

10. Noise and Vibration

10.1 Introduction

10.1.1 This chapter presents the preliminary assessment of the likely significant effects of the Project with respect to noise and vibration. The preliminary assessment is based on information obtained to date. It should be read in conjunction with the Project description provided in **Chapter 2: The Project** and with respect to relevant parts of the following chapters:

- **Chapter 5: Biodiversity;**
- **Chapter 6: Historic Environment;**
- **Chapter 8: Landscape and Visual**
- **Chapter 11: Traffic and Transport;** and
- **Chapter 14: Land Use**

10.1.2 This chapter describes:

- the legislation, policy and technical guidance that has informed the assessment (**Section 10.2**);
- consultation and engagement that has been undertaken to date and how comments from consultees relating to noise and vibration have been addressed (**Section 10.3**);
- the Study Area for the assessment (**Section 10.4**);
- the methods used for baseline data gathering (**Section 10.5**);
- overall, and future baseline (**Section 10.6**);
- embedded environmental measures relevant to noise and vibration (**Section 10.7**);
- the scope of the assessment for noise and vibration (**Section 10.8**);
- the methodology applied for the assessment (**Section 10.9**);
- the preliminary assessment of noise and vibration effects (**Section 10.10**);
- a summary of the preliminary significance conclusions (**Section 10.11**); and
- an outline of further work to be undertaken for the Environmental Statement (ES) (**Section 10.12**).

Limitations and assumptions

10.1.3 The information provided in this Preliminary Environmental Information Report (PEIR) is preliminary; the final assessment of likely significant effects will be reported in the ES. The PEIR has been produced to fulfil the Applicant's

consultation duties and enable consultees to develop an informed view of the likely significant effects of the Project.

- 10.1.4 In particular, details regarding construction schedules and operational plant are not finalised. The construction assessment for PEIR is indicative and assumptions for construction noise may be adjusted when further detail is provided for the ES.
- 10.1.5 A more detailed quantitative assessment will be available in the ES, including an assessment of operational plant. At the ES stage the schedules and equipment list will still likely be indicative with the potential for changes during detailed design. However, to counter this uncertainty a worst-case situation in terms of noise and vibration will be assessed for the ES as part of an assessment envelope. Any reasonable changes to the construction or operation design should therefore be covered in terms of effect by the worst-case scenario.
- 10.1.6 As the pipeline corridor, construction techniques and plant have not been finalised, no baseline sound level surveys have been undertaken to date. Absolute noise level criteria from industry standards will be used to assess predicted construction noise.

10.2 Relevant legislation, planning policy and technical guidance

- 10.2.1 This section identifies the legislation, planning policy and technical guidance that has informed the assessment of effects with respect noise and vibration. Further information on policies relevant to the Project is provided in **Chapter 4: Legislation and policy overview**.

Legislation

10.2.2 A summary of the relevant legislation is given in **Table 10.1**.

Table 10.1 Legislation relevant to the noise and vibration assessment

Legislation	Legislative context
Environmental Protection Act 1990¹ (as amended)	This Act sets out the duty for local authorities to investigate and, where identified, take abatement action against noise nuisance. The Act provides the definition of 'Best Practicable Means' (BPM) to minimise noise (including vibration), the basis for defence against noise abatement action taken by local authorities (Section 80). The Act also provides for individuals to seek for abatement action to be taken by a magistrate's court against noise nuisance (Section 82).
Control of Pollution Act 1974²	This Act provides the definition of BPM to minimise noise (including vibration), the basis for defence against noise abatement action taken by a local authority (Section 60). The Act also provides for, i) persons responsible to seek prior consent for works on construction sites including BPM steps to minimise noise and, ii) the basis for defining codes of practice (applies to BS 5228: 2009+A1:2014 Code of practice for noise and vibration control on construction and open sites, Part 1: Noise and Part 2: Vibration).

¹ UK Government (1990). The Environmental Protection Act 1990 (Online). Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents/made> (Accessed 22 November 2021).

² UK Government (1974). The Control of Pollution Act 1974 (Online). Available at <https://www.legislation.gov.uk/ukpga/1974/40/contents/made> (Accessed 22 November 2021).

Legislation	Legislative context
The Planning Act 2008³	In respect of noise nuisance, the Act confers the defence of statutory authority against proceedings for nuisance unless there is a provision in a granted Development Consent Order (DCO) to the contrary.
Environmental Noise (England) Regulations 2006, as amended⁴	The regulations require regular noise mapping and the production of Noise Action Plans for the management of noise. These regulations also provide the legal means by which ‘Quiet Areas’ and noise ‘Important Areas’ are defined and protected.
Noise Insulation Regulations 1975, as amended⁵	Sets out the eligibility criteria for noise insulation from upgraded highways schemes. These regulations are also utilised for criteria regarding construction traffic noise (although not used for the purposes of eligibility).

Planning policy

10.2.3 A summary of the relevant national and local planning policy is given in **Table 10.2**.

³ UK Government (2008). Planning Act 2008 (Online). Available at: <https://www.legislation.gov.uk/ukpga/2008/29/contents/made> (Accessed 22 November 2021).

⁴ UK Government (2006). The Environmental Noise (England) Regulations 2006 (Online). Available at: <https://www.legislation.gov.uk/uksi/2006/2238/contents/made> (Accessed 22 November 2021).

⁵ UK Government (1975). The Noise Insulation Regulations 1975 (Online). Available at: <https://www.legislation.gov.uk/uksi/1975/1763/contents/made> (Accessed 22 November 2021).

Table 10.2 Planning policy relevant to the noise and vibration assessment

Policy	Policy context
National planning policy	
Overarching National Policy Statement for Energy (EN-1), July 2011	EN-1 describes the effects of adverse impacts of noise on sensitive receptors, including biodiversity and wildlife, and quiet areas, how to assess the likely impact of proposed energy developments, including traffic generated, and the requirements of the developments to mitigate adverse impacts due to noise. The Policy lays outlines requirements for what should be included within a noise assessment: • a description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive tonal, impulsive or low frequency characteristics of the noise; • the characteristics of the existing noise environment and identification of receptors; • a prediction of 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; and • measures to be employed in mitigating noise. The nature and extent of the noise assessment should be proportionate to the likely noise impact.' For mitigation, the policy states that projects should include the quietest cost effective plant, containment of noise within buildings where possible, plant layout and screening. Only when all other forms of mitigation have been exhausted should the decision maker consider requiring noise mitigation through improve sound insulation to dwellings. In paragraph 5.1.9, the policy states that <i>'The IPC [now the Planning Inspectorate] should not be granted development consent unless it is satisfied that the proposals will meet the following aims:</i> • <i>avoid significant adverse impacts on health and quality of life from noise;</i> • <i>mitigate and minimise other adverse impacts on health and quality of life from noise; and</i>

Policy	Policy context
Draft Overarching National Policy Statement for Energy (EN-1), September 2021	<i>where possible, contribute to improvements to health and quality of life through the effective management and control of noise’.</i> The draft update to EN-1 covers health, stating that energy production has the potential to impact health and well-being. Negative impacts may result, with noise included in the direct the impacts identified (paragraph 4.3.3). Section 4.6 sets out information on criteria for ‘Good Design’ of energy infrastructure, which is explained to include siting and use of appropriate technologies in mitigating adverse impacts such as noise. Good design should be applied during the early stages of the project lifecycle. Noise and vibration emission may be subject to separate regulation under the pollution control framework or other consenting regimes. Pollution from industrial sources is controlled through the Environmental Permitting (England and Wales) Regulations 2016 (EPR), which requires industrial facilities to have an environmental permit and to meet limits on emissions, and (for larger facilities) use Best Available Techniques to reduce emissions. Paragraph 5.9.13 references a proportionate noise study required for heritage assets affected by developments. Where opportunities exist, the NPS encourages the applicant to make a positive contribution to the historic environment, such as considering how noise impacts can affect heritage assets and to consider opportunities to enhance access, interpretation, understanding and appreciation of affected assets. Paragraph 5.10.8 The Applicant’s Landscape and Visual assessment should demonstrate how noise and light pollution impacts on sensitive receptors from construction and operational activities will be minimised. The Noise and Vibration specific section 5.12 covers the same points as the current EN1, which are set out above, albeit with some minor wording differences. Some additional text has been included, with the items relevant for this assessment set out below. In the section on the Applicant’s Assessment where items to be considered are listed (paragraph 5.12.4), it adds the following two clauses. (1) ‘...including an assessment of any likely impact on health and well-being where appropriate’ (2) ‘measures to be employed in mitigating the effects of noise - applicants should consider using best available techniques to reduce noise impacts’.

Policy	Policy context
National Policy Statement for Oil and Gas Supply and Storage (EN-4), July 2011	Whilst not the determinant policy document for this project, it does include the following: • a reference to the need to identify noise and vibration sensitive receptors; and • identifies pre-construction, HGV traffic and pipeline drying and hydrotesting during commissioning (using air compressors) and HAGIs as sources of noise.
National Planning Policy Framework (NPPF)	Provides overarching policy on the prevention of adverse effects from noise, requiring the avoidance of significant adverse impacts on health and the quality of life. It states in paragraph 174, that <i>‘Tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value should be identified and protected.’</i>
Noise Policy Statement for England (NPSE), March 2010	Sets out the long-term vision of Government noise policy, i.e. in Paragraph 1.6 to <i>‘promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.’</i> The NPSE vision is supported by aims to effectively manage and control environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development by avoiding significant adverse impacts, mitigating and minimising adverse impacts and contributing to the improvement of health and quality of life. In paragraph 2.20, the policy describes the toxicology concepts to identify “significant adverse” and “adverse” impact in line with the three aims of NPSE: • No Observed Effect Level (NOEL): This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise; • Lowest Observed Adverse Effect Level (LOAEL): This is the level above which adverse effects on health and quality of life can be detected. Extending these concepts for the purpose of this NPSE leads to the concept of a Significant Observed Adverse Effect Level (SOAEL); and • SOAEL; This is the level above which significant adverse effects on health and quality of life occur.

Policy	Policy context
	Where an impact lies somewhere between LOAEL and SOAEL all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur. In paragraph 2.22, the NPSE notes that <i>“it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.”</i>
Planning Practice Guidance-Noise (PPG-N), 2019	Provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. It references the toxicological hierarchy of noise stating that noise above the SOAEL should be avoided and includes an additional level of Unacceptable Adverse Effect level (UAEL), upon which noise should be prevented from occurring. PPG-N also references a list of policy, standards and guidance document and notes that whilst numerical criteria are included, <i>‘These values are not to be regarded as fixed thresholds and as outcomes that have to be achieved in every circumstance.’</i>
Local Planning Policy	
St Helen's Council	No planning document associated with St Helen's Council has policies specific to noise and vibration.
Cheshire West and Chester Council	The Adopted Plan encompasses a set of local planning policy documents, the relevant documents for noise are included below.

Policy	Policy context
Adopted Development Plan, 29 January 2015⁶	
Cheshire West and Chester Council Local Plan (Part One): Strategic Policies, January 2015⁶	Policy SOC 5 on health and wellbeing states that: <i>‘Development that gives rise to significant adverse impacts on health and quality of life (e.g., soil, noise, water, air or light pollution, and land instability, etc) including residential amenity, will not be allowed.’</i> Policy ENV 7 on alternative energy supplies states that <i>‘The Local Plan will support renewable and low carbon energy proposals where there are no unacceptable impacts on [...] Noise, air, water, highways or health.’</i>
Cheshire West and Chester Council Local Plan (Part Two): Land Allocation and Detailed Policies, January 2015⁶	Provides further detail on the assessment and management of noise in relation to Policy DM30 – Noise: <i>‘13.13 [...] In considering the impact of noise, regard should be had to the World Health Organisation Guidelines for Community Noise and the latest British Standards (or their recognised replacement) for both internal and external noise levels. In line with Local Plan (Part One) policy SOC 5, the protection of health (mental and physiological) and prevention of interference with speech communication is a consideration in assessing planning applications. As such, the relaxation of indoor criteria is not considered appropriate, and generally internal levels can be achieved through design and insulation measures.’</i> <i>‘13.17 Noise from construction or demolition works as part of a development can be intrusive or disruptive to local businesses and/or noise sensitive land uses and regard should be had to the latest British Standard, or its recognised replacement. In all instances where alternative working methods exist, the minimisation of noise and vibration shall be a prime consideration in the choice of technique and equipment used. For this reason, construction or demolition activities should be restricted to daytime periods and have fixed start and finish times i.e. 08.00 to 18.00 hours Monday to Friday, and 08.00 to 18.00 hours on Saturdays, with no</i>

⁶ Cheshire West and Chester Council (2015). Cheshire West and Chester Local Plan (Part One) Strategic Policies (Online). Available at: <https://consult.cheshirewestandchester.gov.uk/kse/event/24907/section/3252243> (Accessed 28 June 2022).

