

New Lane, Havant

Noise Constraints Assessment

A118298



Noise Assessment for Proposed Distribution Unit

Havant Property Investment LLP
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INTRODUCTION

PURPOSE OF THIS REPORT

This report presents the findings of a noise assessment for a proposed distribution centre located off New Lane, Havant.

The noise levels from the proposed development have been predicted at local representative receptors using CADNA noise modelling software which incorporates ISO 9613 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.

LEGISLATIVE CONTEXT (ENGLAND)

PPG24 Planning and Noise was replaced by the National Planning Policy Framework (NPPF) on 27 March 2012; current policy guidance with respect to noise is found in the updated NPPF, published on 19th February 2019. With regard to noise and planning, the 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."

Planning 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 (NPSE), 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 present	No Effect	No Observed Effect	No Specific Measures Required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No Specific Measures Required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. 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

Perception	Examples of Outcomes	Increasing Effect Level	Action
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The NPPF, NSPE and PPG: Noise do not, however, present absolute noise level criteria which define SOAEL, LOAEL and NOEL which is applicable to all sources of noise in all situations. Therefore, within the context of the Proposed Development, national planning policy and appropriate guidance documents, including the BS 4142 – ‘*Methods for rating and assessing industrial and commercial sound*’ (2014+A1:2019) 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 PPG: Noise also states that *neither the NPSE nor the NPPF (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of the proposed development.*

ACOUSTIC CONSULTANTS’ QUALIFICATIONS, PROFESSIONAL MEMBERSHIP

The lead project Acoustic Consultant is Lewis Kelter. The report has been checked by Graham Davis. The relevant qualifications, membership and experience are summarised below.

Table 1.2 Qualifications and Experience

Name	Education	Institute of Acoustics Post Graduate Diploma in Acoustic and Noise Control (Pass Date)	Experience in Undertaking Noise Assessments (Start date of working in noise & acoustics)	Attained Associate Membership of the Institute of Acoustics (date)	Attained Membership of the Institute of Acoustics (date)
Lewis Kelter	BSc 2016	Dec 2018	June 2016	Dec 2018	-
Graham Davis	BA 2008	Dec 2013	Sep 2011	Jan 2014	-
Nigel Mann	BSc 1997 MSc 1999	Nov 2001	Nov 1998	Nov 2001	Jul 2005

ASSESSMENT CRITERIA

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

- BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'
- BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings – Code of practice'

Table 2.1 Noise Level Criteria and Actions

Effect Level	Noise Level Criteria	Action / Justification
No Observed Adverse Effect Level (NOAEL)	BS4142 Score of zero or lower	No Action Required Score of zero or lower is an indication of the sound source having a low impact
	Noise levels less than: Bedrooms (night-time) – 30 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax} Living Rooms (daytime) – 30 dB $L_{Aeq,16hours}$	No Action Required Within BS8233
Lowest Observed Adverse Effect Level (LOAEL)	BS4142 Score of +5 or lower	No Action Required Difference of +5 dB likely to be an indication of an adverse effect, depending on context BS4142 Score of plus 5 or lower
	Noise levels exceed: Bedrooms (night-time) – 30 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax} Living Rooms (daytime) – 35 dB $L_{Aeq,16hours}$	Mitigate to achieve: Bedrooms – 30 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax} Living Rooms – 35 dB $L_{Aeq,16hours}$ Within BS8233
Significant Observed Adverse Effect Level (SOAEL)	BS4142 Score greater than +10	Difference of +10 dB likely to be an indication of a significant adverse effect, depending on context If practicable, mitigate to achieve: BS4142 Score of + 5 or lower
	Noise levels exceed: Bedrooms (night-time) – 35 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax} Living Rooms (daytime) – 40 dB $L_{Aeq,16hours}$	Mitigate to achieve: Bedrooms – 30 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax} Living Rooms – 35 dB $L_{Aeq,16hours}$ Within BS8233
Unacceptable Observed Adverse Effect Level (UOAE)	BS4142 Score of +15 or higher	Avoid, depending on context Mitigate to achieve: BS4142 Score of 5 dB or lower
	Noise levels exceed: Bedrooms (night-time) – 35 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax} Living Rooms (daytime) – 40 dB $L_{Aeq,16hours}$	Avoid

ASSESSMENT METHODOLOGY

NOISE MODELLING METHODOLOGY

The development has been assessed using three-dimensional noise modelling of 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 ISO 9613 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data, assumptions and model settings as given in the table below have been used.

Table 3.1 Modelling Parameters Sources and Assumptions

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	Ordnance Survey	Ordnance Survey
Building heights – around site	Tt Observations	8 m height for two storey residential properties, with 3 m per additional storey and 4 m for Bungalows.
Barrier heights	Tt Observations	All existing garden barriers at 1.8 m or as observed, with the exception of hedges and individual trees which are assumed to offer no noise protection. Intrinsic mitigation: 4.0m high barriers in strategic locations.
Receptor positions	Tt	1 m from façade, height of 1.5 m for ground floor, 4 m for first floor properties. 1.5 m height for model grid.
Proposed Plans	SMR Architects	Drawing No: 7379-SMR-00-ZZ-DR-A-2003-S4-P6 Dated: 02/02/21

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.

MODEL INPUT DATA

Noise of a delivery event has been known to vary from site to site by as much as 22 dB L_{Aeq} at 5 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 worst-case calculations have been based on measurements of HGVs and vans delivering goods. 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 beepers. The assessment is based on 100% of the docking bays having an HGV/van arrive, unload and depart in any 1-hour period during daytime and 50% of operations occurring during a given 15-minute night-time period; events are modelled as point sources.

