HINCKLEY NATIONAL
RAIL FREIGHT INTERCHANGE

Noise and Vibration

One of a series of background topic papers prepared by db symmetry in support of a public consultation on proposals for a strategic rail freight interchange in Blaby district, to the north-east of Hinckley in Leicestershire.

INTRODUCTION

1. In 2019 db symmetry will apply to the government for a Development Consent Order (DCO) for a proposed strategic rail freight interchange (SRFI) on a site in Blaby District, to the east of Hinckley in Leicestershire. The project is known as the Hinckley National Rail Freight Interchange (HNRFI).

2. A DCO is a special form of planning permission for large infrastructure projects. It can include a range of additional powers required to implement the proposals, such as powers to acquire land, undertake works to streets, trees and hedgerows and divert utility services.

3. This Topic Paper outlines assessment of the potential acoustic impact of the proposed Hinckley National Rail Freight Interchange on existing noise sensitive receptors during the site preparation, construction and operational phases of the proposed development.

4. This document has been prepared by Hydrock Acoustic Consultants (HAC) for db Symmetry.

5. Once the development is complete, noise associated with road, rail traffic, employment operations and noise generating plant and equipment has the potential to have an impact on noise sensitive receptors located in the immediate vicinity.

6. Noise sensitive receptors will also include noise sensitive premises such as residential dwellings as well as noise sensitive areas of special interest such as habitats.

7. An assessment of the likely significance of any predicted impact as a result of noise or vibration due to the proposed development will be undertaken by HAC.

8. Noise and vibration mitigation and control measures will be recommended to minimise the impact on nearby receptors to within acceptable levels.

9. Due to the technical nature of noise and vibration assessment, specific terms are commonly used to define and assess noise measurements and analyse data. On this basis an acoustic glossary is provided below to ease understanding of assessment terms used throughout this document.

10. A Non-Technical Summary of this paper can be found on page 29.

Table 1: Acoustic Terminology

dB or decibel	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2x10^{-5}$ Pascals).
dB(A) A-weighted decibel	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq,T}$	The equivalent continuous noise level over the time period.
$L_{Amax,T}$	L_{Amax}, Is defined as the maximum A - weighted sound pressure level recorded over the period stated (T). L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall $L_{Aeq,T}$ noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{An}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_{An} indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{A10} is the A-weighted level exceeded for 10% of the time, and the L_{A90} is the level exceeded for 90% of the time.
Free Field	Free-field level of a sound field is determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and away from buildings.
Façade Level	Façade Level. The sound field determined at a distance of 1m in front of large sound reflecting objects such as a building façade or wall.
SEL	Similar to the $L_{Aeq,T}$ - equivalent continuous sound level as the total sound energy is integrated over the measurement period. However instead of averaging over the measurement period, a reference duration of 1 second is used.
L_{ArT}	The A-weighted, sound pressure level of an industrial noise during a specified time period, adjusted for tonal character and impulsiveness.
Time Weighting Fast (F), Slow (S), Impulse (I)	Most sound level meters have two exponential time weightings, F = Fast and S = Slow with time constants of milliseconds respectively. Some also have Impulse Time Weighting which is a quasi-peak detection characteristic with rapid rise time (35 milliseconds) and a much slower 1.5 second decay. F : Fast = 125 milliseconds up and down, S : Slow = 1 second up and down, I : Impulse = 35 milliseconds while the signal level is increasing or 1,500 milliseconds while the signal level is decreasing.

LEGISLATION, POLICY AND GUIDANCE

11. An assessment of the effects of the proposed development on the noise sensitive receptors will be undertaken in accordance with the following best practice guidance and standards.

National Legislation and Policy

12. National Policy Statement for National Networks 2014 (NPS) – including the section on noise and vibration at paragraphs 5.186 -5.200.

NPS Overview:

13. The NPS sets out the need for, and Government policies to deliver, development of Nationally Significant Infrastructure Projects (NSIPs) on the national road and rail networks in England.

14. It provides planning policy for promoters of nationally significant infrastructure projects on the road and rail networks, and the basis for the examination by the Examining Authority and decisions by the Secretary of State.

15. For the purposes of the NPS, the developments referred to are national road, rail and strategic rail freight interchange developments.

16. Paragraphs 5.186-5.200 of the document primarily relate to noise and vibration as reproduced below:

17. Paragraph 5.186:

- *'Excessive noise can have wide-ranging impacts on the quality of human life and health (e.g. owing to annoyance or sleep disturbance), use and enjoyment of areas of value (such as quiet places) and areas with high landscape quality. The Government's policy is set out in the Noise Policy Statement for England. It promotes good health and good quality of life through effective noise management. Similar considerations apply to vibration, which can also cause damage to buildings. In this section, in line with current legislation, references below to "noise" applies equally to assessment of impacts of vibration.'*

18. Paragraph 5.187:

- *'Noise resulting from a proposed development can also have adverse impacts on wildlife and biodiversity. Noise effects of the proposed development on ecological receptors should be assessed in accordance with the Biodiversity and Geological Conservation section of this NPS.'*

19. Paragraph 5.188:

- *'Factors that will determine the likely noise impact include:*
    - *Construction noise and the inherent operational noise from the proposed development and its characteristics;*
    - *The proximity of the proposed development to noise sensitive premises (including residential properties, schools and hospitals) and noise sensitive areas (including certain parks and open spaces);*
    - *The proximity of the proposed development to quiet places and other areas that are particularly valued for their tranquillity, acoustic environment or landscape quality such as National Parks, the Broads or Areas of Outstanding Natural Beauty; and the proximity of the proposed development to designated sites where noise may have an adverse impact on the special features of interest, protected species or other wildlife.'*

NPS Applicant's Assessment

20. Paragraph 5.189:

- *'Where a development is subject to EIA and significant noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment, which should form part of the environment statement:*
    - *A description of the noise sources including likely usage in terms of Number of movements, fleet mix and diurnal pattern. For any associated fixed structures, such as ventilation fans for tunnels, information about the noise sources including the identification of any distinctive tonal, impulsive or low frequency characteristics of the noise.*
        - *Identification of noise sensitive premises and noise sensitive areas that may be affected.*
        - *The characteristics of the existing noise environment.*
        - *A prediction on how the noise environment will change with the proposed development:*
            - *In the shorter term such as during the construction period;*
            - *In the longer term during the operating life of the infrastructure;*
            - *At particular times of the day, evening and night as appropriate.*
    - *An assessment of the effect of predicted changes in the noise environment on any noise sensitive premises and noise sensitive areas.*

- *Measures to be employed in mitigating the effects of noise. Applicants should consider using best available techniques to reduce noise impacts.*

- *The nature and extent of the noise assessment should be proportionate to the likely noise impact.'*

National Planning Policy Framework 2018 (NPPF)

21. The 'National Planning Policy Framework' (NPPF), July 2018, Ministry of Housing, Communities and Local Government, sets out the United Kingdom Government's planning policies for adoption in England and how they should be applied.

