' scenarios are less than or around 1 dB(A) at all receptors. Therefore, in terms of the change in noise level associated with on-site operational noise sources, noise effects are negligible and will fall below the Lowest Observed Adverse Effect Level (LOAEL).

5.5 Road Traffic Noise

Table 5.11 and Table 5.12 below show the results of the traffic noise assessments, comparing the $L_{A10,18\text{hours}}$ noise levels from the 'with' (DS) and 'without' (DM) Development traffic flows in the short-term and long-term. The long-term assessment also takes into account the cumulative traffic impacts associated with the proposed development and the wider Hoyland North development.

Table 5.11 18hr AAWT Short Term Traffic Noise Assessment (2029)

Location	2029 DM dB $L_{A10,18\text{hr}}$	2029 DS dB $L_{A10,18\text{hr}}$	Difference
T1	62.9	63.2	0.3
T2	54.7	51.9	-2.8
T3	62.3	62.9	0.6
T4	61.3	61.5	0.2
T5	71.2	71.3	0.1
T6	72.4	72.4	0.0

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

Table 5.12 18hr AAWT Long Term Traffic Noise Assessment (2017 v 2029)

Location	2017 Base dB L _{A10,18hr}	2029 DS dB L _{A10,18hr}	Difference
T1	62.9	63.2	0.3
T2	54.7	51.9	-2.8
T3	62.2	62.9	0.7
T4	61.1	61.5	0.4
T5	70.8	71.3	0.5
T6	72.1	72.4	0.3

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

When compared to the criteria in Table 2.2 and Table 2.3, the change in road traffic noise levels as a result of the Development are predicted to be less than 1 dB in the short term and less than 3 dB in the long term. Therefore, predicted impacts at all receptors are negligible below the LOAEL.

5.6 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 Site and immediate surrounding area is assessed as falling into Zones 1-4 and is of low to moderate tranquillity. A public footpath traverses through the Rockingham 3 parcel to the north of the Dearne Valley Parkway which is proposed to be diverted and access to areas of greater tranquillity will therefore be maintained.

6.0 Conclusion

NPPF 123 A & B

A noise report has been undertaken to assess the impact of a proposed employment development at land to the north and south of the Dearne Valley Parkway (Gateway 36 Phases 2 and 3 – Local Plan site references ES17 and ES15). The NPPF gives a number of test points relating to noise which are referenced as bullet points below. Considering each of these points, the following conclusions can be drawn in relation to the proposed development:

NPPF 170 (e) and 180 (a)

As there are no fixed details of buildings and the locations of noise generating sources, to allow context and to establish likely significant effects, the assessment and noise modelling undertaken is based on the illustrative masterplan and provides an indication of how the development could be brought forward. Source noise levels for the range of uses to be present at the site are based on reasonable worst-case source noise levels obtained by WYG at similar existing sites.

Based on the assessment undertaken, the development is not expected to have a 'significant adverse impact' on health or quality of life. Effects which are not significant have been predicted in relation to noise generating aspects of the development such as BSP, car parking and deliveries / servicing associated with the proposed employment uses.

NPPF 180 (b), 182 and 183

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 whilst no existing businesses would not be restricted by the development.

Planning Practice Guidance: Noise

It has been predicted that on-site operational noise effects associated with the development as well as the impact of cumulative traffic noise associated with the wider Hoyland North development area will not exceed the Lowest Observed Adverse Effect Level (LOAEL).

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 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.
- Lane** 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

DMRB – Design Manual for Roads and Bridges

HGV – Heavy Goods Vehicle

AAWT – Annual Average Weekday Traffic

DM – Do Minimum (Without Development Traffic Flows)

DS – Do Something (With Development Traffic Flows)

