Lincs Gateway Business Park, Spalding

Proposed Mixed-Use Development
Planning Noise Impact Assessment

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Issued to
Ashley King Developments

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1. INTRODUCTION

Ashley King Developments are seeking planning permission to construct a mixed-use development at Lincs Gateway in Spalding. The proposals involve constructing 24 industrial units and 4 office buildings.

Outline planning permission (ref. H16-0009-14) has been granted for the development, subject to conditions. Two of the outline planning conditions relate to noise. However, it is understood that this permission has now expired, and a full planning application is being submitted for the proposals.

Spectrum Acoustic Consultants have been appointed by Ashley King Developments to carry out a noise assessment for the purpose of establishing the potential noise impact associated with the proposed industrial units and office buildings. This report is submitted with the intention to provide sufficient information to inform and satisfy the requirements of the Local Planning Authority, for the purpose of determining the application.

2. SITE DESCRIPTION

The proposals involve constructing a mixed-use development comprising 24 industrial units and 4 office building at Lincs Gateway Business Park in Spalding. The site is currently agricultural land off B1173 in Spalding.

The site is bounded to the west by B1173, to the north by existing residential properties on Fend End Lane, and to the east and south by agricultural land. The A16 passes approximately 300m to the south east of the site. A satellite imagery showing the site location and the nearest noise sensitive receptors is included in Appendix A.

Ashley King Developments are proposing to market the proposed industrial units for use under Class E(g)(iii) and the proposed office buildings for use under Class E(g)(i). It is understood that the opening hours of all the proposed units would be 08:00 to 18:00.

The proposals include a bund next to the existing residential properties on Fen End Lane. The bund will run along the entire western boundary and extend slightly along the northern boundary of the proposed development. It will have a minimum height of 4m along the northern section, increasing to 6m along the western boundary.

The proposed site layout plan, as well as the proposed floor plans and elevation drawings of each building are included in Appendix B.

Ashley King Developments are to provide the buildings as ‘shell-only’, hence a detailed assessment of noise from fixed mechanical plant is excluded from this assessment report. Accordingly, noise limits for mechanical plant are established in this report (see Section 5) and it will be the responsibility of the future tenants to demonstrate compliance with these limits. However, to demonstrate the acceptability of the proposals in principle, an assessment of noise from a typical arrangement of mechanical plant and typical activity at the proposed units is included in Section 6 of this report.

3. RELEVANT GUIDANCE AND POLICY

3.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The National Planning Policy Framework (NPPF)[1] sets out the Government's planning policies for England and how these should be applied by establishing a framework within which locally prepared plans for development can be produced.

The NPPF requires (174) prevention of new or existing development from contributing to, or being adversely affected by, unacceptable levels of noise pollution.

New development (185) should be appropriate to its location taking into account the likely effects of pollution on health, living conditions and the natural environment. In doing so it is required to:

> *'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[2];*
>
> *'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'*

Planning policies and decisions should also (187) *'ensure that new development can be integrated effectively with existing businesses and community facilities* […]. *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.'*

3.2 NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

The Noise Policy Statement for England (NPSE)[3] sets out the long term vision of government noise policy which is to *'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 aims of the NPSE are to (2.23-2.25):

- 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

These aims are developed by reference (2.20-2.21) to the concepts of:

- NOEL (No Observed Effect Level). This is the level below which no effect can be detected.
- LOAEL (Lowest Observed Adverse Effect Level). This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL (Significant Observed Adverse Effect Level). This is the level above which significant adverse effects on health and quality of life occur.

[1] *National Planning Policy Framework, MHCLG, July 2021*

[2] *See Explanatory Note to the Noise Policy Statement for England, paragraphs 2.23 and 2.24 , Department for Environment, Food & Rural Affairs,15 March 2010).*

[3] *Noise Policy Statement for England (NPSE), DEFRA, 15 March 2010*

It recognises that there is no universally applicable objective threshold for these concepts. Consequently, the NOEL, LOAEL and SOAEL are likely to be different for different noise sources and receptors and at different times (2.22).

Situations of significant adverse effect (SOAEL) should be avoided (2.23). Where the impact is between LOAEL and SOAEL reasonable steps should be taken to minimise and mitigate adverse effects on health and quality of life, but does not mean that such adverse effects cannot occur (2.24). It is also implied that situations of NOEL would be acceptable in noise terms.

3.3 PLANNING PRACTICE GUIDANCE – NOISE (PPG)

Planning Practice Guidance on Noise[4] (PPG-N) sets out government guidance on '*how planning can manage potential noise impacts in new development'*.

Whilst it does advise that noise can override other planning concerns, *'where justified'*, it states that *'it is important to look at noise in the context of the wider characteristics of a development proposal, its likely users and its surroundings, as these can have an important effect on whether noise is likely to pose a concern.' (002)*

It also details the hierarchy of noise exposure, including the thresholds LOAEL and SOAEL, based on the likely average response, referred to within NPSE[5]. The noise exposure categories are summarised below.

- No Observed Adverse Effect: Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response.
- Observed Adverse Effect: Noise can be heard and causes small changes in behaviour, attitude or other physiological response.
- Significant Observed Adverse Effect: The noise causes a material change in behaviour, attitude or other physiological response.
- Unacceptable Adverse Effect: Extensive and regular changes in behaviour, attitude or other physiological response, and/or an inability to mitigate effect of noise leading to psychological stress.

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 is significant adverse effects, the planning process should be used to avoid these effects occurring; where there are unacceptable adverse effects, the situation should be prevented.
In establishing values for LOAELs and SOAELs, which represent the onset levels of adverse effects and significant adverse effects, respectively, the guidance advises because of the subjective nature of noise, there is no simple relationship between noise level and its impact. It will instead depend on a number of factors in a particular situation. These will include:

- 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

[4] *PPG - Noise, MHCLG, 22 July 2019*
[5] *Explanatory Note to the Noise Policy Statement for England, paragraphs 2.19 and 2.20, DEFRA,15 March 2010*

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

- The cumulative impacts with other sources
- Whether internal effects can be completely removed for example by closing windows (relevant with new residential development subject to ventilation being developed)
- Whether existing noise sensitive locations already experience high noise levels,
- Where Noise Action Plans, and, in particular Important Areas are identified nearby.
- The effect on wildlife especially on nationally designated sites.
- The use of external amenity spaces intrinsic to an overall design and including private gardens.
- The potential effect of a new residential or other sensitive development being located close to an existing noisy business or site, and for noise mitigation to be considered.
- Whether there are nearby areas of tranquility relatively undisturbed by noise from human caused sources that undermine the intrinsic character of the area and likely already valued for their tranquility.

It should be observed that the PPG guidance does not provide any detail on the how such assessment including these factors, should be carried out. However, reference is made to documents published by other organisations, such as:

- *BS 8233:2014– Guidance on sound insulation and noise reduction for buildings (British Standards Institute 2014);*
- *Guidelines for Environmental Noise Impact Assessment (Institute of Environmental Management and Assessment, 2014);*
- *ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise- New Residential Development (Association of Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health, May 2017).*

This should not be considered an exhaustive list, however, as reference may also be made to other existing British Standards, where relevant, and to scientific exposure-response studies or reviews relating to noise and its effects on human and, where appropriate, animal populations.

3.4 BS 4142:2014 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND

The principle of BS 4142[6] is to determine an initial estimate of impact of industrial/commercial sound on nearby residents by comparing the Rating Level (sound level from the industrial/commercial source, with a correction applied for any acoustic features that characterise the sound) with the Background Sound Level (L_{A90} as measured in absence of the industrial/commercial source).

Generally, the greater the difference by which the Rating Level exceeds the Background Sound Level, the greater the magnitude of impact. BS 4142 states that *'a difference of around +10 dB or more is likely to be an indication of a significant adverse impact […]. A difference of around +5 dB is likely to be an indication of an 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.'*

[6] *BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound*

However, BS 4142 also advises that ' *when making assessments and arriving at decisions […] it is essential to place the sound in context'* so in each case, the context in which the sound is placed must be considered and the initial estimate of impact should be modified accordingly. For example it advises '*Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night*.' It also indicates that impacts estimated during '*the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes*.'

3.5 OUTLINE PLANNING CONDITIONS

Although the outline planning permission (ref. H16-0009-14) for the site has now expired, conditions 15 and 16 of the permission relate to noise from activities and fixed external mechanical plant and read as follows:

Condition 15: *As part of any reserved matters application for a building for use within Class B2 or B8 details of the exact use shall be provided and an acoustic survey shall be carried out in accordance with BS4142 (as amended) together with details of any necessary mitigation measures and sound insulation of the building and a report shall be submitted to the local planning authority assessing the impact of noise upon existing dwellings abutting the employment site and fronting Fen End Lane. Noise from the use of the buildings shall not exceed the pre-construction background noise levels, when measured at any residential boundary not within the applicants' control, by more than 5 dB(A) when measured as a 15 minute LAeq. Any such measures shall be approved in writing and all works shall be carried out in accordance with the approved scheme(s) and shall be undertaken prior to the use commencing and the mitigation measures shall thereafter be retained.*

Reason: *To safeguard the amenities of nearby residents. This Condition is imposed in accordance with Policy SG17 of the South Holland Local Plan 2006."*

Condition 16: *Noise from fixed plant and machinery shall not exceed the background noise level by more than 5 dB(A) when measured as a 15 minute LAeq at any residential boundary not within the applicants' control.*

Reason: *To safeguard the amenities of nearby residents. This Condition is imposed in accordance with Policy SG17 of the South Holland Local Plan 2006.*

4. NOISE MEASUREMENT SURVEY

Spectrum have carried out a background noise survey and noise impact assessment to support a previous application at this development. The survey was carried out in December 2018 and is considered representative of the existing acoustic environment. Therefore, the results of this survey are utilised in this noise impact assessment.

4.1 SURVEY DETAILS AND INSTRUMENTATION

Existing ambient and background noise levels were measured continuously at two fixed locations between Wednesday 12 and Thursday 13 December 2018. Attended noise measurements were carried out during the same period at three locations. Weather conditions during the survey were generally mild and dry, with low wind speeds.

The nearest existing noise sensitive receptors (NSRs) are:

NSR 1 – 59 Fen End Lane
NSR 2 – 68 Fen End Lane

The noise monitoring locations (NMLs) are shown on the site location plan included in Appendix A and are detailed below:

NML 1 – Rear (east boundary) of 59 Fen End Lane (representative of noise levels at NSR 1)
NML 2 – Approximately 60m south from 59 Fen End Lane
NML 3 – South boundary of 68 Fen End Lane (representative of noise levels at NSR 2)
NML 4 – Logger to the north-west of the site, approximately 40m from the B1173
NML 5 – Logger to the south-west of the site, approximately 40m from the B1173

The following instrumentation was used during the noise measurement survey:

- Bruel & Kjaer Type 2250 Sound Level Meter s/n 3024396
- Bruel & Kjaer Type 4189 Microphone s/n 3147701
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 3021281

- Bruel & Kjaer Type 2260 Sound Level Meter s/n 2027587
- Bruel & Kjaer Type 4189 Microphone s/n 2906873
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 2229825
- Bruel & Kjaer Type ZC 0026 Preamplifier s/n 4130

- Bruel & Kjaer Type 2250 Light Sound Level Meter s/n 3006950
- Bruel & Kjaer Type 4952 Microphone s/n 2922623

- Bruel & Kjaer Type 2238 Sound Level Meter s/n 2562694
- Bruel & Kjaer Type 4188 Microphone s/n 2682521
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 2594792

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.

Measurements made were of the following parameters:

- Ambient Noise Level – defined as the Energy Average Level of a period, in the absence of noise from the proposed development ($L_{Aeq,T}$).
- Background Noise Level - defined as level exceeded for 90% of a period, in the absence of the noise from the proposed development ($L_{A90,T}$).
- Maximum Noise Level – defined as the maximum (L_{AFmax} the maximum noise level).

4.2 RESULTS

Charts showing the results of the long-term noise survey are included in Appendix C. A full listing of the attended measurements, together with a description of the acoustic environment is also included in Appendix C. The measured levels at each noise monitoring location (NML) are summarised into representative Background Sound Levels, Ambient Sound Levels and typical L_{Amax} levels, which are shown in Table 1 below.

The values shown in the third column of Table 1 are the typical representative 5-minute background sound levels, based on statistical and subjective analysis of measured data in each time period. The representative L_{A90} levels have been determined by taking the modal values of the measured $L_{A90,5min}$ (daytime and night time) levels during the measurement period. These values are considered representative of the existing noise environment during a typical day and night.