Van Unloading Event Noise Data

2 minutes at L_p 65.5 dB at 3 m distance	(vehicle arriving and manoeuvring)
36 minutes at L_p 61.9 dB at 3 m distance	(vehicle unloading)
2 minutes at L_p 65.5 dB at 3 m distance	(vehicle leaving)

$$\text{Daytime } L_{Aeq}(1\text{hour}) = 10\log(1/60)(2\text{mins} \times 10^{0.1 \times 65.5 \text{ dB}} + 36 \text{ mins} \times 10^{0.1 \times 61.9 \text{ dB}} + 2 \text{ mins} \times 10^{0.1 \times 65.5 \text{ dB}})$$

$$= 60.6 \text{ dB at 3 m distance}$$

2 minutes at L_p 65.5 dB at 3 m distance	(vehicle arriving and manoeuvring)
13 minutes at L_p 61.9 dB at 3 m distance	(vehicle unloading)

$$\text{Night-time } L_{Aeq}(15\text{mins}) = 10\log(1/15)(2\text{mins} \times 10^{0.1 \times 65.5 \text{ dB}} + 13 \text{ mins} \times 10^{0.1 \times 61.9 \text{ dB}})$$

$$= 62.5 \text{ dB at 3 m distance}$$

Maximum Noise Level

$$L_{Amax} = 80.3 \text{ dB at 3m distance}$$

HGV Unloading Event Noise Data

2 minutes at L_p 67.5 dB at 3 m distance	(vehicle arriving and manoeuvring)
30 minutes at L_p 76.8 dB at 3 m distance	(vehicle unloading)
1 minute at L_p 67.5 dB at 3 m distance	(vehicle leaving)
27 Minutes of quiet with engine off	

$$\text{Daytime } L_{Aeq}(1\text{hour}) = 10\log(1/60)(2 \text{ mins} \times 10^{0.1 \times 67.5 \text{ dB}} + 30 \text{ mins} \times 10^{0.1 \times 76.8 \text{ dB}} + 1 \text{ mins} \times 10^{0.1 \times 67.5 \text{ dB}})$$

$$= 73.8 \text{ dB at 3 m distance}$$

2 minutes at L_p 67.5 dB at 3 m distance	(vehicle arriving and manoeuvring)
13 minutes at L_p 76.8 dB at 3 m distance	(vehicle unloading)

$$\text{Night-time } L_{Aeq}(15\text{mins}) = 10\log(1/15)(2 \text{ mins} \times 10^{0.1 \times 67.5 \text{ dB}} + 13 \text{ mins} \times 10^{0.1 \times 76.8 \text{ dB}})$$

$$= 76.3 \text{ dB at 3 m distance}$$

Maximum Noise Level

$$L_{Amax} = 89.4 \text{ dB at 3m distance}$$

Van Parking Event Noise Data

2 minutes at L_p 65.5 dB at 3 m distance (vehicle arriving and manoeuvring)

$$\text{Daytime } L_{Aeq}(1\text{hour}) = 10\log(1/60)(2\text{mins} \times 10^{0.1 \times 65.5 \text{ dB}})$$

$$= 50.7 \text{ dB at 3m distance}$$

No Vans Parking During the Night-time

Van Movement Noise Data

The following calculations have been used to represent vans arriving/exiting along the access road. During a worst-case daytime hour period 382 vans have been assumed to arrive/leave along the access road during the daytime, with 72 vans predicted to arrive/leave during the night-time period. This is considered to be a worst-case assumption and is based on the number of new van unloading and parking bays, typically the site will operate with less traffic numbers per hour than assumed in this assessment. Worst-case noise-levels have been calculated using this data to represent a worst-case in any 1-hour daytime (07:00 – 23:00) period and 15-minute period during the night-time (23:00 – 07:00). This has been included as a line source in the model.

382 x 10 seconds at L_p 65.5 dB at 3m distance (Single van vehicle arriving and leaving)

$$\text{Daytime } L_{Aeq}(1\text{hour}) = 10\log(1/60)(3820 \text{ seconds} \times 10^{0.1 \times 65.5 \text{ dB}})$$

$$= 65.8 \text{ dB at 3 m distance}$$

72 x 10 seconds at L_p 65.5 dB at 3m distance (Single van vehicle arriving and leaving)

$$\text{Night-time } L_{Aeq}(15\text{mins}) = 10\log(1/15)(720 \text{ seconds} \times 10^{0.1 \times 65.5 \text{ dB}})$$

$$= 64.5 \text{ dB at 3 m distance}$$

Maximum Noise Level

$$L_{Amax} = 73.0 \text{ dB at 3m distance}$$

HGV Movement Noise Data

The following calculations have been used to represent HGVs arriving/exiting along the access road. As a worst-case assumption, during any daytime or night-time hour period, 2 HGVs are predicted to arrive/leave along the access road. Worst-case noise-levels have been calculated using this data to represent a worst-case in any 1-hour daytime (07:00 – 23:00) period and 15-minute period during the night-time (23:00 – 07:00). This has been included as a line source in the model.

2 x 10 seconds at L_p 67.5 dB at 3m distance (Single HGV vehicle arriving and leaving)

$$\text{Daytime } L_{Aeq}(1\text{hour}) = 10\log(1/60)(20 \text{ seconds} \times 10^{0.1 \times 67.5 \text{ dB}})$$

$$= 44.9 \text{ dB at 3 m distance}$$

$$\text{Night-time } L_{Aeq}(15\text{mins}) = 10\log(1/15)(20 \text{ seconds} \times 10^{0.1 \times 67.5 \text{ dB}})$$

$$= 57.0 \text{ dB at 3 m distance}$$

Maximum Noise Level

$$L_{Amax} = 73.0 \text{ dB at 3m distance}$$

It should be noted that, as part of the intrinsic mitigation scheme of the site, an Operational Noise Management Plan (ONMP) has been included at the site which is presented within Appendix B.