PPG – Planning Practice Guidance

WYGE – WYG Environment

NPPF – National Planning Policy Framework

NOAEL – No Observed Adverse Effect Level

LOAEL – Lowest Observed Adverse Effect Level

SOAEL – Significant Observed Adverse Effect Level



Appendix B – Sketches

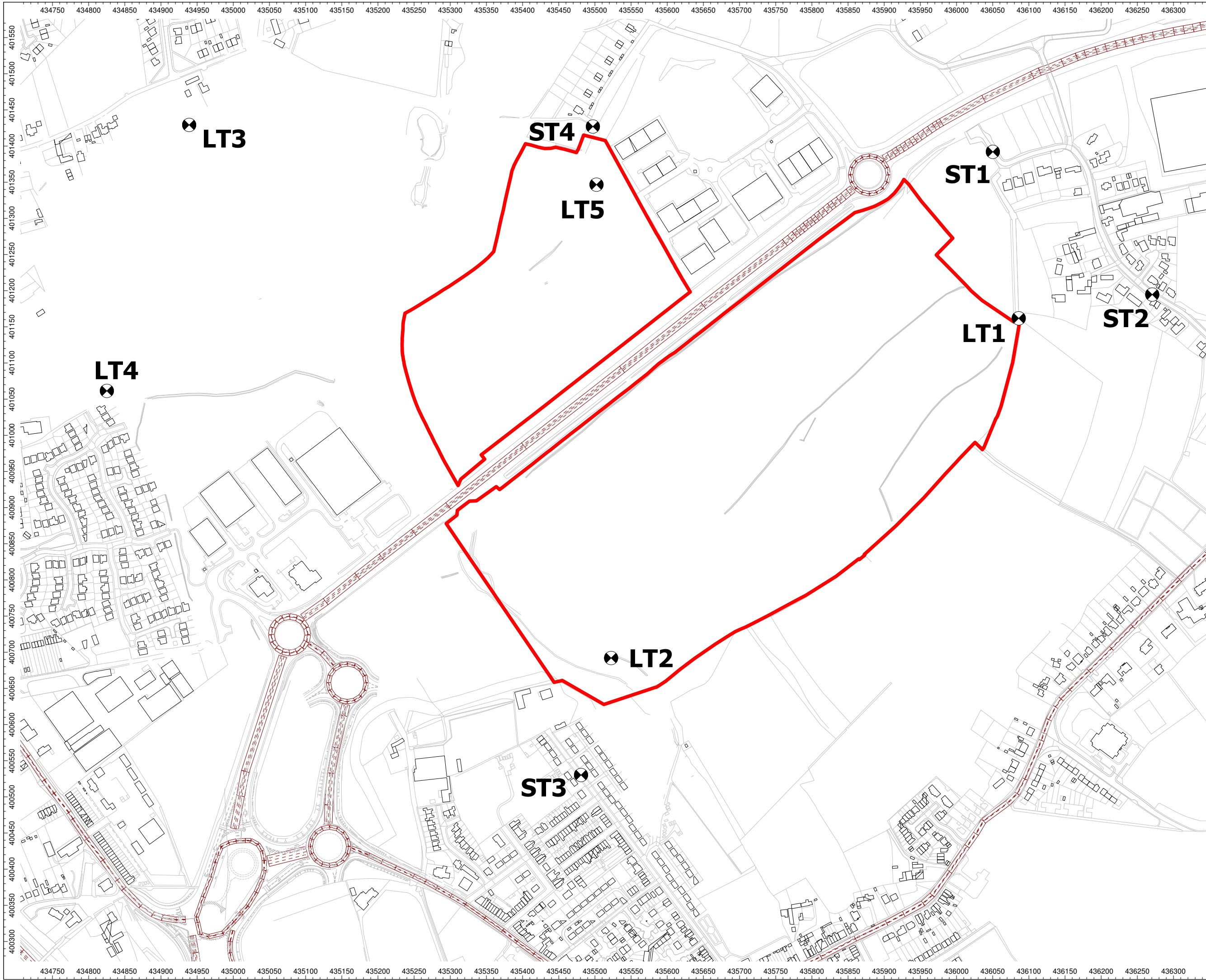
SK01 Noise Monitoring Location Plan

SK02a Existing Receptor Location Plan

SK02b Road Traffic Noise Receptor Location Plan

SK03 Daytime Combined Noise Contour Plot $L_{Aeq,1hour}$

SK04 Night-time Combined Noise Contour Plot $L_{Aeq,15minute}$



Client:
Harworth Group

Project:
Rockingham Phases
2 & 3

Project Number:
A115145

Drawing Title / Scenario:
Noise Monitoring
Location Plan

Drawing Number:
SK01

Key:

Monitoring
Locations: 

Site Boundary: 

