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## CHAPTER 6.0 NOISE AND VIBRATION

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## 6.0 NOISE AND VIBRATION

### 6.1 Introduction

6.1.1 This Chapter of the EIAR Main Report updates the corresponding chapter on noise in the May 2011 ES. The Chapter assesses the likely significant environmental effects of the Proposal with regard to operational noise and increase in road traffic noise, as a result of the increased waste tonnage throughput. It describes the methods used to assess the effects, the established baseline noise conditions and the potentially affected noise sensitive receptors. The Chapter sets out the potential direct and indirect impacts arising from the Proposal and where relevant provides details of any mitigation measures required.

6.1.2 The scope of the assessment includes:

- Information on the potential noise impact of the Proposal on existing Noise Sensitive Receptors (NSR) from any increase in operational noise;
- Information on the potential noise impact of the Proposal on NSR from any increase in road traffic movements; and
- Information on the noise mitigation measures, which may be necessary to comply with current noise standards and guidance.

6.1.3 Potential noise effects are considered in the context of the predicted background noise levels at NSRs, which at this location, are generally influenced by local and distant road traffic movements.

6.1.4 Appendix 6-1 provides details of noise technical terms used within the Chapter. There is also a chart showing typical everyday noise levels to assist in understanding the subjective level of noise in terms of decibels (dB).

#### ***The Proposal***

6.1.5 A full description of the Proposal is provided in Chapter 3.0 of the EIAR Main Report. The LSEP facility will operate 24 hours per day and 7 days per week (as permitted) and as now proposed, the LSEP HGV movement would take place between 07:00 to 23:00 hours.

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- 6.1.6 In terms of assessment of noise impacts, the following needs to be considered:
- Identify any change in operation noise due to the increase in tonnage throughput; and
  - Identify any change in LSEP site operation vehicle noise relative to the local road network.
- 6.1.7 The maximum permissible levels from LSEP at NSR locations have been agreed with the Local Planning Authority (Cheshire West and Chester Council 'CWACC') through the discharge of condition 28 of the DPP. This means that there is no requirement for updating baseline levels at NSR as this condition overrides the need for establishing existing noise levels.

### ***Competence***

- 6.1.8 This Chapter has been prepared by Noise and Vibration Consultants (NVC) Ltd. The author of this Chapter, D R Kettlewell MSc MIOA MAE I.Eng has over 35 years' experience in the field of industrial and environmental acoustics with a Masters' Degree in Acoustics and is a Member of the Institute of Acoustics, Member of the Association of Noise Consultants, Member of the Academy of Experts and an Incorporated Engineer.

## **6.2 Methodology & Scope of Assessment**

### ***General***

- 6.2.1 To establish the impact of the development in respect of noise on NSR it is necessary to consider the relevant noise guidance, standards and policy for the Proposal. The following section examines the guidance and establishes the methodology to be adopted for assessing noise impacts.
- 6.2.2 Information used in this assessment has been obtained from the following sources:
- Ordnance Survey maps of the local area;
  - The layout of the Proposal;
  - National Planning Policy Framework –July 2021;
  - Noise Policy Statement for England (NPSE) – March 2010;
  - Planning Practice Guidance – July 2019;

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- British Standards BS4142: 2014+A1:2019 and BS8233: 2014;
  - World Health Organisation: 'Guidelines for Community Noise' - April 1999;
  - World Health Organisation 'Night Noise Guidelines for Europe' – 2009;
  - Department of Transport 'Calculation of Road Traffic Noise': 1988;
  - Design Manual for Roads and Bridges, LA 111: 2019;
  - ISO 9613-2: 1996 Acoustics – Attenuation of Sound During Propagation Outdoors; and
  - Traffic data contained within the Transport Assessment (TA) of the EIA;

### **Consultation**

- 6.2.3 The Applicant has submitted a Scoping Report to BEIS which has been reviewed and a scoping response provided by BEIS, CWACC and other relevant consultees.

### **Legislation and Guidance**

- 6.2.4 The following section outlines the key planning policy and guidance that relates to the assessment of residential amenity and protection of residents from general environmental and industrial noise sources.

#### *The National Planning Policy Framework (NPPF - July 2021)*

- 6.2.5 Chapter 15 of the National Planning Policy Framework (NPPF) relates to 'Conserving and enhancing the natural environment'. Paragraph 174 (e) refers directly to noise and states that: *"preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."*
- 6.2.6 Furthermore, paragraph 185 states: *"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

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- a) *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
  - b) *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
  - c) *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.”*

6.2.7 The Noise Policy Statement for England (NPSE)<sup>1</sup> was published in March 2010. It specifies the following long-term vision and aims: *“Noise Policy Vision: Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.”* This long-term vision is supported by the following aims:

*“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

- *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.”*

6.2.8 The NPSE introduced three concepts to the assessment of noise, as follows:

- NOEL – No Observed Effect Level: This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise;
- LOAEL – Lowest Observed Adverse Effect Level: This is the level above which adverse effects on health and quality of life can be detected; and
- SOAEL – Significant Observed Adverse Effect Level: This is the level above which significant adverse effects on health and quality of life occur.

