

Langstone Park, Havant

Masterplan Noise Assessment

Report ref.

PJB9272/21410/V1.1

Issued to

XLB Property Ltd

Prepared by

Phill Banks B Eng MIOA
Principal Consultant

Version	Authorised by	Remarks	Date
V1.0	PJB	First Issue	25.11.21
V1.1	PJB	Client Comments	9.12.21



SECTION	TITLE	PAGE
1.	SUMMARY	1
3.	INTRODUCTION	2
4.	SITE DESCRIPTION	2
5.	GUIDELINES FOR ACCEPTABILITY	2
5.1	NOISE POLICY GUIDELINES - NATIONAL PLANNING POLICY FRAMEWORK (NPPF).....	2
5.2	BS 4142	5
5.3	LOCAL AUTHORITY GUIDELINES FOR ACCEPTABILITY	5
6.	AMBIENT SOUND SURVEY AND RESULTS	6
6.1	NOISE SOURCE OBSERVATIONS	7
6.2	RESULTS OF LONG-TERM, UNATTENDED MONITORING	7
7.	PREDICTION OF SOUND LEVEL FROM PROPOSED ACTIVITIES.....	8
7.1	SPECIFIC SOUND PREDICTION MODEL	9
7.2	MODELLED PLANT AND ACTIVITY SCENARIO	10
7.3	RESULTS	11
7.4	UNCERTAINTY	11
8.	ASSESSMENT	13
8.1	ASSESSMENT OF SOUND RATING FROM OVERALL SITE ACTIVITY	13
9.	DISCUSSION	14
9.2	MORE USUAL OPERATING SCENARIOS	15
10.	CONCLUSION	16
APPENDIX A:	Location plan showing noise monitoring locations	
APPENDIX B:	Phasing and illustrative layout plan	
APPENDIX C:	Environmental Noise Record Sheets of ambient noise observations	
APPENDIX D:	Charts showing measured noise levels	
APPENDIX E:	Histograms of measured $L_{A90,T}$ levels	
APPENDIX F:	Figures demonstrating the Predictor noise model	
APPENDIX G:	Noise contour diagrams of daytime and night-time noise from intensive activities	
APPENDIX H:	Predicted noise levels tables for daytime and night-time intensive activities	
APPENDIX I:	Noise contour diagrams of daytime with sensible noise control measures	



1. SUMMARY

- Spectrum have been engaged to assess the potential noise arising from a proposed industrial development at Langstone Park, Havant and, where necessary, recommend measures to ensure acceptably low levels of noise emission from the site. In particular, the developers are seeking to ensure flexible use of the site in terms of hours of operation.
- The proposed development consists of a campus of modern industrial buildings which will be built on a speculative, multi-let basis. Accordingly, there is no information available on the likely occupants of the units, their activities or associated noise. Therefore, a range of robust assumptions have been made concerning the level and type of activity that could occur and the associated mechanical plant that could be installed at the site.
- An ambient noise survey has been conducted to gather representative ambient and background noise levels for nearby existing residences.
- The noise emitted from the site from fixed plant and general activity has been calculated for intensive daytime and night-time scenarios. The impact of this noise at nearby residential locations has been assessed using the method described in BS 4142:2014+A1:2019. The various design parameters and noise control measures (e.g. plant noise level limits and building envelope sound insulation requirements) are included within the noise model and are described within this report.
- The predicted rating level from the night-time scenario results in a noise rating level that is at, or below the representative background sound level at nearby residential locations for the period. Therefore, the potential noise impact is considered to be suitably low and in accordance with guidelines previously used by Havant Borough Council.
- The predicted rating level from the day-time scenario results in a noise rating level that is potentially and adverse impact. Readily available noise control measures are discussed within this report which demonstrate that any adverse impacts can be mitigated to ensure low noise impact for noise sensitive receptors in the vicinity.
- There are good reasons for considering that the predicted sound levels used within these assessments significantly overestimate real-life values, leading to a predicted noise impact that is higher than would ordinarily occur. However, even in the unlikely event that the predicted noise impact was to occur, the analysis provided in this report shows that this can be effectively controlled.



3. INTRODUCTION

XLB Property Ltd are producing a masterplan for the redevelopment of Langstone Park, Havant. As part of this work, Spectrum Acoustic Consultants have been engaged to undertake an outline noise impact assessment for the development. This report provides a description of noise surveys carried out at the site and analyses of the potential noise emission from the site, along with comments on the likely impact of the noise and, where necessary, the measures that would be effective in mitigating this noise.

4. SITE DESCRIPTION

Langstone Park is a 40-acre site located in Langstone, south of Havant, north of Hayling Island and east of Portsmouth. The site is bounded by Havant Bypass (A27) to the North, existing industrial units and a wastewater treatment plant to the West, further industrial units to the South, with a hotel and residential properties to the East. Vehicular access to the site is via Langstone Road on the eastern side and Brookside Road on the west.

A site location plan is shown in Appendix A. This indicates that the majority of nearby noise-sensitive uses are to the east in Brookmead Way, Langbrook Close and Langstone Road. Indications are that there are isolated residences at 47-53 Brookside Road, immediately to the west of the redline boundary.

The noise environment is controlled by road traffic noise, largely from the A27 dual carriageway and, to the south, by traffic on Langstone Road.

The proposals include for redevelopment of the site including demolition of all of the existing buildings on the site and the phased construction of new buildings including new hard and soft landscaping, roadway improvements, etc. Appendix B includes an illustrative layout of the potential overall development. As noted in the drawing, land in the south west corner of the area already has planning permission (ref. APP/21/00405) of units 1 to 4 in two new buildings.

It is expected that the form of construction of the new industrial buildings for the overall site will follow current practice of profiled metal clad buildings of around 10 to 13m height, with roller shuttered loading bay doors, contrasting elements for the offices (e.g. brick clad, curtain walling, etc.) and profile metal roof, typically incorporating 15% of rooflights.

The new units would form a multi-let, speculative industrial use development and, as such, there are no prospective occupiers of the units. However, the developers are seeking to ensure that the use of the units is as flexible as possible in terms of use and hours of operation.

5. GUIDELINES FOR ACCEPTABILITY

5.1 NOISE POLICY GUIDELINES - NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The **National Planning Policy Framework** (NPPF) sets out the government's guidance for local planning authorities and planning application decision-takers.

It says that the planning system should contribute to and enhance the environment by (among other things) preventing development from contributing to, being put at risk from, or being adversely affected by unacceptable levels of noise pollution. (Para. 174.e)



Paragraph 185 states:

- *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;*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”*

Paragraph 187 states that planning policies and decisions should ensure that:

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.

The NPPF refers to the **Noise Policy Statement for England (NPSE)** which sets out the long term vision of Government noise policy as follows: *Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.*

The NPSE aims to clarify the principles and aims in existing policy documents, legislation and guidance that relate to noise. Its noise policy aims are to:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.

through the effective management and control of environmental, neighbour and neighbourhood noise.

These aims are developed by reference to the concepts NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level). NPSE also refers to SOAEL (Significant Observed Adverse Effect Level).

It recognises that there is no universally applicable threshold for these concepts. Consequently, the SOAEL is likely to vary with different noise sources, different receptors and at different times. Even so, significant effects should be avoided, taking account of sustainability aims.

Where noise impact is between LOAEL and SOAEL, the NPSE requires that all reasonable steps should be taken to mitigate adverse effects while taking account of sustainable development aims. It notes (para. 2.7) that *the NPSE should consider noise alongside other relevant issues and noise should not to be considered in isolation.*

In July, 2019, **Planning Practice Guidance on Noise**¹ (PPG-N) was updated. This provides advice on ‘how planning can manage potential noise impacts in new development’.

¹ PPG - Noise, MHCLG, July, 2019



It confirms that neither the NPSE² nor the NPPF³ ‘expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of proposed development’.

It also details the hierarchy of noise exposure, including the thresholds LOAEL and SOAEL, based on the likely average response, referred to within NPSE. The noise exposure categories are summarised below.

- No Observed Adverse Effect: noise can be heard but does not cause any change in behaviour or attitude.
- Observed Adverse Effect: noise can be heard and causes small changes in behaviour and/or attitude.
- Significant Observed Adverse Effect: noise causes a material change in behaviour and/or attitude.
- Unacceptable Adverse Effect: extensive and regular changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or psychological effects.

The guidance advises, in accordance with the first and second aims of the NPSE, that where there is no observed effect or no observed adverse effect, no specific measures are required to manage the acoustic environment. Where there is an observed adverse effect, consideration needs to be given to mitigating and minimising those effects. Where there are significant adverse effects, the planning process should be used to avoid these effects occurring, and where there are unacceptable adverse effects, the situation should be avoided / prevented.

The guidance advises that, because of the subjective nature of noise, there is no simple relationship between noise level and its impact. This informs the values for LOAELs and SOAELs which represent the onset levels of adverse effects and significant adverse effects respectively. These will depend on a number of factors in a particular situation, such as:

- The source, its absolute level and the time of day.
- For intermittent sources, the number and duration of events
- The spectral frequency content of the noise

Other factors will need to be considered in many cases, which are more fully described and detailed within the full PPG guidance, but include issues such as:

- The cumulative impacts of more than one source of noise
- Whether existing noise sensitive locations already experience high noise levels,
- Where external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

The PPG guidance does not provide any detail on the how assessment of these factors should be carried out. Instead reference is usually made to existing British Standards and other guidance.

² Explanatory Note to the Noise Policy Statement for England, paragraphs 2.23 and 2.24 , DEFRA, 15 March 2010)

³ National Planning Policy Framework, MHCLG, July 2021



5.2 BS 4142

British Standard document BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* (BS4142) describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes sound from mechanical plant and equipment as well as sound from the loading and unloading of goods and materials at industrial and / or commercial premises.

The principal of assessment under BS4142 is to compare the sound from the source under investigation (if appropriate, with adjustments for duration and character) with the background L_{A90} (the typical minimum sound level) in the absence of the sound to be assessed. The standard states (Section 11):

- a) *Typically, the greater this difference, the greater the magnitude of the impact.*
- b) *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- c) *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- d) *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

Where the sound rating level is assessed to be 10 dB above the background sound level, this is generally taken to be a Significant Observed Adverse Effect Level (SOAEL). Where the sound rating level is assessed to be 10 dB below the background sound level, this is generally taken to be the No Observed Adverse Effect Level (NOAEL). The Lowest Observed Adverse Effect Level (LOAEL) occurs in a range of "sound rating level minus background sound level" between 0dB and 5 dB depending upon context.

5.3 LOCAL AUTHORITY GUIDELINES FOR ACCEPTABILITY

The Environmental Health Department of Havant Borough Council commented on an earlier development at Langstone Park (Ref. APP/19/00703) on 5 December, 2019 as follows:

...baseline background levels have now been established for both day and night time periods. These can then serve as a baseline for each of the future units occupants, to ensure that any potential noise generating operation, be it during the day or night, can be assessed if required, for each individual unit, against these baseline levels. Any mitigation measures that may be required, to ensure no adverse impact on existing residential receptors, must then be implemented. I would therefore ask that a condition ... should be added to any positive decision by the Planning authority.

"The external sound level emitted from plant, machinery or equipment at the development shall be equal or lower than the representative background sound level, with noise levels assessed (if necessary) in accordance with BS4243:2014 at the nearest and/or most affected noise sensitive premises."

Reason: To protect the amenity of the nearest residential receptors

It should be noted that the British standard referred to in this condition, BS4243:2014 is, I believe is a typing error and should read as BS4142:2014.



As noted in Section 5.2, above the extant version of the standard is BS 4142:2014+A1:2019.

In Spectrum's view, compliance with such a condition for the remainder of the Langstone Park redevelopment would likewise ensure no adverse impact on existing residential receptors.

6. AMBIENT SOUND SURVEY AND RESULTS

Ambient sound measurements were carried out during a site survey between 11 and 12 November, 2021. This survey consisted of continuous, unattended sound measurements of ambient conditions at three locations near the boundary of the site. The measurement positions were as follows:

Position LTM1: At 2.0m above ground level on the north eastern boundary of the site, near the Premier Inn hotel with unobstructed view of traffic and other ambient noise sources in this vicinity. The microphone was in free field conditions.

Position LTM2: At 2.0m above ground level near the south eastern boundary of the site, within the wooded area to the east of the site road. The microphone was in free field conditions.

Position LTM3: At 3.0m above ground level near the western boundary of the site, adjacent to 47 Brookside Road with unobstructed view of traffic and other ambient noise sources in this vicinity. The microphone was in free field conditions.