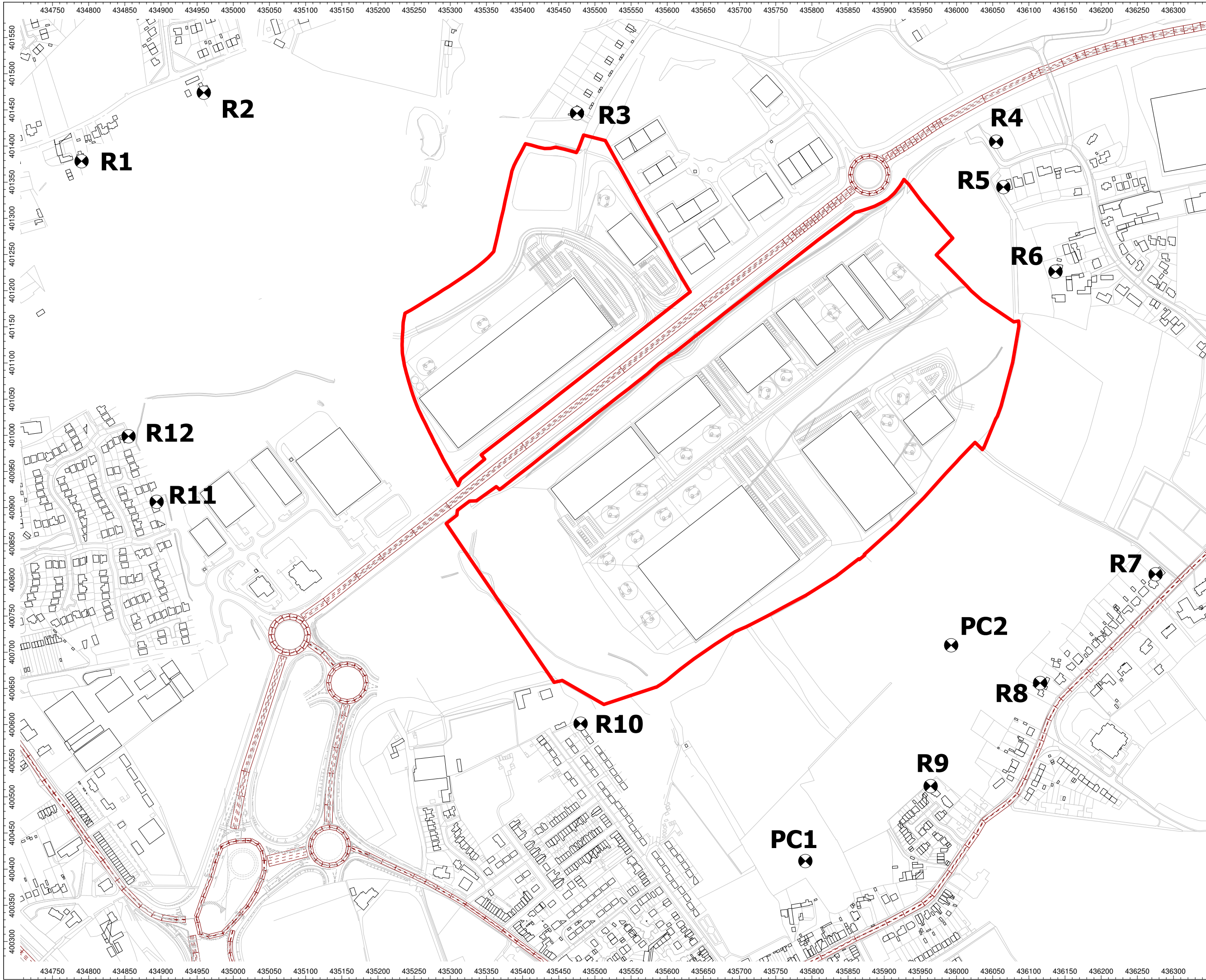
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Executive Park
Avalon Way
Anstey
Leicestershire
LE7 7GR
Tel 0116 234 8000

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Client:
Harworth Group

Project:
Rockingham Phases
2 & 3

Project Number:
A115145

Drawing Title / Scenario:
Receptor Location
Plan (On-Site Noise)

Drawing Number:
SK02a

Key:
Receptor
Locations:

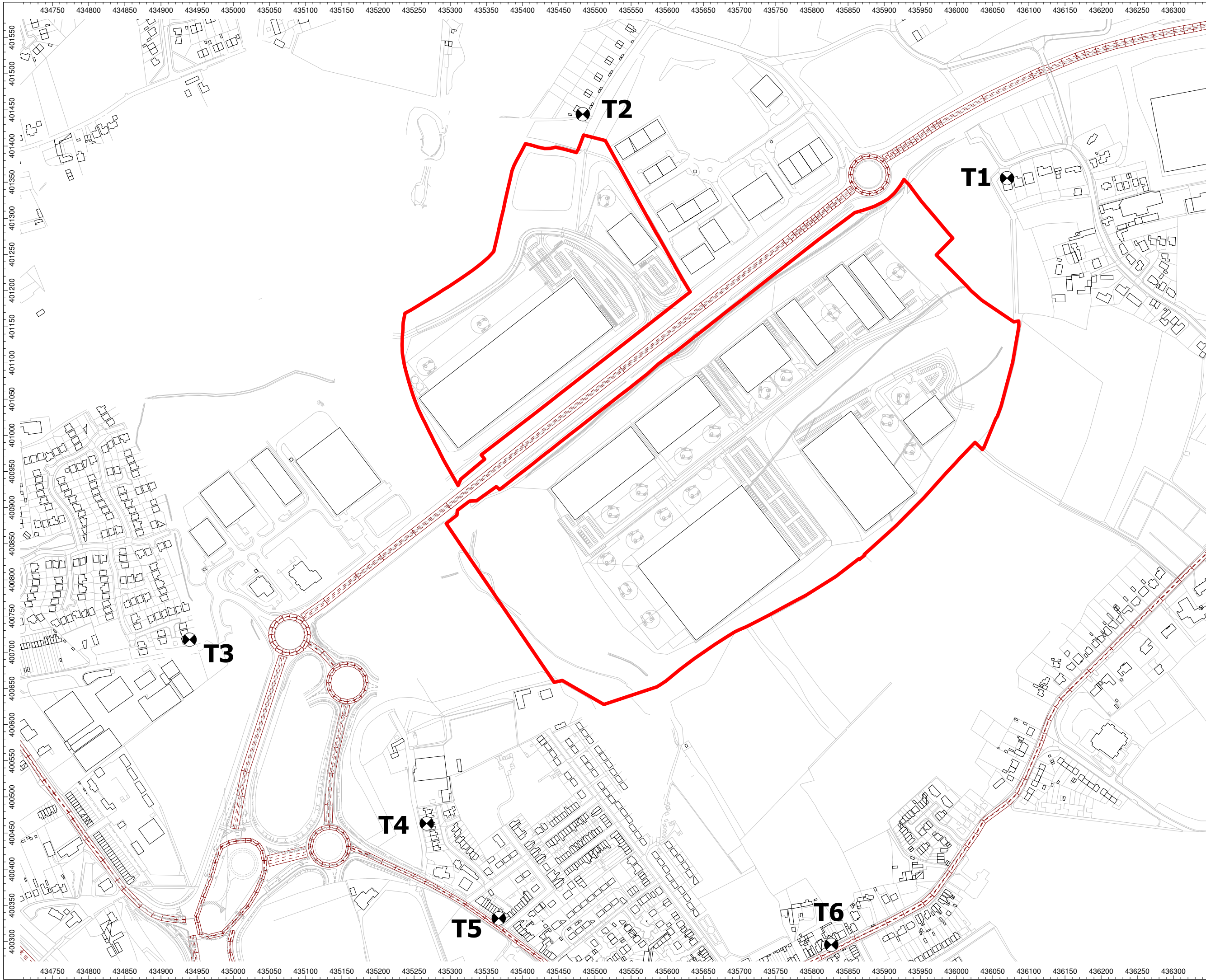
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Scale : Not to scale