6.2.9 The above categories are undefined in terms of noise levels and for the SOAEL, the NPSE indicates that the noise level will vary depending upon the noise source, the receptor and the time of day / day of the week. The need for more research is therefore required to establish what may represent a SOAEL. It is acknowledged in

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<sup>1</sup> *Noise Policy Statement for England – March 2010*

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the NPSE that not stating specific SOAEL levels provides policy flexibility until there is further evidence and guidance.

- 6.2.10 The NPSE indicates how the LOAEL and SOAEL relate to the three aims listed above. The first aim of NPSE requires that: *“significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development.”*
- 6.2.11 The second aim of the NPSE (mitigating and minimising adverse impacts on health and quality of life) refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate adverse effects on health and quality of life whilst also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur, as there may be situations where there is a limit to the effect of mitigation to try and minimise impacts, due to other essential operational requirements.
- 6.2.12 The third aim envisages pro-active management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development.

#### *National Planning Practice Guidance*

- 6.2.13 In 2014, the Government published the National Planning Practice Guidance (PPG) on noise, which provides further information in respect of new developments which may be sensitive to the prevailing noise environment. The PPG was updated in July 2019<sup>2</sup> and the guidance on consultation and pre-decision matters were updated in June 2021.
- 6.2.14 The PPG refers to the NPSE documents and under the heading ‘How can noise impacts be determined?’ it states: *“Plan-making and decision taking need to take account of the acoustic environment and in doing so consider:*
- *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.”*

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<sup>2</sup> *Planning Practice Guidance – 22<sup>nd</sup> July 2019 Department for Communities and Local Government (Ref ID: 30-001-20190722)*

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6.2.15 At paragraph 004, the PPG includes a table summarising the noise exposure hierarchy, based on the likely response. Under the heading of ‘*example of outcome*’ the ‘*present and not intrusive*’ assessment of noise is defined as “*noise can be heard, but does not cause any change in behaviour, attitude or physiological response. Can slight affect the acoustic character of the area but not such that there is a change in the quality of life*”. The increasing effect level under these conditions is deemed to be ‘*no observed adverse effect*’ and ‘*no specific measures are required.*’

6.2.16 The PPG explains this by stating:

*“At the lowest extreme, when noise is not perceived to be present, there is by definition no effect. As the noise exposure increases, it will cross the ‘no observed effect’ level. However, the noise has no adverse effect so long as the exposure does not cause any change in behaviour, attitude or other physiological responses of those affected by it. The noise may slightly affect the acoustic character of an area but not to the extent here is a change in quality of life.*

*If the noise exposure is at this level no specific measures are required to manage the acoustic environment*

*As the exposure increases further, it crosses the ‘lowest observed adverse effect’ level boundary above which the noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise).*

*Increasing noise exposure will at some point cause the ‘significant observed adverse effect’ level boundary to be crossed. Above this level the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is predicted to be above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan-making stage, or by use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of*

*the activity causing or affected by the noise, it is undesirable for such exposure to be caused.*

*At the highest extreme, noise exposure would cause extensive and sustained adverse changes in behaviour and / or health without an ability to mitigate the effect of the noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be avoided.”*

6.2.17 The PPG includes a table summarising the noise exposure hierarchy, based on the likely average response. Table 6.1 below provides the perception, example of outcome, effect and action required relative to noise.

**Table 6.1: Noise Exposure Hierarchy**

<b>Response</b>	<b>Examples of Outcomes</b>	<b>Increasing Effect Level</b>	<b>Action</b>
Not present	No Effect	No Observed Effect (NOEL)	No Specific Measures Required
Present 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 (NOAEL)	No Specific Measures Required
<b>Lowest Observed Adverse Effect Level (LOAEL)</b>			
Present 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
<b>Significant Observed Adverse Effect Level (SOAEL)</b>			
Present 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
Present and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to	Unacceptable Observed Adverse Effect	Prevent



Response	Examples of Outcomes	Increasing Effect Level	Action
	psychological stress or physiological effects, e.g. regular sleep deprivation/ awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory		

*BS4142: 2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'*

6.2.18 BS4142: 2014+A1:2019<sup>3</sup> *'Methods for rating and assessing industrial and commercial sound'* is based on the measurement of background sound using  $L_{A90}$  noise measurements, compared to source noise levels measured in  $L_{Aeq}$  units.

