Immingham Green Energy Terminal

TR030008

Volume 6

6.2 Environmental Statement

Chapter 6: Air Quality

Planning Act 2008

Regulation 5(2)(a)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

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Immingham Green Energy Terminal

Development Consent Order 2023

6.2 Environmental Statement

Chapter 6: Air Quality

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6 Air Quality

6.1 Introduction

6.1.1 This chapter presents the findings of the assessment of the likely significant effects of the construction, operation and decommissioning of the Project on air quality ("AQ"). For more details about the Project, including construction methodology, layout and lifespan and defined Site areas, refer to **Chapter 1: Introduction** and **Chapter 2: The Project [TR030008/APP/6.2]**.

6.1.2 As interrelationships exist with other assessments in relation to potential effects on AQ, reference should be made to the following chapters **[TR030008/APP/6.2]**:

a. **Chapter 8: Nature Conservation (Terrestrial Ecology)** – Where the significance effect of AQ impacts on terrestrial habitats are considered.

b. **Chapter 9: Nature Conservation (Marine Ecology)** – Where the significance effect of AQ impacts on marine habitats are considered.

c. **Chapter 11: Traffic and Transport** – Due to the consideration of construction phase and operational phase road traffic emissions within the AQ assessment reported in this chapter.

d. **Chapter 12: Marine Transport and Navigation** – Due to the consideration of vessel emissions within the AQ assessment reported in this chapter.

e. **Chapter 24: Human Health and Wellbeing** – Where the significance effect of AQ impacts on human health and wellbeing are considered.

6.1.3 This chapter is also supported by the following figures and appendices:

a. **Figure 6.1: Air Quality Study Area** – showing the location of AQ sensitive receptors and AQ monitoring locations in relation to the Site Boundary of the Project **[TR030008/APP/6.3]**.

b. **Figure 6.2: Construction Phase Assessment** – showing construction dust receptors and the areas within which unmitigated impacts may occur **[TR030008/APP/6.3]**.

c. **Figure 6.3: Operational Phase Impacts** – showing operational phase receptors and the magnitude of operational impacts **[TR030008/APP/6.3]**.

d. **Appendix 6.A: Construction Phase Assessment Method** – detailing the approach to the construction phase assessment **[TR030008/APP/6.4]**.

e. **Appendix 6.B: Operational Phase Assessment Method** – detailing the approach to the operational phase assessment **[TR030008/APP/6.4]**.

6.1.4 The AQ assessment is supported by other topic chapters in the Environmental Statement ("ES"), including traffic data generated for the assessment reported in **Chapter 11: Traffic and Transport [TR030008/APP/6.2]**. AQ impacts also have the potential to affect nature conservation sites. The significance of any effect on such sites and protected features is described in **Chapter 8: Nature Conservation (Terrestrial Ecology) [TR030008/APP/6.2]** and **Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]**, and within the

Shadow Habitats Regulations Assessment ("HRA") [TR030008/APP/7.6] for habitats of relevance to that document.

6.2 Consultation and Engagement

6.2.1 A scoping exercise was undertaken in August 2022 to establish the form and nature of the AQ assessment, and the approach and methods to be followed. The Scoping Report (**Appendix 1.A [TR030008/APP/6.4]**) records the findings of the scoping exercise and details the technical guidance, standards, best practice and criteria being applied in the assessment to identify and evaluate the likely significant effects of the Project on AQ. A Scoping Opinion was adopted by the Secretary of State on 10 October 2022 **[TR030008/APP/6.4]**.

6.2.2 Statutory Consultation took place between 9 January and 20 February 2023 in accordance with the Planning Act 2008 ("2008 Act"). The Applicant prepared a Preliminary Environmental Information Report ("PEI Report"), which was publicised at the consultation stage.

6.2.3 Through consideration of the responses to the first Statutory Consultation, the developing environmental assessments and through ongoing design-development and assessment, a series of changes within the Project were identified. A second Statutory Consultation took place between 24 May and 20 July 2023 in accordance with the 2008 Act and a PEI Report Addendum was publicised to support the consultation.

6.2.4 The consultation undertaken with statutory consultees to inform this chapter, including a summary of comments raised via the formal scoping opinion (**Appendix 1.A [TR030008/APP/6.4]**) and in response to the formal consultation is summarised in **Table 6-1**. The full responses to consultation comments are included within the **Summary of Consultation Responses** document **[TR030008/APP/5.1]**.

Table 6-1: Consultation Summary Table

Reference/Date	Consultee	Summary of Response	How comments have been addressed in this chapter
Scoping Report August 2022	Planning Inspectorate	The Air Quality Chapter refers to modelling of multiple emission release heights from flare stacks and/ or vents to encourage optimal dispersion of emissions, as well as use of Selective Catalytic Reduction. The project description of the ES needs to describe the energy plant in detail. The maximum height of any flare stack(s) must be provided and any assumptions regarding minimum flare stack heights should also be set out.	The Project is described in **Chapter 2: The Project [TR030008/APP/6.2]** and includes details of the energy plant. Dispersion model input parameters, including modelled flare stack height, are provided in **Appendix 6.B [TR030008/APP/6.4]**. Requirement 4(4) of the draft Development Consent Order ("DCO") secures minimum heights for the ammonia tank flare stack and hydrogen production unit flare stack.
		The study area is based on screening criteria for assessments of dust and road traffic emissions. The Scoping Report does not discuss how the study area would be established for the assessment of emissions to air from vessel movements and energy plant process contributions. The ES should describe the study area for the assessment, and this should be established in line with relevant guidance and in consultation with relevant consultation bodies. The study areas should be based on the zone of influence ("ZoI") for all sources associated with the Project including on site plant/machinery and vessel movements serving the site. Figure(s) should be used to illustrate the extent of the study area.	The study area for energy plant is described in **Section 6.5** and is based on Environment Agency guidance. There is no standard guidance that defines a suitable study area for the consideration of vessel emissions. Instead, the assessment reports impacts that include docked vessel emissions at the worst affected air quality sensitive receptors located in each direction from that vessel and all other sources modelled. The study area used to define the assessment of emissions is described in **Section 6.5**. The extent of the study area is presented in **Figure 6.1 [TR030008/APP/6.3]** and shows

Reference/Date	Consultee	Summary of Response	How comments have been addressed in this chapter
			the spatial extent of AQ sensitive receptors considered in the assessment.
		The Scoping Report proposes to rely on existing air quality survey data. The Inspectorate supports the use of existing data in principle; however the Applicant should ensure that the data is up to date and geographically accurate and is advised to seek agreement with North East Lincolnshire Council ("NELC") on the survey requirements.	The assessment has been informed by existing data made available by NELC, data published by Defra, and project specific nitrogen dioxide data gathered within the Project study area. No direct AQ-specific consultation has been held with NELC to date, although all air quality data gathered by NELC is publicly available from their Annual Status Reports, which are published online. Monitoring data collected in the last calendar year is presented in **Section 6.5.**
		The Scoping Report does not specify which pollutants would be included in the assessments and provides baseline information on NO_2 and PM_{10} only. The Applicant is advised to seek agreement with NELC on the range of pollutants to be included in the assessments, this should include consideration of $PM_{2.5}$, NO_X, NH_3 and SO_2 where relevant.	NELC has been consulted as part of the Scoping process. Pollutants of concern considered in the AQ assessment for the ES extend beyond nitrogen dioxide (NO_2) and particulate matter with an aerodynamic diameter of 10 and 2.5 microns or less (PM_{10} and $PM_{2.5}$), to also include oxides of nitrogen (NO_X), ammonia (NH_3), sulphur dioxide (SO_2), carbon monoxide (CO) and nitrogen deposition. The range of pollutants modelled is set out in **Table 6-5**.

Reference/Date	Consultee	Summary of Response	How comments have been addressed in this chapter
		The Scoping Report seeks to scope out impacts arising from decommissioning of landside infrastructure on the grounds that the impacts would be uncertain, working practices unknown, and impacts are likely to be no worse than those arising from the construction and operation phases. Paragraphs 2.4.48 – 2.4.49 commit to producing an Outline Decommissioning Strategy with the application to be secured within the DCO. Subject to the provision of this Outline Decommissioning Plan, the Inspectorate agrees to scope out this matter from the ES.	This is noted by the Applicant.
		Paragraph 5.6.8 suggests that the operational phase assessment would consider emissions from vessel energy plant when vessels are docked at the facility, and not include an assessment of emissions from vessels in transit. The Scoping Report does not provide an estimate of operational vessel movements therefore the Inspectorate is not in a position to scope out an assessment of operational vessel movements. The Inspectorate considers that the air quality assessment should include the emissions to air from operational vessel movements where significant effects are likely to occur and that such consideration should be based on the application of relevant threshold criteria.	There is limited guidance available on the screening of marine vessel emissions for the purpose of air quality assessments. Department for Environment, Food & Rural Affairs ("DEFRA") guidance (LAQM TG22 (Ref 6-8)) provides screening criteria for use by Local Authorities in their Local Air Quality Management ("LAQM") responsibilities. The purpose of this criteria is to assist Local Authorities to establish whether any port extension requires further review and assessment to identify an exceedance of an air quality objective. The Project will not meet this screening criteria set by DEFRA guidance for LAQM matters, based on the number of vessel movements per year and the proximity of sensitive receptors (see **Section 6.4**, **Paragraph 6.8.45**). This suggests that vessel emissions based on the scale of the

Reference/Date	Consultee	Summary of Response	How comments have been addressed in this chapter
			Project operations and proximity of receptors is unlikely to be an issue in isolation. To account for the impact of vessels in combination with other onsite sources, the AQ assessment accounts for vessel emissions when vessels are docked. The reason being that when docked, vessel engine emissions are static and assumed to be in operation 7,008 hours per year, based on an assumed theoretical maximum of 292 vessel calls per year and each call lasting 24 hours, therefore having the potential to impact on the same location for a prolonged period of time. The assessment does not account for vessel emissions when vessels are in motion. Such emissions are transient and intermittent – potentially only affecting individual habitat for the limited period of time in which a vessel maneuvers past a sensitive location, and only when the wind is blowing from the vessel towards that location. Based on the speed of vessels accessing the Project (~10 to ~20 knots (~11 to ~23 mph)) and the frequency of predicted vessel movements (0.8 calls per day), impacts at any one location are likely to occur for a matter of minutes per day (~2% of the year). Such an impact is considered unlikely to contribute to a significant effect.

Reference/Date	Consultee	Summary of Response	How comments have been addressed in this chapter
			The assessment methodology for vessel emissions is discussed in **Section 6.4 Paragraphs 6.4.26** to **6.4.35** and **Appendix 6.A [TR030008/APP/6.4]**.
		The effect of odour during operation has not been scoped into the assessment or reasons provided why this has been scoped out. This matter should be considered as part of the assessment made for air quality effects, as well as part of the health and well-being assessment, should significant effects be likely to occur.	The Project is not anticipated to be a notable source of odour – the onsite process operates with full containment and only in the event of an emergency if other prior measures such as control and containment fail would any NH_3 emissions be flared. Any odour will be as a result of fugitive emissions from leaks. A qualitative assessment of odour emissions has been undertaken with reference to Institute of Air Quality Management ("IAQM") Odour guidance (Ref 6-25), the methodology for which is set out in **Paragraph 6.4.22** to **6.4.25**. **Chapter 24: Human Health and Wellbeing [TR030008/APP/6.2]** considers the potential health and wellbeing impacts arising from odour.
Scoping Report August 2022	Natural England	We note and welcome the report's reference to the assessment of air quality issues arising from traffic generation during the construction and operational lifetime of the scheme (para 5.2.1) and offer the following comments: Air quality in the UK has improved over recent decades but air pollution remains a significant issue. For example, approximately 85% of protected nature conservation sites are currently in	Natural England guidance document NE001 is discussed in **Paragraph 6.4.15, Paragraph 6.6.16** and **Paragraph 6.8.39**. The construction of the Project will increase traffic movements on the local road network to the extent that the IAQM/Environmental Protection UK ("EPUK") screening criteria is

Reference/Date	Consultee	Summary of Response	How comments have been addressed in this chapter
		exceedance of nitrogen levels where harm is expected (critical load) and approximately 87% of sites exceed the level of ammonia where harm is expected for lower plants (critical level of 1µg) [1].A priority action in the England Biodiversity Strategy is to reduce air pollution impacts on biodiversity. The Government's Clean Air Strategy also has a number of targets to reduce emissions including to reduce damaging deposition of reactive forms of nitrogen by 17% over England's protected priority sensitive habitats by 2030, to reduce emissions of ammonia against the 2005 baseline by 16% by 2030 and to reduce emissions of NO_x and SO_2 against a 2005 baseline of 73% and 88% respectively by 2030. Shared Nitrogen Action Plans ("SNAPs") have also been identified as a tool to reduce environmental damage from air pollution. The planning system plays a key role in determining the location of developments which may give rise to pollution, either directly, or from traffic generation, and hence planning decisions can have a significant impact on the quality of air, water and land. The ES should take account of the risks of air pollution and how these can be managed or reduced. This should include taking account of any strategic solutions or SNAPs, which may be being developed or implemented to mitigate the impacts of air quality. Further information on air pollution impacts and the sensitivity of different habitats/designated sites can be found on the Air Pollution Information System (www.apis.ac.uk) ("APIS"). Natural England has produced guidance for public bodies to help assess the impacts of road traffic emissions to air quality capable of affecting European Sites. Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations -NEA001 (Ref 6-34)	exceeded on Queens Road and the A1173, between Queens Road and the A180. There are no nature conservation sensitive receptors located within 200m of this route, nor any of the lesser affected routes that experience traffic impacts at a level below the screening criteria. During the operation of the Project, there are no links that would experience an increase in traffic flow on the local road network or Strategic Road Network ("SRN") to the extent that the respective IAQM/EPUK or National Highways screening criteria is exceeded. The assessment methodology with regards to road traffic emissions described in **Paragraph 6.4.14** to **6.4.21** and **Appendix 6.B [TR030008/APP/6.4]**. Assessment results are set out in **Table 6-16** and **Paragraphs 6.10.7** and **6.10.8**. The significance of any effect is described in **Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]**.

Reference/Date	Consultee	Summary of Response	How comments have been addressed in this chapter
		With regard to the construction phase the focus on PM_{10}, set out in this para (5.6.2) should be reviewed with regard to its suitability for ecological receptors including designated sites in the context of the APIS information (site relevant critical loads).NO_2 and $PM_{2.5}$ should also be included in this assessment.	The construction phase assessment has been undertaken in line with relevant guidance published by the IAQM (Ref 6-23) and includes consideration of relevant impacts at sensitive habitats. The assessment methodology for the construction phase is set out in **Paragraph 6.4.5** to **6.4.8** and **Appendix 6.A [TR030008/APP/6.4]**. NO_2 and $PM_{2.5}$ are considered with regards to combustion emissions, as set out in **Paragraph 6.4.12, 6.4.14** and **6.4.26.**
		We note the applicants intention to consult Natural England, Should the applicant wish to explore options for avoiding or mitigating effects on the natural environment with Natural England, we recommend that they use our Discretionary Advice Service.	This is noted by the Applicant.
PEI Report January 2023	Natural England	[1] Potential air quality impacts from traffic during construction and operation phases Paragraph 6.3.13 states that Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) guidance has been used to inform the assessment. Natural England guidance NEA0012 should also be followed when undertaking the assessment. [2] Ammonia (NH_3), along with nitrous oxides (NOx), can contribute to N-deposition in the soil and potential eutrophication of habitats. Whereas background levels of nitrous oxides have shown a steady decline over time due to reduced emissions from vehicles and other sources, levels of ammonia have remained relatively stable over the last 30 years. Ammonia can be emitted from vehicle exhaust	[1] It is assumed that the Natural England reference to the guidance “NEA0012” is intended to refer to the guidance NEA001. The method of assessment of road traffic emissions impacts is set out in **Paragraph 6.4.14** to **6.4.21** and **Appendix 6.B [TR030008/APP/6.4]**. The assessment is undertaken in line with this (Ref 6-34) and other relevant and appropriate guidance (Ref 6-32). The Natural England guidance document titled *Natural England’s approach to advising*

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		emissions as a by-product of the catalytic conversion process designed to reduce emissions of nitrogen oxide. [3] Ammonia emissions from road traffic could make a significant difference to nitrogen deposition close to roads. As traffic composition transitions toward more petrol and electric cars (i.e., fewer diesel cars on the road), catalytic converters may aid in reducing NOx emissions but result in increased ammonia emissions (see https://www.aqconsultants.co.uk/news/february-2020-(1)/ammonia-emissions-from-roads-for-assessing-impacts). Therefore, we advise that further consideration is needed within the air quality assessment. [4] There are currently two models which can be used to calculate the ammonia concentration and contribution to total N deposition from road sources. One of these models is publicly available and called CREAM (Air Quality Consultants - News - Ammonia Emissions from Roads for Assessing Impacts on Nitrogen-Sensitive Habitats (aqconsultants.co.uk), and there is another produced by National Highways. [5] Paragraph 6.8.47 states that it is likely that during operation the traffic movements will equal approximately 96 two-way movements per day, which is below the significance threshold identified in Natural England guidance NEA001. We recommend that this is still considered within the Habitat Regulations Assessment ("HRA"), particularly if these numbers are subject to change.	*competent authorities on the assessment of road traffic emissions under the Habitats Regulations* (NEA001) focuses on the road traffic impact of emissions on sensitive habitat with a European designation. It states that there are 4 sequential steps to consider. The first three steps are summarized as follows: Step 1 is consideration of whether emissions from a project are likely to reach and impact on a European designation, based on the distance between the source and the designation. Step 2 and Step 3 of the guidance require confirmation as to whether the qualifying species within a designated site that are within 200m of a road are sensitive to air pollution and can be exposed to the road's traffic emissions. For the Project, there are no roads within 200m of a European designation that experience an increase in traffic flow because of the Project's construction or operation. Therefore, in accordance with the relevant Natural England guidance, there is no requirement to proceed to Step 4. However, the impact of Project emissions on air quality sensitive habitats within the Humber Estuary Special Area of Conservation ("SAC") has been quantified with the results presented in **Chapter 9: Nature Conservation (Marine Ecology)** and the **Shadow HRA [TR030008/APP/7.6]**.

Reference/Date	Consultee	Summary of Response	How comments have been addressed in this chapter
			[2] Noted. [3] The assessment reported in **Section 6.8** includes consideration of NH_3 emissions as appropriate, where it is released because of ammonia slip from site emissions and emissions from vessels that comply MARPOL Regulation 13 Tier III emission standards. Ammonia emissions from vehicle emissions have not been quantified as part of this assessment. The reason for this is because there are no nature conservation sensitive habitats with 200m of a road affected by the Project. The nearest road to an SAC/SPA/RAMSAR site that exceeds the National Highways DMRB screening criteria (Ref 6-33) during the construction phase is Queens Road, to southwest of the West Site egress. This road is approximately 1.5km away from the nearest SAC and approximate 3km from the nearest section of sensitive habitat within that SAC/SPA/RAMSAR site. During the operational phase, there are no roads that exceed the DMRB screening criteria. [4] Modelled road traffic emissions do not account for ammonia due to the distance of any affected road from a sensitive habitat. [5] Noted.

