9. Air Quality

9.1 Introduction

9.1.1 This chapter presents the preliminary assessment of the likely significant effects of the Project with respect to air quality. 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** where biodiversity features scoped in for assessment are discussed; and
- **Chapter 11: Traffic and Transport** where results from the preliminary effects of the Traffic and Transport effects have been used in the preliminary effects of construction traffic assessment in this Air Quality chapter (**Section 9.11**).

9.1.2 This chapter describes:

- the legislation, policy and technical guidance that has informed the assessment (**Section 9.3**);
- consultation and engagement that has been undertaken to date and how comments from consultees relating to Air Quality have been addressed (**Section 9.4**);
- a description of the Study Area for the assessment (**Section 9.5**);
- the methods used for baseline data gathering (**Section 9.6**);
- the overall (current and future) baseline (**Section 9.7**);
- embedded environmental measures relevant to Air Quality (**Section 9.8**);
- the scope of the assessment for Air Quality (**Section 9.9**);
- the methodology applied for the assessment (**Section 9.10**);
- the preliminary assessment of Air Quality effects (**Section 9.11**);
- a summary of the preliminary significance conclusions (**Section 9.12**);
- an outline of further work to be undertaken for the Environmental Statement (ES) (**Section 9.13**).

9.2 Limitations and assumptions

9.2.1 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.

9.2.2 There are no limitations relating to Air Quality that affect the robustness of the preliminary assessment of the potential likely significant effects of the Project.

9.3 Relevant legislation, planning policy and technical guidance

9.3.1 This section identifies the legislation, planning policy and technical guidance that has informed the assessment of effects with respect to Air Quality. Further information on policies relevant to the Project is provided in **Chapter 4: Legislation and Policy Overview**.

Legislation

9.3.2 A summary of the relevant legislation is given in **Table 9.1**.

Table 9.1 Legislation relevant to the Air Quality assessment

Legislation	Legislative context
The Environment Act 2021[1]	The Environment Act 2021 has introduced legally-binding duties on the government to bring forward at least two air quality targets by October 2022. The first target should look at reducing the annual average of Particulate Matter smaller than 2.5 µm ($PM_{2.5}$), and the second air quality target should be a long-term target. This recognises the long-term health impacts of which air pollution can impose.
The Environment Act 1995[2]	Since Part IV of the Environment Act 1995 came into force, local authorities have been required to periodically review concentrations of the UK Air Quality Strategy pollutants within their areas and to identify areas where the Air Quality Objectives (AQOs) may not be achieved by their relevant target dates. This process of Local Air Quality Management (LAQM) is an integral part of delivering the Government's AQOs detailed in the Strategy. When areas are identified where some or all of the AQOs might potentially be exceeded and where there is relevant public exposure, i.e. where members of the public would regularly be exposed over the appropriate averaging period, the local authority has a duty to declare an Air Quality Management Area (AQMA) and to implement an Air Quality Action Plan to reduce air pollution levels towards the AQOs.

[1] UK Government (2021). Environment Act 2021. (Online). Available from: https://www.legislation.gov.uk/ukpga/2021/30/section/2/enacted (Accessed May 2022).
[2] UK Government (1995). Environment Act 1995. (Online). Available from: https://www.legislation.gov.uk/ukpga/1995/25/contents (Accessed May 2022).

Legislation	Legislative context
Directive 2008/50/EC on ambient air quality and cleaner air for Europe[3] (the 'Ambient Air Directive')	Consolidates previously existing European Union (EU) wide air quality legislation (with the exception of Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air) and provides a new regulatory framework for $PM_{2.5}$. The Ambient Air Directive sets limit values (for the protection of human health) and critical levels (for the protection of vegetation and ecosystems) for selected pollutants that are to be achieved by specific dates, and details procedures EU Member States should take in assessing ambient air quality. Regulated pollutants include sulphur dioxide (SO_2), nitrogen dioxide (NO_2), oxides of nitrogen (NOx), particulate matter smaller than 10 µm (PM_{10}), $PM_{2.5}$, lead (Pb), benzene (C_6H_6) and carbon monoxide (CO). The limit values and critical levels are legally binding limits on concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The values are based on the assessment of the effects of each pollutant on human health, taking into account the effects on sensitive groups such as children, the elderly and those with health conditions, or on vegetation and ecosystems. The limit values and critical levels relate to concentrations in ambient air. The Ambient Air Directive defines ambient air as outdoor air, and explicitly excludes workplaces and other places to which members of the public do not have regular access.

[3] The European Commission (2008). Directive 2008/50/EC of the European Parliament and of The Council of 21 May 2008 on ambient air quality and cleaner air in Europe. (Online) Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0050&from=en (Accessed May 2022).

Legislation	Legislative context
The Environmental Protection Act 1990[4]	Provides the framework for the control of nuisance from dust and odour.
The Air Quality Standards Regulations 2010[5] and the Air Quality Standards (Amendment) Regulations 2016[6]	These came into force on 11 June 2010 and transpose Directive 2008/50/EC, including the limit values, into UK legislation. The Air Quality Standards Regulations 2010 impose a duty on the Secretary of State to meet these limit values. Similar to Directive 2008/50/EC, the Air Quality Standards Regulations 2010 define ambient air as outdoor air, and explicitly exclude workplaces and other places to which members of the public do not have regular access. Amendments were made during 2016 to reflect and transpose EU legislation such as the Emissions Ceiling Directive (EU) 2016/2284. The Air Quality Standards (AQS) and AQOs relevant to the Air Quality Assessment are reported in **Table 9.2**
The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate	The regulations introduce emission limits for gaseous and particulate pollutants, as well as type approval for internal combustion engines for non-road mobile machinery (NRMM).

[4] UK Government (1990). The Environmental Protection Act 1990. (Online). Available from: https://www.legislation.gov.uk/ukpga/1990/43/introduction (Accessed May 2022).
[5] UK Government (2010). Statutory Instrument 2010 No. 1001 Environmental Protection – The Air Quality Standards Regulations 2010. (Online). Available from: https://www.legislation.gov.uk/uksi/2010/1001/contents/made (Accessed May 2022).
[6] UK Government (2016). Statutory Instrument 2016 No. 1184 Environmental Protection – The Air Quality Standards (Amendment) Regulations 2016. (Online). Available from: https://www.legislation.gov.uk/uksi/2016/1184/contents/made (Accessed July 2022).

Legislation	Legislative context
Pollutants) Regulations 2018 (SI 2018/764) [7]	
Wildlife and Countryside Act 1981[8]	This provides the basis for the regulatory framework for the designation of Sites of Special Scientific Interest (SSSI). Sites in England are designated by Natural England if they have special interest by reason of any of their flora, fauna, or geological or physiographical features. Sites in England with SSSI designation will be considered for the assessment of Air Quality impacts and therefore inclusion within the preliminary assessment of Air Quality effects (see **Section 9.11**)

9.3.3 The Air Quality Standards Regulations 2010[5] currently set out the AQOs in the UK. **Table 9.2** provides the AQS and AQOs relevant to the Air Quality assessment.

Table 9.2 Relevant Air Quality Standards and Objectives

Pollutant	Averaging period	Value (µg m^{-3})
NO_2	Annual mean	40
NO_2	1 hour mean, not to be exceeded more than 18 times a year (equivalent to 99.79th percentile)	200
PM_{10}	Annual mean	40

[7] UK Government (2018). The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018. (Online). Available from: https://www.legislation.gov.uk/uksi/2018/764/contents/made (Accessed December 2021).
[8] UK Government (1981). Wildlife and Countryside Act 1981. (Online). Available from: https://www.legislation.gov.uk/ukpga/1981/69 (Accessed May 2022).

PM_{10}	24 hours mean, not to be exceeded more than 35 times a year (equivalent of 90.4th percentile)	50
$PM_{2.5}$	Annual mean	20

Planning policy

9.3.4 A summary of the relevant national and local planning policy is given in **Table 9.3**.

Table 9.3 Planning policy relevant to the Air Quality assessment

Policy	Policy context
National planning policy	
Overarching National Policy Statement for Energy (EN-1)[9]	Sets out overarching guidance and requirements for nationally significant energy infrastructure projects. Section 5.2 discusses air quality and emissions and notes the variety of potential pollutants and impacts on human health and on ecological sites. Section 5.2.6 states: "*Where the project is likely to have adverse effects on air quality the applicant should undertake an assessment of the impacts of the proposed project as part of the Environmental Statement (ES).*" This paragraph identifies what the ES should describe. Section 5.2 also explains how the Planning Inspectorate (PINS) should take air quality into account when making a decision, and how they should consider requirements for mitigation.

[9] Department of Energy and Climate Change, (2011). Overarching National Policy Statement for Energy (EN-1) (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf (Accessed May 2022).

Policy	Policy context
	Section 5.2.7 outlines what the ES should describe in relation to air quality including: *"any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project;* • *the predicted absolute emission levels of the proposed project, after mitigation methods have been applied;* • *existing air quality levels and the relative change in air quality from existing levels; and* • *any potential eutrophication impacts."* In addition, section 4.10.2 states: *"Pollution control is concerned with preventing pollution through the use of measures to prohibit or limit the releases of substances to the environment from different sources to the lowest practicable level. It also ensures that ambient air and water quality meet standards that guard against impacts to the environment or human health."* Section 5.6.1 says: *"During the construction, operation and decommissioning of energy infrastructure there is potential for the release of a range of emissions such as odour, dust, steam, smoke, artificial light and infestation of insects. All have the potential to have a detrimental impact on amenity or cause a common law nuisance or statutory nuisance under Part III, Environmental Protection Act 1990."*
Draft Overarching Policy Statement for Energy (EN-1)[10]	The requirements of the Draft Overarching Policy Statement for Energy (EN-1) relating to Air Quality remain consistent with what is reported above regarding the current EN-1 statement.

10 Department of Energy and Climate Change, (2021). Draft Overarching National Policy Statement for Energy (EN-1) (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf (Accessed July 2022).

Policy	Policy context
National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)[11]	NPS EN-4 provides additional technology specific guidance to complement NPS EN-1. When referring to gas and oil pipelines, NPS EN-4 states that "Many of the generic impacts set out in EN-1 are relevant to the consideration of applications for gas and oil pipelines. The extent to which they are relevant may depend upon the phase of the proposed development being considered". When discussing gas emissions specifically, it is in relation to the gas supply rather than the construction of the gas pipelines. NPS EN-1 should therefore act as a basis for considerations of air quality impacts associated with the Project.
The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)[12]	Provides a framework for improving air quality at a national and local level and supersedes the previous strategy published in 2000. It imposes a number of obligations on local authorities to manage air quality but does not directly impose obligations on developers. To carry out an air quality review and assessment under the LAQM process, local authorities produce an Annual Status Report which describes areas identified to be at potential risk of exceeding the objectives in the regulations, and progress towards meeting the objectives. Review and assessments of local air quality aim to identify areas where national policies to reduce vehicle and industrial emissions are unlikely to result in air quality meeting the Government's AQOs by the required dates.

11 Department for Business, Energy and Industrial Strategy (2011). National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4). [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47857/1941-nps-gas-supply-oil-en4.pdf [Accessed 18 July 2022].

12 Department for Environment, Food and Rural Affairs (Defra) in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland, 2007. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 1). (Online). Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69336/pb12654-air-quality-strategy-vol1-070712.pdf (Accessed May 2022).

Policy	Policy context
	For the purposes of determining the focus of review and assessment, local authorities should have regard to those locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Where the assessment indicates that some or all of the objectives may be potentially exceeded, the local authority has a duty to declare an AQMA. The declaration of an AQMA requires the local authority to implement an Air Quality Action Plan, to reduce air pollution concentrations so that the required AQOs are met.
Clean Air Strategy 2019[13]	The Environment Act 1995 required the adoption of an Air Quality Strategy containing standards, objectives and measures for improving ambient air quality. The 2007 Air Quality Strategy is designed to meet that requirement and provides a framework for improving air quality at a national and local level and supersedes the previous strategy published in 2000. It imposes a number of obligations on local authorities to manage air quality. Central to the Air Quality Strategy are health-based criteria for certain air pollutants; these criteria are based on medical and scientific reports on how and at what concentration each pollutant affects human health and mirror the AQOs set out in the Air Quality (England) Regulations 2000. The AQOs are policy targets often expressed as a maximum ambient concentration not to be exceeded, either without exception or with a permitted number of exceedances, over a specified averaging period.

[13] Defra, 2019. Clean air strategy 2019. (Online). Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf (Accessed May 2022).