6.2.19 Once any corrections have been applied for source noise tonality, distinct impulses etc., the difference between these two measurements (i.e. known as the 'rating' level) determines the impact magnitude. The following can be noted:

- typically, the greater the difference, the greater the magnitude of the impact;
- a difference of around +10 dB or more is likely to be an indication of a significant adverse impact (although this can be dependent on the context);
- a difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- 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 (although this can be dependent on the context).

6.2.20 In order to establish the rating level, corrections for the noise character need to be taken into consideration. The Standard states that when considering the perceptibility: *"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."*

<sup>3</sup>*BS4142: 2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'*

6.2.21 The subjective method adopted includes the character corrections as set out in Table 6.2.

**Table 6.2: BS4142: 2014+A1:2019 Character Corrections**

Level of Perceptibility	Correction for Tonal Character dB	Correction for Impulsivity dB	Correction for Intermittency dB	Correction for 'Other Character' dB
Not perceptible	0	0	0	0
Just perceptible	+2	+3	0	0
Clearly perceptible	+4	+6	+3*	+3*
Highly perceptible	+6	+9	+3*	+3*

*\*Standard defines this should be readily distinctive against the residual acoustic environment, it is interpreted therefore to be either clearly or highly perceptible as a character. If characteristics likely to affect perception and response are present in the specific sound, within the same reference period, then the applicable corrections ought normally to be added arithmetically. However, if any single feature is dominant to the exclusion of the others then it might be appropriate to apply a reduced or even zero correction for the minor characteristics*

*BS8233: 2014 'Guidance on sound insulation and noise reduction for buildings'<sup>14</sup>*

6.2.22 The British Standard BS8233 provides additional guidance on noise levels within buildings. These are based on the World Health Organisation (WHO) recommendations and the criteria given in BS8233 for unoccupied spaces within residential properties.

6.2.23 The guidance provided in section 6.7 of BS8233 provides recommended internal ambient noise levels for resting, dining and sleeping within residential dwellings. Table 6.3 provides detail of the levels given in the standard.

**Table 6.3: BS8233: 2014 Indoor Ambient Noise Levels for Dwellings**

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting Dining Sleeping (daytime resting)	Living Room	35 dB LAeq,16hours	-
	Dining room/area	40 dB LAeq,16hours	-
	Bedroom	35 dB LAeq,16hours	30 dB LAeq,8hours
Study and work requiring concentration	Staff/Meeting Room, Training Room	35-45dB LAeq8hours	
	Executive Office	35-45dB LAeq8hours	
	External Areas	Gardens and patios	50-55dB LAeq,16hrs

6.2.24 This standard would be appropriate to apply to existing or proposed residential development. The LSEP site noise contribution should be within the proposed

<sup>14</sup>BS8233: 2014 'Guidance on sound insulation and noise reduction for buildings'

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internal noise levels, which would include the following noise limits:

- Living room areas:  $\leq 35\text{dB } L_{Aeq,16\text{hours}}$  (0700-2300 hours) [equivalent to an external level of approximately  $65\text{dB } L_{Aeq,16\text{hours}}$  based on typical standard double-glazed units in the closed position and approximately  $50\text{dB } L_{Aeq,16\text{hours}}$  in the open position];
- Bedrooms:  $\leq 30\text{dB } L_{Aeq,8\text{hours}}$  (2300-0700 hours) [equivalent to an external level of approximately  $60\text{dB } L_{Aeq,8\text{hours}}$  based on typical standard double-glazed units in the closed position and approximately  $45\text{dB } L_{Aeq,8\text{hours}}$  in the open position]; and
- Gardens and patios: The guidance refers to traditional external areas that are used for amenity space, it is desirable that the external noise levels does not exceed  $50\text{dB } L_{Aeq,T}$ , with an upper guideline value of  $55\text{dB } L_{Aeq,T}$ , which would be acceptable in noisier environments.

6.2.25 The above internal bedroom limits would comply with sleep disturbance criteria defined by WHO guidelines. The WHO night noise guidelines for Europe refers to sleep disturbance limit of  $42\text{dB}-45\text{dB } L_{Amax}$  for regular peak events within bedrooms [which is approximately  $57\text{dB}-60\text{dB } L_{Amax}$  external to the bedroom window in the open position].

*World Health Organisation (WHO) Guidelines for Community Noise: April 1999<sup>5</sup>*

6.2.26 This document provides further updated information on noise and its effects on the community. Within the document for noise *'In Dwellings'* it states that *"To enable casual conversation indoors during daytime, the sound level of interfering noise should not exceed  $35\text{dB } L_{Aeq}$ .*

*To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed  $55\text{dB } L_{Aeq}$  on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed  $50\text{dB } L_{Aeq}$ .*

*Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development."*

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<sup>5</sup> World Health Organisation (WHO) Guidelines for Community Noise: April 1999

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*World Health Organisation (2009) – Night noise guidelines for Europe<sup>6</sup>*

- 6.2.27 The WHO regional office for Europe set up a working group of experts to provide scientific advice to the Member States for the development of future legislation and policy action in the area of assessment and control of night noise exposure.
- 6.2.28 Considering the scientific evidence on the thresholds of night noise exposure indicated by  $L_{\text{night, outside}}$  as defined in the Environmental Noise Directive (2002/49/EC), an  $L_{\text{night, outside}}$  of 40dB should be the target of the night noise guidance (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly.  $L_{\text{night, outside}}$  value of 55dB is recommended as an interim target for the countries where the NNG cannot be achieved in the short term for various reasons, and where policy-makers choose to adopt a stepwise approach.