Policy	Policy context
	<i>works being permitted on Sundays or Bank Holidays, unless it can be clearly demonstrated that they will not cause unacceptable disturbance to noise sensitive receptors. The location of any site compound must be submitted to and approved by the Council's Environmental Protection team, to ensure that it is appropriately situated in order to minimise the noise impact on neighbouring residential uses.'</i>
Cheshire West and Chester Council, Supplementary Planning Document: Oil and Gas Exploration, Production and Distribution, May 2017⁷	Supplementing the policies in the Local Plan, providing advice for applicants, and decision makers. The document refers back to Local Plan Strategic Policies in addition to identifying noise as a "key issue" in Paragraph 5.5: <i>'Where development is proposed, a noise impact assessment should be submitted. The Council's Environmental Protection team have identified that the starting point is that onshore oil and gas development should not result in an unacceptable rise in background noise levels as measured as an $L_{90dB(A)}$ at the nearest sensitive receptors. The noise impact assessment should demonstrate that the noise levels as a result of the development shall be 5dB(A) or more below the measured background level at the nearest facade of the residential property when measured as a rating level in accordance with British Standard BS4142:2014. In the event that the appropriate level cannot be achieved without mitigation, applicants should carry out detailed investigations and submit appropriate levels of mitigation, including details of the noise output, and the provision of purpose designed attenuation for all noise generative plant and equipment.'</i> The document also requires the noise impacts from flaring or venting to be taken into account and minimised as much as possible. Within 5.28, the document considers cumulative impact arising from the interactions between minerals, waste and other developments, stating <i>'The potential cumulative impacts of oil and gas developments (including both simultaneous and sequential development) and the way they relate to existing developments must be addressed to an acceptable standard as part of a planning application. Applicants must consider the interaction with other existing developments in the area such as housing, and impacts on existing surrounding uses and planned development.'</i>

⁷ Cheshire West and Chester Council (2017). Supplementary Planning Document: Oil and Gas Exploration, Production and Distribution (Online). Available at: <https://consult.cheshirewestandchester.gov.uk/kse/event/29390> (Accessed 28 June 2022)

Policy	Policy context
Cheshire East Council Local Plan Strategy, 27 July 2017⁸	The Cheshire East Local Plan Strategy 2010-2030 was adopted on 27 July 2017. It sets out the overall vision and planning strategy for development in the borough and contains planning policies to ensure that new development addresses the economic, environmental and social needs of the area, including the protection from noise impacts.
Cheshire East Council, Revised Publication Draft Site Allocations and Development Policies Document ('Clean' version) September 2020⁹	Once finalised, the SADPD will form the second part of the Council's local plan, providing further detailed planning policies and site allocations to support the strategic policies and sites contained in the Local Plan Strategy.
Cheshire East Council, Environmental Protection Supplementary Planning Document Consultation Draft October 2021¹⁰	This document adds further detail to the policies in the development plan and is used to provide guidance for development on specific sites, or on particular issues. Provides details regarding NPSE levels of adverse effect, what should be included in a NIA and references specific standards for different types of development (included where relevant within this chapter), examples on mitigation techniques, standard construction hours.

⁸ Cheshire East Council (2017). Local Plan Strategy 2010 – 2030 (Online). Available at:

<https://www.cheshireeast.gov.uk/pdf/planning/local-plan/local-plan-strategy-web-version-1.pdf> (Accessed 28 June 2022).

⁹ Cheshire East Council (2020). Revised Publication Draft Site Allocations and Development Policies Document ('Clean' version).

Available at: https://www.cheshireeast.gov.uk/planning/spatial-planning/cheshire_east_local_plan/site-allocations-and-policies/sadpd-examination/documents/examination-library/ed01b-revised-pub-draft-sadpd-clean-version.pdf (Accessed: 28 June 2022)

¹⁰ Cheshire East Council (2021). Environmental Protection Supplementary Planning Document Consultation Draft October 2021 (Online). Available at: [file:///C:/Users/joseph.bates/Downloads/Draft%20EP%20SPD%20\(Oct%2021\).pdf](file:///C:/Users/joseph.bates/Downloads/Draft%20EP%20SPD%20(Oct%2021).pdf) (Accessed 28 June 2022).

Policy	Policy context
Halton Borough Council Local Plan 2014 – 2037, Revised Core Strategy Policies and Delivery and Allocations Publication Document, 2017¹¹	Provides high level policy guidance on the identification of impacts on the environment, including noise pollution and requirement for mitigation.
Halton Borough Delivery and Allocations Local Plan (incorporating Partial Review of the Core Strategy): Proposed Submission Draft, May 2019¹²	Sets out the planning policies and land allocations to guide decisions on the location, scale and type of development and changes in the way land and buildings are used. Supersedes some of the 2017 Core Strategy. Adds policy HE7 which states: <i>‘Where risks for pollution and nuisance are identified, planning permission will be granted for development providing: [...] b. Noise nuisance is not likely to cause a significant increase in ambient noise levels for either day or night time conditions.’¹²</i>
Warrington Borough Council Local Plan Core Strategy,	The noise pollution section focuses on design of development having regard to minimising noise, including siting, layout and internal features.

¹¹ Halton Borough Council (2017). Revised Core Strategy Policies and Delivery and Allocations Publication Document (Online). Available at: <https://moderngov.halton.gov.uk/documents/s47370/DALP%2028June17.pdf.pdf> (Accessed 28 June 2022).

¹² Halton Borough Council (2019). Delivery and Allocations Local Plan (incorporating Partial Review of the Core Strategy) (Online). Available at: <https://moderngov.halton.gov.uk/documents/s56900/Halton%20Local%20Plan%20-%20PropSubmsn%20Committee%202019-02-28%201831%20r1.pdf> (Accessed 28 June 2022).

Policy	Policy context
Adopted 21 July 2014¹³	
Warrington Borough Council, Environmental Protection: Supplementary planning Document, May 2013¹⁴	Sets out in detail the Council's approach to environmental protection including noise with a tool kit of information, guidance on what assessment should contain and guidance on how noise is assessed.
Trafford Council Local Plan Core Strategy, January 2012	Once adopted, the Local Plan will replace the following Development Plan documents: • The Trafford Core Strategy (adopted January 2012) and • The Revised Trafford Unitary Development Plan (adopted June 2006). Policy L5 on climate change states that: <i>'Development that has potential to cause adverse pollution (of air, light, water, ground), noise or vibration will not be permitted.'</i> Policy 7 on design, protecting amenity states: <i>'In relation to matters of amenity protection, development must:</i> • <i>Be compatible with the surrounding area; and</i> • <i>Not prejudice the amenity of the future occupiers of the development and/or occupants of adjacent properties by reason of overbearing, overshadowing, overlooking, visual intrusion, noise and/or disturbance, odour or in any other way.'</i>

¹³ Warrington Borough Council (2014). Local Plan Core Strategy (Online). Available at: https://www.warrington.gov.uk/sites/default/files/2019-08/local_plan_core_strategy_adopted_2014.pdf (Accessed 28 June 2022).

¹⁴ Warrington Borough Council (2013). Environmental Protection Supplementary Planning Document. (online) Available at: <https://www.warrington.gov.uk/sites/default/files/2020-09/Environmental%20protection%20-%20supplementary%20planning%20guidance.pdf> (Accessed 30 August 2022).

Technical guidance

10.2.4 A summary of the technical guidance for noise and vibration is given in **Table 10.3**.

Table 10.3 Technical guidance relevant to the noise and vibration assessment

Technical guidance document	Context
BS 4142:2014 + A1:2019 Methods for rating and assessing industrial and commercial sound (British Standards Institution, 2008)¹⁵	Describes methods for rating and assessing sound of an industrial nature, such as from factories, industrial premises or fixed installations affecting people who might be inside or outside a dwelling.
BS 5228-1:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1: Noise¹⁶	Provides a recommended scope for construction and demolition noise assessment. Annex E gives example threshold values for significant effects at noise sensitive receptors based upon the results of ambient sound monitoring.
BS 5228-2:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 2: Vibration¹⁷	Provides guidance on the assessment of ground-borne vibration associated with activities such as demolition and construction. Annex B.2 provides guidance of the effect of vibration levels on people.
BS 6472-1: 2008 Guide to evaluation of humans to vibration	Provides guidance on how people inside buildings respond to building vibration. It includes vibration dose value ranges which might result in adverse comment within buildings.

¹⁵ British Standards Institute (2019). BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound. BSI; London.

¹⁶ British Standards Institute (2014). BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 2 - Vibration. BSI; London.

¹⁷ British Standards Institute (2014). BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 2 - Vibration. BSI; London.

Technical guidance document	Context
exposure in buildings: Part 1: Vibration sources other than blasting sound¹⁸	
BS 7385-2: 1993 Evaluation and measurement for vibration in buildings. Part 2: Guide to damage levels from groundborne vibration¹⁹	Provides guidance on the levels of vibration above which building structures could be damaged, the factors which influence vibration response of buildings, and describes the basic procedure for carrying out measurements.
British Standard (BS) 7445:2003 Description and measurement of environmental noise²⁰	BS 7445:2003 provides the framework within which environmental noise should be quantified. Part 1 provides a guide to quantities and procedures and Part 2 a guide to the acquisition of data pertinent to land use. Part 3 provides a guide to the application of noise limits. The standard also refers to BS EN 61672 'Electroacoustics: Sound Level Meters Specifications' (2013), which prescribes the equipment necessary for such measurements.
Calculation of Road Traffic Noise (CRTN)²¹	Provides a calculation methodology for road traffic noise.

¹⁸ British Standards Institute (2019). BS 6472-1: 2008 Guide to evaluation of humans to vibration exposure in buildings: Part 1: Vibration sources other than blasting sound. BSI; London.

¹⁹ British Standards Institute (1993). BS 7385-2: 1993 Evaluation and measurement for vibration in buildings. Part 2: Guide to damage levels from groundborne vibration. BSI; London.

²⁰ British Standards Institute (1988). BS 7445-1:2003 Description and measurement of environmental noise. Part 1: Basic quantities and procedures. BSI; London.

²¹ Department for Transport (DfT) (1998). Calculation of Road Traffic Noise. HMSO; London.

Technical guidance document	Context
Design Manual for Roads and Bridges LA111: Noise and Vibration (DMRB)²²	Presents a methodology for determining impacts on noise sensitive receptors from changes in road traffic noise due to road projects.
TRL (2002) Transport and Road Research Laboratory – Converting the UK traffic noise index LA_{10,18hr} to EU Noise indices for noise mapping (TRL PR/SE/451/02)²³	A method for converting the road traffic noise indexes described in CRTN to produce outputs in the form of European Union indices, in particular TRL Method 2 which outlines the conversion of the LA _{10, 18hr} noise indices to the LA _{Aeq, 16hr} and LA _{Aeq, 8hr} indices.
BS 4142:2014+A1:2019: Technical Note²⁴	Provision of guidance and clarifications for British Standard.
Guidelines for Environmental Noise Impact Assessment²⁵	Presents guidelines on how the assessment of noise effects should be presented within the EIA process. The IEMA guidelines cover aspects such as: scoping, baseline, prediction and example definitions of significance criteria.

²² Highways England (2019). Design Manual for Roads and Bridges, LA 111 – Noise and Vibration (Revision 2) (Online). Available at: <https://www.standardsforhighways.co.uk/dmr/b/search/cc8cfcf7-c235-4052-8d32-d5398796b364> (Accessed 30 July 2020).

²³ Transport and Road Research Laboratory (2006). Converting the UK traffic noise index LA_{10,18hr} to EU Noise indices for noise mapping (TRL PR/SE/451/02) (Online). Available at: https://www.researchgate.net/publication/311964809_METHOD_FOR_CONVERTING_THE_UK_ROAD_TRAFFIC_NOISE_INDEX_LA1018h_TO_THE_EU_NOISE_INDICES_FOR_ROAD_NOISE_MAPPING (Accessed 22 November 2021)

²⁴ Association of Noise Consultants (2020). BS 4142:2014 + A1:2019 Technical Note. (Online). Available at: <https://www.association-of-noise-consultants.co.uk/wp-content/uploads/2020/07/ANC-BS-4142-Guide-March-2020.pdf> (Accessed 27 August 2021).

²⁵ Institute of Environmental Management and Assessment (2014). Guidelines for Environmental Noise Impact Assessment. IEMA; London.

Technical guidance document	Context
ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors. Part 2: General method of calculation²⁶	Defines a method for calculating the attenuation of sound during propagation outdoors, to predict the levels of environmental noise at distances from a source.
Guidelines for Community Noise²⁷	Provides guidelines and recommendations for protecting health, giving internal and external guideline limits.
Night Noise Guidelines for Europe²⁸	Provides guidelines and recommendations for health protection during the night-time period.
Environmental Noise Guidelines for the European Region²⁹	Analysis of exposure – response relationship related to specific noise sources and provision of guidelines for levels to protect human health.

²⁶ International Organization for Standardization (1996). ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors: Part 2 General Method of Calculation. ISO; London.

²⁷ World Health Organization (1999). Guidelines for community noise. WHO; Geneva.

²⁸ World Health Organization (2009). Night noise guidelines for Europe. WHO; Copenhagen.

²⁹ World Health Organization (2018). Environmental Noise Guidelines for the European Region. (Online). Available at: https://www.euro.who.int/__data/assets/pdf_file/0008/383921/noise-guidelines-eng.pdf (Accessed 26 August 2021).

10.3 Consultation and Engagement

Overview

- 10.3.1 The assessment has been informed by consultation responses and ongoing statutory and technical engagement. An overview of the approach to consultation is provided in **Section 3.4 of Chapter 3: Approach to Preparing the PEIR**.

Scoping Opinion

- 10.3.2 A Scoping Opinion was adopted by the Secretary of State, administered by the Planning Inspectorate, on 08 March 2022. A summary of the relevant responses received in the Scoping Opinion in relation to noise and vibration and confirmation of how these have been addressed within the assessment to date is presented in **Table 10.4**.
- 10.3.3 The information provided in the PEIR is preliminary and not all of the Scoping Opinion comments have been addressed at this stage, however all comments will be addressed within the ES.