Reference/Date	Consultee	Summary of Response	How comments have been addressed in this chapter
		Paragraph 6.8.32 states that although the construction vessel working area is adjacent to the SAC, receptors sensitive to air pollution impacts are not present in the vicinity of the vessels, and the nearest sensitive receptor (saltmarsh) is 3km from the location. Natural England advises that this should be clearly explained within the HRA.	This is explained in **Table 1** of the **Shadow HRA[TR030008/APP/7.6]**. Air quality sensitive receptors within the SAC included in the air quality assessment are illustrated on **Figure 6.1 [TR030008/APP/6.3]**.
		We note that at 6.8.7 a 50m buffer for ecological receptors within nature conservation sites has been used. Natural England advises that designated site ecological receptors within 200m should be assessed for potential impacts from dust emissions. However, we agree with paragraph 6.8.19 which states that tidal mudflat has been identified as not being sensitive to dust impacts, therefore we advise that if all ecological receptors within 200m are mudflat then this impact pathway can be screened out.	Noted by the Applicant. The construction dust assessment is reported in **Paragraph 6.8.3** to **6.8.22** and follows an appropriate methodology based on relevant guidance (Ref 6-23).
		Natural England notes that paragraphs 6.8.38 – 6.1.2 consider the combined emissions from both the marine vessel emissions and the landside plant emissions together, it would be useful to understand the contributions from each of these impact pathways, as this will be useful to inform the effectiveness of any mitigation put in place.	**Section 6.8** reports the air quality impact assessment, including the contribution from vessel emissions and landside plant (see **Paragraph 6.8.60**). The mitigation measures are set out in **Sections 6.7** and **6.9**. Those measures will target sources where modelled impacts identify that mitigation is required and reduce emissions through the implementation of good practice.
		Paragraph 6.3.21 states that "NO_2 and NH_3 also contribute to nitrogen deposition, which is another pollutant that is harmful to nature conservation sites. Flares on site will be required to operate in an emergency or during plant start-up to burn off the release of NH_3, which will therefore also be a source of NOx emissions". We	**Section 6.4** sets out and considers all emissions sources and pollutants with the potential to contribute to a significant effect, with reference to applicable guidance. **Paragraph 6.4.29** and **6.4.33** discuss

Reference/Date	Consultee	Summary of Response	How comments have been addressed in this chapter
		advise that as well as contributing to N-deposition, the release of NH_3 may also lead to direct damage to vegetation, and it is not clear if there is potential for release of unreacted ammonia through this process.	sources that emit NH_3 and their contribution to NH_3 concentrations and the contribution of NH_3 to N-deposition.
		We note that PEIR Figures 6.3c and 6.3d include the ecological receptors used as part of the air quality assessment, however, we cannot find any explanation of the reasons for picking these receptors and the habitat types represented at each receptor.	The selection of AQ sensitive receptors is reported in **Paragraph 6.4.36** to **6.4.40** and **Section 6** of **Appendix 6.B [TR030008/APP/6.4]**.
		We note that ecological receptor E2 appears to be located at North Killingholme Haven Pits Sites of Special Scientific Interest ("SSSI"). Assessment should be undertaken to determine potential impacts to the SSSI.	Noted. The assessment described in **Section 6.8** includes consideration of impacts on the North Killingholme Haven Pits SSSI, which is receptor O_E11, as illustrated on **Figure 6.1 [TR030008/APP/6.3]**.
		The PEIR Figures 6.3c and 6.3d indicate that the process contributions exceed 1% of the environmental benchmarks for annual mean NOx and N-deposition at several of the ecological receptors. There does not appear to be figures for annual mean NH3 and sulphur dioxide. At this stage, the assessment provided is very preliminary and therefore Natural England will review in further detail once we are consulted on the ES and HRA.	**Figure 6.3** illustrates the impact and spatial variation of impacts for annual mean NO_X impacts and nitrogen deposition rate impacts. The figure does not illustrate the impacts of NH_3 or sulphur dioxide, because the contribution of those pollutants by the Project is negligible. The impact of pollutants not illustrated in **Figure 6.3** are presented in **Table 6-19** and **Table 6-20** and **Appendix 6.B Section 10 [TR030008/APP/6.4]**.
		Natural England notes at paragraph 6.8.45 of the PIER that it concludes that "the additional predicted contribution from nitrogen emissions from the Project does not result in any exceedance of the Critical Load range for saltmarsh, and it is concluded that there will	At the time the PEI Report assessment was undertaken, APIS had published a Critical Load for saltmarsh habitat as 20-30 kgN/ha/yr. Since the publication of the PEI

Reference/Date	Consultee	Summary of Response	How comments have been addressed in this chapter
		be no adverse effect on the Humber Estuary designated site." However, we consider that detailed ecological justification would be required to understand the reasoning for not using the lower critical load range for upper saltmarsh. This should be based on habitat surveys and frequency of tidal inundation. We would find it useful for the HRA to refer to the notified habitat features of the SAC. Even using the higher critical load, we note that the process contribution for annual mean NOx is predicted to be 11% of the critical load, at ecological receptor (E11) defined as worst affected. E11 receptor is also adjacent to the Able Marine Energy Compensation site (Cherry Cobb Sands Tidal Exchange/ managed realignment site), which is due to be constructed. Saltmarsh surveys have been undertaken recently as part of this project.	Report, APIS have revised the Critical Load for saltmarsh habitat as 10-20 kgN/ha/yr. The Critical Load range relevant to that habitat considered in this assessment is 10 to 20 kgN/ha/yr. This comment from Natural England refers to the higher Critical Load in relation to process contribution for annual mean NO_X. The Applicant notes that there are no lower or higher criteria for annual mean NO_X and the one appropriate standard is the Critical Level of 30 µg/m^3. The Applicant notes that Natural England highlight the impact reported in the PEI Report for receptor R11 and states that R11 is adjacent to the Able Marine Energy Compensation Site. The Applicant notes that receptor R11 in the PEI Report was located on the northern shore of the Humber Estuary. The Able Marine Compensation Site is located on the southern shore and is approximately 5km away from the location of R11. The assessment reported in **Section 6.8** provides the description of impacts on nature conservation sites (see **Table 6-19** and **Table 6-20** and **Appendix 6.B Section 10 [TR030008/APP/6.4]**). The effect and relevant justification for the determination of whether effects are significant or not is provided in **Chapter 9: Nature**

Reference/Date	Consultee	Summary of Response	How comments have been addressed in this chapter
			Conservation (Marine Ecology) [TR030008/APP/6.2] and the **Shadow HRA [TR030008/APP/7.6]**. The impact of cumulative emission sources is provided in **Appendix 25.C Assessment of Cumulative Effects [TR030008/APP/6.4]**
Scoping Report August 2022	Environment Agency	The Environment Agency will only undertake a detailed review of any air quality assessment when determining an application for an Environmental Permit. We are aware that there are receptors in the area, which are sensitive to dust (e.g. storage of new cars) and it may be prudent for the developer to be aware of this and engage with relevant local stakeholders. Paragraph 5.6.13 does not make explicit reference to Air emissions risk assessment for your environmental permit - **https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit**, however, it is referred to in paragraph 5.6.8. This guidance (although written for environmental permitting) will also be useful for the assessment.	The assessment does include consideration of potential dust impacts on dust sensitive receptors. The dust assessment method is described in **Paragraph 6.4.5** to **6.4.8** and **Appendix 6.A [TR030008/APP/6.4]** and follows industry standard guidance (Ref 6-23). Environment Agency guidance is referred to in **Section 6.4** and **Appendix 6.B [TR030008/APP/6.4]** to inform the method of assessment for point source emissions.
Scoping Report August 2022	East Lindsey District Council	"I can advise that this authority has no comments to make."	This is noted by the Applicant.
Scoping Report August 2022	North East Lincolnshire Council	AQ Officer has read and reviewed the proposed EIA Scoping report, they are happy with the suggested approach and methodology used to assess the potential air quality impacts and effects of the Project on human receptors.	This is noted by the Applicant.
PEI Report January 2023	Polynt Composites	Other non-COMAH hazard risks to human health, such as worsening air quality, are also not dealt with adequately in the consultation documentation. Increased levels of harmful dioxins	The impact of emissions from increased traffic movements is considered in **Paragraph 6.8.37** to **6.8.42** and **Table 6-16**, with reference to relevant guidance

Reference/Date	Consultee	Summary of Response	How comments have been addressed in this chapter
		caused by both increased traffic (queuing traffic in particular), must be fully assessed and mitigated.	published by the IAQM (Ref 6-32), National Highways (Ref 6-33) and Defra (Ref 6-8). In line with that guidance, the assessment focuses on the primary pollutants of concern from such emissions.
PEI Report January 2023	Immingham Power Limited	The [Immingham Power Limited] site has external air intakes for cooling and combustion air. Increased airborne particulates and pollution from nearby construction have a detrimental effect on the equipment. Would you install dust monitoring on our site?	The assessment of construction dust impacts determines the level of mitigation required to ensure that a significant effect will not occur, in line with IAQM guidance (Ref 6-23). Mitigation measures are set out in **Paragraph 6.7.7** and **Section 6.9** and included within the **Outline Construction Environmental Management Plan [[TR030008/APP/6.5]**. Details on the required level of dust monitoring are provided within the **Outline Construction Environmental Management Plan [TR030008/APP/6.5]**.
PEI Report January 2023	Local Resident (living within approx. 10km of the project)	The new development will bring noise with the operational phase and contribute to an inhabited area which already suffers poor air quality.	**Paragraph 6.6.2** to **Paragraph 6.6.6** describes the existing and future baseline air quality conditions experienced by receptors in the vicinity of the Project and sources of emissions to air associated with it. **Section 6.8** presents an assessment of the impact of emissions during the construction and operation of the Project and the effect at local AQ sensitive receptors. Measures to avoid significant adverse effects and minimise and mitigate other adverse effects

Reference/Date	Consultee	Summary of Response	How comments have been addressed in this chapter
			at receptors is presented in **Sections 6.7** and **6.9**. These sections demonstrate that existing air quality at inhabited areas of the study area are of a good standard and the effect of Project impacts is not significant.
PEI Report January 2023	Local Resident (living within approx. 10km of the project)	Concern for increased dust and noise, especially traffic noise. Concern for the environment	**Section 6.8** presents an assessment of the impact of emissions during the construction and operation of the Project and the effect on local AQ sensitive receptors. Measures to avoid significant adverse effects and minimise and mitigate other adverse effects at receptors are presented in **Sections 6.7** and **6.9**. These sections demonstrate that existing air quality within the study area is of a good standard and the effect of Project impacts is not significant.

6.3 Legislation, Planning Policy and Guidance

6.3.1 **Table 6-2** presents the legislation, policy and guidance relevant to the air quality assessment and details how their requirements have been met.

Table 6-2: Relevant legislation, policy and guidance regarding air quality

Legislation/Policy/Guidance	Consideration within the assessment
Clean Air for Europe	
The Clean Air for Europe ("CAFÉ") 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 (Ref 6-4) (hereafter referred to as the 'EU Air Quality Framework Directive').	Informed methodology described in **Section 6.4** and results in **Section 6.8**.
Air Quality Standards Regulations	
Directive 2008/50/EC is transcribed into UK legislation by the Air Quality Standards Regulations 2010 (Ref 6-17) which came into force on 11 June 2010. The 2010 Regulations were amended by the Air Quality Standards Regulations 2016 (Ref 6-18), 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.	Informed methodology described in **Section 6.4** and results in **Section 6.8**.
UK Air Quality Strategy	
Part IV of the Environment Act (2021) (Ref 6-20) requires the 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 (Ref 6-7). The AQS 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 AQS 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. 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:	Informed methodology described in **Section 6.4** and results in **Section 6.8**.

Legislation/Policy/Guidance	Consideration within the assessment
a. EU limit values (as transcribed into UK legislation) are legally binding in the UK. National government compliance at the agglomeration scale is mandatory. b. UK air quality objectives are for the purposes of LAQM and there is no legal obligation for local authorities to achieve them. They do have a responsibility to work towards achieving them. The EU limit values and air quality objectives for the remaining pollutants are displayed in **Table 6-3**.	
UK Clean Air Quality Strategy	
In 2019, the UK adopted the Clean Air Strategy 2019 (Ref 6-7), setting out targets and the policies for how it will tackle all sources of air pollution, complementing three other UK government strategies: the Industrial Strategy, the Clean Growth Strategy and the 25 Year Environment Plan. It sets out the Government's long-term target to reduce people's exposure to $PM_{2.5}$, to 10 µg/m^3 in line with the World Health Organisation's (WHO) current guidelines. It sets out how the Government will reduce $PM_{2.5}$ concentrations across the UK, so that the number of people living in locations above the WHO guideline level of 10 µg/m^3 is reduced by 50% by 2025.	Informed methodology described in **Section 6.4** and results in **Section 6.8**.
Environment Act 2021	
The Environment Act 2021 (Ref 6-20) is the UK's primary piece of environmental legislation post-Brexit for Ref 6-16environmental protection and the delivery of the Government's 25-year environment plan It includes provisions to establish a post-Brexit set of statutory environmental principles and ensure environmental governance through an environmental watchdog, the Office for Environmental Protection ("OEP"). Part IV of the Environment Act (2021) requires the Government to produce a national AQS which contains standards, objectives and measures for improving ambient air quality. The AQS proposes for the Secretary of State to publish a report reviewing the AQS every five years (as a minimum and with yearly updates to Parliament). The Act also requires the Government to set two targets by October 2022: the first on the amount of $PM_{2.5}$ pollutant in the ambient air and a second long-term target set at least 15 years ahead to encourage stakeholder investment. Those Targets are set by the Environmental Improvement Plan (Ref 6-22).	Informed methodology described in **Section 6.4** and results in **Section 6.8**.

Legislation/Policy/Guidance	Consideration within the assessment
Environmental Improvement Plan 2023	
On the 31 January 2023, the Environmental Improvement Plan (the Plan) (Ref 6-22) was published to build upon the Government's 25 Year Environmental Plan and in accordance with the provisions of the Environment Act 2021. A key target of the Plan is to improve environmental quality, including measures to: *"Cut overall air pollution by tackling the key sources of emissions, including reducing the maximum limits for domestic burning appliances in Smoke Control Areas.* *Tackle specific hotspots by challenging councils to improve air quality more quickly, while supporting them with clear guidance, funding, and tools.* *Reduce ammonia emissions (crucial for sensitive natural habitats) by using incentives in our new farming schemes".* The Plan confirms the legal target to reduce population exposure to $PM_{2.5}$ by 35% in 2040 compared to 2018 levels, with a new interim target to reduce by 22% by the end of January 2028, and a legal target to require a maximum annual mean concentration of 10 micrograms of $PM_{2.5}$ per cubic metre (µg/m^3) by 2040, with a new interim target of 12 µg/m^3 by the end of January 2028.	Informed methodology described in **Section 6.4** and results in **Section 6.8**.
The Environmental Targets (Fine Particulate Matter) Regulations 2023	
On 30 January 2023, regulations were published regarding the new targets for $PM_{2.5}$ concentrations (Ref 6-21) as required by the Environment Act. The regulations set out the following targets: *"The annual mean concentration target is that by the end of 31st December 2040 the annual mean level of $PM_{2.5}$ in ambient air must be equal to or less than 10 µg/m³ ("the target level")* *The population exposure reduction target is that there is at least a 35% reduction in population exposure by the end of 31st December 2040 ("the target date"), as compared with the average population exposure in the three-year period from 1st January 2016 to 31st December 2018 ("the baseline period"), determined in accordance with regulation 8".*	Informed methodology described in **Section 6.4** and results in **Section 6.8**.
National Policy Statement for Ports ("NPSfP")	
Section 5.7 of the NPSfP (Ref 6-13) 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. Paragraph 5.13.5 of the NPSfP describes what an air quality chapter of an ES should include:	Informed methodology described in **Section 6.4** and specifically a description of emissions, and how they have informed the impact assessment. Informed the impact results reported in **Section 6.8**,

Legislation/Policy/Guidance	Consideration within the assessment
• *"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."* Section 5.8 of the NPSfP sets out policy for ports relating to emissions of dust and odour and the potential harm to amenity. It is acknowledged in 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".* Paragraph 5.8.5 of the NPSfP describes what an air quality chapter 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."*	specifically predicted future baseline and future operational pollutant concentrations and impacts. Informed mitigation section described in **Section 6.7** and **Section 6.9**, including measures to reduce emissions during construction and operational phases.
UK Marine Policy Statement ("MPS")	
Section 2.6.2 of the UK MPS (Ref 6-5) 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."*	Informed methodology described in **Section 6.4**.
UK Marine Strategy	
Descriptor 5 as described in the Marine Strategy Part Three (Ref 6-6) refers to the Control of Nitrogen Oxides (NO_x) 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.	Informed methodology described in **Section 6.4**.

Legislation/Policy/Guidance	Consideration within the assessment
Marine Plan – East Inshore	
The Marine Plan for the UK East Inshore region (Ref 6-30) includes some policies that are relevant to air quality and this assessment. They focus on potential impacts on nature conservation as follows: a. 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)"*; b. 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";* c. 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."*	Informed methodology described in **Section 6.4**.
National Planning Policy Framework ("NPPF")	
The revised NPPF (Ref 6-31) sets out the Government's planning policies for England and how these are expected to be applied. 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. 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 …"* Air quality in the UK has been managed through the 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	Informed methodology described in **Section 6.4** and results in **Section 6.8**.

Legislation/Policy/Guidance	Consideration within the assessment
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 ("PPG")	
Sections of the PPG (Ref 6-12) were updated in November 2019. With regards to air quality, the updated guidance (paragraph 003 Reference ID: 32-003-20191101) 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."* In paragraph 005 (Reference ID: 32-005-20191101) 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."* The PPG goes on to state that considerations that may be relevant to determining a planning application include whether the development would (Paragraph: 006 Reference ID: 32-006-20191101):	Informed methodology described in **Section 6.4** and results in **Section 6.8**.

