KEEPING BRITAIN TRADING

IMMINGHAM EASTERN RO-RO TERMINAL

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Chapter 13: Air Quality
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Immingham Eastern Ro-Ro Terminal

Environmental Statement: Volume 1
Chapter 13: Air Quality

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13.1 Introduction

13.1.1 This chapter provides an assessment of the potential significant effects of the proposed Immingham Eastern Ro-Ro Terminal (IERRT) on air quality. The principal elements of the IERRT project are shown on Figures 1.2 and 1.3 of this Environmental Statement (ES) (Application Document Reference number 8.3). This chapter has been prepared by AECOM Ltd.

13.1.2 The following receptors have been considered as part of the assessment:

- Dust sensitive receptors within 350 m of demolition and construction activities and within 50 m of public roads used by construction traffic that are within 500 m of a construction site entrance; and
- Air quality sensitive receptors, including designated habitats and residential properties with the potential to be significantly affected by the IERRT project emission sources, including vehicle movements and docked vessels.

13.1.3 A number of figures support the description of the existing environment (baseline) relevant to air quality. Figure 13.1 of this ES shows the location of dust and air quality sensitive receptors considered in this assessment, and air quality monitoring locations. Figure 13.2 of this ES shows potential impacts during construction and Figure 13.3 of this ES the potential impacts during operation (found in in Volume 2 of ES (Application Document Reference number 8.3).

13.1.4 The air quality assessment is informed by other environmental impact assessments undertaken in respect of the IERRT project (and as presented in other chapters of this ES): traffic data used in the air quality assessment has been generated for the assessment reported in Chapter 17 Traffic and Transport; and assessment of the significance of any air quality effects on ecological receptors (nature conservation sites and protected features) has been undertaken in this air quality chapter with inputs provided by a competent expert in ecology.

13.1.5 The potential effects on air quality are considered with respect to existing national and local planning policy and with reference to industry standard guidance.

13.2 Definition of the study area

13.2.1 The study area, as illustrated in Figure 13.1 of this ES, for this air quality environmental impact assessment is the area over which potential direct and indirect effects of the IERRT project are predicted to occur during the construction and operational periods.

13.2.2 The IERRT project is located within an existing and well-established operational port and onsite emissions associated with the construction and operation of the project will form a small proportion of the overall emissions associated with the Port of Immingham.

13.2.3 The study area for potential construction impacts from dust and particulate matter (particles with an aerodynamic diameter of less than 10 micrometres (PM_{10})) has been determined with reference to Institute of Air Quality Management (IAQM) guidance (Holman *et al.,* 2014). These effects are only likely to occur at locations:

- Where there are human health or amenity sensitive receptors within 350 m of the IERRT project site boundary (taken to represent the construction site boundary in this assessment); and/or
- Where there are human health or amenity sensitive receptors within 50 m of a public road used by construction vehicles that is within 500 m of a site access point; and
- Where there are sensitive ecological receptors within 50 m of the IERRT project site boundary; and/or
- Where there are sensitive ecological receptors within 50 m of a public road used by construction vehicles that is within 500 m of a site access point.

13.2.4 Potential road traffic emissions impacts during construction and operation are only likely to occur where there are sensitive human and/or ecologically sensitive receptors within 200 m of an 'affected' road link (Highways England, 2019). An 'affected' road link is defined by the following criteria:

- Any urban or rural road link not situated within or adjacent to an Air Quality Management Area (AQMA) that will experience a change in two-way traffic flow of 500 or more annual average daily Light Duty Vehicles (LDV) (vehicles <3.5 tonnes) and/or 100 or more annual average daily Heavy Duty Vehicles (HDV) (all vehicles >3.5 tonnes), as defined within Environmental Protection UK (EPUK) and IAQM guidance (Moorcroft and Barrowcliffe *et al.,* 2017);
- Any urban or rural road link that is situated within or adjacent to an AQMA that will experience a change of in two-way traffic flow of 100 or more annual average daily LDVs and/or 25 or more annual average daily HDVs, as defined within EPUK and IAQM guidance (Moorcroft and Barrowcliffe *et al.,* 2017); and
- Any road link that forms part of the Strategic Road Network (SRN) that will experience a change in two-way traffic flow of 1000 or more Annual Average Daily Traffic (AADT) and/or 200 or more annual average daily HDVs, as defined within National Highways guidance LA105 (Highways England, 2019).

13.2.5 Vessel emissions impacts during construction and operation will occur close to the source. This element of the assessment will focus on human and/or ecologically sensitive receptors that are present in the vicinity of the vessel emissions sources.

13.3 Assessment methodology

Data and information sources

13.3.1 Current baseline conditions have been determined by a desk-based review of available information. A project-specific air quality survey has also been undertaken to characterise baseline nitrogen dioxide (NO_2) concentrations.

13.3.2 The main desk-based sources of information that have been reviewed to inform the current baseline description within the vicinity of the IERRT project include:

- Existing air quality monitoring data gathered by Local Authorities (North East Lincolnshire Council, North Lincolnshire Council, Doncaster Council, Rotherham Council, Bolsover Council and Kirklees Council);
- Existing air quality monitoring data gathered by the Department of Food and Rural Affairs (Defra)'s Automatic Urban and Rural Network (AURN) of continuous air quality monitoring stations; and
- Defra Background Pollutant Concentration Data.

13.3.3 A site specific survey was undertaken to underpin the assessment. This concerned an NO_2 diffusion tube survey to measure baseline concentrations at locations within the study area where existing data was limited. The collated data was used to inform consideration of existing baseline conditions and to provide data by which the dispersion model outputs can be verified.

Determining significance of effects

13.3.4 To facilitate the impact assessment process and ensure consistency in the terminology of significance, a standard assessment methodology has been applied. This methodology has been developed from a range of sources, including:

- IAQM 'Guidance on the Assessment of Dust from Demolition and Construction' (Holman *et al.,* 2014);
- IAQM/ EPUK 'Guidance on Land-use Planning and Development Control: Planning for Air Quality' (Moorcroft and Barrowcliffe. *et al.,* 2017);
- IAQM's 'Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites' (Holman *et al.,* 2020);
- National Highways guidance on assessing the effects of highways projects in the Design Manual for Roads and Bridges (DMRB) (Highways England, 2019); and
- Environment Agency guidance 'Air Emissions Risk Assessment for your Environmental Permit' (Environment Agency, 2016).

Construction phase dust emissions

13.3.5 The impacts associated with the construction phase of the IERRT project have been qualitatively assessed following the approach set out in the IAQM guidance on the Assessment of Dust from Demolition and Construction (Holman *et al.,* 2014).

13.3.6 According to the IAQM, the main air quality impacts that may arise during demolition and construction activities are:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes, which are evidence of dust emissions;
- Elevated PM_{10} concentrations resultant of dust generating activities on site; and
- An increase in concentration of airborne particles and NO_2 due to exhaust emissions from diesel powered vehicles and equipment on site and vehicles accessing the site.

13.3.7 Activities on construction sites are classified into four types to reflect their different potential impacts:

- Demolition;
- Earthworks;
- Construction (erection of buildings and structures); and
- Track-out (the deposition of material onto the public road network by construction vehicles leaving site).

13.3.8 The following steps, as defined by the IAQM, were followed as part of the construction dust assessment:

- Step 1: Screen the need for a detailed assessment. Human and ecological receptors were identified and distance to the IERRT project and construction routes were determined;
- Step 2: Assess the risk of dust impacts arising. The potential risk of dust impacts occurring for each activity was determined, based on the magnitude of the potential dust emissions and the sensitivity of the area;
- Step 3: Identify the need for site-specific mitigation. Based on the risk of impacts occurring, site specific mitigation measures were determined; and
- Step 4: Define impacts and their significance. The significance of the potential residual dust impacts (taking mitigation into account) for each activity was determined.

13.3.9 The full construction dust assessment methodology is set out in Appendix 13.1 in Volume 3 of this ES (Application Document Reference number 8.4).

13.3.10 For amenity effects from coarser dust (>PM_{10}), the aim of the IAQM guidance method is to bring forward a scheme, including mitigation measures where necessary, that would control impacts so that they give rise to negligible or minor effects (at worst) at the closest sensitive receptors. Measures that reduce dust emissions will also reduce emissions of finer particles (PM_{10}). Determination of whether an effect is likely to be significant or not is based on professional judgement (based on experience of similar projects), taking account of whether effects are permanent or temporary, direct or indirect, constant or intermittent and whether any secondary effects are caused (in this instance, ‘secondary effects’ refers to dust that is generated and deposited (primary impact) and then re-suspended and deposited again by further activity).

13.3.11 The classification of dust soiling (amenity) and health effects on receptors exposed to impacts has been assessed using the relationship between the magnitude of impact identified, in combination with receptor sensitivity and other related factors where appropriate (as described in the IAQM guidance (Holman *et al.,* 2014), which results in a classification of effects as defined in Table 13.1.

Table 13.1. Definition of significance of fugitive dust and PM_{10} effects

Effect	Change in Dust Deposition Rate and Short-term PM_{10} Concentrations	Significance
Major	Impact is likely to be intolerable for any more than a very brief period of time and is very likely to cause complaints from local people. Increase in PM_{10} concentrations at a location where concentrations are already elevated and to the extent that the short term PM_{10} air quality objective is likely to be exceeded. Deposition impact likely to harm habitat within a designated nature conservation area of international importance.	A significant effect that is likely to be a material consideration in its own right.
Moderate	Impact is likely to cause annoyance and might cause complaints, but may be tolerated if short-term and prior warning and explanation has been given. Increase in PM_{10} concentrations at a location where concentrations are already elevated and to the extent that the short term PM_{10} air quality objective is at risk of being exceeded. Deposition impact likely to harm habitat within a designated nature conservation area of national importance.	A significant effect that may be a material consideration in combination with other significant effects, but is unlikely to be a material consideration in its own right.
Minor	Impact may be perceptible, but of a magnitude or frequency that is unlikely to cause annoyance to a reasonable person or to cause complaints. Limited increase in PM_{10} concentrations. Deposition impact likely to harm habitat within a designated nature conservation area of local importance.	An effect that is not significant but that may be of local concern.
Negligible	Impact is unlikely to be noticed by and/or have an effect on sensitive receptors. Negligible increase in PM_{10} concentrations and deposition.	An effect that is not significant.

Construction phase emissions from Non-Road Mobile Machinery (NRMM) and site plant

13.3.12 Emissions from construction-related Non-Road Mobile Machinery (NRMM) and site plant will have the potential to increase NO_2, PM_{10} and $PM_{2.5}$ concentrations at locations close to working areas of the site.

13.3.13 IAQM guidance (Holman *et al.,* 2014) states that:

> *"Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed."*

13.3.14 The assessment of potential emissions from NRMM and site plant is, therefore, qualitative in nature and focuses on the justification as to why impacts from this source can be mitigated to ensure any effect is not significant.

Construction and operational phase road traffic and vessel emissions

13.3.15 The incomplete combustion of fuel in vehicle engines results in the presence of a variety of pollutants including hydrocarbons (HC), such as benzene, 1,3-butadiene, sulphur dioxide (SO_2) and carbon monoxide (CO) in the exhaust emissions. However, it is the emission of NO_X (mainly in the form of nitric oxide (NO), which is then converted to NO_2 in the atmosphere) and particulate matter (PM_{10} and $PM_{2.5}$) in exhaust emissions that are the main pollutants of concern in relation to road traffic emissions, due to their association with the potential for adverse effects on human health.

13.3.16 Although SO_2, CO, benzene and 1,3-butadiene are present in motor vehicle exhaust emissions, detailed consideration of the associated impacts from motor vehicle emissions on local air quality is not considered relevant in the context of the site and motor vehicle emission sources. Road traffic emissions of SO_2, CO and HC associated with the construction or operational phase are limited and it is considered would not be capable of compromising the achievement of the relevant air quality objectives for the protection of human health. Concentrations of these pollutants within the surrounding area to the IERRT project are not considered to be at risk of exceedance, having been reviewed as part of each Local Authority's local air quality management responsibilities. Emissions of SO_2, CO and HC from road traffic emissions are, therefore, not considered further within this ES.

13.3.17 Exhaust emissions from road vehicles could affect the concentrations of the principal pollutants of concern, i.e. NO_2, PM_{10} and $PM_{2.5}$, at sensitive receptors in the vicinity of the IERRT project. Therefore, it is these pollutants

that are the focus of the assessment of the impact and significance of road traffic related air quality impacts.

13.3.18 Exhaust emissions from vessels during both construction and operational phases have the potential to impact on local air quality, with the pollutants of concern varying depending on the fuel type of the vessel engine, such as Marine Gas Oil (MGO), but likely to include one or more of the following: NO_X (NO and NO_2); PM_{10}; and $PM_{2.5}$. Vessels using the IERRT project in the operational period will need to comply with relevant MARPOL SO_2 emission standards. As such, liquid fuel vessel engines will either use MGO with a low sulphur content (0.10 and 1.50 m/m) or otherwise operate with an SO_2 scrubber . Sulphur emissions are therefore likely to be negligible and are not considered further in this assessment.

13.3.19 The detailed assessment methodology followed to quantify the impact and total concentrations of the pollutants of concern is set out in Appendix 13.1 of this ES.

13.3.20 Significance of local air quality effects on human health is determined in line with IAQM and EPUK guidance (Moorcroft and Barrowcliffe *et al.*, 2017). This approach does not define a graduating scale of human health receptor sensitivity. Instead, human health receptors are considered either sensitive or not, depending on the period of time for which they are exposed to emissions. The absolute magnitude of change in pollutant concentrations between the baseline and assessment scenarios, relative to the air quality objective value, is described and this is used to consider the risk of those objectives being exceeded.

13.3.21 For a change in annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$, of a given magnitude, IAQM and EPUK have published recommendations for describing the effects of such impacts at individual receptors (Moorcroft and Barrowcliffe *et al*., 2017). These are set out in Table 13.2.

Table 13.2. Annual mean impact descriptors at individual receptors

Annual Mean Concentrations at Receptor in Assessment Year (% of air quality objective)	% Change in Concentration Relative to Air Quality Assessment Level (AQAL)				
	<1%[1]	1 - <2%[2]	2 – <6%[3]	6 – 10%[4]	>10%[5]
≤75%	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%	Negligible	Moderate	Substantial	Substantial	Substantial
Notes: [1] Imperceptible; [2] Very small; [3] Small; [4] Medium; [5] Large					

13.3.22 The IAQM/ EPUK guidance states that the descriptors are for individual receptors only and that overall significance is determined using professional judgement. It also states that it is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the objective value. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the objective value, rather than being exactly equal to it.

13.3.23 A change in predicted long-term (annual mean) concentrations of less than 0.5% of an air quality objective is considered to be 'Imperceptible'. An impact that is 'Negligible', given normal bounds of variation, would not be capable of having a direct effect on local air quality that could be considered to be significant.

13.3.24 The guidance suggests the potential for 'Low' air quality impacts as a result of changes in pollutant concentrations between 2% and 5% of relevant air quality objective. For example, for annual mean NO_2 and PM_{10} concentrations, this relates to changes in concentrations ranging from 0.6-2.1 µg/m³. In practice, changes in concentration at the lower end of this magnitude band are likely to be very difficult to distinguish from the inter-annual effects of varying meteorological conditions and are therefore not considered likely to be capable of having a direct effect on local air quality that could be considered to be significant.

13.3.25 Changes in concentration of more than 5% are considered to be of a magnitude which is far more likely to be discernible above the normal variation in baseline conditions and, as such, carry additional weight within the overall evaluation of significance for air quality. 'Moderate' impacts do not necessarily constitute a significant effect, where they do not contribute to an exceedance or risk of an exceedance of an air quality objective, particularly where such impacts relate to a small minority of receptors with the majority experiencing lesser impacts. A 'substantial' impact will almost certainly constitute a significant effect that will require additional mitigation to address.

13.3.26 For impacts relating to pollutants with an averaging period of less than one year, Defra's LAQM technical guidance suggests the following approach. The magnitude of the change in the predicted number of exceedances of the short-term 24-hour PM_{10} objective can be directly derived from the predicted annual average PM_{10} value using the relationship defined in LAQM.TG (22) (Defra, 2022a). An exceedance of the short-term PM_{10} air quality objective is unlikely where annual mean PM_{10} concentrations are less than 32 µg/m³. Research projects completed on behalf of Defra and the Devolved Administrations (Laxen and Marner, 2003 and AEA Technology, 2008) have concluded that the short-term 1-hour NO_2 objective is unlikely to be exceeded where annual mean concentrations are predicted to be less than 60 µg/m³.

13.3.27 In addition to this and with specific reference to point sources (vertical stacks, such as the point of release of vessel engine emissions), the IAQM/ EPUK guidance also provides thresholds for determining whether short-term (1-hour mean and 24-hour mean) impacts on human health sensitive receptors have the potential to cause a significant effect or not. The guidance indicates that severity of peak short-term concentrations can be described without the need to reference background concentrations as the source contribution is used to measure impact, not the overall short-term concentration at the receptor. The guidance suggests the following criteria to determine the impact of peak short-term source contributions:

- Source contributions ≤10% of the air quality objective represents an imperceptible impact that is 'negligible';
- Source contributions between 11-20% of the air quality objective or is small in magnitude, representing a 'slight' impact;
- Source contributions 21-50% of the air quality objective is medium in magnitude, representing a 'moderate' impact; and
- Source contributions ≥51% of the air quality objective is large in magnitude, representing a 'substantial' impact.