Table 10.4 Summary of EIA Scoping Opinion responses for noise and vibration

Consultee	Consideration	How addressed in this PEIR
Planning Inspectorate (PINS)	Paragraph 10.1.5 Methodology – noise monitoring. The Scoping Report proposes to scope out baseline noise monitoring for a construction noise assessment along the route of the buried pipework, except where this is considered critical for establishing an elevated baseline (for instance at receptor locations adjacent to a motorway potentially affected by horizontal drilling). The Inspectorate agrees that this matter can be scoped out of further assessment, with the exception of such circumstances as highlighted above.	Should circumstances change an assessment will be included in the ES.
PINS	Paragraph 10.4.2 Methodology – vibration monitoring. The Scoping Report proposes to scope out vibration monitoring, on the basis that vibration will be assessed as an absolute (not relative) value. The Inspectorate is content with this approach.	Vibration monitoring not to be undertaken.
PINS	Paragraph 10.4.2 Methodology – noise monitoring within the vicinity of the Instrumentation and Control (IC) kiosks and block valves. The Scoping Report proposes to scope out noise monitoring within the vicinity of the IC kiosks and block valves on the basis that they do not contain noise generating development and an assessment is therefore not proposed to be undertaken. The Inspectorate agrees that this matter can be scoped out of further assessment. The ES should include relevant engineering specifications to demonstrate that block valves and kiosks do not give rise to noise and vibration emissions and should demonstrate that consultation has been undertaken with relevant Environmental Health Officers on this matter.	Relevant engagement will be undertaken with consultees with respect to noise and vibration emissions from block valves and possible electricity kiosks. Relevant engineering information will be presented within the ES to enable the scoping out of block valves and electricity kiosks.

Consultee	Consideration	How addressed in this PEIR
PINS	Paragraph 10.4.2 Methodology – noise monitoring of existing road traffic noise The Scoping Report proposes to scope out noise monitoring in relation to existing road traffic noise on the basis that this will be determined through calculation using traffic flow data, except where baseline traffic flows are too low to comply with predictions requirements. The Inspectorate is content with this approach.	Requirement for traffic noise monitoring to be considered for the ES.
PINS	Paragraph 10.6.7 Study area - operational phase. The Scoping Report proposes to scope out an assessment of effects beyond the study area identified for the Hydrogen Above Ground Infrastructure (HAGI), as they are considered to have the potential to generate noise during operation and there is no mechanism for the propagation of sound from pipework and valves that are buried. The Inspectorate agrees that there should be no noise associated with the operation of the buried pipeline itself during the operational phase and is content this matter can be scoped out of further assessment.	Operational aspects beyond the HAGI scoped out.
PINS	Table 10.5 Construction phase - pipe laying activities for human receptors, quiet or important outside leisure areas beyond 100 metre (m) from the centreline of the pipe route. The Scoping Report proposes to scope out pipe laying activity for human receptors, quiet or important outside leisure areas beyond 100m from the centreline of the pipe route, on the basis that it is a short-term activity. The Inspectorate notes a 300m study area from the boundary of new build infrastructure was adopted for the Hynet North West Carbon Dioxide Pipeline. In light of the similar nature of the proposals, the Inspectorate considers that the potential for significant	The study area for pipe laying activity will be increased to 300m from the boundary of new build infrastructure, with any assessment outcomes reported in future environmental reporting.

Consultee	Consideration	How addressed in this PEIR
	construction noise effects within a 300m study area should be addressed in the ES.	
PINS	Table 10.5 Construction phase - adverse health effects. The Scoping Report proposes to scope out adverse health effects during the construction phase on the basis that noise levels from the construction is unlikely to be sufficiently high or for a duration to result in adverse health effects. In addition, the health of human receptors will be protected via the avoidance of noise levels above the SOAEL and controlled via a CoCP. The Inspectorate agrees that this matter can be scoped out of further assessment.	Assessment of health effects scoped out.
PINS	Table 10.5 Operational phase - noise from HAGIs where these only contain block valves. The Scoping Report proposes to scope out noise from HAGIs during the operational phase where they only contain block valves, on the basis that they do not contain noise generating equipment. The Inspectorate agrees that this matter can be scoped out of further assessment. The ES should include relevant engineering specifications to demonstrate that block valves do not give rise to noise emissions and should demonstrate that consultation has been undertaken with relevant Environmental Health Officers on this matter.	Consultation to be undertaken when further details are available.
PINS	Table 10.5 Operational phase - effects due to vibration from operation of equipment at HAGIs. The Scoping Report proposes to scope out effects due to vibration from operation of equipment at HAGIs during the operational phase,	Consultation on this matter will be undertaken and the evidence base presented in future environmental reporting.

Consultee	Consideration	How addressed in this PEIR
	on the basis that there is no rotating machinery at HAGIs. The Inspectorate agrees that this matter can be scoped out of further assessment. The ES should include relevant engineering specifications to demonstrate that there are no sources of vibration producing equipment and should demonstrate that consultation has been undertaken with relevant Environmental Health Officers on this matter.	
PINS	Table 10.5 Operational phase – maintenance. The Applicant proposes to scope out an assessment of maintenance activities during the operational phase, on the basis that any activities are likely to be minor in nature in terms of noise generation, and of a short duration. The Inspectorate agrees with this approach in principle, however the EIA should secure a notification process for noise sensitive receptors affected by pigging activities in the vicinity of HAGIs, this should include consultation with relevant Environmental Health Officers regarding indicative noise levels.	A proposed notification process will be outlined and agreed with relevant consultees and added to commitments.
PINS	Table 10.5 Operational phase - road traffic for maintenance. The Applicant proposes to scope out road traffic associated with maintenance during the operational phase, such as staff attending site via car or van. The Inspectorate is satisfied that such traffic movements are likely to be infrequent and unlikely to give rise to any likely significant effects and therefore this matter can be scoped out of further assessment.	Maintenance traffic scoped out.
PINS	Table 10.5 Operational phase - adverse health effects.	Health effects scoped out.

Consultee	Consideration	How addressed in this PEIR
	The Applicant proposes to scope out adverse health effects associated with the operational phase of development, on the basis that noise will be controlled through design and provision of mitigation, to levels established through assessment in accordance with BS 41421. The Inspectorate is content with this approach.	
PINS	Paragraph 10.5.4 Mitigation measures. The Scoping Report refers to noise mitigation measures, including enclosures. The ES should address the potential adverse effects of mitigation measures in the relevant aspect chapters of the ES (e.g. Landscape and Visual) where significant effects are likely to occur.	The potential adverse effects will be addressed in other relevant aspect chapters, such as LVIA.
PINS	Paragraph 10.7.12 Construction site noise and haul routes. The Inspectorate notes that the duration of effect criteria applied in addition to Category A, B, C criteria equate to the noise insulation criteria in BS 52282. The ES should explain why the ABC method has been modified in this way and justify the approach, demonstrating that the bar for identification of a likely significant effect has not been set artificially high. The Applicant should seek agreement from relevant local authorities regarding the final criteria where possible.	The ABC method does not provide a method for assessing higher noise levels over a shorter period of time than a month, which could occur on linear infrastructure projects. The noise insulation noise trigger levels and temporal criteria noise has therefore been included to fill the gap of the ABC method. The noise trigger level criteria has been simplified from BS 5228 to consist of the three most common times, which match that of Category C, being 75, 65 and 55dB. It is noted that this does not preclude assessing Category C noise for one month or more where sufficiently high baseline levels have been identified.

Consultee	Consideration	How addressed in this PEIR
		Consultation with the local authority will be sought where possible to agree assessment criteria.
PINS	Migratory fish species. The Applicant's attention is drawn to the Inspectorate's comments regarding impacts to migratory fish.	It is not expected that any works during construction or operation will cause significant underwater noise or vibration due to the distance between crossings and waterways with migratory fish. This will be re-evaluated with design updates for the ES.
Canal and River Trust	The Trust own, manage and operate the Trent & Mersey Canal, Weaver Navigation (part of which we only have a right of navigation for) and parts of the former St Helens (Sankey Canal). The Trust also own and manage the Anderton Boat Lift, a Scheduled Ancient Monument and Grade II* Listed Building. As land owner/ operator of the waterways the Trust would wish to see any potential impacts on; our waterway users (boaters, towpath users and wildlife); infrastructure (the canal, bridges, culverts, towpaths, embankments etc); or the habitats that our waterway support; fully identified and addressed within the ES and supporting application documents. It is extremely important that our waterways and navigational safety along the canals both during construction and operation of the development are maintained. The proposed works, construction routes and construction compounds have the potential to impact on the waterway infrastructure.	Noise and vibration sensitive resources will be considered within the ES once further information on crossings is available.

Consultee	Consideration	How addressed in this PEIR
Canal and River Trust	The Trust agree that noise and vibration should be scoped into the Environmental Statement. The waterway corridors are tranquil spaces and contribute to the health and wellbeing of the nearby residents and users (boaters, anglers, commuters, leisure and recreational users on the towpath). These spaces should be protected from intrusive forms of development and any potential impacts such as noise should be kept to a minimum. We would ask that waterways and their users are included as noise sensitive receptors in the assessment. The proposal both during construction and future operation has the potential to impact on users of the waterway from noise and vibration. This includes boaters (both residential and leisure users) and recreational users along the canal towpaths, as well as wildlife. We consider that boaters/canal users/wildlife should be considered as specific receptors in terms of noise and mitigated accordingly.	Noise and vibration sensitive resources will be considered within the ES.
Canal and River Trust	The Trust own, manage and operate the Trent & Mersey Canal, Weaver Navigation (part of which we only have a right of navigation for) and parts of the former St Helens (Sankey Canal). The Trust also own and manage the Anderton Boat Lift, a Scheduled Ancient Monument and Grade II* Listed Building. As land owner/ operator of the waterways the Trust would wish to see any potential impacts on; our waterway users (boaters, towpath users and wildlife); infrastructure (the canal, bridges, culverts, towpaths, embankments etc); or the habitats that our waterway support; fully identified and addressed within the Environmental Statement (ES) and supporting application documents. It is extremely important that our waterways and navigational safety along the canals both during construction and operation of the development are maintained. The proposed works, construction routes and construction compounds have the potential to impact on the waterway infrastructure.	Noise and vibration sensitive resources will be considered within the ES.

Consultee	Consideration	How addressed in this PEIR
Cheshire West and Chester Borough Council	With regard to construction noise, it is proposed that baseline noise assessments are not required, the intention is to consider Category A, as per BS5228, applies at all locations as a default position. It is noted that the applicant wants to reserve the right to conduct background surveys at specific locations and review the Category against BS5228 with a view to re-evaluating the category depending on the outcome of the background survey. The Council's EPU would advise that we consider this approach to construction noise appropriate for the purpose of laying of pipes and construction of HAGIs and Block Valves (BVs).	Further consultation on this point will be required for the ES. Assessing construction noise against the existing ambient noise environment follows the examples within BS 5228.
Cheshire West and Chester Borough Council	Paragraph 10.1.6 confirms that best practice will be embedded within site management and construction operations taking measures from the Code of Construction Practice and ensuring their implementation through the CEMP(s) (Construction Environmental Management Plan).	Best practice measures to be embedded in the project.
Cheshire West and Chester Borough Council	Site compounds and depots will need to be assessed on a site-by-site basis and will need to meet the requirements of Planning Policy DM30 regarding noise and hours of operation.	Noise and vibration effects from individual site compounds and depots will be considered within the ES. For the PEIR a high level approach is taken appropriate to the level of detail available at the time of writing. Planning Policy DM30 will be included as part of the assessment criteria which is expected to be met.

Consultee	Consideration	How addressed in this PEIR
Cheshire West and Chester Borough Council	Traffic noise will be assessed via utilising the CRTN [Calculation of Road Traffic Noise] tool and given the volume of traffic associated with the construction phase and the transient nature at most locations. The Councils EPU [Environmental Protection Unit] have no concerns on this especially given the proposed hours of work are between 08:00 and 18:00 Monday to Saturday. Out of hours work will need assessing inline with Policy DM30 but traffic noise is not likely to be significant except perhaps at depot sites / construction compounds. Onsite vehicle movements at depots will need to be assessed in accordance with DM30 and specifically BS4142. with Policy DM30 but traffic noise is not likely to be significant except perhaps at depot sites / construction compounds. Onsite vehicle movements at depots will need to be assessed in accordance with DM30 and specifically BS4142.	Mobile construction plant on a construction site falls within the remit of BS 5228. Further consultation on this point will be undertaken prior to the ES.
Cheshire West and Chester Borough Council	Likely significant events The Councils EPU agree Table 10.4 as realistic scenarios where further assessment will be warranted. Regarding Table 10.5, Elements Proposed to be Scoped Out - In terms of operational noise it is proposed to scope out pipeline noise and Block Valves (BVs). The Councils EPU have no objection to the screening out of pipeline noise and in principle we would agree the approach of a BV but as no indicative noise levels have been provided that we could find to support the screening out of BVs, we would advise that further supporting information is provided before agreeing this	BV data to be provided within ES.
Cheshire West and Chester Borough Council	The Councils EPU agree to the proposal to scope out Instrumentation Kiosks.	Kiosks scoped out of assessment, though evidence will be presented within an ES appendix for the purposes of scoping out kiosks.