22. The main aims of the NPPF are set out in section 11, as stated below.

'Planning policies and decisions should:

Encourage multiple benefits from both urban and rural land, including through mixed use schemes and taking opportunities to achieve net environmental gains – such as developments that would enable new habitat creation or improve public access to the countryside;

recognise that some undeveloped land can perform many functions, such as for wildlife, recreation, flood risk mitigation, cooling/shading, carbon storage or food production;

give substantial weight to the value of using suitable brownfield land within settlements for homes and other identified needs, and support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land;

promote and support the development of under-utilised land and buildings, especially if this would help to meet identified needs for housing where land supply is constrained and available sites could be used more effectively (for example converting space above shops, and building on or above service yards, car parks, lock-ups and railway infrastructure); and

support opportunities to use the airspace above existing residential and commercial premises for new homes. In particular, they should allow upward extensions where the development would be consistent with the prevailing height and form of neighbouring properties and the overall street scene, is well designed (including complying with any local design policies and standards), and can maintain safe access and egress for occupiers.'

23. The updated NPPF also brings into effect the 'agents of change' principle. This principle protects existing business, particularly licenced premises and venues, from unreasonable restrictions placed on them as a result of development permitted after they were established. This is generally not considered to be relevant to a development such as that proposed and is more focused towards the protection of existing commercial endeavours where new potentially sensitive l development is proposed.

24. The NPPF refers to guidance contained in 'Noise Policy Statement for England, March 2010, Department for Environmental, Food and Rural Affairs' (NPSE). The NPSE is

intended to apply to all forms of noise, other than noise occurring in the workplace and includes environmental noise and neighbourhood noise of all forms.

25. The NPSE provides advice regarding the impact of noise which should be assessed on the basis of adverse and significant adverse effect. However, the NPSE does not provide any specific guidance on assessment methods or the noise levels at which different effects would be applicable.

26. Moreover, the document advises that it is not possible to have '*a single objective noise-based measure…that is applicable to all sources of noise in all situations*. It further advises that the sound level at which an adverse effect occurs is *'likely to be different for different noise sources, for different receptors and at different times.'*

Noise Policy Statement for England 2010 (NPSE).

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30. Moreover, the document advises that it is not possible to have *'a single objective noise-based measure…that is applicable to all sources of noise in all situations'*. It further advises that the sound level at which an adverse effect occurs is '*likely to be different for different noise sources, for different receptors and at different times*'.

Planning Practice Guidance - Noise 2014 (PPG).

31. The guidance of PPG provides greater level of details in relation to the relevance of noise for planning following the introduction of the NPPF and NPSE.

32. It is stated under the heading '*How to Determine the Noise Impact*' that the following should be considered by local authorities:

- *'whether or not a significant adverse effect is occurring or likely to occur; whether or not an adverse effect is occurring or likely to occur; and whether or not a good standard of amenity can be achieved.'*

33. The assessed noise should include the overall effect of the development, inclusive of the construction stage once completed.

34. The guidance process includes identifying where noise exposure is above or below the

significant observed adverse effect level and the lowest observed adverse effect level for a given situation as required by the NPSE.

35. The observed effects are defined in Table 2 which is taken from the section headed *'How to Recognise when Noise could be a concern?'*

Table 2: PPG Noise Guidance

Perception	Examples of Outcome	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	*'No specific measures required'*
Noticeable and not intrusive	*'Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.'*	No Observed Adverse Effect	*'No specific measures required'*
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	*'Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.'*	Observed Adverse Effect	*'Mitigate and reduce to a minimum'*
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	*'The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.'*	Significant Observed Adverse Effect	*'Avoid'*

36. Under the section heading *'What factors influence whether noise could be a Concern?'*

the subjective nature of noise is discussed. It is stated that there is no simple relationship between noise levels and the impact on those affected. It is all dependent on how various factors combine in particular situations, which include:

- *'The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;*

- *For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;*

- *The spectral content of the noise (i.e. whether or not the noise contained particular high (treble) or low (bass) frequency content and the general character of the noise i.e. whether or not the noise contains particular tonal characteristics (drones and whines) or other particular features (impulsive regular noise events));*

- *The local topology and topography should also be considered, as they (natural land features) can have an effect on sound propagation, along with the existing and, where appropriate, the planned character of the area;*

- *Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation can be found in the Building Regulations;*

- *In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in noise may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur;*

- *If 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.'*

37. Similarly, to the NPSE, no specific noise parameters are defined in the guidance or target noise levels established for comparison.

The Town and Country Planning (Environmental Impact Assessment) Regulations 2017

38. The process of Environmental Impact Assessment (EIA) in the context of town and country planning in England is governed by the Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

39. The aim of EIA is to protect the environment by ensuring that a decision-taker, when deciding whether to allow a project which is likely to have significant effects on the environment to proceed, does so in the full knowledge of the likely significant effects, and takes into account the residual effects following mitigation in the decision-making process.

National Guidance

BS 7445-1:2003 'Description and measurement of environmental noise - Part 1: Guide to quantities and procedures.'

40. This document provides guidance on quantities and procedures for description and measurement of noise in community environments.

BS 4142:2014 'Method for rating and assessing industrial and commercial sound.'