These locations are indicated in Appendix A. The following equipment was used during the survey:

Position LTM1

- Bruel & Kjaer Type 2250 Sound Level Meter s/n 2739650
- Bruel & Kjaer Type 4189 Microphone s/n 2983518
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 3018719
- Bruel & Kjaer Type UA 1404 Outdoor microphone attachment, and
- Bruel & Kjaer Type AO 0441 10m microphone extension cable

Position LTM2

- Bruel & Kjaer Type 2250 Sound Level Meter s/n 2726905
- Bruel & Kjaer Type 4189 Microphone s/n 2710995
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 2730220
- Bruel & Kjaer Type UA 1404 Outdoor microphone attachment, and
- Bruel & Kjaer Type AO 0441 10m microphone extension cable

Position LTM3

- Bruel & Kjaer Type 2250 Sound Level Meter s/n 3000713
- Bruel & Kjaer Type 4189 Microphone s/n 2780512
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 3001598
- Bruel & Kjaer Type UA 1404 Outdoor microphone attachment, and
- Bruel & Kjaer Type AO 0441 10m microphone extension cable



Before and after the survey, the sound level meters were field-calibrated in accordance with the manufacturer's guidelines, and no significant drift was observed. The meters, microphones and field calibrators are laboratory calibrated biennially in accordance with UKAS procedures or to traceable National Standards. Weather conditions were monitored throughout the survey and wind speeds were within acceptable limits for the type of measurements undertaken.

Section 6.2 of BS4142 requires measurements in locations that will give results that are representative of the ambient sound and residual sound at the assessment location(s).

The measurement locations were chosen to be nearby noise sensitive receptors and as well as having the same aspect and relationship to the proposed new industrial developments as those receptors. Accordingly, the noise level data taken from the measurements is considered to be representative of the ambient conditions for the noise sensitive locations nearest those measurement positions. The measurement microphone height was at an appropriate location for both daytime and night-time noise assessment.

Section 6.4 of BS4142 states that weather conditions that could affect the measurements should be noted. Local weather observations were monitored during the survey and conditions were acceptable for the type of measurements being undertaken.

6.1 NOISE SOURCE OBSERVATIONS

In addition to the continuous noise monitoring described above, the survey included for periods of attended observations at the three measurement locations during the evening, night-time, early-morning and daytime periods. These results of these observations are shown in Appendix C.

6.2 RESULTS OF LONG-TERM, UNATTENDED MONITORING

Measurements have been summarised into contiguous 5-minute periods to present the sound profile throughout the monitoring period. Measurement metrics consisted of equivalent continuous (L_{Aeq}) noise levels and maximum (L_{Amax}) noise levels as well as statistical noise levels (termed L_n , where n is the percentage of time the level is exceeded during the measurement period) including L_{A90} levels (the sound level exceeded for 90% of the individual measurement period) which is used to determine the background sound level. Overall A-weighted and octave band measurements were stored for later analysis.

The results of the measurements are shown graphically in Appendix D. A summary of the relevant results for the purposes of this assessment is shown in the following table.

Noise Parameter	Measured level (dB)		
	LTM1	LTM2	LTM3
Daytime L_{A90}	52	42	47
Night-time L_{A90}	44	37	44

Table 1: Aggregated summary results of noise monitoring

In Appendix D, L_{Aeq} and L_{A90} measured noise levels show the normal diurnal variation consistent with greater and more regular activity during the daytime than at night-time, particularly in respect of road traffic noise.



BS4142 at Section 8.1 states:

In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.

As the assessment here considers a new specific sound source, the relevant BS4142 guidance is Section 8.2:

Measure the background sound level at times when the specific sound source(s) is intended to be operated.

In conducting the background survey, the guidance provided in Sections 8.1 and 8.2 was observed. A statistical analysis of $L_{A90,T}$ levels was carried out following the example methodology provided in BS4142. The results of this are shown in Appendix E. The L_{A90} levels taken from the results of this process and used for assessment purposes in this report is as shown in Table 1. The daytime and night-time L_{A90} values as shown in Table 1, have been selected here for the assessment of noise affecting residences and other noise-sensitive uses surrounding the site.

7. PREDICTION OF SOUND LEVEL FROM PROPOSED ACTIVITIES

The purpose of this assessment of noise from the proposed masterplan development is to identify the likely level of noise emitted from the site, assess whether this could be a source of noise impact for nearby noise-sensitive uses and, if so, to suggest feasible methods of controlling this noise to acceptable levels. Havant Borough Council have indicated that an assessment of noise in accordance with 4142:2014+A1:2019 is the appropriate means of determining the acceptability of noise from this type of development, in this area.

Section 7.3.6 of BS4142 states:

Determine the specific sound level by calculation alone if measurement is not practicable, for example if the source is not yet in operation. In such cases, report the method of calculation in detail and give the reason for using it.

NOTE 1 When calculating rather than measuring sound pressure levels, it is necessary to have appropriate representative data on source sound emission, for example as a source sound power level (including source directivity), and the position of any point source(s) creating the same sound pressure levels in the environment as the real source. Often, such data are given in established calculation models, but in other cases it is necessary that they be determined in each individual case.

NOTE 2 Using a suitable method for the sound propagation from source to receiver, the sound pressure level at the assessment point can be calculated. It is necessary to relate the sound propagation to well-defined meteorological and ground conditions. Most calculation models refer to neutral or favourable sound propagation conditions, as other propagation conditions are much more difficult to predict. The acoustic impedance of the ground is also important, in particular at large distances and low source and receiver heights.

These issues are discussed below.



7.1 SPECIFIC SOUND PREDICTION MODEL

The proposal is for a multi-let, multi-unit, speculative industrial estate. That is, the units will be occupied by a range of different businesses, none of whom have yet been identified. Their activities, hours of operation, equipment, machinery, plant, vehicles, etc. will all be determined by the type of commercial activity they carry out. Nevertheless, Spectrum have a long history of working with a number of commercial and industrial estate development companies. Accordingly, we have experience of the typical equipment that tenants usually install at their premises and of the activities they carry out. This has led to Spectrum establishing a schedule of representative noise data for typical activity, plant, equipment and vehicles both during the daytime and at night-time. The precise details of the future installations can't be known at this stage. Even so, we are able to produce robust, realistic scenarios of future activity which are wholly adequate for the outline assessment of noise from the site. Where noise control is necessary to ensure an acceptably low impact, the effectiveness and feasibility of noise control measures is based on our experience of real-life noise mitigation measures. Any measures that are required can be conditioned within the permission or included within future leases so prospective tenants can incorporate them within their fit-out.

The proposals will result in some sound sources that are mobile and some that are fixed. These sources will be distributed about the site and subject to varying degrees of shielding, distance attenuation and reflection, relative to the nearest noise sensitive locations. Accordingly, the analysis which is most appropriate is a numerical noise model of the proposed development and surrounding area.

The particular prediction model that has been used for this analysis is Bruel & Kjaer's Type 7810 'Predictor' software. This acoustic model implements the procedures set out in ISO 9613-2:1996 "*Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation to determine noise levels*". The Predictor model takes account of the following features in its calculation procedure:

- Source sound power level (for point, line and area sources)
- Reflection from nearby structures and source directivity
- Distance from noise source (geometric spreading)
- Atmospheric absorption
- Acoustic screening of intervening structures and topography
- Ground absorption
- Ground effects (which includes the height of ground relative to the noise source)

Detailed noise calculations are then computed of the contribution of each individual noise source to combined noise levels at each receptor location.

The illustrative on-site industrial buildings have been modelled as solid bodies, around which sound can diffract. The intervening ground areas have been modelled as reflective ground, according to the ISO 9613-2 method.

The calculations have been undertaken assuming light down-wind meteorological conditions which maximise predicted noise levels at the receptor location.



7.2 MODELLED PLANT AND ACTIVITY SCENARIO

The modelled scenarios represent the situation when all phases of the Langstone Park development are completed and operational, as this is when the highest level of on-site noise and activity will occur.

In this analysis we have compared the rating level of a 'very busy' scenario of industrial activity on the subject site with the representative background sound levels at the nearest noise-sensitive locations. These activity scenarios represent 'high intensity' daytime and night-time activity. In general, this includes the loudest realistic noise levels (i.e. noise activity within Use Class B2) inside the industrial units both during the daytime and night-time, significant external activity including HGV movements and mechanical plant operating.

In Spectrum's experience, continuous operation at high intensity (i.e. worst-case B2 levels of noise) throughout the night represents an unrealistic overestimate of the level of activity from this type of site. This has been confirmed by the client who has significant involvement with the development and running of industrial estates which operate on a 24-hour basis. Nevertheless, demonstrating that this scenario is acoustically acceptable will give confidence that more typical operating profiles, where less or no activity occurs at night, will be acoustically acceptable.

The first scenario is the aggregate of all sound sources, both fixed and mobile, occurring on the site over a 1-hour **daytime** period to determine the $L_{Aeq,1hr}$ specific sound levels at surrounding noise-sensitive locations. This scenario is as described below.

Daytime activity has been modelled as:

- Each industrial unit is modelled as having an internal reverberant noise level of 84 dBA occurring continuously, breaking out through the building fabric with:
 - o R_w 24 dB profiled steel built-up cladding system on walls and roof.
 - o All loading bay doors are open for the whole 1-hour assessment period.
- Each building has mechanical plant (e.g. extract fans) located at 6m above ground level discharging through the building façade having a sound power level of L_{WA} 72 dB ea, operating continuously.
- For larger units, 10 HGVs arriving at or departing from the site in the 1-hour assessment period (modelled as line sources with an L_{WA} of 60dB/m) each travelling at 10kph. For smaller units, 5 HGV's per hour are assumed.

The internal sound pressure levels that have been modelled inside buildings have been taken from direct long-term measurements inside a metal fabrication factory. The other sound power levels have been taken from Spectrum's library data of representative equipment on equivalent sites. The sound insulation performance of the building elements has been taken from manufacturer's data of similar cladding systems obtained previously. In particular it includes allowance for rooflights on the new industrial units.

The developers are seeking permission for use of the site without hours' restrictions, in order to make the site as commercially attractive as possible. In order to facilitate this, they have requested that Spectrum investigate the noise that arises from typical busy **night-time operations** across the site. The modelled scenario is more activity and higher noise levels than the site is expected to generate during normal night-time operations. Even so, if noise impact for surrounding residents can be acceptably low for this scenario, there will be confidence that more usual operating modes will consequently be acoustically acceptable.

Accordingly, the night-time activity scenario has been modelled as:



- Each industrial unit is modelled as having an internal reverberant noise level of 75 dBA occurring continuously, breaking out through the building fabric with:
 - o R_w 24 dB profiled steel built-up cladding system on walls and roof.
 - o Vehicle access doors are open for the whole 15-minute assessment period.
- Each building has mechanical plant (e.g. extract fans) located at 6m above ground level discharging through the building façade having a sound power level of L_{wA} 67 dB ea, operating continuously.
- For larger units, 2.5 HGVs arriving at or departing from the site in the 15-minute assessment period (modelled as line sources with an L_{wA} of 60dB/m) each travelling at 10kph. For smaller units, 1.25 HGV's per 15min.

In both daytime and night-time scenarios, the sound level of sources that do not operate for the full reference period have been adjusted for on-time as described in Section 7 of BS4142.

Figures showing the prediction model in plan and axonometric views are given in Appendix F. These show receptor locations for the noise sensitive locations to the east and west of the industrial estate.

7.3 RESULTS

Plans showing the predicted emission level (sound rating, L_r) from the proposed development as a sequence of colour-coded noise bands (contour plots) are shown in Appendix G for daytime (ground floor level) and night-time (first floor level) scenarios.

The predicted specific sound level at the most affected location for the daytime operational scenario is $L_{Aeq,1hr}$ 48 dB and for the night-time scenario is $L_{Aeq,15min}$ 38 dB. In both cases, this is for residences in the north western corner of Langbrook Close.

Summary calculation output sheets from Predictor for these scenarios are shown in Appendix H.

7.4 UNCERTAINTY

BS4142 states:

Consider the level of uncertainty in the data and associated calculations. Where the level of uncertainty could affect the conclusion, take reasonably practicable steps to reduce the level of uncertainty. Report the level and potential effects of uncertainty.

Uncertainty in calculating sound levels can arise from:

- a) *uncertainty in any measured sound levels used in the calculations;*
- b) *uncertainty in the operation or sound emission characteristics of the specific sound source and any assumed sound power levels;*
- c) *uncertainty in the calculation method;*
- d) *simplifying the real situation to "fit" the model (user influence on modelling);*
- and*
- e) *error in the calculation process.*

Where the sound power level is used for calculating sound pressure levels, it ought to be representative of the source and the conditions under which the source is expected to operate.

Use a validated method of calculating sound levels, e.g. ISO 9613-2 or similar. If an alternative calculation method is used, fully describe the method and state the reasons for using this method.

Uncertainty in the analysis undertaken here has been minimised by for points a), b), c), and e) by using well known activity profiles and repeatable source sound levels measurements to produce robust sound power levels.