Consultee	Consideration	How addressed in this PEIR
Cheshire West and Chester Borough Council	Operational noise assessment is therefore directed toward HAGIs with pressure reduction units. Pigging is screened out as an infrequent exercise but again, similar to BV noise, there are no indicative levels to support this and again we would advise against doing so until further information is submitted. Pigging is a necessary operation, if the impact is significant then it needs to be identified at this stage and not omitted because of frequency. On provision of acceptable further information supporting its removal from the assessment process then we will happily agree this.	Operational noise sources have been reviewed as part of the PEIR process. Additional information has been provided within Section 10.9 to provide a rationale for scoping operational noise sources out of further assessment where this is considered appropriate.
Cheshire West and Chester Borough Council	10.7 Assessment methodology With regard to Table 10.6, “Establishing the sensitivity of the receptor”, the Councils EPU advise that for those elements where construction noise is likely to be short in duration, limited to weeks rather than months, the criteria is acceptable. However, where there is exposure over a prolonged time then the definition does not hold and those elements in the medium category should be elevated to the high category in such circumstances. Short term there is scope for them to adapt but there are time constraints on this and this should be factored in and would better align with Table 4.1. Operational noise is assessed through other means as discussed elsewhere.	Further consultation will be undertaken to discuss the sensitivity of receptors and agree an approach with all relevant Environmental Protection Units for the ES. It is considered that the duration of the works should be considered as context when qualifying the significance of effect rather than changing the sensitivity of the receptor.
Cheshire West and Chester Borough Council	Determination of significance – construction site noise and haul routes With regard to the matter of magnitude and in the context of Table 4.2 and 10.7, the Councils EPU recognise the difficulty in applying this principle to assessment criteria which already inherently include the concept of magnitude. Consequently we strongly disagree with the criteria laid out in para 10.7.12. It would only be marginally more acceptable if it were applied to a working day window. The incorporation of an additional and/or criteria of an increase of 5dB(A)	The reference to Category C aligns closely with the Trigger levels for noise insulation in BS 5228 which has a smaller temporal requirement of 10 days. The purpose of this approach is to cover the assessment of noise where it is less than one month (which is the temporal threshold for the ABC

Consultee	Consideration	How addressed in this PEIR
	over the relevant/applicable category, be that Category A, B or C would provide better sense and more in line with BS5228.	method). Further consultation will be undertaken to discuss the magnitude of impact and agree an approach with all relevant Environmental Protection Units.
Cheshire West and Chester Borough Council	In any event out of hours working as specified in DM30 of the Local Plan shall only be considered on a site-by-site basis and will require more detailed analysis and justification. That justification only likely to be supported in the event of health and safety reasons when works cannot be undertaken safely between the hours of 08:00 and 18:00 or in the event of crossings to minimise time.	24-hour working is likely to be required with trenchless crossings and possible roadworks to reduce disruption
Cheshire West and Chester Borough Council	Determination of significance – construction traffic noise on public highway The Councils EPU agree the content of Table 10.8. Given the nature of the development and the number of vehicle movements likely, most reasonable scenarios will see a negligible or low magnitude based on the criteria advocated in Table 8, the greatest impact will be on approach roads to depots/compounds where heavy plant is stored overnight or else at the point where construction is ongoing, this latter being likely short lived in duration. Any scenario outside the negligible category is only likely to occur on roads with existing very low traffic levels. Whilst again the criteria applied in para 10.7.12 is applied in para 10.7.14 for medium or high magnitudes, and our concerns over the absurdity of their application remain, we do not consider this to be a high risk matter away from depot locations. On approach roads to depot locations the movement of traffic is likely to only be an issue at night and then only for brief periods of time and in any event night working will have to be subject to separate approval and justified.	Construction traffic on public highways is assessed against construction criteria within the Design Manual For Roads and Bridges. Comment on compound location selection is noted.

Consultee	Consideration	How addressed in this PEIR
	Ultimately depot location selection should ensure these factors are considered in the selection criteria and weighted accordingly. In other words do not choose a depot/compound location where traffic movements are likely to result in residential complaint.	
Cheshire West and Chester Borough Council	Determination of significance – construction vibration The Councils EPU agree the levels in Table 10.9 and note that damage resulting from construction vibration is an issue that has to be dealt with privately, levels set out in Table 10.10 should not occur and activities which identify potential for elevated levels should be carefully planned and subject to review to identify alternative construction measures.	To be addressed as commitments and planned, subject to review by the local authority to identify alternative construction measures by means of CEMP.
Cheshire West and Chester Borough Council	Operational Assessment methodology The Councils EPU note para 10.7.22 and advise a precautionary approach is advocated to deal with uncertainty. We note para 10.7.25 but generally we support a rating level of 5dB below background but that can be relaxed for areas with very low background levels, within that context we agree the content of para 10.7.28.	To be resolved within the operational noise assessment in the ES.
Cheshire West and Chester Borough Council	Non-routine operation The Councils EPU agree para 10.7.32 and 10.7.33	Noted. No action required.
Marine Management Organisation	The MMO recommend that the potential impacts of underwater noise and vibration on marine receptors from the construction/installation operations and machinery are considered in the ES. The receptors that are listed in section 5.4.28 of the Scoping Report are migratory species, therefore consideration should be given to any overlap of the works with key sensitive migration periods.	For the ES, when more detail is known of potential distances to the riverbed, screening calculations will be made to scope out underwater noise and vibration.

Consultee	Consideration	How addressed in this PEIR
Marine Management Organisation	The MMO also recommend that the ES adequately describes all activities that will generate underwater noise, as well as the proposed working hours and duration of activities. The MMO note that construction is expected to commence in 2025 with commissioning in 2027. The Project would be fully operational from late 2027 to early 2028. Typical construction hours can be 10 hours per day (08:00 to 18:00) from Monday to Saturday. Limited 24-hour working would be required for some activities such as trenchless crossings where they need to be completed as a continuous operation as well as pipeline testing (see section 2.6.3 of the Scoping Report).	
Marine Management Organisation	In terms of mitigation measures, A number of embedded environmental measures (as per section 5.5) have been proposed although these are largely concerned with terrestrial ecology. The MMO will be able to further advise on mitigation once an assessment of the potential impacts has been undertaken.	
Trafford Council	The ES should include an assessment of the effects of noise and vibration on nearby properties during the construction phase and set out appropriate mitigation to minimise potential disturbance.	This assessment will be included in the ES.
Trafford Council	Chapter 10 of the Scoping Report describes the scope of the noise and vibration assessment and how it will consider the likely significant effects on residential and non-residential receptors that may arise from the construction and operation of the project. This chapter describes the methodology to be used within the EIA; the datasets to be used to inform the EIA; an overview of the baseline conditions; the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed.	

Consultee	Consideration	How addressed in this PEIR
Trafford Council	The Council's Pollution and Housing Section has reviewed the Scoping Report and are satisfied that the criteria identified for use/reference within the EIA process for assessing construction and operational impact are sufficient. The information provided is comprehensive and appears to include everything of relevance in respect of nuisance impact from noise and vibration	No action required.
Warrington Borough Council	Comments from the WBC Environmental Protection Team have been received and the full response will be attached to this response but they are also summarised below: No baseline surveys have been carried out yet and are only likely to be carried out where critical for establishing an elevated baseline for drilling.	No action required.
Warrington Borough Council	Expect baseline surveys will be necessary around HAGI areas where these are close to residential. So potentially for Warrington – the Arpley HAGI and Penketh HAGI. Noise is intended to be designed out. Baseline surveys to occur in 2022. Ambient baseline where operational noise may be observed beyond site boundaries in accordance with BS4142:2014 +A1:2019.	Surveys to be conducted for the ES. Please note the reduction of HAGI locations in Warrington.
Warrington Borough Council	Background and ambient sound measurements at representative receptors close to be adversely impacted by HAGI's containing PRU's, metering facilities and pigging facilities. Ambient and background noise at locations representative of residences near to proposed construction compounds. Baseline will be long term unattended plus attended surveys – timed to avoid school holidays.	Surveys to be conducted for the ES.
Warrington Borough Council	Agree consultation with LPAs is necessary to agree distances	Distances from site to noise sensitive receptors that require surveys will be

Consultee	Consideration	How addressed in this PEIR
		agreed with local planning authority where required.
Warrington Borough Council	Agree BS5228 is the correct one to utilise for construction impacts	No action required.
Warrington Borough Council	Discusses pipeline insertion crossing major roads and railways. Overnight works may be required. Otherwise will be daytime. No specific detail of level of impact in Warrington from Solvay to Novelis – all roadway and no open space involved. Need information within the ES as to whether special considerations will relate to this. Information only mentions road crossings but information is required on where the entire roadway may be pulled up for linear pipeline installation as is expected between Solvay and Novelis. Does include reference to drilling – ES should include location and details of any drilling to be used in WBC area to minimise highway excavations?	Details of the construction approach to road crossings will be used to assess noise and vibration impacts in the ES where there would be potential significant effects on noise and vibration sensitive receptors.
Warrington Borough Council	Warrington has a lot of Noise Important Areas for Planning (DEFRA Noise Mapping Information) and these need to be considered	Noise and vibration sensitive resources will be considered within the ES.
Warrington Borough Council	For both of these proposed HAGI installations, further information will be required identifying potential operational noise impacts on existing residential dwellings but also whether there will be impacts on existing commercial and agricultural activities in the vicinity of these sites.	
Warrington Borough Council	Solvay Interlox/Ingevity both share the same overall site and area. There are existing residential dwellings to the North East and East of this site. Whilst information has been provided on HAGI areas and the general pipeline, no information has been provided on likely noise or other impacts that may arise from the final connection from the pipeline to these end users. Whilst we do not necessarily expect	Specific noise and vibration sensitive resources will be considered within ES.

Consultee	Consideration	How addressed in this PEIR
	adverse impacts to result from such end user connections, some appraisal of impacts should be included to inform any subsequent formal application along with any controls or mitigation measures that may be necessary.	
Warrington Borough Council	As with Solvay/Ingenity, there are residential dwellings immediately to the East of Novelis as well as over the Ship Canal to the South. Again consideration of any noise impacts from the final connection of the pipeline to these dwellings needs some detail provided	
Warrington Borough Council	Expect baseline surveys will be necessary around HAGI areas where these are close to residential. So potentially for Warrington – the Arpley HAGI and Penketh HAGI. Noise is intended to be designed out. Baseline surveys to occur in 2022. Ambient baseline where operational noise may be observed beyond site boundaries in accordance with BS4142:2014 +A1:2019.	Surveys will be conducted for the ES. Please note the reduction of HAGI locations in Warrington.

Planned future engagement

10.3.4 As yet no specific technical engagement has been conducted for noise. Comments on the PEIR will be incorporated into a set of consultations with statutory stakeholders to answer queries and agree detailed methods for the following aspects of the assessment:

- Assessment criteria;
- Receptor locations;
- Baseline noise monitoring, including locations, durations, parameters; and
- Prediction and assessment approach.

10.4 Study Area

10.4.1 The scopes referenced below are applicable for PEIR and ES, dependent on when a particular aspect has been assessed (e.g. operational noise has not been assessed within this PEIR).

Spatial scope: construction

10.4.2 For construction site works, all noise sensitive receptors within a 300m radius from any construction activity or extent of identification of significant effects if this is beyond 300m have been considered. This distance is based on the basis of BS5228-1, professional judgement, and other recent major infrastructure projects, such as HS2, in which this scope has been agreed. This is considered a robust spatial scope for the assessment.

10.4.3 For construction traffic noise, the special scope has been determined where an increase or decrease in road traffic volumes or traffic types caused by the construction of the Project would be likely to cause a change in noise level exceeding 1dB $L_{Aeq,T}$ during either the daytime (07:00 - 23:00) or night-time (23:00 - 07:00), as advocated in DMRB²². When estimating the number of properties affected by road traffic noise change, the row of properties closest to the road will be considered in built up areas and properties within 50m of the road where properties are sporadic.

10.4.4 For the purposes of identifying potential receptors for the vibration assessment, a vibration study area has been defined as a 100m area from any likely significant vibration source, such as vibratory compaction or piling works. This distance is based on professional judgment in relation to distances where no vibration would be anticipated at receptors with the likely ground conditions (i.e. no consistent medium for vibration from source to receptor such as connecting bedrock).

10.4.5 Reference may be made to potential receptors outside of the Study Areas defined above, such as receptors of special interest (such as designated tranquil areas or precision engineering premises). Where this is the case, those potential receptors will also be considered as part of the noise and vibration assessment.

Spatial scope: operation

- 10.4.6 The Study Areas for operation are limited to the areas around the HAGIs that are considered to have the potential to generate noise during operation. There is no mechanism for the propagation of sound from pipework and valves that are buried. Therefore, there will be no noise associated with the operation of the buried pipeline itself. Furthermore, there will be no noise from the operation of the pipeline and its components, unless there are valve bodies or exposed pipework above ground (i.e. from HAGIs including only Block Valves and/or ICs).
- 10.4.7 The geography to which the Study Area extends has been defined depending on the type of plant expected at the installation. HAGIs including metering units and/or PRUs and/or pigging facilities have the potential for adverse noise impacts. A Study Area of 500m from these installations is proposed, based on scoping distances used for facilities for transportation of carbon dioxide, which have similar noise generating plant and plant layouts.
- 10.4.8 The activities associated with the operation of the Project are not expected to generate significant vibration levels. There is no rotating or reciprocating machinery to give rise to vibration associated with out-of-balance forces. Vibration from pipework that could be perceivable beyond the perimeter of the facilities is highly unlikely because of the necessity to minimise vibration to maintain pipe and valve integrity, which are critical in a hydrogen transport facility.