Policy	Policy context
National Planning Policy Framework (NPPF)[14]	A key part of the Government's reforms to make the planning system less complex and more accessible. The NPPF acts as guidance for local planning authorities and decision-takers, both in drawing up plans and making decisions about planning applications. Paragraph 186 states that policies and plans should sustain and improve air quality. In addition, paragraph 174(e) indicates that developments should, wherever possible, help to improve local environmental conditions such as air quality.
Local planning policy	
Cheshire West and Chester Development Local Plan (Part One) 2015 [15]	SOC 5 Health and well-being states: *"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"* This Air Quality PEIR chapter will ensure that impacts on health and quality of life from effects to air quality associated with the Project are identified. Conclusions of significance of impacts will be made. Embedded environmental measures to reduce potential air quality impacts are reported in **Section 9.8.**
Cheshire East Local Plan Strategy (2017)[16]	SE 12 Pollution, Land Contamination and Land Instability states: *"1. The council will seek to ensure all development is located and designed so as not to result*

[14] Ministry of Housing, Communities and Local Government (2021). National Planning Policy Framework, (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf (Accessed May 2022).
[15] Cheshire West and Chester (2015). Cheshire West and Chester Local Plan (Part One) Strategic Policies 2015 (online). Available at: https://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/adopted_cwac_lp/lp_1_adopted?pointId=3252243#document-3252243 (Accessed May 2022).
[16] Cheshire East Council, (2017). Cheshire East 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 May 2022).

Policy	Policy context
	in a harmful or cumulative impact upon air quality, surface water and groundwater, noise, smell, dust, vibration, soil contamination, light pollution or any other pollution which would unacceptably affect the natural and built environment, or detrimentally affect amenity or cause harm. Developers will be expected to minimise, and mitigate the effects of possible pollution arising from the development itself, or as a result of the development (including additional traffic) during both the construction and the life of the development. Where adequate mitigation cannot be provided, development will not normally be permitted. *2. Development for new housing or other environmentally sensitive development will not normally be permitted where existing air pollution, soil contamination, noise, smell, dust, vibration, light or other pollution levels are unacceptable and there is no reasonable prospect that these can be mitigated against.* *3. Development should support improvements to air quality, not contradict the Air Quality Strategy or Air Quality Action Plan and seek to promote sustainable transport policies"* This Air Quality PEIR chapter will ensure that impacts on health and quality of life from effects to air quality associated with the Project are identified. Conclusions of significance of impacts will be made. Embedded environmental measures to reduce potential air quality impacts are reported in **Section 9.8.**
Trafford Local Plan: Core Strategy (2012)[17]	L5.13-15 Pollution states: *"L5.13: Development that has potential to cause adverse pollution (of air, light, water, ground), noise or vibration will not be permitted unless it can be demonstrated that adequate mitigation measures can be put in place."* L5.14: *"Where development is proposed close to existing sources of pollution, noise or vibration, developers will be required to demonstrate that it is sited and designed in such a way*

[17] Trafford Council, (2012). Trafford Local Plan Core Strategy, (online). Available at: https://www.trafford.gov.uk/planning/strategic-planning/docs/core-strategy-adopted-final.pdf (Accessed May 2022).

Policy	Policy context
	as to confine the impact of nuisance from these sources to acceptable levels appropriate to the proposed use concerned. L5.15: Within the Borough's Air Quality Management Zones developers will be required to adopt measures identified in the Greater Manchester Air Quality Action Plan, to ensure that their development would not have an adverse impact on the air quality." This Air Quality PEIR chapter will ensure that impacts on health and quality of life from effects to air quality associated with the Project are identified. Conclusions of significance of impacts will be made. Embedded environmental measures to reduce potential air quality impacts are reported in **Section 9.8.** Consideration of AQMAs (Please see **Table 9.8**)was given when constructing the methodology for the construction road traffic emission assessment reported in **Section 9.11.** The methodology for this assessment is reported within **Section 9.10**, with further details also reported in **Appendix 9B**.
Warrington Local Plan Core Strategy (2014)[18]	QE6 Environment and Amenity Protection states: *"The Council, in consultation with other Agencies, will only support development which would not lead to an adverse impact on the environment or amenity of future occupiers or those currently occupying adjoining or nearby properties, or does not have an unacceptable impact on the surrounding area. The Council will take into consideration several criteria, including Air Quality."* This Air Quality PEIR chapter will ensure that impacts on health and quality of life from effects to air quality associated with the Project are identified. Conclusions of significance of impacts will be made. Embedded environmental measures to reduce potential air quality impacts are reported in **Section 9.8.**

[18] 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 May 2022).

Policy	Policy context
St Helens Local Plan Core Strategy (2012)[19]	CP 1 Ensuring Quality Development in St. Helens states: *"Minimise and mitigate against the effects of air, light and water pollution (including contamination of soil, surface water and groundwater resources) and noise, vibration, smells, dust and electromagnetic fields caused by the development; Development that is located within or would impact on Air Quality Management Areas will require special consideration with regard to their impacts on air quality".* This Air Quality PEIR chapter will ensure that impacts on health and quality of life from effects to air quality associated with the Project are identified. Conclusions of significance of impacts will be made. Embedded environmental measures to reduce potential air quality impacts are reported in **Section 9.8.** Project activities considered in this chapter are not found to occur within the Borough's Air Quality Management Areas. Consideration of AQMAs was given when constructing the methodology for the construction road traffic emission assessment reported in **Section 9.11.** The methodology for this assessment is reported within **Section 9.10**, with further details also reported in **Appendix 9B**.
Halton Core Strategy (2013)[20]	CS23 Managing Pollution and Risk states: *"To control development which may give rise to pollution:* *• Development proposals should not exacerbate and where possible, should minimise, all forms of emissions and odour, water, noise and light pollution.* *• Proposals for development within or close to identified Air Quality Management Areas (AQMAs) in the Borough should have specific regard to how the exceedance in air pollutants can be addressed and how the impact on receptors can be reduced."*

[19] St Helens Council, (2012). St Helens Core Strategy 2012, (online). Available at: https://www.sthelens.gov.uk/planning-building-control/planning-policy/core-strategy/ (Accessed May 2022).
[20] Halton Borough Council. (2013). Halton's Local Plan Core Strategy April 2013, (online). Available at: https://www3.halton.gov.uk/Documents/planning/planning%20policy/CoreStrategy.pdf (Accessed May 2022).

Policy	Policy context
	This Air Quality PEIR chapter will ensure that impacts on health and quality of life from effects to air quality associated with the Project are identified. Conclusions of significance of impacts will be made. Embedded environmental measures to reduce potential air quality impacts are reported in **Section 9.8.** Consideration of AQMAs was given when constructing the methodology for the construction road traffic emission assessment reported in **Section 9.11.** The methodology for this assessment is reported within **Section 9.10**, with further details also reported in **Appendix B**.

Technical guidance

9.3.5 A summary of the technical guidance for Air Quality is given in **Table 9.4**.

Table 9.4 Technical guidance relevant to the Air Quality assessment

Technical guidance document	Context
Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK), Land-use Planning and Development Control: Planning for Air Quality (2017)[21]	Provides a procedure for screening potential air quality effects of new development and a procedure for assessing the significance of air quality effects in planning applications. This guidance also promulgates the term air quality assessment level (AQAL) as a generic term for the various standards, objectives, limit values etc. against which impacts need to be assessed.

[21] Environmental Protection UK and Institute of Air Quality Management (IAQM) (2017). Land-Use Planning & Development Control: Planning For Air Quality. (Online). Available at: http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf (Accessed May 2022).

Technical guidance document	Context
IAQM, A guide to the assessment of air quality impacts on designated nature conservation sites (2019)[22]	Provides guidance on the air quality impacts of development on designated nature conservation sites but establishes that the assessment of the effects that air quality impacts may have on habitats and species should be the responsibility of a suitability qualified and experienced ecologist.
IAQM, Guidance on the assessment of dust from demolition and construction (2014)[23]	Provides a four-step process for evaluating the risk associated with dust emissions from construction and demolition sites on different types of receptor to dust soiling, health effects and ecological effects.
Defra's Local Air Quality Management Technical Guidance (2021)[24]	The latest guidance on the LAQM process is provided in Defra's Local Air Quality Management Technical Guidance (LAQM.TG (16)). Defra's LAQM.TG (16) outlines the procedure a local authority should follow when undertaking local monitoring and assessment. **Appendix 9A** reports the local air quality monitoring undertaken by each local authority operating within the Preliminary Order Limits relevant to the Air Quality Baseline. This is discussed further in **Section 9.7.**

[22] Institute of Air Quality Management (2019). A guide to the assessment of air quality impacts on designated nature conservation sites. (Online). Available from: https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2019.pdf (Accessed May 2022).
[23] Institute of Air Quality Management (2014). Guidance on the assessment of dust from demolition and construction. (Online). Available from: http://iaqm.co.uk/wp-content/uploads/guidance/iaqm_guidance_report_draft1.4.pdf (Accessed May 2022).
[24] Defra (2021) LAQM Technical Guidance. (online) Available from: https://laqm.defra.gov.uk/air-quality/featured/uk-regions-exc-london-technical-guidance/ (Accessed July 2022).

Technical guidance document	Context
Air Quality Guidelines for Europe[25] and Air Quality Guidelines Global Update (2005)[26]	These documents provide health-based air quality guidelines for a number of pollutants and critical levels for ecological receptors.
Design Manual for Roads and Bridges (DMRB): LA 105 Air quality. 2019[27]	Provides a procedure for screening potential air quality effects of new and existing roads and a procedure for assessing the significance of air quality effects associated with traffic emissions.

[25] World Health Organisation (WHO) (2000). Air Quality Guidelines for Europe. (Online). Available from: https://www.euro.who.int/__data/assets/pdf_file/0005/74732/E71922.pdf (Accessed July 2022).
[26] WHO (2005). Air Quality Guidelines Global Update 2005. (Online). Available from: https://www.euro.who.int/__data/assets/pdf_file/0005/78638/E90038.pdf (Accessed July 2022).
[27] Highways England, Transport Scotland, Welsh Government and Department for Infrastructure (2019). Design Manual for Roads and Bridges (DMRB): LA 105 Air quality. 2019. (online). Available from: https://www.standardsforhighways.co.uk/prod/attachments/10191621-07df-44a3-892e-c1d5c7a28d90 (Accessed August 2022).

9.4 Consultation and Engagement

Overview

9.4.1 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

9.4.2 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 Air Quality and confirmation of how these have been addressed within the assessment to date is presented in **Table 9.5**.

9.4.3 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 together with evidence of how they have been addressed.

Table 9.5 Summary of EIA Scoping Opinion responses for Air Quality

Consultee	Consideration	How addressed in this PEIR
PINS	Paragraph 9.6.11 Construction – emissions from Non-Road Mobile Machinery (NRMM) The Scoping Report proposes to scope out this matter on the basis that emissions are controlled by the NRMM (Emission of Gaseous and Particulate Pollutants) Regulations 1999 (as amended) and the scale, duration and distance of construction activity to relevant receptors is not considered to be of a magnitude that would require detailed assessment. Whilst the Inspectorate considers that emissions from NRMM are unlikely to be significant in most cases, in the absence of detail regarding the location of temporary compounds with respect to receptors and the type and duration of NRMM to be deployed the Inspectorate does not consider that this matter may be scoped out based on current evidence. The ES should include an assessment of emissions from NRMM on sensitive receptors where significant effects are likely to occur.	Finalised detail relating to the number of NRMM expected during construction of the Project is not available at this stage, but indicative numbers are provided in **Chapter 10: Noise and Vibration** and are to be used for the purposes of this PEIR. Please see the 'Predictions' section of **Section 10: Methodology for PEIR assessment** from **Chapter 10: Noise and Vibration** for more detail. **Table 10.10** of **Chapter 10: Noise and vibration** provides the number of plant equipment expected for open cut trenching construction activities. The number of plant equipment reported in **Table 10.10** will not be active at one time, since it is expected that construction staff will operate in different teams, at different times. Please also see **Table 10.12**, **Table 10.14** and **Table 10.15** from **Chapter 10: Noise and Vibration** for plant equipment numbers for the construction of compounds, the HAGIs and the access routes.
PINS	Paragraph 9.6.11 Operational road traffic emissions The Scoping Report proposes to scope out this matter on the basis that it is not considered that operational traffic flows associated with the maintenance of the Proposed Development would exceed the	Since effects from operational road traffic emissions have been scoped out at Scoping phase, operational road traffic emissions have not been considered in this preliminary assessment of Air Quality effects.

Consultee	Consideration	How addressed in this PEIR
	Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) criteria for a detailed air quality assessment. The Inspectorate agrees that the road traffic emissions associated with the operation of the Proposed Development are unlikely to give rise to significant effects and agree that this matter can be scoped out from further assessment. The description of development within the ES should provide details of the likely operational traffic movements by vehicle type and number.	**Chapter 2: The Project** provides a description of operational works within **Section 2.6.**
PINS	Paragraph 9.6.5 Sensitive receptors In addition to the potential receptors identified, impacts from changes in air quality on residents of waterways and recreational receptors (e.g. users of canals) should be assessed where significant effects are likely.	Residents of waterways and recreational receptors have been included as sensitive human receptors when considering the impacts from construction dust emissions. The assessment of impacts from construction dust emissions is reported in **Section 9.11: Preliminary assessment of Air Quality effects.**
PINS	Paragraph 9.6.8 and Table 9.9 Non-statutory sites designated for nature conservation and protected species Scoping Report Paragraph 9.6.8 and Table 9.9 provisionally list statutory sites designated for nature conservation and ancient woodland as sensitive receptors that will be considered in the assessment of air quality. The Applicant should also provide an assessment of air quality impacts on non-statutory sites for nature conservation, including Local Wildlife Sites (LWS) and protected species where significant	A construction traffic assessment has now been completed (see **Section 9.11** and **Appendix 9B**) where sensitive ecological receptors have been identified. Please see **Figure 9.4** and **Section 9.10,** where these ecological receptors are reported and discussed further.