*Road Traffic Noise*

- 6.2.29 The standard index used in the UK for describing road traffic noise is LA10, which is the 'A' weighted sound level in dB exceeded for 10% of the assessment period (ref. LA 111 Terms and Definitions).
- 6.2.30 An assessment of vehicle movements associated with the Proposal on the roads local to the LSEP site has been undertaken using Department for Transport's Calculation of Road Traffic Noise (CRTN<sup>7</sup>), and Design Manual for Roads and Bridges (DMRB) LA 111<sup>8</sup> 'Noise and vibration'<sup>3</sup> May 2020 guidance which provides assessment of impact relating to the change in noise levels.
- 6.2.31 The noise effects of on-site road traffic movements is assessed using the 'line source' calculation method of ISO9613-2 to predict noise levels at NSR.
- 6.2.32 Traffic data for the assessment presented within this Chapter has been provided by AXIS, and is based on the figures presented within the TA. The data identifies the permitted and the proposed traffic flows for the opening year (2023).

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<sup>6</sup> World Health Organisation (WHO) *Night noise guidelines for Europe: 2009*

<sup>7</sup> Department of the Environment: *Calculation of Road Traffic Noise (CRTN) 1988*

<sup>6, 7</sup> <sup>8</sup> Design Manual for Roads and Bridges, LA 111: 2019

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## ***Consultation***

6.2.33 The Department for Business, Energy and Industrial Strategy (BEIS) and CWACC were provided with a Scoping Report (see Appendix 2-1 of the EIAR) as part of the consultation process to agree on the scoping. The Scoping Opinion has been issued by BEIS. In response to the report, BEIS identified the following for consideration in the EIA:

- noise effects associated with increased HGV traffic; and
- the impact of noise associated with changes to the configuration of the plant to accommodate the increased throughput should be scoped into the EIA to ensure that it is duly assessed.

## ***Consultation Responses***

6.2.34 Additional noise related comments received from consultees on the Scoping Report, included a comment from the Canal and Rivers Trust that canal users, boaters and towpath users should be considered as receptors in terms of noise and vibration. This is addressed later within this Chapter.

## ***Level and Significance of Effect***

6.2.35 The level of an effect is a function of the sensitivity or importance of the receiver, or receptor, and the scale or magnitude of the effect. In the case of this assessment the level of the effect has been determined by reference to existing guidance and standards that are explained below.

6.2.36 Two types of receptor have been identified in relation to the Proposal:

- Residents of existing houses adjacent to the LSEP site who could experience site operational noise during daytime periods; and
- Residents of existing houses adjacent to the LSEP site who could experience site generated vehicle noise on the local road network during daytime.

## ***Operational Noise***

6.2.37 Table 6.4 below shows the proposed impact magnitude methodology considering the guidance contained within BS4142: 2014+A1:2019 for fixed and mobile plant noise

(e.g. fixed plant and LSEP site vehicle movements etc.).

**Table 6.4: Impact Magnitude Scale - Future Noise against Existing (Operational Phase) in accordance with BS4142: 2014+A1:2019**

Rating Level above Background Noise dB(A) as BS4142: 2014+A1:2019	Description of Effect	Impact Magnitude	PPG Effect Level
-10 to 0	No discernible effect on the receptor	Negligible	NOEL to NOAEL
+0.1 to +4.4	Non-intrusive - Noise impact can be heard but does not cause any change in behaviour or attitude. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	Slight	LOAEL
+4.5 to +9.4*	Intrusive - Noise impact can be heard and causes small changes in behaviour and/or attitude. Affects the character of the area such that there is a perceived change in the quality of life. Potential for non-awakening sleep disturbance.	Moderate	LOAEL to SOAEL
9.5 or greater	Disruptive – Causes a material change in behaviour and/or attitude e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty getting to sleep. Quality of life diminished due to change in character of the area.	Substantial	SOAEL
Undefined**	Physically Harmful – Significant changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or physiological effects e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm.	Severe	UOAEL
<p>Note: The 'rating' level is the difference between the noise contribution from site and the existing background sound level allowing for any adjustments required for noise characteristics (i.e. tonal, impulsive or intermittent noise character). The Standard advises that rounding of numbers to one decimal place should relate to levels of 0.5dB or above, which is reflected in the table limits. The impact magnitude scales in Tables 6.7 to 6.8 are used in the assessment of operational noise impacts. *The intrusiveness depends on the context of the residual environment and therefore may fall into SOAEL if background and residual levels are similar. **Difficult to define physical harmful effect as this depends on numerous site-specific factors which may include type and character of noise source, location, human sensitivities, duration and receptor expectations etc.</p>			