Temporal scope: construction and commissioning

- 10.4.9 The temporal scope of the assessment of noise and vibration is consistent with the period over which the Project will be carried out and therefore covers the construction period. Construction is currently proposed to take place from 2024 (commencing with site establishment and pipeline construction between 2024 and 2027. Operation of the Project will commence in late 2027/early 2028, following commissioning.
- 10.4.10 Site-based construction noise and vibration emissions for the Project will be assessed at a point and a time when the maximum plant is in use. For the linear pipe burying works, that same approach will be taken. Splitting the predictions into different phases of works will be considered where works are expected to be present in one location for more than one month, and there are different phases to the works. The decision to split predictions in this way will be based on the variety of activities taking place, level of information available, length of time of the works and the potential for significant effect.
- 10.4.11 Installation of the pipes crossing major roads and railways, and other infrastructure, may require overnight works to minimise daytime closures of these transport links. Works may take place over a 24-hour period to support the construction of trenchless crossings, particularly in relation to pipe drying, and testing operations. For the remainder of the Project, as stated in **Chapter 2: The Project**, it is assumed that construction work would be limited to daytime hours but would take place six days per week. Construction noise for the relevant periods will be assessed in future environmental reporting.

- 10.4.12 Noise from road traffic associated with construction will be assessed during the year of construction that sees the peak traffic flow week for that geographic section of the Project (e.g. North Corridor, East Corridor, see **Figure 1.1**).
- 10.4.13 Whilst the assessments will focus on points in time, consideration will be given to the duration of the effect, as relevant to the different phases and activities within those phases (e.g. some construction effects may last for only days whilst some may last for weeks).

Temporal scope: operation

- 10.4.14 As set out in **Chapter 2: The Project**, the Project is expected to begin operation in late 2027/early 2028. During operation, HAGIs would operate continuously in terms of gas flow (and any consequent noise) except when specific intrusive maintenance activities are occurring, e.g. pigging.
- 10.4.15 The only other operational noise would be associated with periodic attendance at site by personnel to carry out checks or maintenance, which would occur throughout the operational lifetime of the Project. The following is set out in **Chapter 2: The Project**.
- 10.4.16 The HAGIs would generally be operated remotely from a central control room located off-site. The frequency of periodic maintenance undertaken on-site has yet to be determined but would typically include the following:
- Routine checks on a weekly basis requiring one-two personnel for a short period (approximately one hour);
 - Annual maintenance requiring two personnel for approximately one day;
 - Major maintenance requiring five personnel for approximately one week (every two to five years);
 - Pipeline inspection operations requiring ten personnel for approximately one week and undertaken every 1 to 5 years. Inspection operations involve an internal examination of the pipe undertaken by a 'pig', an inline inspection tool, which travels inside the pipeline from one HAGI to the next.
 - Infrequent breakdown or urgent visits with access on a 24/7 basis if required.
- 10.4.17 The above site visits would involve a limited number of staff, arriving at site in cars or vans. Heavy vehicles would generally only be required in the event of replacement of large items of equipment. On very rare occasions, equipment may need to be changed as a result of routine updating or failure.
- 10.4.18 Based on the minor nature of the above, in terms of noise generation, and the short duration of activities, maintenance activities are scoped out of the assessment. However, the EIA will identify the need for notifying noise sensitive receptors in the vicinity of HAGIs, when pigging activities are expected.
- 10.4.19 As described in **Chapter 2: The Project**, decommissioning effects will be similar to the methods used for construction, and so will be considered qualitatively in the assessment with the exception of breaking activities, where required.

10.5 Data gathering methodology

Desk study

- 10.5.1 A summary of the organisations that have supplied data, together with the nature of that data is outlined in **Table 10.5**.

Table 10.5 Data sources used to inform the noise and vibration assessment

Source	Date	Summary
WYG	14 May 2019	Existing operational noise assessment undertaken for Bromley by Bow site providing details of AGI noise.
Mott MacDonald	29 November 2019	Existing operational noise assessment undertaken for Leyton PRI providing details of AGI noise
Wood	4 July 2022	Traffic flows as provided within Appendix 10A .
BS 5228-1/2: 2009+A1:2014 (British Standard Institute, 2014a and 2014b)	December 2020	Noise data for construction noise and vibration predictions
GIS information	18 July 2022	Project mapping incorporating ordnance survey base mapping.

Survey work

- 10.5.2 Information regarding the potential need for baseline sound monitoring has been based on examination of the potential route corridors and facility locations available at this stage of the Project. The project GIS viewer has been used to view open source mapping, the potential corridors and facility locations, and their proximity to potentially noise and vibration sensitive receptor zones.
- 10.5.3 Detailed construction noise surveys will be undertaken when the pipe design and the construction methodology is finalised. This will be reported in the ES. However, in lieu of baseline noise survey, predicted noise levels within this PEIR have been assessed against criteria in the form of absolute levels taken from BS 5228-1:2009 + A1:2014. BS 5228-1 describes the 'ABC method' for assessing construction noise, demonstrating how assuming low existing noise levels below the absolute criteria at receptors can form the basis for a worst-case assessment (i.e. baseline data would only make criteria less stringent).

- 10.5.4 Baseline sound surveys are currently being planned and mobilised for 2022 / 2023, with planned details given in **Section 10.13**.

10.6 Overall Baseline

Current baseline

- 10.6.1 As surveys have not yet been undertaken, the description of the existing baseline sound climate is based on professional judgement following examination of the potential route corridors using mapping.
- 10.6.2 Land use in the noise study area, which also encompasses the vibration study area, is predominantly rural, however it does also include more built-up areas, both of an industrial and residential nature. It is anticipated that the baseline ambient noise levels in the rural and residential areas will generally be of a low magnitude except where close to major transportation routes.
- 10.6.3 Near to industrial and commercial sites, as well as major transportation routes, it is anticipated that baseline noise levels will be higher than in those in rural or residential areas. Given the geographical extent of the noise study area, and that the baseline and ambient sound surveys have not yet been undertaken, no further description of the baseline conditions has been provided at this stage.

Future baseline

- 10.6.4 The future baseline sound climate is not anticipated to change for the majority of areas through which the Project runs.
- 10.6.5 Where new industrial or residential development occurs within the small zone of influence of the Project, local sound levels would be expected to increase and/or change in character if that use was new to the area.
- 10.6.6 There may be a small increase in noise levels, as a result of natural traffic growth, close to more major roads. Should HS2 Phase 2b go ahead, an increase in noise levels would be expected close to the alignment. A small decrease in sound levels in the medium to long term could occur near roads with traffic speeds below about 20km/hr as a result of a move to a higher proportion of electric cars.

10.7 Embedded Environmental Measures

- 10.7.1 As part of the project design process, a number of embedded environmental measures are proposed to reduce the potential for impacts on noise and vibration. These measures will be reviewed and added to where appropriate within the ES. Embedded environmental measures must be in place during construction. These measures are generally regarded as industry standard or best practice.
- 10.7.2 The CEMP will detail the best practice methods to be adopted during the construction phase and will include measures to reduce noise and vibration impacts.

- 10.7.3 Construction traffic vibration has the potential to give rise to adverse impacts where heavy vehicles pass close to roadside residential receptors, on lightly trafficked roads that do not normally carry heavy vehicles. Impacts typically only occur where the road surface is in poor condition. Highway condition surveys will be undertaken before, during and after the construction phase and repairs conducted to any damage to highways, as a result of construction heavy goods vehicles (HGVs) on the highways related to the Project, and included within the HGV Access Strategy. This commitment is included within this chapter as it minimises the risk from vibration effects at residences from HGVs passing over holes in the road, close to residences.

10.8 Scope of the Assessment

- 10.8.1 This section sets out the scope of the PEIR assessment for noise and vibration. This scope has been developed as the project design has evolved and responds to feedback received to date during consultation.

Potential receptors

- 10.8.2 The principal noise and vibration receptors that have been identified as being potentially subject to effects are summarised in **Table 10.6**.

Table 10.6 Noise and vibration receptors subject to potential effects

Receptor	Reason for consideration
Residential – residences, including private gardens where appropriate	These dwellings, occurring within the Study Area of the Project, have the potential to experience a change as a result of the Project and potentially adverse noise and/or vibration effects.
Community services – e.g. schools (during daytime periods), places of worship	These sites, occurring within the Study Area of the Project, have the potential to experience adverse noise and/or vibration effects as a result of the Project.
Commercial – e.g. offices, retail, entertainment venues and eateries, leisure facilities	These sites, occurring within the Study Area of the Project, have the potential to experience adverse noise and/or vibration effects as a result of the Project.
Leisure areas – e.g. local nature reserves	These sites, occurring within the Study Area of the Project, have the potential to experience adverse noise and/or vibration effects as a result of the Project.
Terrestrial ecology – e.g. designated sites include Special Protection Areas and Sites of Special Scientific Interest	These sites and species have the potential to experience adverse noise and/or vibration effects as a result of the Project and are reported in Chapter 5: Biodiversity .

Receptor	Reason for consideration
Historic environment – e.g. scheduled monuments, listed buildings	These sites and buildings have the potential to experience adverse noise and/or vibration effects as a result of the Project and are reported in Chapter 6: Historic Environment .

10.8.3 Based on the information set out in **Section 10.10** potential receptors are identified based on their location relative to the project components. Generally, the potential receptors will be residential dwellings. Based on professional judgement residences are considered to have a 'medium' sensitivity to noise and vibration, in comparison with receptors that are highly sensitive such as medical establishments. It should be noted that the process of assessment using this medium sensitivity means that a significant impact would be aligned with that stated in British Standards (e.g. a significant impact in accordance with BS 5228 for construction or BS 4142 for operation would also be a significant effect within this PEIR and the ES). Potential receptors have been identified as individual dwellings or 'community receptors' as appropriate. Where community receptors have been used, the consideration of individual dwellings representative of the wider community may take place for the ES in the unlikely event that significant numbers are affected.

Likely significant effects

10.8.4 The effects on noise sensitive receptors which have the potential to be significant and have been taken forward for detailed assessment are summarised in **Table 10.7** (noting that operational noise is not assessed at PEIR stage and a more detailed construction assessment will be presented at ES stage).

Table 10.7 Summary of effects scoped into the noise and vibration assessment

Activity	Likely significant effects	Receptor
Construction		
Construction road traffic, including use of specially constructed access routes	Potential for significant effects should there be construction traffic on small roads with otherwise low traffic flow resulting in a potentially high magnitude of change in noise. HGVs on poorly maintained roads could result in vibration levels of medium magnitude.	Residential properties, educational, religious and medical premises, quiet or important outside leisure areas.
Activities from site construction works resulting in noise from works and vibration from	Potential for significant noise effects from trenchless crossing sites, long-term compound use, piling noise (if required) and	Residential properties, educational, religious and medical premises,

Activity	Likely significant effects	Receptor
works if very close to sensitive receptors	vibration, and vibration from vibratory ground compaction at the HAGIs on sensitive receptors.	quiet or important outside leisure areas.
Emissions from the drying and hydrotesting	Potential for significant noise effects from commissioning testing using air compressors	Residential properties, educational, religious and medical premises, quiet or important outside leisure areas.
Operation and Maintenance		
Emissions from the operation of the HAGIs	Potential for significant effects due to the proximity of the HAGIs and the quiet character of the existing noise environment would potentially result in changes to the baseline noise environment.	Residential properties, educational, religious and medical premises, quiet or important outside leisure areas.
Decommissioning		
Removal of elements resulting in noise and vibration	Potential for significant effects from the removal of the project. Likely to be similar to construction effects.	Residential properties, educational, religious and medical premises, quiet or important outside leisure areas.

Elements scoped out of further assessment

10.8.5 The receptors/effects detailed in **Table 10.8** have been scoped out from being subject to further assessment because the potential effects are not considered likely to be significant. The following have been widely agreed by PINS and local authorities.

Table 10.8 Summary of effects scoped out of the noise and vibration assessment

Receptors/potential effects	Justification
Construction	
Pipe laying activities	Pipe laying is a short-term activity (see Chapter 2: The Project), using a limited amount of equipment at any one stage.
Adverse health effects	Given the level of construction works and temporary nature of the main element of the works, being the pipeline, noise

Receptors/potential effects	Justification
	levels from the construction is unlikely to be sufficiently high or for a duration to result in adverse health effects. The health of human receptors will be protected via the avoidance of noise levels above the SOAEL and controlled via a CoCP ³⁰ .
Operation and Maintenance	
Noise from HAGIs where these only contain Block Valves	Does not contain noise generating equipment.
Effects due to vibration from operation of equipment at HAGIs	There is no rotating machinery at HAGIs. Plant and pipework can give rise to vibration with the potential to result in vibration which might be perceived at distance from the source. For the safe and efficient operation of such equipment, vibration must be kept to a minimum through design, commissioning and continuously during operation through condition monitoring and maintenance. Due to the need for low levels of vibration in operation to prevent malfunction, to ensure long life and safe and efficient running and the distance between equipment/sensitive receptors, vibration is scoped out.
Maintenance in operation	Based on the minor nature of activities in terms of noise generation and the short duration of activities, maintenance activities are scoped out of the assessment. However, the EIA will identify the need for notifying noise sensitive receptors in the vicinity of HAGIs when pigging activities are expected.
Road traffic for maintenance	Attendance at HAGIs by maintenance staff involves car or van visiting site. Frequency is weekly at most and therefore considered insufficient to give rise to a likely significant effect.
Adverse health effects	Industrial type noise sources (i.e. those at certain HAGIs) become annoying before they reach a level sufficient to give rise to adverse health effects. Noise from industrial type sources will be controlled through design and

³⁰ It is stated within 'Public Health England, (2017). Health and Environment Impact Assessment: A Briefing for Public Health Teams in England (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/629207/Health_and_environmental_impact_assessment.pdf (accessed 18 January 2022)' that population and human health "*should only be scoped into an EIA where the likely health consequences of the project are considered to be significant.*"

Receptors/potential effects	Justification
	provision of mitigation, to levels established through assessment in accordance with BS4142 ¹⁵ . Health effects resulting from industrial type sources were not included in the 2018 WHO Environmental Noise Guidelines ²⁹ ‘... <i>mainly due to the large heterogeneity and specific features of industrial noise, and the fact that exposure to industrial noise has a very localized character in the urban population</i> ’.