The noise prediction model recommended in BS4142, i.e. ISO 9613-2:1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation* has been used in this analysis. The statement of accuracy for calculations within that standard is shown below:

Table 5 — Estimated accuracy for broadband noise of $L_{AT}(DW)$ calculated using equations (1) to (10)

Height, h *)	Distance, d *)	
	$0 < d < 100$ m	$100 \text{ m} < d < 1\,000$ m
$0 < h < 5$ m	± 3 dB	± 3 dB
$5 \text{ m} < h < 30$ m	± 1 dB	± 3 dB
*) h is the mean height of the source and receiver. d is the distance between the source and receiver.		

Figure 1: Extract from Section 9 of ISO9613-2

According to this table, the accuracy for this model is ± 3 dB. The conservative over-estimate of noise emission within the modelling procedure described above easily accounts for a variation of this level.

The uncertainty associated with point d) is addressed by implementing the prediction model in a way that increases predicted levels at surrounding sensitive receptors. This includes:

- Assuming very high sound levels inside the industrial buildings.
- Assuming low (albeit realistic) sound insulation performance of the building envelopes.
- Assuming characteristic 'at-source' sound levels for outdoor equipment, with numerous items distributed in exposed locations.
- Assuming that noise sources generally operate together at maximum sound output for the whole reference period. Where an on-time adjustment is applied, the on-time is at the higher end of expected operational durations.
- All sound sources are assumed to be omnidirectional and no reduction due to source directivity is applied.
- Calculating for light downwind conditions which maximise predicted sound levels at receptor locations.
- Assuming hard (acoustically reflective) ground conditions within the model.

Accordingly, uncertainty in the predicted sound level will not affect the conclusion of this assessment.



8. ASSESSMENT

8.1 ASSESSMENT OF SOUND RATING FROM OVERALL SITE ACTIVITY

In Section 9.1, BS4142 states:

Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level.

NOTE 2 The rating level is equal to the specific sound level if there are no such features present or expected to be present.

In Section 9.2, BS4142 states:

Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed. Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.

The proposed development is a campus of industrial buildings within a larger area of industrial and commercial uses which generally have no restriction on the hours which they may operate. This site itself is currently in industrial use. The context is an acoustic environment that is significantly affected by continuous high-level road traffic noise with regular loud individual vehicle pass-by noise. The sound from the development will be an agglomeration of a large number of individual, uncorrelated sources, none of which will be dominant in level or character. Spectrum's experience of multi-tenanted industrial estates is that there are no prominent acoustic features which would attract a character correction to the specific sound level.

Section 9.2, BS4142 also states:

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Even though no acoustic feature correction is considered to apply, in order to present a robust assessment, a 3 dB penalty is included within the BS4142 assessment carried out here.

The predicted specific activity sound level for the overall site during the daytime period are shown in the previous section as $L_{Aeq,1hr}$ 48 dB and for the night-time scenario is $L_{Aeq,15min}$ 38 dB. Therefore, the rating level for this noise would be L_r 51 dB and 41 dB respectively.

The receptor location at which these predicted levels occur is midway between measurement locations LTM1 and LTM2. These two locations are affected by the continuous noise on the A27 road to a very different extent, so that daytime and night-time background levels vary significantly between the two positions. Accordingly, Spectrum estimate that the prevailing background sound level in the north west



corner of Langbrook Close (i.e. at the location where predicted rating levels are highest) is the average of the background sound values at LTM1 and LTM2.

This results in a representative daytime background sound level of L_{A90} 47 dB and L_{A90} 41 dB at night.

Predictions for the night-time scenario are shown in the previous section as L_{Aeq} 38 dB at the most affected first floor location. Therefore, the rating level for this noise would be L_{Aeq} 41 dB. This compares to a representative night-time background sound level of L_{A90} 41 dB.

According to BS4142, during the daytime, this is an indication of the specific sound source having an adverse impact, depending on the context. The environmental noise context for this area is as follows:- in the absence of the proposed new industrial units, this is an area with extensive industrial development and a noise environment which already has transportation noise and 24 hour industrial noise present. As a result, the context of the noise is not considered to modify the assessment finding above.

At night-time, the noise rating level is predicted to be, at worst, no more than the background sound level. According to BS4142, this is an indication of the specific sound source having a low impact, depending on the context. The context is as described above. As a result, the context of the noise is not considered to modify the assessment of night-time noise. In summary, this is a situation where the development would have a low noise impact.

These assessments are shown in tabular form, below.

Location & Period	Specific Level	Rating Level	Background Sound	Difference	Context correction	Assessment
NW Langbrook Close- Daytime	48	51	47 ¹	5	No effect	Adverse impact
NW Langbrook - Night-time	38	41	43 ¹	-2	No effect	Low impact

Table 2: Summary Assessment

Note 1: Interpolated between values at LTM1 and LTM2

9. DISCUSSION

Appendix B shows an illustrative layout of the site, that is, an example of how the site might be developed to bring forward the proposals in a practical and achievable way. Within this, there are a number of features that are helpful to limiting noise emission to surrounding noise sensitive locations. These include:

- Locating loading bay areas where they are significantly acoustically screened from noise-sensitive areas by the industrial buildings themselves
- Where possible, locating the office component of the building closest to noise-sensitive areas
- Providing undeveloped / landscaped areas as buffer spaces between industrial units and noise-sensitive areas
- Keeping HGV routes toward the centre of the development.

Even so, as stated above, there are situations where intensive use of the site could lead to an adverse noise impact during the daytime.



Even allowing for continued 'high intensity use' of the site, there are operational and engineering noise control measures that can be implemented to ensure that the proposals have a low impact, in accordance with Havant Borough Council's guidelines, as described below.

9.1.1 Closing loading bay doors

The numerical noise model assumes that all loading bay doors are fully open and that high internal sound levels occur continuously. Closing loading bay doors nearest / facing noise-sensitive receptors significantly reduces noise breakout. This assumes that the typical sound reduction index (R_w) of overhead doors is around 18 dB.

9.1.2 External wall sound insulation

The modelled sound insulation of building unit walls is R_w 24 dB. This is very low and is equivalent to the most lightweight insulated panel product available. When a more typical steel profile cladding system is assumed to be used in the construction of external walls of the buildings, the R_w increases to 35 dB.

When the effect of these measures is taken into account within the noise model, the following assessments result:

Location & Period	Specific Level	Rating Level	Background Sound	Difference	Context correction	Assessment
Premier Inn	42	45	52	-7	No effect	Low impact
NW Langbrook Close	44	47	47 ¹	-	No effect	Low impact
W Langbrook Close	40	43	45 ¹	-2	No effect	Low impact
SW Langbrook Close	39	42	42	-	No effect	Low impact
47 Brookside Road	43	46	47	-1	No effect	Low impact

Table 2: Summary Assessment

Note 1: Interpolated between values at LTM1 and LTM2

This indicates that quite straightforward measures are available to ensure an acceptably low noise impact from the development. Of course, they would also further reduce noise emission at night-time, further reducing the impact of the proposals. A noise contour diagram showing the predicted noise emission with these noise control measures in place is provided in Appendix I.

9.2 MORE USUAL OPERATING SCENARIOS

The previous sections have described how the 'high intensity operational scenario' rating levels have been compared with typical minimum background sound levels using calculation assumptions that maximise receptor noise levels.

Even with this, it should be emphasised that there are numerous assumptions within the modelled activity scenarios that are truly more extreme than would realistically occur on a development such as this. In particular:



- The internal noise levels are typical of a metal fabrication factory operating at high rate of activity and noise. It is most unlikely that all or even a few of the units would produce such high noise levels.
- The model assumes that all of the units have this internal noise level occurring at the same time. Again, it is most unlikely that the noisiest activity of the separate businesses coincide.
- The model assumes a high rate of HGV delivery / dispatch activity at all units simultaneously. Many units will have much lower trip generation and a more likely scenario is that HGV trips would be more spread out throughout the day.
- The model assumes that all units have a high level of mechanical plant noise (noisy extract fans in elevated / unscreened locations). Should such plant be necessary, judicious location and engineering noise control could reduce this noise significantly.
- The model neglects any acoustic attenuation of property boundary fences or outbuildings in residential areas. Dwellings that are further away from the site (for example on the east side of Langbrook Close) will benefit from the screening of intervening dwellings.

Accordingly, there is a considerable degree of overestimation of noise impact within the assessment carried out here. It is likely that operational noise levels from the ultimate development, even at busy times, would have noise rating levels much lower than predicted and, potentially acoustically acceptable without any noise controls.

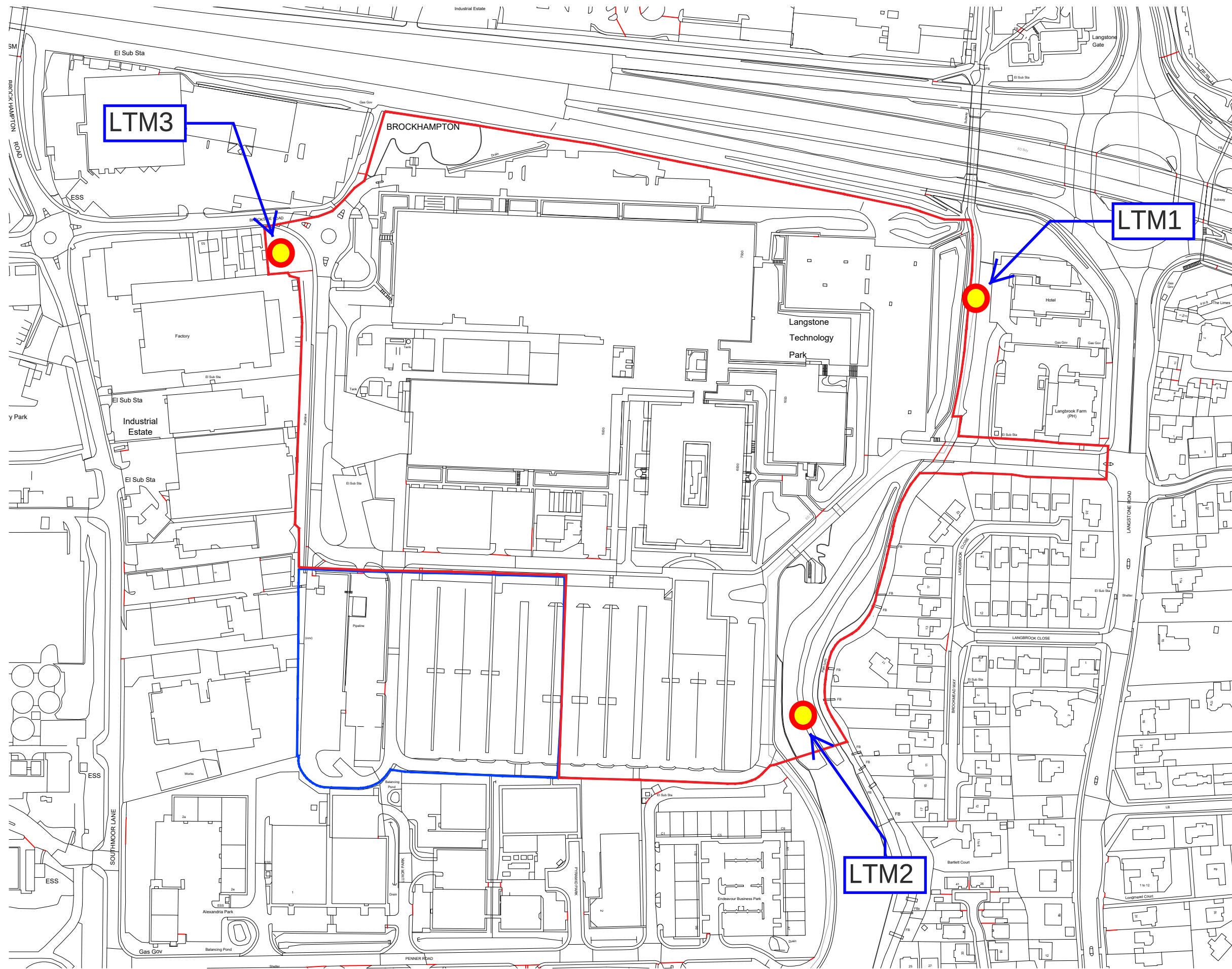
Nevertheless, the Local Planning Authority have the power to impose conditions to ensure that details of the development, when they come forward, meet the Council's standards for acceptability.

10. CONCLUSION

The noise from equipment and activity on the proposed industrial development at land Langstone Park, Havant has been assessed in accordance with BS4142. Predicted rating levels from intensive operation of the site would generally have a low impact and be at or below the LOAEL, although adverse impact could occur during the daytime. Straightforward noise control recommendations are discussed within this report which demonstrate that any such impacts would be mitigated to acceptable levels, in accordance with Havant Borough Council's guidelines. Considering a more usual profile of the activity and noise from this site, the potential noise impact from the proposed use is considered to be suitably low. Accordingly, allowing the proposed industrial use of the whole site without hours of operation restrictions would not give rise to a significant risk of disturbance to nearby residents.