41. The methods described in BS 4142:2014 provide an objective method for assessing the likelihood of disturbance caused by industrial or commercial noise. It can be used to determine:

    1. Rating levels for sources of sound of an industrial and/or commercial nature; and

    2. Ambient, background and residual sound levels,

    for the purposes of:

    1. Investigating complaints;

    2. Assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and

    3. Assessing sound at proposed new dwellings or premises used for residential purposes.

42. Certain acoustic features can increase the perceived impact of a specific noise source. Where such features are present at the assessment location, a character correction is added to the specific sound level to obtain the rating level.

43. The significance of noise impact is initially estimated for the specific sound by subtracting the measured background sound level from the rating level, and the following considered.

    A. Typically, the greater this difference, the greater the magnitude of the impact.

    B. A difference of around +10 decibels or more is likely to be an indication of a significant adverse impact, depending on the context.

    C. A difference of around +5 decibels 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.

44. Where the initial estimate of the impact needs to be modified due to the context, all pertinent factors should be taken into consideration.

BS 8233:2014 'Sound insulation and noise reduction for buildings - Code of Practice.'

45. To address noise control in and around different types of buildings, appropriate guidance and criteria can be taken from this British Standard. The criteria are primarily intended to guide the design of new buildings and are flexible depending on the situational circumstances. For example, Table 3 provides the BS 8233:2014 guidance criteria for indoor ambient noise levels in residential dwellings when they are unoccupied.

Table 3: BS 8233:2014 Internal Noise Limits - Residential

Activity	Location	Daytime (07:00-23:00) $L_{Aeq(16hour)}$ dB	Night-time (23:00-07:00) $L_{Aeq(8hour)}$ dB
Resting	Living room	35	-
Dining	Dining room /area	40	-
Sleeping (daytime resting)	Bedroom	35	30

46. The indoor ambient noise level guidance of BS 8233:2014 is qualified by various notes to the above table which have not been reproduced in full here, these notes generally consider separate assessment of ground-borne noise, assessment time periods in atypical situations, exclusion of unusual or atypical events, assessment of individual events, alternative ventilation strategies and guidance on what constitutes reasonable internal acoustic conditions.

47. Specifically Note 7 states:

'Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable conditions still achieved'.

48. BS 8233:2014 also provides guidance on external noise levels for protection of private amenity spaces for residential demises. It is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, 55dB $L_{Aeq,T}$ should be regarded as the upper guideline value.

49. However, it is recognised that these guideline values are not achievable in all circumstances where development might be desirable. For higher noise areas, such as city centres or urban areas adjoining a strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might

be warranted.

50. Under such circumstances, the development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited on this basis.

BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Noise.'

BS 5228-2:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Vibration.'

51. The standards recommend methods for the control of noise and Vibration on construction and open sites where significant noise or vibration levels may arise from work activities/operations. The standards concentrate on predicting and measuring noise and vibration and impact assessments for those exposed to the relevant activities.

BS 6472-1:2008 'Guide to evaluation of human exposure to vibration in buildings.'

52. Structural vibration in buildings can be detected by the occupants and can affect them in many ways; their quality of life can be reduced, as can their working efficiency. The standard provides best available information on the application of methods of measuring and evaluating vibration in order to assess the likelihood of adverse comment.

Design Manual for Roads and Bridges 2011, Volume 11 Section 3 Environmental assessment techniques, Part 7 DMRB Revision 1, Noise and Vibration,

53. This Advice Note sets out guidance for environmental assessment in relation to all trunk road projects. It also sets the overall aims and objectives of the Environmental Assessment process to be undertaken.

World Health Organisation 'Guidelines for Community Noise' 1999.

54. The internal and external noise guidance of BS 8233:2014 is based on research by the World Health Organisation (WHO) and therefore, the BS 8233:2014 guidance is applicable for guidance on the health effects of noise at night and more specifically, individual event maximum noise levels.

55. The WHO document indicates an internal $L_{Amax,F}$ 42 dB as being an appropriate level to avoid significant adverse health effects. Acoustically, variations in noise level of ± 3 dB(A) are considered to be just perceptible to a normal hearing person. Therefore, events including $L_{Amax,F}$ 45 dB as an upper target at night measured internally within a Bedroom space would be satisfactory.

Department of Transport 'Calculation of Road Traffic Noise' 1988

56. The Department of Transport: Calculation of Road Traffic Noise is used to calculate the predicted noise emissions of road traffic noise emanating from surrounding roads.

Department of Transport 'Calculation of Railway Traffic Noise' 1995

57. The Department of Transport: Calculation of Railway Traffic Noise' is used to calculate the predicted noise emissions of railway noise emanating from surrounding routes.

The Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996

58. These Regulations apply in respect of initial works, additional works or altered works forming part of a transport system of any of the following kinds

- *(a) Railways*
- *(b) Tramways*
- *(c) Systems using a mode of guided transport.*

Subject to and in accordance with the provisions of these Regulations, the responsible authority shall carry out, or make a grant in respect of the cost of carrying out, insulation work in or to any eligible building when on or after the relevant date the movement of vehicles using, or expected to use, initial works or additional works, as the case may be, causes, or is expected to cause, noise at a level not less than the level referred to in the document.

59. These Regulations do not apply in respect of noise resulting from ground-borne vibration.

Regional Policy

Leicester & Leicestershire 2050: Strategic Growth Plan (Draft) 2018

60. 2050 *The Strategic Growth Plan for the ten partner organisations - the City Council, the County Council, the seven boroughs and districts, and the Leicester & Leicestershire Enterprise Partnership prepares a plan which will shape the future of Leicester and Leicestershire. This will be a 'non-statutory' plan, covering the period to 2050.*

61. *It will provide an agreed framework for Local Plans prepared by individual authorities.*

Local Policy

Blaby District Local Plan and Core Strategy 2013

62. The Local Plan (Core Strategy) was adopted by Blaby District Council on 21st February 2013.

63. Policy CS3 'Sustainable Urban Expansion' includes the following in relation to noise:

- *"The development will need to include appropriate measures to mitigate the noise (sic) impacts arising from the development (sic) on existing residents (primarily but not exclusively, those impacts caused by proximity to the M1 and M69 motorways)."*

64. The policy predominantly relates to provision of new residential dwellings in the vicinity of the noted motorways. However, it has been included here for consideration of the proposal of mitigating impacts from development.