6.2.38 The Institute of Environmental Management and Assessment (IEMA) has provided draft 'Guidelines for Environmental Noise Impact Assessment'. The guidelines set out an example of how changes in noise level may be assessed in terms of residual LAeq. This assists in determining the impact of site operational noise relative to the context of the noise climate, which is detailed in Table 6.5.

**Table 6.5: Impact Magnitude Scale – General Site Noise**

Change in Sound Levels LAeq dB	Description of Effect	Impact Magnitude	PPG Effect Level
< +2.9	No discernible effect on the receptor	Negligible	NOEL
+3.0 to +4.9	Non-intrusive - Noise impact can be heard but	Slight	NOAEL

(high receptor sensitivity)	does not cause any change in behaviour or attitude. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.		
+5.0 to +9.9 (high receptor sensitivity)	Intrusive - Noise impact can be heard and causes small changes in behaviour and/or attitude. Affects the character of the area such that there is a perceived change in the quality of life. Potential for non-awakening sleep disturbance.	Moderate	LOAEL
10 or greater (high receptor sensitivity)	Disruptive – Causes a material change in behaviour and/or attitude e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty getting to sleep. Quality of life diminished due to change in character of the area.	Substantial	SOAEL
Undefined*	Physically Harmful – Significant changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or physiological effects e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm.	Severe	UOAEEL
*The level at which physical harm occurs will be dependent upon a number of site-specific factors, which may include type and character of noise source, location, human sensitivities, duration and receptor expectations etc.			

6.2.39 In order to determine the significance of an impact, not only must the magnitude of this impact be determined but also the sensitivity of the receptors to the impact. For this assessment, the categories presented in Table 6.6 have been adopted.

**Table 6.6: Receptor Sensitivity**

Receptor Sensitivity	Type of Receptor
High	Dwellings / residential properties including houses, flats, old people's homes, hospitals, schools, churches, caravans and open spaces / conservation areas.
Moderate	Commercial premises including retails and offices etc.
Low	Industrial premises including warehouses and distribution etc.

6.2.40 Based upon the assessment of impact magnitude and the sensitivity of individual receptors, the matrix shown in Table 6.7 has been developed in order to provide an indication of the possible level of effect for each predicted noise impact. Given that there are many factors which may affect the level of the effect of an impact, not least, the character of the noise and timescales over which the noise operates, the overall level of effect must be assessed on an individual basis using professional judgement and experience. Therefore, whilst the matrix provides a useful indication of the likely significance, it cannot be applied in all situations.

**Table 6.7: Level of Effect Matrix**

Impact Magnitude	Receptor Sensitivity		
	High	Moderate	Low
Severe	Major	Major/Moderate	Moderate/Minor

<b>Substantial</b>	Major/Moderate	Moderate	Minor
<b>Moderate</b>	Moderate	Moderate/Minor	Minor/Neutral
<b>Slight</b>	Minor	Minor/Neutral	Neutral
<b>No significant impact (negligible)</b>	Neutral	Neutral	Neutral

6.2.41 Where a level of effect is defined as Major or Major/Moderate for high sensitivity receptors (i.e. Severe or Substantial impact magnitude) then the effect is likely to be considered significant (i.e. an impact that is likely to be a key material factor in the decision-making process).

6.2.42 The impact magnitude categories can then be correlated with the receptor sensitivity categories provided in Table 6.6 to establish a level of effect as defined in Table 6.7.

### ***Road Traffic Noise Effects***

To assess the likely impact of road traffic movement on NSRs from the Proposal, noise calculations have been undertaken using CRTN methodology and baseline traffic flow information.

6.2.43 The DMRB LA 111 provides guidance on the magnitude of change in terms of road traffic noise. The procedure for assessing noise impacts advises the use of a LA<sub>10</sub> measurement index based on a daytime 18-hour time period (i.e. 0600 to 2400 hours) and night-time period (i.e. 0000-0600 hours). Further assessment of the impact would be required where changes of 1dB(A) or more are expected in the short-term and changes of 3dB(A) in the long term.

6.2.44 DMRB LA 111 defines the short term and long-term scenarios which are considered to represent the situation when a new road opens (short term) and 15 years after a road opens (long term). The magnitude of change criteria are set out in Table 6.8 for the short term and Table 6.9 for the long term.