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Leicestershire
LE7 7GR
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Client:
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Project:
Rockingham Phases
2 & 3

Project Number:
A115145

Drawing Title / Scenario:
Receptor Location
Plan (Traffic)

Drawing Number:
SK02b

Key:
Receptor
Locations: 

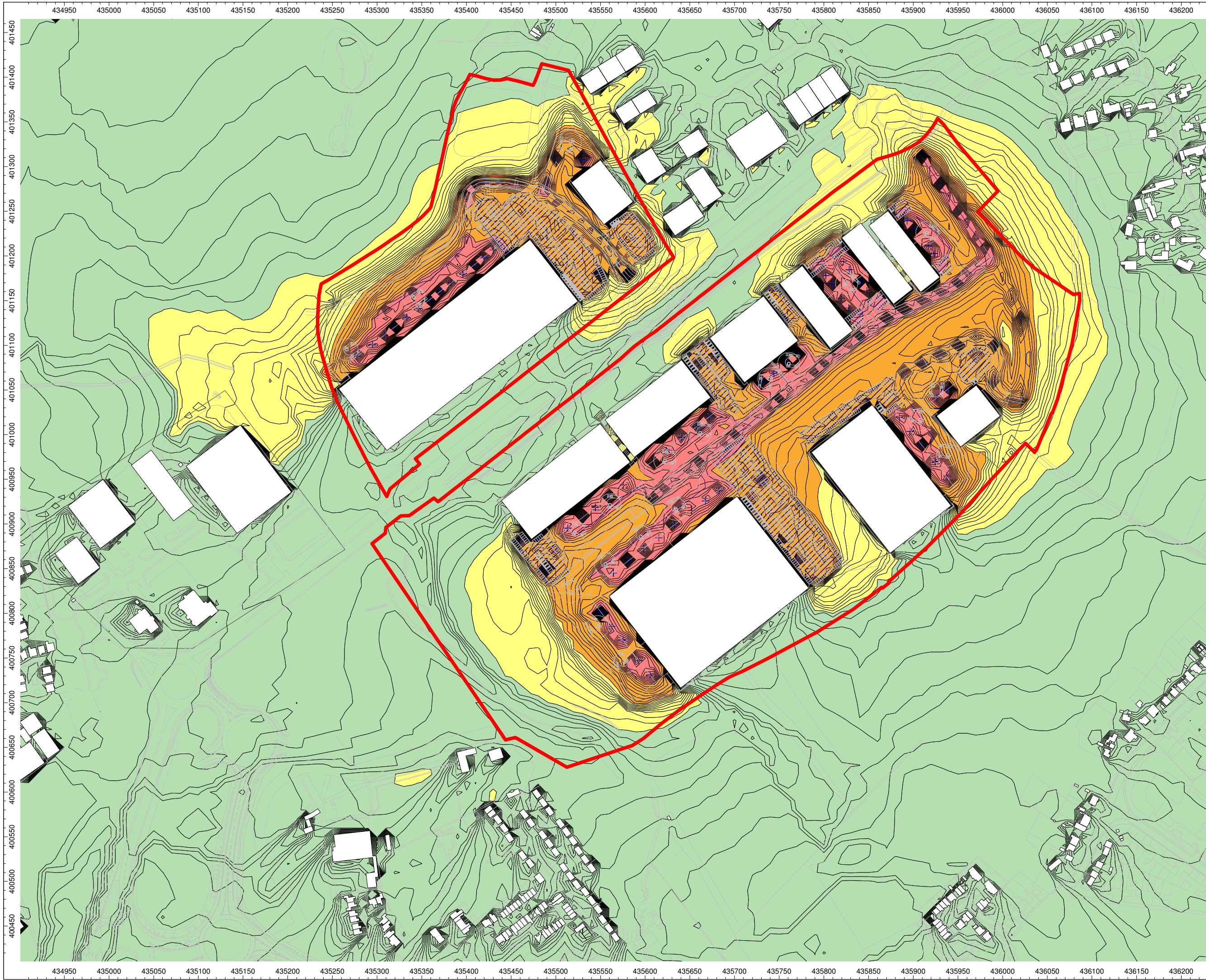
Site Boundary: 

Scale : Not to scale

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Client:
Harworth Group

Project:
Rockingham Phases
2 & 3

Project Number:
A115145

Drawing Title / Scenario:
Daytime LAeq,1hour
Noise Contour Plot

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 for indicative
purposes only.