Hinckley and Bosworth Borough Council local plan and core strategy 2009

65. It is understood that Blaby District Council is the host authority for the development. However, in the context of the National Planning Strategy, the Hinckley policies are relevant despite this not being the 'host' authority, particularly where noise sensitive receptors may fall close to or within the boundary of an adjacent local authority jurisdiction.

66. The Local Plan (Core Strategy) was adopted by Hinckley and Bosworth Borough Council in December 2009.

67. The Local Plan 2006 to 2026 aims to achieve the following:

- *'To have the right facilities, housing, and infrastructure in the right places*
- *To support the local communities by addressing the needs and opportunities of an area*
- *To help to support the growth of the local economy and tourism'*

68. The Hinckley and Bosworth Core Strategy Sets out the overarching strategy and core policies to guide the future development of the Borough to 2026. The Core Strategy is the key Development Plan Document (DPD) in the Local Plan 2006 - 2026 (formerly LDF) providing the vision and spatial strategy for the borough.

Noise Planning Policies of Hinckley and Bosworth Borough Council

69. Relevant local development policies where noise is specifically referred to, are outlined below from the Local *'Site Allocations and Development Management Policies'* document adopted July 2016 into the Local Plan:

70. DM10: *'Development & Design'*

71. *Development will be permitted provided the following requirements are met:*

    - *'It would not have a significant adverse effect on privacy and amenity of nearby residents and occupiers of adjacent buildings including matter of lighting, air quality (including odour), noise, vibration and visual intrusion.'*

THE SITE

Site Location

72. The land within the Draft DCO Boundary ("the site") is located to the northeast of Hinckley, Leicestershire, which has a population of 45,249 (2011 Census). The wider surrounding area (including the areas of Blaby, Leicester, Hinckley and Bosworth, and Nuneaton and Bedworth) has a total population of around 300,000.

73. The site is bound by the Felixstowe to Nuneaton rail line which forms its north-western boundary and the M69 motorway to the east (including Junction 2 at the southeast corner of the site).

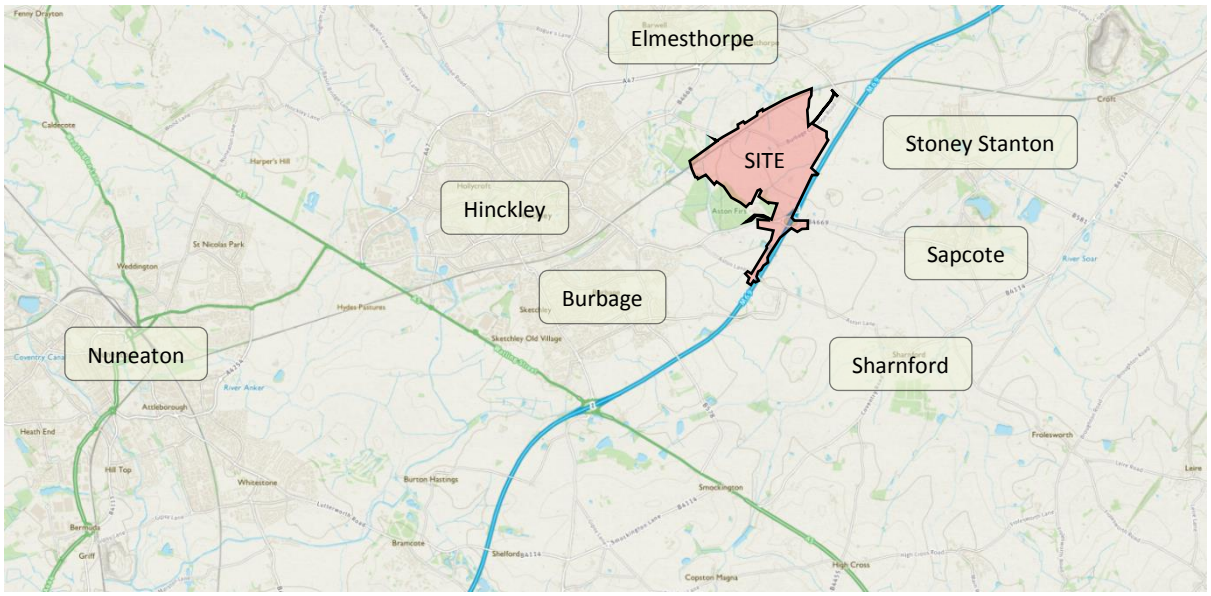
74. The B4669 Hinckley Road runs in an east-west alignment to the south of the site.

75. Burbage Common Road routes through the site and enters/exits at two separate locations to the east (B581 Station Road) and north (B4668 Leicester Road) of the site.

76. The site in its local context can be seen in

77. Figure 1.

Figure 1 - Site Location Plan



78. At present, the site primarily comprises agricultural land and a small number of individual properties and farms.

Study Area

79. Baseline information will be obtained for the land within the Draft DCO Boundary and the surrounding area within a 500m radius of the boundary of the Draft DCO area (the 'Study Area').

80. The assessment of impacts will focus on the nearest noise sensitive receptors to the 'Study Area', in the immediate vicinity.