The representative ambient sound levels $L_{Aeq,T}$ are determined by taking the log average of the available samples during the daytime and night-time periods.

Position	Time period	Representative Background Sound Level L_{A90} (dB)	Ambient Sound Level L_{Aeq} (dB)
NML 1 – Rear (east boundary) of Fen End Lane (NSR 1)	07:00 – 23:00 23:00 – 07:00	51 43	55 50
NML 2 – Approximately 60m south from 59 Fen End Lane	07:00 – 23:00 23:00 – 07:00	51 44	55 49
NML 3 – South boundary of 68 Fen End Lane (NSR 2)	07:00 – 23:00 23:00 – 07:00	51 43	56 49
NML 4 – Logger to the north-west of the site, approx. 40m from B1173	07:00 – 23:00 23:00 – 07:00	56 44	62 55
NML 5 – Logger to the south-west of the site, approx. 40m from B1173	07:00 – 23:00 23:00 – 07:00	55 45	65 58

Table 1: Summary of measured noise levels

Existing noise levels across the site are controlled by road traffic movements on the B1173, A16 and A1175 during both the daytime and night-time periods. Occasional planes are also audible during the daytime period and early night-time period.

5. NOISE FROM FIXED MECHANICAL PLANT AND VENTILATION EQUIPMENT

As detailed above, it is not possible to provide a detailed assessment of noise from fixed mechanical plant in this report as the development buildings would be delivered as 'shell only' so no details are available. Consequently, noise limits have been set for noise from fixed mechanical plant, and it will be the responsibility of the tenants/owners to ensure that any equipment installed complies with these limits.

The limits provided here are expressed in terms of Rating Level $L_{Ar,Tr}$ (dB), as determined in accordance with BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound.* Compliance with the limits must therefore be demonstrated with an assessment in accordance with BS 4142.

Outline Planning Condition 16 requires that noise from fixed mechanical plant does not exceed 5 dB above the existing background sound level. Although the outline planning permission has now expired, it is expected that the same criterion applies. Therefore, the Rating Level limit at the nearest noise sensitive receptors is set to be 5 dB above the representative background sound level, as shown in Table 2 below. This is the total limit for all the mechanical plant, including the industrial units and offices buildings.

As the development comprises 28 units in total (24 industrial units and 4 office buildings), the maximum permissible rating level has been split equally for each individual unit, so that the cumulative noise from fixed mechanical plant at the proposed development would not exceed the criteria at the nearest noise sensitive receptors. Therefore, the maximum permissible rating level for each individual unit is also shown in Table 2. Each user/tenant would need to consider noise from fixed mechanical plant at their premises.

Location of receptors	Period	Background Sound Level L_{A90} (dB)	Maximum Permissible Total Rating Level (dB)	Maximum Permissible Rating Level for each Individual Unit (dB)
Nearest noise sensitive receptors on Fen End Ln	Daytime (07:00 – 23:00)	51	56	41

Table 2: Maximum Rating Levels from mechanical plant at the proposed development

Where the total noise level from fixed mechanical plant at the proposed development meets these limits, there will be a low impact from noise from mechanical plant. The requirements of Condition 16 would also be met.

However, to demonstrate the acceptability of the proposals in principle, an assessment of noise from a typical arrangement of mechanical plant and typical activity at the proposed units is included in Section 6 of this report.

6. ASSESSMENT OF NOISE FROM THE PROPOSED INDUSTRIAL UNITS

The assessment of the impact of noise from mechanical plant and activity at the proposed development on nearby noise sensitive receptors (NSRs) uses the procedure set out in BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound.* As the proposed opening times for the business units are 08:00 – 18:00, the assessment is carried out during the daytime period only.

As detailed in Section 2 above, the developers are seeking to market the industrial units as Use Class E(g)(iii) and the office buildings as Use Class E(g)(i). If any of the units are to be utilised under another use class, such as 'Sui Generis', a separate assessment may be required as noise arising from premises under such class is specific to the individual use case.

Although the industrial units are proposed to be utilised under Use Class E(g)(iii), the site layout plan indicates that the operation of these units may be similar to a B8 unit. Therefore, the assessment below assumes that noise levels arising from the proposed E(g)(iii) units is similar to a Class B8 use as a 'worst-case' scenario.

6.1 NOISE PREDICTION MODEL

Typical use of the premises will result in some sound sources that are mobile and some that are fixed. These sources will be distributed across the industrial site and subject to varying degrees of shielding, distance attenuation, directivity and reflection, relative to the nearest noise sensitive locations. Accordingly, the analysis method which will most accurately represent this situation is a numerical noise model of the buildings and service yards.

The particular prediction model that has been used for this analysis is Bruel & Kjaer's 'Predictor'[7] 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"*, and is Quality Assured to all parts of ISO 17534:2015 *"Acoustics – Software for the calculation of sound outdoors"*. 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)

The contribution of each individual noise source to combined noise levels at the receptor locations is then computed using detailed noise calculations.

The proposed on-site buildings have been modelled as solid bodies, around which sound can diffract. The intervening ground areas have been modelled as part-reflective part-absorptive ground, according to the ISO 9613-2:1996 method.

[7] *EMS Bruel and Kjaer – Predictor (Predictor-LimA) v2019.3 Environmental Noise Calculation Software Package, Type 7810*

6.2 MODELLED PLANT AND ACTIVITY SCENARIO AT THE PROPOSED DEVELOPMENT

In this analysis we have compared the rating level of a 'busy' scenario at the proposed industrial units with the representative Background Sound Levels at the nearest noise sensitive receptors. Noise from mechanical plant at the office buildings is also included in the analysis.

The noise model detailed in Section 6.1 above has been utilised to determine the predicted noise levels from the industrial units and office buildings during the 'busy' scenario. The following assumptions have been made in the noise models:

Industrial Units

- Continuous internal reverberant noise levels inside building, each building having an internal reverberant noise level of L_{pA} 78 dB.
- The industrial units are constructed using insulated wall panels.
- The roller shutter door is assumed to be continuously open at each industrial unit.
- Each building is assumed to have two air conditioning units at the front of the building, each having a sound power level of L_{wA} 79 dB and operating at 50% duty.
- Each building is assumed to have two fans discharging at high level through the rear façade, with a sound power level of L_{wA} 75 dB each and operating at 100% duty.
- Forklifts operating for 30 minutes within the 1-hour period in the yard outside each business unit.
- 1 HGV arriving and departing from each industrial unit within the typical busiest 1-hour period.
- 1 HGV idling for 5 minutes outside each industrial unit within the typical busiest 1-hour period.
- All sound sources, both fixed and mobile, aggregated and modelled simultaneously.

Office Buildings

- Each building is assumed to have two air conditioning units, each having a sound power level of L_{wA} 79 dB and operating at 50% duty.

The internal sound pressure levels that have been assumed to occur inside the industrial units are from measurements inside a storage and distribution centre. The sound power levels of other sources have been taken from Spectrum's library data of representative equipment on equivalent sites.

The exact noise source levels modelled as part of these scenarios are shown in detail in the Equipment List Sound Power Levels included in Appendix D. 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 BS 4142.

The extent and duration of activity, sound source location and sound power levels are considered to result in a conservatively high estimate of noise emission from the site. Therefore, the analysis presents a robust assessment of the potential impact of the proposed use.

6.3 NOISE PREDICTION RESULTS

The predicted sound levels at the most exposed façades of the existing residences on Fen End Lane and at the most expose façade of the proposed office buildings are shown in Table 3 below. Summary calculation output sheets from the Predictor model are shown in Appendix E, including a table of results and contour plots showing noise propagation away from the proposed development during the daytime period.

Noise Sensitive Receptor (NSR)	Time period	Predicted Sound Pressure Level $L_{Aeq,T}$ (dB)
NSR 1 – 59 Fen End Lane	Daytime – 'busy' 1 hour period	44
NSR 2 – 68 Fen End Lane	Daytime – 'busy' 1 hour period	40
Proposed Office Buildings	Daytime – 'busy' 1 hour period	60

Table 3: Summary of predicted sound pressure levels at the nearest noise sensitive receptors and at the proposed office building

6.4 BS 4142:2014 ASSESSMENT

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.*

In this case, the sound from the premises will be an agglomeration of a number of individual, uncorrelated sources, none of which are likely to be dominant in level or character. The potential for tonality from the development is considered low. Some noise from the premises may be intermittent or impulsive in nature, however this will depend significantly on the exact nature of the use of each unit.

Therefore, a total character correction of +6dB is used, comprising +3 dB for impulsivity and +3 dB for intermittency. Subjectively, this represents a level of impulsivity and intermittency that are just perceptible at the receptors and is considered to be representative of the expected perceivable character at the nearest sensitive receptors.

The predicted Rating Levels at each receptor location are shown below in Table 4.

Position	Period	Time period	B'gnd Sound Level L_{A90} (dB)	Rating Level (dB)	Rating Level minus B'gnd Sound Level (dB)
NSR 1 – 59 Fen End Lane	Daytime	08:00-18:00	51	50	-1
NSR 2 – 68 Fen End Lane	Daytime	08:00-18:00	51	46	-5

Table 4: Predicted Rating Levels of noise from the site at nearby sensitive receptors

As these results show, predicted Rating Levels of noise from activities and mechanical plant at the proposed industrial units and mechanical plant at the office buildings during a 'busy 1-hour' daytime period would be at least 1 dB below the background sound level at the existing residential properties on Fen End Lane. This is a good indication that the noise impact of the proposals will be low at the existing residences.

As detailed above, the predictions assume a 'busy' scenario at the proposed development and that the use of the Class E(g)(iii) units would be similar to a B8 unit. When it is considered that normal operation of the site would typically be lower than that modelled, there is even greater confidence that the use of the proposed industrial units and office buildings is acoustically acceptable.

In accordance with the procedure outlined in BS4142, uncertainty has also been considered as part of this assessment. The procedure for minimising uncertainly in this assessment is outlined in Appendix F. For the reasons outlined in Appendix F, uncertainty in the predicted sound level will not affect the conclusion of this assessment.

The Local Planning Authority have provided criteria in Planning Conditions 15 and 16, which relate to noise from fixed mechanical plant and from activity at B2/B8 uses. Although the planning permission expired and the proposed units would not be used under class B2/B8 uses, the criteria provided in the conditions are considered relevant targets and representative of the level of noise considered appropriate by the LPA at this site. The predicted Rating Levels of noise from the proposed units would comfortably meet these targets.

7. ASSESSMENT OF NOISE AT THE PROPOSED OFFICE BUILDINGS

Noise sources affecting the proposed office buildings will include existing road traffic and mechanical plant and activity from the proposed industrial units.

NML 5 was located at a similar distance from the B1173 as the nearest façade of Office Building 1, which is the south-western corner of the building. Therefore, the daytime noise level incident on the most affected façade of the proposed office buildings from road traffic is $L_{Aeq,16hour}$ 65 dB.

As detailed in Section 5.3, predicted noise levels during the 'busy 1-hour period' at the proposed industrial buildings would reach up to $L_{Aeq,1hour}$ 60 dB at the most affected façade of the proposed office buildings. This is on the northern façade of Building 1.

As the noise from road traffic and industrial units would generally affect opposite façades of the office buildings (i.e. most affected façades by road traffic are the ones facing the south-west and the most affected façades by industrial units are the ones facing the north), it is expected that, as a worst case, incident noise levels on the proposed office buildings would not exceed $L_{Aeq,16hour}$ 65 dB during the daytime period.

BS 8233:2014 recommends that the ambient noise levels in an open plan office should be in the range $L_{Aeq,T}$ 45-50 dB and in a staff/meeting room or training room the levels should be in the range $L_{Aeq,T}$ 35-45dB.

A standard façade build-up, for instance brick and block walls with standard double glazed windows and standard window-frame mounted trickle vents is expected to provide 25 dB attenuation. Therefore, noise levels generated by the proposed development are expected to be around $L_{Aeq,T}$ 40 dB inside the proposed office buildings. This is below the BS 8233 recommended ambient noise levels in an open plan office and within the range of acceptable noise levels in a staff/meeting room or training room.

Consequently, the predicted noise levels incident on the proposed office building are unlikely to give rise to significant adverse impact for the future occupiers of the offices.

8. CONCLUSIONS

Ashley King Developments have commissioned Spectrum Acoustic Consultants to carry out a noise assessment to support a planning application for a mixed-use development comprising 24 industrial units and 4 office buildings at Lincs Gateway in Spalding.

Although the outline planning permission for the development has now expired, the criteria provided in Conditions 15 and 16 are considered relevant targets and representative of the level of noise considered appropriate by the LPA at this site.