13.3.28 For impacts at nature conservation receptors, whether the effect is significant or not has been determined by a competent expert in ecology. To inform this judgement, the Environment Agency provide guidance (2016) that states that impacts may be considered insignificant ('not significant') where:

- The short-term impact is less than 10% of environmental assessment level for the nature conservation site; and
- The long-term impact is less than 1% of the long-term air quality objective or environmental assessment level for the nature conservation site.

13.3.29 Where the long-term impact at a nature conservation receptor exceeds these criteria, it may also be considered insignificant ('not significant') where:

- The long-term total concentration after the impact is <70% of the air quality objective or environmental assessment level for the nature conservation site.

13.3.30 Where an impact on nature conservation sensitive receptors cannot be screened as insignificant at this stage, this does not mean that the effect should be considered significant. Where this occurs, model inputs and assumptions are reviewed and model accuracy enhanced where possible. The predicted impacts are then reviewed and considered again in the context of the nature conservation sensitive receptors.

13.4 Consultation

13.4.1 Consultation as to whether there are likely to be any air quality effects as a result of the construction and operation of the IERRT project has been undertaken with relevant stakeholders. The outcomes of the formal scoping process, as well as any feedback received in response to statutory consultation and the publication of the Preliminary Environmental Information Report (PEIR) and supplementary statutory consultation and the publication of the Supplementary Consultation Report, have also been taken into account to inform the air quality assessment within this ES.

13.4.2 The outcome of the consultation that has been undertaken, along with how it has influenced the air quality assessment, is presented in Table 13.3.

Table 13.3. Summary of consultation

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed in this Chapter
PINS	Scoping Opinion, 25 October 2021 Table ID 4.8.2	The Scoping Report states that the study area will cover all roads in the affected road network (ARN) within 200 m of the Humber Estuary Special Area of Conservation (SAC)/ SPA/ Ramsar and SSSI. The Inspectorate considers that the ES should assess effects on Local Wildlife Sites (LWS) and habitats of principal importance within 200 m of the ARN as well.	The air quality assessment reported in this ES does consider the potential for significant effects at the nature conservation sites, including effects on Local Wildlife Sites and habitats of principal importance within 200 m of the ARN. The assessment of impacts on these designations is set out in Section 13.8.
	Scoping Opinion, 25 October 2021 Table ID 4.3.3	Unless it has already been determined which plant would be used during construction, the ES should describe any assumptions made about the plant to be used and explain why these represent the worst-case scenario which could arise under the DCO.	Consideration of construction plant and relevant assumptions are provided in Section 13.8 and Table 13.13.
	Scoping Opinion, 25 October 2021 Table ID 4.3.4	The Scoping Report does not describe whether there are any AQMAs within the proposed ARN that may be affected by the Proposed Development. The ES should confirm whether there are any relevant AQMAs likely to experience impacts from the	The nearest AQMAs to the IERRT project are described in Section 13.6 and shown on Figure 13.1 of this ES.

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed in this Chapter
		Proposed Development and, if so, identify their location on a figure.	
	Scoping Opinion, 25 October 2021 Table ID 4.3.5	The Scoping Report does not explain if $PM_{2.5}$ will be considered in the air quality assessments.	The air quality assessment reported in this ES (Section 13.8) does include consideration of $PM_{2.5}$.
		The Applicant is advised to seek agreement with North East Lincolnshire Council on the range of pollutants to be included in the assessments.	North East Lincolnshire Council has provided a formal Scoping Response that confirmed that the assessment approach described in the Scoping Report, including pollutants to be considered, contained everything they had expected.
	Scoping Opinion, October 2021 Table ID 4.3.6	The ES should include a figure / figures to identify the final study area for air quality and the human and ecological receptors that have been considered in the assessment.	The study area and receptors considered in this ES are shown on Figure 13.1 of this ES.
Natural England	Scoping Opinion, October 2021 Appendix 2 Natural England response	The assessment should take account of the risks of air pollution and how these can be managed or reduced.	Section 13.8 of this ES chapter identifies potential risks of air pollution and Section 13.9 describes mitigation with the aim of managing and reducing this risk.
UK Health Security Agency	UK Health Security Agency response, 25 October 2021	We support approaches which minimise or mitigate public exposure to non-threshold air pollutants, address inequalities (in exposure), maximise co-benefits (such as physical exercise). We	Mitigation measures to manage and reduce emissions generated by the IERRT project are set out in Section 13.9 of this ES chapter.

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed in this Chapter
		encourage their consideration during development design, environmental and health impact assessment, and development consent.	
North East Lincolnshire Council	North East Lincolnshire Council response, 30 November 2021	Having reviewed the air quality section of the scoping request, everything we'd expect to be covered within the proposed Air Quality Assessment is included.	Noted.
North Lincolnshire Council	North Lincolnshire Council response, 30 November 2021	The response lists the impacts described within the Scoping Report to be considered in the air quality assessment, but does not provide any comment on them.	Noted.
DFDS (PI32)	Statutory Consultation 19/01/22 -23/02/22	Impact on air quality from the heavy goods vehicles (HGVs) travelling on local roads, particularly Queens Road, has not adequately been assessed.	Impact of vehicle emissions on receptors adjacent to local roads has been undertaken in line with industry standard guidance and is reported in Section 13.8 of this ES chapter.
UK Health Security Agency (PI37)	Statutory Consultation 19/01/22 -23/02/22	Encourage the minimising of air quality impacts as part of the design phase. Clarify that the cumulative impact of vessel numbers has been considered when comparisons are made with relevant thresholds.	Mitigation measures are set out in Section 13.9 of this ES chapter. The assessment of marine vessel emissions, including any reference to the screening of potential impacts is set out in Section 13.8 of this ES chapter.

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed in this Chapter
		Identify the receptors at risk of air pollution impacts and provide a quantitative assessment of the impacts in terms of both numbers of properties affected and changes in air pollution levels at those locations resulting from the development.	The assessment of operational road traffic emissions impacts at receptors located on local roads close to the IERRT project and receptors located adjacent to the SRN has been undertaken in line with current industry-standard guidance and is reported in Section 13.8 of this ES chapter.
North Lincolnshire Council (PI38)	Statutory Consultation 19/01/22 -23/02/22	Welcome the submission of the relevant air quality information with the forthcoming application.	Noted.
Natural England (PI40)	Statutory Consultation 19/01/22 -23/02/22	Construction Phase: The potential for air quality impacts to the Humber Estuary SPA, SAC and Ramsar from construction dust and site plant emissions should be assessed in the HRA.	The construction dust assessment and the consideration of impacts on the Humber Estuary SPA, SAC and Ramsar is set out in Section 13.8 of this ES chapter and in the Habitat Regulations Assessment (HRA) Report (Application Document Reference number 9.6).
		Operational Phase: Natural England recommends that the ES and HRA consider whether there is likelihood of the operational traffic acting in combination with other plans or projects.	The operational road traffic emissions assessment and the consideration of impacts on sensitive nature conservation sites is set out in Section 13.8 of this ES chapter. The traffic data (see Chapter 17 of this ES) used to inform the air quality assessment includes cumulative flows associated with major

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed in this Chapter
			reasonably foreseeable development in the area (known as committed development).
		Operational Phase: It is not clear whether vessels will pass within 200 m of sensitive habitats when moving through the estuary. This should be clarified in the ES and HRA.	The operational vessels emissions assessment and the consideration of impacts on sensitive nature conservation sites is set out in Section 13.8 of this ES chapter. Vessels will be required to route to and from the IERRT project using the Humber Estuary Main Navigational Fairway. At no point on this route will vessels associated with the operation of the IERRT pass within 200 m of an air quality sensitive habitat.
		We note that construction phase vessel emissions have not been considered in the PEIR and will be considered as part of the detailed assessment in the ES. It should be acknowledged then that there may also be a requirement for mitigation during construction.	The construction phase vessel emissions and the consideration of impacts on sensitive nature conservation sites is set out in Section 13.8 of this ES chapter. Mitigation is set out in Section 13.9.
		We therefore advise that ammonia from traffic and marine vessels should be included for assessment in the HRA.	The operational phase assessment and the consideration of impacts on sensitive nature conservation sites is set out in Section 13.8 of this ES chapter.

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed in this Chapter
			Ammonia emissions have been included in the assessment for appropriate sources on habitats reported in the HRA (Application Document Reference number 9.6).
		Natural England's guidance accepts the use of the significance threshold of 1000 Annual Average Daily Traffic (or the levels of emissions being <1 per cent of the critical level/ load), however, this does not exclude the requirement for an assessment of the potential impacts in combination with other plans or projects. Therefore, Natural England recommends that the ES and HRA consider whether there is likelihood of the operational traffic acting in combination with other plans or projects.	Baseline air quality conditions at nature conservation sites are reported in Section 13.6 of this ES chapter, future baseline conditions are reported in Section 13.7 and operational conditions and impacts are reported in Section 13.8.
North East Lincolnshire Council (PI45)	Statutory Consultation 19/01/22 -23/02/22	Air quality information to be reviewed following submission of forthcoming application.	Noted.
Q59	Statutory Consultation 19/01/22 -23/02/22	Supports the IERRT project because it will remove coal from the area, which creates dust.	Noted.
Q82	Statutory Consultation 19/01/22 -23/02/22	Concern was raised regarding the high emissions from the roro tractor tugs. .	The impact of emissions from land-tugs is reported in Section 13.8 of this ES chapter.

Consultee	Reference, Date	Summary of Response	How Comments have been Addressed in this Chapter
Natural England (PI 22)	Supplementary Statutory Consultation – 28 Oct – 27 Nov 2022	Natural England have advised previously that the applicant also refer to Natural England's guidance on the assessment of road traffic emissions under the Habitats Regulations. To re-iterate: Construction phase The potential for air quality impacts to the Humber Estuary SPA, SAC and Ramsar from construction dust and site plant emissions should be assessed in the HRA. Operational phase Refer to Natural England's previous response dated 23rd February 2022.	Noted. The construction dust assessment and the consideration of impacts on the Humber Estuary SPA, SAC and Ramsar is set out in Section 13.8 of this ES chapter and in the HRA (Application Document Reference number 9.6).
Natural England (PI 22)	Supplementary Statutory Consultation – 28 Oct – 27 Nov 2022	Natural England note there are a number of additional designated sites within proximity to the application site which may require assessment for potential air quality impacts. Detailed modelling will determine those sites which are relevant to the assessment.	The air quality assessment considers the impact of emissions and relevant nature conservation sites in line with current guidance. The assessment of impacts on relevant sites is described in Section 13.8 of this ES chapter.

13.5 Implications of policy legislation and guidance

13.5.1 This section of the chapter sets out key aspects and implications of applicable legislation, regulation, policy and guidance that are relevant to the assessment of likely impacts on air quality. It builds upon the overarching chapter covering the Legislation, Policy and Consenting Framework (Chapter 5 of this ES).

Legislation

Clean Air for Europe

13.5.2 The Clean Air for Europe (CAFE) programme consolidated and replaced (with the exception of the 4th Daughter Directive) preceding directives with a single legal act, the Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC (Council of the European Union, 2008) (hereafter referred to as the 'EU Air Quality Framework Directive'). This directive is transcribed into English law (with certain provisions extended to the UK) by the Air Quality Standards Regulations 2010 (HM Government, 2010) which came into force on 11 June 2010 (the 2010 Regulation). The 2010 Regulations were amended by the Air Quality Standards (Amendment) Regulations 2016 (HM Government, 2016), which came into force on 31 December 2016. The limit values defined therein are legally-binding and are considered to apply everywhere (with the exception of the carriageway and central reservation of roads and any locations where the public do not have access). EU limit values were published in these regulations for 7 pollutants, as well as target values for an additional 5 pollutants.

Air Quality Strategy

13.5.3 Part IV of the Environment Act (2021) (HM Government, 2021) requires HM Government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. Defra's Clean Air Strategy is the current revision of the Strategy (Defra 2019), published in January 2019. The Air Quality Strategy outlines proposals to tackle emissions from a range of sources. This includes providing clear and effective guidance on how Air Quality Management Areas (AQMAs), Clean Air Zones (CAZ) and Smoke Control Areas interrelate and how they can be used by local government to tackle pollution. New legislation will seek to shift the focus towards prevention of exceedances rather than tackling pollution when limits have been surpassed. The Air Quality Strategy sets out air quality objectives that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedances over a specified timescale.

13.5.4 Air quality objectives, as defined by the Air Quality Strategy, are generally in line with the EU limit values, although they have different dates for compliance, and a different legal status as follows:

- EU limit values (as transcribed into UK legislation) are legally binding in the UK. National government compliance at the agglomeration scale is mandatory.
- UK air quality objectives are for the purposes of local air quality management and there is no legal obligation for local authorities to achieve them. They do have a responsibility to work towards achieving them.

13.5.5 Of the seven pollutants for which EU limit values have been set, national assessments have demonstrated that there is no risk of CO, 1,3-butadiene, benzene, lead and SO_2 concentrations exceeding the limits due to emissions from traffic anywhere in the UK.

13.5.6 The EU limit values and air quality objectives for the remaining pollutants are displayed in Table 13.4 of this ES chapter. Limits are expressed in one of two ways: as annual mean concentrations which are not to be exceeded without exception, due to their chronic effects; or as shorter term (24 hour or one hour) mean concentrations for which only a specified number of exceedances are permitted within a specified time frame, due to their acute effects.

13.5.7 An air quality objective for nitrogen oxides (NO_X) of 30 µg/m³ and SO_2 of 20 µg/m³ are set for the protection of vegetation. In addition to these, critical loads for nitrogen deposition have also been determined which represent (according to current knowledge) the exposure below which there should be no significant harmful effects on sensitive elements of those habitats. Critical loads are set for different types of habitats based on their respective sensitivity to nutrient nitrogen and have been obtained for each designated site with the potential to be affected by the IERRT project.

Table 13.4. Annual mean impact descriptors at individual receptors

Pollutant	Averaging Period	Concentration	Maximum Permitted Exceedances	Target Date (AQO)	Target Date (EULV)
Air Quality Objectives (AQOs) / European Union Limit Values (EULVs) for the Protection of Human Health					
Nitrogen Dioxide (NO_2)	Annual mean	40 µg/m³	None	31 Dec 2005	1 Jan 2010
	1 hour mean	200 µg/m³	18 times per year	31 Dec 2005	1 Jan 2010
Particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10})	Annual mean	40 µg/m³	None	31 Dec 2004	1 Jan 2005
	24 hour mean	50 µg/m³	35 times per year	31 Dec 2004	1 Jan 2005
Particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$)	Annual mean	25 µg/m³	None	1 Jan 2015	1 Jan 2010
Sulphur Dioxide (SO_2)	24 hour mean	125 µg/m³	3 times per year	31 Dec 2004	1 Jan 2005
	1 hour mean	350 µg/m³	24 time per year	31 Dec 2004	1 Jan 2005
AQOs/EULVs for the Protection of Vegetation and Ecosystems					
Nitrogen oxides (NO_X)	Annual mean	30 µg/m³	None	31 Dec 2000	19 Jul 2001
Sulphur dioxide	Annual mean	20 µg/m³	None	31 Dec 2000	19 Jul 2001
Nutrient nitrogen deposition	Annual mean	Saltmarsh: 20-30 kg N/ha/yr	None	N/A	N/A
		Broadleaved deciduous woodland: 10-20 kg N/ha/yr[1]			
		Meso- and eutrophic Quercus woodland: 10-20 kg N/ha/yr			
		Non-Mediterranean dry acid and neutral closed grassland: 10 – 15 kg N/ha/yr[2]			

Notes:
[1] Precautionarily used to represent the Critical Load for ancient woodland sites and woodland-based LWS habitats.
[2] Precautionarily used to represent the Critical Load for grassland-based LWS habitats.

National policy

National Policy Statement for Ports (NPSfP)

13.5.8 Section 5.7 of the National Policy Statement for Ports (NPSfP) (Department for Transport (DfT), 2012) sets out the Government's policy for ports relating to air quality. It highlights key air quality concerns relating to ports as emissions from vehicles accessing and leaving ports, emissions from ship engines and dust emissions from potentially dust generating cargo.

13.5.9 Paragraph 5.7.5 of the NPSfP describes what an air quality chapter of an ES should include with regards to air quality and emissions:

- *"Any significant air emissions, their mitigation and any residual effects, distinguishing between the construction and operation stages and taking account of any significant emissions from any road traffic generated by the project;*
- *The predicted absolute emission levels from the proposed project, after mitigation methods have been applied; and*
- *Existing air quality levels and the relative change in air quality from existing levels."*

13.5.10 Section 5.8 of the NPSfP sets out policy for ports relating to emissions of dust and odour (amongst other things) and the potential harm to amenity. It is acknowledged at paragraph 5.8.3 of the NPSfP that *"some impact on amenity for local communities is likely to be unavoidable. The aim should be to keep impacts to a minimum and at a level that is acceptable*".