Legislation/Policy/Guidance	Consideration within the assessment
a. Lead to changes in vehicle-related emissions in the immediate vicinity of the proposed development or further afield; b. Introduce new point sources of air pollution; c. Expose people to harmful concentrations of air pollutants; d. Give rise to potentially unacceptable impacts during construction for nearby sensitive locations; and e. Have a potential adverse effect on biodiversity. f. 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): g. A description of baseline conditions; h. Consideration of sensitive habitats (including designated sites of importance for biodiversity); i. The assessment methods to be adopted and any requirements for the verification of modelling air quality; j. The basis for assessing impacts and determining the significance of an impact; k. Where relevant, the cumulative or in-combination effects arising from several developments; l. Construction phase impacts; m. Acceptable mitigation measures to reduce or remove adverse effects; and n. Measures that could deliver improved air quality even when legally binding limits for concentrations of major air pollutants are not being breached.	
North East Lincolnshire Local Plan (2013 – 2032)	
The Local Plan was adopted in 2018 and sets out a strategic vision for the county (Ref 6-36). The plan is centered around set challenges for the Local Council and policy which has been implemented to solve them and support local economic sectors. 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. Immingham town itself serves the surrounding rural community. The main challenges in this area concern traffic movements and air quality in relation to proximity to the Port of Immingham.	Informed methodology described in **Section 6.4**, baseline in **Section 6.6** and results in **Section 6.8**.

Legislation/Policy/Guidance	Consideration within the assessment
A relevant strategic objective outlined in the Local Plan is SO [Strategic Objective] 2: 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. Several policies within the Local Plan are relevant to air quality in the Immingham port area: a. Policy 5: Development boundaries sets out how all proposed developments within the Council must consider noise and air quality, in line with sustainability considerations. b. 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. c. 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.	
North East Lincolnshire Council Transport Plan	
This Plan also highlights air quality in Transport Challenge H (section 1.3), which recognises 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 (Ref 6-35).	Informed methodology described in **Section 6.4,** baseline in **Section 6.6** and results in **Section 6.8**.
North Lincolnshire Local Development Framework ("LDF") (2006 to 2026)	
The North Lincolnshire Local Plan has been replaced by the LDF (2006 to 2026). The LDF consists of a Core Strategy (Ref 6-38) 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 Project is: a. 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.	Informed methodology described in **Section 6.4,** baseline in **Section 6.6** and results in **Section 6.8**.
North Lincolnshire Local Transport Plan (2011 – 2026)	
The plan details a strategic vision for transport management in the borough (Ref 6-39). 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	Informed methodology described in **Section 6.4,** baseline in **Section 6.6** and results in **Section 6.8**.

Legislation/Policy/Guidance	Consideration within the assessment
environment. In the Transport Plan, the A160 at South Killingholme was identified as an area of concern regarding levels of NO_2.	
Guidance on the assessment of dust from demolition and construction	
Published by the IAQM (Ref 6-23), this guidance describes a qualitative methodology for the assessment of potential construction phase impacts from construction dust, traffic, and non-road mobile machinery.	Informed methodology described in **Section 6.4** and **Appendix 6.A [TR030008/APP/6.4]**, and results in **Section 6.8**.
Land-Use Planning & Development Control: Planning for Air Quality	
Published by the IAQM (Ref 6-32), 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.	Informed methodology described in **Section 6.4** and **Appendix 6.B [TR030008/APP/6.4]**, and results in **Section 6.8**.
DMRB – Sustainability & Environment Appraisal: LA 105 Air quality	
Published by National Highways (Ref 6-33), 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.	Informed methodology described in **Section 6.4** and **Appendix 6.B [TR030008/APP/6.4]**, and results in **Section 6.8**.
Local Air Quality Management Technical Guidance 2022 (LAQM TG(22))	
Published by Defra (Ref 6-8), 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.	Informed methodology described in **Section 6.4** and **Appendix 6.B [TR030008/APP/6.4]**, and results in **Section 6.8**.
Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (NEA001)	
Guidance on how Natural England advises competent authorities and others on the assessment of plans and projects (as required by the 'Habitats Regulations') likely to generate road traffic emissions to air which are capable of affecting European Sites.	Informed methodology described in **Section 6.4** and **Appendix 6.B [TR030008/APP/6.4]**, and results in **Section 6.8**.
A guide to the assessment of air quality impacts on designated nature conservation sites	
Published by the IAQM (Ref 6-24), this guidance describes a methodology to assist with assessment of air quality impacts on nature conservation.	Informed methodology described in **Section 6.4** and **Appendix 6.B [TR030008/APP/6.4]**, and results in **Section 6.8**.

Legislation/Policy/Guidance	Consideration within the assessment
Air emissions risk assessment for your environmental permit	
Published by the Environment Agency (Ref 6-14), this guidance provides a methodology for assessment of point source emissions impacts on human health and nature conservations sites.	Informed methodology described in **Section 6.4** and **Appendix 6.B [TR030008/APP/6.4]**, and results in **Section 6.8**.

6.3.2 The EU limit values, UK air quality objectives and relevant Critical Levels and Loads for the pollutants of concern are displayed in **Table 6-3**. Limits and objectives 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 allowed within a specified time frame, due to their acute effects.

6.3.3 An air quality objective for NO_X of 30 µg/m^3 and SO_2 of 20 µg/m^3 are set for the protection of vegetation (referred to as Critical Levels). In addition to these, a Critical Level for NH_3 has been defined by the Environment Agency and Critical Loads for nitrogen deposition have been determined by the UNECE Convention on Long Range Transboundary Air Pollution. These 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 habitat based on their respective sensitivity to nutrient nitrogen and have been obtained for the designated sites with the potential to be affected by the Project.

Table 6-3: Air quality objectives, EU limit values and Environmental Assessment Levels

Pollutant	Averaging Period	Concentration	Maximum Permitted Exceedances	Target Date (AQO)	Target Data (EULV)
AQOs/EULVs for the Protection of Human Health					
Nitrogen Dioxide (NO_2)	Annual mean	40µg/m^3	None	31 Dec 2005	1 Jan 2010
	1 hour mean	200µg/m^3	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	40µg/m^3	None	31 Dec 2004	1 Jan 2005
	24 hour mean	50µg/m^3	35 times per year	31 Dec 2004	1 Jan 2005

Pollutant	Averaging Period	Concentration	Maximum Permitted Exceedances	Target Date (AQO)	Target Data (EULV)
Particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$)	Annual mean	20 µg/m^3	None	1 Jan 2020	1 Jan 2010
Sulphur Dioxide (SO_2)	24 hour mean	125 µg/m^3	3 times per year	31 Dec 2004	1 Jan 2005
	1 hour mean	350 µg/m^3	24 times 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/m^3	None	31 Dec 2000	19 Jul 2001
Sulphur dioxide (SO_2)	Annual mean	20 µg/m^3	None	31 Dec 2000	19 Jul 2001
Environmental Assessment Levels for the Protection of Vegetation and Ecosystems					
Ammonia (NH_3)	Annual mean	3 µg/m$^{3(1)}$	None	N/A	N/A
Nutrient nitrogen deposition	Annual mean	Salt marsh: 10-20 kg N/ha/yr Woodland: 10-20 kg N/ha/yr Grassland: 10-20 kg N/ha/yr	None	N/A	N/A
[1] 1 µg/m^3 where lichens or bryophytes (including mosses, liverworts and hornwarts) are present, 3 µg/m^3 where they are not present. Bryophytes are not considered present at the habitats considered in this assessment.					

6.4 Assessment Methodology

6.4.1 The assessment of air quality impacts has been undertaken with reference to the industry standard guidance documents listed in **Table 6-3**. In line with **Chapter 5: EIA Process [TR030008/APP/6.2]**, the assessment of impacts assumes that embedded and standard mitigation (see **Section 6.7**) is already in place. Embedded and standard mitigation includes all control measures described in the **Outline Construction Environmental Management Plan ("CEMP") [TR030008/APP/6.5]**. As such, no unmitigated scenario is assessed because such a scenario will never occur.

6.4.2 This approach does deviate to some extent, from the IAQM guidance relating to the assessment of construction phase dust emissions (Ref 6-23). The methodology set out in that guidance requires the assessment of impacts without mitigation to determine the level of mitigation required to offset the risk of dust impacts occurring. For the assessment of construction dust emissions, the assessment has been undertaken in line with that guidance, to identify the level of mitigation required to be included in the **Outline CEMP [TR030008/APP/6.5]** but is reported in the order described by **Chapter 5: EIA Process [TR030008/APP/6.2]**, to maintain consistency with other chapters.

6.4.3 The assessment considers the following scenarios:

a. Existing baseline (2022) – for road traffic emissions model verification.

b. Future baseline (2026) – to represent the year of peak construction without the Project under construction.

c. Future construction (2026) – to represent the year of peak construction with the Project under construction.

d. Future baseline (2028) – to represent the year of opening without the Project in operation.

e. Future operational (2028) – to represent the year of opening with the Project in operation

6.4.4 It has been assumed for the purpose of this assessment, that the Project will be fully operational in the year of opening (2028). In reality, not all of the Project is likely to be operational until 2036. The assumption that all Project sources are operational in 2028 is precautionary, as it assumes all those sources will combine with the baseline conditions of 2028. Due to the anticipated year-on-year improvement in background air quality and the year-on-year evolution of emissions technology, baseline air quality conditions are likely to better in 2036. As such, the total pollutant concentrations reported for 2028, based on full operation, are precautionary.

Construction Phase

Construction Dust Emissions

6.4.5 The construction dust assessment follows the qualitative method of assessment set out in IAQM guidance (Ref 6-23). According to that guidance, the main air quality impacts that may arise during demolition and construction activities are:

a. Dust deposition, resulting in the soiling of surfaces.

b. Visible dust plumes, which are evidence of dust emissions.

c. Elevated PM_{10} and $PM_{2.5}$ concentrations resultant of dust generating activities on site (with majority of fine particulates generated from construction phase activities having an aerodynamic diameter of greater than 25µm).

d. 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.

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

a. Demolition (not of relevance to the Project).

b. Earthworks.

c. Construction (erection of buildings and structures).

d. Track-out (the deposition of material onto the public road network by construction vehicles leaving site).

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

a. Step 1: Screen the need for a detailed assessment. Human and ecological receptors were identified and distance to the Project and construction routes were determined.

b. 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.

c. Step 3: Identify the need for site-specific mitigation. Based on the risk of impacts occurring, site specific mitigation measures were determined.

d. Step 4: Define impacts and their significance. The significance of the potential residual dust impacts (taking mitigation into account) for each activity was determined.

6.4.8 The IAQM construction dust methodology used to inform this assessment is provided in more detail in **Appendix 6.A [TR030008/APP/6.4]**.

Construction Site Plant and Non-Road Mobile Machinery Emissions

6.4.9 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.

6.4.10 IAQM guidance (Ref 6-23) states that:

> *"Experience of assessing the exhaust emissions from on-site plant (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."*

6.4.11 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 Vessel Emissions

6.4.12 Construction vessel emissions have the potential to impact on sensitive receptors by increasing exposure to the pollutants most commonly associated with combustion emissions, namely NO_X, which is a precursor for NO_2 and nitrogen deposition, PM_{10} and $PM_{2.5}$. SO_2 (and PM) emissions will be limited due to use of low-sulphur content fuel.

6.4.13 Construction phase vessel emissions have been considered in a qualitative manner in this assessment. The risk of this source contributing to a significant effect is determined by review of construction phase vessel emissions, their duration and frequency, and the proximity of those emissions to the nearest air quality sensitive receptors.

Construction Road Traffic Emissions

6.4.14 The assessment of construction traffic emissions focuses on the primary pollutants of concern with regards to vehicle exhaust emissions – NO_X, the precursor for NO_2 and nitrogen deposition, PM_{10} and $PM_{2.5}$.

6.4.15 Construction phase traffic emissions can be considered in a qualitative manner or quantitative manner, subject to the traffic impact expected and how that compares to relevant screening criteria set out in industry standard guidance (Ref 6-32, Ref 6-33). Where traffic impacts exceed the screening criteria, a detailed quantitative assessment methodology is taken forward, the approach to which is described in **Appendix 6.B [TR030008/APP/6.4]**.

6.4.16 Traffic data has been provided which includes daily average two-way Light Duty Vehicle ("LDV") (vehicles <3.5 tonnes) movements and Heavy Duty Vehicle ("HDV") (vehicles >3.5 tonnes) movements on the local road network and the nearest sections of the SRN.

6.4.17 Daily average flows on the local road network have been screened against criteria published in IAQM and EPUK guidance (Ref 6-32). The guidance suggests that a detailed assessment of local air quality is likely to be required where:

a. A road link not situated within or adjacent to an AQMA experiences a:
   i. change in annual average daily two-way LDV flow of 500 or more.
   ii. change in annual average daily two-way HDV flow of 100 or more.
b. A road link that is situated within or adjacent to an AQMA experiences a:
   i. change in annual average daily two-way LDV flow of 100 or more.
   ii. change in annual average daily two-way HDV flow of 25 or more.

6.4.18 Daily average flows on the SRN have been screened against criteria published in National Highways guidance (Ref 6-33). The guidance suggests that a detailed assessment of local air quality is required where:

a. Annual average daily traffic ("AADT") flow changes by 1000 or more two-way movements.
b. HDV AADT changes by 200 or more two-way movements.

6.4.19 Where a road link exceeds the criteria above and where there are air quality sensitive receptors within 200m of that link, detailed modelling of road traffic emissions has been undertaken, following the approach set out in **Appendix 6.B [TR030008/APP/6.4]**.

6.4.20 The National Highways screening criteria is also referred to in Natural England guidance (Ref 6-33) in their step by step approach to determining whether the road traffic impacts of a scheme or project could have a significant effect on a nature conservations site covered by the Habitat Regulations.

Operational Phase

Operational Road Traffic Emissions

6.4.21 The approach undertaken for construction phase road traffic emissions has also been undertaken for operational phase road traffic emissions. Where a road link exceeds the criteria set out in **Paragraphs 6.4.17** and **6.4.18**, where there are air quality sensitive receptors within 200m of that link, detailed modelling of road traffic emissions has been undertaken, following the approach set out in **Appendix 6.B [TR030008/APP/6.4]**.

Operational Odour emissions

6.4.22 A qualitative odour assessment has been undertaken with reference to IAQM odour guidance (Ref 6-25).

6.4.23 Odours are highly subjective. The perception of odours, whether they are pleasant or offensive, and to what extent is partly determined through the life experiences of the individual. It is, however, generally accepted that the odour associated with NH_3 is offensive.

6.4.24 Before an adverse effect (such as harm to amenity) can occur, there must be odour exposure. For odour exposure to occur all three links in the source-pathway-receptor chain must be present:

a. An emission source - a means for the odour to get into the atmosphere.

b. A pathway - for the odour to travel through the air to locations offsite, noting that:

   i. Anything that increases dilution and dispersion of an odorous pollutant plume as it travels from source to receptor will reduce the concentration at the receptor, and hence reduce exposure.

   ii. Increasing the length of the pathway (e.g. by releasing the emissions from a high flare stack or moving odour sources as far away from receptors as possible) will, all other things being equal, increase the dilution and dispersion.

c. The presence of receptors (such as residential properties or places where people would expect a certain level of amenity) that could experience an adverse effect, noting that people vary in their sensitivities to odour, determined by the level of amenity associated with the land use and the typical duration of exposure.

6.4.25 The IAQM guidance (Ref 6-25) includes a description of methods by which odour effects can be determined at the pre-planning stage. It states that in order to determine the impact of odour emissions, the following elements need to be determined:

a. Description of baseline odour conditions.

b. Description of the location of receptors and their relative sensitivities to odour effects.

c. Details of potential odour sources.

d. Description of control/mitigation measures incorporated into the scheme.

e. Prediction of the likely odour effects at relevant sensitive receptors, taking into account:

   i. The likely magnitude of odour emissions.

   ii. The likely meteorological characteristics at the site.

   iii. The dispersion and dilution afforded by the pathway to receptors and the resulting magnitude of odour that could result.

   iv. The sensitivity of the receptors.

   v. The potential cumulative odour effects.

f. Appropriate additional mitigation recommended where necessary.

g. Residual odour effects and the determination of impact significance.

Operational Site and Vessel Emissions

6.4.26 Operational vessel emissions have the potential to impact on sensitive receptors by increasing exposure to the pollutants most commonly associated with combustion emissions, namely NO_X, a precursor for NO_2 and nitrogen deposition and fine particulate matter. SO_2 and PM emissions will be limited by MARPOL Regulation 14 (Ref 6-27) and the use of low-sulphur content fuel and/or other SO_2 and PM emissions reduction technologies.

6.4.27 The assessment of operational site and vessel emissions follows a hybrid approach, based on the perceived risk of sources contributing to a significant effect on air quality. Site emissions consist of those from a number of onshore hydrogen production units and flares, and offshore vessel combustion plant emissions. A quantitative assessment of those sources that are considered to represent a risk of contributing to a significant effect has been undertaken and is described in **Appendix 6.B [TR030008/APP/6.4]**.

6.4.28 The onshore hydrogen production units will be fuelled initially by natural gas. The main pollutant of concern from this is the NO_X emissions from the combustion of the gas. The hydrogen production units will have Selective Catalytic Reduction ("SCR") technology installed to reduce the amount of NO_X released. The presence of SCR technology will also mean that another pollutant of concern will be NH_3 emissions associated with the SCR process. NO_X and NH_3 at elevated concentrations are harmful to nature conservations sites and, when NO_X is converted to NO_2 following release into the ambient air, also harmful to human

health. NO_2 and NH_3 also contribute to nitrogen deposition, which is harmful to nature conservation sites. It is considered that emissions from hydrogen production units have the potential to contribute to a significant effect on air quality and these sources are included in the detailed assessment.

6.4.29 Flares will also be a source of combustion emissions. The flares will operate for most of the time on pilot mode. They will only operate on flare mode in the event of an emergency or during plant start-up, to burn off the release of any uncontrolled NH_3. Such an event is not expected to occur for more than a few hours per year.

6.4.30 Exhaust emissions from vessels during operation have the potential to impact on air quality, particularly when they are in dock. At such time, the vessel emissions source is static and, given the anticipated frequency of vessels in dock, operational for approximately 80% of the year. This means that docked vessel emissions will impact on the same locations consistently throughout the year, subject to meteorological conditions. Docked vessel emission impacts on local air quality have been quantified in this assessment.

6.4.31 Pollutants of concern vary depending on the fuel type of the vessel engine, such as Liquified Natural Gas ("LNG") and Marine Gas Oil ("MGO") but will include NO_X (NO and NO_2).

6.4.32 Vessels using the Project in the operational phase will need to comply with relevant International Convention for the Prevention of Pollution from Ships ("MARPOL") NO_X and SO_2 emission standards (Ref 6-26 and Ref 6-27), noting that approach to and from the Project is within the North Sea Emissions Control Area ("ECA").

6.4.33 MARPOL Regulation 13 (Ref 6-26) requires that vessel engines comply with tiered NO_X emissions standard based on the age of a vessel's engines. For vessel engine plant installed before 1 January 2021 or new vessels constructed before that same date, NO_X emissions need to be limited to $44n^{-0.23}$ g/kWh (MARPOL Regulation 13 Tier II), where n is the engine's rated speed as Revolutions per Minute ("RPM"). For vessel engine plant or new vessels constructed on or after that date, NO_X emissions will need to be limited to $9n^{-0.2}$ g/kWh (MARPOL Regulation 13 Tier III). It is likely that vessel engines will require SCR technology to meet the Tier III NO_X standard, the use of which will induce some NH_3 slip. Marine vessel NH_3 slip is typically below 10ppm (Ref 6-15), subject to the efficiency of the SCR system.