The proposals include a bund next to the existing residential properties on Fen End Lane and along the western boundary of the site, which acts as an acoustic barrier for noise generated at the proposed development.

A noise survey has been carried out by Spectrum in December 2018 to inform a separate planning application at this site. The recorded noise levels are considered to be representative of the existing acoustic environment and are therefore utilised in this noise assessment.

Rating Level limits have been set to ensure that impact from noise from any mechanical plant associated with the industrial units and office buildings is low. As the development is being delivered as shell only, it will be the responsibility of each user/tenant to demonstrate that these limits will be met. Given that these noise limits are met, the requirements of outline Planning Condition 16 would be met.

Noise from activity and mechanical plant at the proposed industrial units has been assessed in accordance with BS 4142:2014[6]. Predicted Rating Levels from the operation of the proposed industrial units under 'busy' daytime scenario including general site-related activities, fixed plant and indoor activity do not exceed the background sound level at the existing NSRs. In context, the potential noise impact from the use of the premises is therefore considered to be low at the nearby residences.

Although Condition 15 would not apply as the proposed industrial units would not be utilised under use class B2 or B8, noise from the proposed development would meet the criteria set out in this condition.

The predicted incident noise levels on the proposed office buildings have been assessed and the results indicate that the proposed development is unlikely to give rise to significant adverse impact inside these premises.

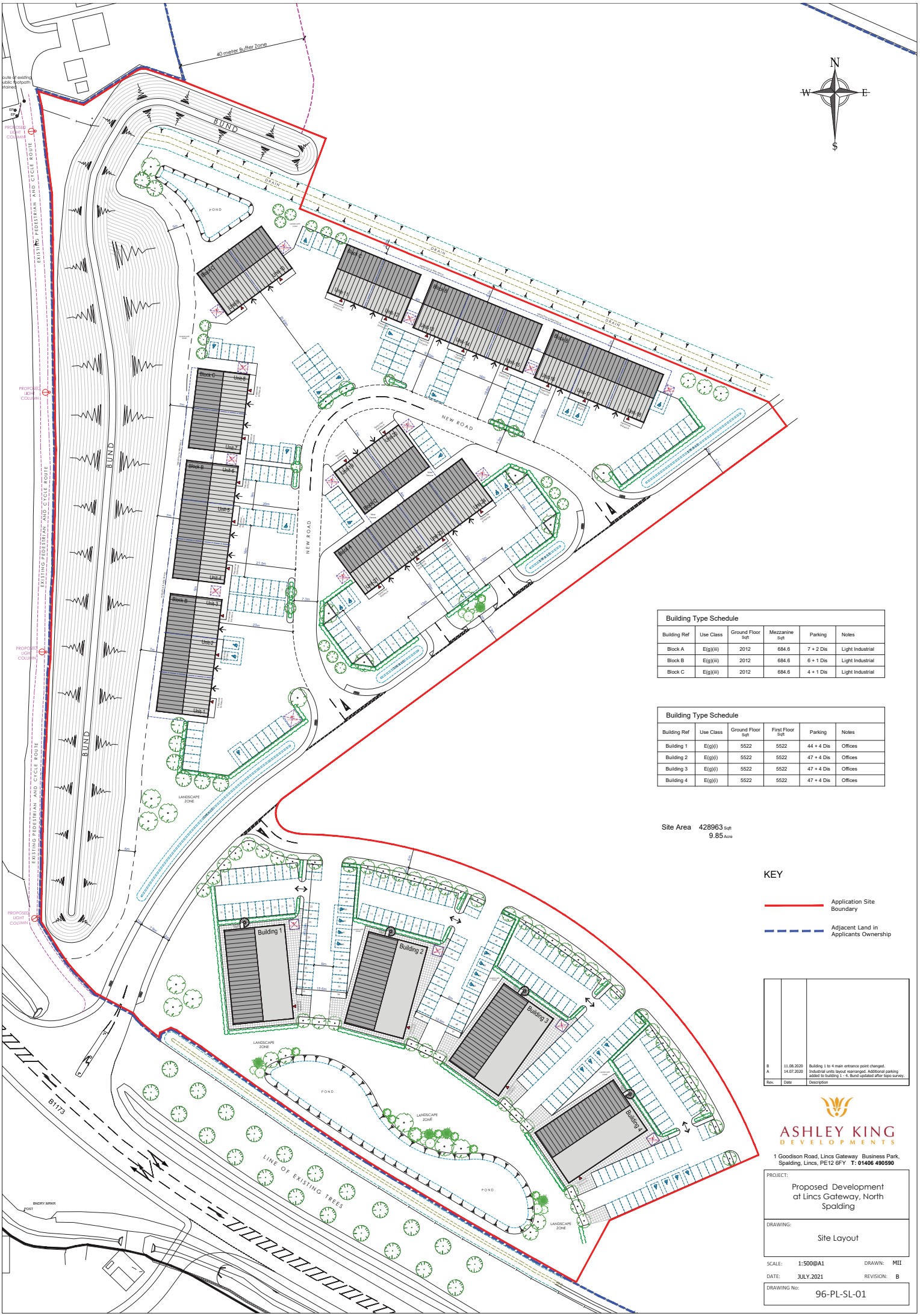
APPENDIX A

Aerial View showing the Site Location Plan and the Noise Measurement Locations


NSR 1 - 59 Fen End Lane
NSR 2 - 68 Fen End Lane
Attended NML 1
B1173
B1173
Attended NML 3
Attended NML 2
Unattended NML 4
Approximate site location plan
Unattended NML 5
Ashwood Homes
Greggs
Takeaway

APPENDIX B

Proposed Site Plan, Floor Plans and Elevation Drawings



Building Type Schedule					
Building Ref	Use Class	Ground Floor Sqft	Mezzanine Sqft	Parking	Notes
Block A	E(g)(iii)	2012	684.6	7 + 2 Dis	Light Industrial
Block B	E(g)(iii)	2012	684.6	6 + 1 Dis	Light Industrial
Block C	E(g)(iii)	2012	684.6	4 + 1 Dis	Light Industrial

Building Type Schedule					
Building Ref	Use Class	Ground Floor Sqft	First Floor Sqft	Parking	Notes
Building 1	E(g)(i)	5522	5522	44 + 4 Dis	Offices
Building 2	E(g)(i)	5522	5522	47 + 4 Dis	Offices
Building 3	E(g)(i)	5522	5522	47 + 4 Dis	Offices
Building 4	E(g)(i)	5522	5522	47 + 4 Dis	Offices

Site Area 428963 Sqft
9.85 Acre

KEY

Application Site Boundary

Adjacent Land in Applicants Ownership

Rev.	Date	Description
B	11.08.2020	Building 1 to 4 main entrance point changed.
A	14.07.2020	Industrial units layout rearranged. Additional parking added to building 1 - 4. Bund updated after topo survey.

ASHLEY KING DEVELOPMENTS
1 Goodison Road, Lincs Gateway Business Park, Spalding, Lincs, PE12 6FY **T: 01406 490590**

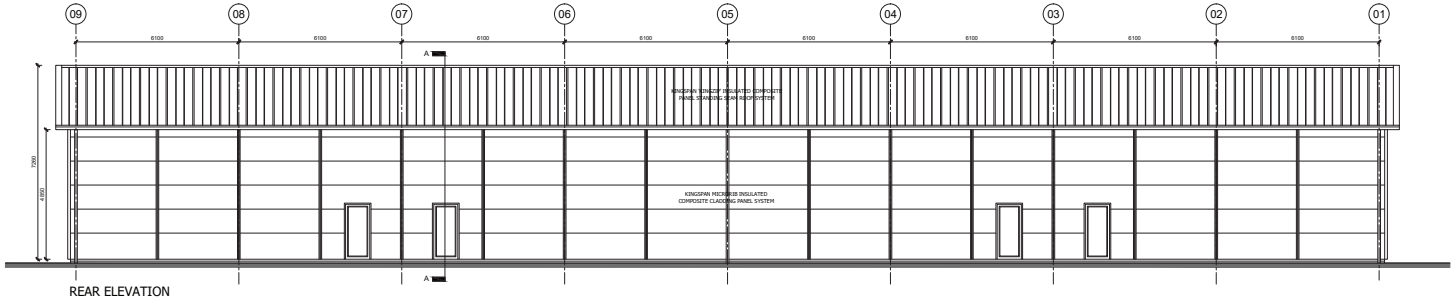
PROJECT:
Proposed Development at Lincs Gateway, North Spalding