13.5.11 Paragraph 5.8.5 of the NPSfP describes what an air quality chapter of an ES should include with regards to potential emissions of dust and odour:

- *"the type, quantity and timing of emissions;*
- *aspects of the development which may give rise to emissions;*
- *premises or locations that may be affected by the emissions;*
- *effects of the emission on identified premises or locations; and*
- *measures to be employed in preventing or mitigating the emissions."*

UK Marine Policy Statement (MPS)

13.5.12 Section 2.6.2 of the UK Marine Policy Statement (Defra, 2011) sets out the Government's policy for marine environments relating to air quality. In paragraph 2.6.2.1 it is noted that *"The construction, operation and decommissioning phases of projects can involve emissions to air which could lead to adverse impacts on human health, biodiversity, or on the wider environment."*

UK Marine Strategy

13.5.13 Descriptor 5 as described in the Marine Strategy Part Three (Defra, 2015) refers to the Control of Nitrogen Oxides (NOx) emissions from ships through

the Merchant Shipping (Prevention of Air Pollution from Ships) Regulations 2008 (as amended). It states that this measure requires engines installed on a ship to meet the specified NOx emission standard, and is primarily designed to improve air quality.

East Inshore and East Offshore Marine Plans

13.5.14 The Marine Plan for the UK East Inshore and East Offshore regions (Maritime Management Organisation, 2016) includes some policies that are relevant to air quality and this assessment. They focus on potential impacts on nature conservation as follows:

- **Policy BIO1 Biodiversity** – *"Appropriate weight should be attached to biodiversity, reflecting the need to protect biodiversity as a whole, taking account of the best available evidence including on habitats and species that are protected or of conservation concern in the East marine plans and adjacent areas (marine, terrestrial)";*
- **Policy ECO1 Ecosystem** – *"Cumulative impacts affecting the ecosystem of the East marine plans and adjacent areas (marine, terrestrial) should be addressed in decision-making and plan implementation";*
- **Policy MPA1 Marine protected areas** – *"Any impacts on the overall Marine Protected Area network must be taken account of in strategic level measures and assessments, with due regard given to any current agreed advice on an ecologically coherent network."*

National Planning Policy Framework

13.5.15 Whilst not the primary planning policy document for a port development, the revised National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government, 2021) contains policy on air quality that has relevance to this chapter. It sets out the Government's planning policies for England and how these are expected to be applied.

13.5.16 The revised NPPF maintains the presumption in favour of sustainable development which should be delivered in accordance with three main objective areas: economic, social and environmental (Paragraph 8). The revised NPPF aims to enable local people and their local authorities to produce their own distinctive local and neighbourhood plans, which should be interpreted and applied in order to meet the needs and priorities of their communities.

13.5.17 Air quality is considered as an important element of the natural environment. On conserving and enhancing the natural environment, Paragraph 174 states that:

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by:*
> *…*
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.*

Development should, wherever possible, help to improve local environmental conditions such as air and water quality …"

13.5.18 Air quality in the UK has been managed through the Local Air Quality Management (LAQM) regime using national objectives. The effect of a proposed development on the achievement of such policies and plans may be a material consideration by planning authorities when making decisions for individual planning applications. Paragraph 186 of the NPPF states that:

"*Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."*

Planning Practice Guidance

13.5.19 Sections of the Planning Practice Guidance (PPG) (Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government, 2021) relating to Air Quality were updated in November 2019. With regards to air quality, the updated guidance (paragraph 005 Reference ID: 32-005-20191101) states that:

"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.

13.5.20 In the same paragraph it is stated that:

"*Where air quality is a relevant consideration the local planning authority may need to establish:*

- *the 'baseline' local air quality, including what would happen to air quality in the absence of the development;*
- *whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and*

- *whether occupiers or users of the development could experience poor living conditions or health due to poor air quality."*

13.5.21 The PPG goes on to state (Paragraph: 006 Reference ID: 32-006-20191101) that considerations that may be relevant to determining a planning application include whether the development would :

- Lead to changes in vehicle-related emissions in the immediate vicinity of the proposed development or further afield;
- Introduce new point sources of air pollution;
- Expose people to harmful concentrations of air pollutants;
- Give rise to potentially unacceptable impacts during construction for nearby sensitive locations; and
- Have a potential adverse effect on biodiversity.

13.5.22 The PPG also suggests that the following items could form part of an air quality assessment suitable for an EIA (Paragraph: 007 Reference ID: 32-007-20191101):

- A description of baseline conditions;
- Consideration of sensitive habitats (including designated sites of importance for biodiversity);
- The assessment methods to be adopted and any requirements for the verification of modelling air quality;
- The basis for assessing impacts and determining the significance of an impact;
- Where relevant, the cumulative or in-combination effects arising from several developments;
- Construction phase impacts;
- Acceptable mitigation measures to reduce or remove adverse effects; and; Measures that could deliver improved air quality even when legally binding limits for concentrations of major air pollutants are not being breached.

Local policy

North East Lincolnshire Local Plan 2013 to 2032

13.5.23 The North East Lincolnshire Local Plan (Local Plan) (2013 to 2032) was adopted in 2018 and sets out a strategic vision for the county (North East Lincolnshire Council, 2018). The plan is centred around set challenges for the Council and policy which has been implemented to solve them and support local economic sectors.

13.5.24 A key challenge highlighted in the Local Plan (paragraph 14.151) is to "*ensure transport contributes to environmental excellence, improved air quality and reduced greenhouse gas emissions*" and aims to enhance the environment in parallel with delivering economic growth. A key weakness identified by the Council with regards to the environment is pockets of poor air quality in Grimsby and Immingham (North East Lincolnshire Local Plan

2013 to 2032, Table 7.1). Immingham town itself serves the surrounding rural community. The main challenges in this area concern to traffic movements and air quality in relation to proximity to the Port of Immingham (North East Lincolnshire Local Plan 2013 to 2032, paragraph 6.25).

13.5.25 A relevant strategic objective (SO) outlined in the Local Plan is 'SO2: Climate change'. Whilst titled 'Climate change', this objective also includes managing air quality in the North East Lincolnshire Council area, decreasing the number of active AQMAs, and improving use of sustainable modes of transport.

13.5.26 Several policies within the Local Plan are relevant to air quality in the Immingham port area:

- Policy 5: Development boundaries sets out how all proposed developments within the Council must consider noise and air quality, in line with sustainability considerations.
- Policy 31: Renewable and low carbon infrastructure was introduced to maximise renewable energy capacity and developments must consider use of renewable energy along with air quality impacts.
- Policy 36: Promoting sustainable transport aims to reduce congestion and improve environmental quality. This policy highlights priority areas, including the A180 corridor, where sustainable transport measures and highway improvements will be focused.

13.5.27 The North East Lincolnshire Council Transport Plan also highlights air quality in Transport Challenge H (section 1.3), which recognised that emissions of transport account for a large part of the council's total carbon emissions and is a source of poor air quality in Immingham and Grimsby (North East Lincolnshire Council, 2016).

North Lincolnshire Local Development Framework 2006 to 2026

13.5.28 In neighbouring North Lincolnshire, the North Lincolnshire Local Plan has been replaced by the Local Development Framework (LDF) (2006 to 2026). The LDF consists of a Core Strategy (North Lincolnshire Council, 2011a) which states that a key goal of the Framework is to reduce pollution levels and frame North Lincolnshire local environmental needs within the wider global picture. Most air quality management objectives focus on the AQMA at Scunthorpe. However, a relevant objective to the IERRT project is:

- Spatial Objective 7: Efficient Use and Management of Resources. This aims to support measures to minimise pollution and improve air quality and ensure adequate infrastructure is in place to serve new developments.

13.5.29 The North Lincolnshire Local Transport Plan (2011-2026) details a strategic vision for transport management in the borough (North Lincolnshire Council, 2011b). Local transport goals include supporting sustainable modes of transport and reducing traffic related CO_2 and NO_2 emissions so as to

protect and enhance the natural environment. In the Transport Plan, the A160 at South Killingholme was identified as an area of concern regarding levels of NO_2.

Guidance

Guidance on the assessment of dust from demolition and construction

13.5.30 Published by the IAQM (Holman *et al.,* 2014), this guidance describes a qualitative methodology for the assessment of potential construction phase impacts from construction dust, traffic, and non-road mobile machinery.

Land-Use Planning & Development Control: Planning For Air Quality

13.5.31 Published by the IAQM (Moorcroft and Barrowcliffe *et al.,* 2017), this guidance describes a methodology to assist with screening the level of detail required of an air quality assessment, based on several variables including the magnitude of traffic impact, and a means to describe air quality impacts on human health and the determination of whether they are significant.

A guide to the assessment of air quality impacts on designated nature conservation sites

13.5.32 Published by the IAQM (Holman *et al.,* 2020), this guidance describes a methodology to assist with assessment of air quality impacts on nature conservation.

DMRB – Sustainability & Environment Appraisal: LA 105 Air quality

13.5.33 Published by National Highways (Highways England, 2019), this guidance provides a methodology for the assessment of air quality impacts associated with motorway and all-purpose trunk road projects. It has been referred to in this assessment for the consideration of potential impacts on receptors adjacent to the Strategic Road Network.

Local Air Quality Management Technical Guidance 2022 (LAQM TG(22))

13.5.34 Published by Defra (2022a), LAQM TG(22) is guidance intended to assist local authorities with their annual reporting of local air quality within their administrative areas. The guidance includes various best practice methods and tools that have been used to inform the air quality assessment described in this chapter.

Air emissions risk assessment for your environmental permit

13.5.35 Published by the Environment Agency (2016), this guidance provides a methodology for assessment of point source emissions impacts on human health and nature conservations sites.

13.6 Description of the existing environment

Local air quality management

13.6.1 The main sources of air pollution within the North East Lincolnshire Council area are detailed in the North East Lincolnshire Council Air Quality Annual Status Report (2022). That report details air quality monitoring data for up to 2021. Whilst data for 2020 and 2021 does exist, 2019 represents the most recent representative dataset, due to the Covid-19 pandemic and the affect this had on reducing emissions to air (from both traffic and industry) in 2020 and to a lesser extent in 2021.

13.6.2 In North East Lincolnshire, the main sources of pollution are road traffic emissions and local background sources such as rail and industry. Historically, industrial emissions associated with the Ports of Grimsby and Immingham have been a local factor, but monitoring over the past few years has suggested this is no longer the case. An AQMA previously designated within Immingham was revoked in 2016 due to relevant pollutant concentrations falling below the air quality objective value. One AQMA does still remain in place in Grimsby, at Cleethorpes Road/ Riby Square, declared for annual mean NO_2 in 2010, although annual mean concentrations have been measured to be below the air quality objective value for the last few years.

13.6.3 Within the North East Lincolnshire Council area, passive and automatic monitoring is undertaken, including the background Automatic Urban and Rural Network (AURN) monitoring station, which is in place on Woodlands Avenue and is operated by the Environment Agency. A summary of monitoring data gathered in the vicinity of the IERRT project is provided in Table 13.5 of this ES chapter. In 2019, there were no recorded exceedances of the annual mean NO_2 objective and concentrations were such that there was little risk of the 1-hour mean NO_2 objective being exceeded - where annual mean NO_2 concentrations are below 60 µg/m³, this is also considered to represent a proxy to suggest that the 1-hour NO_2 objective is not exceeded. Some diffusion tube locations have been in operation at the same location for a number of years and inter-annual variation suggest that annual mean concentrations of NO_2 are generally falling, including at locations within the AQMA. The 2021 data shows that conditions are typically returning to pre-pandemic levels.

Table 13.5. Recorded NO_2 concentrations in Immingham and Grimsby from North East Lincolnshire Air Quality Monitoring Network

Site ID	Grid Ref.		Site Type	Monitoring Type	Annual Mean Conc. (µg/m³)				
	X	Y			2016	2017	2018	2019	2021
Immingham									
AURN	518277	415116	Urban Background	Automatic	-	16.9	13.9	13.5	12.1
NEL 23	519193	415279	Roadside	Diffusion Tube	33.3	28.5	26.5	24.5	25.3
NEL 24	517543	414312	Kerbside	Diffusion Tube	-	-	-	16.5	15.0
NEL 25	518108	414533	Kerbside	Diffusion Tube	-	-	-	19.1	18.2
Cleethorpe Road AQMA, Grimsby									
Cleethorpe Road	527761	410425	Roadside	Automatic	**41.6**	35.9	-	32.0	33.4
NEL 11/12/13	527761	410425	Roadside	Co-located Diffusion Tubes	**45.2**	**47.3**	38.0	37.8	39.1
NEL 14	527754	410445	Kerbside	Diffusion Tube	37.3	34.7	33.3	31.6	34.2
NEL 15	527789	410438	Kerbside	Diffusion Tube	35.7	37.3	32.9	31.0	35.8
Notes: Values in **Bold** signify an exceedance of the annual mean NO_2 air quality objective									

13.6.4 North East Lincolnshire Council does not currently monitor PM_{10} or $PM_{2.5}$. However, in 2017, PM_{10} was monitored by Beta Attenuation (Particulate) Monitors (BAMs) at two sites: Fryston House in Grimsby (CM1) and Kings Road in Immingham (CM2). No exceedances of the annual mean objective were recorded at either of the monitoring sites.

13.6.5 In the North Lincolnshire Council area, air quality is monitored across the administrative area using both automatic and passive monitoring. North Lincolnshire Council declared an AQMA for exceedances of the 24-hour mean PM_{10} concentrations in Scunthorpe in 2005, which was amended to cover a smaller area of the town in 2018. Within Scunthorpe, there is an Integrated Iron and Steel Works, which is the main source of these emissions. The M180 runs to the south of Scunthorpe and outside of this AQMA.

13.6.6 The North Lincolnshire Council Annual Status Report (2020) details recorded annual mean NO_2 monitoring results for the past few years (North Lincolnshire Council, 2020), including locations close to the A160 at South Killingholme. These results are summarised in Table 13.6 and demonstrate concentrations below the air quality objective and below the value to suggest any risk of the one hour NO_2 objective being exceeded.

13.6.7 The Annual Status Report also demonstrates that in 2019, the annual mean PM_{10} air quality objective and the 24 hour mean objective were complied with at all monitoring locations, including CM6 at South Killingholme, and at monitoring stations within the AQMA at Scunthorpe. All other objectives relating to SO_2, NO_2 and $PM_{2.5}$ were also complied with at all sites. It was highlighted by North Lincolnshire Council that despite levels of PM_{10} having met the 24 hr mean objective during 2019, some areas within the borough still experienced high concentrations. In particular, the area immediately around Scunthorpe Integrated Steelworks site, within the AQMA.

13.6.8 Baseline monitoring data has also been reviewed in other local authority areas where those authorities have declared AQMAs adjacent to sections of the SRN likely to be affected by the operation of the IERRT. Selected data from the AQMAs is summarised in Table 13.7.

Table 13.6. Recorded NO_2 concentrations in South Killingholme from North Lincolnshire Air Quality Monitoring Network

Site ID	Grid Ref.		Site Type	Monitoring Type	Annual Mean Conc. (µg/m³)				
	X	Y			2015	2016	2017	2018	2019
South Killingholme									
CM6	514880	416133	Other	Automatic	20	17	17	18	15
DT13	514573	415901	Roadside	Diffusion Tube	26	31	20	17	17
DT14	514782	415971	Roadside	Diffusion Tube	34	31	27	28	29
DT15	515452	416107	Urban Background	Diffusion Tube	19	21	19	20	18
DT16	515279	416085	Roadside	Diffusion Tube	27	26	25	26	25

Table 13.7. Selected recorded NO_2 concentrations in various local authority Air Quality Monitoring Networks

Site ID	Grid Ref.		Site Type	Monitoring Type	Annual Mean Conc. (µg/m³)[1,2]				
	X	Y			2016	2017	2018	2019	2021
Bolsover Council – South Normanton Air Quality Management Area (Revoked in 2022)									
Bolsover_5,26,27	445241	356536	Roadside	Diffusion Tube	36.3	37.2	34.7	32.9	-
Bolsover_6	445828	355805	Roadside	Diffusion Tube	30.9	28.5	32.8	30.2	-
Bolsover_8	445394	356045	Roadside	Diffusion Tube	29.7	24.3	26.9	24.4	-
Bolsover_10	445140	356458	Roadside	Diffusion Tube	29.1	24.2	27.6	25.7	-
Bolsover_15	445245	356539	Roadside	Diffusion Tube	36.0	39.8	34.8	32.6	-
Bolsover_20	445278	356540	Roadside	Diffusion Tube	35.5	36	33.8	30.9	-
Bolsover_21	448652	339652	Urban Background	Diffusion Tube	28.3	27.5	26.6	25.8	-
Bolsover Council – Barlborough AQMA No.2 (Revoked in 2022)									
DT2	447174	377246	Roadside	Diffusion Tube	30.8	29.8	28.7	24.0	-
Doncaster Council – AQMA No.4									
CM4	462278	400111	Roadside	Automatic	-	37.2	28.1	-	-
DT13	462242	400134	Roadside	Diffusion Tube	**43**	**44**	**41**	38	30.6
Rotherham Council – Rotherham AQMA 1 – Part 1 & Part 3									
Rotherham_Wales	447378	382897	Roadside	Automatic	**50.5**	**46.3**	**41.6**	39.0	-
Rotherham_RDT66	447389	382893	Roadside	Diffusion Tube	-	**41.4**	38.1	37.5	-
Rotherham_RDT67	448144	381215	Roadside	Diffusion Tube	-	27	26.1	23.5	-
Rotherham_RDT68	448133	380458	Roadside	Diffusion Tube	33.1	32.4	28.8	25.3	-
Kirklees Council – AQMA No.4									
Kirklees_K15,K16,K17	420441	427353	Roadside	Diffusion Tube	-	**40.3**	37.7	36.5	33.8
Kirklees_K62	420472	427360	Roadside	Diffusion Tube	-	28.1	31.6	26.4	25.5
Kirklees_K63	419866	427561	Roadside	Diffusion Tube	-	**52.1**	33.6	27.3	26.7
Kirklees_K65	419981	427623	Urban Background	Diffusion Tube	-	29.4	**44.3**	**41.1**	32.6
Kirklees_K66	420349	427434	Urban Background	Diffusion Tube	-	29.1	26.7	24.8	18.7

[1] Values in **Bold** signify an exceedance of the annual mean NO_2 air quality objective. [2] Values provided to the number of decimal places reported at source.