6.4.34 MARPOL Regulation 14 (Ref 6-27) is not tiered and applies to all vessels operating within an ECA. To reduce emissions of SO_2 and fine particulates (PM_{10}), vessel engines must operate using MGO with a sulphur content of no more than 0.10 %m/m when travelling through the North Sea ECA, or by means of technological intervention, such as an SO_2 scrubber (subject to approvals with the relevant administration). SO_2 and PM emissions from vessels are therefore likely to be negligible and are not considered further in this assessment.

6.4.35 The detailed assessment methodology followed to quantify the contribution of vessel emissions to impacts and total concentrations of the pollutants of concern is set out in **Appendix 6.B [TR030008/APP/6.4]**.

Air Quality Sensitive Receptors

6.4.36 The air quality receptors selected for this assessment are those that are considered sensitive to air quality effects and most likely to experience worst-case impacts from the impact pathways considered, because of the Project's construction and operation. Each selected receptor can be considered representative of other sensitive locations in their vicinity.

6.4.37 Receptor selection therefore takes account of the study area of each impact pathway (see **Section 6.5**) and the location of sensitive receptors relative to the Project's emission sources. The receptors considered in the assessment are described in **Appendix 6.A** and **Appendix 6.B [TR030008/APP/6.4]** and shown in **Figure 6.1 [TR030008/APP/6.3]**.

6.4.38 With regards to construction phase emissions, there are a number of high sensitivity amenity and human health sensitive receptors within the 250 m of the construction Site Boundary criteria in the IAQM guidance (Ref 6-23). These include the residential dwellings off Queens Road, immediately adjacent to the West Site. There is also lower sensitivity commercial and industrial land use adjacent to both the East Site and the West Site. 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 (Ref 6-23), including the high sensitivity Humber Estuary Special Area of Conservation ("SAC")/Special Protection Area ("SPA"), which is immediately adjacent to the East Site. Although the mudflat habitat closest to the Site is not considered as sensitive to construction phase impacts as more distant SAC habitat, such as saltmarsh.

6.4.39 Receptors sensitive to impacts from road traffic and point source emissions include the residential properties and nature conservation sites described above, but also more distant receptors, including human health sensitive receptors in the East Riding of Yorkshire Council ("ERoY") area and Grimsby, and the saltmarsh habitat along the northern and southern shore of the Humber Estuary. It is noted that the residential receptors considered in the construction phase assessment on Queens Road will not be present in the operational scenario as explained in **Paragraph 6.4.64**.

6.4.40 Receptor sensitivity to combustion emissions is determined in line with relevant guidance (Ref 6-23, Ref 6-24, Ref 6-25, Ref 6-32). With regards to impacts of the pollutants set out in the Air Quality Standards Regulations (Ref 6-17, Ref 6-18), the sensitivity of receptors was considered in the setting of those Standards. As such, a high level of sensitivity is applied to all receptors subject to the duration of their exposure (determined by land use) relative to the exposure period set by the Standards.

Determination of Significance

Construction Phase and Operational Phase Amenity Impacts

6.4.41 For amenity effects from coarser dust (>PM_{10}) and odour, the aim of the IAQM guidance methods 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 construction dust emissions will also reduce emissions of finer particles (PM_{10}).

6.4.42 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. Also, for construction dust, whether any secondary effects are caused (in this instance, secondary effects refer to dust that is generated and deposited (primary impact) and then re-suspended and deposited again by further activity).

6.4.43 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 (Ref 6-23)), which results in a classification of effects as defined in **Table 6-4**.

6.4.44 The impacts associated with the operational phase odour emissions have been qualitatively assessed following the approach set out in the IAQM guidance on the Assessment of Odour for Planning (Ref 6-25).

Table 6-4: Definition of Significance for Fugitive Dust, PM_{10} and Odour Effects

Effect	Change in Dust Deposition Rate and Short-term PM_{10} Concentrations	Change in Odour Conditions	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.		A significant effect that is likely to be a material consideration in its own right.
	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.		

Effect	Change in Dust Deposition Rate and Short-term PM_{10} Concentrations	Change in Odour Conditions	Significance
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.		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.
	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.		
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.		An effect that is not significant but that may be of local concern.
	Limited increase in PM_{10} concentrations. Deposition impact likely to harm habitat within a designated nature conservation area of local importance.		
Negligible	Impact is unlikely to be noticed by and/or have an effect on sensitive receptors.		An effect that is not significant.
	Negligible increase in PM_{10} concentrations and deposition.		

Construction Phase and Operational Phase Combustion Emissions

6.4.45 For local air quality impacts from combustion emissions associated with construction phase and operational phase road traffic movements, vessel movements and energy and process plant, the significance of local air quality effects is determined in line with IAQM/EPUK guidance (Ref 6-32). 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.

6.4.46 For a change in annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$, of a given magnitude, the IAQM and EPUK guidance provides recommendations for describing the effects of such impacts at individual receptors. These are set out in **Table 6-5**.

Table 6-5: Impact Descriptors at Individual Receptors - Annual Mean NO_2, PM_{10} and $PM_{2.5}$

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]	2-5 %[3]	6-10 %[4]	> 10 %[5]
≤75 %	Negligible	Negligible	Negligible	Slight	Moderate
76 % – 94 %	Negligible	Negligible	Slight	Moderate	Moderate
95 % – 102 %	Slight	Slight	Moderate	Moderate	Substantial
103 % – 109 %	Moderate	Moderate	Moderate	Substantial	Substantial
≥110 %	Moderate	Moderate	Substantial	Substantial	Substantial
[1] Imperceptible; [2] Very low; [3] Low; [4] Medium; [5] Large					

6.4.47 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.

6.4.48 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.

6.4.49 The guidance suggests the potential for 'Low' air quality impacts arises 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/m^3. 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.

6.4.50 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 when the majority experience lesser impacts. A 'Substantial' impact will almost certainly constitute a significant effect that will require additional mitigation to address.

6.4.51 The IAQM and EPUK guidance also provide thresholds for determining whether short-term (one-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:

a. Source contributions ≤10 % of the air quality objective represents an Imperceptible impact that is 'Negligible'.

b. Source contributions between 11-20 % of the air quality objective is Small in magnitude, representing a 'Slight' impact.

c. Source contributions between 21-50 % of the air quality objective is Medium in magnitude, representing a 'Moderate' impact.

d. Source contributions ≥51 % of the air quality objective is Large in magnitude, representing a 'Substantial' impact.

6.4.52 In addition to the short-term criteria provided by the IAQM/EPUK, 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) (Ref 6-8). An exceedance of the short-term PM_{10} air quality objective is unlikely where annual mean PM_{10} concentrations are less than 32 µg/m^3. Research projects completed on behalf of Defra and the Devolved Administrations (Ref 6-1 and Ref 6-29) 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/m^3.

6.4.53 For impacts at nature conservation receptors, whether the effect is significant or not is determined by a competent expert in ecology and is described in **Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]**. To inform this judgement, National Highways guidance (Ref 6-33) and Environment Agency guidance (Ref 6-14) both state that impacts may be considered insignificant ('not significant') where the impact of a scheme or project alone is less than 1% of the long-term air quality objective or environmental assessment level for the nature conservation site. Natural England guidance (Ref 6-34) also refers to 1% as a screening threshold.

6.4.54 For assessments undertaken based on National Highways guidance (Ref 6-33), it is common practice for the contribution of cumulative emissions sources to be accounted for in both the future baseline (Do-Minimum) scenario and the operational (Do-Something) scenario. With such an approach, the effect of a scheme is determined by consideration of the impact of the scheme alone along with total operational (Do-Something) concentrations and deposition rates that include the contribution of emissions from cumulative sources. Natural England guidance (Ref 6-34) applies the 1% threshold to both a scheme or project alone and the scheme or project in combination with other committed and reasonably foreseeable schemes and projects.

6.4.55 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 or deposition rate remains below the relevant environmental assessment level for the nature conservation site.

Limitations and Assumptions

6.4.56 The air quality assessment has been informed by construction phase and operational traffic data used to inform the traffic and transport assessment and therefore is subject to the relevant limitations, assumptions and uncertainties described in **Chapter 11: Traffic and Transport [TR030008/APP/6.2]**.

6.4.57 The air quality assessment has been informed by onsite emissions source characteristics and data provided by the Project design team, including the location, height and internal diameter of flare stack emission points and vents, and the temperature, rate, and mass by pollutant of emissions released. Where there remains intended flexibility in design, assumptions made have been precautionary where practical. For example, where there is a possible range of flare stack heights from which emissions may be released, the lowest of the possible heights has been assumed, as set out in requirement 4(4) of the **draft DCO [TR030008/APP/2.1]**. This is because a lower release height will result in higher ground level contributions.

6.4.58 There is also flexibility in the final location of the flare stacks on the West Site, within the defined Work Areas, and the internal diameter of all flare stacks proposed. For the assessment reported in this chapter, flare stack locations and the internal diameter of stacks have been modelled at their most likely location and diameter. The internal diameter of the flare stacks is modelled on a reasonable worst case basis, given that any material change to that modelled would affect the structural integrity of stacks and their viability to release the volume of gas required (such that an Environmental Permit would not be granted for the resulting design). There is flexibility as to the final location of the stacks within the West Site, which must be within the defined areas shown on the **Works Plans [TR030008/APP/4.1]** as applicable for the relevant works set out in Schedule 1 of the **draft DCO [TR030008/APP/2.1]**. For the assessment reported in this chapter, flare stacks have been modelled at a certain location within the relevant area shown on the **Works Plans [TR030008/APP/2.1]**, but the construction of the flare stacks in a different location within those areas would not affect the conclusions of this assessment given the distance between those potential locations and the nearest receptors.

6.4.59 Assumptions made to inform the modelling of onsite plant emissions are as follows:

a. Combustion and process emissions associated with the landside hydrogen production units will be operational up to 8760 hours per year.

b. Hydrogen plant will be fitted with Selective Catalytic Reduction technology to reduce emissions of NO_X. It is anticipated that this will cause NH_3 slip and a reasonable worst case of 5ppm has been considered.

6.4.60 The air quality assessment includes the assessment of vessel emissions. At this stage, the actual vessels that will call at the facility are unknown. In the absence of this information, a number of assumptions have been made to inform the modelling of vessel emissions. The assessment is based on the following key assumptions:

a. Two hundred and ninety-two vessel calls to the facility each year, which equates to 0.8 vessel calls as a daily average (this is considered to be a theoretical maximum, or worst case)

b. There will be a single vessel docked at the facility at any one time for 7,008 hours (80%) of the year, based on 292 vessel calls assumed per year.

c. When in dock, vessel energy demand will be met by marine auxiliary engines based on a peak demand of around 8MW, to load and discharge cargo;

d. All vessels calling at the facility will have this same energy demand when in dock, irrespective of size.

e. The Wärtsilä 14V31 (8,260 kW^e) marine auxiliary engine has been assumed to be representative of the engines required to meet this energy demand.

f. The auxiliary engine will operate at full load for every hour a vessel is in dock.

g. The Humber Estuary is part of the North Sea ECA for SO_X and PM_{10}. The assumed implication of the ECA for SO_X and PM_{10} is that vessel emissions of SO_2 and PM_{10} will be negligible, either due to ultra-low sulphur fuel or the operation of a scrubber, following MARPOL Regulation 14.

h. The Humber Estuary is now also an ECA for NO_X. The implication of the ECA for NO_X is that vessels with engines installed prior to 2021 have to comply with the MARPOL Regulation 13 Tier II NO_X emissions standard. Engines installed on or after 1 January 2021 have to comply with the Regulation 13 Tier III emissions standard.

i. Vessels will need to use SCR technology to meet the NO_X Regulation 13 Tier III emissions standard. NH_3 slip from vessel engine SCR use is reported to range from 2ppm to 10ppm. For the purpose of this assessment an NH_3 slip of 10ppm has been assumed from vessel engine emissions.

6.4.61 Combustion emissions associated with flares will be operational on pilot mode for 8760 hours per year. The controlled flaring of NH_3 emissions will only occur in the event of an emergency, or when plant requires start-up.

6.4.62 Meteorological data used in the air quality assessment has been sourced from the nearest and most representative meteorological monitoring site, Humberside Airport, which is approximately 13km southwest of the Site. This data is considered the most representative data available close to the Site. Due to the inter-annual variation in meteorological conditions, five years of data have been used in the modelling of point source emissions to account for that variability, in accordance with Environment Agency guidance.

6.4.63 Defra background data (Ref 6-9) and APIS background data (Ref 6-2) has been used to represent background pollutant concentration data in the study area. These background concentrations have not had any sources removed and are therefore considered to include emissions associated with the existing neighbours of the Site, including nearby industry and the Port of Immingham. Such an approach is considered proportionate and robust, and is in line with industry standard guidance (Ref 6-8, Ref 6-33 and Ref 6-34).

6.4.64 There are a number of residential and mixed residential/commercial properties within the Site on Queens Road. The residential use of these properties is considered incompatible with the operation of the hydrogen production facility on the West Site (and an impediment to the grant of the necessary hazardous substances consent). Discussions are ongoing with the owners and occupiers with a view to negotiating the acquisition of these residential properties by agreement. Compulsory acquisition powers for these properties are also sought through the **draft DCO [TR030008/APP/2.1]**. It is intended that, following the acquisition of the properties, the permanent cessation of their residential use will be secured through the **draft DCO [TR030008/APP/2.1]**. The residential use of these properties does not therefore form part of the operational assessment.

6.5 Study Area

6.5.1 The study area is the area over which potentially significant direct and indirect effects of the Project may occur during its construction and operation (decommissioning having been scoped out of the assessment). Air quality impacts will impact on receptors with the administrative areas of NELC, NLC and ERoY. The study area described below is illustrated on **Figure 6.1 [TR030008/APP/6.3]**.

6.5.2 The Project will be developed across several parcels of land on and in close proximity to the Port of Immingham, which is an existing and well-established port with a number of existing sources of emissions to air. 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.

6.5.3 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 IAQM guidance (Ref 6-23). They are only likely to occur at locations where there are human health or amenity sensitive receptors within 250 m of the Site Boundary (taken to represent the construction site boundary in this assessment) and/or 50 m of a public road used by construction vehicles that is within 250 m of a site access point, and where there are sensitive ecological receptors within 50 m of the Site Boundary and/or 50 m

of a public road used by construction vehicles that is within 250m of a site access point.

6.5.4 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 200m of an 'affected' road link (Ref 6-33). An 'affected' road link is defined by the following criteria:

a. Any urban or rural road link not situated within or adjacent to an AQMA that will experience a change in two-way traffic flow of 500 or more annual average daily LDV (vehicles <3.5 tonnes) and/or 100 or more annual average daily HDV (all vehicles >3.5 tonnes), as defined within EPUK and IAQM guidance (Ref 6-32).

b. Any urban or rural road link that is situated within or adjacent to an AQMA that will experience a change 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 (Ref 6-32).

c. Any road link that forms part of the SRN that will experience a change in two-way traffic flow of 1000 or more AADT and/or 200 or more annual average daily HDVs, as defined within National Highways guidance LA105 (Ref 6-33).

6.5.5 The study area for onsite point source emissions and vessels at berth during operation is determined with reference to Environment Agency permitting guidance (Ref 6-14), which includes worst-case human health and nature conservation impacts within 10km of the emissions sources.

6.5.6 Vessel emissions impacts during construction will occur close to the source due to the limited height of vessels above sea level. Emissions from the larger operational vessels will occur at a greater height and impact across a wider area. In the absence of guidance, the study area applied to the onsite point source emissions has also been applied to this source also. The assessment focuses on worst-case impacts at the nearest human health and/or ecologically sensitive receptors, where present, in each direction from the vessel sources.

6.5.7 The study area for the qualitative odour assessment has, again, been determined by the guidance documents used to inform the assessment (Ref 6-25). The guidance document does not specifically refer to a study area based on any distance criteria from the site boundary. Instead, the odour study area has been assumed to include the nearest odour sensitive receptors in each direction from the Site.

6.6 Baseline Conditions

Existing Baseline

6.6.1 A desk-based study has been undertaken to inform the baseline characterisation on which the impact assessment has been based. This has included review of the following key data sources:

a. NELC Local Air Quality Management Data (Ref 6-37).

b. North Lincolnshire Council Local Air Quality Management Data (Ref 6-40).

c. A baseline nitrogen dioxide diffusion tube survey.

d. Defra's Pollution Climate Mapping ("PCM") Model Compliance Link Outputs (Ref 6-10).

e. Defra's Background Pollutant Concentration Maps (Ref 6-9).

f. APIS Background Pollutant Concentration Maps (Ref 6-2).

Local Air Quality Management Data

6.6.2 NELC undertake monitoring of air quality in their administrative area as part of their LAQM duties (Ref 6-37)). This includes the monitoring of nitrogen dioxide (NO_2) at two automatic monitoring sites and 30 passive monitoring sites. Of those monitoring sites, four are located at Immingham, including one of the automatic monitoring sites. In 2019, when conditions were not affected by the Covid-19 pandemic, concentrations ranged from 16.5 µg/m^3 to 24.5 µg/m^3 at roadside locations in the town and 13.5 µg/m^3 at an urban background location. Concentrations had generally returned to pre-pandemic levels in 2021. These data are summarised in **Table 6-6** 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.

6.6.3 North Lincolnshire Council also undertake monitoring of air quality within their administrative area using passive and automatic monitoring (Ref 6-40), including at locations in South Killingholme and adjacent to the A160. These data are summarised in **Table 6-6** and also demonstrate concentrations below the air quality objective and below the value to suggest any risk of the one-hour NO_2 objective being exceeded.

6.6.4 Both councils have current AQMAs declared. NELC have an AQMA located adjacent to the A180 through Grimsby (designated due to elevated NO_2 concentrations). The location of this AQMA is shown on **Figure 6.1 [TR030008/APP/6.3]**. NLC have a more distant AQMA located at Scunthorpe (designated due to elevated concentrations of particulate matter (PM_{10})). Immingham itself has historically had an AQMA close to the Port of Immingham on Kings Road, due to elevated concentrations of PM_{10}. However, this AQMA was revoked in 2016, to reflect PM_{10} concentrations that are now well below the relevant air quality objectives.

Table 6-6: Recorded NO_2 Concentrations in Immingham and Grimsby from North East Lincolnshire Air Quality Monitoring Network.