The objective is to ensure that the external operations operate efficiently and effectively; thereby minimising any incidence of potential disruption on the highway and noise disturbance to local residents. It is considered that an effective ONMP could help improve the overall operation of the delivery strategy at the site, removing issues relating to vehicles causing noise disturbance to local residents; the model input data presented above do not include the effects of the ONMP however, studies at other sites have shown that operational noise levels can be typically reduced by 5 – 7 dB and therefore a conservative overall 5 dB reduction has been incorporated into this assessment.

Car Park Noise Data

Noise levels within the proposed car parks have been based on measurements of a distribution centre during a shift change at the centre of the car park to represent a worst-case scenario.

$$L_{Aeq,1hour} = 53.0 \text{ dB @ 1.5m height}$$

Building Services Plant Noise Data

Although specific manufacturer details are unavailable, point sources have been used in the model to represent the worst-case plant locations. The maximum sound pressure levels of the point sources at 1 and 3 metres were estimated in the model as a conditional maximum level that the noise levels at nearby receptors were predicted to meet the BS 4142 assessment criteria. Noise emission limits have been specified to ensure that plant noise rating levels are at least 10 dB below the existing night-time background noise level at all surrounding receptors.

SENSITIVE RECEPTORS

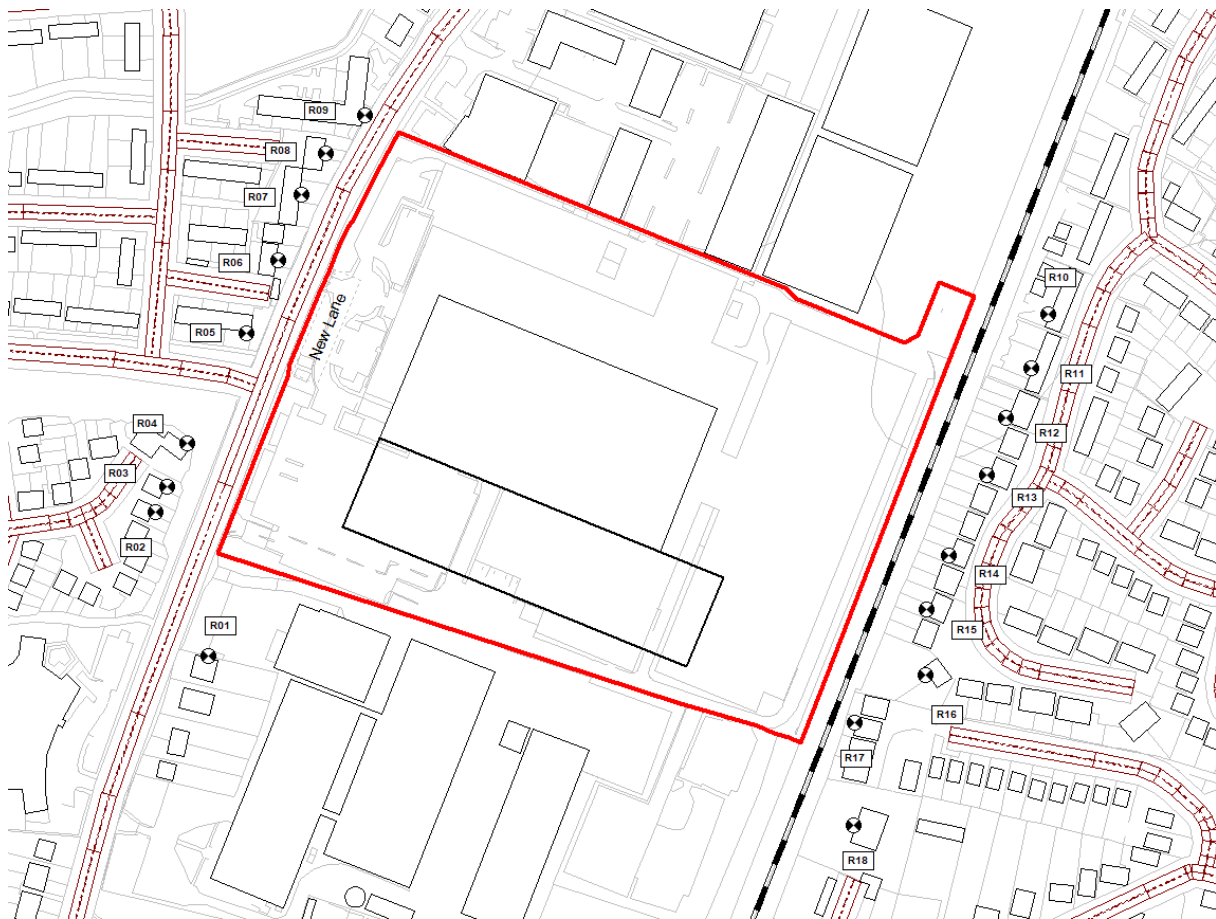
The table below summarises receptor locations that have been selected to represent worst-case residential receptors with respect to direct noise from the site. These are shown illustratively on Figure 3.1 below.