Baseline NO_2 survey

13.6.9 To supplement the existing NO_2 monitoring data gathered by the Local Authorities in the study area, a project specific NO_2 survey has also been undertaken. Data was gathered at nine locations across Immingham, South Killingholme and Brigg between November 2021 and February 2022. The location of the diffusion tube monitoring is shown in Figure 13.1b of this ES.

13.6.10 The data gathered during the survey has been annualised and adjusted for diffusion tube bias in line with Defra's LAQM TG(22) guidance (2022a), to represent annual mean concentrations for 2019, as summarised in Table 13.8 below.

Table 13.8. Baseline NO_2 survey results, annualisation and bias-adjustment

Diffusion Tube ID	Period Mean Concentrations (µg/m³)			Annualised Mean (2019)[1]	Bias-adjusted Mean (2019)[2]
	Period 1 (09/11/21 – 06/12/21)	Period 2 (06/12/21– 06/01/22)	Period 3 (06/01/22 – 03/02/22)		
DT1	26.5	20.4	25.0	20.0	16.8
DT2	36.2	28.3	36.8	28.2	23.7
DT3	-[3]	-[3]	-[3]	-	-
DT4	25.5	18.6	36.1	22.3	18.8
DT5	19.9	20.7	27.2	18.9	15.9
DT6	24.5	20.4	29.5	20.7	17.4
DT7	15.4	15.8	21.3	14.6	12.3
DT8	18.4	18.4	24.9	17.2	14.4
DT9	20.7	18.4	26.4	18.2	15.3

[1] Annualisation factor of 0.83 calculated by comparison of period mean and 2019 annual mean concentrations from the following automatic monitoring stations on the Automatic and Urban Monitoring Network: Immingham and Hull Freetown.
[2] Bias-adjustment factor of 0.84 sourced from Defra's National Bias Adjustment Spreadsheet (Defra, 2022b) calculated from a co-location study was undertaken during the survey at the Immingham AURN monitoring station, but ratified data from the AURN site for the survey period is not currently available.
[3] Diffusion tube not present when collected following exposure.

13.6.11 Annual mean concentrations of NO_2 monitored at locations in Immingham, South Killingholme and locations adjacent to the M180 are well below the air quality objective.

Defra background pollutant map concentrations

13.6.12 Defra has produced maps of background pollutant concentrations covering the whole of the UK for Local Authorities and consultants to use in air quality assessments, where local background monitoring data are unavailable or inappropriate to use. The maps provide background pollutant concentrations for each 1km x 1km grid square within the UK for all years between 2018

and 2030 for NO_X, NO_2, PM_{10} and $PM_{2.5}$, and 2001 for SO_2. Table 13.9 of this ES chapter outlines the average 2019 background concentrations of NO_X, NO_2, PM_{10} and $PM_{2.5}$, and the 2001 background for SO_2, within the grid square where the IERRT project is approximately located (519500, 412500). Background concentrations within this grid square are well below the respective Air Quality Standards.

Table 13.9. Defra mapped annual mean background concentrations for approximate area of site (µg/m³)

Grid Square		NO_X	NO_2	PM_{10}	$PM_{2.5}$	SO_2
X	Y					
519500	412500	14.5	13.0	13.0	9.4	6.7

13.6.13 Background concentration data used to inform all receptors considered in this assessment are provided in Appendix 13.1 of this ES.

Dust

13.6.14 Existing background dust levels are likely to be variable across the site. Close to the Port and surrounding industrial/ commercial areas, there are likely to be a number of dust generating activities already present and baseline levels of dust deposition and dust soiling are potentially elevated. Away from the Port and the industrial areas, where most dust sensitive receptors are present, including the residential areas of Immingham and South Killingholme, dust deposition rates and dust soiling are likely to be typical of most urban, suburban, and semi-rural locations.

13.6.15 There are a number of high sensitivity amenity and human health sensitive receptors within the 350 m of the construction site boundary criteria in the IAQM guidance (Holman *et al*., 2014). These include the residential dwellings off Queens Road, within 200 m south of the southern storage area, and residential properties along Kings Road in Immingham between Trenchard Close and Pelham Road, approximately 270 m south-west of the western storage area (see Figure 13.2 of this ES). There is also low sensitivity commercial and industrial land use adjacent to the site in all directions.

13.6.16 There are also a number of nature conservation receptors within the 50 m of the construction site boundary criteria set out in the IAQM guidance (Holman *et al*., 2014), including the high sensitivity Humber Estuary SAC/ SPA, which is immediately adjacent to the north and north-eastern sections of the site. It should be noted that the sections of the SAC closest to the construction site are predominantly water-based habitats and are not considered sensitive to air quality or dust. There is also Priority Habitat to the south of the southern and central storage areas and the east of the eastern storage area. These are shown on Figure 13.2 of this ES.

13.7 Future baseline environment

13.7.1 The site of the IERRT project forms part of the operational Port of Immingham and has been in active use for port purposes for a number of decades. The current use of the site is for bulk cargo, steel sections, lorry and automotive storage. In the absence of the IERRT project, the site would continue to be utilised for port activities.

Local air quality

Human health sensitive receptors

13.7.2 Future baseline air quality in the year of opening 2025 has been modelled (without the IERRT project) at selected air quality sensitive locations in the vicinity of the IERRT project site and at locations within AQMAs that are adjacent to sections of the SRN affected by the IERRT. Future baseline pollutant statistics at human health sensitive receptors are reported in Table 13.10 below. The location of receptors is illustrated in Figure 13.1 of this ES.

Table 13.10. Predicted future baseline pollutant statistics (human health senstive receptors)

Receptor ID	Annual Mean NO_2 Conc. (µg/m³)	Annual Mean PM_{10} Conc. (µg/m³)	Annual Mean $PM_{2.5}$ Conc. (µg/m³)
Immingham			
R1	18.2	14.5	8.4
R2	18.8	15.3	8.7
R3	19.2	15.4	8.7
South Killingholme			
R4	25.3	17.6	10.1
R5	27.9	18.3	10.5
R6	14.0	16.8	9.0
R7	17.2	16.9	9.1
R8	24.8	18.7	10.1
A180 / M180 Corridor			
R9	10.5	16.5	8.7
R10	12.4	19.0	9.8
R11	13.4	18.1	9.6
R12	13.3	18.6	9.8
R13	15.4	17.7	9.6
R14	17.1	18.1	9.5
R15	10.4	16.4	9.0
R16	12.4	16.1	9.2
R17	14.4	18.7	11.3
R18	13.4	15.8	9.0
Doncaster Council – AQMA No.4			
R19	23.1	15.4	9.3
R20	22.8	15.3	9.2
R21	21.3	15.5	9.3
R22	20.5	15.1	9.1

Receptor ID	Annual Mean NO_2 Conc. (µg/m³)	Annual Mean PM_{10} Conc. (µg/m³)	Annual Mean $PM_{2.5}$ Conc. (µg/m³)
Rotherham Council – Rotherham AQMA 1 – Part 3			
R23	33.7	16.8	10.0
R24	29.1	16.0	9.5
Bolsover Council – Barlborough AQMA No.2			
R25	27.4	16.3	9.5
Bolsover Council – South Normanton AQMA (revoked 02/03/2022)			
R26	34.2	17.1	10.3
Near to Wakefield Council – M1 AQMA			
R27	19.1	15.4	8.9
R28	19.9	15.1	8.9
Between Wakefield Council – M1 AQMA and Kirklees Council – AQMA No.4			
R29	26.7	16.2	10.1
R30	28.3	16.3	10.2
Kirklees Council – AQMA No.4			
R31	30.7	15.4	10.0
R32	28.8	15.2	9.9

13.7.3 Future baseline conditions at the human health sensitive receptors are summarised as follows:

- Annual mean concentrations of PM_{10} and $PM_{2.5}$ are well below the respective air quality objectives for those pollutants (40 µg/m³ and 25 µg/m³ respectively) at all modelled locations;
- Annual mean PM_{10} concentrations are such that daily mean concentrations of PM_{10} are unlikely to exceed that air quality objective (no more than 35 daily exceedances of 50 µg/m³);
- Close to the proposed IERRT project, at receptors in Immingham and South Killingholme, and locations adjacent to the A180 and M180, annual mean concentrations of NO_2 are well below the air quality objective for that pollutant (40 µg/m³);
- At locations within or near to AQMAs on the SRN, annual mean concentrations of NO_2 are not considered to be at risk of exceeding the air quality standard for that pollutant (<36 µg/m³), including the following locations:
  - Doncaster Council – AQMA No.4;
  - Rotherham Council – Rotherham AQMA 1 – Part 3;
  - Bolsover Council – Barlborough AQMA No.2 (revoked);
  - Bolsover Council – South Normanton AQMA (revoked);
  - Near to Wakefield Council – M1 AQMA
  - Between Wakefield Council – M1 AQMA and Kirklees Council – AQMA No.4; and
  - Kirklees Council – AQMA No.4.
- Annual mean NO_2 concentrations are such that hourly mean concentrations of NO_2 are unlikely to exceed that air quality objective (no more than 18 hourly exceedances of 200 µg/m³).

Nature conservation receptors

13.7.4 Future baseline pollutant statistics in the year of opening 2025 at nature conservation sensitive receptors (closest part of the nature conservations site to the nearest modelled source) are reported in Table 13.11 below. The location of receptors is illustrated in Figure 13.1 of this ES. Two future baseline scenarios are reported. The first is typical of a future baseline scenario reported in an air quality chapter, based on traffic data that represents the year of opening without the IERRT project in operation and including for traffic growth from the existing baseline year and major committed development in the area. The second future baseline scenario has been added to the chapter to address stakeholder feedback from Natural England on in-combination effects (see Table 13.3). This future baseline is based on the existing baseline traffic data for 2019, but with emission rates and background pollutant concentrations that represent the future baseline year of 2025. This then provides conditions in 2025 without taking account of any traffic growth from the existing baseline year nor major cumulative development in the area.

Table 13.11. Predicted future baseline pollutant statistics (nature conservation senstive receptors)

Receptor ID[1]	Future Baseline 1 – With Traffic Growth and Committed Development Flows		Future Baseline 2 – Without Traffic Growth and Committed Development Flows	
	Annual Mean NO_X Conc. ($\mu g/m^3$)[2]	Nitrogen Deposition Rate (kg N/ha/yr)[2]	Annual Mean NO_X Conc. ($\mu g/m^3$)[2]	Nitrogen Deposition Rate (kg N/ha/yr)[2]
Humber Estuary SAC (North East Lincolnshire estuary shore and East Riding of Yorkshire estuary shore)				
SAC1[3,4]	19.8	**20.4**	19.8	**20.4**
SAC2[3,4]	17.2	19.2	17.2	19.2
SAC3[3,4]	14.2	19.0	14.2	19.0
SAC4[3,4]	15.7	19.0	15.7	19.0
SAC5[3,4]	16.0	17.9	16.0	17.9
Potteric Carr SSSI (adjacent to the M18 motorway)				
SSSI1[5]	27.8	**34.8**	20.4	**33.4**
SSSI2[5]	23.9	**35.1**	18.3	**34.0**
Edlington Wood SSSI (adjacent to the M18 motorway)				
SSSI3[6]	**49.5**	**39.0**	**32.6**	**36.2**
Local Wildlife Site (Homestead Park, Immingham)				
LWS1[3,6]	16.9	**34.2**	16.9	**34.2**
Local Wildlife Sites (selected locations adjacent to the A180, M180 and M18)				
LWS2[7]	20.9	**23.9**	16.3	**23.4**
LWS3[5]	23.9	**45.0**	17.7	**43.8**
LWS4[5]	22.5	**53.9**	16.7	**52.7**
LWS5[5]	27.0	**54.6**	19.1	**53.1**
LWS6[5]	19.3	**39.8**	14.8	**38.8**

Receptor ID[1]	Future Baseline 1 – With Traffic Growth and Committed Development Flows		Future Baseline 2 – Without Traffic Growth and Committed Development Flows	
	Annual Mean NO_X Conc. ($\mu g/m^3$)[2]	Nitrogen Deposition Rate (kg N/ha/yr)[2]	Annual Mean NO_X Conc. ($\mu g/m^3$)[2]	Nitrogen Deposition Rate (kg N/ha/yr)[2]
LWS7[7]	**34.2**	**22.9**	22.5	**21.9**
LWS8[5]	**31.1**	**37.5**	22.5	**35.9**
LWS9[5]	**42.0**	**39.4**	28.3	**37.0**
LWS10[7]	**62.2**	**22.8**	**39.9**	**21.1**
LWS11[7]	**69.1**	**23.2**	**43.9**	**21.4**
LWS12[5]	**49.5**	**37.3**	**32.5**	**34.4**
LWS13[5]	**56.4**	**38.3**	**36.4**	**35.0**
LWS14[5]	**62.7**	**39.1**	**39.6**	**35.5**
Ancient Woodland (selected locations adjacent to the M18 motorway)				
AW1[5]	**34.3**	**35.1**	24.1	**33.2**
AW2[5]	**43.0**	**37.1**	28.8	**34.7**
AW3[5]	**35.2**	**35.2**	24.6	**33.3**
Site of Importance for Nature Conservation (adjacent to Manby Road Immingham)				
SINC1[3,7]	16.9	**20.4**	16.9	20.4
Priority Habitats (within and adjacent to the Port of Immingham)				
PH1[3,5]	19.2	**32.3**	19.2	32.3
PH2[3,5]	18.6	**32.3**	18.6	32.3
PH3[3,7]	26.2	**20.4**	26.2	20.4
PH4[3,5]	14.0	**34.2**	14.0	34.2
Air Quality Standard	**30**	**10 – 20[4,5]** **15 – 20[6]** **20 – 30[7]**	**30**	**10 – 20[4,5]** **15 – 20[6]** **20 – 30[7]**

Notes:
[1] For roadside site, results reported at section of nature conservation site closest to the road. For full receptor transect results, see Appendix 13.1 of this ES.
[2] **Bold** values denote and exceedance of the relevant air quality standard.
[3] Future baseline based on reported background data due to distance from modelled baseline sources. These concentrations also represent future baseline 2 conditions with no traffic growth or cumulative development in their vicinity.
[4] Coastal saltmarsh [5] Broadleaved deciduous woodland. [6] Meso- and eutrophic Quercus woodland. [7] Acid grassland.

13.7.5 Future baseline conditions at the nature conservation sensitive receptors are summarised as follows:

- Future baseline 1 – with traffic growth and cumulative development:
  - Predicted annual mean NO_X concentrations are below the air quality objective at the saltmarsh habitats within the SAC, at Potteric Carr Site of Special Scientific Importance (SSSI), and at the Site of Importance for

Nature Conservation (SINC) adjacent to Manby Road and Priority Habitats considered in Immingham;
- Annual mean NO_X concentrations are predicted to exceed the air quality objective at Edlington Wood SSSI, and at some Local Wildlife Sites (LWS) and ancient woodland considered adjacent to the A180, M180 and M18;
- Nitrogen deposition rates at the saltmarsh habitat within the SAC are close to or are above the relevant Critical Load for that habitat; and
- Nitrogen deposition rates at all other habitats considered are above the relevant lower Critical Load thresholds.

- Future baseline 2 – without traffic growth and cumulative development:
  - For receptors located adjacent to the local road network or SRN, concentrations and deposition rates without the contribution of traffic growth and cumulative development are lower.

13.7.6 Following stakeholder consultation, Natural England advised that the ammonia (NH_3) emissions should be taken into account to inform the Habitat Regulations Assessment (HRA) report, specifically with regard to that pollutant's contribution to nitrogen deposition. Future baseline NH_3 and nitrogen deposition statistics at the nearest air quality sensitive habitat within the SAC are reported in Table 13.12.