Scale : Not to scale

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Avalon Way
Anstey
Leicestershire
LE7 7GR
Tel 0116 234 8000

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Client:
Harworth Group

Project:
Rockingham Phases
2 & 3

Project Number:
A115145

Drawing Title / Scenario:
Night-time LAeq,15mins
Noise Contour Plot

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 for indicative
purposes only.

Scale : Not to scale

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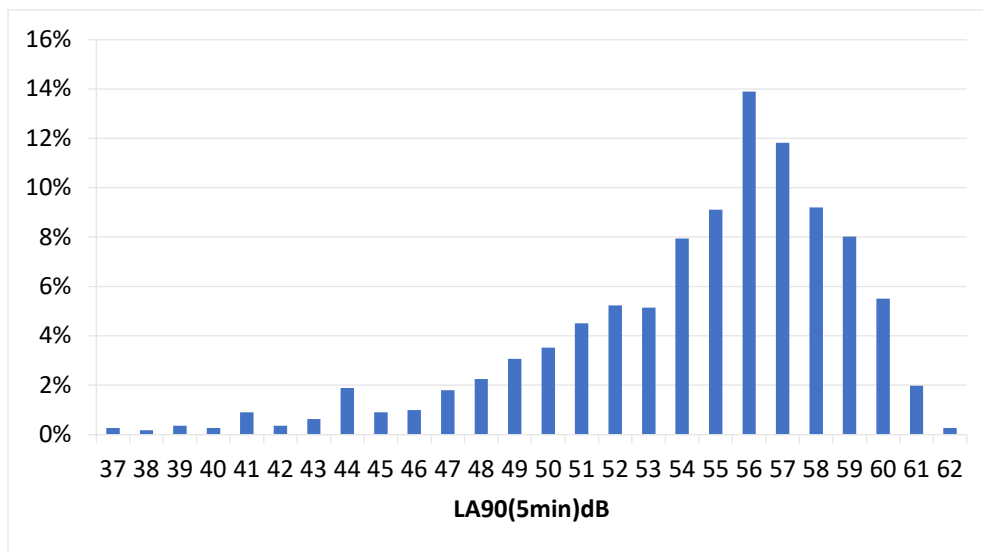
Executive Park
Avalon Way
Anstey
Leicestershire
LE7 7GR
Tel 0116 234 8000

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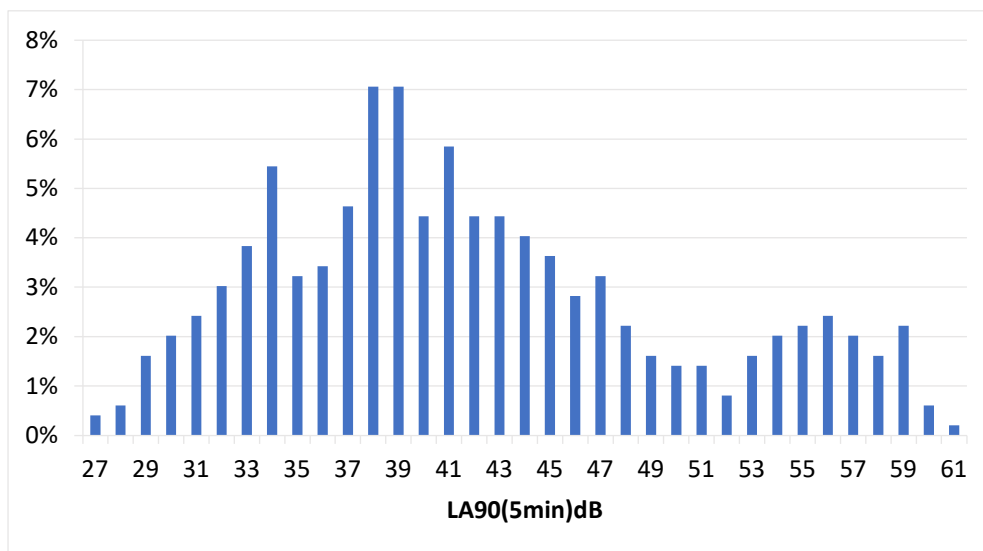