DRAWING:
Site Layout

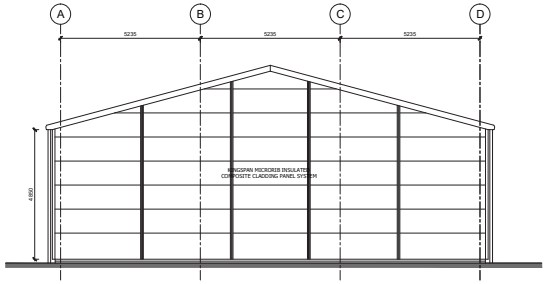
SCALE: 1:500@A1 DRAWN: MII

DATE: JULY.2021 REVISION: B

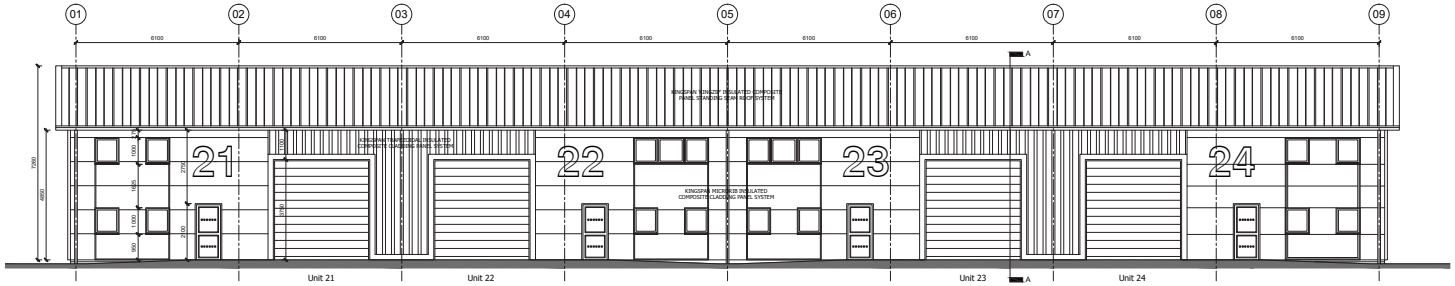
DRAWING No: 96-PL-SL-01



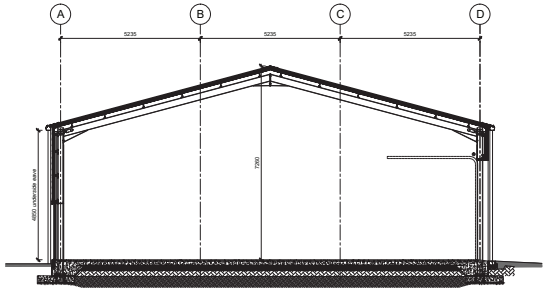
REAR ELEVATION



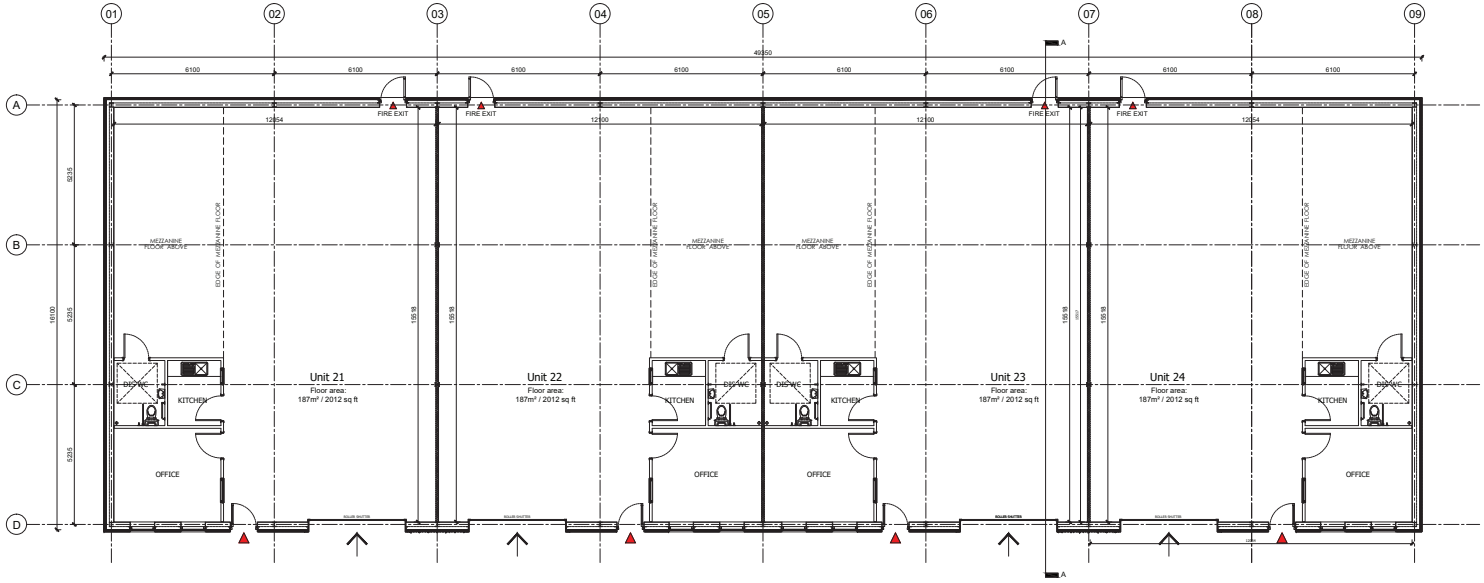
SIDE ELEVATION



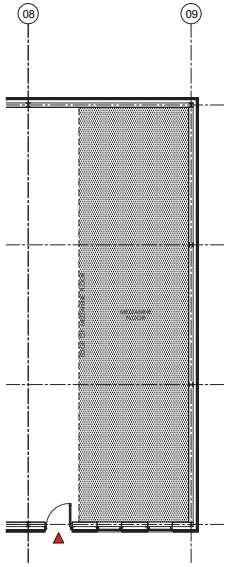
FRONT ELEVATION



SECTION A-A



GROUND FLOOR PLAN



MEZZANINE FLOOR PLAN

Rev.	Date	Description
A	26.07.21	Cladding revised to elevations, plan and section updated.

ASHLEY KING DEVELOPMENTS

1 Goodison Road, Lincs Gateway Business Park, Spalding, Lincs, PE12 6FY **T: 01406 490590**

PROJECT:

Proposed Development at Lincs Gateway, Spalding

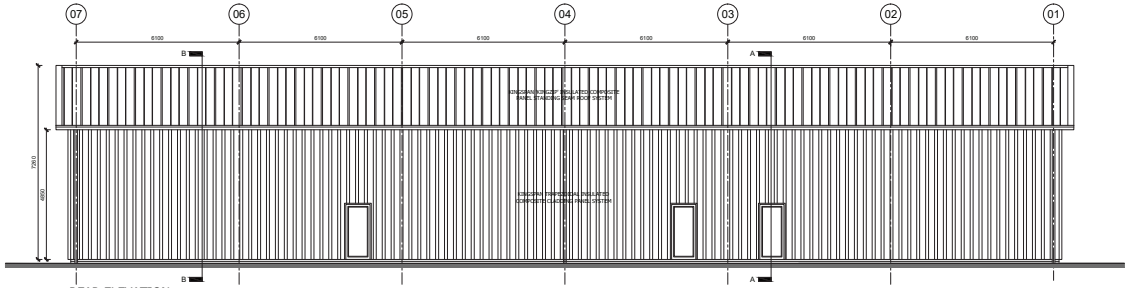
DRAWING:

Block A
Floor plan & Elevations

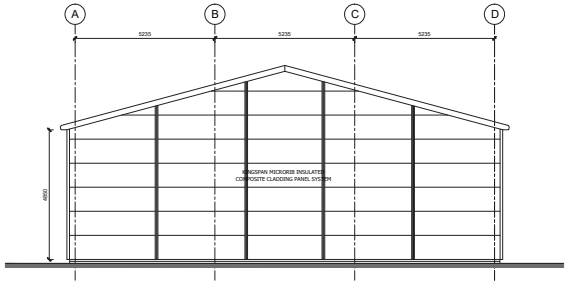
SCALE: 1:500@A1 DRAWN: MII

DATE: JULY.2021 REVISION: A

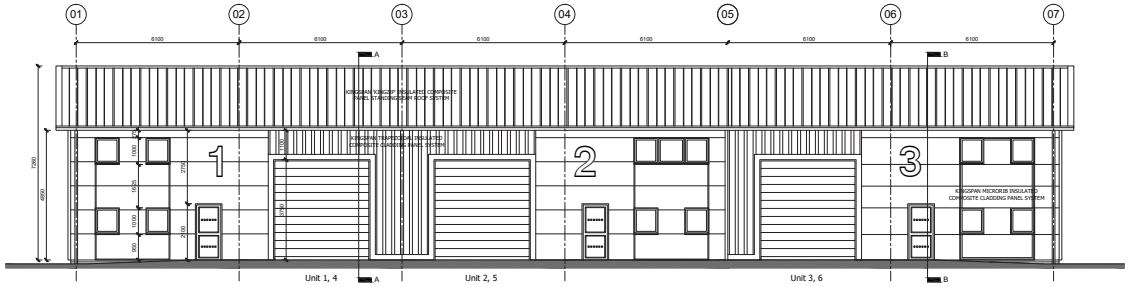
DRAWING No: 96-PL-BA-100



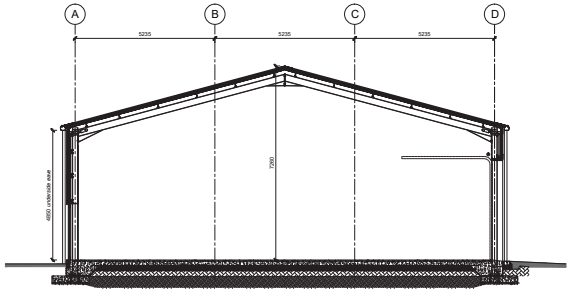
REAR ELEVATION
Unit 1, 2, 3, 4, 5, & 6



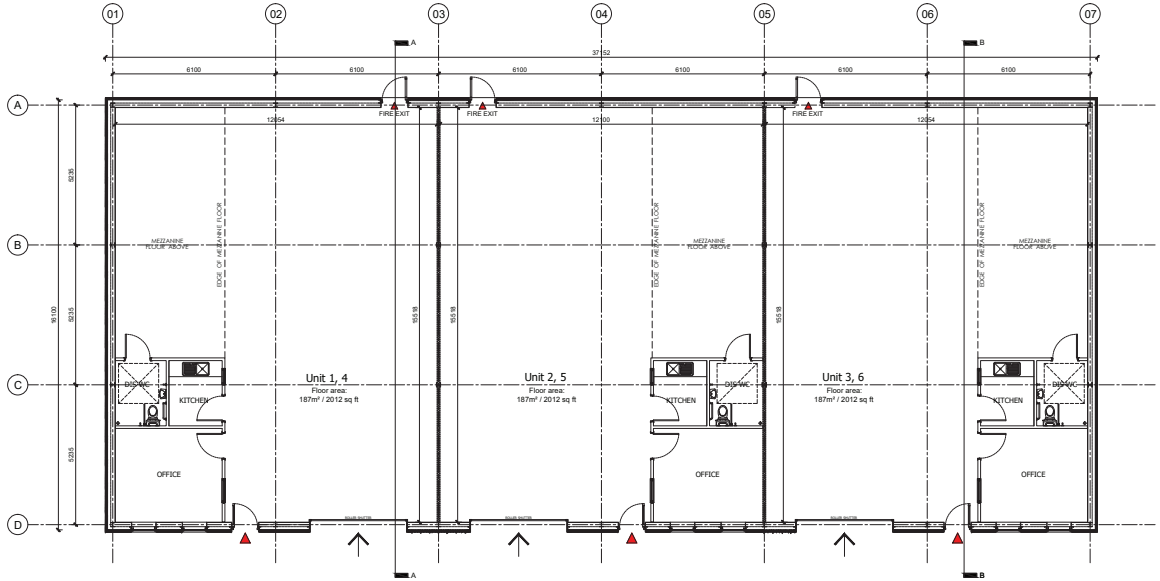
SIDE ELEVATION



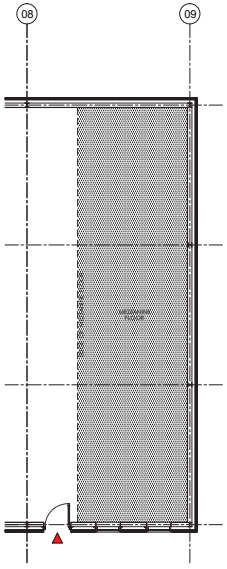
FRONT ELEVATION



SECTION A-A



GROUND FLOOR PLAN



MEZZANINE FLOOR PLAN

Rev.	Date	Description
A	26.07.21	Cladding revised to elevations, plan and section updated.

ASHLEY KING DEVELOPMENTS
1 Goodison Road, Lincs Gateway Business Park, Spalding, Lincs, PE12 6FY **T: 01406 490590**

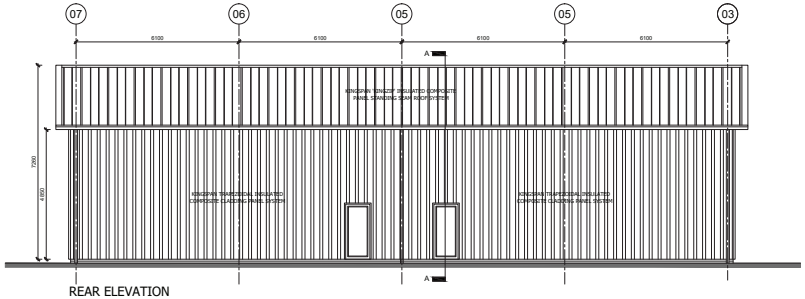
PROJECT:
Proposed Development at Lincs Gateway, Spalding

DRAWING:
Block B
Floor plan & Elevations

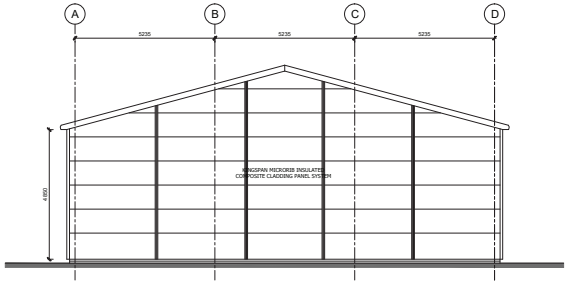
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DATE: JULY.2021 REVISION: A

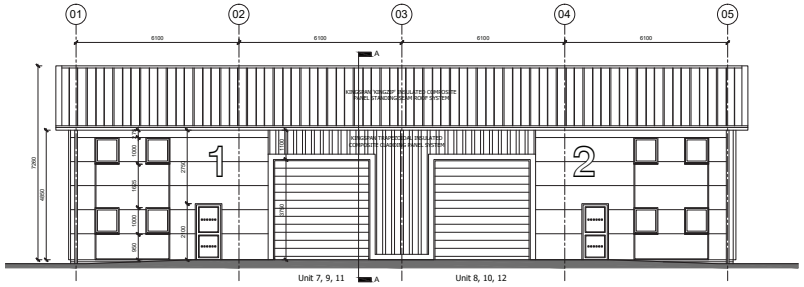
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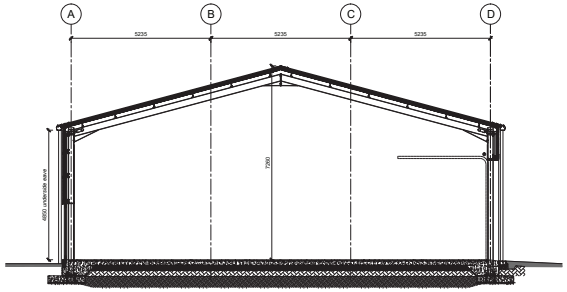
REAR ELEVATION
Unit 7, 8, 9 & 10



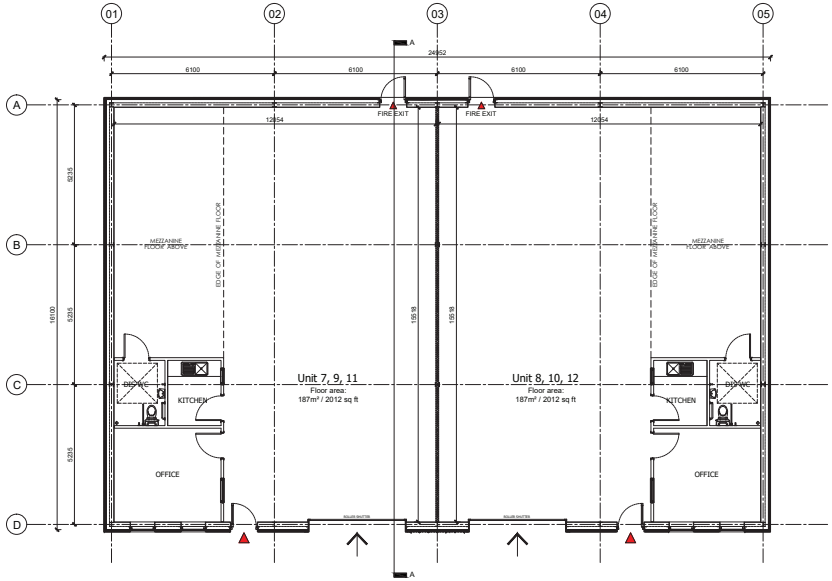
SIDE ELEVATION



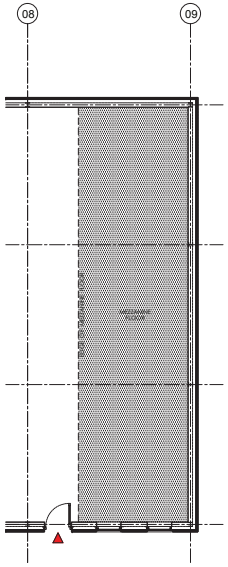
FRONT ELEVATION



SECTION A-A



GROUND FLOOR PLAN



MEZZANINE FLOOR PLAN

Rev.	Date	Description
A	26.07.21	Cladding revised to elevations, plan and section updated.