Table 13.12. Predicted future baseline NH_3 and nitrogen deposition statistics (nature conservation senstive receptors)

Receptor ID[1]	Annual Mean NH_3 Conc. ($\mu g/m^3$)	Nitrogen Deposition Rate (kg N/ha/yr)[2]
Humber Estuary SAC (North East Lincolnshire estuary shore and East Riding of Yorkshire estuary shore)		
SAC1[3]	**2.1**	**20.4**
SAC2[3]	**2.0**	19.2
SAC3[3]	**2.1**	19.0
SAC4[3]	**2.1**	19.0
SAC5[3]	**2.0**	17.9
Air Quality Standards	**1 – 3**	**20 – 30[4]**

Notes:
[1] **Bold** values denote and exceedance of the relevant air quality standard.
[2] Nitrogen deposition rate includes the contribution from NH_3 and NO_2 concentrations.
[3] Future baseline based on reported background data due to distance from modelled baseline sources.
[4] Coastal saltmarsh.

13.7.7 Future baseline conditions at the nature conservation sensitive receptors are summarised as follows:

- Annual mean NH_3 concentrations at the saltmarsh habitat considered within the SAC exceed the lower Critical Level for that pollutant; and
- Nitrogen deposition rates derived from NH_3 and NO_2 are close to or are above the relevant Critical Load for that habitat.

Dust

13.7.8 Future baseline dust conditions are unlikely to be perceptibly different to conditions experienced now, providing no greater source of dust emissions is introduced into the study area than what is currently present. This is considered highly unlikely given the current use of sections of the site for bulk cargo storage.

13.8 Consideration of likely impacts and effects

13.8.1 This section identifies the potential likely effects on air quality sensitive receptors as a result of the construction and subsequent operation of the IERRT project.

13.8.2 The Details of Project Construction and Operation chapter (Chapter 3 of this ES) has informed the outcomes of the construction phase dust assessment. Data gathered to inform the Traffic and Transport chapter (Chapter 17 of this ES) has been used to inform the operational road traffic emissions assessment.

13.8.3 Cumulative impacts on air quality could arise as a result of other developments and activities in the air quality study area. This will be considered as necessary as part of the cumulative impacts and in-combination effects assessment (see Chapter 20 of this ES). It should be noted that the assessment of road traffic emissions is inherently cumulative, in that the future year traffic data used to inform the assessment already accounts for general year on year traffic growth, and specific flows associated with other reasonably foreseeable development in the area (known as committed development).

Construction phase

13.8.4 The construction of the IERRT project may be completed in a single stage, or it may be sequenced such that construction of the southernmost pier takes place at the same time as operation of the northernmost pier (see Chapter 3 of this ES). In the case of a sequenced construction, the duration of construction activity will be extended but it will not increase the scale of construction activity. The construction traffic assessment (in Chapter 17 of the ES) assumed all construction movements would take place in a single activity, and therefore higher on a daily basis. Therefore, the below impact pathway assessment is considered the worst case and will not be worsened by a sequenced construction period. Construction is expected to begin in early 2024 and be complete by mid-2025 (for a single stage construction) or by late 2026 (for a sequenced construction scenario).

13.8.5 The following impact pathways have been assessed:

- Onsite emissions sources (construction dust, site plant and vessel emissions); and
- Offsite emissions (road traffic emissions on the local and road network).

Onsite emissions sources

Construction Dust

13.8.6 As described in Section 13.3 and Appendix 13.1 of this ES, the construction dust and particulate matter assessment follows the step-by-step approach set out in relevant IAQM guidance (Holman *et al.,* 2014). The outcomes of this process are summarised in the sub-sections below.

Step 1 Screen the requirement for a detailed assessment

13.8.7 Step 1 of the IAQM construction dust guidance is to screen the requirement for a more detailed assessment. According to the guidance, no further assessment is required if there are no receptors within a specified distance of the works. The screening distances set by the IAQM guidance are detailed in paragraph 13.2.3.

13.8.8 As described in Section 13.6 above, there are a number of high sensitivity amenity and human health sensitive receptors within 350 m of the construction site boundary, including the residential dwellings off Queens Road, within 200 m south of the southern storage area, and residential properties along Kings Road in Immingham between Trenchard Close and Pelham Road, approximately 270 m south-west of the western storage area (see Figure 13.2 of this ES). There is also low sensitivity commercial and industrial land use adjacent to the site in all directions.

13.8.9 There are also a number of nature conservation receptors within 50 m of the construction site boundary, including the high sensitivity Humber Estuary SAC/ SPA, which is immediately adjacent to the north and north-eastern sections of the site. The sections of the SAC closest to the construction site are predominantly water-based habitats and are not considered sensitive to air quality or dust, and are therefore not considered further within this assessment. There is also Priority Habitat to the south of the southern and central storage areas and the east of the eastern storage areas. These are shown on Figure 13.2 of this ES.

13.8.10 Due to the presence of the high sensitivity amenity and human health sensitive receptors within the screening distances set by the guidance, the more detailed dust assessment is required and is set out in paragraphs 13.8.11 to 13.8.24 below.

Step 2 Assess the Risk of Dust Impacts

<u>Step 2A Determine the Dust Emissions Magnitude</u>

13.8.11 Step 2A requires the determination of the dust emission magnitude, which the guidance states is based on the scale of the anticipated works with the following activities: demolition; earthworks; construction (i.e. the building and erection of structures); and trackout (the deposition of dust and particulate matter onto public roads by construction vehicles), and should be classified as Small, Medium, or Large. A description of the construction works is

provided in Chapter 3 of this ES. The assessment focuses on landside works, based on the assumption that potentially dusty materials associated with the marine works will be naturally suppressed by the estuary water.

Demolition

13.8.12 The landside works consist of four areas: central storage area, north storage area, south storage area and west storage area (see Figure 1.3 of this ES). In preparation for the new construction works, the sites will be cleared and unused structures will be demolished.

13.8.13 Demolition work includes the demolition of four buildings within the northern storage area (two of which will be replaced), and the existing East Gate which will be upgraded once demolished. With reference to criteria set out in IAQM guidance, the aggregate volume of buildings and structures to be demolished is greater than 50,000 m³, the building and structures are predominantly of a material with low potential to generate dust and demolition activities should not be required at a height of 10 m or more above ground. In light of the above, and in line with the IAQM guidance criteria (Holman *et al*., 2014) summarised in Appendix 13.1 of this ES, the dust emission magnitude for the proposed demolition works is medium.

Earthworks

13.8.14 The site is anticipated to require earthworks associated with soil-stripping, ground levelling and excavation works, which are required to facilitate the laying of draining and services, and the foundations of proposed buildings and structures. For the purpose of this assessment, earthworks are anticipated to meet or exceed the criteria given in IAQM guidance (Holman *et al*., 2014), with an area of works exceeding 10,000 m³, the handling of a large mass of materials and multiple earth-moving vehicles. As such, the dust emissions magnitude of effect for earthworks is large.

Construction

13.8.15 Potentially dusty materials that may be in use during construction works are concrete (if delivered dry), sand and hard core, which will be stored and handled at the site throughout the construction phase. Other construction materials are likely to be prefabricated with little dust emissions potential. For the purpose of this assessment, construction works are anticipated to meet or exceed the criteria given in IAQM guidance (Holman *et al*., 2014), with the of buildings and structures considered to be >100,000 m³ and the requirement to store and handle potentially dusty material. As such, the dust emissions magnitude for construction is large.

Trackout

13.8.16 Trackout is associated with the deposition of mud and potentially dusty material onto the public network from construction vehicles leaving site. On average there is anticipated to be more than the 50 outward construction related HDV (all vehicles >3.5 tonnes) movements per day cited as IAQM guidance criteria (Holman *et al*., 2014), although the access road surface used by these vehicles will be paved. To be precautionary, the dust emission magnitude for trackout is assigned as large.

Step 2B Determine the Sensitivity of the Area

13.8.17 Step 2B of the IAQM construction dust guidance requires the determination of the sensitivity of the area to construction dust impacts. According to the guidance, this is based on the sensitivity of individual receptors, the proximity and number of those receptors, background PM_{10} concentrations and site-specific factors, such as local terrain, meteorology and natural and existing windbreaks.

13.8.18 In this instance, there are between 10 and 100 high sensitivity amenity and human health receptors between 200 and 350 m of the construction site boundary and or site access point, and a number of low sensitivity industrial/ commercial receptors within 20 m of the site boundary. This equates to an area of low sensitivity for dust soiling amenity impacts.

13.8.19 Background PM_{10} concentrations are estimated to be around 17 µg/m³ and this, coupled with the limited number of receptors and their proximity to the construction site, means that the sensitivity of the area to health impacts is also low.

13.8.20 The proximity of the Humber Estuary SAC/ SPA means that there is a high sensitivity nature conservation receptor within 20 m of the construction site boundary. However, the areas of the SAC/ SPA that are within 20 m of the construction site boundary are tidal mudflats and such habitat is not considered sensitive to air quality or construction dust impacts, because the tidal nature of the estuary will regularly wash deposited dust away. Priority Habitats located adjacent to the storage areas have been identified due to the species of vegetation present and these are potentially sensitive to air quality and construction dust impacts. The IAQM guidance does not specifically refer to Priority Habitats when describing the sensitivity of nature conservation sites, but does state that habitat where "*there is a particularly important plant species, where its dust sensitivity is uncertain or unknown"*, these should be classed as having medium sensitivity. A medium sensitivity receptor within 20 m of the construction site boundary means that the sensitivity of the area to ecological impacts is medium.

Step 2C Determine the Risk of Dust Impacts

13.8.21 Step 2C of the IAQM construction guidance concerns the determination of the risk of dust impacts, which is informed by the dust emission magnitude identified in Step 2A and the sensitivity of the area identified in Step 2B.

13.8.22 For dust soiling amenity and human health impacts, the Large dust emission magnitude identified for earthworks, construction and trackout, in an area of low sensitivity, equates to a low risk of dust impacts during those activities. The small dust emission magnitude identified for demolition equates to a **negligible** risk of dust impacts.

13.8.23 For dust impacts on ecology, the Large dust emission magnitude identified for earthworks, construction and trackout, in an area of medium sensitivity,

equates to a medium risk of dust impacts during those activities. The small dust emission magnitude identified for demolition equates to a low risk of dust impacts.

13.8.24 Without any mitigation, a low to medium risk of dust impacts could potentially contribute to a significant effect.

Site Plant and NRMM

13.8.25 According to the IAQM guidance (2014) exhaust emissions from on-site plant (NRMM) and site traffic are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. Emissions from site plant and NRMM are often transient and intermittent in nature, operating as, when and where required, therefore not impacting upon the same location for a prolonged period of time.

13.8.26 In this instance, the nearest human health sensitive receptors to the IERRT project construction site are approximately 200 m away from the site boundary and a greater distance away from site plant and NRMM emission sources. The nearest highly sensitive nature conservation receptors to the site boundary are the saltmarsh habitats within the SAC, the nearest of which is approximately 3 km away. The Priority Habitats within and adjacent to the construction site are considerably closer to the site plant and NRMM emissions sources. However, there is currently no relevant guidance that requires the impact of site plant and NRMM emissions on such a habitat classification to be quantified.

13.8.27 In light of the above, the effect of temporary and intermittent site plant and NRMM emissions impacts will not contribute to a significant effect, due to the distance between the working areas of the construction site and nearest high sensitivity human health and nature conservation receptors (residential dwellings on Queens Road and saltmarsh habitat northwest of the ABP Humber International Terminal respectively).

13.8.28 Table 13.13 below provides a summary of the site plant and NRMM anticipated to be operation during the construction phase.

Table 13.13. Anticipated Construction Phase Site Plant and Duration on Site (not Duration of Operation)

Description[1]	Number	Duration (Days)[2]
Equipment for piling and marine works		
Pile Hammer (CG 300)	x3	90
Vibratory Hammer (PTC 130 HD)	x3	90
Backhoe Dredger (Manu Pekka)	x1	100
Multipurpose Hopper Barge (Cork Sand)	x5	100
Crane Barge Inc 350T Crawler Crane (piling)	x2	74
Crane Barge Inc 350T Crawler Crane (deck build)	x2	395

Description[1]	Number	Duration (Days)[2]
Crawler Crane 150T	x1	90
Tug / Multi Cat	x2	395
Hatch Barge/Deck Barge	x3	395
Earth moving and processing equipment		
Dozer (D6)	x6	180
Hydraulic Excavator 30T	x8	180
Dump Trucks 35T	x24	180
Crushers	x4	90
Screening Plants	x4	90
Road making equipment		
Roller (Bomag 213 DH - 5)	x4	180
Road Paver (VOLVO P6820D ABG)	x4	180
Asphalt / Concrete Plant	x1	240
Hauling equipment		
Tractor Trailers	x4	630
Tipper	x4	630
Concreting equipment		
Concrete Pumps	X150	as required
Pneumatic equipment		
Peckers	x6	630
Compressors	x10	630
Pavement Breakers	x6	630
Lifting and handling equipment		
Cranes 76-100 Ton	x4	600
Cranes 101-150 Ton	x4	150
Cranes 151-200 Ton	x4	150
Cranes 201-250 Ton	x4	150
Cranes 251-300 Ton	x4	150
Cranes 301-600 Ton	x1	30
Welding equipment		
Generators	x10	630
Transformers	x10	630
Automatic Welding Set	x10	630
Equipment for laying pipeline and ducting		
14T Excavator	x10	180
Compressor	x6	180
Trailor	x4	180
Dumper	x4	180
Test Pump	x2	180
Dewatering Pump	x10	180
Pressure Recorder	x2	180
Miscellaneous equipment		
Petrol Hydraulic Hand Breaker	x4	630
20Kva & 3 Phase 63 to 32amp	x10	630
Compressor + Hose	x4	630
Man Riding Basket	x4	630
17 m Telehandler	x4	630

Description[1]	Number	Duration (Days)[2]
Pressure Washer Towable	x4	630
1000 litre road tow fuel bowser	x2	630
8T Mini Digger	x4	630
6T Dumper	x6	630
9T Dumper	x6	630
Hydraulic Breaker/ Pecker	x4	630
Burning Gear	x10	630
Notes: [1] Not all items will be in themselves a source of combustion emissions. [2] Days present on site based on the simultaneous construction of all three berths, not days of operation.		

Construction marine vessels

13.8.29 Construction phase vessel activity will be approximately 1.5 km away from the nearest human health sensitive receptors (residential dwellings on Queens Road) and around 3 km from the nearest air quality sensitive nature conservation receptors – the highly sensitive habitat within the Humber Estuary SAC/ SPA (saltmarsh to the north-west of the ABP Humber International Terminal). Habitat with a lower sensitivity to air quality impacts (Priority Habitat with no designation) is located within 500 m of construction phase vessel activity, within and adjacent to the Port of Immingham.

13.8.30 With regards to the impact on human health at receptors on Queens Road, Defra's LAQM-TG(22) (Defra, 2022a) guidance states that for the purposes of LAQM, emissions from port expansions may need to be considered where:

- There are more than 5,000 large ship movements (i.e. cross-channel ferries, roll on-roll off ships, bulk cargo, container ships, cruise liners, etc – one ship generating two movements (arrival and departure)) per year, with relevant exposure within 250 m of the berths and main areas of manoeuvring; or
- There are more than 15,000 large ship movements per year, with relevant exposure within 1km of these areas.

13.8.31 Construction phase vessel emissions will occur over 1km away from the nearest human health sensitive receptors and any impacts will be transient, intermittent and temporary (for the duration of the construction phase only (approximately 2 years)). The construction phase vessels do not fall under the description of 'large ships' given in the Defra guidance (2022a) (i.e., cross-channel ferries, roll on-roll off ships, bulk cargo, container ships, cruise liners, etc). The number of construction phase vessel movements in isolation will also fall below the annual number of movements suggested within the Defra guidance (although total vessel movements associated with the Port of Immingham as a whole will exceed 15,000 large ship movements per year).

13.8.32 The transient, intermittent, and temporary construction phase vessel emissions will occur over 3 km away from the nearest highly sensitive nature conservation receptors. Impacts will also be limited to periods when construction vessels are in operation close to a sensitive habitat. The Priority Habitats within and adjacent to the construction site are considerably closer to the construction vessel emissions sources. However, as stated previously, there is currently no relevant guidance that requires the impact of emissions on an undesignated habitat to be quantified, or for impacts at such sites to determine significance. It is also reasonable to assume that emissions from vessel movements associated with the construction of the IERRT project will not adversely affect the closer but less sensitive Priority Habitat to any significant extent, given that such habitat is already present in the context of a busy operational port environment, with or without the IERRT project in place.

13.8.33 Given the distance between the area of activity for construction phase vessel movements and the nearest human health sensitive and high sensitivity nature conservation receptors, the transient, intermittent and temporary nature of emissions, and the limited sensitivity of the nearest habitats, it is considered that the effect of construction phase vessel movement emissions impacts would not contribute to a significant effect.

Significance of onsite emissions sources effects

13.8.34 The assessment of onsite emissions sources during the construction phase has demonstrated that the combustion emissions from site plant and vessels will not contribute to a significant effect. However, it is considered that unmitigated construction phase dust impacts could cause a significant effect. Without an appropriate level of mitigation, the effect of construction phase site emissions impacts **could potentially be significant**.