Table 3.3 Sensitive Receptor Locations

Ref.	Description	Use Classification	Height (m) Daytime / Night-time
R01	26 New Lane	Residential	1.5 / 4.0
R02	22 Oak Park Drive	Residential	1.5 / 4.0
R03	26 Oak Park Drive	Residential	1.5 / 4.0
R04	The Oaks, 23 Park Drive	Residential	1.5 / 4.0

Ref.	Description	Use Classification	Height (m) Daytime / Night-time
R05	6 Flexford Gardens	Residential	1.5 / 4.0
R06	8 Flexford Gardens	Residential	1.5 / 4.0
R07	17 Flexford Gardens	Residential	1.5 / 4.0
R08	31 Flexford Gardens	Residential	1.5 / 4.0
R09	1 Kyoto Terrace, 63 New Lane	Residential	1.5 / 4.0
R10	147 Nutwick Road	Residential	1.5 / 4.0
R11	137 Nutwick Road	Residential	1.5 / 4.0
R12	129 Nutwick Road	Residential	1.5 / 4.0
R13	121 Nutwick Road	Residential	1.5 / 4.0
R14	109 Nutwick Road	Residential	1.5 / 4.0
R15	101 Nutwick Road	Residential	1.5 / 4.0
R16	95a Nutwick Road	Residential	1.5 / 4.0
R17	17 Swallow Close	Residential	1.5 / 4.0
R18	18 Fourth Avenue	Residential	1.5 / 4.0

Figure 3.1 Sensitive Receptor Locations



Not to scale
OS Licence No. AL553611

NOISE SURVEY

NOISE SURVEY METHODOLOGY

A monitoring survey was undertaken to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background and traffic noise levels. Equipment used during the survey included:

Rion NL-52	Environmental Noise Analyser	s/n	253702
Rion NL-52	Environmental Noise Analyser	s/n	1021257
Rion NL-52	Environmental Noise Analyser	s/n	264490
Rion NL-52	Environmental Noise Analyser	s/n	1176464
Rion NC-74	Sound Calibrator	s/n	35046823

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice, a maximum drift of 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.

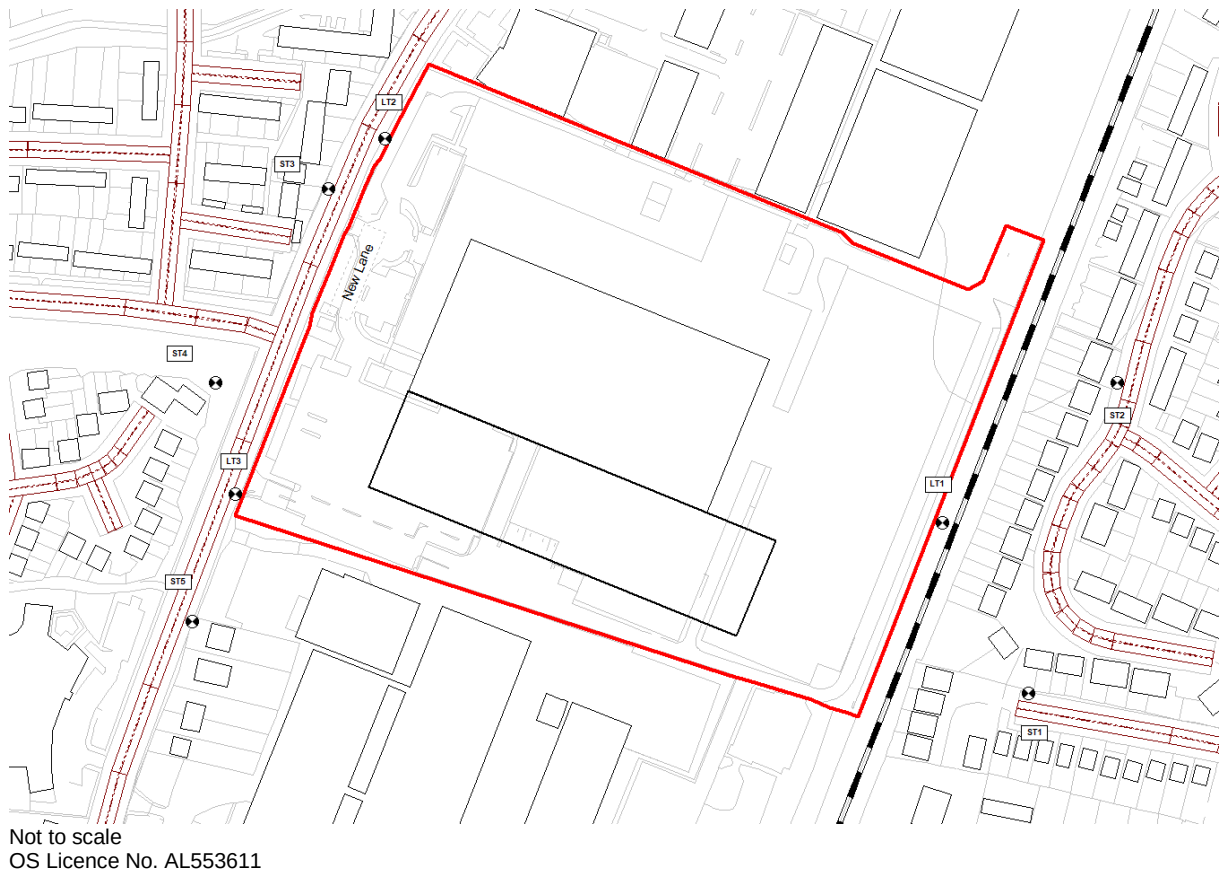
A baseline monitoring survey was undertaken at eight locations (as specified in the following table and shown in SK01 of Appendix B) from Wednesday 9th December 2020 to Monday 14th December 2020. Attended short term measurements were undertaken at five locations during daytime, evening and night-time periods with three additional locations being measured unattended over a 123-hour period. The raw data collected from the long-term (LT) 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 and overcast. Anemometer readings confirmed that wind speeds were less than 5 ms⁻¹ at all times during the survey, with mixed wind directions during the survey.