Site ID	Grid Reference		Site Type	NO_2 Annual Mean Concentration (µg/m^3)[1,2]						
	X	Y		2015	2016	2017	2018	2019	2021	2022
Immingham										
AURN[3]	518277	415116	Background	-	-	16.9	13.9	13.5	12.1	11.7
NEL 23[4]	519193	415279	Roadside	30.0	33.3	28.5	26.5	24.5	25.3	21.7
NEL 24[4]	517543	414312	Kerbside	-	-	-	-	16.5	15.0	14.6
NEL 25[4]	518108	414533	Kerbside	-	-	-	-	19.1	18.2	17.6
Cleethorpe Road AQMA, Grimsby										
Cleethorpe Road[2]	527761	410425	Roadside	**46.5**	**41.6**	35.9	-	32.0	33.4	29.6
NEL 11/12/13[5]	527761	410425	Roadside	**42.7**	**45.2**	**47.3**	38.0	37.8	39.1	36.7
NEL 14[4]	527754	410445	Kerbside	34.7	37.3	34.7	33.3	31.6	34.2	31.5
NEL 15[4]	527789	410438	Kerbside	30.8	35.7	37.3	32.9	31.0	35.8	31.3

[1] Values in **Bold** signify an exceedance of the annual mean NO_2 air quality objective

[2] Values for 2020 not reported due to the influence of Covid-19 lockdowns on emissions

[3] Continuous monitoring station with reference monitor

[4] Diffusion tube

[5] Triplicate diffusion tubes and average reported

Table 6-7: Recorded NO_2 concentrations in South Killingholme from North Lincolnshire Air Quality Monitoring Network

Site ID	Grid Ref.		Site Type	Annual Mean Conc. (µg/m³)[1,2]						
	X	Y		2015	2016	2017	2018	2019	2021	2022
CM6[3]	514880	416133	Other	20	17	17	18	15	14	14
DT13[4]	514573	415901	Roadside	26	31	20	17	17	17.4	16.8
DT14[4]	514782	415971	Roadside	34	31	27	28	29	28.4	27.1
DT15[4]	515452	416107	Background	19	21	19	20	18	17.9	16.7
DT16[4]	515279	416085	Roadside	27	26	25	26	25	22.0	23.8

[1] North Lincolnshire report concentrations as whole numbers

[2] Values for 2020 not reported due to the influence of Covid-19 lockdowns on emissions

[3] Continuous monitoring station with reference monitor

[4] Diffusion tube

Baseline Survey Data

6.6.5 To supplement the existing NO_2 monitoring data gathered by the Local Authorities in the study area, a project specific NO_2 survey has been undertaken from January 2023 to April 2023. The data gathered during the survey has been annualised and adjusted for diffusion tube bias in line with Defra's LAQM TG (22) guidance (Ref 6-8), to represent annual mean concentrations for 2022.

6.6.6 These results are summarised in **Table 6-8** 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. The locations of the diffusion tube monitoring sites are illustrated in **Figure 6.1 [TR030008/APP/6.3]**.

Table 6-8: Baseline NO_2 survey results, annualisation and bias-adjustment

Diffusion Tube ID	Period Mean Concentration (µg/m³)			Annualised Mean (2022)[1]	Bias-adjusted mean (2022)[2]
	Period 1 (31/01/23 – 28/02/23)	Period 2 (28/02/23 – 28/03/23)	Period 3 (28/03/23 – 26/04/23)		
DT1	25.4	20.2	23.4	23.6	19.9
DT2	20.0	18.7	16.6	18.9	15.9
DT3	19.4	20.3	16.5	19.3	16.2
DT4	26.8	26.2	23.9	26.3	22.1

Diffusion Tube ID	Period Mean Concentration (µg/m^3)			Annualised Mean (2022)[1]	Bias-adjusted mean (2022)[2]
	Period 1 (31/01/23 – 28/02/23)	Period 2 (28/02/23 – 28/03/23)	Period 3 (28/03/23 – 26/04/23)		

[1] Annualisation factor of 1.03 calculated by comparison of period mean and 2022 annual mean concentrations from the following automatic monitoring stations on the Automatic Urban and Rural Network: Immingham Woodlands Avenue (1.00), York Bootham (1.04) and Scunthorpe Town (1.03), and the North Lincolnshire Council monitoring site: South Killingholme School (1.03). The monitoring station Hull Freetown has not been used due to poor data capture during the sampling period.

[2] A bias-adjustment factor of 0.84 sourced from Defra's National Bias Adjustment Spreadsheet (Ref 6-11) which calculated from a number of co-location studies undertaken by the laboratory that prepared and analysed the diffusion tubes used in the survey.

Defra PCM Model

6.6.7 The closest PCM link to the Project is the A1173 located approximately 120m from the western edge of the site. This link has a modelled concentration of 22.6 µg/m^3 in 2019 (Ref 6-10).

Human Health Relative Background Data

6.6.8 Defra has produced publicly available maps of background pollutant concentrations covering the whole of the UK, for the purpose of LAQM (Ref 6-9). These maps provide a useful resource for locations where background monitoring data is limited. The maps give background pollutant concentrations for each 1km x 1km grid square within the UK for all years between 2018 and 2030 for NO_2, PM_{10} and $PM_{2.5}$.

6.6.9 **Table 6-9** outlines the 2022 background concentrations of NO_2, PM_{10} and $PM_{2.5}$, within the grid squares where the Project is located and where there are key features of interest to the assessment. The background concentration values account for existing sources of emissions to air within each and neighbouring grid squares and none of these sources have been removed from the values reported. Total background concentrations within these grid squares are well below the respective air quality objectives.

Table 6-9: Defra mapped annual mean background concentrations for 2022

Rec. ID	Interest Feature	Annual Mean Concentration (µg/m^3)		
		NO_2	PM_{10}	$PM_{2.5}$
Construction Phase Receptors				
C_R1	Residential receptor on Queens Road	15.2	14.6	8.4
C_R2	Residential receptor on Queens Road	15.2	14.6	8.4

Rec. ID	Interest Feature	Annual Mean Concentration (µg/m^3)		
		NO_2	PM_{10}	$PM_{2.5}$
C_R3	Residential receptor on Queens Road	14.4	13.9	8.1
C_R4	Residential receptor on Kings Road	15.2	14.6	8.4
C_R5	Residential receptor within Grimsby AQMA	19.6	13.1	8.4
C_R6	Residential receptor within Grimsby AQMA	19.6	13.1	8.4
Operational Phase Receptors				
O_R1	Residential property on Kings Road	15.2	14.6	8.4
O_R2	Residential property on Chestnut Avenue	15.2	14.6	8.4
O_R3	Residential property on Talbot Road	15.2	14.6	8.4
O_R4	Residential property on Somerton Road	15.2	14.6	8.4
O_R5	Residential property on Kendal Road	15.2	14.6	8.4
O_R6	Residential property on Pelham Road	12.5	13.7	8.3
O_R7	Residential property on Margaret Street	12.5	13.7	8.3
O_R8	Residential property – Mauxhall Farm	11.2	15.7	8.6
O_R9	Residential property on North Moss Lane	11.3	15.4	8.4
O_R10	Residential property on South Marsh Road	11.6	15.8	8.6
O_R11	Residential property on Church Lane	9.6	15.3	8.3
O_R12	Residential property within Grimsby AQMA	19.6	13.1	8.4
O_R13	Residential property to north of the Humber Estuary	12.3	11.6	7.3
O_R14	Residential property to north of the Humber Estuary	11.7	14.7	8.1
O_R15	Residential property to north of the Humber Estuary	11.0	14.9	8.1
O_R16	Residential property to north of the Humber Estuary	11.6	14.0	7.9
O_R17	Residential property to north of the Humber Estuary	10.7	14.9	8.1
Air Quality Objective Values		**40**	**40**	**20**

Nature Conservation Relative Background Data

6.6.10 With regard to pollutants of importance to nature conservation, Defra also publish 1km x 1km grid square data for NO_X for all years between 2018 and 2030. For other pollutants, the APIS make publicly available maps of background pollutant data across the UK for SO_2, NH_3 and nitrogen deposition rates (Ref 6-2). The background concentrations for SO_2 are based on 1km x 1km grid squares whilst concentrations of NH_3 and nitrogen deposition rates are based on 5km x 5km grid squares across the UK. Each square includes for the contribution of existing sources of emissions to air within them and from other grid squares around them.

6.6.11 **Table 6-10** provides 2019 background pollutant data (based on a three-year average of 2018 – 2020 inclusive) for SO_2 and NH_3. These 2019 values are used to represent conditions in the existing baseline year of 2022, because there is no published means by which to account for any year-on-year improvements in these pollutants. The table provides 2022 background pollutant data for NO_X and nitrogen deposition. The 2022 nitrogen deposition rate background is the 2019 value provided by the APIS and the application of a yearly reduction in deposition rate of 0.07 kg/ha/yr, as published by the Joint Nature Conservation Committee's Nitrogen Futures Project (Ref 6-28).

Table 6-10: APIS mapped annual mean background concentrations and deposition rates for 2022

Rec. ID	Interest Feature	Annual Mean Conc. (µg/m^3)			Nitrogen Deposition Rate (kg/ha/yr)
		NO_X	SO_2	NH_3	
O_E1	Saltmarsh (SAC)	16.7	2.1	1.5	**15.0**
O_E2	Saltmarsh (SAC)	16.7	2.1	1.5	**15.0**
O_E3	Saltmarsh (SAC)	16.5	1.8	1.6	**14.3**
O_E4	Saltmarsh (SAC)	15.3	1.7	1.6	**14.3**
O_E5	Saltmarsh (SAC)	18.4	3.9	1.5	**15.1**
O_E6	Saltmarsh (SAC)	21.0	3.4	1.6	**16.4**
O_E7	Saltmarsh (SAC)	14.0	1.6	1.6	**14.3**
O_E8	Saltmarsh (SSSI)	16.6	2.2	1.5	**15.1**
O_E9	Saltmarsh (SAC)	17.7	1.9	1.5	**15.1**
O_E10	Saltmarsh (SAC)	28.7	2.8	1.6	**13.9**
O_E11	Saltmarsh (SAC)	23.0	3.4	1.6	**16.4**
O_E12	Saltmarsh (SAC)	**37.9**	3	1.6	**16.4**

Rec. ID	Interest Feature	Annual Mean Conc. (µg/m^3)			Nitrogen Deposition Rate (kg/ha/yr)
		NO_X	SO_2	NH_3	
O_E13	Saltmarsh (SAC)	15.0	2	1.5	**15.0**
O_E14	Saltmarsh (SAC)	13.0	1.7	2.1	**16.6**
O_E15	Saltmarsh (SAC)	13.0	1.7	2.1	**16.6**
O_E16	Grassland (LWS)	20.6	3.2	1.5	**15.1**
O_E17	Woodland (LWS)	18.2	3.53	1.6	**26.5**
O_E18	Woodland (LWS)	15.4	1.75	1.5	**25.4**
O_E19	Grassland (LWS)	14.8	2.22	1.5	**15.1**
Critical Levels and Critical Load		**30**	**20**	**3**	**10**

[1] Short vegetation, such as grassland and marsh, has a lower deposition velocity then tall vegetation, hence lower background deposition rates.

[2] Tall vegetation, such as woodland, has a higher deposition velocity than short vegetation, hence higher background deposition rates.

6.6.12 Background concentrations of SO_2 and NH_3 in 2022 are well below their respective Critical Levels. Background concentrations of NO_X are well below the Critical Level for that pollutant at most locations. There is an existing exceedance at grid square 516500,420500, the centre point of which is at the Humber Sea Terminal, and an elevated concentration at grid square 527500,410500, which includes the Port of Grimsby and North East Lincolnshire's Grimsby AQMA. Background nitrogen deposition rate date for both short vegetation and tall vegetation exceed the new lower Critical Load for saltmarsh habitat, which was confirmed by the APIS as 10 kg/ha/yr on 25 May 2023. However, nitrogen deposition rates to short vegetation do not exceed the upper Critical Load value of 20 kg/ha/yr.

Dust

6.6.13 Existing background dust levels are likely to be variable across the sites. 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, dust deposition rates and dust soiling are likely to be typical of most urban, suburban, and semi-rural locations.

Future Baseline

6.6.14 The future baseline scenario provides the air quality conditions against which the impact of Project emissions is considered. Future baseline air quality differs from existing baseline air quality for several reasons. These include:

a. Increased vehicle movements on the local road network and SRN, due to traffic growth (refer to **Chapter 11: Traffic and Transport [TR030008/APP/6.2]** regarding assumptions related to consented developments and traffic growth).

b. Reduced emissions per vehicle movement, due to improving vehicle emissions standards and the evolution of the UK vehicle fleet.

c. An overall trend of decreasing background pollutant concentrations over future years.

Local Air Quality

6.6.15 Future baseline air quality has been quantified for the year of peak construction (2026) and for the year of opening (2028), which has also been used to represent the future baseline for the year of full operation (2036). The assumption that the year of opening represents year of full operation is precautionary. Background air quality is projected to improve beyond 2028 and baseline conditions in 2036 are likely to be better than those experienced in 2028.

6.6.16 The construction phase is the only scenario that causes a traffic impact of more than the screening criteria set out in **Paragraph 6.4.17** or **Paragraph 6.4.18**. The construction traffic route that experiences a traffic impact of more than the screening criteria is from the site entrance on Queens Road and the A1173, between Queens Road and the A180. This route passes air quality human health sensitive receptors located adjacent to Queens Road. It does not pass within 200 m of a nature conservation site of national or international importance, with reference to the requirements of the Natural England guidance (Ref 6-34).

6.6.17 At the receptors that are located within 200m of the construction routes that exceed the traffic screening criteria (receptor C_R1 to C_R6), the year of peak construction baseline is based on the projected background concentration data for 2026, plus cumulative emissions associated with flows from general traffic growth and committed developments in construction or operation by 2026.

6.6.18 Future baseline air quality in 2026 is presented at selected air quality sensitive receptors located within the distances of the emissions sources, as described in **Section 6.5**. Future baseline pollutant statistics at human health sensitive receptors are reported in **Table 6-11** below. The receptors are described in **Appendix 6.B [TR030008/APP/6.4]** and their location of is illustrated in **Figure 6.1 [TR030008/APP/6.3]**.

Table 6-11: Future Baseline Concentrations at nearest human health sensitive receptors for 2026

Receptor ID	Annual Mean Background Contribution (µg/m³)[1]			Annual Mean Modelled Contribution (µg/m³)			Annual Mean Concentration (µg/m³)[3]		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
C_R1	14.1	14.2	8.0	2.7	0.8	0.4	16.8	15.0	8.5
C_R2	14.1	14.2	8.0	2.4	0.7	0.4	16.5	14.9	8.4
C_R3	13.3	13.4	7.7	2.5	0.7	0.4	15.8	14.1	8.1
C_R4	14.1	14.2	8.0	3.0	1.0	0.5	17.2	15.1	8.6
C_R5	18.0	12.7	8.0	9.4	1.9	1.1	27.4	14.6	9.1
C_R6	18.0	12.7	8.0	9.0	1.8	1.0	27.0	14.5	9.1

Notes:

[1] Background contribution of existing sources, minus the contribution from the sources specifically modelled.

[2] Model contribution, including the contribution from baseline traffic flows.

[3] Annual mean concentration is the combined contribution of background and modelled sources.

6.6.19 The future baseline conditions reported in **Table 6-11** for the year of peak construction can be summarised as follows:

a. It is demonstrated that air quality at locations adjacent to the main construction traffic routes is well below the relevant air quality objectives; and

b. There is considered to be no risk of an exceedance of an air quality objective, even within the Grimsby AQMA.

6.6.20 The operation of the Project in the year of opening (2028) and year of full operation (2036) does not cause a traffic impact that is more than the screening criteria, as set out in **Paragraph 6.4.17** or **Paragraph 6.4.18**. As such, the future baseline air quality to represent 2028 (and 2036) is based on the projected Defra background concentrations at the selected air quality sensitive receptors located within the distances of the emissions sources as described in **Section 6.5**. Future baseline pollutant statistics at human health sensitive and nature conservation receptors are reported in **Table 6-12** and **Table 6-13** below. The location of receptors is illustrated in **Figure 6.1 [TR030008/APP/6.3]**.

Table 6-12: Future Baseline Concentrations at nearest human health sensitive receptors for 2028 (also representing 2036)

Receptor ID	Annual Mean Baseline Concentration (µg/m^3)		
	NO_2	PM_{10}	$PM_{2.5}$
O_R1	13.8	14.1	8.0
O_R2	13.8	14.1	8.0
O_R3	13.8	14.1	8.0
O_R4	13.8	14.1	8.0
O_R5	13.8	14.1	8.0
O_R6	11.1	13.2	7.9
O_R7	11.1	13.2	7.9
O_R8	9.9	15.3	8.2
O_R9	10.1	14.9	8.0
O_R10	9.9	15.3	8.2
O_R11	8.5	14.8	8.0
O_R12	17.5	12.6	8.0
O_R13	11.3	11.1	7.0
O_R14	10.6	14.3	7.7
O_R15	10.0	14.5	7.7
O_R16	10.6	13.5	7.5
O_R17	9.7	14.5	7.7
Air Quality Objective Values	**40**	**40**	**20**

Table 6-13: Future Baseline Concentrations at selected nature conservation sensitive receptors for 2028 (also representing 2036)

Rec. ID	Annual Mean Baseline Concentration			
	NO_X	SO_2	NH_3	N-dep
	µg/m³			kgN/ ha/yr
O_E1	15.1	2.1	1.5	**14.6**
O_E2	15.1	2.1	1.5	**14.6**
O_E3	14.9	1.8	1.6	**13.9**
O_E4	13.8	1.7	1.6	**13.9**
O_E5	16.6	3.9	1.5	**14.7**
O_E6	19.1	3.4	1.6	**16.0**
O_E7	12.6	1.6	1.6	**13.9**
O_E8	14.6	2.2	1.5	**14.7**
O_E9	15.8	1.9	1.5	**14.7**
O_E10	25.1	2.8	1.6	**13.5**
O_E11	21.1	3.4	1.6	**16.0**
O_E12	**36.5**	3.0	1.6	**16.0**
O_E13	13.6	2.0	1.5	**14.6**
O_E14	11.6	1.7	2.1	**16.1**
O_E15	11.6	1.7	2.1	**16.1**
O_E16	18.4	3.2	1.5	**14.7**
O_E17	16.2	3.53	1.6	**25.5**
O_E18	13.1	1.75	1.5	**26.0**
O_E19	13.0	2.22	1.5	**14.7**
Critical Levels and Critical Load	**30**	**20**	**3**	**10**

6.6.21 The future baseline conditions in 2028 (also representing 2036) reported in **Table 6-12** and **Table 6-13** can be summarised as follows:

a. At the human health sensitive receptors, air quality is of a good standard and there is considered no risk of an exceedance of an air quality objective,

b. At the sensitive nature conservation receptors, annual mean NO_X concentrations exceed the Critical Level at the location of receptor O_E12 but are below or well below the Critical Level at all other locations considered. Concentrations appear to be elevated at O_E12 because of emissions associated with the Humber Sea Terminal,

c. Annual mean concentrations of SO_2 and NH_3 are well below their respective Critical Levels,

d. Nitrogen deposition rates are in excess of the lower Critical Load value for saltmarsh habitat (10 kg/ha/yr) but also less than the upper Critical Load value at all receptors considered.