**Table 6.8: Magnitude of Change – Road Traffic Noise - Short Term**

<b>Short Term Magnitude</b>	<b>Short Term Noise Change (dB LA<sub>10,18hr</sub> or L<sub>night</sub>)</b>
Negligible	Less than 1.0
Minor (Slight*)	1.0 to 2.9
Moderate	3.0 to 4.9
Major	Greater than or equal to 5.0



\*Added by chapter author to concur with other semantic impact magnitudes.

**Table 6.9: Magnitude of Change – Road Traffic Noise - Long Term**

<b>Long Term Magnitude</b>	<b>Long Term Noise Change (dB L<sub>A10,18hr</sub> or L<sub>night</sub>)</b>
Negligible	Less than 3.0
Minor (Slight*)	3.0 to 4.9
Moderate	5.0 to 9.9
Major	Greater than or equal to 10.0

\*Added by chapter author to concur with other semantic impact magnitudes.

### ***Limitations***

6.2.45 There are no limitations relating to this assessment that are to be considered.

## **6.3 Baseline**

6.3.1 Planning condition 28 of the DPP was discharged by CWACC in July 2019 (under application 19/01615/DIS). This condition related to the provision of a scheme for the monitoring and control of noise from the LSEP. This scheme sets out the agreed maximum permissible levels at NSR locations which the LSEP needs to comply with. This means that there is no requirement for updating baseline levels at NSR as this condition overrides the need for establishing existing noise levels.

### ***Presence of New Receptors***

6.3.2 Consideration of any new residential receptors that are approved or proposed within the planning system have been investigated. The results of detailed search within the local planning system shows no evidence of any identified NSR permitted or proposed that are likely to be more sensitive than those already agreed under the scheme provided to discharge condition 28.

### ***Noise Limits***

6.3.3 As described above, a series of noise limits have been established at the NSR. The limits are based upon the results of established baseline noise monitoring and are set at a level that would ensure (in accordance with relevant policy and guidance)

that no significant effects would occur as a consequence of the LSEP facility (i.e. rating levels do not exceed representative background sound level at NSR).

- 6.3.4 Condition 28 which sets out the scheme for the monitoring and control of noise from LSEP agrees the following permissible noise limits at NSR:

**Table 6.10: Condition 28 Permissible Noise Limits at NSR**

NSR	Time	Maximum Permissible Rating Level (LAeq dB)	Measurement Time Period
LT1: St Johns Close and Cottage Close	Daytime	42	1 hour
LT1: St Johns Close and Cottage Close	Night time	39	5 mins
LT2: Lostock Gralam	Daytime	42	1 hour
LT2: Lostock Gralam	Night time	42	5 mins

- 6.3.5 The above limits were agreed, based on the agreed baseline background levels and the premise that the rating level of noise emitted from the LSEP site shall not exceed the background noise level in accordance with BS 4142.1997 'Method for rating industrial noise affecting mixed residential and industrial areas'.

#### ***Future Baseline***

- 6.3.6 Without the proposed amendments to the LSEP scheme, the effect on the future noise baseline would be negligible as the increase in vehicle movements is deemed not significant and the residual noise levels at NSR is high relative to the LSEP site noise contribution.

## **6.4 Assessment of Effects**

### ***Operational Phase Effects***

#### ***Operational Noise***

- 6.4.1 As previously explained in earlier chapters of the EIAR Main Report, the Proposal does not necessitate any physical changes to the Consented Development. Increasing the waste fuel throughput would not increase the noise output from the plant as the consented operations of the facility (e.g., fixed plant and machinery) will be running regardless of the higher volumes of waste passing through it.

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- 6.4.2 The only other change that can be accounted for in terms of potential changes to noise levels of the facility is the number of HGVs docking at the Tipping Hall during daytime hours. Noise `break-out' from the Tipping Hall is based on a constant noise source (i.e., highest likely internal reverberant noise level from HGV movement) and is therefore not predicated on the number of HGVs entering or leaving the building. We conclude therefore that noise from fixed plant and LSEP buildings would not change as a result of the Proposal.
- 6.4.3 Condition 28 of the DPP sets out the agreed noise limits and the approved scheme to discharge the condition applied the relevant standard at the time of the May 2011 ES work (1997 version of BS4142). The standard was updated in 2014 and subsequently in 2019, which included a requirement to include any site-specific mobile noise sources that are inherent to its operation within the overall LSEP site. As there is no change to the fixed plant noise sources or noise `break-out' from the associated buildings at the LSEP facility and the limits agreed, it is not necessary to re-assess the LSEP site's plant noise levels. The effect of the increase in HGVs within the LSEP site is however considered necessary to assess, and this is done so against the 2019 version of BS4142. The assessment of HGVs on the local road network is dealt with below relative to the DMRB LA 111 guidance.