Consultee	Consideration	How addressed in this PEIR
	effects are likely to occur and cross-reference the ecology chapter (and vice-versa) where relevant.	
PINS	n/a Study area The ES should include a figure/figures to identify the final study areas for each element of the air quality assessment, including the location of human and ecological receptors that have been considered.	Please see **Figure 9.1: Baseline Air Quality Study Area**, **Figure 9.3: Construction dust assessment Study Area** and **Figure 9.4**: **Construction road traffic assessment Study Area**
PINS	Table 9.5 Scope of Assessment – Warrington Air Quality Management Area (AQMA) The Scoping Report does not mention the Warrington AQMA which covers the town centre ring road and major arterial roads. The Warrington AQMA has potential to be affected by any construction works and traffic rerouting and should therefore be considered within further assessment work. The Applicant's attention is drawn to the consultation response from Warrington Borough Council in this regard (see Appendix 2 of this report).	Warrington AQMA 4 which covers the link roads and the town centre ring road is included in **Section 9.7**. The preliminary traffic data suggests that the roads in the AQMA will not be affected by construction traffic.
Canal and River Trust	The Trust agree that air quality should be scoped into the Environmental Statement. The canals should be identified as sensitive receptors particularly with regards to dust emissions during construction and the significant excavations that would be required. Mitigation measures should be set out to ensure that regular checks of the waterways are	The potential for dust emissions from construction sites has been considered in **Section 9.11: Preliminary assessment of Air Quality effects.** The conclusions from this assessment will inform measures to be included in the Outline Code of Construction Practice (CoCP). These measures will

Consultee	Consideration	How addressed in this PEIR
	undertaken during construction and for a period following completion of the works.	ensure that dust emissions are minimised such that adverse effects do not occur.
Canal and River Trust	The waterway users should be identified as sensitive receptors that may be affected. It should be clarified that users of the waterway for recreation, boaters, both leisure users and residential, along with pedestrians and cyclists on the towpaths as well as wildlife are all sensitive receptors, especially during construction.	Residents of waterways and recreational receptors have been included as sensitive human receptors when considering the impacts from construction dust emissions. The assessment of impacts from construction dust emissions is reported in **Section 9.11: Preliminary assessment of Air Quality effects.**
Cheshire East Council	The proposed scope is considered acceptable	
Cheshire West Council	The Councils Environmental Protection Unit (EPU) agree with the content and in particular the embedded measures set out in Table 9.6 [of the Scoping Report]. EPU do not believe the scale of the project and the associated traffic flows are likely to present an issue with regard to exceedances of the air quality objectives but it is advised that it would be prudent to agree the assessment criteria to demonstrate this and to that end we agree the details proposed.	The methodology adopted for the preliminary assessment of construction traffic effects is reported within **Section 9.11,** with further details of this assessment alongside the results reported within **Appendix 9B.**
Cheshire West Council	Construction dust is likely to have local impacts but will be subject to measures to limit and control. The Councils EPU agree the content of para 9.6.11 in terms of scoping out the effects of NRMM and operational road traffic. With regard to NRMM irrespective of the EIA requirements, the applicant	Noted. Embedded measures suggested to be implemented to limit and control construction dust are reported within **Table 9.11.**

Consultee	Consideration	How addressed in this PEIR
	should note the content of DM31 and explanation para. 13.28 of the Local Plan, many aspects will be covered through the CEMPs.	
Cheshire West Council	Construction dust is likely to have local impacts but will be subject to measures to limit and control. The Councils EPU agree the content of para 9.6.11 in terms of scoping out the effects of NRMM and operational road traffic. With regard to NRMM irrespective of the EIA requirements, the applicant should note the content of DM31 and explanation para. 13.28 of the Local Plan, many aspects will be covered through the CEMPs.	Measures for inclusion in the CoCP are detailed in **Section 9.8**.
Natural England	The planning system plays a key role in determining the location of developments which may give rise to pollution, either directly, or from traffic generation, and hence planning decisions can have a significant impact on the quality of air, water and land. The ES should take account of the risks of air pollution and how these can be managed or reduced. This should include taking account of any strategic solutions or SNAPs, which may be being developed or implemented to mitigate the impacts on air quality. Further information on air pollution impacts and the sensitivity of different habitats/designated sites can be found on the Air Pollution Information System (www.apis.ac.uk).	Embedded environmental measures are reported within **Section 9.8,** please see **Table 9.11** for more information.

Consultee	Consideration	How addressed in this PEIR
Natural England	Information on air pollution modelling, screening and assessment can be found on the following websites: • SCAIL Combustion and SCAIL Agriculture - http://www.scail.ceh.ac.uk/ • Ammonia assessment for agricultural development https://www.gov.uk/guidance/intensivefarming-risk-assessment-for-your-environmental-permit • Environment Agency Screening Tool for industrial emissions https://www.gov.uk/guidance/airemissions-risk-assessment-for-your-environmental-permit • Defra Local Air Quality Management Area Tool (Industrial Emission Screening Tool) – England http://www.airqualityengland.co.uk/laqm	These resources were duly noted and considered when ecological impacts were addressed as part of the preliminary assessment of effects of air quality (these assessments are reported and discussed further in **Section 9.11**).
St Helens Borough Council	The Councils Air Quality officer has reviewed this chapter. They state that the SR contains a lot of detail as to how construction dust, construction road emissions and operational road emissions will be assessed. Highly sensitive human and eco-logical receptors will be considered in any assessments undertaken. The scoping report method statement outlines that a construction assessment will be included as part of the EIA using the EPUK & IAQM Assessment of dust from demolition and construction (2014 guidance) and traffic impacts will be assessed using the EPUK & IAQM Land-use Planning and Development Control: Planning for Air Quality (2017 guidance). On that basis they agree with the scope of the assessment in this chapter.	Noted. Both the construction dust assessment and construction road traffic assessment are reported and discussed further in **Section 9.11.**

Consultee	Consideration	How addressed in this PEIR
Trafford Council	No part of the site lies within the Greater Manchester Combined Authority Air Quality Management Area (2016).	Noted, no Project elements (HAGIs or pipeline infrastructure) lie within the Greater Manchester Combined Authority AQMA, however access routes used by construction traffic associated with the Project have been identified within the Greater Manchester Combined Authority AQMA. Human health receptors included within the construction road traffic assessment of human health impacts are reported in **Table 9.15.**
Trafford Council	There will be a requirement for air quality impacts from construction and operational phases to be considered and modelled. The Scoping Report confirms that air quality impacts will be assessed as part of the proposals and confirms the information and modelling methodology that will be utilised.	Air quality impacts from the operational phase of the Project have been considered. These impacts have been scoped out of further assessment, please see **Section 9.9** and **Table 9.14** for more information. Construction phase impacts have been considered and assessment. Both the construction dust assessment and construction road traffic assessment are reported and discussed further in **Section 9.11.**
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 satisfactory for measuring impacts on air quality.	Noted.
UK Health Security Agency	Recommendation	The assessment of emissions from construction traffic in the peak construction year of 2025 is detailed in

Consultee	Consideration	How addressed in this PEIR
	Our position is that pollutants associated with road traffic or combustion, particularly particulate matter and oxides of nitrogen are non-threshold; i.e., an exposed population is likely to be subject to potential harm at any level and that reducing public exposure to non-threshold pollutants (such as particulate matter and nitrogen dioxide) below air quality standards will have potential public health benefits. We support approaches which minimise or mitigate public exposure to non-threshold air pollutants, address inequalities (in exposure) and maximise co-benefits (such as physical exercise). We encourage their consideration during development design, environmental and health impact assessment, and development consent.	**Section 9.11** and **Appendix 9B**. Pollutant concentrations are expected to be below the AQOs. There will be increases in pollutant concentrations at some receptors as a result of the Project, however the impact of these increases is considered to be negligible.
	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: Scoping Report acknowledges the Motorway Air Quality Management Area (AQMA). It does not though mention the Warrington AQMA which covers the town centre ring road and major arterial roads. The Warrington AQMA is most likely to be affected by any construction works and traffic rerouting and should therefore be considered within further assessments	Noted. Warrington AQMA covering the town centre ring road has been considered within this Air Quality chapter and reported in **Section 9.7,** specifically **Table 9.8.**
Warrington Borough Council	It is concluded that air quality has been adequately considered as part of the EIA scoping but that further	The assessment of construction dust impacts and impacts from construction traffic is provided in **Section**

Consultee	Consideration	How addressed in this PEIR
	detailed assessment is required when full information is available on the construction methods and route. It is recommended that further detailed assessments are required for air quality impacts to include: - Air quality impacts from for any traffic rerouting due to construction works. - Construction dust and mitigation measures during construction. - Use of low emission vehicles, plant and machinery during construction. - Financial contribution to the Council's Environment Protection Team for air quality monitoring and Air Quality Action Plan measures. - Any other appropriate mitigation. - The Council's Environmental Protection team should be contacted to agree the methodology for an air quality assessment.	**9.11**. Measures for inclusion in the CoCP are detailed in **Section 9.8**.
Warrington Borough Council	The traffic associated with the development will be limited with no significant impacts expected long term as no vehicular activity of any note associated with the running and maintenance of this proposal	Noted. Air quality impacts from the operational phase of the Project have been considered. These impacts have been scoped out of further assessment, please see **Section 9.9** and **Table 9.14** for more information.
Warrington Borough Council	Appendix 9A details Air Quality monitoring sites and info. It should be noted though that for any detailed assessment, care need to be taken from using data collected during the Covid pandemic due to the	The dispersion model verification process detailed in **Appendix 9B**, which informs the assessment of construction traffic impacts in **Section 9.11** has used monitoring data from 2019. Data from 2020 and 2021

Consultee	Consideration	How addressed in this PEIR
	reductions in travel leading to potential temporary improvements in air quality	is expected to have been affected by reduced emissions during COVID-19 lockdowns.
Warrington Borough Council	It is concluded that air quality has been adequately considered as part of the EIA scoping but that further detailed assessment is required when full information is available on the construction methods and route. It is recommended that further detailed assessments are required for air quality impacts to include: • Air quality impacts from for any traffic rerouting due to construction works. • Construction dust and mitigation measures during construction. • Use of low emission vehicles, plant and machinery during construction. • Financial contribution to the Council's Environment Protection Team for air quality monitoring and Air Quality Action Plan measures. • Any other appropriate mitigation. • The Council's Environmental Protection team should be contacted to agree the methodology for an air quality assessment.	Detail of the consideration of the following air quality impacts can be found in **Section 9.9**: • Air quality impacts from for any traffic rerouting due to construction works. • Construction dust and mitigation measures during construction. • Use of low emission vehicles, plant and machinery during construction. Detail of the assessment of the following air quality impacts can be found in **Section 9.11.** The methodology adopted for the preliminary assessment of air quality effects is reported in **Section 9.11.** Technical engagement with the Council will be made prior to the completion of the Environmental Statement Air Quality chapter. This is due to take place from October 2022.

9.5 Study Area

Spatial scope

9.5.1 There will be different Study Areas for different emissions to air associated with the Project. The Study Areas will be defined once the scope of assessment has been concluded and methodology for the air quality assessments finalised. Therefore, **Section 9.10** reports the final Study Areas adopted for this Chapter (See **Figure 9.3** and **Figure 9.4**).

9.5.2 The methodological approach to developing the spatial extent of the Study Area for air quality is described in the sub sections below, where various emissions are discussed separately.

9.5.3 Each emission source has a different Zones of Influence (ZoI) which are dependent upon the location of the emission source(s), the magnitude of the emissions, the extent to which they are dispersed and diluted in the atmosphere, and the relative location of the human and ecological receptors. The emission sources considered within this Air Quality PEIR chapter include:

- Construction road traffic emissions;
- Construction dust emissions; and
- Decommissioning dust and road traffic emissions.

9.5.4 The methodological approach to deciding upon the spatial extent of the Study Area for air quality has been informed by the IAQM (2014[23] and 2017[21]) and the DMRB[27] guidance documents. The guidance documents will be used to determine the assessment requirements, which will inform the areas to be considered of relevance to air quality assessment. Details of the approach to determining the Study Areas for different air quality pollutants is provided below where the various emissions are discussed separately.

Road traffic emissions

9.5.5 An initial screening exercise has been undertaken using the IAQM[21] criteria summarised in **Table 9.6** to determine the road links that may require detailed assessment, due to emissions during the construction phase.

9.5.6 The ZoI from road traffic emissions when considering the impact on human receptors is 50m from roads within the affected road network of the Project. When considering ecological receptors, the ZoI for road traffic emissions is 200m from affected roads[27]. The DMRB technical guidance document reports that a distance of 200m from affected roads should be considered. A distance of 50m when considering human receptors is considered a worst case.