APPENDIX A

Location plan showing noise monitoring locations



Offices
Woking
London
Milton Keynes
Warsaw

Architecture
Planning
Master Planning
Urban Design
Interiors
Landscape

12 Warren Yard,
Warren Park,
Milton Keynes,
MK12 5NW
01908 305 246

info@prc-group.com
www.prc-group.com

Revisions:

Drawn/Chkd: Date:

Figured dimensions only are to be used. All dimensions to be checked onsite. Differences between drawings and between drawings and specification or bills of quantities to be reported to the PRC Group. The copyright of the drawings and designs contained therein remains vested in the PRC Group

Client:
XLB PROPERTY &

Project:
HAVANT S.a.r.L (Luxembourg)

Drawing Title:
LANGSTONE TECHNOLOGY PARK
HAVANT

Scale @ A3:
1:2500

Checked by:
ME

Date:
NOV 21

Job No:
11392

Stage:
PL

Drawing No:
008

Rev:
*

Construction ☐ Preliminary ☐ Information ☐
Approval ☐ Tender ☐

PRC Architecture & Planning

PRC



A P P E N D I X B

Phasing and illustrative layout plan



Figured dimensions only are to be used. All dimensions to be checked onsite. Differences between drawings and between drawings and specification or bills of quantities to be reported to the PRC Group.

The copyright of the drawings and designs contained therein remains vested in the PRC Group.

Revisions: Drawn/Chkd: Date:

BUILDINGS TO HAVE FLEXIBLE USE CLASSES, E CLASS RESEARCH & DEVELOPMENT, LIGHT INDUSTRY, B2 & B8

CAR PARKING BASED ON A MAXIMUM OF 1 PER 45m² (HIGH TECH, R&D, LIGHT INDUSTRY) GENERALLY

UNIT 5 CAR PARKING PROVIDED AT 1 PER 90m² (B8).

BUILDINGS 9 & 10 CAR PARKING PROVIDED BETWEEN 1 PER 45m² & 1 PER 90m²

ACCESSIBLE CAR PARKING PROVIDED AT 5%, EVC PROVIDED 10% MINIMUM ACTIVE & 20% PASSIVE

UNIT 14 SINGLE STOREY AMENITY FACILITY AND OUTDOOR SEATING (3,000ft² GYM, 2,000ft² CAFE), PARKING PROVIDED AT 1 PER 14M² MAX

AMENITY HUB (CAFE / GYM)

FLEXIBLE USE EMPLOYMENT SPACE

ANCILLARY OFFICE SPACE

TREES

Client:
XLB PROPERTY &
HAVANT S.a.r.l. (Luxembourg)

Project:
LANGSTONE PARK
HAVANT

Drawing Title:
INDICATIVE MASTER PLAN

Scale @ A1: 1:1000
Checked by: ME
Date: SEPT 21

Job No: 11392
Stage: Drawing No: Rev: PL 005

Issue Status:
Construction ☐ Preliminary ☐
Information ☐ Approval ☐
Tender ☐

PRC Architecture & Planning



12 Warren Yard,
Warren Park,
Milton Keynes,
MK12 5HW
01908 305 246

info@prc-group.com
www.prc-group.com

Architecture
Planning
Master Planning
Urban Design
Interiors
Landscape

Offices
Woking
London
Milton Keynes
Warsaw

APPENDIX C

Environmental Noise Record Sheets of ambient noise observations



ENVIRONMENTAL NOISE RECORD SHEET

Sheet 1 of 1

MC10/21410

Location: Langstone Park, Havant

Date: 11.11.21 / 12.11.21

Project: 21410 – Langstone Park

Instrumentation: B&K 2250 x3

Calibration Times:

Plant Operating Condition: Ambient Noise

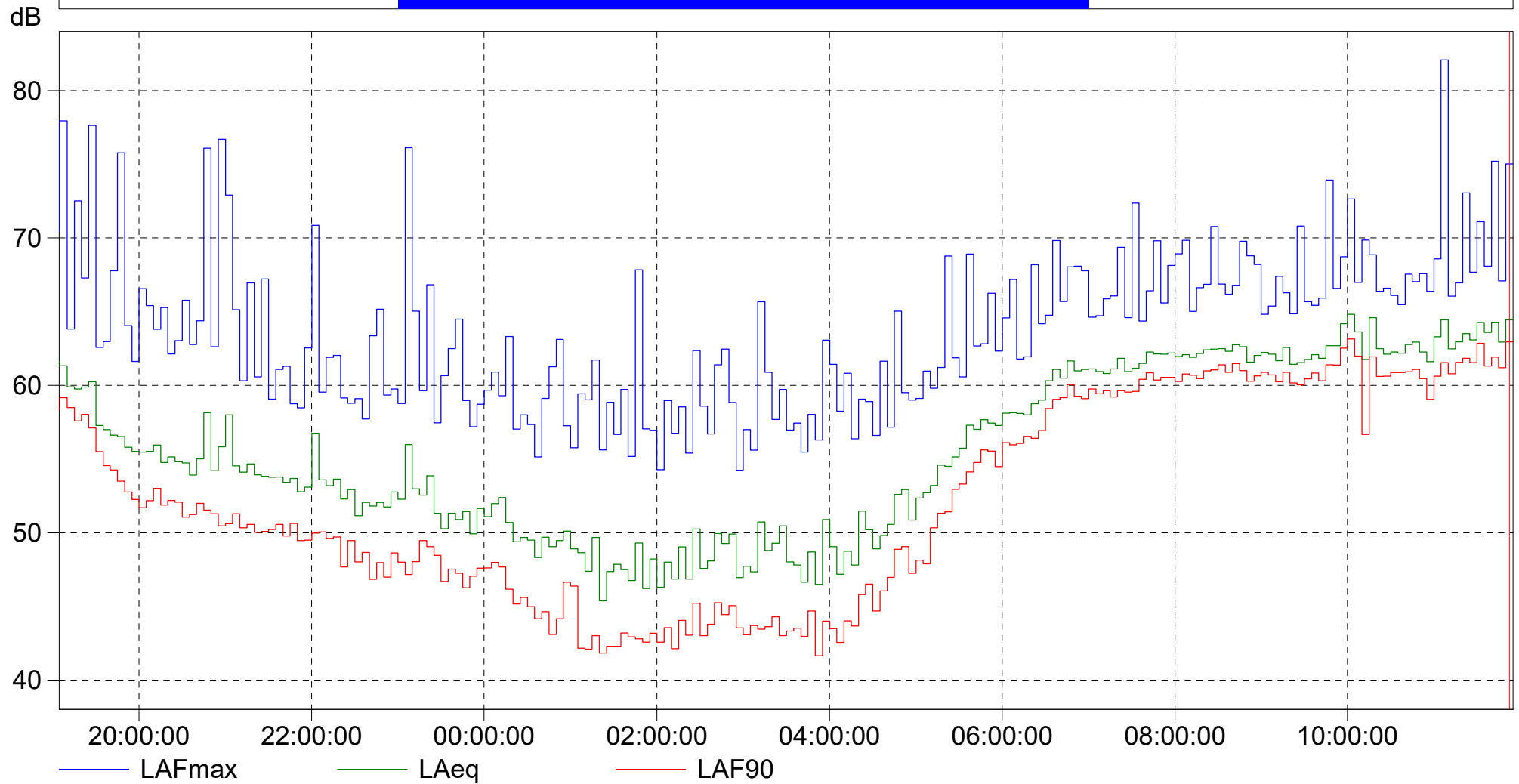
Position Number	Time		Weather			Noise Level dB(A)						Comments (Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise)).
	Start	Dur'n (Min)	Wind Speed m/s	Wind Dir'n	Cloud (%)	L10	L50	L90	LMAX	LMIN	LAeq	
3	19:40	15	0	-	70							Road noise dominant from A27, no plant noise, minimal passing traffic noise
2	20:00	15	0	-	40							Road noise dominant from Langstone road, no plant noise, zero passing traffic, foliage noise in slight breezes, road private access only.
1	20:21	15	2	S	20							Road noise dominant from A27, plant noise from back of Premier Inn, foliage noise in gusts of wind, position close to public footpath, pedestrian talking noise, close to car park
3	20:40	15	2	SW	30							Road noise dominant from A27, some passing vehicles, speaking to resident close to road, distant sirens, distant car spinning tyres
2	21:03	15	4	S	20							Langstone road still dominant, wind speed higher so more foliage noise.
1	21:19	15	3	S	10							A27 still dominant, no more plant noise from Premier Inn, higher foliage noise.
3	23:04	15	4	SW	20							Wind noise dominant, no passing vehicles, some road noise from A27
2	23:23	15	3	S	30							Some traffic noise on Langstone Road, wind still dominant, no passing vehicles.
1	23:42	15	4	S	20							A27 still dominant, wind noise in lull of traffic noise, some passing pedestrians talking.
3	06:17	15	3	SE	60							Traffic noise dominant from A27, wind noise in lull of road traffic, some passing traffic to technology park.
2	06:35	15	3	SE	80							Langstone road noise dominant, some passing road traffic to car park
1	06:53	15	5	S	90							A27 road noise dominant, started raining heavily towards end of survey.
3	10:05	15	2	E	50							A27 Road noise dominant, some passing traffic near measurement site, no plant noise
2	10:24	15	3	SE	40							Langstone road noise dominant, some passing road traffic to car park, foliage noise in traffic lulls
1	10:41	15	3	SE	30							Road noise dominant from A27, plant noise from back of Premier Inn, foliage noise in gusts of wind
3	10:59	15	2	S	30							A27 Road noise dominant, some passing traffic near measurement site, no plant noise
2	11:18	15	2	S	30							Langstone road noise dominant, some passing road traffic to car park, foliage noise in traffic lulls
1	11:36	15	3	S	20							Road noise dominant from A27, plant noise from back of Premier Inn, foliage noise in gusts of wind