ASHLEY KING
DEVELOPMENTS

1 Goodison Road, Lincs Gateway Business Park,
Spalding, Lincs, PE12 6FY **T: 01406 490590**

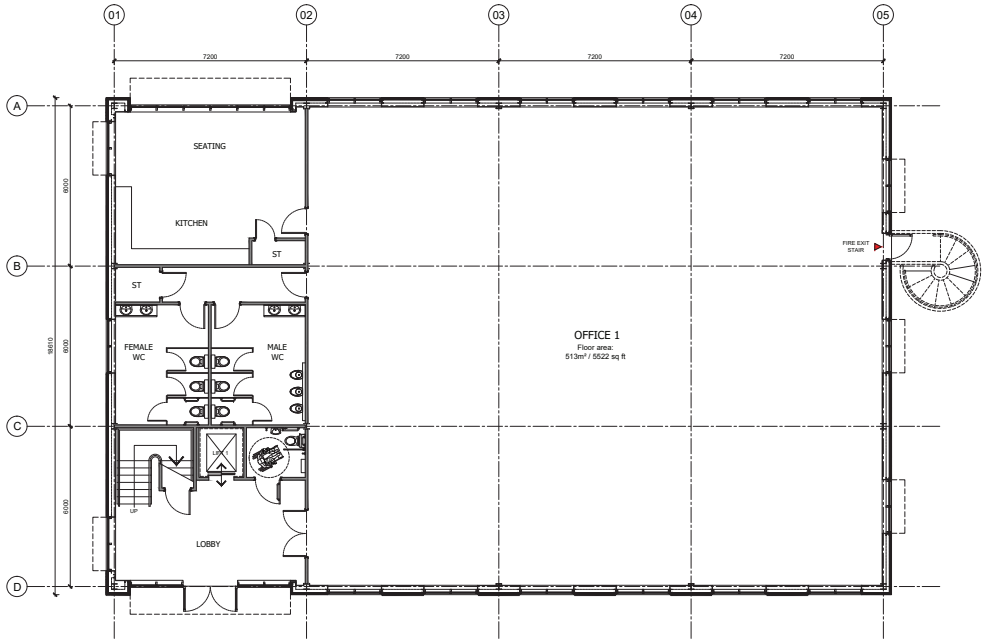
PROJECT:
Proposed Development
at Lincs Gateway, Spalding

DRAWING:
Block C
Floor plan & Elevations

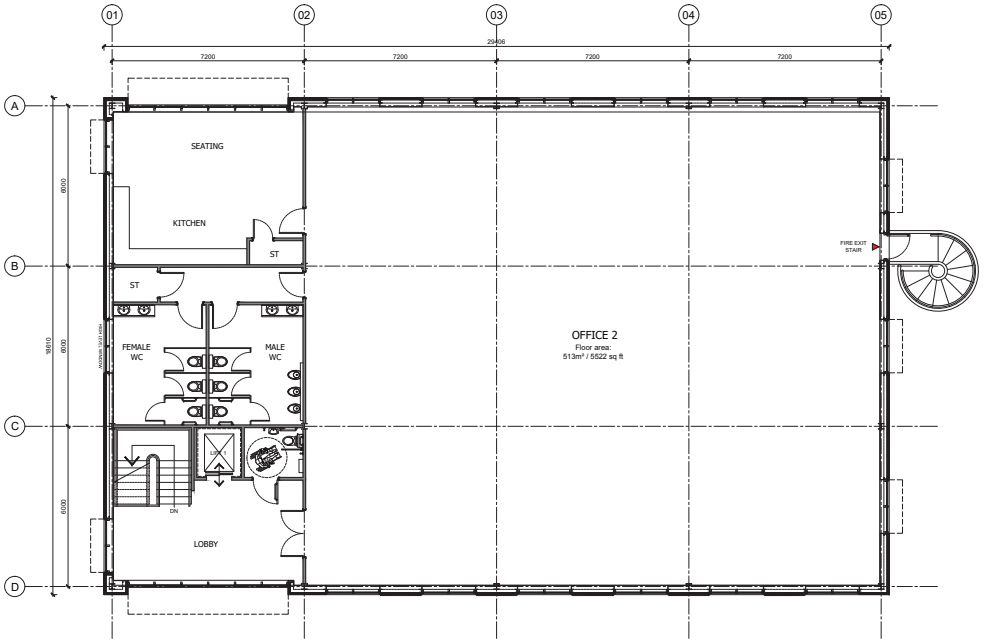
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DATE: JULY.2021 REVISION: A

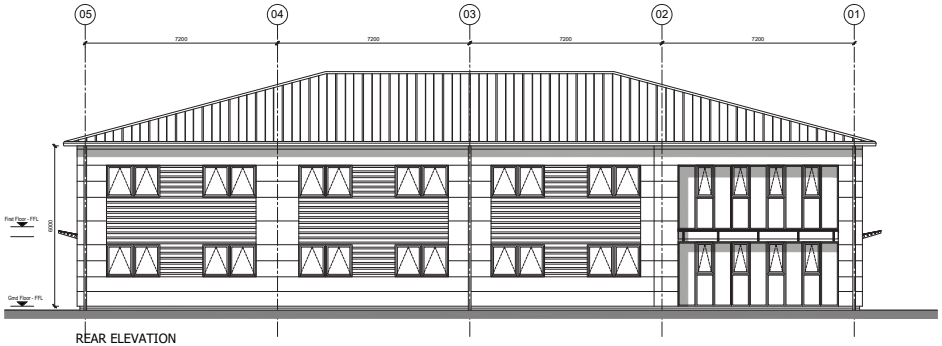
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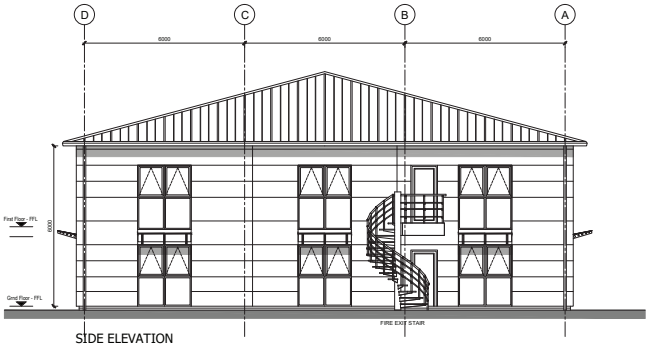
GROUND FLOOR PLAN



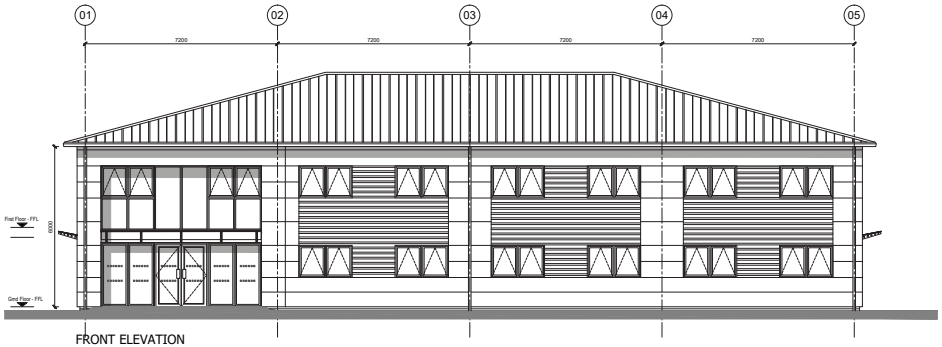
FIRST FLOOR PLAN



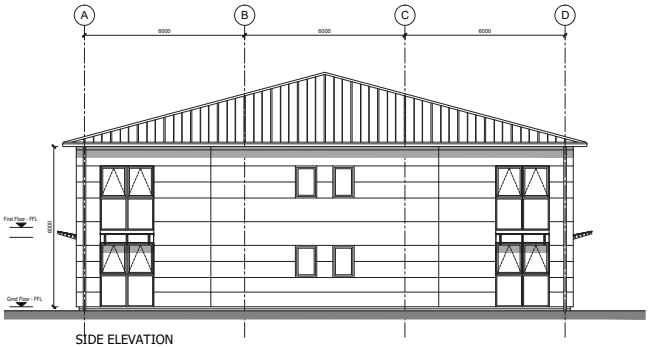
REAR ELEVATION



SIDE ELEVATION



FRONT ELEVATION



SIDE ELEVATION

Rev.	Date	Description
B	05.08.21	Cladding revised to elevations, plans mirrored.
A	26.07.21	Cladding revised to elevations, plans updated.