Table 9.6 Screening criteria for detailed air quality assessment of road traffic emissions

Nature of Impact	Screening criteria for a detailed air quality assessment
Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors (LDV = cars and small vans <3.5t gross vehicle weight).	A change of LDV flows of: • more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA; and • more than 500 AADT elsewhere.
Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: • more than 25 AADT within or adjacent to an AQMA; and • more than 100 AADT elsewhere.
Realignment of roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA.
Introducing a new junction or removal of an existing junction near to relevant receptors.	The introduction of a new junction or removal of a junction will lead to a detailed air quality assessment, when this addition/ removal causes traffic to significantly change vehicle acceleration or deceleration, e.g. traffic lights, or roundabouts.

Taken from IAQM & EPUK guidance Land-Use Planning & Development Control: Planning For Air Quality[21]

Construction dust and fine particle emissions

9.5.7 Construction activities, associated with the Project, with the potential to give rise to dust and fine particle emissions will include the construction of Hydrogen Above Ground Installations (HAGIs) and Block Valves, plus works related to the installation of underground pipelines. The activities associated with the construction phase of the Project, considered to cause air quality impacts, include earthworks, construction and vehicle movements that could cause track-out of material.

9.5.8 As per the IAQM guidance[23], the following ZoIs will be used where an assessment of dust emissions from these activities is required:

- A human receptor within:
  - 350m of the boundary of the construction site considered; or
  - 50m of the route(s) used by construction vehicles; and
  - Vehicles on the public highway, up to 500m from the construction site entrance(s).

- An ecological receptor within:
  - 50m of the boundary of the construction site considered; or
  - 50m of the route(s) used by construction vehicles; and
  - On the public highway, up to 500m from the construction site entrance(s).

Temporal scope

9.5.9 The temporal scope of the Air Quality assessment is determined by the potential effects, which are all likely to occur during the construction phase. The peak year of construction is expected to be 2025 (see **Chapter 2: The Project**).

9.6 Data gathering methodology

Desk study

9.6.1 A summary of the organisations that have supplied data, together with the nature of that data is outlined in **Table 9.7**.

Table 9.7 Data sources used to inform the Air Quality assessment

Source	Date	Summary
Department for Environment, Food and Rural Affairs (Defra) (2020)[28]	November 2020	Background maps of forecast air quality concentrations
Cheshire West and Chester Council Annual Status Report (ASR) (2021)[29]	June 2021	Monitoring data and supporting information on AQMAs
Cheshire East Council ASR (2021)[30]	June 2021	Monitoring data and supporting information on AQMAs

[28] Defra (2020). Background Mapping data for local authorities. (Online) Available at: https://uk-air.defra.gov.uk/data/laqm-background-home (Accessed December 2021).
[29] Cheshire West and Chester Council (2021). 2020/2021 Air Quality Annual Status Report (ASR). (Online) Available at: https://www.cheshirewestandchester.gov.uk/documents/pests-pollution-food-safety/pollution-and-air-quality/air-quality-review-and-assessment/reports/air-quality-annual-status-report-2020-21.pdf (Accessed December 2021).
[30] Cheshire East Council (2021). 2021 Air Quality Annual Status Report (ASR). (Online) Available at: https://www.cheshireeast.gov.uk/pdf/environment/air-quality/cec.asr.2021.4.pdf (Accessed July 2022).

Source	Date	Summary
Halton Borough Council ASR (2021)[31]	October 2021	Monitoring data and supporting information on AQMAs
Warrington Borough Council ASR (2020)[32]	June 2020	Monitoring data and supporting information on AQMAs
Greater Manchester Combined Authority ASR (2021)[33]	30 June 2021	Monitoring data and supporting information on AQMAs
St. Helens Council ASR (2021)[34]	30 June 2021	Monitoring data and supporting information on AQMAs

Data limitations

9.6.2 Results from 2020 and 2021 are presented for information but have not been used in the assessment as concentrations were affected by both reduced emissions as a result of COVID-19 lockdowns and logistical monitoring challenges during the lockdowns.

9.7 Overall baseline

Current baseline

9.7.1 A 'Baseline Study Area' has been identified, independent of the Study Area described in **Section 9.5.** Where the final Study Areas (**Figure 9.3** and **Figure 9.4**)

[31] Halton Borough Council (2021). 2021 Air Quality Annual Status Report (ASR). (Online) Available at: https://www3.halton.gov.uk/Documents/Forms/AllItems.aspx?RootFolder=%2fDocuments%2fplanning%2fairquality%2fassessments&FolderCTID=0x0120003507EC0635BEE944A003D419B1769AFC (Accessed July 2022).
[32] Warrington Borough Council (2020). 2020 Air Quality Annual Status Report (ASR). (Online) Available at: https://www.warrington.gov.uk/sites/default/files/2020-12/asr_warrington_2020.pdf (Accessed December 2021).
[33] Greater Manchester Combined Authority (2021). 2020 Air Quality Annual Status Report (ASR). (Online) Available at: https://assets.ctfassets.net/tlpgbvy1k6h2/4IY6QAZe4MdkqcedBIbgE8/a343eef4385f33f4710bb9f08c70f59f/GM_2020_Air_Quality_Annual_Status_Report.pdf (Accessed December 2021).
[34] St Helens Council (2021). 2021 Air Quality Annual Status Report (ASR). (Online) Available at: https://sthelens.gov.uk/media/3160/Air-Quality-Annual-Status-Report-2021/pdf/ASR_Template_England_2021_v2.0_St_Helens.pdf?m=637835489351070000 (Accessed July 2022).

take account of emission sources associated with the Project, the Baseline Study Area has been informed by the construction traffic routes associated with the Project and jurisdictional area of the local authorities, which the pipeline is proposed to cross.

Air Quality Management Areas

9.7.2 **Figure 9.1** presents the AQMAs within 10km of the Preliminary Order Limits. Four of these AQMAs have been identified within 50m of areas where construction traffic is expected to be generated by the Project. The AQMAs within 50m of construction traffic are reported in **Table 9.8**, alongside the local authority which has declared the respective AQMA, a description of the AQMA and the distance of the AQMA to the Preliminary Order Limits. Traffic generated by the Project has the potential to affect air quality within these AQMAs. Each AQMA, except for Thornton-le-Moors AQMA, has been declared for exceedances of the NO_2 AQO. Thornton-le-Moors AQMA has been declared for exceedances of the SO_2 AQO.

Table 9.8 AQMAs declared within 10km of the Preliminary Order Limits

Local Authority	AQMA name	Description	Distance to the Preliminary Order Limits
Cheshire West and Chester Council	Frodsham AQMA Cheshire West and Chester	An area at the junction of Fluin Lane with the A56 High Street.	0.5km
Cheshire West and Chester Council	Thornton le Moors AQMA No. 4	An area encompassing the entire village of Thornton le Moors, its surroundings and parts of the adjacent area of Stanlow.	Within the West Corridor of the Preliminary Order Limits
Greater Manchester Authority	AQMA Greater Manchester	An area covering the ten districts of Greater Manchester, including arterial routes, district centres and airport. This is also the boundary of the Manchester Clean Air Zone (CAZ)[35],	1.3km

[35] Clean Air Greater Manchester (undated). Clean Air Greater Manchester website. (Online). Available at: https://cleanairgm.com/ (Accessed January 2022).

Local Authority	AQMA name	Description	Distance to the Preliminary Order Limits
		which was introduced during May 2022. A charge for the most polluting commercial and passenger vehicles was also introduced.	
Warrington Borough Council	Warrington AQMA No.1	A 50m continuous strip on both sides of the M6, M62 and M56 motorway corridors.	Within the Preliminary Order Limits
Warrington Borough Council	Warrington AQMA No.4	Covering the link roads and the town centre ring road.	Adjacent to the Preliminary Order Limits

Background

9.7.3 The Defra UK-AIR website provides data for background concentrations of NO_2, NO_x, PM_{10}, and $PM_{2.5}$. The background concentrations represent 1km^2 grid squares. The background concentrations reported by Defra for each of these pollutants are provided in **Appendix 9B**. These figures show that annual average background concentrations of each pollutant are below the respective AQOs reported in **Table 9.2**.

9.7.4 The 2019 maximum annual average concentrations of NO_X, NO_2, PM_{10} and $PM_{2.5}$ are reported below in **Table 9.9**.

Table 9.9 Background concentrations of air quality pollutants

Pollutant	2019 maximum annual average concentration (ugm^{-3})
NO_x	35.1
NO_2	23.6
PM_{10}	14.4
$PM_{2.5}$	9.4

Data source: Defra, UK-AIR

Automatic monitoring

9.7.5 Automatic monitoring of NO_2 was undertaken by the six local authorities during the period of 2013 – 2021, as follows:

- Cheshire West and Chester Council: three automatic monitoring locations;
- Halton: three automatic monitoring locations;
- Warrington: three automatic monitoring locations;
- Cheshire East: three automatic monitoring locations;
- Trafford: three automatic monitoring locations; and
- St Helens: four automatic monitoring locations.

9.7.6 The location of the NO_2 automatic monitoring sites within 10km of the Preliminary Order Limits is reported in **Appendix 9A**, alongside the concentrations of NO_2 for the monitoring period 2013 – 2021. The location of the automatic monitoring sites in relation to the Preliminary Order Limits are shown in **Figure 9.2**.

9.7.7 Automatic monitoring of NO_2 for the monitoring period of 2013 – 2021 has shown there were 14 exceedances of the AQO for NO_2. Restrictions on travel were imposed during the 2020 and 2021 as a result of COVID-19, and this will have caused a reduction in vehicles on the local road network across the UK. Results obtained from 2019 report only one exceedance of the NO_2 annual average AQO.

9.7.8 All local authorities except for Cheshire East undertook automatic monitoring of PM_{10} during the period 2013 – 2021. Warrington Borough Council was the only local authority to have undertaken automatic monitoring of $PM_{2.5}$ during this period. There were no exceedances of the PM_{10} or the $PM_{2.5}$ annual average AQO for the period 2013 – 2021.The concentrations for this period for PM_{10} and $PM_{2.5}$ are reported in **Appendix 9A.**

Passive monitoring

9.7.9 Passive diffusion tube monitoring of NO_2 concentrations was undertaken by the six local authorities from 2013 – 2021. The number of passive monitoring locations where each local authority undertook monitoring, within during this period, is as follows:

- Cheshire West and Chester Council: 88 monitoring locations;
- Halton: 16 monitoring locations;
- Warrington: 33 monitoring locations;
- Cheshire East: 50 monitoring locations;
- Trafford: 17 monitoring locations; and
- St Helens: 27 monitoring locations.

9.7.10 **Appendix 9A** reports the details of the monitoring sites and respective concentrations of NO_2 within 10km of the Preliminary Order Limits covered by these local authorities.

9.7.11 The last year when data is expected to not be affected by reduced emissions as a result of the COVID-19 is 2019. The NO_2 annual mean AQO was exceeded at 19 of the 197 monitoring locations used in 2019. This shows that the annual mean AQO is only exceeded at certain roadside locations and that concentrations across the majority of the area are below the AQO.

9.7.12 Out of the exceedances reported during 2019, two monitoring sites reporting such exceedances were found close to the Preliminary Order Limits of the West Corridor. Seven monitoring sites are found within 1km of the Warrington Spurs.

Future baseline

9.7.13 It is expected there will be a gradual decline in pollutant concentrations in the atmosphere as a result of measures such as the implementation of the Government's Clean Air Strategy[36], improvements in real world emissions performance of road vehicles, and more stringent emission limits for industrial sources as environmental permits for operators covering the various industrial sectors are updated in a phased manner to bring them in line with the requirements of the Industrial Emissions Directive[37].

9.7.14 With regard to the potential effects of climate change on the future air quality baseline, the 2007 report produced by the Air Quality Expert Group (AQEG)[38] indicated that the Winter season may become windier with fewer, less stable weather conditions by the end of the century, whilst Summer seasons are anticipated to become hotter and sunnier, with an increase in unstable weather conditions by the 2040s. The net effect of these anticipated changes on the baseline air quality is difficult to establish but is unlikely to significantly alter the baseline air quality to an extent that it would affect the outcome of any assessment. Other factors such as changes in technology and the move away from combusting fossil fuels, driven by climate change abatement would potentially lead to decreases in emissions of the key pollutants, considered in this assessment, and a corresponding decrease in background concentrations of air pollutants into the future.

9.8 Embedded environmental measures

9.8.1 As part of the project design process, a number of embedded environmental measures are proposed to reduce the potential for impacts on Air Quality. **Table**

[36] Department for Environment, Food & Rural Affairs (2019), Clean Air Strategy 2019. (online) Available at: https://www.gov.uk/government/publications/clean-air-strategy-2019 (Accessed July 2022)
[37] European Commission (2010). Directive 2010/75/EU of the European Parliament and of the Council. (Online). Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0075&from=EN (Accessed December 2021).
[38] Air Quality Expert Group (2007). Air Quality and Climate Change: A UK Perspective. (Online) Available at: https://uk-air.defra.gov.uk/library/assets/documents/reports/aqeg/fullreport.pdf (Accessed December 2021).

9.10 outlines how these embedded measures will influence the Air Quality assessment.