APPENDIX D

Charts showing measured noise levels

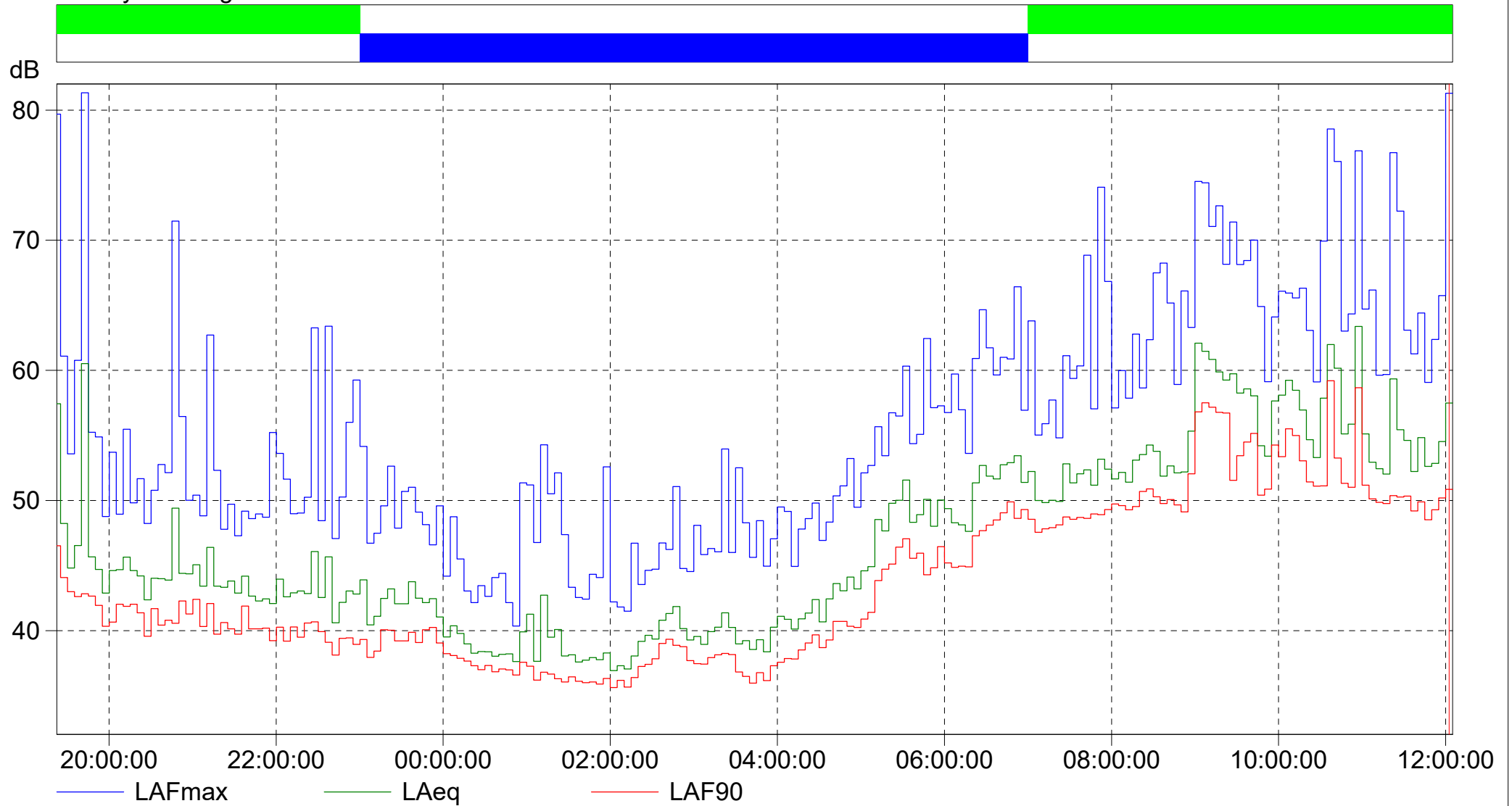
LTM1 Results

Day Night



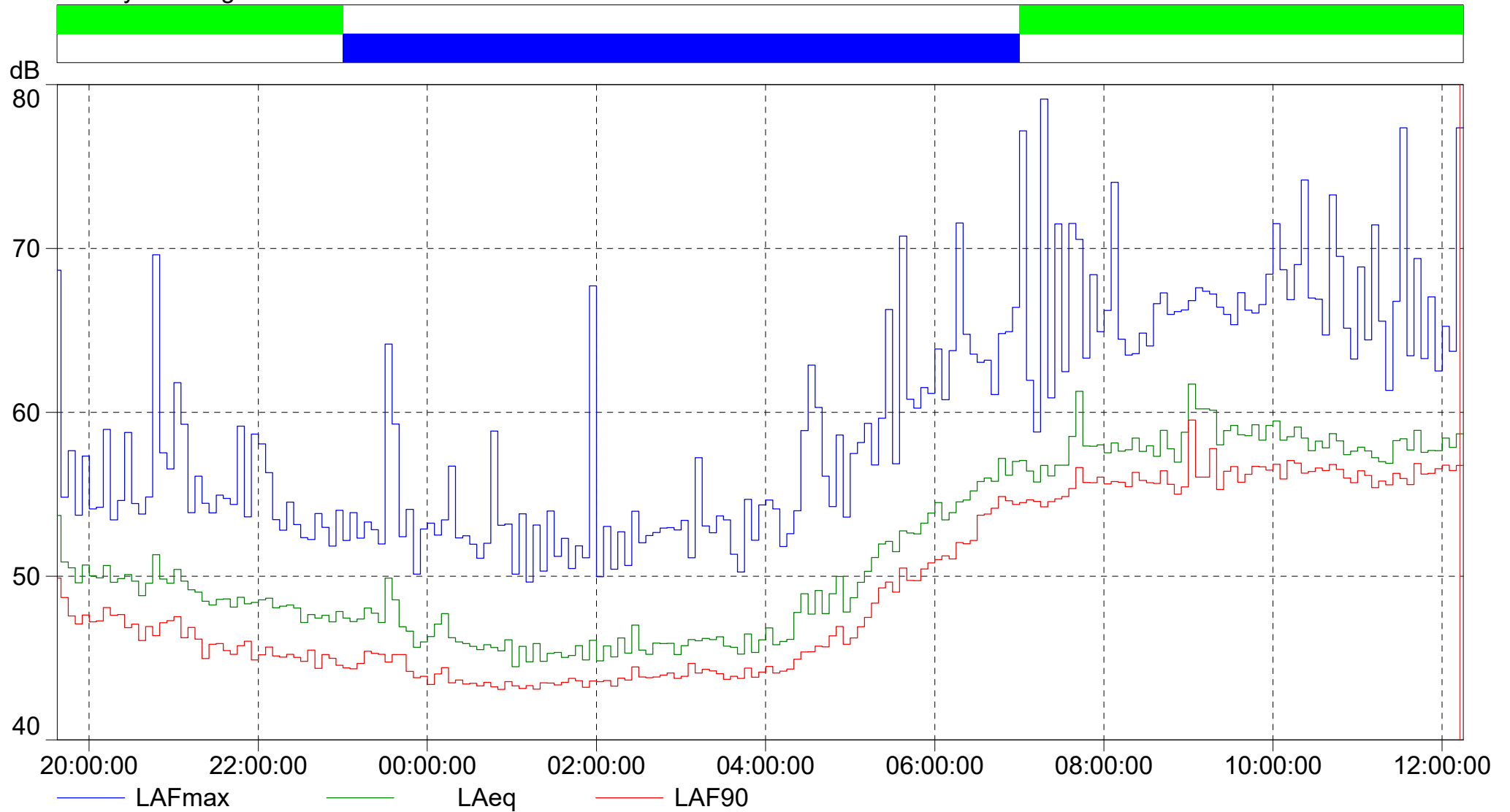
LTM2 Results

Day Night



LTM3 Results

Day Night





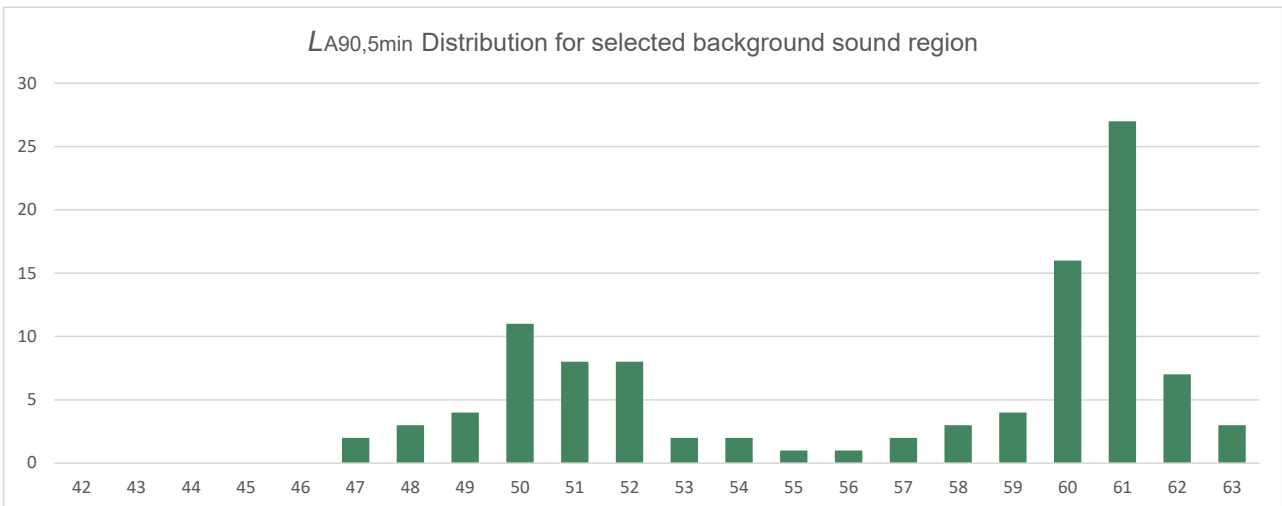
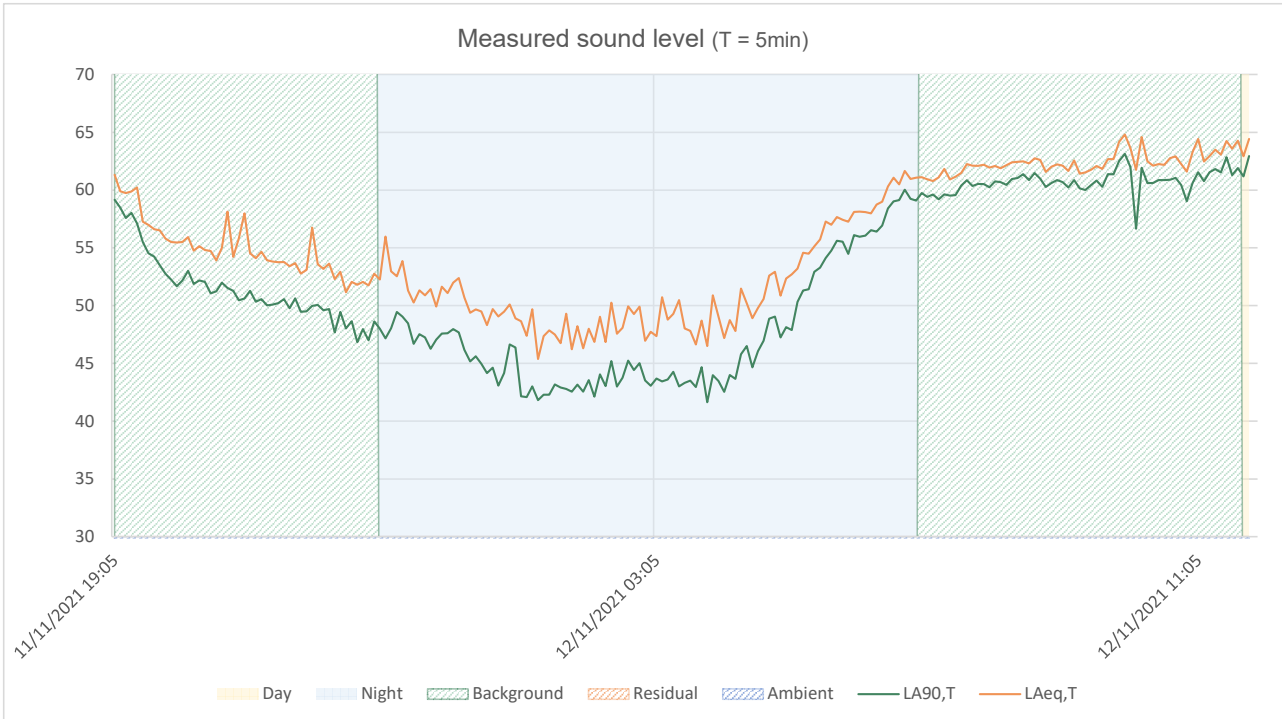
APPENDIX E

Histograms of measured $L_{A90,T}$ levels

Measured Sound Data Analysis



Project	Langstone Technology Park
Project number	21410
Date	25/11/2021
Monitoring location	LTM1
Analysis	Background - Day



Background sound level analysis

Range: 47 - 63 Mean: 57 Mode(s): 61 Median: 60 Std. Dev.: 5.1

Residual sound level

LAeq

Ambient sound level

LAeq

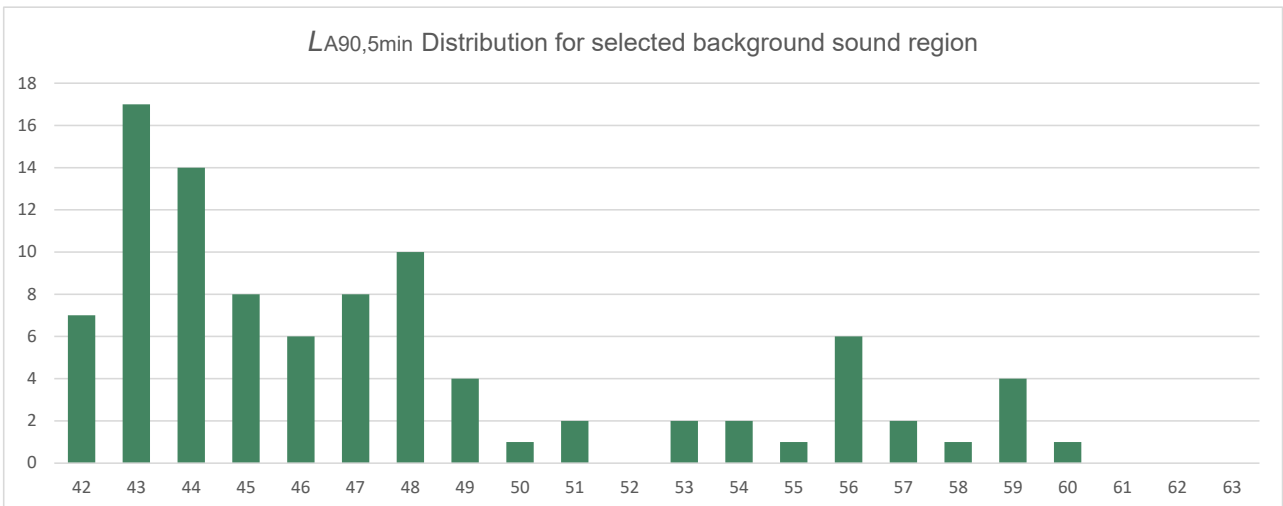
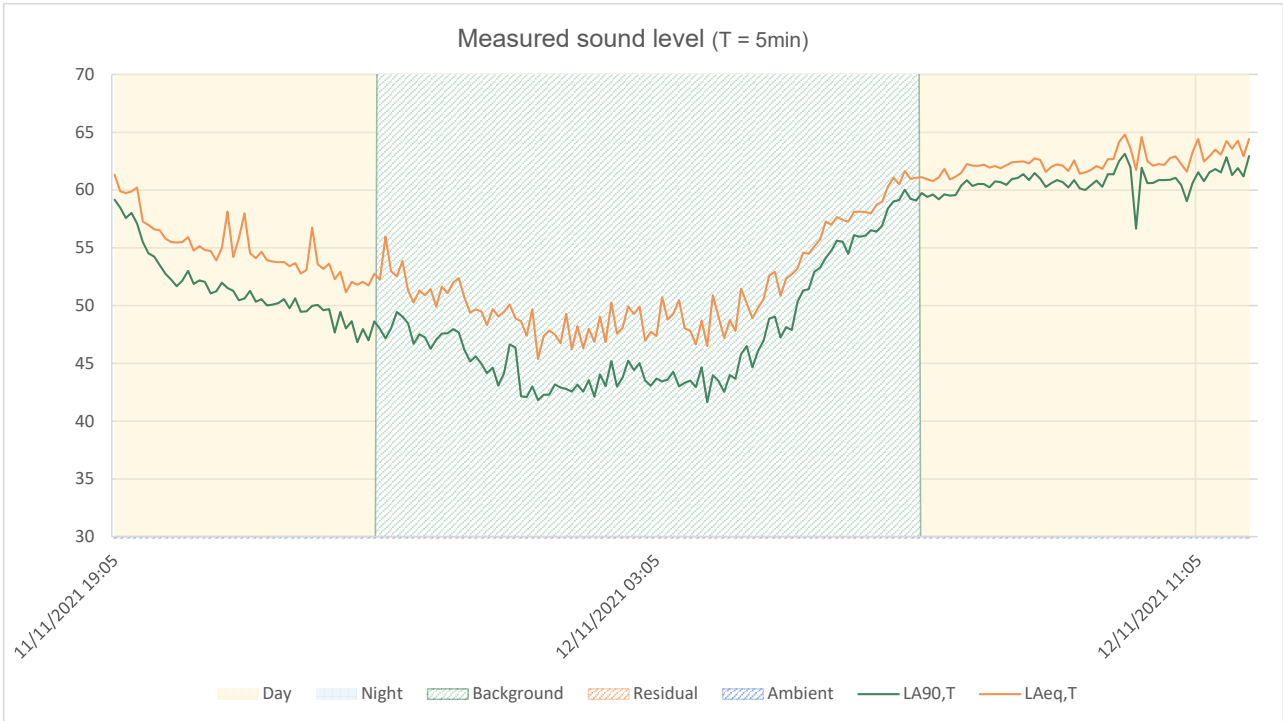
Specific sound level