Table 4.1 Noise Monitoring Locations

Ref	Description
LT1	Eastern boundary of site
LT2	North-western boundary of site
LT3	Southwestern boundary of site
ST1	At the end of Swallow Close
ST2	Outside 131 Nutwick Road
ST3	On New Lane, opposite Pfizer Main Entrance
ST4	Behind the Oaks, Oak Park Drive
ST5	Outside 26 New Lane

Figure 4.1 Noise Monitoring Locations



NOISE SURVEY RESULTS

The existing noise climate is characterised by road traffic noise from New Lane and Crossland Drive to the west of the site; traffic noise from the residential areas to the west and east of the site and industrial activity from the surrounding industry to the north and south of the site were also audible during the survey including noise from the existing plastic factory to the south of the site.

Ambient and background noise levels are usually described using the L_{Aeq} index (a form of energy average) and the L_{A90} index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the L_{A10} index (i.e. the level exceeded for 10% of the measurement period). For the 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 4.2 Meteorological Conditions during the Survey

Survey Location	Date & Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Daytime ST1	09/12/2020 10:51	5	0-1	WNW	7	Distant road traffic noise
Daytime ST2	09/12/2020 10:31	5	0-1	WNW	7	Distant road traffic noise
Daytime ST3	09/12/2020 09:30	3	0-1	WNW	7	Road traffic noise (New Lane)
Daytime ST4	09/12/2020 09:46	4	0-1	WNW	7	Road traffic noise (New Lane, Crossland Drive, St. Albans Road)
Daytime ST5	09/12/2020 10:04	4	0-1	WNW	7	Road traffic noise (New Lane)
Evening ST1	09/12/2020 21:25	4	0-1	SSE	5	Occasional train pass
Evening ST2	09/12/2020 21:07	4	0-1	SSE	5	Occasional train pass
Evening ST3	09/12/2020 20:10	4	0-1	SSE	5	Occasional road traffic noise (New Lane)
Evening ST4	09/12/2020 20:26	4	0-1	SSE	5	Occasional road traffic noise (New Lane, Crossland Drive)
Evening ST5	09/12/2020 20:42	4	0-1	SSE	5	Occasional road traffic noise (New Lane)
Night-time ST1	10/12/2020 00:16	3	0-1	SSE	5	Occasional train pass, distant background road
Night-time ST2	09/12/2020 23:58	3	0-1	SSE	5	Occasional train pass, distant background road traffic noise
Night-time ST3	09/12/2020 23:00	3	0-1	SSE	5	Road traffic noise (New Lane)
Night-time ST4	09/12/2020 23:16	3	0-1	SSE	5	Occasional vehicle (New Lane, Crossland Drive)
Night-time ST5	09/12/2020 23:33	3	0-1	SSE	5	Occasional vehicle (New Lane)

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).

Table 4.3 Results of Baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	L _{Aeq,T} (dB)	L _{Amax,T} (dB)	L _{Amin,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)
Weekday Daytime 07:00 - 23:00	51 Hours	09/12/2020 – 14/12/2020 07:00 – 23:00	LT1	58.6	90.4	38.5	50.5	50.0
Weekday Night-time 23:00 – 07:00	24 Hours	09/12/2020 – 14/12/2020 23:00 – 07:00		54.8	85.0	37.5	46.3	40.0
Weekend Daytime 07:00 - 23:00	32 Hours	12/12/2020 – 13/12/2020 07:00 – 23:00		49.7	82.5	38.5	48.1	43.0
Weekend Night-time 23:00 – 07:00	16 Hours	12/12/2020 – 13/12/2020 23:00 – 07:00		51.2	90.9	36.8	42.5	38.0
Weekday Daytime 07:00 - 23:00	50 Hours	09/12/2020 – 14/12/2020 07:00 – 23:00	LT2	61.3	88.7	48.5	64.1	55.0
Weekday Night-time 23:00 – 07:00	24 Hours	09/12/2020 – 14/12/2020 23:00 – 07:00		55.1	83.1	38.0	55.4	52.0
Weekend Daytime 07:00 - 23:00	32 Hours	12/12/2020 – 13/12/2020 07:00 – 23:00		59.0	92.2	40.3	61.3	52.0
Weekend Night-time 23:00 – 07:00	16 Hours	12/12/2020 – 13/12/2020 23:00 – 07:00		50.4	80.8	39.3	49.7	43.0
Weekday Daytime 07:00 - 23:00	50 Hours	09/12/2020 – 14/12/2020 07:00 – 23:00	LT3	62.6	87.7	49.1	65.6	58.0
Weekday Night-time 23:00 – 07:00	24 Hours	09/12/2020 – 14/12/2020 23:00 – 07:00		57.3	83.5	36.0	56.2	57.0
Weekend Daytime 07:00 - 23:00	32 Hours	12/12/2020 – 13/12/2020 07:00 – 23:00		60.2	94.8	39.5	61.3	52.0
Weekend Night-time 23:00 – 07:00	16 Hours	12/12/2020 – 13/12/2020 23:00 – 07:00		52.1	78.6	35.9	49.7	40.0
Daytime 09:30 - 16:30	15 Mins	09/12/2020 10:51	ST1	44.0	65.8	39.6	45.6	41.3
	15 Mins	09/12/2020 10:31	ST2	48.7	70.2	36.4	50.2	38.2
	15 Mins	09/12/2020 09:30	ST3	71.3	92.6	47.9	75.1	54.1
	15 Mins	09/12/2020 09:46	ST4	59.0	67.4	50.4	62.1	53.9
	15 Mins	09/12/2020 10:04	ST5	68.1	88.7	46.7	72.9	49.5
Evening 19:00 - 23:00	15 Mins	09/12/2020 21:25	ST1	47.2	66.6	39.0	47.4	42.2
	15 Mins	09/12/2020 21:07	ST2	44.2	54.1	38.9	45.7	41.6
	15 Mins	09/12/2020 20:10	ST3	65.0	79.8	48.1	69.1	51.1
	15 Mins	09/12/2020 20:26	ST4	58.6	84.1	48.1	59.0	51.0
	15 Mins	09/12/2020 20:42	ST5	61.5	80.4	44.0	61.8	46.3
Night-time 23:00 - 07:00	15 Mins	10/12/2020 00:16	ST1	43.5	65.8	32.2	44.0	36.3
	15 Mins	09/12/2020 23:58	ST2	42.1	63.3	31.4	42.9	35.4
	15 Mins	09/12/2020 23:00	ST3	64.3	89.8	46.6	59.2	49.6
	15 Mins	09/12/2020 23:16	ST4	55.4	67.0	48.8	57.7	52.0
	15 Mins	09/12/2020 23:33	ST5	55.7	82.5	43.0	49.9	45.7