Dust

6.6.22 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 those sources currently present. This is considered highly unlikely given the current use of sections of the nearby Port of Immingham for bulk cargo storage, including land to the north of the Port's East Gate.

6.7 Development Design and Impact Avoidance

6.7.1 This section sets out measures by which emissions to air are controlled by embedded design methods, or by standard practice methods secured through the DCO process. The assessment of air quality impacts set out in **Section 6.8** assumes that these measures are already in place, as there is no such scenario where they would not be.

6.7.2 It should be noted that some elements of the Project design remain flexible subject to the evolution of the Project design. To account for this flexibility, the air quality assessment is based on precautionary assumptions, such as modelling the lowest emissions release heights of those possible within the flexible design.

Embedded Measures

6.7.3 The Project has been designed, as far as possible, to avoid and minimise impacts and effects to population and health through the process of design development, and by embedding mitigation measures into the design.

6.7.4 Emissions to air and potential impacts at sensitive locations are mitigated by direct and indirect control measures including those which will be embedded within the Project design or which will be required to obtain or secure compliance with the environmental permit which must be obtained for the operation of the hydrogen production facility ("Environmental Permit"). These measures include, but are not limited to:

a. Project layout design and the locating of defined works and associated onsite sources set out in Schedule 1 of the **draft DCO [TR030008/APP/2.1]** within the relevant work areas shown on the **Work Plans [TR030008/APP/4.2],** which has given consideration to nearby air quality sensitive receptors, including the position of the jetty and docked vessels,

b. Closed system for ammonia and hydrogen handling with leak detection management system, which will be a requirement of the Environmental Permit,

c. Emergency flares to burn off NH_3 or hydrogen emissions should the need arise; hydrogen flares will also be used in plant start up and shut down, which will be a requirement of the Environmental Permit and necessary to ensure compliance with COMAH regulations (ALARP),

d. Emissions release heights to encourage optimal dispersion – assuming the lowest emission release height of the flexible design parameters as set out in Requirement 4(4) of the draft DCO,

e. Demonstration of the application of best available techniques in plant design and operation as will be required to obtain the Environmental Permit, which the hydrogen production facility will need to comply with throughout its operational life,

f. The enforcement of relevant emissions standards including those set by MARPOL for Marine Vessels, with the Humber Estuary being part of the North Sea ECA for SO_X and NO_X, as enforced by the UK Maritime and Coastguard Agency.

Standard Measures

6.7.5 Standard measures set out within the **CEMP [TR030008/APP/6.5]** and **Construction Traffic Management Plan** ("CTMP") **[TR030008/APP/6.7]** secured by requirements of the draft DCO will reduce emissions of dust from construction activities and combustion emissions from traffic movements. The measures considered standard are set out in the following sections.

Construction Phase

Construction Dust Emissions

6.7.6 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 (Ref 6-23) lists measures that should be applied, if practical, relative to the risk identified (see **Section 6.8**).

6.7.7 A Low/Medium risk of dust impacts was identified in **Section 6.8** due to the potential dust emission magnitude and the sensitivity of the area. Therefore, the list of IAQM mitigation measures taken forward for this Project is proportionate to the risk identified. These measures will be secured through the CEMP. The measures identified for the Project are as follows, based on IAQM recommendation for low and medium risk sites:

a. Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.

b. Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.

c. Display the head or regional office contact information.

d. Develop and implement a Dust Management Plan ("DMP"), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the measures set out here and within the **Outline CEMP [TR030008/APP/6.5]**. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections, as required for the risk associated with the site.

e. 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.

f. Make the complaints log available to the local authority when asked.

g. Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.

h. Hold regular liaison meetings with other construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

i. Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This would include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.

j. Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.

k. Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

l. Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during earthworks and construction.

m. Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.

n. Erect solid screens or barriers around dusty activities or the Site Boundary that are at least as high as any stockpiles on site.

o. Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.

p. Avoid site runoff of water or mud.

q. Keep site fencing, barriers and scaffolding clean using wet methods.

r. Remove materials that have a potential to produce dust from the Site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.

s. Cover, seed or fence stockpiles to prevent wind whipping.

t. Ensure all on-road vehicles comply with the requirements of relevant NRMM standards, where applicable.

u. Ensure all vehicles switch off engines when stationary - no idling vehicles.

v. Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.

w. Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).

x. Produce a CTMP based on the **Outline CTMP [TR030008/APP/6.7]** to manage the sustainable delivery of goods and materials;

y. Implement a Construction Worker Travel Plan ("CWTP") based on the **Outline CWTP [TR0300008/APP/6.7]** that supports and encourages sustainable travel (public transport, cycling, walking, provision of multi-occupancy vehicles and car-sharing).

z. Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.

aa. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.

bb. Use enclosed chutes and conveyors and covered skips.

cc. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.

dd. Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

ee. Avoid bonfires and burning of waste materials.

ff. Avoid scabbling (roughening of concrete surfaces) if possible.

gg. Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

hh. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.

ii. For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

jj. Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.

kk. Avoid dry sweeping of large areas.

ll. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;

mm. Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.

nn. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

oo. 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.

pp. Access gates to be located at least 10 m from receptors where possible.

Construction Phase Plant and Vessel Emissions

6.7.8 It is best practice to mitigate emissions to air. Measures to reduce emissions from construction phase vessel and road traffic emissions sources include taking steps to:

a. Prohibit unnecessary vehicle or vessel movements, as specified in the CEMP.

b. Prohibit unnecessary idling of vehicle and vessel engines, as specified in the CEMP.

c. Encourage/promote the use of cleaner engines and fuels, noting that construction vessels will be required to comply with the MARPOL Regulations, as enforced by the UK Maritime and Coastguard Agency.

d. Discourage single-user car journeys as specified in the **Outline CWTP [TR0300008/APP/6.7]**.

Operational Phase

6.7.9 As stated previously, it is best practice to mitigate emissions to air. Measures to reduce operational phase sources include (as outlined within the Schedule of Mitigation **[TR030008/APP/7.2])**:

a. Implementation of an Odour Management Plan to control odour emissions, to be a requirement of the Environmental Permit.

b. Operational process and management control and monitoring of emissions to be a requirement of the Environmental Permit.

6.8 Assessment of Likely Impacts and Effects

Construction Phase

6.8.1 The assessment has identified that the construction of the Project has the potential to adversely impact on local air quality at sensitive locations in the vicinity of the Site.

6.8.2 These impacts are associated with the following pathways:

a. Dust emissions.

b. Site plant and NRMM emissions.

c. Vessel emissions.

d. Traffic emissions.

Construction Dust Emissions

6.8.3 The construction dust assessment follows the step-by-step approach set out in relevant IAQM guidance (Ref 6-23). This process is summarised in the sub-sections below. The construction dust assessment is illustrated in **Figure 6.2 [TR030008/APP/6.3]**.

6.8.4 It is anticipated that the construction of the Project will be undertaken in six phases and will last for approximately 11 years. The construction dust assessment is based on a single worst-case time-slice assuming peak construction activity and is used to represent all 11 years of construction.

6.8.5 Peak construction will occur during phase 1 of the construction works, which will last for approximately two and a half to three years and will include the construction of the following:

a. Jetty structure.

b. Jetty topside infrastructure.

c. NH_3 pipeline from the jetty.

d. Jetty access road.

e. H_2, NH_3 and Natural Gas pipelines between East and West Site.

f. Utilities and cabling to East and West Sites.

g. NH_3 tank at the East Site.

h. Internal access roads, drainage and utilities at the East Site.
i. Temporary construction area at the East Site.
j. Two hydrogen production units at the West Site.
k. One liquefier at the West Site.
l. Tanker loading bays at the West Site.
m. Trailer filling Station at the West Site.
n. Hydrogen Refuelling Station at the West Site.
o. Control room and workshop building at the West Site.
p. Other supporting building and facilities at the West Site.
q. Internal access roads, drainage and utilities at the West Site.

6.8.6 Phases 2 – 6 are anticipated to each have a duration of two years and collectively occur over a period of eight years, if built consecutively. These phases relate to increasing the capacity of the hydrogen production facility, with the installation of two additional hydrogen production units on the West Site, and three hydrogen production units and three liquefiers on the East Site. Due to the length of time over which these activities will occur, the construction works during Phases 2 – 6 will be less intensive than those undertaken during Phase 1.

Step 1 Screen the requirement for a detailed assessment

6.8.7 Step 1 of the 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 is provided in **Section 2** of **Appendix 6.A: Construction Phase Assessment Method [TR030008/APP/6.4]**.

6.8.8 There are nature conservation receptors within 50m of the construction Site, including the high sensitivity Humber Estuary SAC/SPA, which is immediately adjacent to the north and north-eastern sections of the site.

6.8.9 There are human health sensitive and amenity sensitive receptors within 250m of the construction Site, the nearest being residential properties and local businesses located on Queens Road along the northern boundary of the West Site.

6.8.10 Due to the presence of the high sensitivity amenity, human health and nature conservation sensitive receptors within the screening distances set by the guidance, the more detailed assessment is required and is set out in the following steps.

Step 2 Assess the Risk of Dust Impacts

6.8.11 Step 2 is set out in **Section 3** of **Appendix 6.A: Construction Phase Assessment Method [TR030008/APP/6.4]**.

Step 2A Determine the Dust Emissions Magnitude

6.8.12 Step 2A is set out in **Paragraphs 3.1.4** to **3.1.7** of **Appendix 6.A: Construction Phase Assessment Method [TR030008/APP/6.4]** and 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.

6.8.13 There is no requirement to undertake any demolition works as part of the construction of the Project, beyond the deconstruction of a small temporary structure within the East Site that will not contribute to the generation of dust emissions from the Site.

6.8.14 The Site is anticipated to require substantial earthworks associated with soil-stripping, ground levelling and excavation works. The total ground area of earthworks is likely to meet the large criteria set by the IAQM guidance (>110,000 m^2). The number of heavy earth-moving vehicles present on site will be more than ten, although for the majority of the works, the number of earth-moving vehicles in operation at any one time is likely to be less than ten. To maintain a precautionary approach to the assessment, the dust emissions magnitude for earthworks is classed as Large, with reference to **Table A.3** of **Appendix 6.A: Construction Phase Assessment Method [TR030008/APP/6.4]**.

6.8.15 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. There is also the potential that concrete batching will be undertaken on site. The volume of the construction work proposed is anticipated to meet the large criteria set by the IAQM guidance (>75,000 m^3). For these reasons, the dust emissions magnitude for construction is classed as Large, with reference to **Table A.4** of **Appendix 6.A: Construction Phase Assessment Method [TR030008/APP/6.4]**.

6.8.16 Trackout is associated with the deposition of mud and potentially dusty material onto the public network from construction vehicles leaving the Site. On any one day, there will be more than 50 outward construction related HDV (all vehicles > 3.5 tonnes) movements from one or more site entrances. A proportion of the construction will pass by the residential properties located on Queens Road. The assigned dust emission magnitude for trackout is therefore classed as Large, with reference to **Table A.5** of **Appendix 6.A: Construction Phase Assessment Method [TR030008/APP/6.4]**.

Step 2B Determine the Sensitivity of the Area

6.8.17 Step 2B of the IAQM construction dust guidance is set out in **Paragraphs 3.1.8** and **3.1.9** of **Appendix 6.A: Construction Phase Assessment Method [TR030008/APP/6.4]** 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 number and proximity of those receptors to

the construction works, background PM_{10} concentrations and site-specific factors, such as local terrain, meteorology, and natural and existing windbreaks.

6.8.18 The limited number of receptors combined with their proximity to the Site, means that the sensitivity of the area to dust soiling effects on people and property is Medium, with reference to **Table A.1** and **Table A.6** of **Appendix 6.A: Construction Phase Assessment Method [TR030008/APP/6.4]**.

6.8.19 Background PM_{10} concentrations are estimated to be 13 – 15 µg/m^3 and this, coupled with the limited number of receptors and their proximity to the Site, means that the sensitivity of the area to human health impacts is Low, with reference to **Table A.1** and **Table A.7** of **Appendix 6.A: Construction Phase Assessment Method [TR030008/APP/6.4]**.

6.8.20 The proximity of the Humber Estuary SAC/SPA means that there is a high sensitivity nature conservation receptor within 20m of the construction Site Boundary. However, the areas of the SAC/SPA that are within 20m of the Site Boundary are tidal mudflats, which are not considered sensitive to construction dust impacts, due to the absence of vegetation within the habitat to be affected and any material deposited being washed away with the retreating tide. However, the Applicant is keen to demonstrate a high level of commitment to the control of impacts from the Site, and the sensitivity with regards to nature conservation is assigned as Medium, with reference to **Table A.1** and **Table A.8** of **Appendix 6.A: Construction Phase Assessment Method [TR030008/APP/6.4]**.

Step 2C Determine the Risk of Dust Impacts

6.8.21 Step 2C of the IAQM construction guidance is set out in **Paragraph 3.1.10** and **Table A.9** of **Appendix 6.A: Construction Phase Assessment Method [TR030008/APP/6.4]** and 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.

6.8.22 The risk of dust impacts is shown in **Table 6-14**.

Table 6-14: Summary Dust Risk Table

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	N/A	Medium	Medium	Medium
Human health	N/A	Low	Low	Low
Nature Conservation	N/A	Medium	Medium	Medium

Step 4 Define Impacts and their Significance

6.8.23 Step 3 of the IAQM construction dust guidance (Ref 6-23) is presented in **Paragraph 6.7.6** and **6.7.7** and describes the mitigation measures required to offset the risk of dust impacts identified in Step 2 of the assessment. Step 4 of the guidance is described in **Section 5** of **Appendix 6.A: Construction Phase Assessment Method [TR030008/APP/6.4]**. This Step is simply to confirm that if

the standard practice mitigation measures described in **Paragraph 6.7.7**, which are secured through the DCO process by the **Outline CEMP** in **Appendix 2.C [TR030008/APP/6.5]**, are adhered to throughout the works, they are capable of controlling emissions to the extent that effect of construction dust impacts is **Minor Adverse** at worst and **Not Significant**.

Non-Road Mobile Machinery ("NRMM") and Site Plant

6.8.24 Peak construction will occur during phase 1 and the NRMM and site plant anticipated to be present onsite across the Pipeline Corridor, West Site and East Site, at any one time during this phase of the works, is summarised in **Table 6-15**.

Table 6-15: Summary Dust Risk Table

Plant	Units on site	Months on site	Hours on site per unit per annum	% hours on site per unit per annum
Diesel generator 550 kW	4	20	2882	33
Diesel generator 450 kW	4	18	2594	30
Transformer 2x630 kW	4	22	3170	36
Crawler crane	4	12	1729	20
Truck crane, capacity <100Te	6	20	2882	33
Truck crane, capacity >100 t	6	16	2306	26
Telehandler	6	24	3459	39
Piling rig	10	10	1441	16
Concrete mixer	20	12	1729	20
Pump	3	3	432	5
Tracked Front Loader	4	12	1729	20
Wheel loaders	4	12	1729	20
Wheel loaders/excavators	2	12	1729	20
Tracked excavators	6	12	1729	20
Dumpers	6	12	1729	20
Compacting equipment:	2	12	1729	20
Four-axle dump truck	12	6	865	10
Three-axle dump truck	2	6	865	10

6.8.25 The NRMM and site plant listed above may be present onsite at the same time but will never all be operational at the same time. The operation of all individual NRMM and site plant is limited to as and when required, within the working day. On average, it is anticipated that NRMM and site plant will be operational for 1,752 hours per year, or 22% of a year. This is based on the Project assumption that operation could occur for 70% of each 9.5-hour working day, of which there are 264 working days per year.

6.8.26 The NRMM and site plant listed above will also be distributed between the East Site, the West Site, and the Pipeline Corridor works areas.

6.8.27 The East Site works area is immediately adjacent to the Humber Estuary SAC, although the nearest sections of the SAC to the Site are not considered sensitive to air quality impacts. The nearest nature conservation sensitive locations considered to be sensitive to air quality impact are the saltmarsh habitat, approximately 3km away to the southeast. Site plant and NRMM, like road vehicles, have exhausts at near ground level, meaning that impacts are likely to only occur within close proximity of the source, and will drop off quickly with increasing distance from the source.

6.8.28 The West Site is located immediately adjacent to a small number of residential properties (c.10) alongside its northern boundary, on Queens Road. Beyond those, the nearest residential properties are located on Chestnut Avenue, 460m away to the west. The Queens Road properties are also the nearest air quality sensitive receptors to the Pipeline Corridor works area, and the East Site works area, albeit with a greater setback distance (c.100m to the nearest property from the Pipeline Corridor works area and 750m from the East Site works area).

6.8.29 Whilst the properties on Queens Road are in close proximity to the West Site boundary, they will experience some setback from the main area of works within that site. Any NRMM machinery or site plant that is operational within 100m of those properties will only be so for a limited number of days or weeks at most, with the vast majority of operations occurring within the works area being more than 100m away.

6.8.30 Air quality at the receptors on Queens Road during the year of peak construction is predicted to be of a good standard, with no risk of an exceedance of an air quality objective.

6.8.31 In light of this, the intermittent nature of NRMM and site plant emissions, and the limited number of receptors close enough to be potentially impacted upon, and the good standard of air quality at the nearest sensitive receptors, it is considered that the effect of impacts from this source are **not significant**, before mitigation. NRMM and site plant emissions would not contribute to a significant effect on local air quality.

Marine Vessel Emissions

6.8.32 Peak construction vessel operation will also occur during Phase 1, when the jetty structure and berth, and jetty topside infrastructure will be constructed. Anticipated construction phase vessels will comprise:

a. Jack-up barges (likely two in operation at any one time) used for piling operations.

a. Tugs (likely one) used for repositioning the barge(s) into new pilling locations and for moving flat top supply barges from marine load-out to the work location.

b. Multi-cats (likely two) used to resupply the barge(s) with piles, plant, consumables and associated jetty fabrications.

c. Flat top barges (likely three) used to transport equipment to the work area, house plant etc.

d. Floating barges (likely two) with a crane used to undertake lifting operation.

e. Safety boat (likely one) used to support operations and assist with crew transfers.

f. Dredging vessels formed of backhoe dredger and split hopper barges.

6.8.33 During the jetty construction, it is anticipated that the tug, multi-cat vessels and a safety boat would be operating in the construction area daily. It is anticipated that multiple barge moves would be undertaken each week.

6.8.34 The closest human health sensitive receptors to the construction phase vessel working area are the residential properties on Queens Road, approximately 1.5km away from the nearest marine works and 2.5km away from the furthest marine works.

6.8.35 The construction vessel working area is immediately adjacent to the Humber Estuary SAC, although, as previously noted, the nearest sections of the SAC to the Site are not considered sensitive to air quality impacts. The sensitive locations of the SAC are the saltmarsh habitat, approximately 3km away to the northeast and 3km to the southeast.