LAeq -

Measured Sound Data Analysis



Project	Langstone Technology Park
Project number	21410
Date	25/11/2021
Monitoring location	LTM1
Analysis	Background - Night



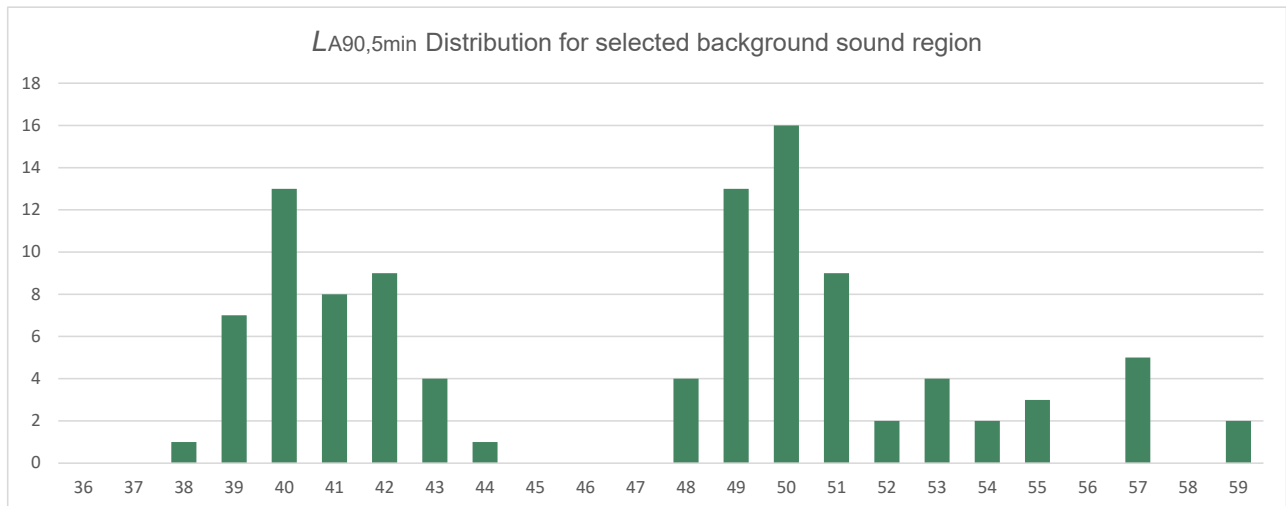
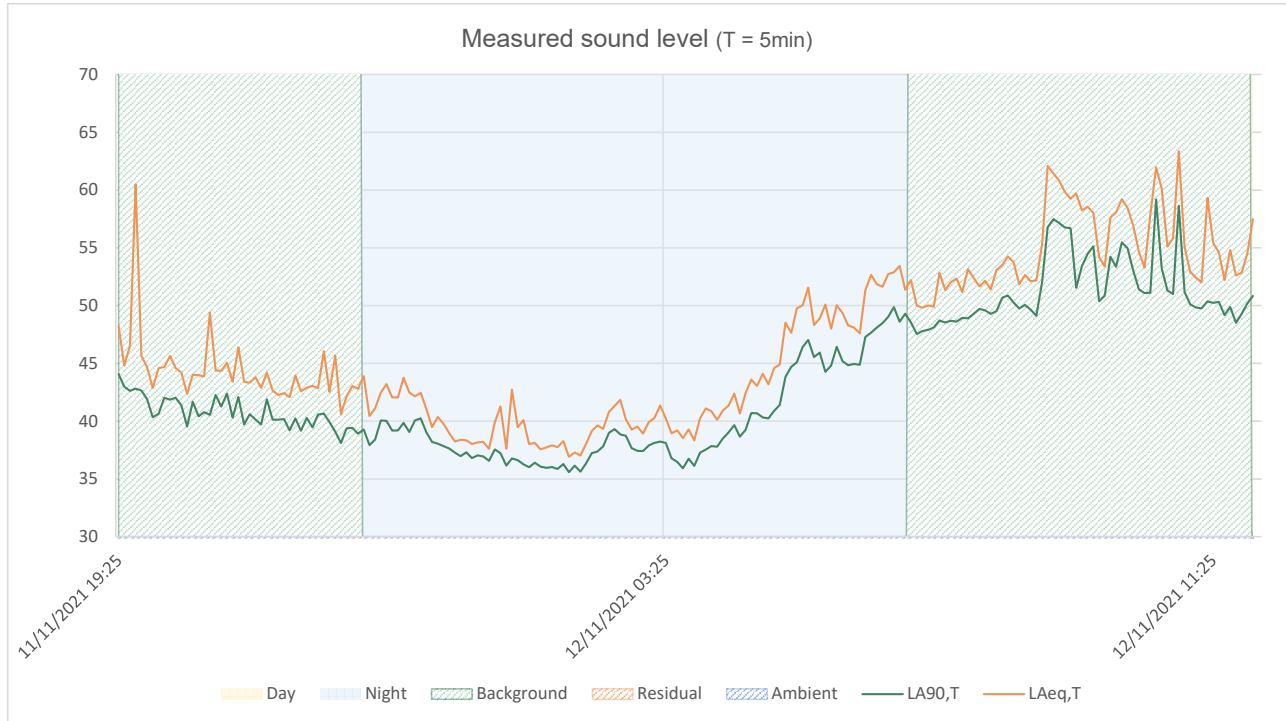
Background sound level analysis				
Range: 42 - 60	Mean: 47	Mode(s): 43	Median: 46	Std. Dev.: 5.1
Residual sound level			Ambient sound level	
LAeq			LAeq	
			Specific sound level	
			LAeq -	

Measured Sound Data Analysis

Project Langstone Technology Park
Project number 21410
Date 25/11/2021



Monitoring location LTM2
Analysis Background - Day



Background sound level analysis

Range: 38 - 59 Mean: 47 Mode(s): 50 Median: 49 Std. Dev.: 5.7

Residual sound level

LAeq

Ambient sound level

LAeq

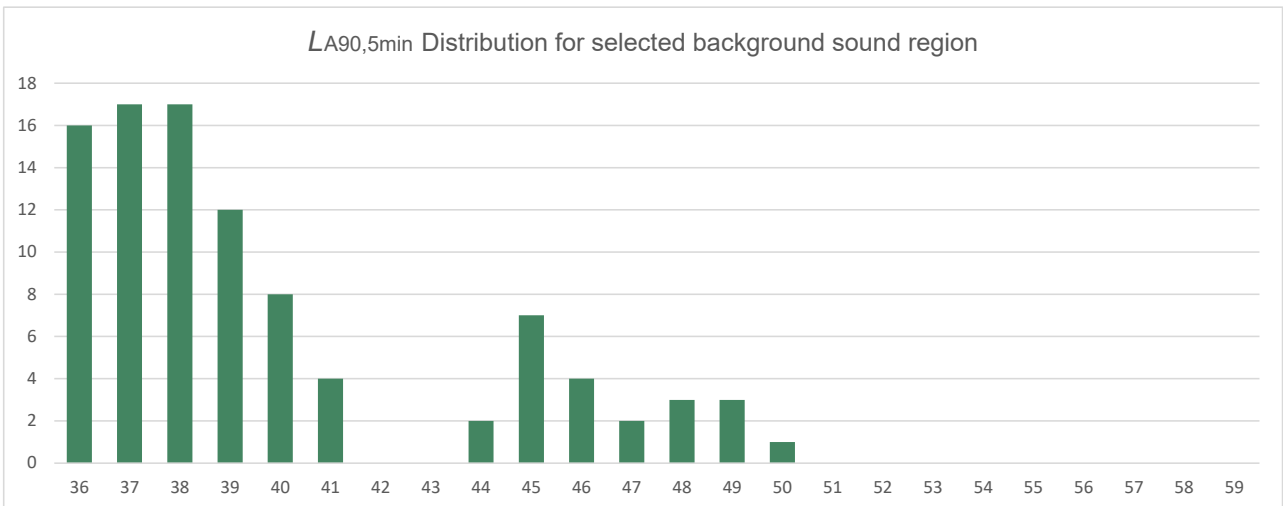
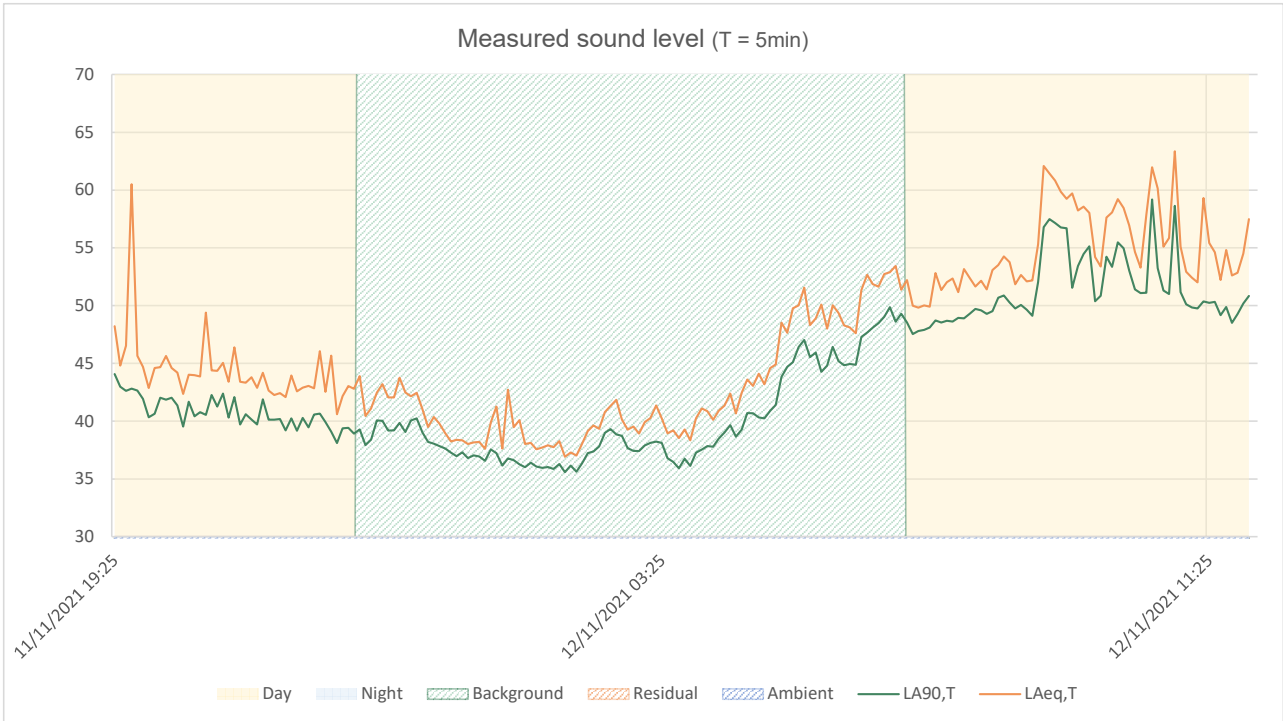
Specific sound level