Offsite emissions sources

Construction traffic

13.8.35 As reported in the Traffic and Transport chapter (Chapter 17 of this ES), it is estimated that, on average there would be a total of 200 heavy goods vehicle (HGV; vehicles >3.5 tonnes, not including buses or coaches) movements per day over an approximate 78-week construction programme for a single stage construction (early 2024 to mid-2025). There may be days where the peaks in construction traffic will be considerably higher, with other days much lower, and therefore as stated in Chapter 17, as a worst-case scenario, a total of 280 construction HGV movements per day has been assessed.

13.8.36 The number of additional HGV movements exceeds the criteria given in IAQM/ EPUK guidance (Moorcroft and Barrowcliffe *et al.*, 2017) to suggest that detailed modelling may be required to demonstrate if there are significant effects or not.

13.8.37 An assessment of construction phase road traffic emissions impacts has been undertaken to consider the potential effect of this emission source on air quality sensitive human health receptors adjacent to the construction traffic route between the A180 and the IERRT construction site.

13.8.38 In reality, daily average movements will be less than the figure referred to in the paragraphs above, although for the assessment set out below, the peak daily movements have been precautionarily used to estimate potential impacts.

13.8.39 For the purpose of the assessment, it has been assumed that half of construction traffic will access and leave the construction site by the Port of Immingham west gate, via the A160, and half of the construction traffic will access and leave the construction site by the Port of Immingham east gate, via Queens Road. Table 13.14 below provides the results of the assessment.

Table 13.14. Construction phase road traffic impacts

Receptors	Future Baseline			Future Construction			Impact[1]		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
Residential properties adjacent to Queens Road	18.8	15.8	9.2	19.1	15.9	9.3	+0.3 (N)	+0.1 (N)	+0.1 (N)
Residential properties adjacent to Humber Road (A160)	25.3	17.2	10.2	25.7	17.4	10.3	+0.3 (N)	+0.1 (N)	<0.1 (N)

Notes:
[1] IAQM/EPUK impact descriptors in parenthesis:
N = Negligible; Sl = Slight; M = Moderate; Su = Substantial

13.8.40 Table 13.14 shows the total pollutant concentrations for NO_2, PM_{10} and $PM_{2.5}$ in future baseline and future construction phase scenarios, the magnitude of change between those scenarios, and the impact descriptor in line with IAQM and EPUK guidance (Moorcroft and Barrowcliffe *et al.*, 2017). An imperceptible increase in pollutant concentrations equates to negligible impact at receptors adjacent to both construction traffic routes considered.

13.8.41 Annual mean concentrations of NO_2 and PM_{10} are such that there is considered no risk of an exceedance of either the hourly mean NO_2 air quality objective, or the daily mean PM_{10} air quality objective.

13.8.42 Construction traffic movements will also pass within 200 m of two areas consisting of Priority Habitat. However, in line with IAQM guidance on air

quality impacts on nature conservation sites (Holman *et al.*, 2020), the number of construction phase vehicle movements falls below the screening criteria referenced in that guidance – National Highways DMRB criteria (a change in two-way traffic flow of 1000 or more AADT and/or 200 or more annual average daily HDVs (all vehicles >3.5 tonnes) (Highways England, 2019)).

Significance of offsite emissions sources effects

13.8.43 The assessment of offsite emissions sources during the construction phase has demonstrated that the effect of the temporary negligible impact from construction phase vehicle movement emissions is considered to be **insignificant**.

Operational phase

13.8.44 This section contains an assessment of the potential impacts to air quality as a result of the operational phase of the IERRT project. The IERRT project is expected to be operational in 2025. The following impact pathways have been assessed:

- Onsite emissions sources (including vessel, land-tug and road traffic emissions; and
- Offsite emissions sources (road traffic emissions on the local and road network and SRN).

Onsite emissions sources

Operational Marine Vessels

13.8.45 Emissions associated with vessel energy generation plant when they are in dock have been considered in this assessment. When docked, any vessel emissions are a static source that could be operational for a prolonged period of time.

13.8.46 Emissions associated with vessel energy generation plant when they are sailing have not been considered. When sailing, emissions are transient and only likely to impact on a specific location for a short period of time (<1-hour) per day. It is also noted that whilst vessels will have to pass through the Humber Estuary SAC to access and leave the IERRT project, they will do so via the Humber Estuary Main Navigational Fairway, which does not pass within 200 m of any air quality sensitive habitat, within or beyond the SAC.

13.8.47 The IERRT project will have three berths in operation and each berth will have a docked vessel present for approximately 4,710 hours per year. When docked, each vessel will generate energy from two 1,540 kW_E engines and one 7 barg oil-fired boiler.

13.8.48 With regards to the potential impact on human health, the vessels will dock at a distance of around 1.5 km away from the nearest human health sensitive receptors (residential dwellings on Kings Road and Queens Road). Defra's LAQM-TG(22) guidance (Defra, 2022a) states that for the purposes

of LAQM, emissions from port expansions may need to be considered where:

- There are more than 5,000 large ship movements (i.e. cross-channel ferries, roll on-roll off ships, bulk cargo, container ships, cruise liners, etc – one ship generating two movements (arrival and departure)) per year, with relevant exposure within 250 m of the berths and main areas of manoeuvring; or
- There are more than 15,000 large ship movements per year, with relevant exposure within 1km of these areas.

13.8.49 The operational phase vessels do fall under the description of 'large ships' given in the Defra guidance (2022a), but the number of operational phase vessel movements per year associated with the IERRT project will fall well below the number of vessel movements listed in the guidance criteria (although it is noted that the total number of ships associated with the Port of Immingham (IERRT project + wider Port services) may exceed the values given in the Defra guidance). Given the distance between the likely area of operation of vessel movements and the nearest human health sensitive receptors, and the limited number of IERRT project vessel movements per year (relative to the criteria set by the Defra guidance), it is considered that the operational phase vessel emissions impacts at human health sensitive receptors would have an **insignificant** effect.

13.8.50 The vessels will dock at a distance of around 3 km away from the nearest air quality sensitive habitat within the Humber Estuary SAC/ SPA (saltmarsh to the north-west of the ABP Humber International Terminal) and within 500 m of undesignated Priority Habitat located to the east of the site and to the south of the southern storage area. There is the potential for operational phase vessels to contribute to the impact on the nature conservation habitats.

Land-tug and HGVs

13.8.51 Emissions associated with the operational phase land-tugs and onsite HGV movements have been considered in this assessment. The assessment is based on a number of assumptions summarised as follows:

- Land-tugs are required to move all unaccompanied freight to docked vessels during loading and from docked vessels during unloading;
- Total daily land-tug movement numbers based on information provided by the potential site operator;
- The distribution of land-tugs movements on each section of onsite road provided by the competent expert for traffic and transport;
- The land-tugs will operate using a Volvo 160 kW NRMM Stage V compliant engine, which has a NO_X emission rate of 0.4 g/kWh; and
- Land-tug NH_3 emission rates calculated based on the NO_X/NH_3 relationship obtained for HGVs from Defra's Emission Factor Toolkit (version 11) and Air Quality Consultants (AQC) Calculator for Road Emissions of Ammonia (CREAM) tool (Version 1A).

Combined onsite source impacts

Human health receptors

13.8.52 The focus of the assessment of onsite emissions sources has been on the nearest nature conservation receptors. However, the impact of these emissions on the nearest human health sensitive receptors, the residential properties on Queens Road, has also been quantified . At receptor R3 (see Table 13A.19 in Appendix 13.1 and Figure 13.1b of this ES), there is a combined onsite source emissions impact of 0.3 µg/m³, 39% of which is contributed from IERRT project land-tug and onsite HGV movements, and 61% is contributed from docked vessel energy plant. In itself, a 0.3 µg/m³ impact is described by IAQM/ EPUK guidance (Moorcroft and Barrowcliffe, 2017) as negligible impact on human health, the effect of which would be **insignificant**.

Nature conservation receptors

13.8.53 Operational pollutant statistics at nature conservation sensitive receptors close to the IERRT are reported in Table 13.15 below.

Table 13.15. Predicted operational pollutant statistics from onsite sources (nature conservation senstive receptors)

Receptor ID	Annual Mean NO_X (µg/m³)		Nitrogen Deposition Rate (kg N/ha/yr)[1]	
	Concentration[2]	Change[3,4]	Deposition Rate[2]	Rate Change[3,4]
Humber Estuary SAC/ SPA (North East Lincolnshire estuary shore and East Riding of Yorkshire estuary shore)				
SAC1	19.9	0.1 (<1%)	**20.5**	<+0.1 (<1%)
SAC2	17.2	0.1 (<1%)	19.2	<+0.1 (<1%)
SAC3	14.7	**0.5 (1.6%)**	19.1	+0.1 (<1%)
SAC4	16.2	**0.5 (1.7%)**	19.1	+0.1 (<1%)
SAC5	16.3	**0.3 (1.0%)**	18.0	<+0.1 (<1%)
Local Wildlife Site (Homestead Park, Immingham)				
LWS1	17.1	0.2 (0.6%)	**34.2**	<+0.1 (<1%)
Site of Importance for Nature Conservation (adjacent to Manby Road Immingham)				
SINC1	17.1	0.2 (0.7%)	**20.5**	<0.1 (0.2%)
Priority Habitats (within and adjacent to the Port of Immingham)				
PH1	20.1	**0.9 (3.1%)**	**32.4**	0.1 (<1%)
PH2	19.4	**0.8 (2.8%)**	**32.4**	0.1 (<1%)
PH3	29.2	**3.0 (10.1%)**	**20.7**	0.2 (2.3%)
PH4	14.0	0.1 (0.3%)	**34.2**	<0.1 (0.1%)
Air Quality Standard	**30**		**10 – 20[5,6] 20 – 30[7]**	

Notes:
[1] Nitrogen deposition rate based on NO_2 contributions.
[2] **Bold** values denote and exceedance of the relevant air quality standard.
[3] **Bold** values denote an impact of more than 1% of the air quality standard
[4] From Future baseline 1 only. These receptors are too distant from the modelled road network to be affected by the contribution of in-combination traffic flows.
[5] Broadleaved deciduous woodland. [6] Acid grassland. [7] Coastal saltmarsh.

13.8.54 Receptors include the nearest sensitive saltmarsh habitat to the site within the SAC/ SPA, and other nearby nature conservation designations. The location of these receptors and summary of results is illustrated in Figure 13.3 of this ES.

13.8.55 Operational conditions at the nature conservation sensitive receptors within and adjacent to the IERRT project are summarised as follows:

- Annual mean NO_X concentrations predicted are below the air quality objective at the saltmarsh habitats within the SAC/ SPA, and at the LWS, SINC and Priority Habitats considered in Immingham;
- The impact of operational onsite emissions is greater than 1% of the air quality objective for annual mean NO_X at some sections of saltmarsh habitat within the SAC/ SPA and at Priority habitat locations close to onsite emission sources. These impacts cannot be screened as insignificant;
- Nitrogen deposition rates at the saltmarsh habitat within the SAC/ SPA are close to or are above the relevant Critical Load for that habitat. Deposition rates at the LWS, SINC and Priority Habitats considered in Immingham are above the relevant lower Critical Load thresholds;
- The impact of operational onsite emissions is less than 1% of the Critical Load for nitrogen deposition at the saltmarsh habitat within the SAC/ SPA; and
- The impact of operational onsite emissions is greater than 1% of the Critical Load for nitrogen deposition at some Priority habitat locations close to onsite emission sources. However, there is currently no guidance that requires impacts to be quantified on this classification of habitat, nor how to determine the significance of air quality impacts.

13.8.56 The predicted NO_X and nitrogen deposition impacts have been reviewed by the competent experts for ecology. At the saltmarsh habitats within the SAC/ SPA, annual mean NO_X impacts of 1.7% of the air quality objective are predicted to affect a small proportion of these habitats. These impacts occur at a location where total concentrations are less than 70% of the air quality objective. At the Priority Habitats considered, annual mean NO_X and nitrogen deposition impacts of 10% and 2% of their relevant air quality standards respectively are predicted to affect the grassland habitat near to the IERRT project's southern storage area. At this location total NO_X concentrations account for 87% of the air quality objective and total nitrogen deposition rates 103% of the of the upper Critical Load for acid grassland habitat. However, and as stated previously, there is currently no guidance that requires consideration of air quality impacts on Priority Habitat. Therefore, whilst these impacts are reported, they do not inform the determination of significance.

13.8.57 Operational NH_3 and NH_3 (+ NO_2) derived nitrogen deposition statistics at the nearest air quality sensitive habitat within the SAC/ SPA are reported in Table 13.16 below.

Table 13.16. Predicted operational NH_3 and nitrogen deposition statistics from onsite sources (nature conservation senstive receptors)

Receptor ID	Annual Mean NH_3 (µg/m³)		Nitrogen Deposition Rate (kg N/ha/yr)[1]	
	Concentration[2]	Change[3,4]	Deposition Rate[2]	Rate Change[3,4]
Humber Estuary SAC/ SPA (North East Lincolnshire estuary shore and East Riding of Yorkshire estuary shore)				
SAC1	**2.1**	<+0.1 (<1%)	**20.5**	<+0.1 (<1%)
SAC2	**2.0**	<+0.1 (<1%)	19.2	<+0.1 (<1%)
SAC3	**2.1**	<+0.1 (<1%)	19.1	+0.1 (<1%)
SAC4	**2.1**	<+0.1 (<1%)	19.1	+0.1 (<1%)
SAC5	**2.0**	<+0.1 (<1%)	18.0	<+0.1 (<1%)
Air Quality Standard	**1 - 3**		**20 – 30**[5]	

Notes:
[1] Nitrogen deposition rate based on NH_3 and NO_2 contributions.
[2] **Bold** values denote and exceedance of the relevant air quality standard.
[3] **Bold** values denote an impact of more than 1% of the air quality standard.
[4] From Future baseline 1 only. These receptors are too distant from the modelled road network to be affected by the contribution of in-combination traffic flows.
[5] Coastal saltmarsh.

13.8.58 Operational conditions at the SAC/ SPA receptors within and adjacent to the IERRT project are summarised as follows:

- Annual mean NH_3 concentrations predicted are above the lower Critical Level threshold at all saltmarsh habitats considered within the SAC/ SPA;
- The annual mean NH_3 impact is less than 1% of the lower Critical Level threshold;
- Nitrogen deposition rates at the saltmarsh habitat within the SAC/ SPA are close to or are above the relevant Critical Load for that habitat; and
- The impact on nitrogen deposition rates is less than 1% of the lower Critical Load threshold for saltmarsh.

Significance of onsite emissions sources effects

13.8.59 The assessment of onsite emissions sources during the operational phase has demonstrated that the effect of combined emissions from marine vessels, and land-tug and HGV movements on onsite roads will be **insignificant** for human health sensitive and nature conservation sensitive receptors.

13.8.60 The effect of emissions on the SAC considered **insignificant**, due to the annual mean NO_X concentrations remaining below 70% of the air quality standard and nitrogen deposition rate and NH_3 concentration impacts accounting for less than 1% of the Critical Load and Critical Level respectively.

Offsite emissions sources

Operational traffic

13.8.61 Air quality impacts are derived from the magnitude of change in pollutant concentration as a result of the IERRT project and the total pollutant concentration experienced at a receptor with the IERRT project in operation, relative to the air quality standard.

13.8.62 The assessment of operational road traffic emissions therefore considers the impact of flows on roads local to the IERRT project. At these locations the magnitude of change will be highest due the concentrated number of IERRT-related traffic movements as they approach and leave the Port. The assessment also considers the impact of flows on roads more remote from the IERRT project. At these locations, IERRT-related traffic movements will have diluted across the wider road network and the magnitude of change will be less. However, total pollutant concentrations may be higher, particularly where these roads experience higher future baseline traffic flow and higher future baseline pollutant concentrations. The remote locations considered in the assessment include AQMAs and designated nature conservations sites adjacent to sections of the SRN (A180, M180, M18, M1 and M62).

13.8.63 The traffic data used for the assessment is provided in Appendix 13.1 of this ES. The traffic flow impact of the IERRT project, as change in two-way daily average total vehicle flow, light goods vehicle (LGV) and HGV flow is summarised in Table 13.10. It should be noted that the traffic impact reported in the table below and used to inform this assessment is precautionary. This is because approximately 15% of the IERRT-project HGV flows reported here are associated with existing Ro-Ro operations at the Port of Immingham's Inner Dock.