Table 9.10 Summary of embedded environmental measures

Embedded measures	Compliance mechanism
Construction phase	
Where practical, sensitive sites will be avoided by the temporary construction compounds and permanent Project elements including SSSIs, Local Nature Reserves, Local Wildlife Sites, Ancient Woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, National Trust Land, Listed Buildings and Scheduled monuments.	Development Consent Order (DCO) works plans and Order Limits
Good practice air quality measures will be applied as described in IAQM guidance on the Assessment of Dust from Demolition and Construction[23]. These are provided in Table 9.11 below.	CoCP secured via DCO requirement

9.8.2 Good practice air quality measures as described in the IAQM guidance on the Assessment of Dust from Demolition and Construction[23] to be employed across the Project and incorporated in the CoCP are provided in **Table 9.11.**

9.8.3 'Medium/High Risk Sites' as reported in **Table 9.11** refer to sites which have been concluded as Medium or High risk as part of the assessment of the dust emission effects (reported in **Section 9.11**).

Table 9.11 Embedded measures for the construction phase

Category	Measures to be incorporated across the Project	Measures for Medium/High Risk Sites only
Communication	Develop and implement a stakeholder communication plan that includes community engagement before work commences on site Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be	

Category	Measures to be incorporated across the Project	Measures for Medium/High Risk Sites only
	the environment manager/ engineer or the Project Manager. Display the head or regional office contact information.	
Dust management	Develop and implement site specific Dust Management Plans (DMPs), including the recommended measures in this document.	
Site management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. Make the complaints log available to the local authority when asked. Record any exceptional incidents that cause dust and/or emissions, either on- or off-site and the action taken to resolve the situation in the log book.	Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same road network routes.
Monitoring	Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked. Increase the frequency of site inspections by the person accountable for air quality and dust issues on-site, when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary. Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with local authorities. Where possible commence baseline monitoring at least three months before

Category	Measures to be incorporated across the Project	Measures for Medium/High Risk Sites only
		work commences on site or, if it a large site, before work on a phase commences.
Preparing and maintaining site	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. Where possible, fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period. Avoid site runoff of water or mud. Keep hoarding, barriers and scaffolding clean using wet methods. Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. Where appropriate, cover, seed or fence stockpiles to prevent wind whipping.	
Operating vehicles/ machinery	Use Euro VI vehicles for haulage during construction, where possible for the tasks required. Use Stage V NRMM, unless there is a specific reason that suitable Stage V equipment cannot be obtained.	

Category	Measures to be incorporated across the Project	Measures for Medium/High Risk Sites only
	Ensure all vehicles switch off engines when stationary and not operating – no idling vehicles. Impose and signpost a maximum-speed-limit of 10mph on surfaced and 10mph on un-surfaced haul roads and work areas. Lower maximum speed limits will be considered further. Avoid the use of diesel- or petrol-powered generators and use low-carbon alternative equipment where practicable. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	
Operations	Where possible, only use cutting, grinding or sawing equipment fitted, or in conjunction, with suitable dust suppression techniques such as water sprays or local extraction e.g. suitable local exhaust ventilation systems. This will be aligned with HSE policy. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. Use enclosed chutes and conveyors and covered skips.	

Category	Measures to be incorporated across the Project	Measures for Medium/High Risk Sites only
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment, wherever appropriate. Ensure equipment readily available on-site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event, using wet cleaning methods.	
Waste management	Avoid bonfires and burning of waste materials	
Earthworks		Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. Stockpiles of topsoil which remain present for six months or longer will be used (e.g. through seeding) to encourage stabilisation, minimise soil erosion and prevent infestation by nuisance weeds. Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. This will depend on conditions and season. Only remove the cover in small areas during work and not all at once
Construction	Avoid scabbing if possible. Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case	Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery

Category	Measures to be incorporated across the Project	Measures for Medium/High Risk Sites only
	ensure that appropriate additional control measures are in place.	For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust
Trackout	Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. At compound and access points, wheel wash or dust sweepers will be used. Avoid dry sweeping of large areas, where possible. Refer to the Dust Management Plan. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. A condition survey is being undertaken (in the traffic chapter). Record all inspections of haul routes and any subsequent action in a site log book. A condition survey is being undertaken (in the traffic chapter). Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). A condition survey is being undertaken (in the traffic chapter).	Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.

Category	Measures to be incorporated across the Project	Measures for Medium/High Risk Sites only
	Where possible, ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits Access gates to be located at least 10m from receptors where possible.	

9.9 Scope of the assessment

Potential receptors

9.9.1 The principal Air Quality receptors that have been identified as being potentially subject to effects are summarised in **Table 9.12**.

Table 9.12 Air Quality receptors subject to potential effects

Receptor	Reason for consideration
Human receptors – Residents living near to construction sites or along roads affected by traffic associated with the Project.	Residents living near construction sites may be subject to the impacts of road traffic emissions, NRMM emissions and dust nuisance.
Ecological receptors – internationally and nationally designated nature conservation sites in the locality of construction sites or roads affected by traffic associated with the Project.	Designated sites may be susceptible to direct exposure to air pollutants emitted during the construction phase of the Project and through indirect effects associated with nitrogen and acid deposition.

Potential significant effects

9.9.2 The effects on Air Quality receptors, which have the potential to be significant and have been taken forward for detailed assessment are summarised in **Table 9.13**.

Table 9.13 Air Quality effects scoped in for further assessment

Activity	Effect	Receptor
Construction		
Construction of project infrastructure	Fugitive dust emissions and increases in PM_{10} and $PM_{2.5}$	Human and ecological receptors
Use of road vehicles for the construction of the Project	Combustion product emissions arising from the construction traffic will affect concentrations of pollutants. Changes in concentrations of pollutants have the potential to affect human receptors and can cause damage to sensitive ecological receptors. The human receptors that could be affected include residents living near to construction sites or along roads affected by traffic associated with the Project. The ecological receptors that could be affected include internationally and nationally designated nature conservation sites in the locality of construction sites or roads affected by traffic associated with the Project.	Human and ecological receptors

Elements scoped out of further assessment

9.9.3 The receptors/effects detailed in **Table 9.14** have been scoped out from being subject to further assessment because the potential effects are not considered likely to be significant.

Table 9.14 Summary of effects scoped out of the Air Quality assessment

Receptors/potential effects	Justification
The effect of pollutant emission from NRMM on human and ecological receptors	Emissions are controlled by the NRMM (Emission of Gaseous and Particulate Pollutants) Regulations 1999 (as amended)[7] and the scale and distance of construction activity to relevant receptors is not considered to be of a magnitude that would cause significant effects on local air quality. For the construction of the pipelines, as it is a linear project, there is unlikely to be a concentration of NRMM close to receptors for a long duration. The scale of activity from the NRMM expected for the construction of the HAGIs is not expected to be of a magnitude that would cause significant effects on local air quality. The amount of equipment expected is not large, equipment will be placed as far as possible from sensitive receptors, and each item of equipment will only be used when required and will not be used continuously. More information on the number of construction plant equipment expected is provided in the 'Predictions' section of **Section 10: Methodology for the PEIR assessment** within **Chapter 10: Noise and Vibration**.
The effect of combustion product emissions from operational road traffic on human and ecological receptors	See the indicative maintenance schedule detailed in **Section 2.6** of **Chapter 2**: **The Project**. activities As reported within **Table 11.26** of **Chapter 11: Traffic and Transport**, negligible amounts of traffic are expected during this phase of the Project.
The effect of combustion product emissions from road traffic associated with the decommissioning of the Project	Combustion product emissions expected at the time of decommissioning of the Project are expected to be minimal. This is due to the expected changes in technologies and therefore the type of vehicles used for transportation. As per **Table 11.26** of **Chapter 11: Traffic and Transport**, negligible amounts of traffic are expected during this phase of the Project.
The effect of fugitive dust emissions associated with the decommissioning of the Project	As described in **Chapter 2: The Project**, dust emissions may arise as a result of dismantling the HAGI compounds only. The pipelines will be left in situ. It can therefore be concluded that the risk of dust emission impacts from the decommissioning phase of the Project at each HAGI location will be the same as that reported and

Receptors/potential effects	Justification
	assessed for the risk of dust emission impacts from the construction phase of the Project at each HAGI location. See **Section 9.11: Preliminary assessment of effects – dust emissions - HAGIs** for more information.

9.10 Methodology for PEIR assessment

Introduction

9.10.1 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 Air Quality assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this Air Quality assessment.

Assessment of effects and determining significance

Construction phase – dust emissions

9.10.2 A desktop assessment will be undertaken to assess the effects of dust emissions to air. The IAQM Guidance on the assessment of dust from demolition and construction[23] will be used for this air quality assessment. Consideration will be given towards the potential for the mobilisation of contaminated materials from the disturbance of land located adjacent to or running through industrial areas. This will include discussions with the technical experts authoring **Chapter 12: Ground Conditions**.

9.10.3 The dust emitting activities that may take place during the construction phase of the Project can be divided into four different types:

- Demolition – an activity involved with the removal of an existing structure or structures;
- Earthworks – the processes of soil-stripping, ground-levelling, excavation and landscaping;
- Construction – an activity involved in the provision of a new structure; and
- Activities that cause Trackout – the transport of dust and dirt from the site onto the public road network. This arises when lorries leave site with dusty materials or transfer dust and dirt onto the road having travelled over muddy ground on-site.

9.10.4 The IAQM Guidance on the assessment of dust from demolition and construction[23] considers three separate dust impacts:

- Annoyance due to dust soiling;

- The risk of health impacts due to an increase in exposure to PM_{10}; and
- Harm to ecological receptors.

9.10.5 Detailed air quality assessment involves a three-stage process:

- Stage 1 - construction sites are classified according to the risk of dust impacts (based upon the scale and nature of the works, plus the proximity of sensitive receptors);
- Stage 2 - appropriate site-specific Good Practice Measures are identified; and
- Stage 3 - the significance of effects is then determined.

9.10.6 The methodology for the classification of construction sites according to the risk of effects is described in paragraphs 9.10.19 - 9.10.22**.** within the **Determination of Significance** section below.

9.10.7 The ZOIs as described within paragraph 9.5.8 determined the spatial scope of the construction dust emission assessment. **Figure 9.3** presents the construction dust assessment Study Area upon which the construction dust emission assessment was based on.

Construction phase human health impacts - road traffic emissions

9.10.8 EPUK and IAQM provide guidance[22] on screening of road traffic impacts to determine when a detailed air quality assessment is required (as reproduced in **Table 9.6**). Given the widespread nature of the anticipated construction traffic generation, the air quality assessment has focused on determining the greatest impacts from construction traffic on local air quality. To do this, the traffic data provided has been screened to consider the locations with the highest current pollutant concentrations (AQMAs) and the locations where the construction traffic impact is predicted to be greatest during the peak construction year of 2025.

9.10.9 Sensitive receptors have been chosen at the closest points (where concentrations will be highest) to the road links in the AQMAs and where construction traffic volumes will be greatest. All receptors have been placed at the building façade facing the road link and have been modelled at a height of 1.5m. The receptors are presented in **Table 9.15** and **Figure 9.4**, where **Figure 9.4** presents the construction traffic assessment Study Area.

Table 9.15 Human health receptors for construction traffic assessment

ID	X (m)	Y (m)	Area	Road Link
Cheshire West diffusion tube FTG	351993	378102	Frodsham AQMA	A56
Cheshire West diffusion tube FRC	352023	378121	Frodsham AQMA	A56
Cheshire West diffusion tube FH	352146	378139	Frodsham AQMA	A56

ID	X (m)	Y (m)	Area	Road Link
Cheshire West diffusion tube FJ	352171	378140	Frodsham AQMA	A56
Warrington DT7	360233	381994	Warrington AQMA 1	M56
Warrington DT5	366084	389210	Warrington AQMA 1	M6
Trafford diffusion tube TR23NO	376438	396383	Greater Manchester AQMA	M60
Trafford diffusion tube TR23ANO	376395	396360	Greater Manchester AQMA	M60
Benbecula Way	376693	396312	Greater Manchester AQMA	M60
Harris Avenue	376767	396279	Greater Manchester AQMA	M60
Iona Way	377239	396083	Greater Manchester AQMA	M60
Manchester Road	366100	389211	Warrington AQMA 1	M6
Olympic Way	364511	390677	Warrington AQMA 1	M6
Keepers Cottage	360132	381876	Warrington AQMA 1	M56
Ring O Bells	357937	382871	Warrington AQMA 1	M56
Delph Lane	357530	382172	Warrington AQMA 1	M56
78 High Street	352171	378145	Frodsham AQMA	A56
68 High Street	352126	378140	Frodsham AQMA	A56
67 High Street	352016	378121	Frodsham AQMA	A56
59 High Street	351926	378092	Frodsham AQMA	A56
1 Bridge Street	352207	378146	Frodsham AQMA	A56
49 Bridge Street	352351	378189	Frodsham AQMA	A56
The Croft	360675	377214	A49/A533 Crossroads	A49/A533
White House	360613	377113	A49/A533 Crossroads	A49/A533

ID	X (m)	Y (m)	Area	Road Link
Hollybush Cottage	360541	376995	A49/A533 Crossroads	A49/A533
Sonora	360509	376989	A49/A533 Crossroads	A49/A533
Idene	360502	377461	A49/A533 Crossroads	A49/A533
Happy Guest Lodge	360602	377474	A49/A533 Crossroads	A49/A533
Laburnum Cottage	361004	377059	A49/A533 Crossroads	A49/A533
Meadow Farm	360673	377847	A49/A533 Crossroads	A49/A533

9.10.10 Model verification has been undertaken to compare pollutant concentrations from monitored data and the concentrations calculated. This enables the calculation of suitable model adjustment factors. The results of the model verification calculation is provided in **Appendix 9B.**

9.10.11 The traffic data has been used to estimate emissions for three scenarios:

- the 2019 baseline used for model verification, based on 2019 traffic flow data, 2019 emission factors and predicted background concentrations [2019 baseline] (2019 has been used as the latest year unaffected by the COVID-19 pandemic);
- the 2025 future baseline scenario based on 2025 traffic data, emission factors and predicted background concentrations [2025 without development]; and
- the 2025 peak construction year scenario based on 2025 traffic data, emission factors and predicted background concentrations [2025 with development].