ASHLEY KING
DEVELOPMENTS

1 Goodison Road, Lincs Gateway Business Park,
Spalding, Lincs, PE12 6FY **T: 01406 490590**

PROJECT:
Proposed Development
at Lincs Gateway, Spalding

DRAWING:
Building 1, 2, 3 & 4
Floor plan & Elevations

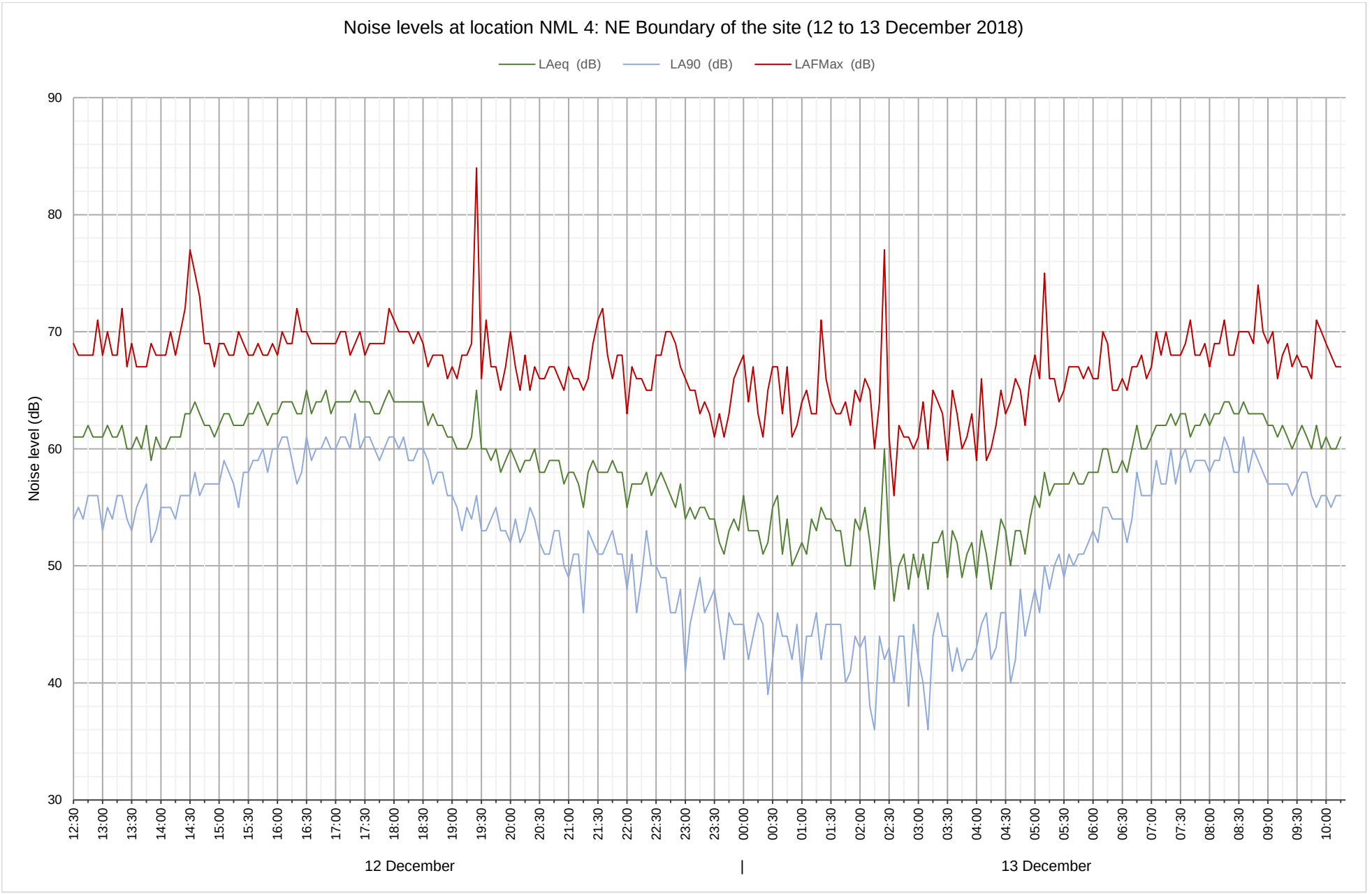
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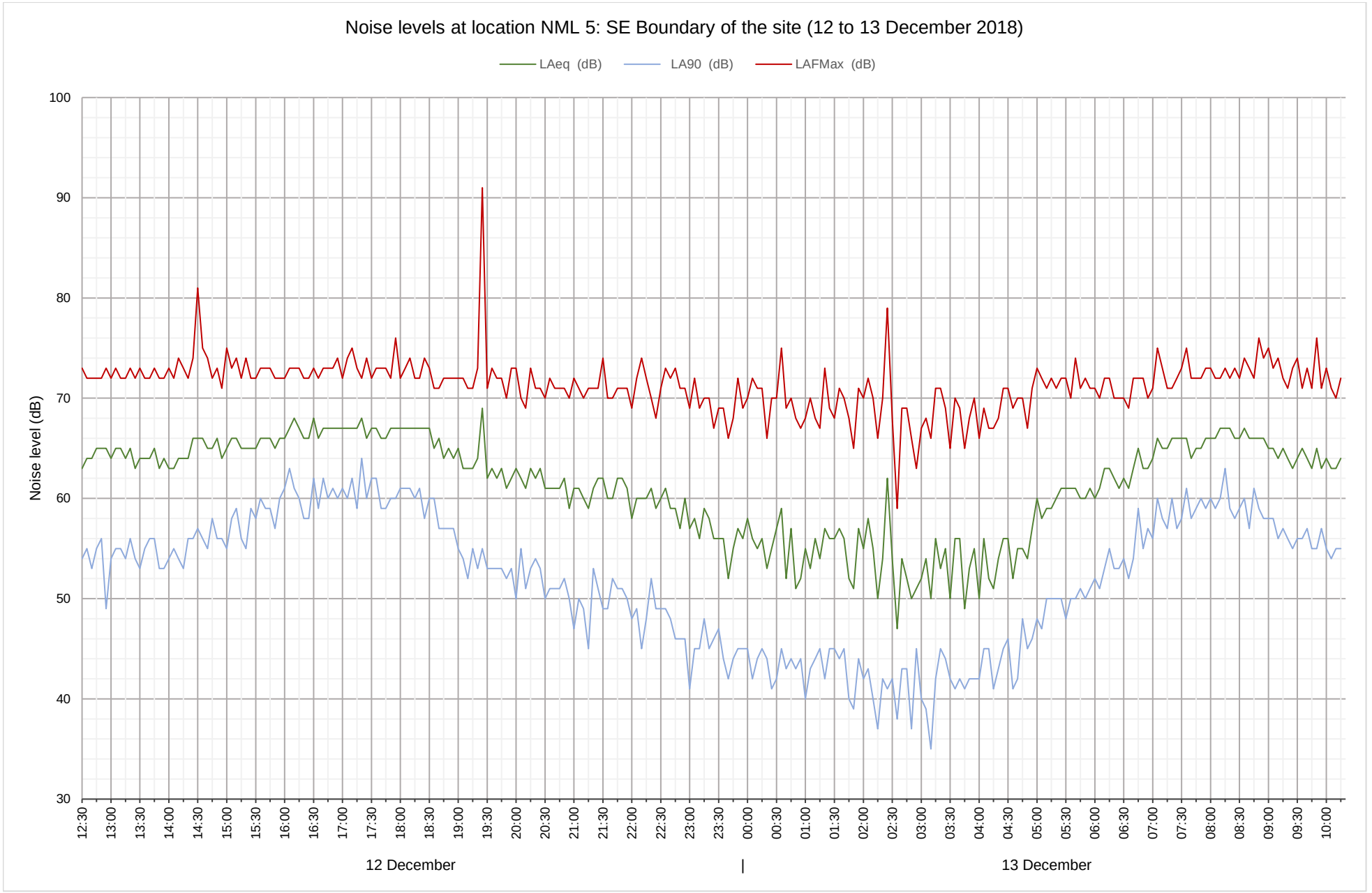
DATE: OCT.2018 REVISION: B

DRAWING No:
96-B4-100

APPENDIX C

Measured Noise Data in Graphical Form and Environmental Noise Record Sheets


Noise levels at location NML 4: NE Boundary of the site (12 to 13 December 2018)
LAeq (dB)
LA90 (dB)
LAFMax (dB)
Noise level (dB)
90
80
70
60
50
40
30
12:30
13:00
13:30
14:00
14:30
15:00
15:30
16:00
16:30
17:00
17:30
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04:30
05:00
05:30
06:00
06:30
07:00
07:30
08:00
08:30
09:00
09:30
10:00
12 December
|
13 December


Noise levels at location NML 5: SE Boundary of the site (12 to 13 December 2018)
LAeq (dB)
LA90 (dB)
LAFMax (dB)
Noise level (dB)
100
90
80
70
60
50
40
30
12:30
13:00
13:30
14:00
14:30
15:00
15:30
16:00
16:30
17:00
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06:00
06:30
07:00
07:30
08:00
08:30
09:00
09:30
10:00
12 December
13 December

ENVIRONMENTAL NOISE RECORD SHEET

Location: Position 1 - Daytime
Date: 12/12/2018
Calibration Times: 12:23, 16:52, 19:06, 13:57

Project: 18472 – Lincs Gateway, Spalding
Instrumentation: Bruel & Kjaer Type 2250 Sound Level Meter s/n 3024396
Bruel & Kjaer Type 2260 Sound Level Meter s/n 2027587
Plant Operating Condition: N/A

Date	Time		Weather			Noise Level dB(A)						Comments
	Start	Dur'n (Min)	Wind Speed m/s	Wind Dir'n	Cloud (%)	L_{10}	L_{50}	L_{90}	L_{MAX}	L_{MIN}	L_{Aeq}	(Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise).
12/12/2018	12:42	05:00	1-2	N	20	56	53	50	60	46	54	Road traffic noise from A16/A1175/B1173, light aircraft noise, trees rustling
12/12/2018	12:47	05:00	1-2	N	20	56	54	49	63	46	54	Road traffic noise from A16/A1175/B1173, light aircraft noise, trees rustling
12/12/2018	12:52	05:00	1-2	N	20	55	53	51	60	48	53	Road traffic noise from A16/A1175/B1173, light aircraft noise, trees rustling
12/12/2018	13:39	05:00	1-2	N	20	54	52	50	58	46	53	Road traffic noise from A16/A1175/B1173, birdsong
12/12/2018	13:44	05:00	1-2	N	20	56	54	51	59	49	54	Road traffic noise from A16/A1175/B1173, birdsong
12/12/2018	13:49	05:00	1-2	N	20	54	52	49	59	45	52	Road traffic noise from A16/A1175/B1173, birdsong
12/12/2018	14:36	05:00	1-2	N	15	62	55	53	74	50	59	Road traffic noise from A16/A1175/B1173, jet aircraft noise, birdsong
12/12/2018	14:41	05:00	1-2	N	15	61	55	52	69	50	57	Road traffic noise from A16/A1175/B1173, jet aircraft noise, birdsong
12/12/2018	14:46	05:00	1-2	N	15	58	55	53	65	52	56	Road traffic noise from A16/A1175/B1173, jet aircraft noise, birdsong
12/12/2018	19:12	05:00	0-1	N	100	57	55	53	63	50	55	Road traffic noise from A16/A1175/B1173
12/12/2018	19:17	05:00	0-1	N	100	58	55	52	64	47	56	Road traffic noise from A16/A1175/B1173
12/12/2018	19:22	05:00	0-1	N	100	57	54	51	60	48	54	Road traffic noise from A16/A1175/B1173
12/12/2018	20:09	05:00	0-1	N	100	56	53	50	62	47	54	Road traffic noise from A16/A1175
12/12/2018	20:14	05:00	0-1	N	100	56	54	51	63	49	54	Road traffic noise from A16/A1175
12/12/2018	20:19	05:00	0-1	N	100	56	54	51	61	48	54	Road traffic noise from A16/A1175

ENVIRONMENTAL NOISE RECORD SHEET

Location: Position 1 – Daytime
Date: 12/12/2018
Calibration Times: 12:23, 16:52, 19:06, 13:57

Project: 18472 – Lincs Gateway, Spalding
Instrumentation: Bruel & Kjaer Type 2250 Sound Level Meter s/n 3024396
Bruel & Kjaer Type 2260 Sound Level Meter s/n 2027587
Plant Operating Condition: N/A

Date	Time	L90 dB(A)	L90 Octave Band Pressure Level									Comments
			31	63	125	250	500	1k	2k	4k	8k	
12/12/2018	12:42	50	55	54	43	41	45	48	38	23	16	As above
12/12/2018	12:47	49	55	52	42	40	43	47	38	23	17	
12/12/2018	12:52	51	56	55	44	42	46	49	39	23	15	
12/12/2018	13:39	50	57	54	43	41	45	49	38	23	16	
12/12/2018	13:44	51	56	56	45	42	47	50	39	23	16	
12/12/2018	13:49	49	53	52	42	40	43	48	38	23	16	
12/12/2018	14:36	53	58	56	46	44	48	51	40	23	14	
12/12/2018	14:41	52	58	56	46	44	47	51	40	23	14	
12/12/2018	14:46	53	58	56	45	43	48	52	41	24	15	
12/12/2018	19:12	53	55	54	46	42	48	51	41	22	---	
12/12/2018	19:17	52	53	52	45	41	47	50	40	---	---	
12/12/2018	19:22	51	53	52	45	40	46	49	38	---	---	
12/12/2018	20:09	50	51	52	44	40	44	48	37	---	---	
12/12/2018	20:14	51	49	49	44	40	46	50	39	---	---	
12/12/2018	20:19	51	52	52	46	41	46	50	38	---	---	

ENVIRONMENTAL NOISE RECORD SHEET

Location: Position 1 – Night-time
Date: 12/12/2018 – 13/12/2018
Calibration Times: 12:23, 16:52, 19:06, 13:57

Project: 18472 – Lincs Gateway, Spalding
Instrumentation: Bruel & Kjaer Type 2250 Sound Level Meter s/n 3024396
Bruel & Kjaer Type 2260 Sound Level Meter s/n 2027587
Plant Operating Condition: N/A