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

ASSESSMENT OF KEY EFFECTS

PLANT NOISE ASSESSMENT

This assessment has been undertaken to establish the maximum external noise levels from the proposed development. The assessment compares the predicted permissible plant noise levels with the typical measured night-time background noise L_{A90} at the closest existing residential receptors.

When the sound pressure levels are set as shown in Tables 5.1 (which are considered to be achievable), the noise levels at all the existing receptors are predicted to be at least 10 dB below the existing background levels during the worst-case night-time period, as shown in Table 5.2.

In accordance with section 9.2 of BS4142 an overall +2 dB character correction has been applied to account for any tonal characteristics of noise from the plant units that may be just perceptible. The assessment presented below has been undertaken with the plant operating at full capacity, simultaneously.

As the plant has the potential to operate 24/7, background L_{A90} noise levels measured over the entire night-time period (as sourced from long-term measurements) have been used within the assessment.

Indicative plant locations are shown on Figure 5.1 below.

Table 5.1 Proposed Emission Limits for BSP as Modelled

BSP Description & Location	Noise Emission Limit - Sound Pressure Level (Each Unit)
4 x Roof-mounted BSP Units	74.5 dB(A) at 1m distance OR 64.9 dB(A) at 3m distance

Table 5.2 BS 4142 Assessment for Proposed Plant

Reference	Measured Background L_{A90}	Rating level from plant	BS 4142 Score
R01	40	30	-10
R02	40	26	-14
R03	40	27	-13
R04	40	28	-12
R05	43	30	-13
R06	43	30	-13
R07	43	29	-14
R08	43	28	-15
R09	43	27	-16
R10	38	24	-14
R11	38	24	-14
R12	38	25	-13
R13	38	26	-12

Reference	Measured Background L_{A90}	Rating level from plant	BS 4142 Score
R14	38	26	-12
R15	38	26	-12
R16	38	26	-12
R17	38	26	-12
R18	38	24	-14

NOISE INTRUSION ASSESSMENT (CUMULATIVE OPERATIONAL NOISE LEVELS)

Tables 5.3 – 5.5 below present the external noise levels at nearby sensitive receptors from all sources of potential noise associated with the proposed development (including HGV/van movements, unloading, parking, staff parking and building services plant). Internal L_{Aeq} and L_{Amax} noise levels 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.

The assessment below has been undertaken with the inclusion of intrinsic mitigation in the form of 4.0m high barriers in strategic locations (with barriers stepping down from 4.0m to 1.0m at the site access points) as well as the effect of the operational noise management plan that will be implemented to ensure the effective and efficient management of the site. The locations of the barriers are shown illustratively on figure 5.1 below.

Table 5.3 Noise Intrusion Levels L_{Aeq} (Daytime)

Location	External L_{Aeq} Noise Level at 1 metre from façade	Internal L_{Aeq} with windows-open	Internal L_{Aeq} with windows-closed	Criteria (Internal L_{Aeq} dB Daytime)
R01	34.6	19.6	4.6	35
R02	44.4	29.4	14.4	35
R03	44.5	29.5	14.5	35
R04	41.0	26.0	11.0	35
R05	38.3	23.3	8.3	35
R06	38.6	23.6	8.6	35
R07	39.8	24.8	9.8	35
R08	43.8	28.8	13.8	35
R09	44.6	29.6	14.6	35
R10	39.2	24.2	9.2	35
R11	41.9	26.9	11.9	35
R12	42.1	27.1	12.1	35
R13	41.7	26.7	11.7	35
R14	42.3	27.3	12.3	35
R15	42.4	27.4	12.4	35
R16	41.6	26.6	11.6	35
R17	44.5	29.5	14.5	35
R18	40.7	25.7	10.7	35

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

Table 5.4 Noise Intrusion Levels L_{Aeq} (Night-time)

Location	External L_{Aeq} Noise Level at 1 metre from façade	Internal L_{Aeq} with windows-open	Internal L_{Aeq} with windows-closed	Criteria (Internal L_{Aeq} dB Night-time)
R01	33.5	18.5	3.5	30
R02	42.7	27.7	12.7	30
R03	42.8	27.8	12.8	30
R04	39.7	24.7	9.7	30
R05	37.0	22.0	7.0	30
R06	37.5	22.5	7.5	30
R07	38.8	23.8	8.8	30
R08	42.4	27.4	12.4	30
R09	43.4	28.4	13.4	30
R10	37.9	22.9	7.9	30
R11	40.1	25.1	10.1	30
R12	40.3	25.3	10.3	30
R13	39.9	24.9	9.9	30
R14	40.6	25.6	10.6	30
R15	40.7	25.7	10.7	30
R16	40.2	25.2	10.2	30
R17	42.5	27.5	12.5	30
R18	39.8	24.8	9.8	30