Construction phase ecological impacts - road traffic emissions

9.10.12 Provisional ecological receptors have been identified for the inclusion within the construction traffic assessment and are presented in relation to the Preliminary Order Limits and the Project access routes in **Figure 9.4**. These ecological receptors are as follows:

- Holcroft Moss SAC/SSSI;
- Woolston Eyes SSSI;
- Dunham Park SSSI; and
- Rostherne Mere SSSI.

9.10.13 Ecological receptors were identified for inclusion within the construction traffic assessment since they may be susceptible to direct exposure to air pollutants emitted from construction traffic and the indirect effects associated with nitrogen and acid deposition. Each ecological receptor has been modelled by including transect points within the ADMS model. The transect points included within the ADMS model are reported in **Table 9B.11** in **Appendix 9B**.

9.10.14 There are two categories of pollutants which are important to the air quality assessment of ecological impacts from road traffic emissions. These are pollutants which have an effect on vegetation/habitats in a gaseous form and those which have an impact through deposition. **Table 9.16** reports a summary of the relevant air quality standards, objectives, environmental assessment levels and targets relevant to the assessment of air quality impacts on ecological receptors.

9.10.15 The Air Pollution Information System (APIS)[39] provides background deposition data and critical loads and levels for deposition assessments. Unlike for the AQS and EAL values, critical loads differ depending on species sensitivity. The critical loads for nitrogen deposition and acid deposition applicable to each ecological receptor are reported below in **Table 9.17**. The assessment will be undertaken with reference to **Chapter 5: Biodiversity**.

Table 9.16 Summary of relevant assessment criteria for ecological receptors

Pollutant	AQS/Environmental Assessment Level (EAL)/Target	Objective (UK)	AQS/EAL/Target
NO_x	AQS	30 μgm^{-3}	Annual Mean
	AQS	200 μgm^{-3}	Daily Mean
	EAL	75 μgm^{-3}	Daily Mean

Table 9.17 Minimum Critical Load and Critical Level (CL) values (kg N $ha^{-1}yr^{-1}$)

	Minimum nutrient nitrogen deposition (kg N/ha/yr)	Minimum acid deposition CLs (MinCLMaxN, keq/ha/yr)
Holcroft Moss SSSI	15	0.366
Woolston Eyes SSSI	20	0.400
Dunham Park SSSI	10	0.357
Rostherne Mere SSSI	20	0.223

[39] APIS (2021). Air Pollution Information System (APIS). (Online). Available at: http://www.apis.ac.uk/ (Accessed May 2021).

Construction traffic assessment – pollutant calculations

9.10.16 Annual average concentrations of NO_x, PM_{10} and $PM_{2.5}$ have been determined using the ADMS-Roads atmospheric dispersion model (version 5.0). Annual average concentrations of NO_2 have been calculated from the annual average concentrations of NO_x and by using Defra's NO_x to NO_2 calculator. Road-NO_2 concentrations were predicted at ecological receptors for use in calculating nitrogen and acid deposition by also using Defra's NO_x to NO_2 calculator, by converting road-NO_x concentrations. Emission factors obtained from Defra's Emission Factor Toolkit v11.0 (EFT) have been used to predict emissions which can subsequently be imported into ADMS-Roads.

9.10.17 To calculate nitrogen deposition, the AQTAG methodology was used. Dry deposition flux was calculated for the road-NO_2 annual mean concentrations at each modelled receptor using the dry deposition velocities in **Table 9.18**. Dry deposition flux was then converted to kilograms of nitrogen per hectare per year (kg N ha-1 yr-1) deposition for NO_X using the conversion factors shown in **Table 9.18**. Nitrogen deposition rates were added together with the background nitrogen deposition rate to give total nitrogen deposition at all modelled transect points.

Table 9.18 Dry deposition velocities and NOx conversion factor

Pollutant	Area	Dry deposition velocity (ms^{-1})	Conversion factor
NO_2	Grassland	0.0015	96
NO_2	Forrest	0.0003	96

9.10.18 Nitrogen and sulphur deposition both contribute to acid deposition and the Critical Load Function Tool provided by APIS is used to determine the deposition that will not cause harmful effects. Dry deposition is the portion of total deposition that is deposited through processes such as settling, impaction and adsorption and is quantified in terms of flux, which is dependent on the dry deposition velocity and concentration of a pollutant in the air. The dry flux deposition is multiplied by a conversion factor of 0.071428 to calculate the kilo- equivalent of acid deposition. As above, deposition values were added together with the background acid deposition to determine total acid deposition at all modelled transect points. The change in deposition between Do Minimum and Do Something is used alongside the Critical Load Function Tool to calculate the change as a percentage of the critical load.

Determination of Significance

Determination of significance – dust emissions

9.10.19 The magnitude of each of the dust emitting activities has been considered on a site specific basis. The magnitude is based on the scale of the proposed

construction activities and will be categorised according to the small, medium or large categorisation provided in the IAQM guidance[23]. The sensitivity of the area to dust and particulate emissions is then determined on the basis of the number of receptors in the vicinity.

9.10.20 The magnitude of the dust emitting activities and the overall sensitivity of the area surrounding the construction activities has been used to determine the risk of dust impacts for the four dust activities (demolition, earthworks, construction and trackout). The risk of impacts has been defined as either high, medium, low or negligible. The conclusion of the risk of impacts was based on professional judgment and the guiding principles as stated within the IAQM guidance[23] (see **Table 9.19**).

9.10.21 Based on the overall risk assessment for the four activities, measures detailed in **Section 9.8** have been recommended depending on the risk of the impact identified.

9.10.22 The assessment of the significance of dust effects is undertaken after consideration of the site-specific embedded mitigation. The overall significance of the effects arising from the construction phase of the Project will be based on professional judgement, taking into account the risk of the effects of each of the four activities.

Table 9.19 Matrices for determining risk of impacts from construction dust

Category Type	Sensitivity of Area	Dust Emission Magnitude		
		Large	Medium	Small
Demolition	High	High Risk	Medium Risk	Medium Risk
	Medium	High Risk	Medium Risk	Low Risk
	Low	Medium Risk	Low Risk	Negligible
Earthworks	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible
Construction	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible
Trackout	High	High Risk	Medium Risk	Low Risk

Category Type	Sensitivity of Area	Dust Emission Magnitude		
		Large	Medium	Small
	Medium	Medium Risk	Low Risk	Negligible
	Low	Low Risk	Low Risk	Negligible

Determination of significance – construction road traffic emissions

9.10.23 In accordance with IAQM guidance[21], the magnitude of change due to an increase and/or decrease in the annual mean pollutant concentrations due to the Project has been described using the criteria in **Table 9.20**. Criteria are based on the change in the concentration of a pollutant at an existing receptor location due to a new development, as a percentage of the AQAL (i.e. the AQO). When describing the effect at a specific receptor, the percentage change in concentration relative to AQAL is considered in combination with the long-term average concentration at a receptor in the assessment year.

Table 9.20 Impact descriptors for individual receptors

Absolute concentration with the Project, relative to assessment level	% change in Concentration Relative to Assessment Level				
	0%	1%	2–5%	6-10%	>10%
75% or less	Negligible	Negligible	Negligible	Slight	Moderate
76–94%	Negligible	Negligible	Slight	Moderate	Moderate
95–102%	Negligible	Slight	Moderate	Moderate	Substantial
103–109%	Negligible	Moderate	Moderate	Substantial	Substantial
110% or more	Negligible	Moderate	Substantial	Substantial	Substantial

9.11 Preliminary Assessment of Air Quality effects

Preliminary Assessment of Effects – Dust Emissions – HAGI

Potential dust emission magnitude

9.11.1 Following the IAQM guidance[23], four dust emitting activities (paragraph 9.10.3) are considered in this assessment. This section of the assessment considers the magnitude of the four dust emitting activities, expected to be associated with the construction of the ten proposed HAGIs (see **Chapter 2: The Project**). They are as follows:

- St Helens;
- Clock Face;
- Higher Walton;
- Partington;
- Warburton;
- Hydrogen Storage Facility (HSF);
- Central Hub;
- Runcorn;
- Rocksavage; and
- Hydrogen Production Plant (HPP).

9.11.2 For HAGI locations reported within **Chapter 2: The Project** to have options for their locations remaining, it can be assumed that the results reported in this assessment apply to all options.

9.11.3 Demolition activities are not required to enable the construction of the HAGIs, therefore this activity has not been considered further in the assessment.

9.11.4 The main construction material thought to have a potential for dust release is the concrete used for the base of the HAGI. Each HAGI location is proposed to comprise of an area which is larger than 10,000m^2. This is indicative of a 'large' dust emission magnitude for the earthwork activities associated with the construction of the HAGIs.

9.11.5 An estimate for the total volume of concrete required at each HAGI has been made, based upon the proposed square footprint of each HAGI. The Central Hub HAGI is estimated to require a volume of concrete more than 25,000m^3 which is indicative of a 'medium' dust emission magnitude for earthworks activities. All remaining HAGIs are estimated to require a volume of concrete less than 25,000m^3, indicative of a 'small' dust emission magnitude for construction activities.

9.11.6 It is expected that no more than 10 HGV movements per day will be required to construct each HAGI. This is indicative of a 'low' dust emission magnitude for trackout.

9.11.7 The concluded dust emission magnitude for each dust emitting activity, at each HAGI location is reported below in **Table 9.21**.

Table 9.21 Construction of HAGI potential dust emission magnitude

HAGI	Dust emission magnitude			
	Demolition	Earthworks	Construction	Trackout
St Helens	N/A	Large	Small	Small
Clock Face	N/A	Large	Small	Small
Higher Walton	N/A	Large	Small	Small
Partington	N/A	Large	Small	Small
Warburton	N/A	Large	Small	Small
HSF	N/A	Large	Small	Small
Central Hub	N/A	Large	Medium	Small
Runcorn	N/A	Large	Small	Small
Rocksavage	N/A	Large	Small	Small
HPP	N/A	Large	Small	Small

Sensitivity of the area

9.11.8 In order to define the sensitivity of the area in which the Project is found, three different impacts are considered:

- Sensitivity to dust soiling;
- Sensitivity to human health; and
- Ecological impacts.

9.11.9 The sensitivity of the area is then assessed in relation to the four dust emitting activities (paragraph 9.10.3). For this dust assessment, each HAGI was considered as an area to conclude a sensitivity towards dust soiling, human health and ecological impacts.

9.11.10 There were no sensitive human receptors found within 250m of the Rocksavage HAGI location, therefore the effects of construction and earthworks activities on both human health and dust soiling have not been considered further for

Rocksavage HAGI and are reported as 'N/A'. This applies to all three options considered for the Rocksavage HAGI (RSH1, RSH2 and RSH3 as per **Chapter 2: The Project**).

Sensitivity of the area to dust soiling

9.11.11 The number of human receptors in the vicinity of each HAGI location was estimated to determine the sensitivity of each HAGI location to dust soiling for earthworks, construction and trackout activities. This exercise is undertaken by considering a 'selection area' at each HAGI location for each dust emitting activity.

9.11.12 The selection area for identifying human receptors is different for trackout activities than it is for earthworks and construction activities, this means that the number of sensitive human receptors identified for trackout activities will be different to that of earthwork and construction activities. This is since trackout activities consider the routes followed by construction traffic, therefore human receptors are identified within certain distances from these roads. The magnitude of trackout activities reported in **Table 9.21** determines the selection area for human receptors sensitive to dust soiling impacts from trackout activities. The human receptors found within the vicinity of each HAGI, when considering earthwork and construction activities only are reported in **Table 9.23**.

9.11.13 Following the IAQM guidance[23], human receptors can be defined as either a low, medium or high sensitivity receptor. **Table 9.22** reports the sensitivity of human receptors concluded at each HAGI location.

Table 9.22 Sensitivity of closest human receptors at HAGI locations

HAGI location	Sensitivity of closest human receptor within selection area
St Helens	High
Clock Face	High
Higher Walton	Medium
Partington	Medium
Warburton	High
HSF	High
Central Hub	High
Runcorn	High
Rocksavage	High
HPP	High

9.11.14 The magnitude of trackout activities expected at each HAGI is small, therefore construction routes within 50m of each HAGI site were considered in this dust assessment. The number of human receptors found within 50m of these roads were reported. Between 1 and 10 human receptors were found within 50m of affected roads at the St Helens, Clock Face and Warburton HAGIs. This concludes a medium sensitivity towards dust soiling from trackout activities. There were no human receptors found within 20m of affected roads, and less than 100 human receptors found within 100m of affected roads at all remaining HAGIs. This concludes a low sensitivity towards dust soiling from trackout activities.