Date	Time		Weather			Noise Level dB(A)						Comments
	Start	Dur'n (Min)	Wind Speed m/s	Wind Dir'n	Cloud (%)	L10	L50	L90	LMAX	LMIN	LAeq	(Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise).
12/12/2018	23:04	05:00	0-1	N	100	52	47	43	60	40	49	Road traffic noise from A16/A1175/B1173, passenger plane noise
12/12/2018	23:09	05:00	0-1	N	100	53	50	46	60	40	50	Road traffic noise from A16/A1175/B1173, passenger plane noise
12/12/2018	23:14	05:00	0-1	N	100	55	51	47	62	43	52	Road traffic noise from A16/A1175/B1173, passenger plane noise
13/12/2018	00:19	05:00	1-2	N	100	53	49	45	60	41	50	Road traffic noise from A16/A1175
13/12/2018	00:24	05:00	1-2	N	100	49	43	39	55	36	46	Road traffic noise from A16/A1175
13/12/2018	00:29	05:00	1-2	N	100	53	48	43	66	40	50	Road traffic noise from A16/A1175
13/12/2018	01:19	05:00	1-2	N	100	53	48	43	61	40	50	Road traffic noise from A16/A1175
13/12/2018	01:24	05:00	1-2	N	100	55	51	46	60	43	52	Road traffic noise from A16/A1175
13/12/2018	01:29	05:00	1-2	N	100	55	50	46	61	40	52	Road traffic noise from A16/A1175

Date	Time	L90 dB(A)	L90 Octave Band Pressure Level									Comments
			31	63	125	250	500	1k	2k	4k	8k	
12/12/2018	23:04	43	49	45	39	34	39	41	29	---	---	As above
12/12/2018	23:09	46	49	47	41	36	41	43	32	---	---	
12/12/2018	23:14	47	53	52	43	37	43	44	31	---	---	
13/12/2018	00:19	45	54	49	42	37	41	42	31	23	22	
13/12/2018	00:24	39	53	46	39	35	35	36	27	23	23	
13/12/2018	00:29	43	53	48	41	36	39	41	30	22	22	
13/12/2018	01:19	43	52	48	40	34	41	41	28	18	15	
13/12/2018	01:24	46	55	53	43	37	43	44	33	20	15	
13/12/2018	01:29	46	52	50	40	36	41	45	33	19	14	

ENVIRONMENTAL NOISE RECORD SHEET

Location: Position 2 – Daytime
Date: 12/12/2018
Calibration Times: 12:23, 16:52, 19:06, 13:57

Project: 18472 – Lincs Gateway, Spalding
Instrumentation: Bruel & Kjaer Type 2250 Sound Level Meter s/n 3024396
Bruel & Kjaer Type 2260 Sound Level Meter s/n 2027587
Plant Operating Condition: N/A

Date	Time		Weather			Noise Level dB(A)						Comments
	Start	Dur'n (Min)	Wind Speed m/s	Wind Dir'n	Cloud (%)	L_{10}	L_{50}	L_{90}	L_{MAX}	L_{MIN}	L_{Aeq}	(Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise).
12/12/2018	13:02	05:00	2-3	N	25	59	55	53	70	50	56	Road traffic noise from A16/A1175/B1173, light aircraft noise, trees rustling, passenger plane noise, birdsong
12/12/2018	13:07	05:00	2-3	N	25	60	53	51	67	49	56	Road traffic noise from A16/A1175/B1173, light aircraft noise, trees rustling, passenger plane noise, birdsong
12/12/2018	13:12	05:00	2-3	N	25	56	54	52	65	50	54	Road traffic noise from A16/A1175/B1173, light aircraft noise, trees rustling, passenger plane noise, birdsong
12/12/2018	13:59	05:00	1-2	N	20	55	53	51	60	49	54	Road traffic noise from A16/A1175/B1173, passenger plane noise, light aircraft noise, trees rustling, birdsong
12/12/2018	14:04	05:00	1-2	N	20	56	54	52	62	49	54	Road traffic noise from A16/A1175/B1173, passenger plane noise, light aircraft noise, trees rustling, birdsong
12/12/2018	14:09	05:00	1-2	N	20	56	54	53	61	49	55	Road traffic noise from A16/A1175/B1173, passenger plane noise, light aircraft noise, trees rustling, birdsong
12/12/2018	14:57	05:00	1-2	N	20	56	54	51	60	49	54	Road traffic noise from A16/A1175/B1173, light aircraft noise, birdsong
12/12/2018	15:02	05:00	1-2	N	20	57	56	54	62	52	56	Road traffic noise from A16/A1175/B1173, light aircraft noise, birdsong
12/12/2018	15:07	05:00	1-2	N	20	57	55	54	60	52	56	Road traffic noise from A16/A1175/B1173, light aircraft noise, birdsong
12/12/2018	19:33	05:00	0-1	N	100	57	53	48	61	44	54	Road traffic noise from A16/A1175
12/12/2018	19:38	05:00	0-1	N	100	56	53	50	61	46	54	Road traffic noise from A16/A1175
12/12/2018	19:43	05:00	0-1	N	100	56	54	52	60	49	54	Road traffic noise from A16/A1175

ENVIRONMENTAL NOISE RECORD SHEET

Location: Position 2 – Daytime
Date: 12/12/2018
Calibration Times: 12:23, 16:52, 19:06, 13:57

Project: 18472 – Lincs Gateway, Spalding
Instrumentation: Bruel & Kjaer Type 2250 Sound Level Meter s/n 3024396
Bruel & Kjaer Type 2260 Sound Level Meter s/n 2027587
Plant Operating Condition: N/A

Date	Time	L90 dB(A)	L90 Octave Band Pressure Level									Comments
			31	63	125	250	500	1k	2k	4k	8k	
12/12/2018	13:02	53	60	60	51	43	48	50	41	29	25	As above
12/12/2018	13:07	51	60	59	49	42	46	49	40	28	24	
12/12/2018	13:12	52	59	59	48	42	48	49	40	29	25	
12/12/2018	13:59	51	58	57	46	39	47	49	40	26	19	
12/12/2018	14:04	52	58	58	46	39	47	50	41	26	19	
12/12/2018	14:09	53	59	59	47	41	49	50	41	26	19	
12/12/2018	14:57	51	57	57	47	41	47	50	41	25	17	
12/12/2018	15:02	54	58	59	49	42	49	52	44	27	16	
12/12/2018	15:07	54	59	61	49	42	49	52	43	27	17	
12/12/2018	19:33	48	49	49	40	37	42	46	37	---	---	
12/12/2018	19:38	50	54	54	45	39	45	48	39	22	---	
12/12/2018	19:43	52	55	56	45	41	47	50	41	23	---	

ENVIRONMENTAL NOISE RECORD SHEET

Location: Position 2 – Night-time
Date: 12/12/2018 – 13/12/2018
Calibration Times: 12:23, 16:52, 19:06, 13:57

Project: 18472 – Lincs Gateway, Spalding
Instrumentation: Bruel & Kjaer Type 2250 Sound Level Meter s/n 3024396
Bruel & Kjaer Type 2260 Sound Level Meter s/n 2027587
Plant Operating Condition: N/A

Date	Time		Weather			Noise Level dB(A)						Comments
	Start	Dur'n (Min)	Wind Speed m/s	Wind Dir'n	Cloud (%)	L_{10}	L_{50}	L_{90}	L_{MAX}	L_{MIN}	L_{Aeq}	(Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise).
12/12/2018	23:41	05:00	0-1	N	100	52	47	44	66	39	49	Road traffic noise from A16/A1175/B1173, trees rustling
12/12/2018	23:46	05:00	0-1	N	100	52	47	45	58	42	49	Road traffic noise from A16/A1175/B1173, trees rustling
12/12/2018	23:51	05:00	0-1	N	100	53	48	44	60	40	50	Road traffic noise from A16/A1175/B1173, trees rustling
13/12/2018	00:40	05:00	0-1	N	100	51	47	44	58	40	49	Road traffic noise from A16/A1175
13/12/2018	00:45	05:00	0-1	N	100	51	47	45	56	41	48	Road traffic noise from A16/A1175
13/12/2018	00:50	05:00	0-1	N	100	53	48	43	57	41	49	Road traffic noise from A16/A1175
13/12/2018	01:39	05:00	0-1	N	100	53	49	46	66	41	50	Road traffic noise from A16/A1175,occasional vehicle on B1173
13/12/2018	01:44	05:00	0-1	N	100	52	48	42	58	36	49	Road traffic noise from A16/A1175,occasional vehicle on B1173
13/12/2018	01:49	05:00	0-1	N	100	53	47	38	59	34	49	Road traffic noise from A16/A1175,occasional vehicle on B1173

Date	Time	L90 dB(A)	L90 Octave Band Pressure Level									Comments
			31	63	125	250	500	1k	2k	4k	8k	
12/12/2018	23:41	44	49	50	42	38	40	41	31	23	20	As above
12/12/2018	23:46	45	51	50	43	40	41	42	32	24	20	
12/12/2018	23:51	44	50	48	42	39	40	42	32	24	20	
13/12/2018	00:40	44	50	48	37	34	39	42	33	25	22	
13/12/2018	00:45	45	54	52	39	36	41	42	31	24	21	
13/12/2018	00:50	43	52	48	38	34	40	40	31	23	20	
13/12/2018	01:39	46	53	54	42	36	42	43	34	24	19	
13/12/2018	01:44	42	49	47	36	32	38	39	31	21	17	
13/12/2018	01:49	38	48	44	35	32	35	35	26	21	17	

ENVIRONMENTAL NOISE RECORD SHEET

Location: Position 3 - Daytime
Date: 12/12/2018
Calibration Times: 12:23, 16:52, 19:06, 13:57

Project: 18472 – Lincs Gateway, Spalding
Instrumentation: Bruel & Kjaer Type 2250 Sound Level Meter s/n 3024396
Bruel & Kjaer Type 2260 Sound Level Meter s/n 2027587
Plant Operating Condition: N/A

Date	Time		Weather			Noise Level dB(A)						Comments
	Start	Dur'n (Min)	Wind Speed m/s	Wind Dir'n	Cloud (%)	L10	L50	L90	LMAX	LMIN	LAeq	(Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise).
12/12/2018	13:21	05:00	0-1	N	25	60	55	51	76	48	58	Road traffic noise from A16/A1175/B1173, light aircraft noise, trees rustling, birdsong
12/12/2018	13:26	05:00	0-1	N	25	56	54	51	61	48	54	Road traffic noise from A16/A1175/B1173, light aircraft noise, trees rustling, birdsong
12/12/2018	13:31	05:00	0-1	N	25	57	54	51	62	48	54	Road traffic noise from A16/A1175/B1173, light aircraft noise, trees rustling, birdsong
12/12/2018	14:18	05:00	0-1	N	20	58	55	52	65	49	55	Road traffic noise from A16/A1175/B1173, passenger plane noise, light aircraft noise, trees rustling, birdsong
12/12/2018	14:23	05:00	0-1	N	20	63	55	52	72	49	59	Road traffic noise from A16/A1175/B1173, passenger plane noise, light aircraft noise, trees rustling, birdsong
12/12/2018	14:28	05:00	0-1	N	20	59	56	53	72	50	58	Road traffic noise from A16/A1175/B1173, passenger plane noise, light aircraft noise, trees rustling, birdsong
12/12/2018	15:16	05:00	0-1	N	20	58	55	52	62	49	56	Road traffic noise from A16/A1175/B1173, birdsong
12/12/2018	15:21	05:00	0-1	N	20	59	56	54	65	51	57	Road traffic noise from A16/A1175/B1173, birdsong
12/12/2018	15:26	05:00	0-1	N	20	59	57	55	62	53	57	Road traffic noise from A16/A1175/B1173, birdsong
12/12/2018	19:51	05:00	0-1	N	100	56	54	51	60	48	54	Road traffic noise from A16/A1175/B1173
12/12/2018	19:56	05:00	0-1	N	100	56	53	50	60	47	54	Road traffic noise from A16/A1175/B1173
12/12/2018	20:01	05:00	0-1	N	100	56	53	50	59	45	54	Road traffic noise from A16/A1175/B1173
12/12/2018	20:48	05:00	0-1	N	100	57	54	51	61	49	55	Road traffic noise from A16/A1175/B1173
12/12/2018	20:53	05:00	0-1	N	100	55	52	49	60	46	53	Road traffic noise from A16/A1175/B1173
12/12/2018	20:58	05:00	0-1	N	100	56	52	48	60	45	53	Road traffic noise from A16/A1175/B1173

ENVIRONMENTAL NOISE RECORD SHEET

Location: Position 3 - Daytime
Date: 12/12/2018
Calibration Times: 12:23, 16:52, 19:06, 13:57

Project: 18472 – Lincs Gateway, Spalding
Instrumentation: Bruel & Kjaer Type 2250 Sound Level Meter s/n 3024396
Bruel & Kjaer Type 2260 Sound Level Meter s/n 2027587
Plant Operating Condition: N/A