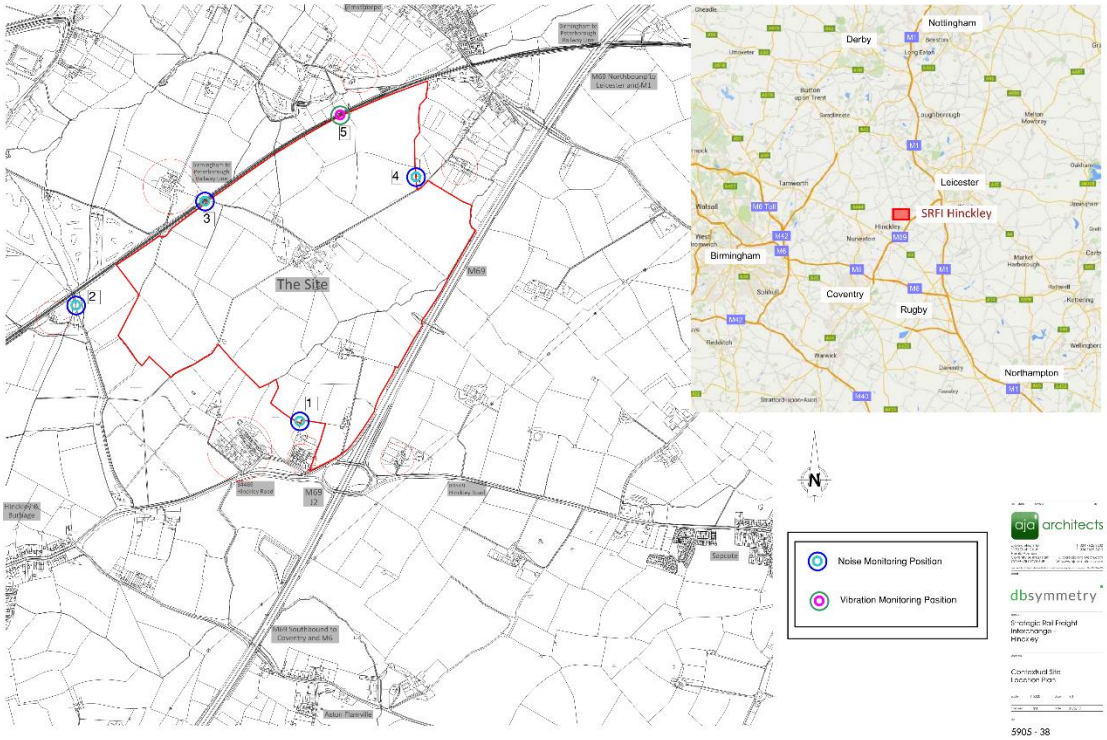
81. The noise sensitive receptors to be assessed as part of the ES will include, but not be limited to, the following:

- *Castlewood Mobile Home Park;*
- *Woodfield Stables;*
- *Aston Firs Caravan Park;*
- *Bridge Farm;*
- *Elmesthorpe Estate;*
- *Langton Farm;*
- *Averley House Farm;*
- *Properties within Elmesthorpe Village.*

82. Receptors such as traveller sites will also be considered where deemed noise sensitive.

83. The below figure indicates the identified environmental noise survey assessment locations:

Figure 2 – Noise and Vibration Monitoring Location Plan



84. The noise and vibration monitoring positions were chosen to be representative of the site boundaries such that surrounding receptors can be assessed for the potential impact from construction, and operational phases of the development.

85. Hydrock have also received rail working papers from WSP as of 9/5/18. These rail working papers detailing items (such as train capacity, rail terminal storage capacity etc.) that are to be analysed for inclusion into the assessment, this document package also contained:

- *An explanation of the number of containers carried on each train including conversion to lorry trips saved.*

86. The above data will be reviewed and incorporated into the acoustic assessment on rail noise impact, and potential noise impact from road traffic as a result of the development.

ASSESSMENT APPROACH

Desktop Studies

Construction Phase

87. An assessment is being undertaken to determine the impact of noise and vibration associated with construction activities on nearby noise sensitive receptors. Construction noise generally comprises:

- Moving plant and equipment servicing groundworks and activities such as piling and the ongoing construction works.
- Temporary fixed power sources such as generators (large and small) for onsite and welfare facilities power provision.
- Hand and power tools used within the construction process.

88. The assessment is being carried out in accordance with guidance provided within BS 5228:2009.

89. The significance of construction noise and vibration effects will then be determined through application of the guidance from BS 5228 Part 1 Annex E and BS 5228 Part 2. 'Code of practice for noise and vibration control on construction and open sites'.

90. The assessment of noise levels due to construction activity and their significance will be dependent on the prevailing ambient and construction noise levels, as well as the level, duration, time of occurrence and frequency of the activity.

Road Traffic Noise

91. The site is expected to give rise to road traffic associated with the movement of freight nationally to and from the rail interchange.

92. Such road traffic will typically include HGV movements to and from the site and the UK motorway network.

93. An assessment of road traffic noise, including that identified above that is likely to affect the site and surrounding receivers, will be undertaken using baseline and future road traffic volume data obtained from the transport consultants and input into Datakustik CadnaA Version 4.5.151 (CadnaA) noise modelling software.

94. The assessment will predict the likely impact of future traffic associated with the proposed development on nearby noise sensitive receptors.

95. The impact will be assessed using the methodology provided in the Design Manual for Roads and Bridges (DMRB) or any other relevant guidance such as Department of Transport 'Calculation of Road Traffic Noise' (CRTN).

Operational Phase

96. During operation the site will have fixed externally located or externally exhausting equipment and plant which could potentially be a source of noise, such items which require consideration include:

- Operational plant within the rail port.
- Supply and extract air provision and ventilation equipment.
- Refrigeration plant.
- The site may also have independent or emergency power generation equipment.
- Substations associated with its connection to the national power grid.

97. Operational noise sources such as those outlined above, which can be described as either:

- External fixed plant.
- Internal plant which generates noise to atmosphere.
- Commercial operations,
- Any other equipment.

98. An assessment of the impact will be undertaken using CadnaA noise modelling software and measurement data collected during field studies.

99. Where specific data will not be available to allow prediction of noise levels from plant and equipment associated with the proposed development, measurement data collected during field studies will be used for the setting of suitable noise limits as sensitive receptors.

Consultation

100. Liaison has been undertaken with the Environmental Health Departments of Blaby District Council, and Hinckley and Bosworth Borough Council in order to confirm the proposed noise monitoring locations. A suitable monitoring methodology was previously agreed prior to the site survey being undertaken.

101. Further consultation was undertaken with Natural England in order to determine the prevalence of designated nature conservation sites, protected landscapes and protected species within the study area.