Appendix C – Background Noise Level Graphs

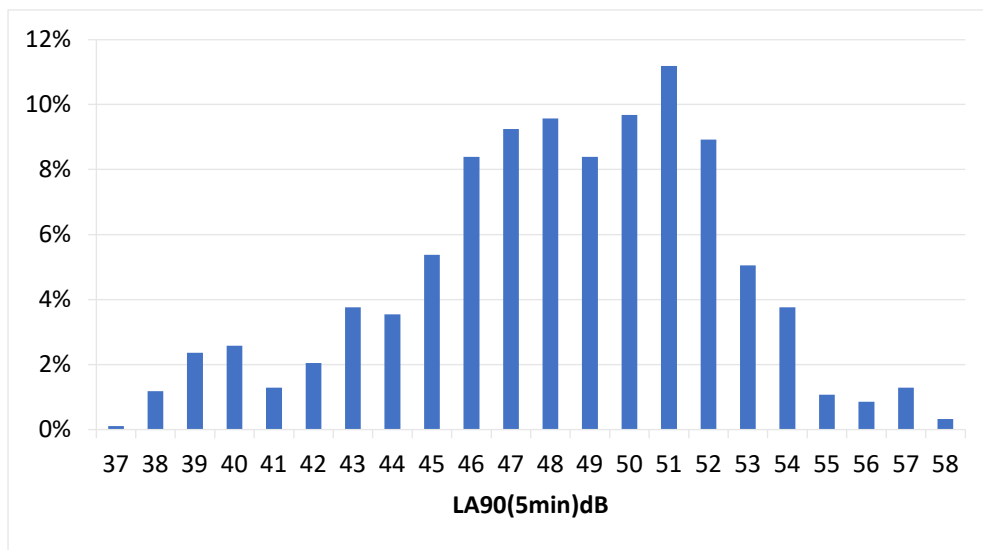
LT1 Day



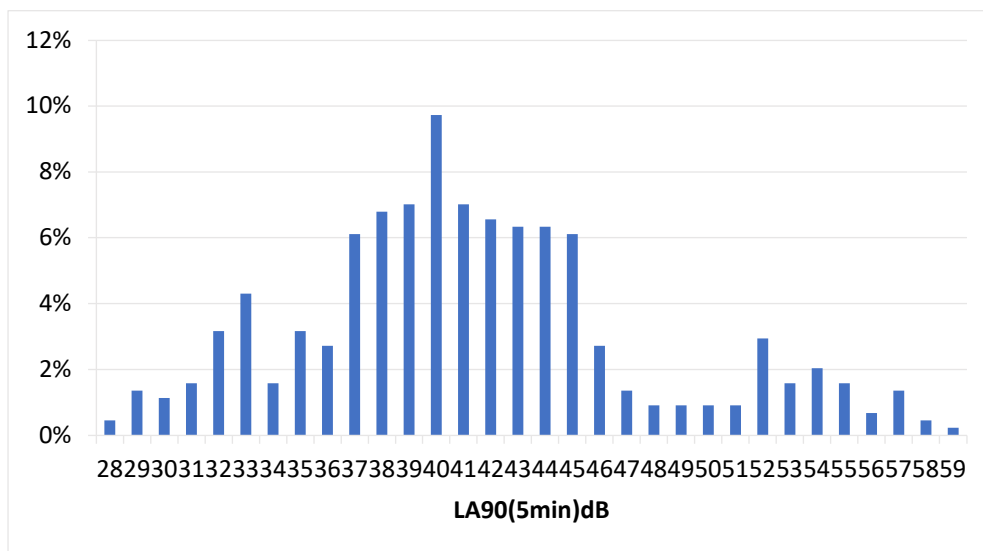
LT1 Night



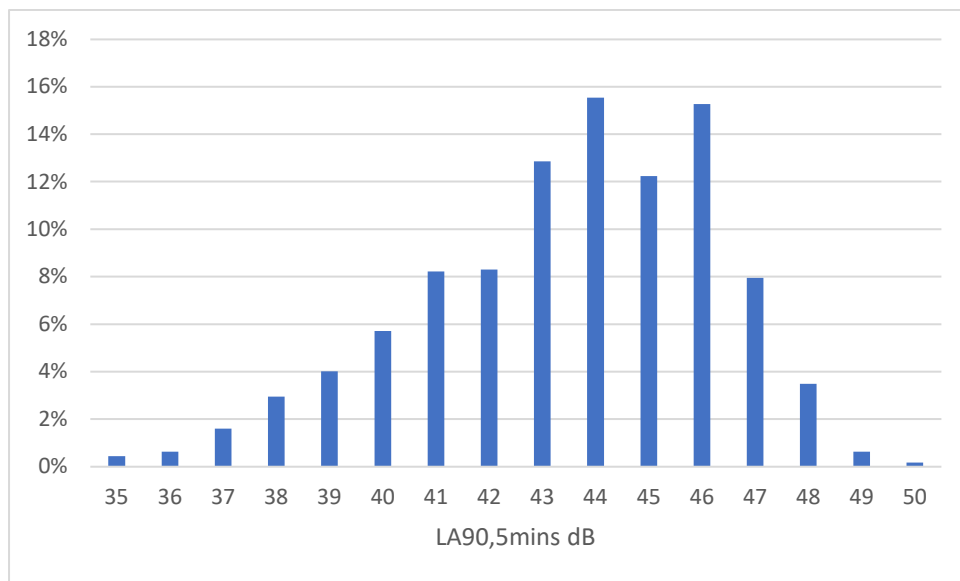
LT2 Day



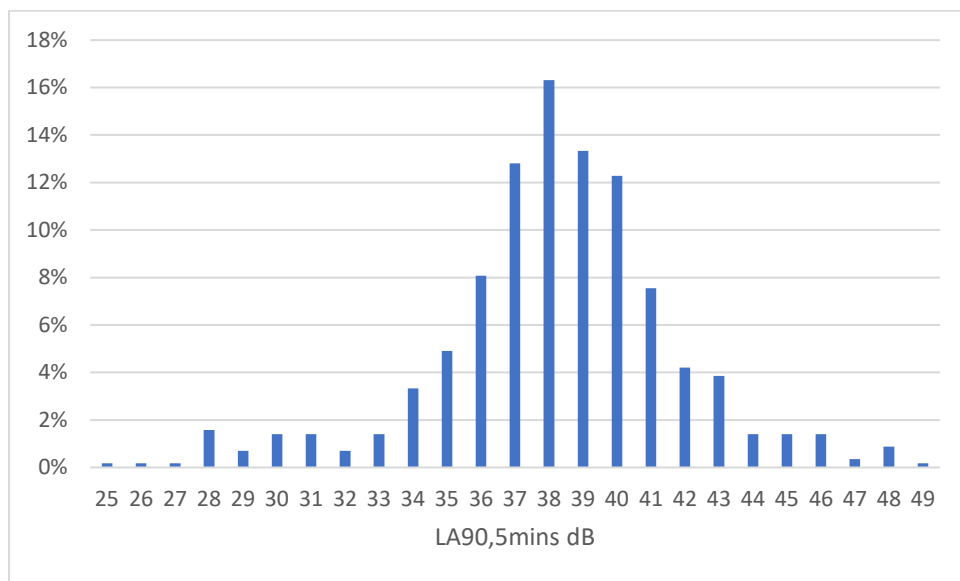
LT2 Night



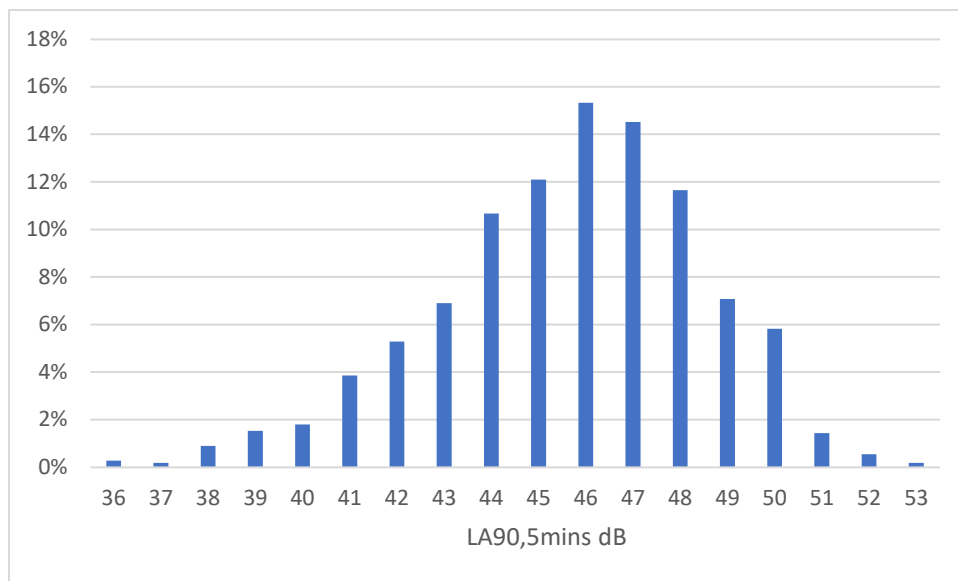
LT3 Day



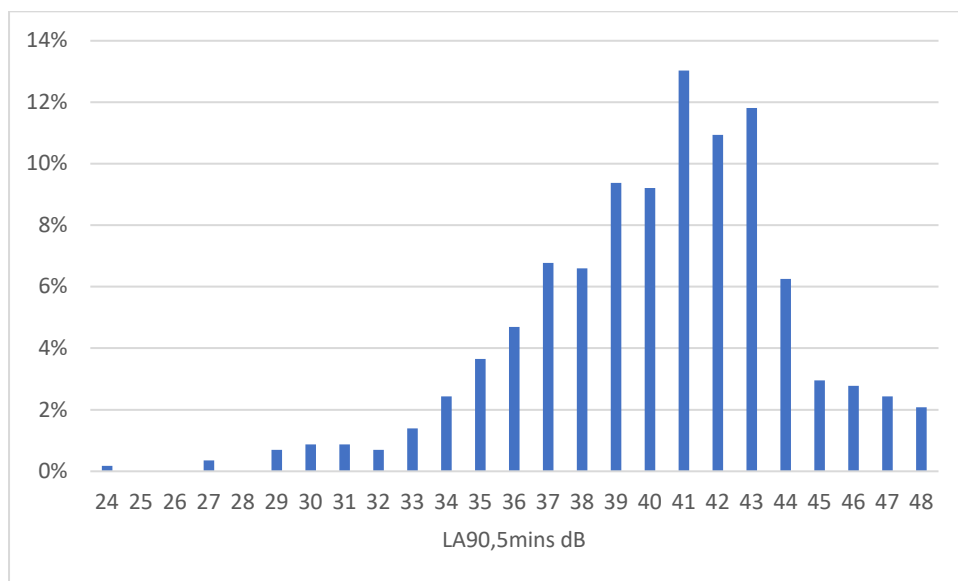
LT3 Night



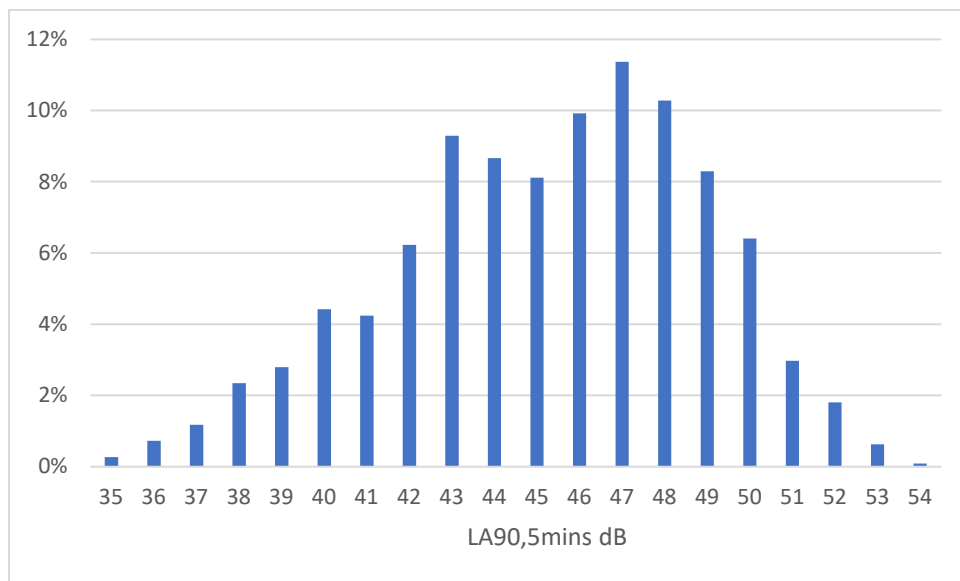
LT4 Day



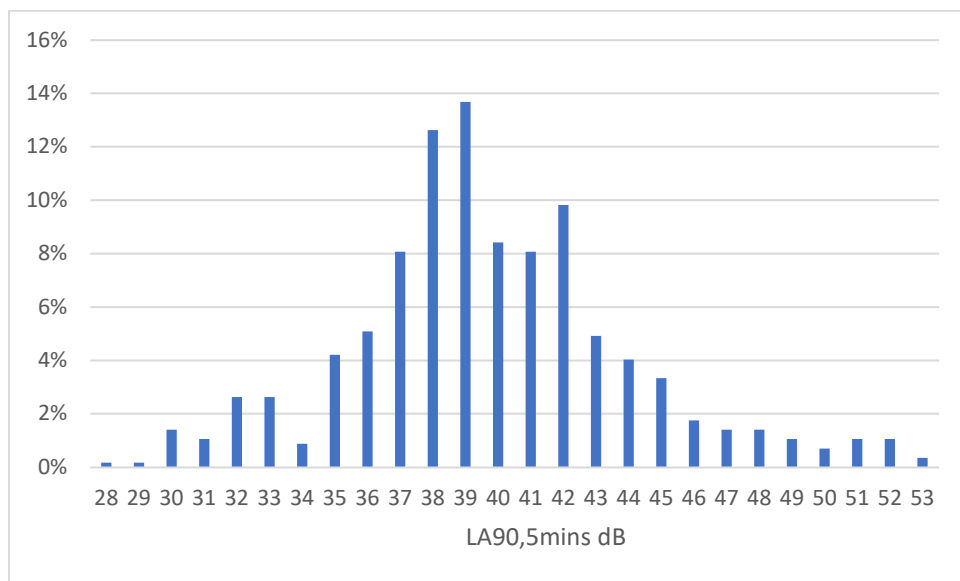
LT4 Night



LT5 Day



LT5 Night