LAeq -

Measured Sound Data Analysis



Project	Langstone Technology Park
Project number	21410
Date	25/11/2021
Monitoring location	LTM2
Analysis	Background - Night



Background sound level analysis

Range: 36 - 50	Mean: 40	Mode(s): 38 37	Median: 38	Std. Dev.: 3.9
----------------	----------	-------------------	------------	----------------

Residual sound level

LAeq

Ambient sound level

LAeq

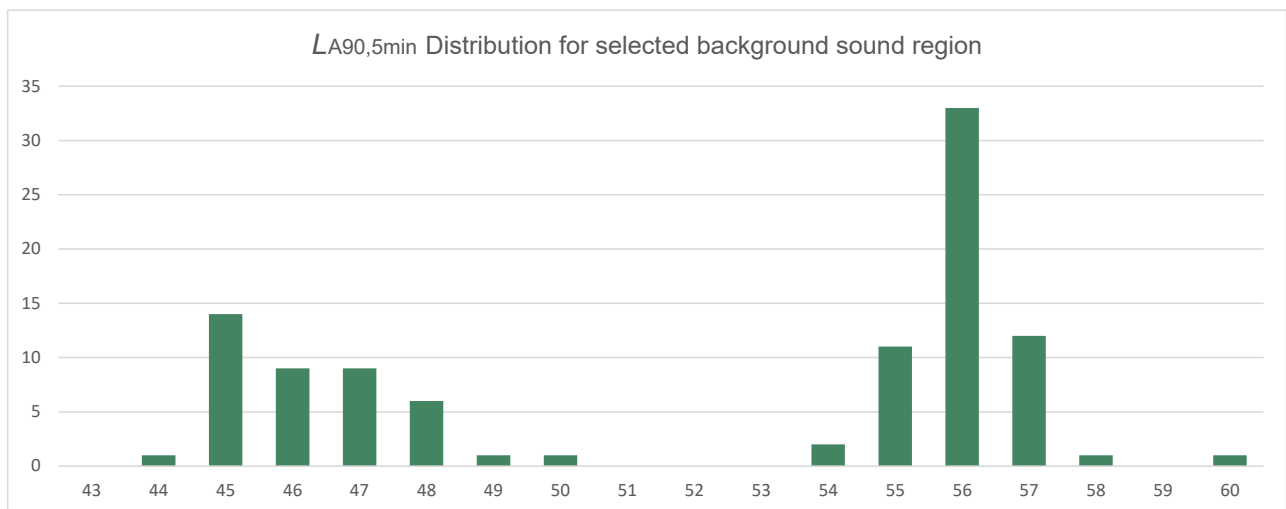
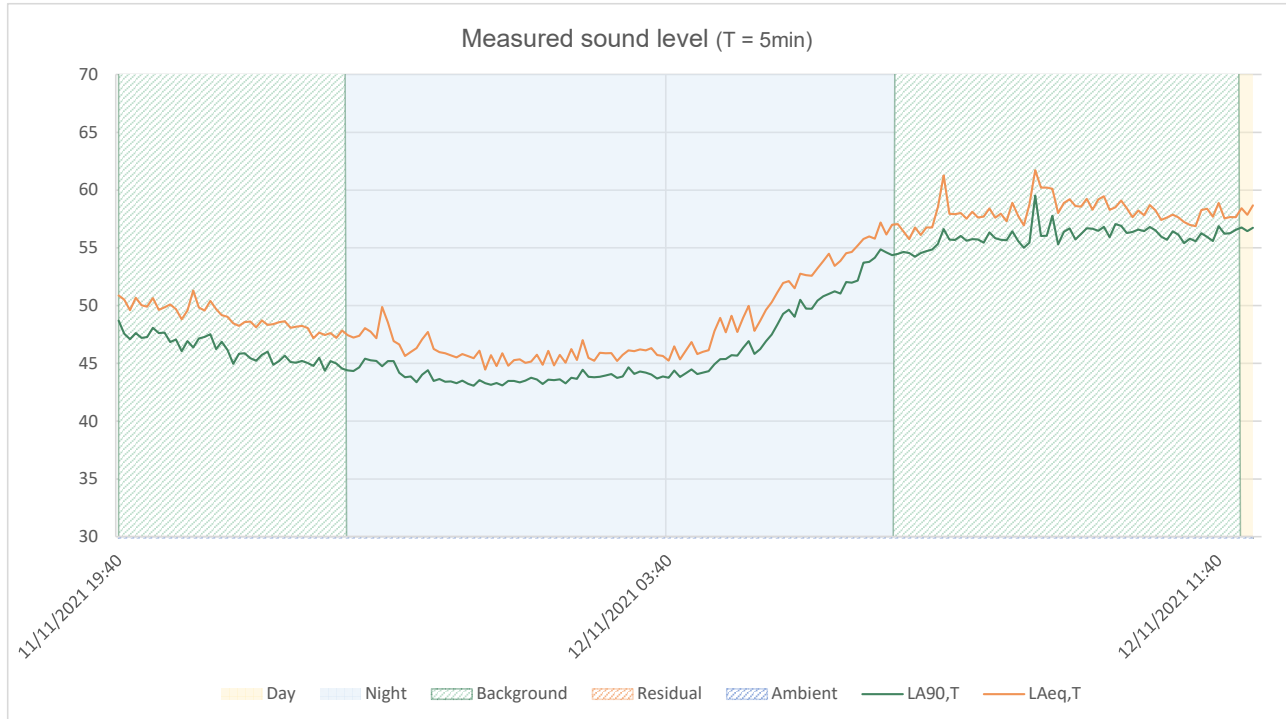
Specific sound level

LAeq -

Measured Sound Data Analysis



Project	Langstone Technology Park
Project number	21410
Date	25/11/2021
Monitoring location	LTM3
Analysis	Background - Day



Background sound level analysis

Range: 44 - 60 Mean: 52 Mode(s): 56 Median: 55 Std. Dev.: 4.9

Residual sound level

LAeq

Ambient sound level

LAeq

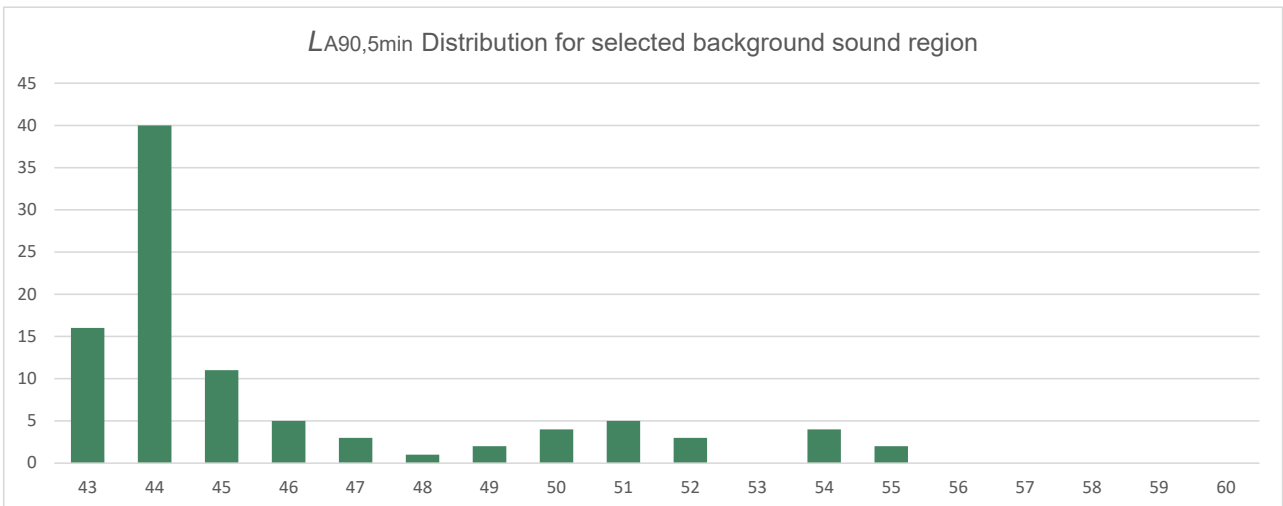
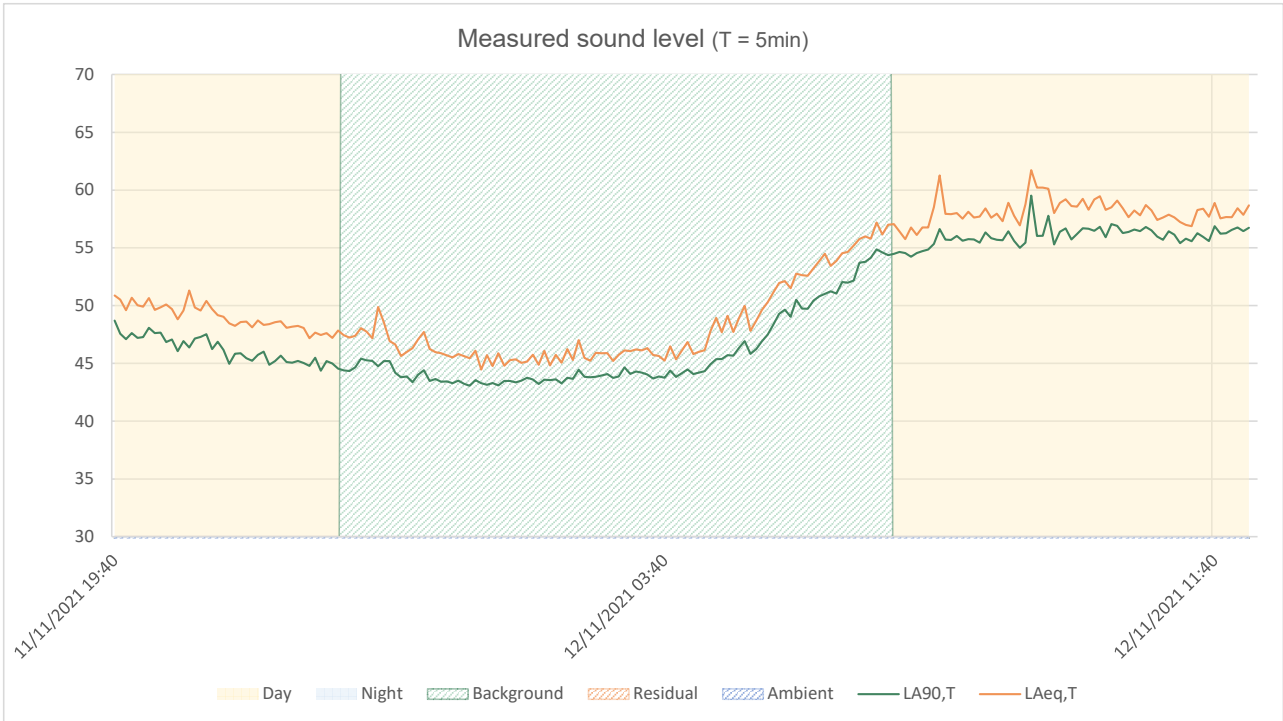
Specific sound level

LAeq -

Measured Sound Data Analysis



Project	Langstone Technology Park
Project number	21410
Date	25/11/2021
Monitoring location	LTM3
Analysis	Background - Night