102. In May 2018 email correspondence was sent to Blaby District Council and Hinckley and Bosworth Borough Council providing the outline of our proposed monitoring and assessment methodology. This followed the Scoping Opinion response received by HAC

from both Councils. Both Councils agreed to the methodology and the monitoring locations as proposed.

103. HAC undertook a baseline noise and vibration survey between the 24/07/2018 and 01/08/2018when access was available to site which is under multiple ownership.

Field Studies

104. A combination of long and short-term environmental noise measurements was undertaken in accordance with the requirements and guidance of BS 7445-1:2003 and BS 4142:2014. Measurements were undertaken at multiple locations across the proposed development site for a minimum of 168 hours (7 continuous days) in order to determine the baseline noise levels of the site.

105. The survey included extensive measurement of the surrounding road and rail network as well as background noise levels at the identified nearest noise sensitive receptors.

106. Baseline noise measurements are being used to develop an acoustic model of the proposed development site and surroundings using computer software, Ordnance Survey mapping, geo satellite imagining and measured noise levels in order to determine the existing noise climate across the site.

107. The noise model will later be used in part to quantify the impacts of the various phases of the development on nearby noise sensitive receptors.

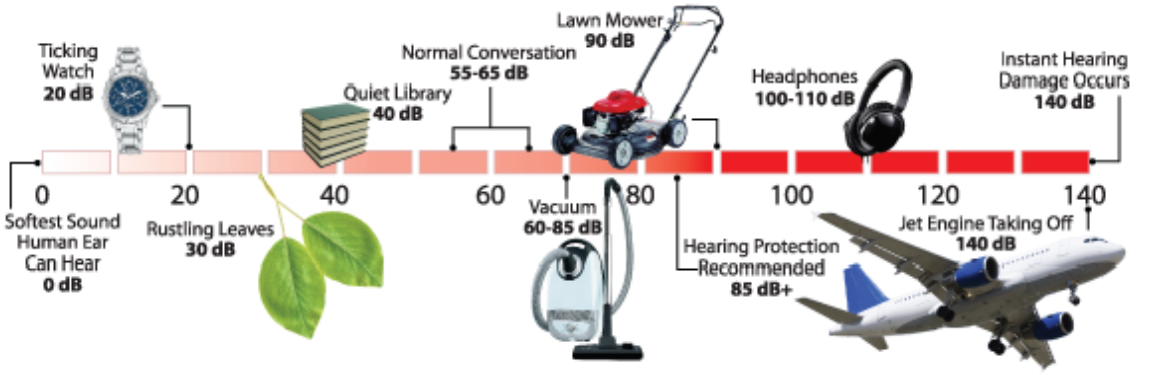
THE LIKELY MAIN EFFECTS OF THE PROPOSALS

108. Noise and vibration are experienced subjectively by receptors and individuals thus to assess these impacts objectively in a reportable format a process of categorisation is needed for the various forms of noise or vibration that may have an impact on their surroundings.

109. Sound level meters (SLM) measure sound pressure levels in terms of decibels. It is often difficult to understand the decibel scale as noise levels are not simply described as loud or quiet or moderate but are numerically presented.

110. The below figure outlines a presentative range of noise types in context of their decibel level, and sound pressure/intensity levels, the table also helps the reader understand how decibels increase and decrease with noise source volume, size and type:

Figure 3 : Representative Sound Pressure Levels



111. Technical terms are applied to objectively assess the objective impact of such a development some of which are explained below:

112. Magnitude: *'A numerical quantity or value.'*

113. Significance: '*The quality of being worthy of attention or importance*.'

114. Threshold: *'the magnitude or intensity that must be exceeded for a certain reaction, phenomenon, result, or condition to occur or be manifested.'* (*for example, the level above which an impact is harmful or of certain qualifying significance).'*

115. Sensitivity: *'Condition of being sensitive i.e. the capacity to respond to changes in the environment.'*

116. Effect: '*A change which is a result or consequence of an action or other cause/ cause (something) to happen; bring about change*.'

Significance of Effects

117. The significance of likely effects arising from plant and equipment associated with the site clearance, construction and operational phase of the proposed development on the environment is to be determined by identifying the magnitude of the effect and the sensitivity of the receptor.

118. Identifying the sensitivity, magnitude and significance will be based on the criteria described below.

Magnitude of Effect-Construction Phase

119. The significance of effects of the proposed development during the site preparation, construction and operational phases will be assessed. The assessment will outline both the long and short term predicted effects of each phase of the development and any required or specified mitigation measures in order to reduce any significant adverse effects of noise and vibration upon the identified noise sensitive receptors.

120. An assessment will be undertaken to determine the effects of noise and vibration associated with construction activities on nearby noise sensitive receptors. The assessment will be carried out in accordance with BS 5228:2009.

121. The significance of construction noise and vibration effects will be determined through the guidance of BS 5228 Part 1 Annex E and BS 5228 Part 2. The assessment of noise levels due to construction activity and their significance of effects will be dependent on the prevailing ambient and construction noise levels, as well as the magnitude, duration, time of occurrence and frequency of the noise change.

Table 4– Potential Construction Noise Significant Effects at Noise Sensitive Receptor.

Assessment category and threshold value period	**Threshold values in decibels (dB) ($L_{Aeq,T}$)**		
	A	B	C
Night-time (2300-0700 Hrs)	45	50	55
Evenings (1900-2300 Hrs Weekdays) Weekends (1300-2300 Hrs Saturdays and 0700-2300 Hrs Sundays)	55	60	65
Daytime (0700-1300 Hrs) and Saturdays (0700-1300 Hrs)	65	70	75

122. The values in Category A, B and C are the threshold values to be used to determine the potential for significance at a noise sensitive property, based on ambient noise levels rounded to the nearest 5dB.

123. A receptor is categorised by comparing its rounded ambient noise level with the values assigned to a Category for a relevant time period. It is then categorised depending on whether the rounded ambient noise levels are less than, equal to, or higher than the values in the respective Category column.

124. A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level. If the ambient noise level exceeds the Category C threshold levels given in the table, then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise.