10.9 Methodology for PEIR Assessment

High Level Assessment Approach

- 10.9.1 The assessment for PEIR will focus on the effects of construction noise on the surrounding environment. This will be treated semi-qualitatively as described below. The approach for the ES will assess noise quantitatively and how vibration, operational noise and decommissioning noise and vibration will be assessed are considered in **Section 10.13**. A realistically worst-case scenario has been assessed, both from the prediction approach, for instance assuming plant equipment is operational at the same time in a worst-case boundary location (e.g. on the working width), and the type of works (e.g. HDD deemed worst case).
- 10.9.2 For this PEIR, the assessment of noise from trench construction, trenchless crossings, compound construction/operation and HAGI construction and operation have been undertaken by calculating a distance/buffer zone upon which a significant effect could occur. A review of receptors within this distance/buffer zone has then been conducted.
- 10.9.3 The buffer zones have been given for daytime criteria (65 dB for activities for one month or more and 75 dB for less than one month). An assessment of night-time is presented where appropriate, for instance with trenchless crossing works. Within the standard construction hours Saturday afternoon would be considered to fall within the ‘evening’ time criteria. At this PEIR stage, these Saturday hours are not included within the assessment, as being once a week, they would not contribute to an exceedance of limits in the 10 out of 15 day criteria (i.e. the temporal exceedance would either occur from daytime works or not at all; the Saturday afternoon criteria would not materially contribute to exceedances). These hours will be considered within the ES.
- 10.9.4 An assessment of traffic noise has used predicted worst case traffic flows which have been compared with baseline flows to provide a calculated change in noise levels, at a set 10m distance from each affected road link. It is considered that this distance would adequately cover the most affected sensitive receptors to road changes, whether they were closer or further to the road than 10m (up to 300m) as the change in noise would be the same (on the basis of traffic road noise only). Data on the proposed types of HGVs using the link roads is not yet finalised and

so a worst-case sound power of 105 dB(A) has been applied to all vehicles (from Ref. 59 of Table D.3 of BS 5228:2014-1).

Predictions

- 10.9.5 The following tables provide the source information used to calculate the distance at which a significant effect would occur, for the aspects covered within this PEIR. Construction site noise is predicted using the calculation methodology within BS-5228. Noise from traffic on haul routes or temporary access not used for public highways is predicted using the haul route method within BS-5228. The difference from traffic on established roads is that haul roads cannot be compared to existing traffic levels (i.e. the haul roads do not exist).
- 10.9.6 Traffic noise calculations on public highways are predicted using CRTN calculation methodology. This has been undertaken for a 'with' and 'without' construction traffic scenario, which are then compared to provide the change in traffic noise as a result of the works. The difference between the 'with' and 'without' scenarios has been assessed using short-term criteria within the DMRB (Highways Agency, 2020) updated noise assessment section (Volume 11, Section 3, Part 7, LA111).

Open Cut Trenching

- 10.9.7 It is anticipated that open cut trenching throughout would be undertaken by sets of teams undertaking one activity after another on a stretch of the route. However, the final construction method has yet to be agreed and will be covered in the ES. For the purpose of this assessment it has been assumed that the slowest period of active construction would be a single, 1km span of the route 10 days in a 15 day rolling period With the first team preparing the trenching (3 days), the next installing the pipe (3-4 days) and the third reinstating the land (3 days). The equipment would consist of the following, the quantity taking into account all construction gangs working on a section:

Table 10.9 Trenching Pipeline Equipment Assumptions

Activity	Quantity	Description	Percentage On-time Within An Average Hour
Right of Way Preparation	1	Dumper	100
	2	Bulldozer	100
	2	Excavator	100
	2	Tractors	100
	1	Hydraulic ram (fencing)	50
	1	HGV's	10

Activity	Quantity	Description	Percentage On-time Within An Average Hour
Pipe delivery & stringing of pip on RoW	2	Excavator	50
	5	Tractor	20
Cold bending of pipe and welding and field joint coating	5	Welder generator on tracked vehicle	100
	5	Grinding machines	25
	10	Welding machines	100
	1	Cold bending machine – 70 t (diesel engine)	100
	1	Bulldozer to tow machine	10
	2	Coating joint- shot blasting (compressor) machine mounted on tracked vehicle (day after welding and not considered in total)	100
Trench excavation		Trenching machines/mechanical excavators	100
	2		
	1	Trench support (hammer on machine – not piling Close sheet piling)	5
	1	Dewatering	25
Lower and lay	10	Excavators / sideboom tractors	100
Backfilling	1	Excavators	100
	1	Compacting heads on excavators (vibrating pad)	100
	1	Padding machine (sorts material)	50
Restoration	1	Dumper	100
	2	Bulldozer	100
	2	Excavator	100

Activity	Quantity	Description	Percentage On-time Within An Average Hour
	2	Tractors	100
Land restoration / reinstatement (not within the same month time period as other activities)	10	Tractors	25

Trenchless Crossing

- 10.9.8 There are many locations across the Project where trenchless crossings will be required so that the Pipeline can pass under a road, river or other infrastructure as outlined in **Chapter 2: The Project**. Four types of trenchless crossings have been described: Horizontal Directional Drilling (HDD), Auger Bore, Microtunneling, and Direct Pipe. The equipment used in each trenchless method is similar in terms of noise output, and duration of use, with differences in the compound setup required.
- 10.9.9 For Auger Bore, Microtunneling, and Direct Pipe methods, a trenched compound must be constructed. This has the potential to involve piling, which is a large source of impulsive noise. However, piling is only expected to be conducted for a short period and only during daytime hours. Where piling is required, this will be assessed fully in the ES. Once constructed, the trench will provide a level of noise screening.
- 10.9.10 A review of the trenchless crossing techniques was undertaken and HDD was considered the worst case on account of the possible requirement for above ground plant to be active during the night. Other methods either had equipment within a pit, thereby shielding the equipment with a natural barrier, or could restrict high noise activities, such as piling, to daytime hours. For HDD the equipment identified in **Table 10.10** has been assumed for the entrance pit, using a worst case scenario of night-time (as the HDD drill rig itself is the dominant feature the daytime does not result in higher noise levels). The exit pit would not be considered a significant noise source, as this would likely have only intermittent excavator use and water pumping during the night. As the direction of the HDD is uncertain, entrance pits have been assumed at each end of each HDD location.
- 10.9.11 It is assumed as a worst-case scenario that these operations are unable to be temporarily halted and therefore, works will need to continue for 24 hours a day until completion. For this reason, an assessment considers both daytime and night-time periods.

Table 10.10 HDD (Night-time)

Description	Quantity	Percentage On-time
HDD Drill Rig	1	100
Water pump	1	100
Generator	1	100

Compound Construction

Table 10.11 Compound Construction

Activity	Quantity	Description	On-time
Site Clearance	2	Tracked excavators	80
	1	Dozer	80
	1	Wheeled loader	80
	1	40t ADT	80
	1	Water Pump	100
Construction of internal haul road and laydown areas	2	Tracked excavators	80
	1	Dozer	80
	1	Lorry	50
	1	Vibratory Roller	50
	2	40t ADT	80

Compound Operation

Table 10.12 Compound Operation

Description	Quantity	On-time
Generators	2	50
Forklift	1	80
Mobile Crane	2	50
Miscellaneous tools	5	50

HAGI Construction

- 10.9.12 The HAGI Construction would be divided into several activities, but for the purposes of the PEIR a worst-case activity has been chosen for assessment, being the initial earthworks.

Table 10.13 HAGI Construction - Earthworks Activity

Description	Quantity	On-time
Excavator	2	80
Backhoe Loader	2	80
Dozer	2	80
Dump truck	2	80

*Access route construction***Table 10.14 Access Route Construction**

Activity	Quantity	Description	On-time
Site Clearance	2	Chainsaws	80
Construction of internal haul road and laydown areas	2	Tracked excavators	80
	1	Dozer	80
	1	Lorry	50
	1	Vibratory Roller	50
	1	Mobile Crane	50
	2	40t ADT	50

Access route operation

- 10.9.13 Predicted traffic use of each access route per day has been provided by the Project Engineers and will be presented in full within the ES. Daily $L_{Aeq, T}$ have been calculated at 10 m using the method contained within section F.2.5.2 of BS5228:2014-1. The speed limit for the haul roads is 16 kph, All HGV traffic has been assumed to have a worst-case sound power of 105 dB(A).

Construction Traffic

- 10.9.14 The construction traffic used in this assessment is presented in **Appendix 10A**. The total AAWT 18-hour (00:00 – 06:00) flows have been used along with the

HGV% of that flow and speeds to provide an LA₁₀, 18 hour for both the base and construction scenarios to provide a comparison.

Assessment of effects and determining significance

- 10.9.15 The generic project-wide approach to the assessment methodology is set out in **Chapter 3: Approach to preparing the PEIR**. However, whilst this has informed the approach that has been used in this noise and vibration assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this noise and vibration assessment.
- 10.9.16 The EIA Regulations do not define significance and it is necessary to state how this is defined for EIA. The significance of an effect resulting from a development during construction or operation is most commonly assessed by reference to the sensitivity (or value) of a receptor and the magnitude of the effect. This approach provides a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate the risk presented by the development.

Receptor Sensitivity

- 10.9.17 The precise determination of the sensitivity of a receptor relies on professional judgement.
- 10.9.18 **Table 10.15** details the basis for assessing receptor sensitivity with respect to noise effects, which has been produced on the basis of experience of assessing similar facilities, and on professional judgement.

Table 10.15 Establishing the sensitivity of receptors

Sensitivity	Examples
High	Vulnerable subgroups including hospitals and pre-schools, care homes, hospices, recording studios.
Medium	Dwellings, schools, hotels.
Low	Areas used primarily for leisure activities, including Public Rights of Way, sites of historic or cultural importance.
Very Low	All other areas such as those used primarily for industrial, commercial or agricultural purposes.

- 10.9.19 The sensitivity of a receptor will be used within the assessment to qualify adverse impacts which are initially identified via quantification. For instance, identified adverse impacts at residential premises based on noise level might not be significant at commercial premises at the same level, whereas lower impacts could still be significant if affecting vulnerable subgroups.

Magnitude of Impact

- 10.9.20 **Table 10.16** provides examples of how various magnitudes of change will be determined with respect to noise and vibration (operational criteria presented for information on the future approach at ES stage). The criteria and examples in **Table 10.16** focus on negative changes, but positive changes may also occur and will be considered on a case-by-case basis as required.
- 10.9.21 For non-residential receptors, the same magnitude of change will apply for temporary effects from construction noise, construction vibration and construction traffic as for residential.

Table 10.16 Magnitude of Change

Magnitude	Site Construction & Access Noise	Site Construction Vibration	Construction Traffic Noise	Operational Noise on Residential Receptors	Operational Noise on Non-Residential Receptors
High	Exceeds BS 5228-1 cut-off values* for one month or more by 10dB, or	$x \geq 10\text{mm/s}$ Peak Particle Velocity (PPV)	Increase in traffic noise***, $x \geq 5\text{dB}$ $L_{A10, 18h}$	Plant noise rating level ($L_{Ar,T}$) difference with background ($L_{A90,T}$), $x \geq 10\text{ dB}$	Change in noise level ($L_{Aeq, T}$) $x \geq 5\text{dB}$
Medium	Trigger levels** by more than 9 days in a 15 day period by 10 dB.	$0.3 \leq x < 10\text{mm/s}$ PPV	$3 \leq x < 5\text{dB}$ $L_{A10, 18h}$	$5 \leq x < 10\text{dB}$	$3 \leq x < 5\text{dB}$
Low	Exceeds BS 5228-1 cut-off values for one month or more by 1 to 9 dB. or Triggers levels by more than 9 days in a 15 day period by 1 to 9 dB.	$0.14 \leq x < 0.3\text{mm/s}$ PPV	$1 \leq x < 3\text{dB}$ $L_{A10, 18h}$	$0 \leq x < 5\text{dB}$	$1 \leq x < 3\text{dB}$
Very Low	Exceeds BS 5228-1 threshold values or trigger levels but less than temporal criteria of significance.	$0.1 \leq x < 0.14\text{mm/s}$ PPV	$0 \leq x < 1\text{dB}$ $L_{A10, 18h}$	$-10 \leq x < 0\text{dB}$	$0 \leq x < 1\text{dB}$

* 65 dB day, 07:00 – 23:00 Monday to Friday, 07:00 – 13:00 Saturday. 45 dB night-time 23:00-07:00. Assumes evening work would also necessitate night-time work, which would be the constraining time period. ** 75 dB daytime, 55 dB night-time. *** Change in $L_{A10, 18h}$, construction traffic noise + baseline traffic noise minus baseline traffic noise in isolation.

Significance of Effect

- 10.9.22 The overall significance of effect rating is based on the evaluation of significance matrix presented in **Table 3.3**.
- 10.9.23 Professional judgement will be applied to the results of the evaluation to qualify the resultant effect resulting from the sensitivity of receptor and magnitude of impact. This will normally only be amendments of effect into adjacent descriptors (for example major to moderate), but where necessary this could be a larger adjustment. Qualifying factors include timescales and absolute noise levels. Context is important in both the residential, as incorporated into BS4142 (British Standard Institute, 2019), and non-residential assessment of operational noise.
- 10.9.24 For residential receptors, context will mainly apply to the existing levels and type of industrial noise. Residents near an industrial area are likely to be less sensitive to HAGI noise during the operational phase, which may also be masked by other existing industrial noise. Conversely, if, for example, an existing HAGI is the only source of industrial noise in an otherwise quiet rural area, residents could be more sensitive to any increase in noise from energy sites.
- 10.9.25 For non-residential receptors, the operational noise effect of changes will be qualified as significant if noise levels from the Project are above a threshold value. These threshold values, which are presented in **Table 10.17**, are based on World Health Organisation (1999) recommended limits for different premises.