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

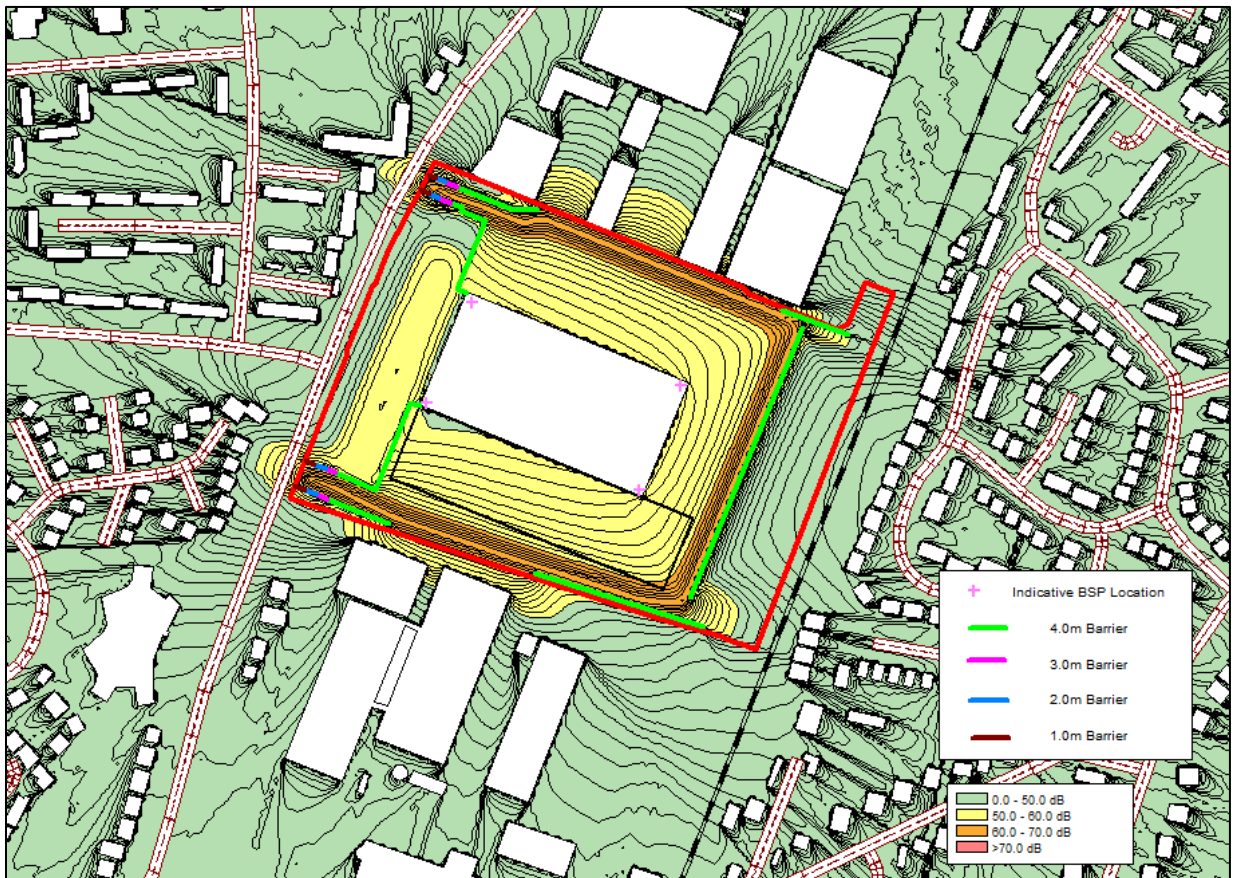
Table 5.5 Noise Intrusion Levels L_{Amax} (Night-time)

Location	External L_{Amax} Noise Level at 1 metre from façade	Internal L_{Amax} with windows-open	Internal L_{Amax} with windows-closed	Criteria (Internal L_{Amax} dB Night-time)
R01	42.1	27.1	12.1	45
R02	50.0	35.0	20.0	45
R03	50.0	35.0	20.0	45
R04	45.7	30.7	15.7	45
R05	42.6	27.6	12.6	45
R06	42.6	27.6	12.6	45
R07	44.2	29.2	14.2	45
R08	49.6	34.6	19.6	45
R09	50.7	35.7	20.7	45
R10	46.0	31.0	16.0	45
R11	43.9	28.9	13.9	45
R12	43.9	28.9	13.9	45
R13	42.0	27.0	12.0	45
R14	42.7	27.7	12.7	45
R15	42.7	27.7	12.7	45
R16	42.2	27.2	12.2	45
R17	47.2	32.2	17.2	45
R18	48.2	33.2	18.2	45

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

The assessments presented in the tables above demonstrate that internal daytime and night-time L_{Aeq} and night-time L_{Amax} noise levels from the proposed development are predicted to be below the BS 8233/WHO noise intrusion criteria at all receptors with windows-open and windows-closed. Therefore, operational noise intrusion levels are predicted to be within the No Observed Adverse Effect Level.

Figure 5.1 Worst-case Daytime $L_{Aeq,1hour}$ Noise Levels



CONCLUSIONS OF NOISE ASSESSMENT

A noise assessment has been undertaken to assess the impact of a storage and distribution unit at New Lane, Havant

Maximum noise level limits have been set for proposed building services plant which are predicted to result in a noise rating level which are at least 10 dB below the existing background noise level during the worst-case night-time period at the closest sensitive receptor locations. Accordingly, building services plant is expected to have no adverse impact at the closest sensitive receptors.