125. Exceedance of fixed noise limits will be used to inform the assessment of the magnitude of effect of construction noise in relation to all other land uses. Noise levels, between 07.00 and 19.00 hours, outside the nearest window of the occupied room at the identified noise sensitive receptors closest to the site boundary, will be assessed against a fixed value of 70 decibels (dBA).

126. The magnitude of effect for dwellings will ultimately be determined on the basis of professional judgement, baseline noise levels determined from surveys and comparison with the fixed limit described.

Magnitude of Effect-Construction Phase-Vibration

127. The magnitude of effect of construction vibration will be considered in relation to the guidance provided with BS 5228-2:2009. Typically, the main effects of vibration arise from piling or ground work activities. It is noted that the duration of construction vibration impacts is of less significance because all of the construction works generating vibration will be of relatively short duration.

128. The significance of potential construction vibration impacts is categorised according to the vibration magnitude as follows:

- *Any works causing a vibration level greater than 10mm/s (measured as a peak particle velocity) will constitute a high adverse impact;*
- *Any works causing a vibration level between 1mm/s and 10mm/s will constitute a moderate adverse impact;*
- *Any works causing a vibration level between 0.3mm/s and 1mm/s will constitute a low adverse impact; and:*
- *Any works causing a vibration level less than 0.3mm/s will constitute a neutral or negligible impact.*

Magnitude of Effect-Road & Rail Traffic

129. The Design Manual for Roads and Bridges (DMRB) will be used as the basis for the assessment of road traffic noise in relation to the Proposed Development. DMRB provides a simple and detailed method for assessing the effects of road traffic noise during both the construction and operational phases.

130. The assessment methodology is usually used for new roads; however, the simple method provides a robust methodology for assessing the change in traffic on existing roads.

131. The assessment requires a calculation of the short term and long-term impacts of the development at noise sensitive receptors through a comparison of the following design scenarios, based on projected baseline and design year traffic data.

- Do-Minimum scenario in the baseline year against Do-Something in the baseline year.
- Do-Minimum scenario in the baseline year against Do-Something in the future assessment year.

132. The magnitude of effect will be determined on the basis of a noise change assessment, making reference to tables 3.1 and 3.2 'Classification of Magnitude of Noise Impacts in the short-term and long term' from the DMRB, which is set out in Table 5.

133. In accordance with paragraph 5.191 of the NPS for National Networks, the Department of Transport's Calculation of Railway Noise will be used in conjunction with the methodology outlined in the Noise Insulation (Railways and other Guided Transport Systems) Regulations to determine the predicted increase in noise level owing to rail traffic at the nearest noise sensitive receptors.

134. The magnitude of effect will be determined on the basis of a noise change assessment, referring to Table 3.1 and Table 3.2 'Classification of Magnitude of Noise Impacts in the short-term and long term' from DMRB, which is detailed in Table 5 below.

Table 5 – Level of Magnitude for Road Traffic Noise (Construction and Operational)

Level of Magnitude	Noise Change $L_{A10,18hr}$ dB Short Term	Noise Change $L_{A10,18hr}$ dB Long Term	Magnitude of Impact – as described in DMRB
High	5+	10+	Major
Moderate	3-4.9	5-9.9	Moderate
Low	1-2.9	3-4.9	Minor
Negligible	0.1-0.9	0.1-2.9	Negligible
	0	0	No Change

135. The Department of Transport, Calculation of Railway Noise will be used in conjunction with the methodology outlined in the Noise Insulation (Railways and other Guided Transport Systems) Regulations to determine the predicted increase in noise level owing to rail traffic at the nearest noise sensitive receptors.

136. As neither document contains a method to determine the level of magnitude owing to the impact from rail noise on noise sensitive receptors the magnitude of effect will be determined using the methodology outlined in the DMRB and Table 5.

Magnitude of Effect-Operational Phase

137. The magnitude of effect of any externally located or externally exhausting plant or equipment associated with the proposed development will be assessed. Further assessment will be undertaken of operational noise which may arise from commercial activities, such as the movement of stock within the railport and warehouse yards, on the identified noise sensitive receptors through the methodology outlined in BS 4142:2014.

138. BS 4142:2014 provides guidance on the assessment of the likelihood of complaints relating to noise from industrial sources. The standard presents a method of assessing potential noise impact by comparing the noise level due to industrial sources (the Rating Level) with that of the existing background noise level at the nearest noise sensitive receptor in the absence of the source (the Background Sound Level).

139. The magnitude of effect will be determined on the basis of a BS 4142:2014 assessment, referring to the significance descriptions summarised in Table 6.

Table 6 – Level of Magnitude for Operational Activities

Level of Magnitude	**Definition of Magnitude**	
	BS 4142 Assessment Rating Level	**Descriptions provided in BS 4142 for the Likely significance of Impact.**
High	+10 dB or Greater	*'A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.'*
Moderate	+5 dB to +10 dB	No BS 4142 description but the greater the difference, the greater the magnitude of the impact.
	+5 dB	*'A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context'*
Low	0 to +5dB	*'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.'*
Negligible	< 0	*'When 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'*

Sensitivity of Receptor

140. The sensitivity of individual receptors will be selected based on their usage class, distance from the source and the prevailing background noise level in the immediate vicinity.

141. Receptors deemed to be classed as highly sensitive will typically be; residential dwellings, hospitals, care homes, hotels and other forms of private accommodations.

142. Offices, shops, warehouses and outdoor amenity spaces will typically be classed as low sensitivity receptors.

143. The sensitivity of environmental receptors, such as woodland habitats and areas of outstanding naturally beauty, will be determined during consultation with Natural England regarding the proximity and sensitivity of each area on a case by case basis.

Duration of Effect

144. The duration of effects will be taken into consideration when determining the overall significance of the effects. The following timescales outlined in Table 7, will be used to define the terms:

Table 7 – Duration of Effect

Timescale	Definition
Short Term	0-5 years including the construction period on completion
Medium Term	5-15 years including mitigation establishment
Long Term	15+ years including long term operation of the development

Significance of Effect

145. The significance of effects arising from noise associated with the construction and operational phase of the proposed development on the noise environment will be determined by identifying the magnitude of the effect and the sensitivity of the receptor.