Table 10.17 Threshold Criteria for establishing significant effects on noise-sensitive non-residential receptors

Receptor(s)	Threshold Criteria	
	Daytime (07:00-23:00)	Night-time (23:00 – 07:00)
Acoustical resources	50dB LAeq, 16h	50dB LAeq, 8h
i.e. Auditoria; concert halls; sound recording, broadcast studios and theatres	50dB LAeq, 16h	N/A
Places of meeting for religious worship; courts; cinemas; lecture theatres; museums; small auditoria or halls	50dB LAeq, 16h	45dB LAeq, 8h
Healthcare facilities	50dB LAeq, 16h	45dB LAeq, 8h
Including hospitals and out-patient clinics	50dB LAeq, 16h	N/A
Hotels	55dB LAeq, 16h	N/A
Educational facilities	55dB LAeq, 16h	N/A

10.10 Preliminary Assessment of Noise Effects

Construction Phase

Temporary noise effects from the open cut trenching of the pipeline

- 10.10.1 It is assumed that open cut trenching would commence during daytime working hours only (Monday to Saturday (08:00 to 18:00 hours) and no works on Sundays or Bank Holidays. No screening has been assumed for the purposes of predictions given the mobile nature of the works. **Table 10.18** presents the distance at which the threshold values of BS-5228 for works of over one month (65 dBA) or at least 10 days (75 dBA) would be breached.

Table 10.18 Distance at which BS-5228 threshold values are breached

Activity	Distance (m) = 65 dB(A)	Distance (m) = 75 dB(A)
Right of Way Preparation	145	46
Pipe delivery and stringing of pipe on RoW	79	25
Cold bending of pipe and welding	129	41
Trench excavation	57	18
Lower and Lay	63	20
Backfilling	109	35
Restoration	142	45
Land restoration	89	28

- 10.10.2 The results show that there would likely be noise sensitive receptors experiencing noise above the threshold value of 65dB(A). However, this level would not be exceeded for a duration of one month or more. If any noise sensitive receptors were to experience noise above the 75dB(A) level, this would likely only be for two-three days at a time and would not exceed the temporal criteria for the trigger level of 10 in a 15 day rolling period or 40 days in a six month period. On this basis, the magnitude of impact would be very low. The highest level of sensitivity affected would likely be residences considered to be of medium sensitivity. The resulting significance would be considered a minor temporary adverse effect and **not significant**.

Temporary noise effects from trenchless crossings works

- 10.10.3 **Table 10.19** presents the results of noise predictions from HDD activities (from the compound area) based on a buffer zone from the compound at which BS5228 construction threshold values would be exceeded, resulting in medium to high impact. There are different criteria and therefore buffer zones dependent on the duration of works.
- 10.10.4 Due to the sensitivities of the HDD potentially resulting in disturbance during the night, details of the numbers of buildings potentially affected have been included within the preliminary assessment (i.e. number of buildings within the buffer zones of exceedance). For the purposes of assessment it is assumed the buildings are residential; some of them will be less sensitive commercial or otherwise premises used only during the daytime.
- 10.10.5 For each crossing the worst-case side of the crossing has been assumed for the compound location, affecting the most buildings. Where a crossing compound is used for multiple collections of crossings, a line may refer to the one above using two apostrophes where the worst-case compound is shared between crossings. The HDD ID references relate to the element to be crossed so for each compound there could be multiple references, but only one of these references has been used to identify the impacts as below.
- 10.10.6 It is considered that screening would be feasible for the HDD works and a 10dB reduction has been assumed to be achievable from breaking line of sight between the main noise sources and dwelling windows using screening.

Table 10.19 Noise predictions at the closest noise sensitive receptors to the trenchless crossings

HDD ID	Approximate Number of Buildings within BS 5228 threshold noise level relating to works shorter than 30 days		Approximate Number of Buildings within BS 5228 threshold noise level relating to works of 30 days or longer	
	Day (75dB LAeq18 hr)	Night-time(55dB LAeq18 hr)	Day(65dB LAeq18 hr)	Night-time(45dB LAeq18 hr)
RDX-01-00-00-001	0	5	0	112
RDX-01-00-00-003	0	0	0	225
RLX-01-00-00-001	0	0	0	4
RVX-01-00-00-015	0	1	1	231

HDD ID	Approximate Number of Buildings within BS 5228 threshold noise level relating to works shorter than 30 days		Approximate Number of Buildings within BS 5228 threshold noise level relating to works of 30 days or longer	
	Day (75dB LAeq18 hr)	Night-time(55dB LAeq18 hr)	Day(65dB LAeq18 hr)	Night-time(45dB LAeq18 hr)
RLX-01-00-00-002	5	29	10	344
RDX-01-00-00-012	“	“	“	“
RDX-01-01-02-003	0	56	1	454
RDX-01-00-00-013	2	18	11	118
RLX-01-00-00-003	0	9	0	49
CLX-01-00-00-002	0	0	0	30
RDX-01-00-00-017	0	16	4	29
RDX-02-00-00-001	0	19	6	75
RDX-02-01-00-001	0	22	10	113
RDX-02-01-00-003	0	14	1	102
RDX-03-00-00-002	0	2	1	39
RDX-04-00-00-004	0	5	0	13
RDX-04-00-00-009	0	4	0	61
CLX-04-00-00-001	2	18	7	70
CLX-04-00-00-002	1	5	1	71
RVX-04-02-00-001	0	1	0	106
RVX-04-02-00-02	0	91	2	626

HDD ID	Approximate Number of Buildings within BS 5228 threshold noise level relating to works shorter than 30 days		Approximate Number of Buildings within BS 5228 threshold noise level relating to works of 30 days or longer	
	Day (75dB LAeq18 hr)	Night-time(55dB LAeq18 hr)	Day(65dB LAeq18 hr)	Night-time(45dB LAeq18 hr)
RVX-04-00-00-002	0	0	0	10
RDX-04-00-00-013	0	0	0	35
RDX-04-00-00-015	0	0	0	11
RLX-04-00-00-003	0	0	0	23
RDX-04-03-00-001	0	1	0	55
RDX-04-03-00-004	1	10	3	191
RLX-04-03-00-001	0	33	0	518
CLX-02-01-00-001	4	37	6	145
CLX-02-01-00-002	0	1	0	91
RDX-03-00-00-002	0	2	1	39
RDX-03-00-00-007	0	9	0	52
RDX-03-00-00-013	0	5	0	42
RDX-03-00-00-016	0	0	0	135
RDX-03-00-00-020	0	40	17	110
RDX-03-00-00-023	0	13	1	43
RDX-03-00-00-024	“	“	“	“
RVX-02-00-00-001	0	32	1	116

HDD ID	Approximate Number of Buildings within BS 5228 threshold noise level relating to works shorter than 30 days		Approximate Number of Buildings within BS 5228 threshold noise level relating to works of 30 days or longer	
	Day (75dB LAeq18 hr)	Night-time(55dB LAeq18 hr)	Day(65dB LAeq18 hr)	Night-time(45dB LAeq18 hr)
RLX-02-00-00-001	0	4	0	277
RDX-02-00-00-004	0	18	0	144
RLX-02-00-00-002	0	1	0	32
RDX-02-00-00-008	0	14	1	84
RVX-02-00-003	0	0	0	39
RLX-02-00-00-003	0	4	2	7
RDX-02-00-00-012	1	2	2	137
RVX-02-00-004	0	0	0	25
CLX-02-00-00-003	“	“	“	“
RLX-02-00-00-004	0	4	0	13
RDX-02-00-00-014	0	1	1	10

- 10.10.7 The preliminary analysis shows that at all trenchless crossing sites are predicted to exceed the night-time noise limit at several residential buildings should the works exceed one month. The majority of works lasting less than one month would also result in residences experiencing noise above night-time threshold levels. Daytime exceedances are substantially lower with six HDDs (duration less than one month) resulting in daytime exceedances of the threshold noise level, if for a duration of less than one month and 11 HDDs if for more than one month.
- 10.10.8 As HDD works for more than one month and at night are likely, the magnitude of impact would be medium. The highest level of sensitivity included would likely be dwellings considered to be of medium sensitivity. The resulting significance would be considered a moderate temporary adverse effect and **significant**.

Temporary noise effects from the construction, operation and deconstruction of the temporary construction compounds

- 10.10.9 In support of the construction activities, a number of temporary construction compounds will be set-up for welfare and logistics purposes. The construction, operation and deconstruction of the temporary compounds will result in temporary noise effects. The noise from the construction and deconstruction are assumed to be the same for the purposes of noise prediction.
- 10.10.10 Compound locations are planned for pipe laydown areas, HAGI construction and trenchless crossing (with HDD considered here as the worst case) works. It is anticipated that HDD compound construction would be for a duration less than tendays and therefore not likely to result in significant adverse effects. Pipe laydown areas and HAGI construction compounds are assumed to take over one month, and then be in use for at least six months.
- 10.10.11 It is assumed that compound construction and operation will commence during daytime working hours only, Monday to Saturday (08:00 to 18:00 hours) and no works on Sundays or Bank Holidays. **Table 10.20** presents the distance at which the threshold values of BS-5228 for works of over 1 month (65dBA) or at least 10 days (75dBA) would be breached.

Table 10.20 Distance at which BS5228 threshold values are breached from Compound Construction and Operation

Phase	Activity	Distance (m) = 65dB(A)	Distance (m) = 75dB(A)
Construction	Site Clearance	86	27
	Internal haul roads and laydown areas	119	38
Operation		120	38

- 10.10.12 Along the route, many of the pipe laydown areas and HAGI compounds have noise sensitive receptors which are within these distances. These receptors include:
- Residences, the nearest being within 10m of the pipe laydown areas within Thatto Heath and 20m to the nearest HAGI in Warburton;
 - Leisure facilities, the nearest being Sutton Hall Golf Club, which potentially would have a pipe laydown area within its premises, and Runcorn Rowing Club which is located 10m from the nearest HAGI; and
 - Numerous pathways and cycle routes.
- 10.10.13 Given the duration of both construction and operation of these compounds, the magnitude of impact would be considered of low magnitude (the trigger threshold level unlikely to be exceeded). The highest level of sensitivity affected would be

dwelling consider of medium sensitivity. The resulting significance would be considered a minor temporary adverse effect and **not significant**.

Temporary noise effects from the construction of the Hydrogen Above Ground Installations

- 10.10.14 It is assumed that HAGI construction will commence during daytime working hours only (Monday to Saturday (08:00 to 18:00 hours)). It is assumed that screening would be feasible for the HAGI works and a 10dB reduction has been assumed to be achievable from breaking line of sight between the main noise sources and dwelling windows. The predicted distance at which the threshold values of BS-5228 for works of over 1 month (65dBA) would be breached is 40m. There are no residences or non-residential noise sensitive receptors within 40m of the proposed HAGI locations. The only noise sensitive resources are those footpaths which pass near to the sites.
- 10.10.15 The impact on the rights of way, a resource of low sensitivity, would be of medium magnitude, resulting in a minor effect and **not significant**.

Access Construction

- 10.10.16 It is assumed that open cut trenching will commence during daytime working hours only (Monday to Saturday (08:00 to 18:00 hours)). No screening has been assumed for the purposes of predictions given the mobile nature of the works. **Table 10.21** presents the distance at which the threshold values of BS-5228 for works of over 1 month (65 dBA) or at least 10 days (75dBA) would be breached.

Table 10.21 Distance at which BS5228 threshold values are breached from Access Construction

Activity	Distance (m) = 65dB(A)	Distance (m) = 75dB(A)
Site Clearance	89	28
Road Construction	112	35

- 10.10.17 It is assumed that the access route construction would quickly move past noise sensitive receptors such that the above distances would be exceeded after one or two days. Therefore, exceedances in the threshold values would not meet the temporal requirements of 10 days in a 15 day rolling period.
- 10.10.18 On this basis the magnitude of impact would be very low. The highest level of sensitivity affected would be dwellings consider of medium sensitivity. The resulting significance would be considered a minor temporary adverse effect and **not significant**.

Access Use

- 10.10.19 The predicted daily noise level $L_{Aeq,10h}$ at 10m from each access route does not exceed 65 dB(A). This assumes the HGV passes provided by the project engineers, heavy vehicles with a sound power level of 105 dB(A) traveling at an average speed of 16 kph (10 mph).

- 10.10.20 On this basis the magnitude of impact is considered to be low, as most receptors are located more than 10 m from the proposed accesses and are considered medium or negligible sensitivity. The resulting significance would be considered a minor temporary adverse effect and **not significant**.

Temporary noise effects from construction road traffic noise

- 10.10.21 **Table 10.22** presents the results of the construction road traffic noise predictions, which have been calculated at 10m (in accordance with the CRTN) from the road based on 18-hour Annual Average Weekday Traffic (AAWT) worst-case road traffic provided in **Appendix 10A**. Whilst the premises affected by road traffic will be at varying distances from the road, the assessment is mainly based on the difference between the future baseline scenario and the future 'with development'.