Appendix D – Traffic Data

Location Name	18hr AAWT						Speeds (mph)
	Base 2017		DM 2029		DS 2029		
	Total	% HGV	Total	HGV %	Total	HGV %	
M1S	94727	11.0%	95581	10.9%	95946	11.0%	70
A61 (west of M1)	25710	15.4%	26429	15.0%	26929	15.5%	44
M1 N	98805	11.8%	99718	11.7%	100162	11.9%	70
A61 Sheffield Road	21845	8.6%	22053	8.5%	22253	8.5%	28
A61 Link East of M1 J36	39223	13.7%	41710	12.9%	43019	13.9%	40
A6135 S of B6096	11223	7.2%	11803	6.9%	12060	6.7%	30
Tankersley Lane	6945	5.6%	6965	5.6%	6965	5.6%	30
B6096	11518	7.4%	13137	6.5%	13137	6.5%	30
A6135 N of B6096	13752	9.4%	15098	8.6%	15354	8.5%	28
A6195 S of Kestrel Way	24097	14.3%	25628	13.4%	27138	15.0%	40
Sheffield Road	2615	9.3%	2927	8.3%	3136	7.7%	40
A6195 W of Phase 3	25568	13.8%	26721	13.2%	28440	14.5%	50
A6195 E of Phase 3	25568	13.8%	26721	13.2%	28359	14.3%	50
Proposed Access Road	-	-	-	-	2042	34.3%	30
A6195 E of Phase 2	25121	13.7%	26299	13.1%	26999	13.8%	70



Appendix E – Report Conditions

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