146. Identifying the sensitivity, magnitude and significance will be based on the criteria described in Table 8:

Table 8 – Impact Descriptors for Individual Receptors

Receptor sensitivity	Magnitude of Impact					
		Very High	**High**	**Medium**	**Low**	**Very Low**
	Very High	Major	Major	Moderate	Minor	Minor
	High	Major	Moderate	Minor	Minor	Negligible
	Medium	Moderate	Minor	Minor	Negligible	Negligible
	Low	Minor	Minor	Negligible	Negligible	Negligible
	Very Low	Minor	Negligible	Negligible	Negligible	Negligible

147. The noise and vibration assessment will include the following:

- *The assessment of construction noise and vibration impacts on the identified nearest noise sensitive receptors.*
- *The noise and vibration impact associated with the operation of the development.*
- *Formulation of noise control measures where appropriate.*

148. The site clearance and construction noise and vibration impacts will be assessed through comparison with relevant guidance.

149. The operational impacts of the proposed development post construction will be assessed through appropriate methods in order to determine the significance of their affects.

150. Where necessary, consideration within the design stage of the development process will be provided outlining appropriate noise control measures in order to ensure that noise limits are met based upon the baseline measurements, calculated significance of effects and relevant standards and guidance criteria.

151. The significance of effects of the proposed development during the site clearance, construction and operational phases will be summarised in the assessment chapter. The assessment chapter shall outline both the long and short term predicted effects of each phase of the development and any required or specified mitigation measures in order to reduce the impact of noise and vibration upon the identified noise sensitive receptors.

152. With reference to the guidance documentation:

- Effects of Major significance that are above the 'Unacceptable Adverse Effect Level' (UAEL) should be prevented and require mitigation
- Effects of Moderate significance that are above the 'Significant Observed Adverse Effect Level' (SOAEL) should be avoided and require control.

- Effects of Minor significance that are below the SOAEL do not require mitigation but they are above the 'Lowest Observed Adverse Effect Level' (LOAEL) and should be minimised and reduced as far as reasonably practicable.

153. In summary effects of Major or Moderate significance are defined as Significant and effects of Minor significance or below are defined as Not Significant for the purposes of the Environmental Impact Assessment.

Proposed Cumulative Assessment

154. The Intra-project (the affects from all sources within this project) and inter-project (this project with other developments) cumulative effects will be assessed in accordance with the above methods.

155. The potential intra-project relationship of effects with other environmental impacts will be considered during the assessment.

156. The inter-project cumulative effects of the proposed development acting in combination with other major developments locally will also be assessed.

157. Those developments which are considered to be of relevance to the assessment of noise have been identified

158. Developments considered will generally fall into the Study Area previously identified and have previously been agreed in advance with Blaby and/or Hinckley and Bosworth Local Authorities depending on relevance to each authority's jurisdiction.

PROPOSED APPROACH TO MITIGATION

159. Having assessed the magnitude of impact against the identified receptors, the assessment will consider whether any noise control or mitigation measures are necessary to further control noise incident on receptors.

160. Where possible, noise control measures will be embedded or *'built in'* into the design of the proposed development to reduce the environmental effects to an acceptable level. However, where this is not sufficient, further measures may be specified where significant adverse effects have been identified.

161. The residual effects of the proposed development taking account of embedded *'built in'* and additional mitigation will be confirmed to reduce, remove or compensate for any significant adverse effects identified.

NEXT STEPS

162. The environmental noise survey data retrieved from site has been processed and analysed to establish the underlying acoustic environment and finalise the baseline computer models of the existing acoustic environment.

163. The noise and vibration effects as a result of the proposed development generated during all phases (construction and operation) will then be assessed using appropriate methodologies against these underlying acoustic characteristics.

164. The impact assessments once undertaken will inform both the long term and short term predicted effects of each phase of the development and any required or specified mitigation measures will be derived and proposed based on the findings of those assessments.

Hydrock ◆ October 2018

NON-TECHNICAL SUMMARY

165. An assessment is being undertaken to determine the potential noise and vibration effects the project may have on the study area (500m) around the site.

166. The assessment has been undertaken in line with the principles set out in National, Regional and Local Policy.

167. The scope of this noise and vibration assessment will include the following specific aspects:

- *Determination of the prevailing baseline ambient, maximum and background noise and vibration levels.*
- *Assessment of the potential noise and vibration associated with the site enabling and construction activities*
- *Noise associated with the operation of building services plant of the development*
- *Noise associated with the operation of commercial activities of the development*
- *The predicted future baseline ambient and background noise*
- *Baseline noise and vibration surveys undertaken in Summer 2018.*

168. The purpose of the site survey was to determine the prevailing noise and vibration levels around the proposed development site and to assist the validation of the baseline computer noise model.

169. A qualitative assessment will be undertaken for the likely noise and vibration impact associated with the construction phase of the proposed development on nearby noise sensitive receivers in accordance with British Standard BS 5228-1:2009+A1:2014 (Code of practice for noise and vibration control on construction and open sites).

170. A computer noise model is also being prepared to: assess the likely noise impact on existing noise-sensitive receptors due to the enabling and construction phases.

171. The cumulative construction noise effects will be limited to the temporary period of construction works and would likely be intermittent depending on the construction works that are taking place.

172. Mitigation measures during the enabling and construction phase will be outlined based on best practice measures presented in BS 5228-1:2009+A1: 2014 and BS 5228-2:2009+A1: 2014.

173. The baseline computer noise model will also be used to inform the design criteria for Operational Noise of the development post construction.

174. An operational noise model will be developed to inform the above assessment.

175. Any machinery associated with the commercial uses, such as air conditioning or air extraction will be required to adhere to specific noise limits which will be set out to ensure that this effect is mitigated.

176. The cumulative effect of building services plant, operational noise from the site, and noise associated with the proposed development access routes, will be considered at noise sensitive receptors.

177. Acoustic design criteria and mitigation measures will be provided in order for noise impact as a result of the future development in operation to be minimised at potential noise sensitive receptors.