#### *Operational Road Traffic Noise*

- 6.4.4 Chapter 4.0 of the EIAR and the TA (Appendix 4-1) provide details of the proposed increase in HGV movements. It is proposed to increase the HGV movements to / from the LSEP site with the current movements controlled by condition 9 of the DPP, which reads: *"HGV movements to and from the Development once operational shall not exceed 262 round trips (131 movements in, 131 movements out) Monday to Friday on more than 3 days in a continuous 30-day monitoring period and shall not exceed 276 round trips (138 movements in, 138 movements out) on any one day, Monday to Friday. HGV movements to and from the Development once operational shall not exceed 132 round trips (66 movements in, 66 movements out) on Saturdays"*.
- 6.4.5 The actual number of HGV movements that would be required to serve the LSEP with the proposed increased throughput is 434 round trips per day (i.e. 217 movements in and 217 movements out).

6.4.6 The May 2011 ES Noise Chapter (at Appendix 1.5: Option 2: HGVs only) sets out the predicted specific noise levels for the daytime period, which includes an allowance for HGV movement, which is shown to be included in Appendix 12.4 (page 5 of 5) and confirms that 22 HGV vehicles per hour is considered, as per the extant permission.

6.4.7 The predicted daytime noise contribution from the LSEP site without any HGV movements has been calculated from the May 2011 ES, as well as the noise contribution expected from the proposed additional HGV movements. These figures are presented in Table 6.11 below.

**Table 6.11: Operational Noise Predictions During Daytime with Increased HGV Movement on Site**

NSR	Established Background Sound Level LA90 dB	Agreed Permissible Rating Noise Limit LAeq <sub>1hr</sub> dB	Site Specific Noise Level May 2011 ES LAeq <sub>1hr</sub> dB	LSEP facility Site Specific Noise Level with increase in HGVs LAeq <sub>1hr</sub> dB	Increase due to increase in HGVs LAeq <sub>1hr</sub> dB
LT1: St Johns Close and Cottage Close	42	42	38-39	39-40	+1
LT2: Lostock Gralam	42	42	36	36	0

6.4.8 The above results show that the increase in noise levels during the daytime period when HGV movements would occur, is only likely to be +1dB LAeq,1hr as a result of increased number of HGVs associated with the Proposal.

6.4.9 In relation to BS4142: 1997 (the standard used to in the scheme to discharge condition 28 of the DPP) and the updated standard (i.e. BS4142:2014+A1:2019) the assessment of impact is provided below in Table 6.12 for the Proposal.

**Table 6.12: Operational Noise Predictions During Daytime with Increased HGV Movement on Site**

NSR	Rating <sup>1</sup> Level From LSEP facility with HGVs LAeq <sub>1hr</sub> dB	Established Background Sound Level LA90 dB [LAeq dB]	Level difference between Site Rating Level and background LAeq dB	Increase <sup>2</sup> in residual noise levels LAeq <sub>1hr</sub> dB	Conclusion according to BS4142: 1997	Conclusion according to BS4142: 2019

LT1: St Johns Close & Cottage Close	39-40	42 [50]	-3 to -2	+0.4	<b>No likely complaint</b>	<b>Low impact</b>
LT2: Lostock Gralam	36	42 [52]	-6	+0.1	<b>No likely complaint</b>	<b>Low impact</b>

<sup>1</sup>Note: The rating level does not include any noise character penalties as these would be controlled by design.

<sup>2</sup>Column 5 is calculated by logarithmically adding column 3 in [ ] with column 2 and then subtracting column 3 in [ ].

6.4.10 The above results show no change in impact relative to the 2019 version of the standard and no change to the conclusions provided under the May 2011 ES. The impact relative to BS4142 (refer to Table 6.4) is shown to be **negligible** and a **neutral** level of effect and therefore not significant.

6.4.11 In terms of the increase in residual noise levels the above table shows that this would be +0.1dB(A) and +0.4dB(A) which is not significant and therefore the impact according to Table 6.5 is **negligible** and a **neutral** level of effect.

#### *Trent and Mersey Canal Receptors*

6.4.12 The May 2011 ES, at paragraph 12.101, sets out the predicted noise levels along the section of the Trent and Mersey Canal that is contiguous with the boundary of the LSEP site. It concludes that the noise level is not particularly high compared with many urban environments a key point is made this would only be a transitional and temporary experience as the duration which canal users took to pass-by the LSEP site would be short. Furthermore, there are no overnight moorings along this stretch of the canal. We do not consider that these conclusions would be materially altered by the Proposal.

#### *Road Traffic Noise on Local Road Network*

6.4.13 The TA for the EIAR considers the assessment opening year (2023) for the traffic demand from the Proposal for these periods compared to a 'Do-nothing' scenario. Table 6.13 provide details of the noise impact due to the increased traffic flow along the local road network based on a 16-hour average for the opening year using the traffic data provided within the TA.