Table 13.17. Change in traffic flows with IERRT in operation

Road Link	Total Flow	LGV	HGV Flow
West Gate	352	61	**291**
East Gate	**2000**	348	**1652**
Queens Road	**1779**	139	**1640**
A1173	**1741**	101	**1640**
A160	304	13	**291**
A180	**1642**	76	**1566**
M180 (J4-J5)	**1811**	76	**1735**
A15 (south of M180)	371	0	**371**
M180 (J3-J4)	**1365**	2	**1363**
A18	0	0	0
M180 (J2-J3)	**1365**	2	**1363**
M180 (J1-J2)	**1365**	2	**1363**
M18 (J5-J6)	256	0	**256**
M18 (J4-J5)	497	1	**496**
M18 (J3-J4)	497	1	**496**

Road Link	Total Flow	LGV	HGV Flow
A638	0	0	0
A1 (J36-J37)	0	0	0
M18 (J1-J2)	463	1	**462**
M1 (J30-J31)	393	0	**393**
M1 (J28-J29)	355	0	**355**
M1 (J25-J26)	191	0	191
M1 (J24A-J25)	191	0	191
M1 (J32-J33)	70	1	69
M1 (J33-J34)	37	0	37
M1 (J34-J35)	37	0	37
M1 (J36-J37)	6	0	6
M62 (J29-J30)	256	0	**256**
M62 (J27-J28)	215	0	**215**
M62 (J26-J27)	215	0	**215**
M62 (J35-J36)	0	0	0

Human health sensitive receptors

13.8.64 Operational air quality and impacts associated with offsite road traffic emissions have been modelled at selected air quality sensitive locations in the vicinity of the IERRT project and at locations within AQMAs that are adjacent to sections the SRN affected by the IERRT project. Operational pollutant statistics at human health sensitive receptors are reported in Table 13.10 below. The location of receptors and a summary of results is illustrated in Figure 13.3 of this ES.

Table 13.18. Predicted operational pollutant statistics (human health senstive receptors)

Receptor ID	Annual Mean NO_2 Conc. ($\mu g/m^3$)[1]	NO_2 Change ($\mu g/m^3$)	Annual Mean PM_{10} Conc. ($\mu g/m^3$)[1]	PM_{10} Change ($\mu g/m^3$)	Annual Mean $PM_{2.5}$ Conc. ($\mu g/m^3$)[1]	$PM_{2.5}$ Change ($\mu g/m^3$)
Immingham						
R1	20.0	1.7	15.4	+0.8	8.8	+0.5
R2	20.5	1.6	16.1	+0.8	9.1	+0.4
R3	21.2	1.8	16.3	+0.9	9.2	+0.5
South Killingholme						
R4	25.4	+0.1	17.3	+0.1	9.9	+0.1
R5	28.1	+0.1	17.8	+0.1	10.2	+0.1
R6	14.0	+0.1	16.9	+0.1	9.0	<+0.1
R7	17.2	+0.1	16.7	+0.1	9.0	<+0.1
R8	25.0	+0.1	18.3	+0.1	9.9	0.1
A180 / M180 Corridor						
R9	10.6	<+0.1	16.5	<+0.1	8.7	<+0.1
R10	12.5	<+0.1	19.1	+0.1	9.8	<+0.1
R11	13.5	+0.1	18.2	+0.1	9.6	<+0.1

Receptor ID	Annual Mean NO_2 Conc. ($\mu g/m^3$)[1]	NO_2 Change ($\mu g/m^3$)	Annual Mean PM_{10} Conc. ($\mu g/m^3$)[1]	PM_{10} Change ($\mu g/m^3$)	Annual Mean $PM_{2.5}$ Conc. ($\mu g/m^3$)[1]	$PM_{2.5}$ Change ($\mu g/m^3$)
R12	13.4	+0.1	18.6	+0.1	9.8	<+0.1
R13	15.5	+0.1	17.8	+0.1	9.7	+0.1
R14	17.3	+0.1	18.2	+0.1	9.6	+0.1
R15	10.4	<+0.1	16.5	<+0.1	9.0	<+0.1
R16	12.4	<+0.1	16.1	+0.1	9.2	<+0.1
R17	14.5	<+0.1	18.8	+0.1	11.3	<+0.1
R18	13.5	<+0.1	15.9	+0.1	9.0	<+0.1
Doncaster Council – AQMA No.4						
R19	23.1	<+0.1	15.4	<+0.1	9.3	<+0.1
R20	22.8	<+0.1	15.4	<+0.1	9.3	<+0.1
R21	21.3	<+0.1	15.5	<+0.1	9.3	<+0.1
R22	20.6	<+0.1	15.2	<+0.1	9.1	<+0.1
Rotherham Council – Rotherham AQMA 1 – Part 3						
R23	33.7	<+0.1	16.8	<+0.1	10.0	<+0.1
R24	29.1	<+0.1	16.1	<+0.1	9.5	<+0.1
Bolsover Council – Barlborough AQMA No.2						
R25	27.5	<+0.1	16.3	<+0.1	9.5	<+0.1
Bolsover Council – South Normanton AQMA (revoked 02/03/2022)						
R26	34.2	<+0.1	17.1	<+0.1	10.3	<+0.1
Near to Wakefield Council – M1 AQMA						
R27	19.1	<+0.1	15.4	<+0.1	8.9	<+0.1
R28	20.0	<+0.1	15.1	<+0.1	8.9	<+0.1
Between Wakefield Council – M1 AQMA and Kirklees Council – AQMA No.4						
R29	26.7	<+0.1	16.3	<+0.1	10.1	<+0.1
R30	28.3	<+0.1	16.3	<+0.1	10.2	<+0.1
Kirklees Council – AQMA No.4						
R31	30.7	<+0.1	15.4	<+0.1	10.0	<+0.1
R32	28.8	<+0.1	15.2	<+0.1	9.9	<+0.1
Air Quality Objectives	**40**		**40**		**25**	

Notes:
[1] **Bold** values denote and exceedance of the relevant air quality objective.

13.8.65 Operational conditions at the human health sensitive receptors are summarised as follows:

- Annual mean concentrations of PM_{10} and $PM_{2.5}$ are well below the respective air quality objectives for those pollutants (40 $\mu g/m^3$ and 25 $\mu g/m^3$ respectively) at all modelled locations;
- The maximum change in PM_{10} and $PM_{2.5}$ concentrations due to the operation of the IERRT project, of 0.9 $\mu g/m^3$ (small) and 0.5 $\mu g/m^3$ (small) respectively, occurs at receptor R3. A small change in concentration where total concentrations are <75% of the air quality objective represents a negligible impact;

- Annual mean PM_{10} concentrations are such that daily mean concentrations of PM_{10} are unlikely to exceed that air quality objective for that pollutant (no more than 35 daily exceedances of 50 µg/m³);
- Close to the IERRT project, at receptors in Immingham and South Killingholme, and locations adjacent to the A180 and M180, annual mean concentrations of NO_2 are well below the air quality objective for that pollutant (40 µg/m³);
- The maximum change in NO_2 concentrations due to the operation of the IERRT project at receptors in Immingham and South Killingholme is +1.8 µg/m³ (small). A small change in concentration where total concentrations are <75% of the air quality objective represents a negligible impact;
- At receptor R3, the change of offsite road traffic emissions (+1.8 µg/m³ and onsite emissions sources (+0.3 µg/m³ reported in paragraph 13.8.52) equates to a combined of 2.1 µg/m³ (medium). A medium change in concentration where total concentrations are <75% of the air quality objective represents a slight adverse impact;
- At locations remote from the IERRT project, within or near to AQMAs on the SRN, annual mean concentrations of NO_2 are not considered to be at risk of exceeding the air quality objective for that pollutant (<36 µg/m³);
- The change in NO_2 concentrations due to the operation of the IERRT project at these locations is <+0.1 (imperceptible). An imperceptible change in air quality represents a negligible impact;
- Annual mean NO_2 concentrations in the operational scenario are such that hourly mean concentrations of NO_2 are unlikely to exceed that air quality objective for that pollutant (no more than 18 hourly exceedances of 200 µg/m³).

Nature conservation receptors

13.8.66 Operational pollutant statistics and impacts from offsite road traffic emissions at nature conservation sensitive receptors are reported in Table 13.10 below. The location of receptors and summary of results is illustrated in Figure 13.3 of this ES. The table presents the future operational conditions and the air quality impact on annual mean NO_X concentrations and nitrogen deposition rates, based on the contribution from the IERRT project alone (Future baseline 1). This value has been used by the competent experts for ecology to consider the effect of air quality impact on the nature conservation sites. Following stakeholder consultation and a recommendation from Natural England that the ES (and HRA) consider the likelihood of operational traffic acting in combination with other plans or projects, Table 13.19 also shows the change between the Operational scenario and Future baseline 2, the impact of the IERRT project alongside the contribution from traffic growth between the existing baseline (2019) and the year of opening (2025), and major cumulative developments in the area.

Table 13.19. Predicted operational pollutant statistics (nature conservation senstive receptors)

Receptor ID[1]	Annual Mean NO_X (µg/m³)			Nitrogen Deposition Rate (kg N/ha/yr)[2]		
	Concentration[3,4]	Change		Deposition Rate[3,4]	Change	
		From Future Baseline 1 [5, 6]	From Future Baseline 2[7]		From Future Baseline 1 [5,6]	From Future Baseline 2[7]
Potteric Carr SSSI (adjacent to the M18 motorway)						
SSSI1[9]	27.8	<+0.1 (<1%)	+7.4 (+24.7%)	**34.8**	<+0.1 (<1%)	1.4 (+14.5%)
SSSI2[9]	23.9	<+0.1 (<1%)	+5.6 (+18.6%)	**35.1**	<+0.1 (<1%)	1.2 (+11.6%)
Edlington Wood SSSI (adjacent to the M18 motorway)						
SSSI3[10]	**49.5**	<+0.1 (<1%)	+16.9 (+56.2%)	**39.0**	<+0.1 (<1%)	2.8 (+18.9%)
Local Wildlife Sites (selected locations adjacent to the A180, M180 and M18)						
LWS2[8]	21.0	+0.2 (<1%)	+4.7 (+15.6%)	**23.9**	<+0.1 (<1%)	0.5 (+4.7%)
LWS3[9]	24.1	+0.2 (<1%)	+6.4 (+21.5%)	**45.0**	<+0.1 (<1%)	1.3 (+12.7%)
LWS4[9]	22.6	+0.2 (<1%)	+6.0 (+19.9%)	**53.9**	<+0.1 (<1%)	1.2 (+12.0%)
LWS5[9]	27.2	+0.2 (<1%)	+8.1 (+27.0%)	**54.7**	<+0.1 (<1%)	1.5 (+15.4%)
LWS6[9]	19.5	+0.1 (<1%)	+4.7 (+15.7%)	**39.8**	<+0.1 (<1%)	1.0 (+9.9%)
LWS7[8]	**34.4**	+0.3 (<1%)	+11.9 (+39.6%)	**22.9**	<+0.1 (<1%)	1.0 (+10.3%)
LWS8[9]	**31.1**	<+0.1 (<1%)	+8.6 (+28.8%)	**37.5**	<+0.1 (<1%)	1.6 (+16.4%)
LWS9[9]	**42.1**	<+0.1 (<1%)	+13.8 (+45.9%)	**39.4**	<+0.1 (<1%)	2.4 (+23.9%)
LWS10[8]	**62.5**	**+0.3 (+1%)**	+22.6 (+75.4%)	**22.8**	<+0.1 (<1%)	1.7 (+17.1%)
LWS11[8]	**69.4**	**+0.4 (+1%)**	+25.6 (+85.2%)	**23.3**	<+0.1 (<1%)	1.9 (+18.7%)
LWS12[9]	**49.6**	+0.1 (<1%)	+17.0 (+56.8%)	**37.3**	<+0.1 (<1%)	2.9 (+28.7%)
LWS13[9]	**56.5**	+0.1 (<1%)	+20.1 (+67.0%)	**38.3**	<+0.1 (<1%)	3.3 (+32.6%)
LWS14[9]	**62.7**	+0.1 (<1%)	+23.1 (+77.0%)	**39.1**	<+0.1 (<1%)	3.6 (+36.3%)
Ancient Woodland (selected locations adjacent to the M18 motorway)						
AW1[9]	**34.4**	+0.1 (<1%)	+10.3 (+34.2%)	**35.1**	<+0.1 (<1%)	1.9 (+19.1%)
AW2[9]	**43.1**	+0.1 (<1%)	+14.2 (+47.4%)	**37.1**	<+0.1 (<1%)	2.5 (+24.7%)
AW3[9]	**35.2**	+0.1 (<1%)	+10.6 (+35.5%)	**35.2**	<+0.1 (<1%)	2.0 (+19.7%)

Receptor ID[1]	Annual Mean NO_x (µg/m³)			Nitrogen Deposition Rate (kg N/ha/yr)[2]		
	Concentration[3,4]	Change		Deposition Rate[3,4]	Change	
		From Future Baseline 1 [5, 6]	From Future Baseline 2[7]		From Future Baseline 1 [5,6]	From Future Baseline 2[7]
Air Quality Standard	**30**			**10 – 20**[8,9] **15 – 20**[10]		

Notes:

[1] Results reported at section of nature conservation site closest to the road. For full receptor transect results, see Appendix 13.1 of this ES.

[2] Nitrogen deposition rate based on NO_2 contributions.

[3] **Bold** values denote and exceedance of the relevant air quality objective and/or Critical Load.

[4] Operation contribution includes traffic growth and major cumulative development between the existing baseline (2019) and the year of opening (2025).

[4] **Bold** values denote an impact of more than 1% of the air quality standard.

[5] Including traffic growth and major cumulative development between the existing baseline (2019) and the year of opening (2025).

[6] Not including traffic growth or major cumulative development between the existing baseline (2019) and the year of opening (2025).

[8] Acid grassland [9] Broadleaved deciduous woodland. [10] Meso- and eutrophic Quercus woodland.

13.8.67 Operational conditions at the nature conservation sensitive receptors are summarised as follows:

- Annual mean NO_X concentrations predicted are below the air quality objective at the Potteric Carr Site of Special Scientific Importance (SSSI);
- Annual mean NO_X concentrations predicted exceed the air quality objective at Edlington Wood SSSI, and at some LWSs and ancient woodland considered adjacent to the A180, M180 and M18;
- Nitrogen deposition rates are above the Critical Loads identified for the relevant habitat types at all receptors considered;
- Operational against Future baseline 1 – with traffic growth and cumulative development:
  - The change in annual mean NO_X between future baseline and the operational scenarios is below 1% (0.3 µg/m³) of the air quality objective at all sensitive SSSI and ancient woodland habitats, and at the majority of LWS habitats, with the exception of LWS10 and LWS11 (impact at LWS7 is 0.28 µg/m³). LWS10 and LWS11 are located immediately adjacent to the M18 motorway, south of junction 5, and at these habitats it is only the area within 10 m of the motorway that experiences an impact of 1%;
  - The change in annual mean NO_X between the existing baseline and operational scenarios demonstrates that the impact of the IERRT project plus cumulative development since 2019 has seen a decrease in concentrations. This is predominantly due to the improvement in vehicle emissions technology and the evolution of the vehicle fleet;
  - The change in nitrogen deposition rate is below 1% of Critical Load at all habitats, including locations within the SSSIs; and
  - The change in nitrogen deposition rates between the existing baseline and operational scenarios demonstrates that the impact of the IERRT project plus cumulative development since 2019 has seen some decrease in deposition rates. Again, this is mainly due to the improvement in vehicle emissions technology and the evolution of the vehicle fleet.
- Operational against Future baseline 2 – without traffic growth and cumulative development:
  - The combined impact of the IERRT project, traffic growth between 2019 and major cumulative development in the area accounts for a greater proportion of the air quality objective and Critical Loads than the impact of the IERRT project in isolation. The is, therefore, some likelihood of operational traffic acting in combination with other projects. However, the other projects account tor the largest contribution.

Significance of offsite emissions sources effects

13.8.68 The assessment of offsite emissions sources during the operational phase has demonstrated that the effect of impacts on human health sensitive receptors summarised above and shown in Table 13.10 are considered to be **insignificant**.

13.8.69 Impacts reported at the nature conservation sites located adjacent to the public road network and SRN, as reported in Table 13.10, account for less

than 1% of the Critical Load for nitrogen deposition at all of the habitats considered. Impacts on annual mean NO_X account for less than 1% of the air quality objective at the majority of habitats considered, with the exception of roadside locations within two LWS habitats adjacent to the M18 motorway. As these impacts account for 1% of the air quality objective only at areas of the LWS habitats that are within 10 m of the nearest M18 carriageway, and the fact that all other habitats experience impacts of less than 1% of the relevant air quality standard, the effect of the impacts reported in Table 13.10 is considered **insignificant**.

13.9 Mitigation measures

Construction phase

Onsite emissions sources

Construction dust

Step 3 Site Specific Mitigation

13.9.1 Step 3 of the IAQM construction dust guidance uses the risk of dust impacts identified in Step 2C to compile an appropriate list of dust mitigation to offset that risk and ensure that a significant effect does not occur. The IAQM guidance relevant to the construction dust assessment (IAQM, 2014) lists measures that should be applied, if practical, relative to the risk identified.

13.9.2 In this instance, a medium risk of dust impacts was identified due to the potential dust emission magnitude and the sensitivity of the area. Therefore, the list of IAQM recommended mitigation measures provided below is proportionate to the risk identified. The final list of mitigation measures to be taken forward during the construction works is defined within the Construction Environmental Management Plan (CEMP) (Application Document Reference number 9.2).