Date	Time	L90 dB(A)	L90 Octave Band Pressure Level									Comments
			31	63	125	250	500	1k	2k	4k	8k	
12/12/2018	13:21	51	57	55	45	42	47	49	39	26	20	As above
12/12/2018	13:26	51	56	54	43	41	47	49	40	25	18	
12/12/2018	13:31	51	58	56	44	42	47	49	37	23	17	
12/12/2018	14:18	52	57	56	45	42	48	50	40	24	17	
12/12/2018	14:23	52	56	55	46	43	48	50	40	24	15	
12/12/2018	14:28	53	58	57	49	44	49	51	39	23	16	
12/12/2018	15:16	52	56	55	45	42	49	50	40	25	15	
12/12/2018	15:21	54	56	55	46	43	49	52	42	25	14	
12/12/2018	15:26	55	58	58	48	44	51	54	44	27	15	
12/12/2018	19:51	51	49	49	42	39	46	49	39	---	---	
12/12/2018	19:56	50	54	51	43	39	46	48	37	---	---	
12/12/2018	20:01	50	52	52	42	38	45	48	38	---	---	
12/12/2018	20:48	51	53	51	43	41	47	49	38	---	---	
12/12/2018	20:53	49	51	48	40	37	44	47	37	---	---	
12/12/2018	20:58	48	50	49	41	38	45	45	34	---	---	

ENVIRONMENTAL NOISE RECORD SHEET

Location: Position 3 – Night-time
Date: 12/12/2018 – 13/12/2018
Calibration Times: 12:23, 16:52, 19:06, 13:57

Project: 18472 – Lincs Gateway, Spalding
Instrumentation: Bruel & Kjaer Type 2250 Sound Level Meter s/n 3024396
Bruel & Kjaer Type 2260 Sound Level Meter s/n 2027587
Plant Operating Condition: N/A

Date	Time		Weather			Noise Level dB(A)						Comments
	Start	Dur'n (Min)	Wind Speed m/s	Wind Dir'n	Cloud (%)	L10	L50	L90	LMAX	LMIN	LAeq	(Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise).
13/12/2018	00:01	05:00	0-1	N	100	53	50	45	58	42	51	Road traffic noise from A16/A1175/B1173
13/12/2018	00:06	05:00	0-1	N	100	53	48	41	62	38	49	Road traffic noise from A16/A1175/B1173
13/12/2018	00:11	05:00	0-1	N	100	51	48	45	60	41	49	Road traffic noise from A16/A1175/B1173
13/12/2018	01:00	05:00	0-1	N	100	51	46	41	57	37	48	Road traffic noise from A16/A1175,occasional vehicle on B1173
13/12/2018	01:05	05:00	0-1	N	100	52	48	44	61	41	49	Road traffic noise from A16/A1175,occasional vehicle on B1173
13/12/2018	01:10	05:00	0-1	N	100	53	49	45	60	41	51	Road traffic noise from A16/A1175,occasional vehicle on B1173
13/12/2018	01:59	05:00	0-1	N	100	52	47	43	60	39	49	Road traffic noise from A16/A1175,occasional vehicle on B1173
13/12/2018	02:04	05:00	0-1	N	100	53	47	43	64	40	50	Road traffic noise from A16/A1175,occasional vehicle on B1173
13/12/2018	02:09	05:00	0-1	N	100	52	45	38	62	34	48	Road traffic noise from A16/A1175,occasional vehicle on B1173

Date	Time	L90 dB(A)	L90 Octave Band Pressure Level									Comments
			31	63	125	250	500	1k	2k	4k	8k	
13/12/2018	00:01	45	50	47	40	38	43	42	31	23	20	As above
13/12/2018	00:06	41	49	45	39	37	40	38	28	24	21	
13/12/2018	00:11	45	50	46	39	37	42	42	31	24	21	
13/12/2018	01:00	41	50	46	37	34	40	37	26	17	15	
13/12/2018	01:05	44	53	49	38	36	42	41	28	17	15	
13/12/2018	01:10	45	51	49	39	37	43	42	29	17	15	
13/12/2018	01:59	43	52	45	36	34	40	40	29	18	14	
13/12/2018	02:04	43	47	46	38	34	40	41	30	17	14	
13/12/2018	02:09	38	46	42	36	32	36	35	23	15	14	

APPENDIX D

Equipment List Sound Power Levels

18472 - Lincs Gateway, Spalding - Equipment List Sound Power Levels

Revision	Date	Comment
0	02/08/2021	

Equipment or Source	Octave Band Sound Power Level, Lw (Linear)								Overall LwA (dB)	Point (P) Line (L) Area (A)	% On-time	No. off	Corrected overall LwA (dB)	Comments
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz						
Daytime - 'Busy Period' 1 hour														
Proposed Class E(g) Units														
HGV Manouvering at each industrial unit	105	100	93	96	95	93	89	79	**100**	L	3	1	**63 LwA/m**	1 HGV arriving and 1 HGV departing. Movement calculated at 10 km/h
HGV Idling at each industrial unit	107	93	91	92	90	88	83	76	**95**	P	25	1	**89 LwA**	1 HGV idling for 5min.
Forklift at each industrial unit	81	78	76	87	79	79	76	67	**87**	P	50	1	**84 LwA**	Running for 30min during daytime. 1 at each of the industrial units
Air Conditioning Plant at each unit	78	77	77	78	75	68	65	65	**79**	P	50	2	**79 LwA**	Running at 50% duty. 2 at each industrial unit and office building.
Extract Fans at each industrial unit	70	72	74	74	70	65	60	50	**75**	P	100	2	**78 LwA**	Running at 100% duty. 2 at each industrial unit
E(g)(iii) Indoor Reverberant Noise Level	66	62	65	68	70	72	72	70	**78**	P	100	1	**78 LwA**	Continuous reverberant noise level inside the industrial units.

APPENDIX E

Noise Prediction Model Results and Contour Plots from activities at the Proposed Development

18472 - Lincs Gateway, Spalding
Predicted LAeq levels from mechanical plant and activity at the units

Report: Table of Results
Model: Proposed Development - Industrial Units Daytime
LAeq per octave: total results for receivers
Group: (main group)
Group Reduction: No

Name			Day								
Receiver	Description	Height	Total	63	125	250	500	1000	2000	4000	8000
NSR 1a_A	59 Fen End Lane - South Facade	2.00	40	30	25	28	35	35	31	21	--
NSR 1a_B	59 Fen End Lane - South Facade	4.50	44	30	27	32	39	40	37	31	12
NSR 1b_A	59 Fen End Lane - Garden	1.50	38	29	24	26	32	34	31	21	--
NSR 2_A	68 Fen End Lane	2.00	40	30	25	27	35	35	32	21	--
Office-1a_	Office Building 1	4.50	60	41	43	46	53	55	54	48	36
Office-1a_	Office Building 1	1.50	60	42	43	46	54	55	54	48	36
Office-1b_	Office Building 1	4.50	43	32	29	32	38	37	35	25	--
Office-1b_	Office Building 1	1.50	42	32	29	31	37	37	34	26	--
Office-2a_	Office Building 2	4.50	57	41	40	44	51	52	51	44	27
Office-2a_	Office Building 2	1.50	57	42	41	44	51	52	51	45	28
Office-2b_	Office Building 2	4.50	42	32	28	31	38	35	31	20	--
Office-2b_	Office Building 2	1.50	39	31	27	29	34	32	29	20	--
Office-3a_	Office Building 3	4.50	54	39	37	42	49	49	48	40	22
Office-3a_	Office Building 3	1.50	56	41	40	44	50	51	49	41	25
Office-3b_	Office Building 3	4.50	39	30	25	28	35	33	29	18	--
Office-3b_	Office Building 3	1.50	37	30	25	26	32	30	28	18	--
Office-4a_	Office Building 4	4.50	51	37	34	40	47	47	44	35	21
Office-4a_	Office Building 4	1.50	52	38	36	41	48	47	45	36	23
Office-4b_	Office Building 4	4.50	37	29	24	26	32	31	28	18	--
Office-4b_	Office Building 4	1.50	35	27	23	23	29	29	28	18	--

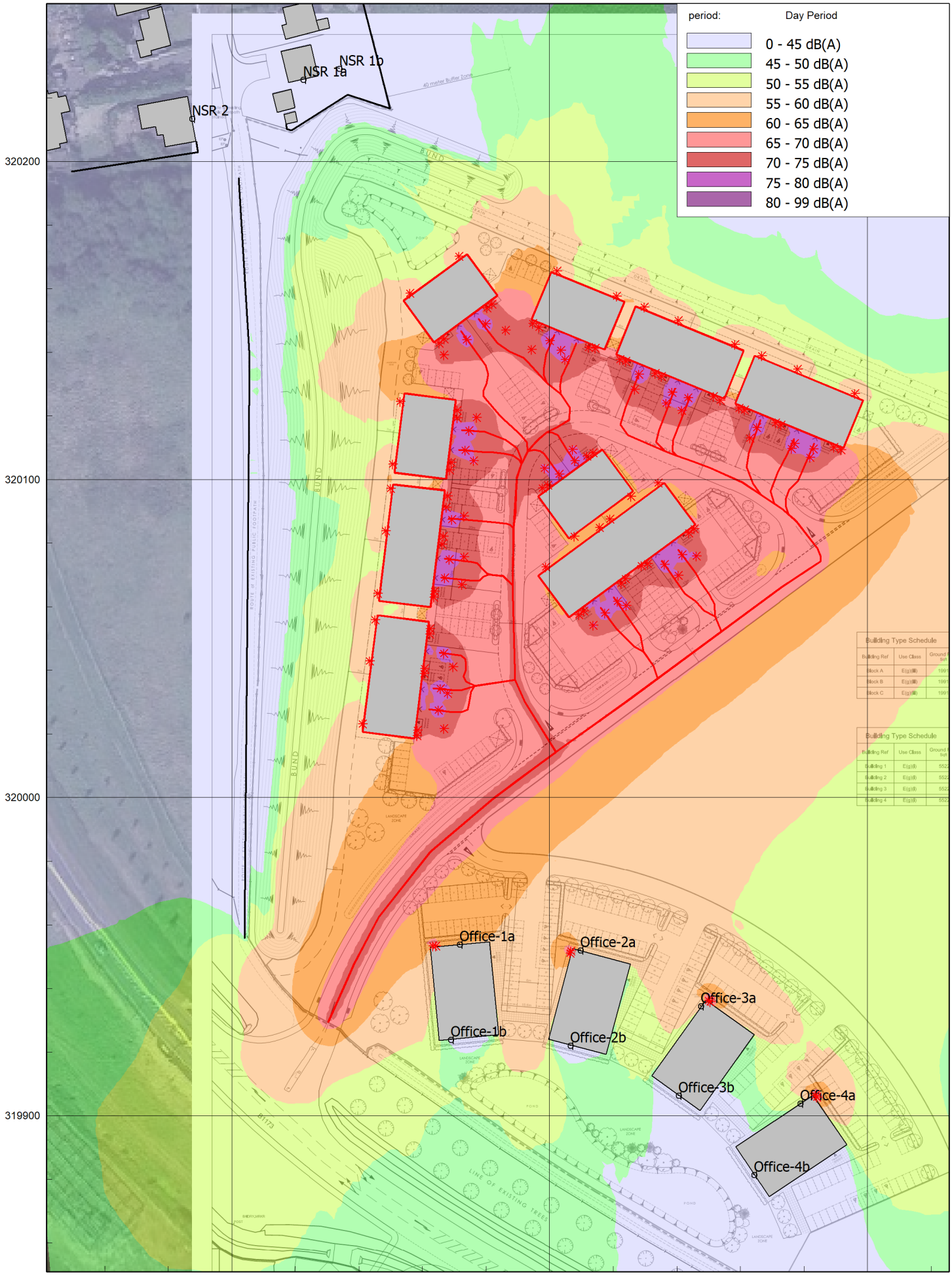
All shown dB values are A-weighted

18472 - Lincs Gateway, Spalding

Spectrum Acoustics, UK

Predicted LAeq levels from mechanical plant and activity at the proposed development

Contours at 1.5m



Industrial noise - LimA - ISO 9613.1/2, [Rev. 0 - Proposed Development - Industrial Units Daytime] , Predictor V2021.1 Licensed to Spectrum Acoustics, UK

APPENDIX F

Uncertainty in the BS4142 Assessment

Uncertainty in the BS4142 assessment

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 implementing the prediction model in a way that increase predicted levels at surrounding sensitive receptors. This includes:

- Assuming typical high sound levels inside the building
- Assuming high 'at-source' sound levels for outdoor equipment
- Assuming that all noise sources 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.

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 ±3dB. The conservative over-estimate of noise emission within the modelling procedure described above easily accounts for a variation of this level.

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