Table 10.22 Noise predictions 10m from construction traffic routes

Road Name	Receptor Location	Future year 2026 (FY) (no development) LA10, 18h at 10m	FY (with peak development traffic) LA10, 18h at 10m	FY (with peak development traffic) – FY (no development) difference (dB)
A5117	Between Common Lane and M56 J14	71.6	71.7	0.1
A557	Between A56 and Halton Station Road	69.6	69.9	0.3
A56	River Weaver Bridge	74.4	74.6	0.2
A533	Between A49 and Higher Lane	71.1	71.6	0.5
A533	Between Aston Lane and Redacre Close	66.9	67.1	0.2
A56	Between Proffits Lane and Woodhouses Lane	69.0	69.1	0.0
A557	Between M56 J12 and Weston Point ExPy (n)	74.9	75.0	0.1

Road Name	Receptor Location	Future year 2026 (FY) (no development) LA _{10, 18h} at 10m	FY (with peak development traffic) LA _{10, 18h} at 10m	FY (with peak development traffic) – FY (no development) difference (dB)
A557	Between Rocksavage Way and Weston Link	75.8	75.8	0.0
A56	Between Station Road and A533	69.0	69.2	0.2
A56	Frodsham Town Centre	69.8	69.8	0.0
A5117	Between M56 and B5132	73.5	73.8	0.4
A56	Between M56 and A558	76.9	77.1	0.2
A56	Between A5060 and Mill Lane	76.0	76.1	0.1
A57	Between Monmouth Close and Dam Lane	70.8	71.0	0.1
A50	Between Farrell Street and Bridgewater Avenue	74.3	74.3	0.1
A562	Between A5080 and Tavistock Road	74.8	75.0	0.2
A562	Between A5080 and Mowcroft Lane	72.8	73.0	0.2
A5080	Between A557 and South Lane	66.4	67.0	0.6
A557	Between M62 J13 and B5419	74.0	74.1	0.1

Road Name	Receptor Location	Future year 2026 (FY) (no development) LA10, 18h at 10m	FY (with peak development traffic) LA10, 18h at 10m	FY (with peak development traffic) – FY (no development) difference (dB)
A57	Between B5149 and M62J7	73.3	73.4	0.2
A570	between Chapel Lane and Eurolink	77.7	77.8	0.2
A570	Between Burtonhead Road and B5204	77.6	77.7	0.1
A570	Between Sherdley Road and Linkway East	78.2	78.2	0.0
Higher Lane	Between A533 and A49	51.3	59.2	7.8
B5204	Between A570 and Rainhill Road	67.6	68.0	0.3
Runcorn Road	Between A56 and Moore	62.9	64.0	1.1
Liverpool Road	Sankey Bridge	67.2	67.7	0.5
A49	Between Grimsditch Lane and Street Lane	74.2	74.4	0.2
A559	Between M56 J10 and Stockley Lane	71.1	71.5	0.5
A49	Between M56 J10 and Limes Lane	74.2	74.4	0.2
Arley Road	Between B5356 and Reedgate Lane	56.1	61.2	5.1

Road Name	Receptor Location	Future year 2026 (FY) (no development) LA10, 18h at 10m	FY (with peak development traffic) LA10, 18h at 10m	FY (with peak development traffic) – FY (no development) difference (dB)
A50	Between West Lane and Crabtree Lane	68.0	68.6	0.6
A56	Between M56 J7 and Bow Green Road	74.0	74.0	0.0
A56	Between M56J7 and Reddy Lane	71.8	72.4	0.6
A6144	Between Isherwood Road and Banky Lane	70.1	70.6	0.5
Woodhouse Lane	Dunham Woodhouses	62.7	62.8	0.1
A6114	Partington	67.8	68.3	0.5
A6114	South of Partington	65.4	66.3	0.9
A49	Between A533 and Willow Green Lane	75.0	75.3	0.3
A49	Between Station Road and B5144	73.9	74.2	0.3
B5153	West of Weaverham	62.5	63.4	0.9
A556	Between Whitegate Lane and School Lane	76.0	76.2	0.2
A533	Between Church Street and London Road	71.3	71.5	0.2

Road Name	Receptor Location	Future year 2026 (FY) (no development) LA10, 18h at 10m	FY (with peak development traffic) LA10, 18h at 10m	FY (with peak development traffic) – FY (no development) difference (dB)
A530	Between King Street and Davenham Road	75.2	75.5	0.3
A556	Between Penny's Lane and Birches Lane	78.6	78.8	0.2
A533	Between Shutley Lane and Broomsfield Lane	69.6	69.9	0.3
Marbury Road	Between Cogshall Lane and Budworth Lane	66.3	66.7	0.4
A533	Barton Centre	70.2	70.3	0.2
M56	M56 Junction 12 (M56/A557)	85.0	85.0	0.0
M62	Between M62 J8 and J7	84.8	84.9	0.0
M6	M6 J21	85.7	85.8	0.0
M56	Between J8 M56 and J9 M56/J20M6	83.2	83.2	0.0
M60	Between M60 J10 and J9	84.2	84.2	0.0
M60	Between M60 J6 and 5	85.1	85.1	0.0
M62	Between M62/M602/M60 and M62 J11	85.7	85.7	0.0

Road Name	Receptor Location	Future year 2026 (FY) (no development) LA _{10, 18h} at 10m	FY (with peak development traffic) LA _{10, 18h} at 10m	FY (with peak development traffic) – FY (no development) difference (dB)
M56	Between J6 and J5 M56	85.3	85.3	0.0
M6	Between M6 J19 and M56 J9/M6J20	85.4	85.4	0.0
A556	Between Chapel Lane and M56 J8	77.6	77.6	0.0
M6	Between J19 and J18 (M6)	85.6	85.6	0.0
M56	Between M6 and Junction 10	85.2	85.3	0.1

Magnitude of change

- 10.10.22 The preliminary results outlined in **Table 10.22** show that receptors on the majority of roads would not experience a change in noise levels of more than 1dB. The exceptions are those situated on Arley Road and Higher Lane, including residences with medium sensitivity. This would constitute a **high** increase in traffic noise levels at residences along these road links.
- 10.10.23 For most residential receptors, the magnitude of change is defined as **low** and the sensitivity of the receptors are classified as **medium**. The effect is direct, temporary and of **minor adverse significance**, which is **not significant**.
- 10.10.24 For residential receptors along Arley Road, and Higher Lane, the magnitude of change is defined as **high** and the sensitivity of receptors is classified as **medium**. The effect is direct, temporary and of **major adverse significance**, which is **significant**.

10.11 Preliminary Significance Conclusions

- 10.11.1 A summary of the results of the preliminary noise and vibration assessment is provided in **Table 10.23**.

Table 10.23 Preliminary summary of significance of effects

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
Noise from open cut trenching	Medium	Low	Minor (Not Significant)	High noise but very temporary disturbance
Noise from trenchless crossing	Medium	Medium	Moderate (Significant)	High noise for a significant duration (i.e. 10 days in a 15 day rolling period or over a month dependent on the noise level)
Noise from compound construction	Medium	Low	Minor (Not Significant)	Unlikely to be high enough volume to be significant
Noise from compound operation	Medium	Low	Minor (Not Significant)	Unlikely to be high enough volume to be significant
Noise from HAGI construction	Low	Low	Minor (Not Significant)	Unlikely to be high enough volume to be significant and only affecting rights of way nearby
Noise from access construction	Medium	Low	Minor (Not Significant)	Unlikely to be high enough volume to be significant
Noise from access use	Medium	Low	Minor	Unlikely to be high enough volume to be significant

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
			(Not Significant)	
Noise from construction traffic	Medium	High	Major (Significant)	Residences on two rural roads will experience high levels of temporary road traffic noise increases

1. The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 10.9** and is defined as [very low, low, medium and high].
2. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 10.9** and is defined as [very low, low, medium and high].
3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (potentially significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 10.9**.

10.12 Further Work to be Undertaken

- 10.12.1 The information provided in this PEIR is preliminary, the final assessment of likely significant effects will be reported in the ES. This section describes the further work to be undertaken to support the Noise and Vibration Assessment presented in the ES.

Baseline

- 10.12.2 Baseline sound level surveys will be undertaken at areas representative of noise sensitive receptors, which could experience a significant adverse effect. The purpose of the surveys will be to:
- Obtain and understand the background and ambient baseline sound environment at locations where operational noise may be observed to provide context to the assessment of operational noise in accordance with BS 4142:2014 + A1:2019;
 - Obtain ambient baseline sound measurements at representative noise sensitive receptors near to the route of the proposed pipelines and compounds, where elevated baseline levels could result in increased noise criteria, for instance near a motorway;
 - Obtain ambient sound measurements near to roads with very low flows in the base scenario, which would be affected by increased construction traffic.
- 10.12.3 Baseline sound monitoring will be undertaken by suitably qualified personnel and will be for a period of at least one week for the purposes of operational noise and 24 hours for the purposes of construction noise. Surveys will be unattended, but with night-time site visits with surveys completed for the purposes of operational noise. Surveys will be during a period outside of local school holidays.
- 10.12.4 Measurements will take into account the appropriate standards as outlined in **Table 10.3**.
- 10.12.5 A meteorological station is proposed to be set up in conjunction with the noise monitoring equipment, set to 15-minute intervals, so the data will be concurrent and available for data analysis. It will monitor local wind speeds and direction, precipitation, and air temperature during the ambient and background sound monitoring surveys. The results of the meteorological surveys will be used in the analysis of the ambient and background sound data to ensure that only data collected under appropriate weather conditions will be used in defining the baseline sound levels. This approach is advocated within BS 4142:2014 + A1:2019 and BS 5228-1:2009 + A1:2014. 14.4.27. It is proposed that by default ambient and background sound measurements are undertaken in accordance with BS 4142:2014 + A1:2019 and BS 7445-1:2003, i.e. with microphones mounted to a minimum height of 1.2 to 1.5m above ground level and no less than 3.5m from any reflecting surface other than the ground.
- 10.12.6 Sound levels will be measured using integrating averaging Sound Level Meters (SLMs) conforming to Class 1 as defined by BS EN 61672-1:2013/44. The SLMs will be field calibrated before and at the end of each survey period by applying an

acoustic calibrator, conforming to BS EN 60942:2003, to the microphone to check the sensitivity of the measuring equipment. Any drift in calibration levels will be noted upon collection, and measurements repeated in the event that excessive (i.e., greater than 0.5dB) drift is observed.

Assessment

Detailed construction assessments

- 10.12.7 With the exception of construction trenching, construction assessments will be detailed in the ES, taking into account specific locations for compounds, access routes, HAGIs and trenchless crossing locations. Predictions will be made to specific noise receptors, both residential and non-residential.
- 10.12.8 In addition, the construction assessments will take account of the combined effect on receptors from each aspect occurring over a period of time where this is likely to result in a significant effect when each individual aspect (i.e. access, compounds, HDD, trenching) had not resulted in a significant effect.

Update Traffic Assessment

- 10.12.9 For the ES, the construction road traffic noise assessment will be updated using baseline traffic predictions informed by up-to-date traffic counts or survey data, where applicable. Computer noise modelling will be undertaken where upon review of the spreadsheet predictions, a significant effect may be identified based on noise from two or more roads. This ensures that the simpler spreadsheet calculation is not omitting a combined significant effect at any receptor locations.

Vibration assessment

- 10.12.10 The ES will include a vibration assessment for each vibratory activity once further location details are known for activities such as piling and road rolling.

Operation and maintenance phase assessment

- 10.12.11 For the ES an assessment of operational sound generated by the HAGI will be undertaken using prediction methodology within ISO 9613-2 (International Standards Organisation, 1996) and assessed in accordance with BS 4142 (British Standard Institute, 2019). It is unlikely that final details of the plant will be available prior to DCO Application and therefore a worst-case noise envelope will be included within a computer noise model for the identified HAGIs.
- 10.12.12 Noise will be typical of that found on natural gas installations, which are common throughout the country. Noise from such plant is controlled using conventional and readily available noise control measures such as enclosures and pipe lagging. Enclosures and potentially lagging would be installed to limit noise should there be a noise sensitive receptor close enough to the installation for noise to give rise to a likely significant effect. These measures will be included in further detail in the ES once more information is available on the HAGIs.
- 10.12.13 It will be assumed that a tonal penalty from the gas metering units would be applied to form a rating correction, but that none of the other corrections would be

required (i.e. impulsivity, intermittency or other sound characteristics). Given that the HAGIs will include design assumptions to minimise noise intrusion, it is not considered likely that a tonal correction of more than +3 dB will be required. This could be lower dependent on the specific noise level of the noise source.

As outlined in **Section 10.6**, for the ES screening predictions³¹ the use of computer noise modelling software will be undertaken to assess whether the proposed HAGIs would result in noise levels, at residences, above measured background sound levels.

Decommissioning assessment

- 10.12.14 The decommissioning assessment will be informed by the construction assessment as it will largely be similar to the noise and vibration from the construction but in reverse. It is not possible to predict what the future baseline will be, but the same threshold values are assumed for assessment purposes. The only difference that will be considered notable, and will therefore be included in this assessment, is the potential use of pneumatic hammering for breaking concrete at the HAGI to break the concrete foundations (though concrete is likely to be left *in situ*).

Cumulative (inter-project) effects assessment

- 10.12.15 At ES stage a cumulative effects assessment (CEA) will be undertaken for the Project, which considers the combined impacts with other developments on the same single receptor or resource (inter-project effects). The detailed method followed in identifying and assessing potential cumulative effects is set out in **Section 3.9 of Chapter 3: Approach to Preparing the PEIR**.

Environmental measures

- 10.12.16 Further consideration of approaches/equipment for trenchless crossings will be undertaken for each crossing to minimise the adverse impact from noise.

³¹ Standard practice as per ETSU-R-97: The Assessment and Rating of Noise from Wind Farms (1996)

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