6.8.36 Given the limited number of construction vessel emissions sources, the frequency of their operation over the course of a year and distance between source and sensitive receptors, it is considered highly likely that the effect of impacts from this source would be **not significant**. Construction vessel emissions would not contribute to a significant effect on air quality.

Road Traffic Emissions

6.8.37 Peak construction traffic impacts are anticipated to occur in 2026, during the first phase of the Project construction works. During that Phase, there is anticipated to be an annual daily average of 1,451 two-way construction-related LDV movements and 199 two-way HDV movements between the West Site access and the Kings Road/A1173 junction, and 729 two-way construction-related LDV movements and 60 two-way HDV movements between the West Site access Queens Road and Laporte Road, Immingham. There is also anticipated to be an increase of 805 two-way construction-related LDV movements and 199 two-way HDV movements on the A1173 between Queens Road and the A180. Such a traffic impact exceeds the non-AQMA screening criteria set out in **Paragraph 6.4.17**.

6.8.38 There are also anticipated to be an annual daily average of 412 two-way construction-related LDV movements and 90 two-way HDV movements on Cleethorpe Road, Grimsby. Such a traffic impact exceeds the AQMA screening criteria set out in **Paragraph 6.4.17**.

6.8.39 All traffic impacts on other local roads either occur where there are no sensitive receptors within 200m of the road, or to the extent that the screening criteria in **Paragraph 6.4.17** is not exceeded. All traffic impacts on the SRN do not exceed the screening criteria set out in **Paragraph 6.4.18** with regards to human health (Ref 6-33) and nature conservation (Ref 6-34).

6.8.40 **Table 6-16** presents the construction phase air quality impact of the Project, and the assessment is illustrated in **Figure 6.2 [TR030008/APP/6.3]**. It demonstrates that the modelled sources account for less than 1% of the air quality objectives for annual mean NO_2, PM_{10} and $PM_{2.5}$. At locations where total concentrations with the Project under construction are less than 75% of the air quality objectives, the impact is deemed to be negligible, in line with industry standard guidance (Ref 6-32).

Table 6-16: Construction Phase Concentrations at nearest human health sensitive receptors for 2026

Receptor ID	Annual Mean Background Contribution (µg/m³)[1]			Annual Mean Modelled Baseline Contribution (µg/m³)[2]			Annual Mean Modelled IGET Contribution (µg/m³)[3]			Annual Mean Concentration (µg/m³)[4]		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
C_R1	14.1	14.2	8.0	1.9	0.8	0.4	0.2	0.2	0.1	16.2	15	8.5
C_R2	14.1	14.2	8.0	1.7	0.7	0.4	0.2	0.1	0.1	15.9	15	8.5
C_R3	13.3	13.4	7.7	1.6	0.7	0.4	0.2	0.1	0.1	15.1	14.4	8.3
C_R4	14.1	14.2	8.0	2.2	1.0	0.5	0.1	<0.1	<0.1	16.4	17.9	10.1
C_R5	18.0	12.7	8.0	6.2	1.9	1.1	0.1	<0.1	<0.1	24.4	14.6	9.1
C_R6	18.0	12.7	8.0	5.9	1.8	1.0	0.1	<0.1	<0.1	24.1	13.1	8.3

Notes:

[1] Background contribution of existing sources, minus the contribution from the sources specifically modelled.

[2] Model contribution, including the contribution from the IERRT project and other cumulative sources.

[3] Modelled contribution from IGET construction traffic emissions.

[4] Annual mean concentration is the combined contribution of background and modelled sources.

6.8.41 Annual mean concentrations of NO_2 and PM_{10} are low to the extent that there is considered no risk of the hourly mean air quality objective for NO_2, nor the daily mean objective for PM_{10} being exceeded due to the Project.

6.8.42 In line with the industry standard IAQM/EPUK guidance and following review of baseline air quality on Queens Road and the wider study area, it is considered that the construction phase traffic impact will not contribute to a significant effect on local air quality. Before mitigation, the effect of the construction phase road traffic emissions impact is **not significant**.

Operational Phase

6.8.43 This section contains an assessment of the potential impacts to air quality as a result of the operational phase of the Project. The following impact pathways have been assessed:

a. Onsite marine-side vessel emissions and landside combustion and process emissions.

b. Road traffic emissions.

c. Odour emissions.

Marine Vessel Emissions and Landside Plant Emissions

6.8.44 Exhaust emissions from operational phase vessels in motion have the potential to impact on local air quality. Whilst in motion, the vessel emissions source is transient and will impact a specific location for the period in which the vessel passes that location, subject to the wind direction at that time. It is assumed that there could be up to 292 vessel calls associated with the Project per year, which equates to 0.8 calls per day, or 1.6 two-way vessel movements per day. Assuming a vessel speed of 10 to 20 knots (19 km/hr to 37 km/hr), a specific location will be within 10km of the transient vessel emissions for 32 minutes per day at a speed of ten knots and 16 minutes per day at a speed of 20 knots. With 292 vessel calls assumed per year (584 two-way movements), this will account for 3.5% of the year and 1.8% of the year respectively, assuming the wind will always blow from the source to each receptor. Given the variable nature of wind direction, exposure of any one location to transient vessel emissions will be even lower. Such a transient and intermittent emission source is considered unlikely to impact to the extent that they will contribute to a significant air quality effect. Emissions from vessels in motion during operation have not therefore been quantified in this assessment.

6.8.45 It is also noted that the number of operational vessel movements associated with the Project (584 two-way movements per year) falls well below the DEFRA LAQM-TG(22) guidance criteria (Ref 6-8), which states that for the purpose of LAQM, emissions from port expansions may only need to be considered where:

a. There are more than 5,000 ship movements per year (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)), with relevant exposure within 250m of the berths and main areas of manoeuvring.

b. There are more than 15,000 large ship movements per year, with relevant exposure within 1km of these areas.

6.8.46 The impact of docked vessel emissions and onsite plant emissions has been quantified in line with the methodology set out in **Paragraph 6.4.26** to **6.4.35** and **Appendix 6.B** [**TR030008/APP/6.4**]. Assessment assumptions used to inform the quantification of these impacts are listed in **Paragraphs 6.4.59.6.4.57**

6.8.47 **Table 6-17** and **Table 6-18** present the operational phase air quality impact of the Project on the selected human health sensitive receptors considered in this assessment (see **Paragraph 6.4.39** and **Section 6** of **Appendix 6B [TR030008/APP/6.4]**. The assessment is illustrated in **Figure 6.3 [TR030008/APP/6.3]** (Figures 6.3(A1) and 6.3(A2) assuming MARPOL Tier III vessel emissions and Figures 6.3(B1) and 6.3(B2) assuming MARPOL Tier III vessel emissions.

6.8.48 **Table 6-17** provides contributions and concentrations if all vessels calling at the Project will conform to the MARPOL Regulation 13 Tier III NO_X emissions standard (as introduced in **Paragraph 6.4.60**). **Table 6-18** provides contributions and concentrations assuming that all vessels calling at the Project will conform to the MARPOL Regulation 13 Tier II NO_X emissions standard. It is impossible to estimate the proportion of Tier II and Tier III vessels using the facility in 2028 or 2036, but it is a certainty that all vessels will be Tier II compliant as a minimum. Therefore, the actual impact at each receptor is likely to be somewhere between the two values reported in **Table 6-17** and **Table 6-18**. Something that is certain though, is that Tier II vessels will reduce year on year and Tier III vessels will increase year on year, as older vessels or vessel engines are replaced or retrofitted with new technology.

6.8.49 **Table 6-17** demonstrates that with vessels complying with MARPOL Tier III emissions standards, modelled Project sources account for less than 1% of the air quality objectives for annual mean NO_2 (0.4 µg/m^3), PM_{10} (0.4 µg/m^3) and $PM_{2.5}$ (0.2 µg/m^3). At locations where total concentrations with the Project in operation are less than 75% of the air quality objectives (30 µg/m^3) for NO_2 and PM_{10}, and 15 µg/m^3 for $PM_{2.5}$), the impact is deemed to be negligible, in line with industry standard guidance (Ref 6-32).

6.8.50 **Table 6-18** demonstrates that with vessels complying with MARPOL Tier II emissions standards, modelled Project sources account for less than 1% of the air quality objectives for annual mean PM_{10} and $PM_{2.5}$ at all locations and for annual mean NO_2 at around half of the locations. Impacts of more than 1% of the air quality objective for annual mean NO_2 are predicted at receptors O_R1 (1%), O_R4 (1%), O_R5 (1%), O_R13 (3%), O_R14 (1%), O_R15 (1%), O_R16(2%) and O_R17 (2%). At locations where total concentrations with the Project in operation are less than 75% of the air quality objectives, the impact is still deemed to be negligible, in line with industry standard guidance (Ref 6-32).

Table 6-17: Operational concentrations at nearest human health sensitive receptors for 2028 (also representing 2036) – Assuming MARPOL Tier III Emissions Standards (with SCR)

Receptor ID	Annual Mean Background Contribution (µg/m³)		Annual Mean Modelled IGET Contribution (µg/m³)			Annual Mean Concentration (µg/m³)			
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
O_R1	13.8	14.1	8.0	0.3	<0.1	<0.1	14.1	14.1	8.0
O_R2	13.8	14.1	8.0	0.2	<0.1	<0.1	14.1	14.1	8.0
O_R3	13.8	14.1	8.0	0.2	<0.1	<0.1	14.1	14.1	8.0
O_R4	13.8	14.1	8.0	0.3	<0.1	<0.1	14.1	14.1	8.0
O_R5	13.8	14.1	8.0	0.3	<0.1	<0.1	14.2	14.1	8.0
O_R6	11.1	13.2	7.9	0.1	<0.1	<0.1	11.2	13.2	7.9
O_R7	11.1	13.2	7.9	0.1	<0.1	<0.1	11.2	13.2	7.9
O_R8	9.9	15.3	8.2	0.2	<0.1	<0.1	10.0	15.3	8.2
O_R9	10.1	14.9	8.0	0.1	<0.1	<0.1	10.2	14.9	8.0
O_R10	9.9	15.3	8.2	0.1	<0.1	<0.1	10.0	15.3	8.2
O_R11	8.5	14.8	8.0	0.1	<0.1	<0.1	8.6	14.8	8.0
O_R12	17.5	12.6	8.0	<0.1	<0.1	<0.1	17.5	12.6	8.0
O_R13	11.3	11.1	7.0	0.3	<0.1	<0.1	11.6	11.1	7.0
O_R14	10.6	14.3	7.7	0.1	<0.1	<0.1	10.8	14.3	7.7
O_R15	10.0	14.5	7.7	0.2	<0.1	<0.1	10.2	14.5	7.7
O_R16	10.6	13.5	7.5	0.2	<0.1	<0.1	10.8	13.5	7.5
O_R17	9.7	14.5	7.7	0.2	<0.1	<0.1	9.9	14.5	7.7

Table 6-18: Operational concentrations at nearest human health sensitive receptors for 2028 (also representing 2036) – Assuming MARPOL Tier II Emissions Standard (without SCR)

Receptor ID	Annual Mean Background Contribution (µg/m³)[1]			Annual Mean Modelled IGET Contribution (µg/m³)			Annual Mean Concentration (µg/m³)[4]		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
O_R1	13.8	14.1	8.0	0.4	<0.1	<0.1	14.3	14.1	8.0
O_R2	13.8	14.1	8.0	0.4	<0.1	<0.1	14.2	14.1	8.0
O_R3	13.8	14.1	8.0	0.4	<0.1	<0.1	14.2	14.1	8.0
O_R4	13.8	14.1	8.0	0.4	<0.1	<0.1	14.3	14.1	8.0
O_R5	13.8	14.1	8.0	0.5	<0.1	<0.1	14.3	14.1	8.0
O_R6	11.1	13.2	7.9	0.3	<0.1	<0.1	11.4	13.2	7.9
O_R7	11.1	13.2	7.9	0.2	<0.1	<0.1	11.3	13.2	7.9
O_R8	9.9	15.3	8.2	0.3	<0.1	<0.1	10.1	15.3	8.2
O_R9	10.1	14.9	8.0	0.3	<0.1	<0.1	10.4	14.9	8.0
O_R10	9.9	15.3	8.2	0.2	<0.1	<0.1	10.1	15.3	8.2
O_R11	8.5	14.8	8.0	0.2	<0.1	<0.1	8.7	14.8	8.0
O_R12	17.5	12.6	8.0	0.1	<0.1	<0.1	17.5	12.6	8.0
O_R13	11.3	11.1	7.0	1.0	<0.1	<0.1	12.3	11.1	7.0
O_R14	10.6	14.3	7.7	0.4	<0.1	<0.1	11.1	14.3	7.7
O_R15	10.0	14.5	7.7	0.5	<0.1	<0.1	10.6	14.5	7.7
O_R16	10.6	13.5	7.5	0.7	<0.1	<0.1	11.3	13.5	7.5
O_R17	9.7	14.5	7.7	0.6	<0.1	<0.1	10.3	14.5	7.7

6.8.51 Annual mean concentrations of NO_2 and PM_{10} are low to the extent that there is considered no risk to the hourly mean air quality objective for NO_2, nor the daily mean objective for PM_{10} (see **Paragraph 6.4.52**). Modelled contributions of hourly NO_2 and daily PM_{10} from point source emissions considered in this assessment, with or without SCR technology, account for less than 10% of the air quality objectives.

6.8.52 In line with the industry standard IAQM/EPUK guidance and following review of baseline air quality on Queens Road and the wider study area, it is considered that the operational phase Project impacts will not contribute to a significant effect on local air quality. The effect of the operational phase emissions impact on human health is **not significant**.

6.8.53 **Table 6-19** and **Table 6-20** present the operational phase air quality impact of the Project on the selected nature conservation sensitive receptors considered in this assessment (see **Paragraph 6.4.39** and **Section 6** of **Appendix 6B [TR030008/APP/6.4]**. The assessment is illustrated in **Figure 6.3 [TR030008/APP/6.3]** (Figures 6.3(A1) and 6.3(A2) assuming MARPOL Tier III vessel emissions and Figures 6.3(B1) and 6.3(B2) assuming MARPOL Tier III vessel emissions.

6.8.54 **Table 6-19** provides contributions and concentrations assuming that all vessels calling at the Project will conform to the MARPOL Regulation 13 Tier III NO_X emissions standard. **Table 6-20** provides contributions and concentrations assuming that all vessels calling at the Project will conform to the MARPOL Regulation 13 Tier II NO_X emissions standard.

6.8.55 **Table 6-19** demonstrates that with vessels complying with MARPOL Tier III emissions standards, modelled Project sources account for 1% or less of the Critical Level for annual mean NO_X at all but two receptor locations in the SAC (O_E1 and O_E2) and the LWS receptor adjacent to the East Site (O_E16). At the two SAC receptors, total NO_X concentrations account for 52% of the Critical Level. At the LWS receptor, total NO_X concentrations account for 64% of the Critical Level.

6.8.56 With MARPOL Tier III emissions standards, modelled IGET sources account for 1% or less of the Critical Levels for SO_2 and NH_3 and the Critical Load for nitrogen deposition at all receptors considered in the SAC and three of the LWS receptors considered, noting that the IAQM state that the 1% screening criteria should not be used rigidly and not to a numerical precision greater than the expression of the criteria themselves (Ref 6-24). An impact of 2% of the Critical Load is predicted at the LWS adjacent to the East Site (O_E16).

6.8.57 **Table 6-20** demonstrates that with vessels complying with MARPOL Tier II emissions standards, modelled Project sources account for 1% or less of the Critical Level for annual mean NO_X at all but three receptor locations in the SAC (O_E1, O_E2 and O_E3), and at the LWS receptors adjacent the East Site (O_E16). At the three SAC locations, total NO_X concentrations account for 56% of the Critical Level at most, and at the LWS location, 66% of the Critical Level.

6.8.58 With MARPOL Tier II emissions standards, modelled Project sources account for 1% or less of the Critical Levels for SO_2 and NH_3. Project sources account for 1% or less of the Critical Load for nitrogen deposition at all but two receptors in the SAC (O_E1 and O_E2), with an impact of 1.7% and 1.9% respectively, and at the LWS receptor adjacent to the East Site, with and impact of 2%. At these locations, the Critical Load for nitrogen deposition is already exceeded by the background contribution alone with the Project contribution accounting for just 1% of the total nitrogen deposition rate predicted at these locations.

6.8.59 In **Table 6-19** and **Table 6-20**, receptor O_E12 experiences an annual mean NO_X concentration in excess of the Critical Level for that pollutant. However, the contribution from the Project account for less than 1% of the Critical Level at that location.