**Table 6.13: Predicted Change in Road Traffic Noise on Local Road Network (weekdays)**

Road	Opening Year	'Do nothing' LA10 <sub>16hours</sub> (dB)	'Do something' LA10 <sub>16hours</sub> (dB)	Change (with development) LA10 <sub>16 hours</sub> (dB)
A530 North of Site Access	2023	63.4	63.4	0
A530 South of Site Access	2023	64.2	66.0	+1.8
Middlewich Road	2023	65.2	65.2	0
Pennys Lane	2023	0	0	0
A530 South of Middlewich Road	2023	67.6	68.5	+0.9
A556 West of A530	2023	71.7	71.9	+0.2
A556 East of A530	2023	72.1	72.2	+0.1
A530 South of A556	2023	68.1	68.4	+0.3

*Note: The predicted noise levels are based on a notional 10m distance from the kerbside*

6.4.14 Based on a maximum HGV demand over weekday periods, the impact shows **negligible to slight** impact magnitude and **neutral to minor** level of effect in respect of traffic movements relative to the nearest local road network at nearest residential properties. In terms of the DMRB LA 111 guidance, in relation to short-term effects (refer to Table 6.8) an increase of <3dB(A) is minor and <1dB(A) is negligible. The effect of traffic movements would not be significant.

#### *Operation Vibration Effects*

6.4.15 No significant operational vibration is likely to be generated by the LSEP facility, which is based on empirical measurements at similar plants in the UK by the author of this assessment.

#### **Cumulative Effects**

6.4.16 Traffic data for the CRTN assessment presented in this Chapter is based on the figures contained within the TA which accompanies the Variation Application documentation. The TA sets out existing and predicted traffic data for the opening year of 2023 for the LSEP and a future assessment year of 2028. The traffic data used has taken assumptions based on established growth factors and known committed developments. In this regard the impact of road traffic noise is inherently a cumulative assessment.

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- 6.4.17 Furthermore, there are no known additional permanent developments proposed in the area that are considered likely to result in any material cumulative effects in combination with the Proposal.

### ***Construction Phase***

- 6.4.18 As discussed elsewhere within the chapters of the EIAR Main Report, the Proposal will not involve any change to the built development of the LSEP project and therefore it will not be necessary to consider construction works for the Proposal when assessing the effects on noise (or indeed on any other effects).

## **6.5 Mitigation**

### ***Operational Mitigation***

- 6.5.1 No further mitigation measures are deemed necessary as there is no change in the operational noise of the LSEP facility and changes in noise level associated with the additional HGV movements is not significant.

## **6.6 Residual Effects and Conclusions**

- 6.6.1 The assessment of impact on existing residential areas from any increase in road traffic noise during the daytime operation of the LSEP facility shows no significant change in noise levels. It is therefore likely to be a **negligible to minor** magnitude impact at receptors, resulting in a **neutral to slight** level of effect. The effect would not be significant.
- 6.6.2 The assessment of impact in respect of the proposed additional vehicle movements within the LSEP site shows no significant increase in noise levels at NSR during the daytime operational period. The site generated noise levels would remain within the agreed permissible noise limits (i.e., those set out in the scheme prepared to discharge condition 28 of the DPP). According to BS4142: 2014+A1:2019, the rating level relative to the assessment baseline noise would indicate **negligible** magnitude impact at all receptors (refer to Table 6.4). The operational noise impacts from the facility are therefore considered to represent a **neutral** level of effect, and are not significant.

6.6.3 In relation to the increase in residual noise levels at receptors (refer to Table 6.5), the results show no significant change in noise level, which indicates a **negligible** magnitude impact. The predicted level of effect that would be experienced by residential receptors would therefore be **neutral** and not significant.

6.6.4 In summary, no significant noise impacts have been identified in relation to the operation of the LSEP facility. Table 6.14 below summarises the predicted operation effects of the LSEP development, accounting for the proposed amendments to the scheme.

**Table 6.14: Residual Impact at Nearest Receptor Relative to the Proposal**

Source	Nature of Effect	Time Period	Impact Magnitude	Level of Effect
Road traffic noise (operation)	Permanent	Daytime	Negligible to Minor	Neutral to Slight
Industrial noise (Site operation)	Permanent	Daytime	Negligible	Neutral

### ***Conclusions***

6.6.5 Noise levels have been considered and assessed during the operation of the LSEP facility with the Proposal.

6.6.6 Noise considerations identified in the Scoping exercise and those of the consultee responses have been included in the noise assessment.

6.6.7 Relevant and appropriate noise guidance and standards have been used to determine the impacts of noise from the LSEP with the Proposal. The assessment has been undertaken to identify any potential noise impacts on NSR and mitigate where appropriate any adverse effects.

6.6.8 The assessment shows that there will be no significant impacts as a result of the Proposal and no further noise related mitigation is required to the LSEP project.