9.11.15 **Table 9.23** concludes the sensitivity of each HAGI location towards dust soiling for earthworks, construction and trackout activities. **Table 9.23** also reports the human receptors found within the selection area at each HAGI location for earthwork and construction activities only. The number of human receptors found within the selection areas at each HAGI location for trackout activities is discussed above in **Paragraph 9.11.14**.

Table 9.23 Sensitivity of HAGI locations to dust soiling

HAGI		Sensitivity of surrounding area		
	Receptors*	Earthworks	Construction	Trackout
St Helens	1 to 10 within 20m	Medium	Medium	Medium
Clock Face	<100 within 100m	Low	Low	Medium
Higher Walton	<100 within 100m	Low	Low	Low
Partington	No high sensitivity receptors	Low	Low	Low
Warburton	1 to 10 within 20m	Medium	Medium	Medium
HSF	1 within 50m	Low	Low	Low
Central Hub	<100 within 100m	Low	Low	Low
Runcorn	<100 within 100m	Low	Low	Low
Rocksavage	N/A	N/A	N/A	Low
HPP	1 to 10 within 20m	Medium	Medium	Low

*Note – This column reports the number of human receptors found within the selection area at each HAGI location for construction and earthwork activities only, this does not report those found within the selection area for trackout activities.

Sensitivity of the area to human health impacts

9.11.16 According to IAQM guidance[23], the sensitivity of the area to human health impacts is considered low if PM_{10} concentration is less than 24µg m^{-3} and there are less than 100 highly sensitive receptors found within 20m of the source. The maximum background annual average PM_{10} concentration reported in the Study Area (**paragraph 9.7.4**) is 14.4µg m^{-3}. At all locations with highly sensitive human receptors (see **Table 9.22**) within their vicinity, there were less than 100 human receptors found within 20m of the HAGI sites. Therefore, the sensitivity is characterised as 'low' towards human health impacts for earthworks and construction activities at these HAGI locations.

9.11.17 It has been determined that the Partington HAGI location has medium sensitivity receptors in its vicinity (see **Table 9.22**). According to the IAQM guidance[23], the

sensitivity of the area to human health impacts is considered low if the PM_{10} concentration in the area is less than 24 µg m^{-3} and the human receptors are concluded to have a medium sensitivity towards human health impacts. Therefore, the sensitivity is characterised as 'low' towards human health impacts for earthwork and construction activities at the Partington HAGI.

9.11.18 The magnitude of trackout activities expected at each HAGI is small, therefore following the IAQM guidance, construction routes within 50m of each HAGI site were considered in this dust assessment. The number of human receptors found within 50m of these roads at each HAGI location were reported.

9.11.19 According to IAQM guidance, as with earthworks and construction activities, when considering impacts from trackout, the sensitivity of the area to human health impacts is considered low if the PM_{10} concentration is less than 24 µg m^{-3} and there are less than 100 highly sensitive receptors found within 20m of the source. There were less than 100 highly sensitive receptors found within 20m of the St Helens, Clock Face and Warburton HAGI sites. The Partington HAGI was found to have medium sensitivity receptors within 350m. There were no highly sensitive receptors found within 20m of all remaining HAGI sites, however there were highly sensitive receptors found within 350m of the sites. With a maximum background PM_{10} concentration taken as a worse case, the sensitivity of each HAGI location towards human health impacts is characterised as 'low' for trackout activities.

9.11.20 The sensitivity of each HAGI location has been concluded as 'low' towards human health impacts for all dust emitting activities considered in this assessment: earthworks, construction and trackout activities.

Sensitivity of the area to ecological impacts

9.11.21 Following the IAQM guidance[23], a highly sensitive ecological receptor includes locations with international or national designation and could be a location where the site contains designated features which may be affected by dust soiling.

9.11.22 There are no highly sensitive ecological receptors found within 50m of any of the HAGI sites. There are also no highly sensitive ecological receptors found within 50m of the construction routes which are found within 50m of each HAGI site.

9.11.23 Low sensitivity ecological receptors include locations with a local designation where features may be affected by dust deposition[23]. There are local wildlife sites found within the vicinity of the Higher Walton HAGI, the St Helens HAGI, the Partington HAGI and the Rocksavage HAGI. Ecological impacts from earthworks, construction and trackout have not been considered further for all remaining HAGIs, where no ecological receptors were found within their vicinity. The local wildlife sites identified are listed below:

- Moor Nature Reserve;
- Ravenhead Ponds;
- Partington Nature Reserve; and
- Frodsham, Helsby and Inches Marshes.

9.11.24 **Table 9.24** reports the sensitivity concluded for the Higher Walton HAGI, the St Helens HAGI, the Partington HAGI and the Rocksavage HAGI towards ecological impacts from earthworks, construction and trackout activities associated with the Project.

Table 9.24 Sensitivity of HAGIs towards ecological impacts

HAGI	Sensitivity of surrounding area		
	Earthworks	**Construction**	**Trackout**
St Helens	N/A	N/A	Low
Higher Walton	Low	Low	Low
Partington	N/A	N/A	Low
Runcorn	Low	Low	Low
Rocksavage	Low	Low	Low

Risk of dust impacts – Dust soiling

9.11.25 IAQM guidance[23] provides a matrix which combines the sensitivity of the area (see **Table 9.23**) and the dust emission magnitude (see **Table 9.21**). These results reflect a scenario where mitigation measures are yet to be applied. **Table 9.25** summarises the results for defining the risk of dust soiling impacts at each HAGI location for earthworks, construction and trackout.

Table 9.25 Final results defining the risk of dust soiling impacts at HAGI sites

HAGI	Risk of dust soiling impacts		
	Earthworks	**Construction**	**Trackout**
St Helens	Medium	Low	Negligible
Clock Face	Low	Negligible	Negligible
Higher Walton	Low	Negligible	Negligible
Partington	Low	Negligible	Negligible

HAGI	Risk of dust soiling impacts		
	Earthworks	Construction	Trackout
Warburton	Medium	Low	Negligible
HSF	Low	Negligible	Negligible
Central Hub	Low	Low	Negligible
Runcorn	Low	Negligible	Negligible
Rocksavage	N/A	N/A	Negligible
HPP	Medium	Low	Negligible

Risk of dust impacts – Human health

9.11.26 The risk of human health impacts at each HAGI site for earthworks, construction and trackout is summarised in **Table 9.26**

Table 9.26 Final results defining the risk of human health impacts at HAGI sites

HAGI	Risk of human health impacts		
	Earthworks	Construction	Trackout
St Helens	Low	Negligible	Negligible
Clock Face	Low	Negligible	Negligible
Higher Walton	Low	Negligible	Negligible
Partington	Low	Negligible	Negligible
Warburton	Low	Negligible	Negligible
HSF	Low	Negligible	Negligible
Central Hub	Low	Low	Negligible

HAGI	Risk of human health impacts		
	Earthworks	Construction	Trackout
Runcorn	Low	Negligible	Negligible
Rocksavage	N/A	N/A	Negligible
HPP	Low	Negligible	Negligible

Risk of dust impacts – Ecological impacts

9.11.27 The risk of human health impacts at each HAGI site for earthworks, construction and trackout is summarised in **Table 9.27.**

Table 9.27 Final results defining the risk of ecological impacts at HAGI sites

HAGI	Risk of ecological impacts		
	Earthworks	Construction	Trackout
St Helens	N/A	N/A	Negligible
Higher Walton	Low	Negligible	Negligible
Partington	N/A	N/A	Negligible
Runcorn	Low	Negligible	Negligible
Rocksavage	Low	Negligible	Negligible

Preliminary assessment of effects – dust emissions – Pipelines and Spurs

Potential dust emission magnitude – Pipelines and Spurs

9.11.28 This section of the assessment considers the magnitude of the four dust emitting activities (discussed in paragraph 9.10.3) expected to be associated with the construction of the pipelines along the four route corridors and the spurs.

9.11.29 Demolition activities are not anticipated for construction of the pipelines along the route corridors and spurs therefore this activity has not been considered further in the assessment.

9.11.30 The main elements of earthwork activities associated with the construction of each pipeline are topsoil stripping and trench excavation. Earthwork activities associated with each pipeline is proposed to comprise of an area which is larger than 10,000m^2. This is indicative of a 'large' dust emission magnitude for earthworks activities associated with the pipelines. Five of the spurs proposed are estimated to comprise of an area of 2,500m^2 – 10,000m^2 which is indicative of a 'medium' dust emission magnitude for earthworks activities. The remaining six spurs proposed are estimated to comprise of an area more than 10,000m^2, indicative of a 'large' dust emission magnitude for earthworks activities. It should be noted that the size of these areas will be considered in the ES, when the Order Limits have been refined following further environmental and engineering work.

9.11.31 A volume has been estimated for construction materials required for the pipelines and spurs. Each route corridor is estimated to require a volume larger than 100,000m^3, which is indicative of a 'large' dust emission magnitude for construction activities. The Clock Face Spurs are both estimated to require a volume more than 25,000m^3, indicative of a 'medium' dust emission magnitude for construction activities. All remaining spurs are estimated to require a volume less than 25,000m^3 which is indicative of a 'small' dust emission magnitude for construction activities.

9.11.32 It is estimated that there would be a requirement for 160 trucks per km of pipeline to be constructed. The dust emission magnitude for trackout for each route corridor and spur has therefore been deduced by considering the length of each route corridor and spur.

9.11.33 The concluded preliminary dust emission magnitude for each dust emitting activity, for each pipeline and spur is reported in **Table 9.28.** The pipelines considered in this assessment are grouped according to the route corridors as described within **Chapter 2: The Project.**

Table 9.28 Construction of pipeline and spur preliminary dust emission magnitude

Project area considered	Dust emission magnitude		
	Earthworks	Construction	Trackout
West Corridor	Large	Large	Large
South Corridor	Large	Large	Large
East Corridor	Large	Large	Large
North Corridor	Large	Large	Large
Clock Face Spur	Large	Medium	large
Northwich Spur	Large	Large	large
SAICA, Partington Spur	Medium	Small	Large
Partington Cadent AGI Spur	Small	Small	Medium
Basell Polyolefins, Partington Spur	Small	Small	Large
Runcorn/Rocksavage Spur	Medium	Small	large
Pilkington UK's Greengate Works, St Helens Spur	Small	Small	Medium
Glass Futures, St Helens Spur	Medium	Small	large
Solvay, Warburton Spur	Small	Small	Medium
Ingevity, Warrington Spur	Medium	Small	large

Project area considered	Dust emission magnitude		
	Earthworks	Construction	Trackout
Novelis, Warrington Spur	Medium	Small	large

Sensitivity of the area to dust soiling

9.11.34 Human receptors found within the vicinity of the route corridors were identified as having a high sensitivity in relation to dust soiling as the majority are residential properties. Human receptors found within the vicinity of the Partington Spurs and Warrington Spurs were identified as having a medium sensitivity in relation to dust soiling. This is since these human receptors are industrial sites[23].

9.11.35 The number of human receptors in the vicinity of each route corridor and each spur was estimated to determine the sensitivity of each location to dust soiling for construction and earthworks activities. These are reported in **Table 9.29**.

9.11.36 The magnitude of trackout activities expected for each route corridor is large, therefore construction routes within 500m of the route corridors were considered. The number of human receptors found within 20m of these roads were reported. More than 10 human receptors were found within 20m of the affected roads surrounding the route corridors, therefore this concludes a high sensitivity towards dust soiling from trackout.

9.11.37 The number of human receptors found within either 50m, 200m or 500m of the different spurs were identified, depending on the magnitude of trackout activities expected at each spur (see **Table 9.28**). More than 10 human receptors were identified at the Clock Face Spur, the Northwich spur, the Runcorn/Rocksavage Spur and the Novelis, Warrington spur. Less than 10 human receptors were identified at the Basell Polyolefins, Partington Spur, the St Helen Spurs (Pilkington UKs Greengate Works and Glass Futures, St Helens spurs), the Warburton Spur and the Solvay and Ingevity, Warrington Spurs. There were no human receptors found within 20m of affected roads associated with the Partington Spur, however human receptors (less than 10) were found within 50m of affected roads at this spur.