Intrinsic mitigation in the form of 4.0m high barriers in strategic locations (with barriers stepping down from 4.0m to 1.0m at the site access points) as well as the effect of the operational noise management plan that will be implemented to ensure the effective and efficient management of the site.

Cumulative operational noise levels during the daytime and night-time periods are predicted to be below the guideline noise intrusion criteria at nearby properties assuming both a windows-open and a windows-closed scenario. Therefore, operational noise levels are considered to be within the No Observed Adverse Effect Level.

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.
- L_n** Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say, 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the L_{A10, 1 hr} = x dB.

The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90}, the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.

R_w The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.

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

CADNA – Computer Aided Noise Abatement

DMRB – Design Manual for Roads and Bridges

HGV – Heavy Goods Vehicle

PPG – Planning Practice Guidance

UDP – Unitary Development Plan

UKAS – United Kingdom Accreditation Service

APPENDIX B – OPERATIONAL NOISE MANAGEMENT PLAN

Objective

The objective will be to ensure that noise is kept to a minimum and that vehicles operate efficiently and effectively when serving the depot; thereby minimising any incidence of potential disruption from potential noise disturbance to local residents. This document has been produced in accordance with the DfT Quiet Deliveries Good Practice Guidance – Key Principles and Processes for Retailers: April 2014. Relevant signage will be installed, reminding drivers and of the Noise Management Plan (NMP) principles and regular training will be provided by management to enforce the points. An activity log of ongoing checks and training will be kept and available to the Local Planning Authority (LPA) on request.

Timescales and Review

This noise management plan will be reviewed bi-annually as part of public and local authority liaison. Where required, additional mitigation, monitoring or best practice will be included in subsequent revisions. Similarly, in the absence of complaints or interest the regularity of review of this management plan may be reduced or mitigation controls relaxed.

Implementation of the physical measures will be undertaken prior to occupation. It is expected that the management controls below will be implemented in full within 1 month of occupation.

Physical Noise Mitigation Measures

Building services plant will be designed to achieve NR25 criterion at nearby sensitive properties through the selection of plant, location of vents and openings away from sensitive properties and the use of appropriate acoustic enclosures.

No Tannoy systems will be used in the site.

Waste and recycling areas will be provided with acoustic screening as part of detailed design proposals for the unit to eliminate direct lines of sight to nearby dwellings and use of equipment machinery or vehicles associated with the waste recycling areas will be subject to a working hours restriction of 7am to 6pm. Similarly, only soft materials such as cardboard or plastics will be manually deposited in the recycling areas between 7am to 6pm.

This NMP includes the requirement for the following noise mitigation measures to be installed/kept:

- Surfacing of the service yard to be smooth with no cracks and mixed height joints.
- Signage to remind drivers of being quiet at night

Vehicle Management Strategies

A combination of strategies will contribute to the operation of the NMP. These include overriding management controls.

- Vehicle Manoeuvres

- Vehicle Schedules

Delivery and Loading Process

There are a number of management and operations measures to reduce noise levels which include: -

Unloading

- Ensure engines are switched off;
- Manoeuvring should be minimised;
- Goods will be loaded/offloaded from the vehicle directly from/into the internal loading bay;
- There should be no radios left on;
- Doors should be closed without excessive force;
- There should be no shouting in the external yard area;
- There should be no use of vehicle horns in the area except in event of emergency; and
- Drivers should seek to:
 - lower loading plates into the correct position with minimal noise;
 - avoid making contact with trailer walls, lift guardrails and other obstructions; and
 - maintain conversation to a minimum.

The Return Journey

- All vehicle doors must be closed with minimal noise; and
- Drivers should seek to:
 - engage gears with minimal noise;
 - avoid the use of horns other than as required by the Highway Code in the event of emergency situations;
 - keep engine revs to a minimum;
 - apply brakes gently; and
 - accelerate gently until the vehicle is a reasonable distance from the distribution centre.

Reversing Alarms

The occupier will endeavour to use broadband (white noise) reversing alarms however, it is not possible to ensure that every vehicle visiting the site will be fitted with broadband reversing alarms. For example, the majority of vehicles owned by the occupier have broadband (white noise) reversing alarms however, 3rd party vehicles (including maintenance vehicles) may not be able to be controlled in this way and therefore this would not be able to be enforced.

Ongoing Management and Maintenance

Management staff will undertake monthly checks, both within and surrounding the yard areas to ensure that all equipment, gates etc. are operating efficiently and without excessive noise. This includes a check on the external yard surfacing. Similarly, management staff will check that the NMP is being adhered to and keep a log of this activity. A direct, out of hours telephone line, with contact details, will be made available to nearby residents and local authority Environmental Health Officers to aid liaison.

Signage will be provided at the entrance to site reminding drivers to be respectful of local residents and to keep noise to a minimum and also providing the 24hrs hotline number for residents to call to resolve any concerns.

Any defects or damage (such as squeaking gates, cracks to yard surface, gaps/splits in dock cushions, clips to stone pillars) will be reported to the centre Manager and remedied in a reasonable time.

Training and Ongoing Management

Regular training will be undertaken by management to drivers and local staff to ensure that this Management Plan and the DfT Quiet Deliveries Good Practice Guidance will be adhered to. This training will be logged and made available to the LPA upon request.

- Management staff will undertake a minimum of monthly checks, to ensure that this Management Plan is being adhered to.
- Regional management will undertake unannounced checks (in conjunction with their existing schedule of unannounced checks) to ensure that this Management Plan is being adhered to.

APPENDIX C – REPORT CONDITIONS

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