13.9.3 Of the recommended IAQM dust (and particulate matter) mitigation measures for medium risk sites, those to be implemented during the works are as follows:

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary;
- Display the head or regional office contact information;
- Inclusion of a comprehensive list of dust control measures within the CEMP;
- 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 air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook;

- Undertake daily onsite 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;
- Carry out regular site inspections to monitor compliance with dust control measures within the CEMP, record inspection results;
- Increase the frequency of site inspections by the person accountable for air quality and dust issues onsite when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions;
- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
- Erect solid screens/ barriers or enclose site or specific operations where there is a very high potential for dust production and the site is active for an extensive period;
- Avoid site runoff of water or mud;
- Keep site fencing, 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. If they are being re-used on-site cover as described below;
- Cover, seed or fence long-term stockpiles to prevent wind whipping;
- Ensure all vehicles switch off engines when stationary - no idling vehicles;
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable;
- Impose and signpost maximum-speed-limits on surfaced and unsurfaced haul roads and work areas;
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression technique;
- Ensure an adequate water supply on the site for effective dust/ particulate matter suppression/ mitigation;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment if it is fitted;
- Ensure equipment is readily available onsite to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods;
- Avoid bonfires and burning of waste materials;
- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);
- Ensure effective water suppression is used during demolition operations;
- Avoid explosive blasting, using appropriate manual or mechanical alternatives;
- Bag and remove any biological debris or damp down such material before demolition;
- Avoid scabbling (roughening of concrete surfaces) if possible;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out;

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Record all inspections of haul routes and any subsequent action in a site logbook;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). Ensuring that there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits;
- 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; and
- Access gates to be located at least 10 m from receptors where possible.

Construction site plant, NRMM and marine vessels

13.9.4 Even though the effect of construction phase plant, NRMM and vessel emissions impacts is not significant before mitigation, it is good practice to reduce emissions to air where possible and the following measures will be implemented to reduce emissions associated with these sources:

- They will conform to relevant emissions standards;
- Operate on an only when required basis, with no engine idling;
- Be well maintained and operate in accordance with manufacturer's instructions; and
- Be operated by fully trained and qualified individuals.

Offsite emissions sources

Construction road traffic emissions

13.9.5 Even though the effect of construction phase road traffic emissions impacts is not significant before mitigation, it is good practice to reduce emissions to air where possible. Mitigation measures that apply to construction road traffic emissions are as follows:

- The emissions standards of the construction vehicle fleet should be a consideration when appointing construction contractors;
- Construction vehicle trips should be minimised as much as possible;
- Construction traffic routes should be planned to avoid areas where air quality is already constrained; and
- Single car occupancy trips should be discouraged.

Operational phase

13.9.6 No significant effects on air quality have been identified during construction. However, it is considered good practice to reduce emissions to air where possible. Some such measures are inherent within the IERRT project design.

Onsite emissions sources

Marine vessels, land-tugs and HGVs

13.9.7 During the operational phase, proposed mitigation measures relate to vessel, land-tug and HGV emissions onsite and are summarised as follows:

- Vessel emissions to comply with relevant MARPOL NO_X and SO_2 emission standards;
- Main vessel engines fitted with scrubber technology to ensure compliance with the SO_2 emission standard;
- The prohibiting of unnecessary engine idling of all vehicles on site; and
- The enforcement of mandatory speed limits on site.

13.9.8 It is also noted that the use of shoreside electrical power to ships at berth, electric vehicle charging points, the phasing out of diesel-powered land-tugs for electric land-tugs, and the use of other electric powered site plant are likely to become more common in future years. This inevitably means that onsite emissions during operation will decrease over time

Offsite emissions sources

Operational traffic

13.9.9 No mitigation measures are listed for offsite road traffic emissions impacts. However, it is noted that vehicle emissions will improve over future years, due to modernised emissions technology and the evolution of the vehicle fleet that uses the IERRT project. Whilst not being a variable that can be controlled by the IERRT project, it inevitably means that operational road traffic emissions impacts will decrease over time.

13.10 Limitations and assumptions

13.10.1 The assessment has been undertaken based on a number of assumptions with the following limitations:

- Baseline conditions within the study area have been established through a review of monitored pollutant concentration data gathered by local authorities, which has been supplemented by a project specific NO_2 diffusion tube survey carried out at locations adjacent to Queens Road, A160 Humber Road and sections of the M180. Data at specific locations has been assumed to be representative of conditions experienced at other nearby locations. This data has also been used to verify the road traffic emission dispersion model, on the assumption that it represents actual conditions within the study area that the model can be validated against;
- Defra background data (Defra, 2022a) has been used to represent background pollutant concentration data in the study area. Such an approach is not unreasonable and is common practice. Defra background concentrations for the existing baseline year of 2019 broadly

align with the background monitoring data available within the study area;
- The detailed assessment of road traffic emissions impacts is informed by traffic data provided by in Chapter 17 (Traffic and Transport) of this ES. The data are derived from two sources: traffic counts undertaken on local roads in the vicinity of the IERRT project; and DfT traffic counts undertaken on the SRN remote from the IERRT project. In the absence of wider project-specific traffic counts, the use of data from counts undertaken by DfT is considered acceptable;
- Vehicle speeds have been estimated based on the speed limit of the roads and the location of receptors relative to junctions that will affect vehicle speeds. The road traffic emissions dispersion model has been verified in line with relevant guidance and that process will account for uncertainties in vehicle speeds;
- The assessment of construction phase vehicle emissions is based on the precautionary assumption that 100% of construction traffic will access the construction site via the Port of Immingham west gate, via Humber Road, and that 100% of construction traffic will access the construction site via the Port of Immingham east gate, via Queens Road. In reality, it is likely that the construction traffic will be distributed between both gates;
- The assessments reported in this ES chapter are informed by hourly sequential meteorological data gathered in 2019 from a number of meteorological monitoring stations. Humberside Airport was used to represent locations close to the site and sections of the A180 and M180; Doncaster Sheffield Airport was used to represent locations adjacent to sections of the M18 and M1 at Rotherham and Sheffield; Watnall was used to represent conditions adjacent to the M1 at Bolsover and Broxtowe; and Emley Moor was used to represent conditions at Kirklees, Leeds and Wakefield. It is assumed that these data are representative of meteorological conditions experienced within the relevant sections of the air quality study area. In the absence of a nearer publicly available sources of hourly sequential data, this is considered the most appropriate approach; and
- NH_3 has been modelled to quantify impacts at sensitive habitats within the SAC to inform the HRA, based on emissions derived using the AQC CREAM tool approach. The tool provides a precautionary estimate of NH_3 emissions.

13.11 Residual effects and conclusions

13.11.1 A summary of the impact pathways that have been assessed, the identified residual impacts and level of confidence is presented in Table 13.20 of this ES chapter.

13.11.2 The assessment of construction phase dust impacts has identified a number of measures that could be implemented to reduce emissions and offsite impacts. The measures listed in Section 13.9 of this ES chapter are best practice measures defined by the IAQM (Holman *et al*., 2014). Measures are also listed that apply to construction site plant, NRMM and marine vessels.

13.11.3 The assessment of operational phase emissions includes mitigation inherent within the IERRT project design.

13.11.4 Residual effects after the application of mitigation measures identified in the assessment are provided below.

Construction phase

Onsite emission sources

13.11.5 Step 4 of the IAQM construction dust guidance (Holman *et al*., 2014) is to determine whether or not the effects, after the application of the identified level of mitigation are, significant or not. The IAQM guidance states that:

> *"For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'".*

13.11.6 Therefore, providing a sufficient level of dust mitigation is implemented on site throughout the works, with reference to those recommended by the IAQM, which are considered standard practice on all well managed construction sites, it is considered that the residual effects from the IERRT project are **insignificant** at both human health and nature conservation receptors. The contribution of site plant, NRMM and construction marine vessel emissions were already considered not to contribute to a significant effect before mitigation.

Offsite emission sources

13.11.7 The residual effect of construction phase traffic emissions impacts on human health sensitive receptors is **insignificant** with reference to the significance criteria published by IAQM/ EPUK (Moorcroft and Barrowcliffe *et al.*, 2017).

13.11.8 The nearest nature conservation receptor within 200 m of a known construction route is the LWS habitats located adjacent to the A180 at Melton Ross. At the distance of the LWS from the IERRT project, construction traffic is expected to have diluted on the public road network to be below relevant screening criteria and the temporary impact nature conservation is also **insignificant**.

Operational phase

Onsite emissions

13.11.9 A detailed assessment of operational onsite emissions has been undertaken, including docked vessel emissions, land-tug emissions and onsite HGV movement emissions.

13.11.10 Impacts have been quantified at the nearest sensitive habitat within the Humber Estuary SAC/ SPA, the nearest LWS habitat to the IERRT project, the nearest SINC habitat, and at a number of undesignated Priority Habitats. At the SAC/ SPA, LWS and SINC habitats, the impact of onsite emissions is screened as **insignificant**. At three of the undesignated Priority Habitat areas, impacts are over 3% of the annual mean NO_X air quality objective. At one undesignated Priority Habitat area, impacts are over 2% of the relevant Critical Load for nitrogen deposition. However, as there is no guidance nor accepted mechanism by which to determine the significance of effect at undesignated habitat, the +1% impacts predicted at the Priority Habitat areas has not been used to inform the significance of effects reported in this chapter.

Offsite emissions

13.11.11 A detailed assessment of operational offsite vehicle movement emissions has been undertaken utilising anticipated traffic flow impact on roads local to the IERRT project and roads remote to the IERRT project. Remote roads were considered where traffic impacts are expected on the SRN at locations where local air quality is already compromised in the existing baseline (AQMAs).

13.11.12 The magnitude of change in annual mean concentrations of NO_2 was found to be small at a limited number of residential dwellings on Queens Road. Due to total pollutant concentrations with the IERRT project in place being predicted well below the relevant air quality objectives, the impact there was determined to be negligible. Elsewhere, including receptors within the AQMAs on the SRN, the magnitude of change was either very small or imperceptible and the impact determined negligible. The effect of a negligible impact on local air quality is considered to be **insignificant**.

13.11.13 A detailed assessment of operational offsite vehicle movement emissions has also been undertaken at sensitive nature conservation habitats located adjacent to roads affected by IERRT traffic. This included LWS habitats adjacent to the A180 and M180, and ancient woodland adjacent and two SSSI habitats adjacent to the M18.

13.11.14 The magnitude of change at the majority of these habitats to annual mean NO_X concentration and nitrogen deposition rate is <1% of the relevant air quality objective and Critical Loads. At these locations, impacts were be screened as **insignificant**. At two LWS habitats immediately adjacent to the M18, annual mean NO_X impacts accounted for 1% of the air quality objective. The 1% increase affected just the proportion of the LWS habitats located within 10 m of the M18 carriageways. Beyond 10 m, the impact was <1% of the air quality objective. Given the level of designation of these habitats, the impact of just 1%, and the limited area of each habitat affected by the 1% increase, the effect at these two locations is also considered to be **insignificant**.

13.11.15 Due to the uncertainty associated with future conditions, in terms of background air quality and vehicle emissions, a sensitivity analysis has also been undertaken. This provides an overly precautionary estimate of operational phase offsite traffic emissions impacts and is reported in Appendix 13.1 of this ES. Whilst the precautionary assumptions used to inform the sensitivity analysis result in higher pollutant concentrations and a greater magnitude of change, the conclusion of the sensitivity analysis does not conflict with that of the main assessment reported in this chapter.

Table 13.20. Summary of potential impact, mitigation measures and residual impacts

Receptor	Impact Pathway	Impact Significance	Mitigation Measure	Residual Impact	Confidence
Construction Phase					
Human health and amenity sensitive receptors	Onsite emissions sources (marine vessels, site plant and construction dust)	Potentially significant due to effect of unmitigated dust impacts	Standard practice dust mitigation as recommended by the IAQM	Insignificant	High
	Offsite emissions sources (road traffic movement emissions on local roads and SRN)	Insignificant	Standard trip and emissions reduction measures typically set out within a Construction Travel Plan and/or CEMP	Negligible	High
Nature conservation receptors	Onsite emissions sources (marine vessels, site plant and construction dust)	Potentially significant due to effect of unmitigated dust impacts	Standard practice dust mitigation as recommended by the IAQM	Negligible	High
	Offsite emissions sources (road traffic movement emissions on local roads and SRN)	Insignificant	Standard trip and emissions reduction measures typically set out within a Construction Travel Plan and/or Construction Environmental Management Plan	Negligible	High

Receptor	Impact Pathway	Impact Significance	Mitigation Measure	Residual Impact	Confidence
Operational Phase					
Human health sensitive receptors	Onsite emissions sources (marine vessels, land-tugs and HGV movement emissions)	Insignificant	Marine Vessels: - Compliance with appropriate emission standards - SO_2 scrubbers on main engine emissions Land-tugs: - Prohibit the unnecessary idling of engines - Selective Catalytic Reduction - Onsite speed limits HGVs: - Operational travel plan - Onsite speed limits - Prohibit the unnecessary idling of engines	Insignificant	High
	Offsite emissions sources (road traffic movement emissions on local roads and SRN)	Insignificant	- Indirect evolution of the vehicle fleet with introduction of modernised vehicles and better emissions technology	Insignificant	High

Receptor	Impact Pathway	Impact Significance	Mitigation Measure	Residual Impact	Confidence
Nature conservation receptors	Onsite emissions sources (marine vessels, land-tugs and HGV movement emissions)	Insignificant	Marine Vessels: - Compliance with appropriate emission standards - SO_2 scrubbers on main engine emissions Land-tugs: - Prohibit the unnecessary idling of engines - Selective Catalytic Reduction - Onsite speed limits HGVs: - Operational travel plan - Onsite speed limits - Prohibit the unnecessary idling of engines	Insignificant	High
	Offsite emissions sources (road traffic movement emissions on local roads and SRN)	Insignificant	- Indirect evolution of the vehicle fleet with introduction of modernised vehicles and better emissions technology	Insignificant	High

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13.13 Abbreviations/Acronyms

Acronym	Definition
AADT	Annual Average Daily Traffic
ABP	Associated British Ports
AQAL	Air Quality Assessment Level
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
ARN	Affected Road Network
AURN	Automatic Urban and Rural Network
BAMs	Beta Attenuation (Particulate) Monitors
barg	Unit for the Measurement of Gauge Pressure
CAFE	Clean Air For Europe
CAZ	Clean Air Zones
CEMP	Construction Environmental Management Plan
CO	Carbon monoxide
CREAM	Calculator for Road Emissions of Ammonia
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
EC	European Community
EIA	Environmental Impact Assessment
EPUK	Environmental Protection UK
ES	Environmental Statement
EU	European Union
EULV	European Union Limit Value
ha	Hectare(s)
HCs	Hydrocarbons
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
HM	His (Her) Majesty's
HRA	Habitat Regulations Assessment
IAQM	Institute of Air Quality Management
ID	Identity

IERRT	Immingham Eastern Ro-Ro Terminal
kWE	Kilowatt-Electric
LAQM	Local Air Quality Management
LDF	Local Development Framework
LDV	Light Duty Vehicle
LGV	Light Goods Vehicle
LWS	Local Wildlife Sites
MARPOL	International Convention for the Prevention of Pollution from Ships
MGO	Marine Gas Oil
MPS	Marine Policy Statement
MWe	Megawatts electric
MWe	Megawatt Electric
N/A	Not Applicable
NH_3	Ammonia
NO	Nitrous oxide
NO_2	Nitrogen dioxide
NO_X	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPSfP	National Policy Statement for Ports
NRMM	Non-Road Mobile Machinery
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PM_{10}	Particulate matter
$PM_{2.5}$	Fine particulate matter
PPG	Planning Practice Guidance
SAC	Special Area of Conservation
SINC	Site of Importance for Nature Conservation
SO	Strategic Objective
SO_2	Sulphur dioxide
SPA	Special Protection Area
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
TG	Technical Guidance
UK	United Kingdom

Cardinal points/directions are used unless otherwise stated.

SI units are used unless otherwise stated.

13.14 Glossary

Term	Definition
Air Quality Management Area	Zones declared by Local Authorities where areas of relevant exposure exceed or are at risk of exceeding an air quality objective
Carbon monoxide (CO)	Carbon monoxide, a by-product of fossil fuel combustion
Heavy Good Vehicle	Any truck with a weight greater than 3.5 tonnes
Heavy Duty Vehicle	Any vehicle with a weight greater than 3.5 tonnes
Hydrocarbons (HCs)	Hydrocarbons, an organic compound consisting entirely of hydrogen and carbon, and a by-product of fossil fuel combustion
µg/m³	Micrograms per metre cubed
µm	Micrometres
MW_e	Megawatts of electrical output generated
Nitrogen dioxide (NO_2)	Nitrogen dioxide, a by-product of fossil fuel combustion
Oxides of nitrogen (NO_X)	Oxides of nitrogen, a mixture of gases that are composed of nitrogen and oxygen, and a by-product of fossil fuel combustion
Particulate matter (PM_{10})	Particles with an aerodynamic diameter of less than 10 µm, and a by-product of combustion of some fossil fuels
Particulate matter ($PM_{2.5}$)	Particles with an aerodynamic diameter of less than 2.5 µm, a by-product of combustion of some fossil fuels
Priority Habitat	A range of semi-natural habitat types that were identified by the UK Biodiversity Group as being the most threatened and requiring conservation action
Sulphur dioxide (SO_2)	Sulphur dioxide, a by-product of combustion of some fossil fuels
Trackout	The deposition of material onto the public road network by construction vehicles leaving site

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