Background sound level analysis

Range: 43 - 55 Mean: 46 Mode(s): 44 Median: 44 Std. Dev.: 3.3

Residual sound level

LAeq

Ambient sound level

LAeq

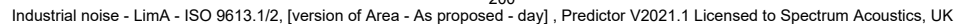
Specific sound level

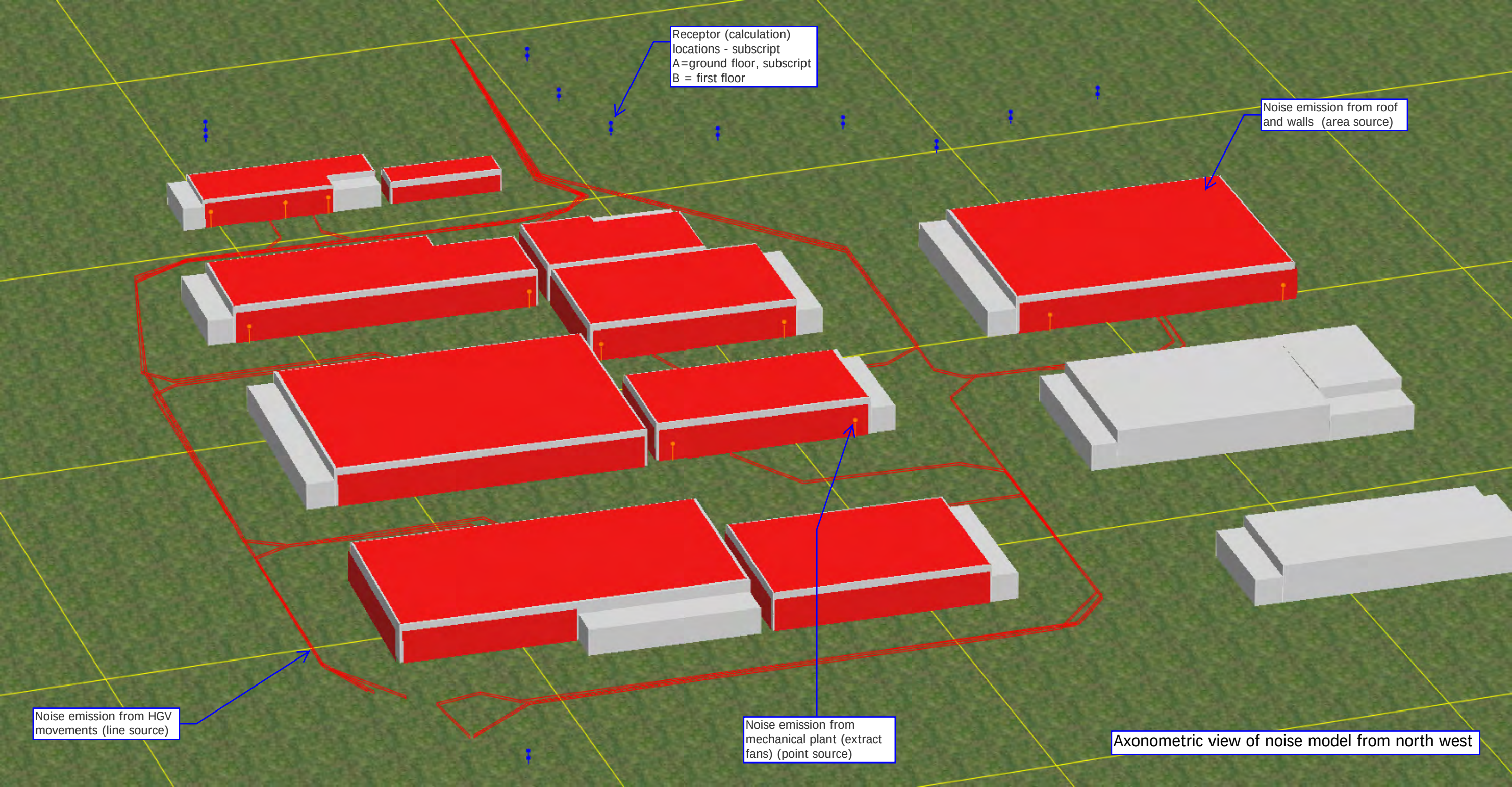
LAeq -



APPENDIX F

Figures demonstrating the Predictor noise model





Receptor (calculation)
locations - subscript
A=ground floor, subscript
B = first floor

Noise emission from roof
and walls (area source)

Noise emission from HGV
movements (line source)

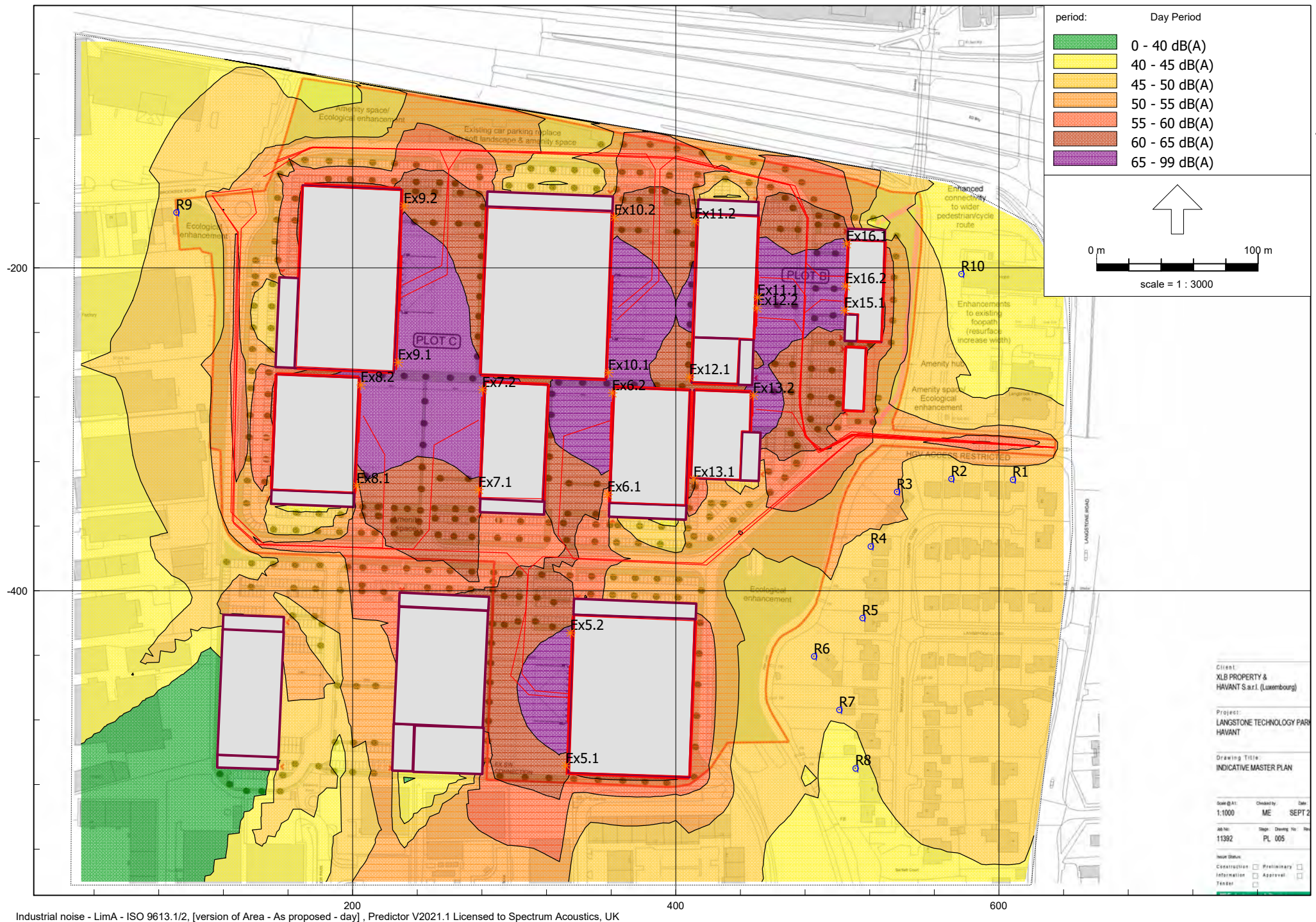
Noise emission from
mechanical plant (extract
fans) (point source)

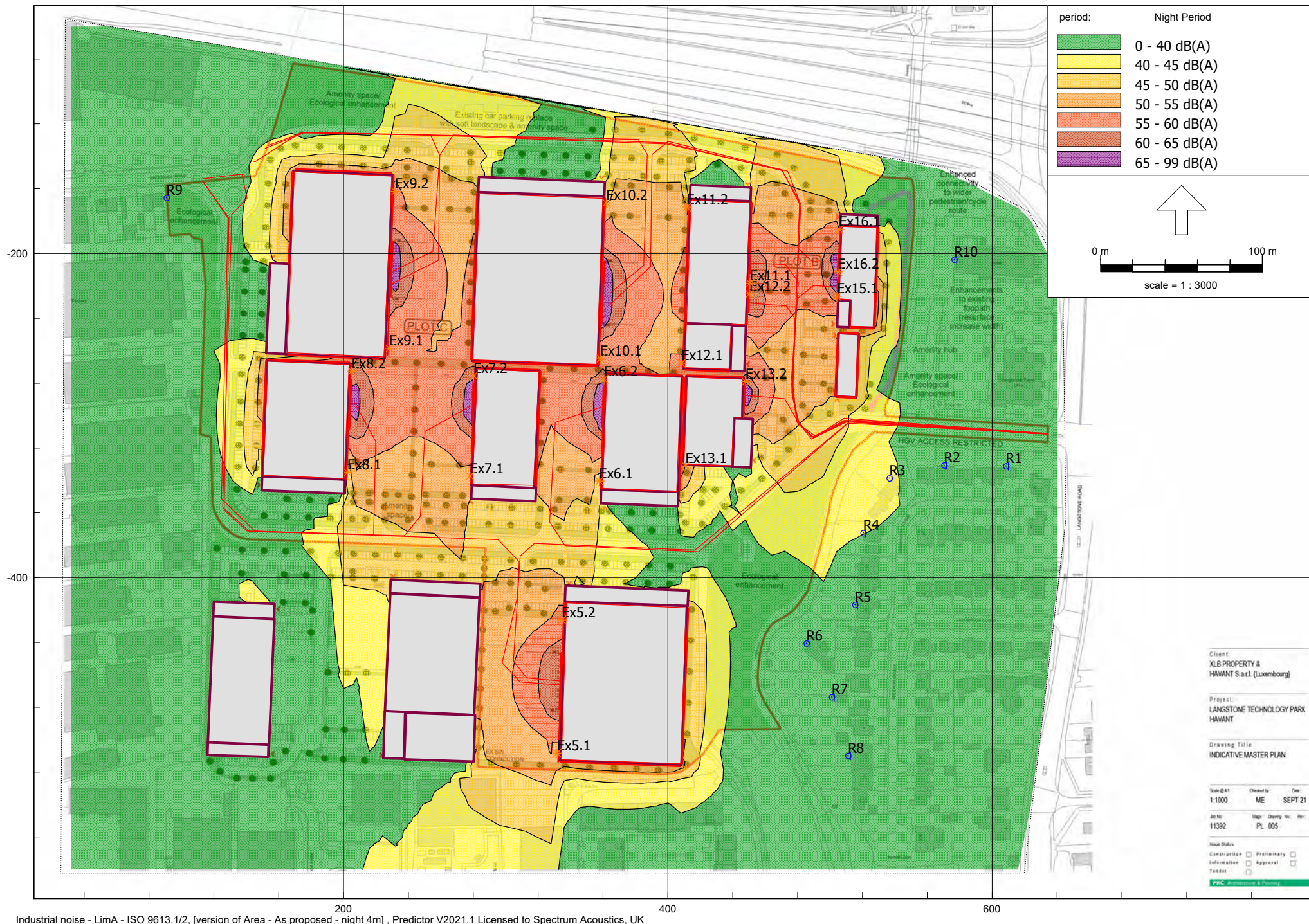
Axonometric view of noise model from north west



A P P E N D I X G

Noise contour diagrams of daytime and night-time noise from intensive activities





A P P E N D I X H

Predicted noise levels tables for daytime and night-time intensive activities

Report: Table of Results
Model: As proposed - day
LAeq: total results for receivers
Group: (main group)
Group Reduction: No

Name Receiver	Height	Day
R1_A	2.00	48.3
R1_B	4.50	48.2
R10_A	2.00	43.8
R10_B	4.50	44.7
R10_C	7.50	45.7
R2_A	2.00	48.7
R2_B	4.50	49.2
R3_A	2.00	50.8
R3_B	4.50	51.7
R4_A	2.00	50.0
R4_B	4.50	50.8
R5_A	2.00	47.9
R5_B	4.50	48.6
R6_A	2.00	47.6
R6_B	4.50	48.4
R7_A	2.00	45.9
R7_B	4.50	46.6
R8_A	2.00	43.8
R8_B	4.50	44.6
R9_A	2.00	46.0
R9_B	4.50	46.3

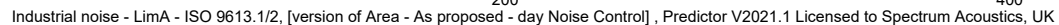
Report: Table of Results
Model: As proposed - night 4m
LAeq: total results for receivers
Group: (main group)
Group Reduction: No

Name Receiver	Height	Night
R1_A	2.00	35.2
R1_B	4.50	35.2
R10_A	2.00	32.8
R10_B	4.50	33.6
R10_C	7.50	34.6
R2_A	2.00	36.4
R2_B	4.50	37.1
R3_A	2.00	40.0
R3_B	4.50	40.8
R4_A	2.00	39.4
R4_B	4.50	40.1
R5_A	2.00	37.2
R5_B	4.50	37.9
R6_A	2.00	36.9
R6_B	4.50	37.6
R7_A	2.00	35.1
R7_B	4.50	35.7
R8_A	2.00	32.9
R8_B	4.50	33.6
R9_A	2.00	34.0
R9_B	4.50	34.4



A P P E N D I X I

Noise contour diagrams of daytime with sensible noise control measures



Head Office

Spectrum Acoustic Consultants Ltd
27-29 High Street
Biggleswade
Bedfordshire
SG18 0JE
UNITED KINGDOM

 +44 (0)1767 318871

 enquiries@spectrumacoustic.com

 www.spectrumacoustic.com