9.11.38 **Table 9.29** concludes the sensitivity of each pipeline and spur towards dust soiling for earthworks, construction and trackout activities. As before, the pipelines considered in this assessment are grouped according to the route corridors as described within **Chapter 2: The Project.**

Table 9.29 Sensitivity of the pipelines and spurs to dust soiling

Project area considered	Receptors*	Sensitivity of surrounding area		
		Earthworks	Construction	Trackout
West Corridor	1 to 10 within 20m	Medium	Medium	High
South Corridor	1 to 10 within 20m	Medium	Medium	High
East Corridor	1 to 10 within 20m	Medium	Medium	High
North Corridor	1 to 10 within 20m	Medium	Medium	High
Clock Face Spur	0 within 20m and <10 within 50m	Low	Low	High
Northwich Spur	1 to 10 within 20m	Medium	Medium	High
SAICA, Partington Spur	1 to 10 within 20m	Medium	Medium	N/A

Project area considered	Receptors*	Sensitivity of surrounding area		
		Earthworks	Construction	Trackout
Partington Cadent AGI Spur	1 to 10 within 20m	Medium	Medium	Low
Basell Polyolefins, Partington Spur	1 to 10 within 20m	Medium	Medium	Medium
Runcorn/Rocksavage Spur	1 to 10 within 20m	Medium	Medium	High
Pilkington UKs Greengate Works, St Helens Spur	0 within 20m and <10 within 50m	Low	Low	Medium
Glass Futures, St Helens Spur	0 within 20m and <10 within 50m	Low	Low	Medium
Solvay, Warburton Spur	0 within 20m and 50m, and <100 within 100m	Low	Low	Medium
Ingevity, Warrington Spur	1 to 10 within 20m	Medium	Medium	Medium

Project area considered	Receptors*	Sensitivity of surrounding area		
		Earthworks	Construction	Trackout
Novelis, Warrington Spur	1 to 10 within 20m	Medium	Medium	High

*Note – This column reports the number of human receptors found within the selection area at each route corridor and spur location for construction and earthwork activities only, this does not report those found within the selection area for trackout activities.

Sensitivity of the area to human health impacts

9.11.39 According to IAQM guidance[23], the sensitivity of the area to human health impacts is considered medium if the PM_{10} concentration is less than 24 µg m^{-3} and there are more than 100 highly sensitive receptors found within 20m of the source. The maximum annual average PM_{10} concentration reported for the Baseline Study Area (see **paragraph 9.7.4**) is 14.4µg m^{-3}. There were more than 100 highly sensitive human receptors found within 20m of both of the St Helens Spurs (Pilkington UKs Greengate Works and Glass Futures, St Helens spurs). Therefore, the sensitivity is characterised as 'medium' with regards to human health impacts for earthworks and construction activities at these locations.

9.11.40 The West, South East and North Corridors and the Clock Face Spur, the Northwich Spur, the Runcorn/Rocksavage Spur and the Warburton Spur were found to have less than 100 highly sensitive human receptors within 20m. The sensitivity is therefore characterised as 'low' towards human health impacts for earthworks and construction activities at these locations.

9.11.41 The Partington Spurs (Partington Spurs (including SAICA and Basell Polyolefins, Cadent/Carrington Power Station), and the Warrington Spurs (Solvay and Ingevity) were found to have medium sensitivity receptors in the vicinity. According to the IAQM guidance[23], the sensitivity of the area to human health impacts is considered low if the PM_{10} concentration is less than 24 µg m^{-3} when concerned with human receptors of medium sensitivity. Therefore, the sensitivity is characterised as 'low' towards human health impacts for earthworks and construction activities at these locations.

9.11.42 The number of human receptors found within either 50m, 200m or 500m of the different spurs were identified depending on the magnitude of trackout activities expected at each spur (see **Table 9.28**). There were more than 100 highly sensitive receptors found within 20m of the affected routes surrounding the West, South and East Corridor, the Clock Face Spur and the Novelis, Warrington Spur. Therefore, the sensitivity is characterised as 'Medium' towards human health impacts for trackout activities at these locations.

9.11.43 There were less than 100 human receptors found within 20m of the affected roads surrounding the North route corridor and all remaining spur locations. Therefore, the sensitivity is characterised as 'Low' towards human health impacts for trackout activities at these locations. There were no human receptors found in close proximity to the Partington spur, therefore the sensitivity of the Partington spur towards human health impacts from trackout activities has not been considered further and is reported as not applicable within **Table 9.30.**

9.11.44 The sensitivity of each pipeline and spur towards human health impacts is summarised in **Table 9.30** for earthwork, construction and trackout activities. As before, the pipelines considered in this assessment are grouped according to the route corridors as described within **Chapter 2: The Project.**

Table 9.30 Sensitivity of the route corridors and spurs to human health impacts

Project area considered	Sensitivity of surrounding area		
	Earthworks	Construction	Trackout
West Corridor	Low	Low	Medium
South Corridor	Low	Low	Medium
East Corridor	Low	Low	Medium
North Corridor	Low	Low	Low
Clock Face Spur	Low	Low	Medium
Northwich Spur	Low	Low	Low
SAICA, Partington Spur	Low	Low	N/A
Partington Spur	Low	Low	Low
Basell Polyolefins, Partington Spur	Low	Low	Low
Runcorn/Rocksavage Spur	Low	Low	Low
Pilkington UKs Greengate Works, St Helens Spur	Medium	Medium	Low
Glass Futures, St Helens Spur	Medium	Medium	Low
Solvay, Warburton Spur	Low	Low	Low
Ingevity, Warrington Spur	Low	Low	Low
Novelis, Warrington Spur	Low	Low	Medium

Sensitivity of the area to ecological impacts

9.11.45 There were no sensitive ecological receptors found within 50m of the route corridors or the spurs. Therefore, ecological impacts from construction and earthworks activities have not been considered further. Whilst the Frodsham Railway and Road Cuttings SSSI is within 50m of construction routes which are within 500m of the Runcorn/Rocksavage Spur, the site is not considered sensitive towards dust emissions[39]. Therefore, ecological impacts from trackout activities have not been considered further.

Risk of dust impacts – Dust soiling

9.11.46 **Table 9.32** summarises the results for defining the risk of dust soiling impacts for each pipeline by consideration the location of the route corridors and for each spur

location for earthwork, construction and trackout activities. These results reflect a scenario where mitigation measures are yet to be applied.

Table 9.31 Final results defining the risk of dust soiling impacts at the route corridor and spurs

Project area considered	Risk of dust soiling impacts		
	Earthworks	Construction	Trackout
West Corridor	Medium	Medium	High
South Corridor	Medium	Medium	High
East Corridor	Medium	Medium	High
North Corridor	Medium	Medium	High
Clock Face Spur	Low	Low	High
Northwich Spur	Medium	Medium	High
SAICA, Partington Spur	Medium	Low	Negligible
Partington Spur	Low	Low	Low
Basell Polyolefins, Partington Spur	Low	Low	Medium
Runcorn/Rocksavage Spur	Medium	Low	High
Pilkington UKs Greengate Works, St Helens Spur	Negligible	Negligible	Low
Glass Futures, St Helens Spur	Low	Negligible	Medium
Solvay, Warburton Spur	Negligible	Negligible	Low
Ingevity, Warrington Spur	Medium	Low	Medium
Novelis, Warrington Spur	Medium	Medium	High

Risk of dust impacts – Human health

9.11.47 The risk of human health impacts at each route corridor and spur is reported in **Table 9.32.** The risk of human health impacts has mostly been concluded as either low or negligible. A medium risk of human health impacts is concluded for construction activities at the Clock Face Spur and for trackout activities at the West Corridor, South Corridor, East Corridor, Clock Face Spur and Novelis, Warrington spur. These results reflect a scenario where mitigation measures are yet to be applied.

Table 9.32 Final results defining the risk of human health impacts at the route corridor and spurs

Project area considered	Risk of human health impacts		
	Earthworks	Construction	Trackout
West Corridor	Low	Low	Medium
South Corridor	Low	Low	Medium
East Corridor	Low	Low	Medium
North Corridor	Low	Low	Low
Clock Face Spur	Low	Low	Medium
Northwich Spur	Low	Low	Low
SAICA, Partington Spur	Low	Negligible	Negligible
Partington Cadent AGI Spur	Negligible	Negligible	Low
Basell Polyolefins, Partington Spur	Negligible	Negligible	Low
Runcorn/Rocksavage Spur	Low	Negligible	Low
Pilkington UKs Greengate Works, St Helens Spur	Low	Low	Low
Glass Futures, St Helens Spur	Medium	Low	Low
Solvay, Warburton Spur	Negligible	Negligible	Low
Ingevity, Warrington Spur	Low	Negligible	Low
Novelis, Warrington Spur	Low	Negligible	Medium

9.11.48 In accordance with IAQM methodology[23], the assessment detailed above has been used to define appropriate embedded mitigation measures to be implemented to ensure that there will be no significant effect. These are documented in **Section 9.8**.

Preliminary assessment of effects – construction road traffic emissions

9.11.49 This section presents a summary of the modelling assessment in relation to the concentrations of NO_2, PM_{10} and $PM_{2.5}$. Detailed results are provided in **Appendix 9B**.

9.11.50 **Table 9B.7** presents the annual mean NO_2 concentrations for the 2019 baseline and the 2025 'without development' and 'with development' (peak construction

year) scenarios. The maximum concentration predicted in 2025 is 36.2µgm^{-3} at Harris Avenue, which is below the NO_2 annual mean AQO of 40µgm^{-3}. Harris Avenue is located within the outer west side of the Greater Manchester AQMA (see **Table 9.15** and **Figure 9.4** which presents the human health receptors and road links considered for the construction traffic assessment). Concentrations are predicted to be comfortably below the NO_2 annual mean AQO at all modelled receptors. The maximum impact during the peak construction period is predicted to occur at receptors on the A49 Warrington Road, where the concentration is predicted to increase by 0.9µgm^{-3} as a result of construction traffic. However, as the predicted concentration at this location is well below the AQO, the impact is considered to be negligible. Changes in concentration at all other receptors are expected to be lower than those reported for the receptors modelled.

9.11.51 **Table 9B.8** presents the annual mean PM_{10} concentrations for the 2019 baseline and the 2025 'without development' and 'with development' (peak construction year) scenarios. The maximum concentration predicted in 2025 is 16.6µgm^{-3} at Harris Avenue, which is below the PM_{10} annual mean AQO of 40µgm^{-3}. Concentrations are predicted to be comfortably below the PM_{10} annual mean AQO at all modelled receptors. The maximum impact during the peak construction period is predicted to occur at receptors on the A49 Warrington Road, where the concentration is predicted to increase by 0.1µgm^{-3} as a result of construction traffic. However, as the predicted concentration at this location is well below the AQO, the impact is considered to be negligible. Changes in concentration at all other receptors in the area of the Project are expected to be lower than those reported for the receptors modelled.

9.11.52 **Table 9B.9** presents the annual mean $PM_{2.5}$ concentrations for the 2019 baseline and the 2025 'without development' and 'with development' (peak construction year) scenarios. The maximum concentration predicted in 2025 is 10.7µgm^{-3} at Harris Avenue, which is below the $PM_{2.5}$ annual mean AQO of 20µgm^{-3}. Concentrations are predicted to be comfortably below the $PM_{2.5}$ annual mean AQO at all modelled receptors. The maximum impact during the peak construction period is predicted to occur at receptors on the A49 Warrington Road, where the concentration is predicted to increase by 0.1µgm^{-3} as a result of construction traffic. However, as the predicted concentration at this location is well below the AQO, the impact is considered to be negligible. Changes in concentration at all other receptors in the area of the Project are expected to be lower than those reported for the receptors modelled.

9.11.53 As reported in **Paragraph 9.10.8**, this construction traffic assessment considers worse-case road links (See **Figure 9.4**) since these were considered to be areas where the highest impact from construction traffic on air quality is to be expected.

9.12 Preliminary Significance Conclusions

9.12.1 A summary of the results of the preliminary Air Quality assessment is provided in **Table 9.33**.

Table 9.33 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
Human receptors Fugitive dust emissions and increases in PM_{10} and $PM_{2.5}$	High	Negligible	Not significant	The CoCP will incorporate recommended measures to ensure efficient measures are in place to mitigate any effects.
Ecological receptors Fugitive dust emissions and increases in PM_{10} and $PM_{2.5}$	High	Negligible	Not significant	The CoCP will incorporate recommended measures to ensure efficient measures are in place to mitigate any effects.
Human health receptors Increases to pollutant concentrations as a result of construction traffic	High	Negligible	Not significant	Emissions and background pollutant concentrations are expected to reduce by the peak construction year of 2025 such that the AQOs are not expected to be exceeded on the roads used by construction traffic. The impact magnitude is expected to be negligible.
Ecological receptors Increases to pollutant concentrations as a result of construction traffic	High	Negligible	Not significant	Emissions and background pollutant concentrations are expected to reduce by the peak construction year of 2025 such that impacts on designated ecological sites through NO_X concentrations and nitrogen and acid deposition are expected to be negligible.

1. The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 9.10** and is defined as 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 9.10** and is defined as negligible, low, medium and high. Amend range as appropriate for this chapter.

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 9.10**.

9.13 Further Work to be Undertaken

9.13.1 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 Air Quality assessment presented in the ES.

Baseline

9.13.2 Updated air quality monitoring data for 2021 collected by the local authorities in which the Project is located will be collated in the ES. Depending on the timing of provision of final construction traffic data this may be used to update the dispersion model verification.

Assessment

9.13.3 Refined plans for the Project will be used to update the construction dust assessment.

9.13.4 Any new traffic predictions for the peak year of construction will be used in the assessment of construction traffic effects.

9.13.5 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), and reported in the ES. 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**.

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