Table 6-19: Operational concentrations and deposition rates at selected nature conservation sensitive receptors for 2028 (also representing 2036) – Assuming MARPOL Tier III Emissions Standards (with SCR)

Rec. ID	Annual Mean Background Contribution (µg/m³)[1]				Annual Mean Modelled IGET Contribution (µg/m³)[3]				Annual Mean Concentration/ Deposition Rate (µg/m³)[4]			
	NO_X	SO_2	NH_3	N-dep	NO_X	SO_2	NH_3	N-dep	NO_X	SO_2	NH_3	N-dep
	µg/m³			kgN/ ha/yr	µg/m³			kgN/ ha/yr	µg/m³			kgN/ ha/yr
O_E1	15.1	2.1	1.5	**14.6**	0.5	<0.1	0.01	0.10	15.6	2.1	1.6	**14.7**
O_E2	15.1	2.1	1.5	**14.6**	0.5	<0.1	0.01	0.11	15.7	2.1	1.6	**14.7**
O_E3	14.9	1.8	1.6	**13.9**	0.2	<0.1	<0.01	0.04	15.1	1.8	1.6	**13.9**
O_E4	13.8	1.7	1.6	**13.9**	0.2	<0.1	<0.01	0.03	13.9	1.7	1.6	**13.9**
O_E5	16.6	3.9	1.5	**14.7**	0.1	<0.1	<0.01	0.03	16.7	3.9	1.5	**14.7**
O_E6	19.1	3.4	1.6	**16.0**	0.1	<0.1	<0.01	0.02	19.2	3.4	1.6	**16.0**
O_E7	12.6	1.6	1.6	**13.9**	0.1	<0.1	<0.01	0.02	12.7	1.6	1.6	**13.9**
O_E8	14.6	2.2	1.5	**14.7**	<0.1	<0.1	<0.01	0.01	14.6	2.2	1.5	**14.7**
O_E9	15.8	1.9	1.5	**14.7**	<0.1	<0.1	<0.01	0.01	15.8	1.9	1.5	**14.7**
O_E10	25.1	2.8	1.6	**13.5**	<0.1	<0.1	<0.01	0.01	25.2	2.8	1.6	**13.5**
O_E11	21.1	3.4	1.6	**16.0**	<0.1	<0.1	<0.01	0.01	21.2	3.4	1.6	**16.0**
O_E12	36.5	3.0	1.6	**16.0**	<0.1	<0.1	<0.01	0.01	**36.5**	3.0	1.6	**16.0**
O_E13	13.6	2.0	1.5	**14.6**	0.1	<0.1	<0.01	0.01	13.7	2.0	1.5	**14.6**
O_E14	11.6	1.7	2.1	**16.1**	<0.1	<0.1	<0.01	0.01	11.7	1.7	2.1	**16.1**
O_E15	11.6	1.7	2.1	**16.1**	<0.1	<0.1	<0.01	0.01	11.7	1.7	2.1	**16.1**
O_E16	18.4	3.2	1.5	**14.7**	0.8	<0.1	0.02	0.20	19.2	3.2	1.6	**14.9**
O_E17	16.2	3.53	1.6	**25.5**	0.1	<0.1	<0.01	0.03	18.5	3.5	1.6	**25.5**
O_E18	13.1	1.75	1.5	**26.0**	0.1	<0.1	<0.01	0.03	18.5	1.8	1.5	**26.1**

Rec. ID	Annual Mean Background Contribution (µg/m³)[1]				Annual Mean Modelled IGET Contribution (µg/m³)[3]				Annual Mean Concentration/ Deposition Rate (µg/m³)[4]			
	NO_X	SO_2	NH_3	N-dep	NO_X	SO_2	NH_3	N-dep	NO_X	SO_2	NH_3	N-dep
	µg/m³			kgN/ ha/yr	µg/m³			kgN/ ha/yr	µg/m³			kgN/ ha/yr
O_E19	13.0	2.22	1.5	**14.7**	0.1	<0.1	<0.01	0.02	18.5	2.2	1.5	**14.7**

Table 6-20: Operational concentrations and deposition rates at selected nature conservation sensitive receptors for 2028 (also representing 2036) – Assuming MARPOL Tier II Emissions Standard (without SCR)

Rec. ID	Annual Mean Background Contribution (µg/m³)[1]				Annual Mean Modelled IGET Contribution (µg/m³)[3]				Annual Mean Concentration/ Deposition Rate (µg/m³)[4]			
	NO_X	SO_2	NH_3	N-dep	NO_X	SO_2	NH_3	N-dep	NO_X	SO_2	NH_3	N-dep
	µg/m³			kgN/ ha/yr	µg/m³			kgN/ ha/yr	µg/m³			kgN/ ha/yr
O_E1	15.1	2.1	1.5	**14.6**	1.5	<0.1	0.01	0.17	16.6	2.1	1.5	**14.8**
O_E2	15.1	2.1	1.5	**14.6**	1.6	<0.1	0.01	0.19	16.8	2.1	1.5	**14.8**
O_E3	14.9	1.8	1.6	**13.9**	0.6	<0.1	<0.01	0.07	15.5	1.8	1.6	**14.0**
O_E4	13.8	1.7	1.6	**13.9**	0.4	<0.1	<0.01	0.05	14.2	1.7	1.6	**14.0**
O_E5	16.6	3.9	1.5	**14.7**	0.3	<0.1	<0.01	0.04	16.9	3.9	1.5	**14.7**
O_E6	19.1	3.4	1.6	**16.0**	0.2	<0.1	<0.01	0.03	19.4	3.4	1.6	**16.0**
O_E7	12.6	1.6	1.6	**13.9**	0.3	<0.1	<0.01	0.04	12.9	1.6	1.6	**13.9**
O_E8	14.6	2.2	1.5	**14.7**	0.1	<0.1	<0.01	0.02	14.7	2.2	1.5	**14.7**
O_E9	15.8	1.9	1.5	**14.7**	0.1	<0.1	<0.01	0.01	15.9	1.9	1.5	**14.7**
O_E10	25.1	2.8	1.6	**13.5**	0.1	<0.1	<0.01	0.01	25.2	2.8	1.6	**13.5**
O_E11	21.1	3.4	1.6	**16.0**	0.1	<0.1	<0.01	0.02	21.2	3.4	1.6	**16.0**
O_E12	**36.5**	3.0	1.6	**16.0**	0.1	<0.1	<0.01	0.01	**36.6**	3.0	1.6	**16.0**
O_E13	13.6	2.0	1.5	**14.6**	0.1	<0.1	<0.01	0.02	13.7	2.0	1.5	**14.6**
O_E14	11.6	1.7	2.1	**16.1**	0.1	<0.1	<0.01	0.01	11.7	1.7	2.1	**16.1**

Rec. ID	Annual Mean Background Contribution (µg/m³)[1]				Annual Mean Modelled IGET Contribution (µg/m³)[3]				Annual Mean Concentration/ Deposition Rate (µg/m³)[4]			
	NO_X	SO_2	NH_3	N-dep	NO_X	SO_2	NH_3	N-dep	NO_X	SO_2	NH_3	N-dep
	µg/m³			kgN/ ha/yr	µg/m³			kgN/ ha/yr	µg/m³			kgN/ ha/yr
O_E15	11.6	1.7	2.1	**16.1**	0.1	<0.1	<0.01	0.01	11.7	1.7	2.1	**16.1**
O_E16	18.4	3.2	1.5	**14.7**	1.5	<0.1	0.02	0.25	19.9	3.2	1.6	**14.9**
O_E17	18.4	3.5	1.6	**25.5**	0.3	<0.1	<0.01	0.04	18.7	3.5	1.6	**25.5**
O_E18	18.4	1.8	1.5	**26.0**	0.3	<0.1	<0.01	0.05	18.8	1.8	1.5	**26.1**
O_E19	18.4	2.2	1.5	**14.7**	0.2	<0.1	<0.01	0.03	18.6	2.2	1.5	**14.7**

6.8.60 In **Table 6-19**, the contribution to annual mean NO_X concentrations from the Tier III vessel emissions accounts for around 70% of the impact and site emissions around 30% of the impact at the worst affected receptors in the SAC (O_E1 and O_E2). Elsewhere, there is a relatively even split between the contribution from vessels and site. The contribution to nitrogen deposition from the Tier III vessel emissions accounts for around 58% of the impact and site emissions around 42% of the impact at those worst affected receptors. Elsewhere, site emissions account for a greater proportion of the nitrogen deposition impact. For the results shown in **Table 6-20**, Tier II vessel emissions account for 80-90% of the annual mean NO_X impact at the majority of receptors, and 60-80% of the nitrogen deposition impact at the worst affected receptors.

6.8.61 The effect of impacts on nature conservation receptors is described in **Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]**. In summary:

a. For saltmarsh, the APIS provides a Critical Load range of 10-20 kg/ha/yr and nitrogen inputs have been experimentally demonstrated to have an effect on overall species composition of saltmarsh. However, the Critical Loads on APIS are relatively generic for each habitat type and cover a wide range of deposition rates. They do not (and are not intended to) take other influences (to which the habitat on a given site may be exposed) into consideration.

b. Moreover, it is important to note from APIS that the experimental studies which underlie conclusions regarding the sensitivity of saltmarsh have "… *neither used very realistic N doses nor input methods i.e. they have relied on a single large application more representative of agricultural discharge"*, which is far in excess of anything that would be deposited from atmosphere. Therefore, APIS indicates that determining which part of the critical load range to use for saltmarsh requires expert judgement. Overall, there is good reason to believe the upper part of the critical load range (20 kgN/ha/yr) may be more appropriate than the lower part (10 kgN/ha/yr) for upper saltmarsh.

c. Generally, nitrogen inputs from the air are not as important to plants as nitrogen from other sources. Effects of nitrogen deposition from atmosphere are likely to be dominated by much greater impacts from marine or agricultural sources. This is reflected on APIS itself, which states regarding saltmarsh that '*Overall, N deposition [from atmosphere] is likely to be of low importance for these systems as the inputs are probably significantly below the large nutrient loadings from river and tidal inputs'*. Another mitigating factor is that the nature of intertidal saltmarsh in the Humber estuary means that there is daily flushing from tidal incursion. This is likely to further reduce the role of nitrogen from atmosphere in controlling botanical composition.

6.8.62 In **Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]** it is determined that the additional predicted contribution from nitrogen emissions from the Project does not result in any exceedance of the Critical Load range for saltmarsh, as the highest deposition rate reported in **Table 6-20** is less than 20 kg N/ha/yr. The operation of the Project does not cause an exceedance of the Critical Levels for NO_X, NH_3 or SO_2. It is therefore concluded that there will be a neutral impact on the Humber Estuary designated site, which gives rise to a neutral effect that is **insignificant**.

Road Traffic Emissions

6.8.63 During the operational phase, the Project will generate a maximum increase in annual daily average traffic movements on Queens Road and the A1173, between Queens Road and the A180, which will account for 123 to 190 two-way LDV movements and 96 two-way HDV movements. There are no human health or nature conservation receptors within 200m of these roads. On all other local roads the annual daily average traffic flow will increase by between 20 to 67 two-way LDV movements and there will be zero HDV movements. On the SRN, the annual daily average traffic flow will increase by between 23 to 63 two-way LDV movements and between 44 and 52 two-way HDV movements.

6.8.64 Where there are receptors sensitive to changes in air quality, traffic impacts fall well below the screening criteria described in **Paragraph 6.4.17** or **Paragraph 6.4.18**. It is also noted that there are no nature conservation sites with a European designation with 200m of any road affected by the operation of the Project. As such, it is considered that the impact of operation traffic emissions will not contribute to a significant effect on local air quality. Before mitigation, the effect of the operational phase emissions impact on human health is **not significant**.

Odour

6.8.65 The odour impact assessment is summarised in **Table 6-21**. The table sets out the factors used to determine the likely odour impacts and resulting effect from Project sources. It follows the stepped approach described in IAQM guidance (Ref 6-25). The Project is not expected to be a significant source of odour emissions, due to the contained nature of the process system. However, with all such systems, there is the risk of fugitive emissions from potential leaks and/or accidents.

Table 6-21: Odour Impact Assessment

IAQM Guidance Criteria	Assessment of Project Conditions
A description of existing baseline odour conditions.	The East Site is located adjacent to the eastern extent of the Port of Immingham and has existing industrial facilities as neighbours, including petroleum storage and chemical manufacturing. The wider port area, petroleum storage and chemical manufacturing are likely to be existing sources of odour emissions. The East Site also has a small Sewage Treatment Works nearby, which will be a source of odour. The West Site is also close to the Port of Immingham and has some existing industrial facilities as neighbours, including the manufacture of building products. The West Site also has a household recycling centre nearby, which will be a source of odour.
A description of the location of receptors and their relative sensitivities to odour effects.	The nearest receptors to the East Site are the existing commercial and industrial land uses. These are considered to have a low sensitivity to odour impacts. The nearest receptors to the West Site are commercial properties on Queens Road. These are considered to have a low sensitivity to odour impacts. The nearest high sensitivity receptors are the residential properties, 350m to the west.
Details of potential odour sources and the resulting potential for generating odours.	Sources are limited to fugitive emissions of NH_3 from potential leaks and controlled emissions from flare stacks and vents. Emissions from leaks will be intermittent and short in duration. Emissions from flare stacks will be continuous, but the proportion of NH_3 is minimal.
A description of control/mitigation measures incorporated into the scheme (including management controls and, where appropriate, engineering controls).	The control of odour emissions will be secured by Environmental Permit. To control fugitive emissions, a leak detection management system will be in place, meaning that leaks can be identified and repaired quickly. The flares are used to combust any ammonia that would otherwise be released to atmosphere, thereby removing any odorous content from the emission. To control emissions from flare stacks, emissions are released from such a height that dispersion is encouraged and combustion temperatures are such that NH_3 emissions are minimised. To demonstrate good practice, which will likely be required by the Project's Environmental Permit, the operation of the Project will be subject to an Odour Management Plan. Such plan would: a. Set out additional odour control requirements beyond those embedded in the Project design. b. Establish best practice processes. c. Assign responsibilities, including record keeping. d. Set out the odour monitoring regime, including the frequency of sniff tests, the monitoring of meteorological

IAQM Guidance Criteria	Assessment of Project Conditions
	conditions, maintaining an odour diary and logging and investigating complaints.
A prediction of the likely odour impact and resulting effects at relevant sensitive receptors, and taking into account: a. The likely magnitude of odour emissions (after control by measures incorporated into the scheme, if applicable). b. The likely meteorological characteristics at the site. c. The dispersion and dilution afforded by the pathway to the receptors and the resulting magnitude of odour that could result. d. The sensitivity of the receptors. e. The potential cumulative odour effects with any odours of a similar character.	a. Wind rose plots from Humberside Airport over a five year period (see **Appendix 6.B [TR030008/APP/6.4]**) demonstrate the greatest frequency of winds blow from the southwest to the northeast across a narrow vector from 190º to 230º. Although winds do blow from all other directions at times during the year. b. Both the East Site and the West Site and surrounding area are reasonably flat with limited natural or artificial barriers. c. There is limited distance between the East Site and the West Site boundaries and the nearest odour sensitive receptors, although there will be some setback from potential odour emission sources. Over such distances there will be some potential for the dilution of emissions. d. The majority of receptors in close proximity to both the East Site and the West site are commercial or industrial land used with limited sensitivity to odour impacts. There nearest high sensitivity residential properties are 350m away off Kings Road. e. There are numerous cumulative sources of odour emissions in the area, although those existing sources are unlikely to be of a similar character.
Where odour effects are assessed as significant, details of appropriate further mitigation and control measures that could allow the proposal to proceed without causing significant loss of amenity.	Given the limited nature of emissions associated with the Project's operation and control measures incorporated into the Project design, a significant odour effect is considered to be unlikely and no further mitigation is considered necessary.
The residual odour impacts and their effects	Given the nature of the potential odour sources, the control measures incorporated into the Project design, and the commitment to review odour throughout the operational lifetime of the Project facility, the residual impacts considered not likely to contribute to a significant effect. The effect of odour is considered **Negligible** and **Not Significant**.

6.9 Mitigation and Enhancement Measures

6.9.1 The air quality assessment described in this chapter does not identify a significant air quality effect following the implementation of development design and impact avoidance (see **Section 6.8**).

6.9.2 No additional mitigation or enhancement measures are considered to be required.

6.10 Assessment of Residual Effects

6.10.1 Based on the implementation of the embedded and standard mitigation measures as detailed herein, the assessment of local air quality effects for the Project is summarised below.

Construction Phase

Construction Dust Emissions

6.10.2 Step 4 of the IAQM construction dust guidance (Ref 6-23) is to determine whether or not the effects, after the application of the identified level of mitigation are significant. 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'".

6.10.3 With the application of the embedded and standard practice mitigation measures, including those set out in the **Outline CEMP [TR030008/APP/6.4]** (see **Section 6.7**), the residual effect remains unchanged to that reported in **Section 6.8** and is **Not Significant**.

NRMM and Site Plant Emissions

6.10.4 According to the IAQM (Ref 6-23):

"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. For site plant and on-site traffic, consideration should be given to the number of plant/vehicles and their operating hours and locations to assess whether a significant effect is likely to occur".

6.10.5 A review of site plant and NRMM has deemed that impacts are **not significant**, for the following reasons:

a. The transient and intermittent nature of emissions.

b. The limited number of emissions sources in operation per average day.

c. The distance between emission sources and the nearest high sensitivity receptors.

d. The effectiveness of standard practice emission control measures.

Construction Vessel Emissions

6.10.6 Construction vessel emissions have been considered in the same way as site plant and NRMM emissions. A review of construction vessel emissions has deemed that impacts are **not significant**, for the following reasons:

a. The transient and intermittent nature of emissions.

b. The number of vessel movements falls well below the number stipulated in Defra guidance (Ref 6-8) to represent a Local Air Quality Management concern.

c. The limited number of emissions sources.

d. The distance between emission sources and the nearest high sensitivity receptors.

Construction Road Traffic Emissions

6.10.7 Predicted construction phase traffic impacts have been considered at receptors adjacent to roads that exceed the relevant screening criteria set out in **Paragraph 6.4.17** or **Paragraph 6.4.18**. The screening exercise identified that roads on the route between the construction site entrance on Queens Road, to and from the A180 via the A1173, will exceed the local road screening criteria. No SRN road links will experience a traffic impact above the SRN screening criteria.

6.10.8 The impact of the Project's construction on local air quality, either in isolation or in-combination with the IERRT project is **not significant**.

Operational Phase

Operational Site and Vessel Emissions

6.10.9 Predicted operational phase emissions associated with site and vessel sources identified impacts on human health receptors as negligible. The effect of such an impact is **not significant**.

6.10.10 Predicted operational phase emissions from these sources identified impacts on nature conservation receptors of more than 1% of the Critical Level for NO_X and 1% of the Critical Load for nitrogen deposition at a limited number of sensitive receptor locations within the SAC. Impacts have been predicted based on vessel compliance with either MARPOL Tier III NO_X emission standards or MARPOL Tier II NO_X emissions standards. Whether or not these impacts constitute a significant effect is reported in **Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]**.

Operational Road Traffic Emissions

6.10.11 The potential for operational phase traffic impacts has been considered by comparing changes in traffic flows against the screening criteria set out in **Paragraph 6.4.17** or **Paragraph 6.4.18**. This process identified that there are no roads that exceed the criteria relevant for local roads or relevant to roads on the SRN. Roads that experience the highest increase in traffic flow due to the operation of the Project do not have air quality sensitive receptors within 200m of them.

6.10.12 The impact of the operational traffic emissions on local air quality will not contribute to a significant effect. The effect of road traffic emission is **not significant**.

6.11 Summary of Assessment

6.11.1 A summary of the impact pathways that have been assessed, and the identified residual effects and level of confidence are presented in **Table 6-22.**

Table 6-22: Summary of potential impact, mitigation measures and residual effect

Receptor	Impact Pathway	Effect (unmitigated)	Mitigation Measure	Residual Effect	Confidence
Construction Phase					
Human health and amenity sensitive receptors	Construction dust emissions	Negligible to Low Not significant	Standard practice dust mitigation as recommended by the IAQM, outlined in **Section 6.7**	Negligible to Low Not significant	High – assessment based on industry standard guidance and precautionary assumptions
	Site Plant and NRMM emissions	Low Not significant	Standard practice mitigation as recommended by the IAQM, outlined in **Section 6.7**	Low Not significant	High – assessment based on industry standard guidance and precautionary assumptions
	Marine vessel emissions	Low Not significant	Good practice mitigation outlined in **Section 6.7**	Low Not significant	Medium – conclusion drawn on professional judgement informed by the number of construction vessels and the distance between those vessels and the nearest highly sensitive receptors
	Road traffic emissions	Negligible Not significant	Good practice mitigation outlined in **Section 6.7**	Negligible Not significant	High – detailed assessment following criteria provided in industry standard guidance and review of baseline air quality

Receptor	Impact Pathway	Effect (unmitigated)	Mitigation Measure	Residual Effect	Confidence
Nature conservation sensitive receptors	Construction dust emissions	Low Not significant	Standard practice dust mitigation as recommended by the IAQM, outlined in **Section 6.7**	Low Not significant	High – assessment based on industry standard guidance and precautionary assumptions
	Site Plant and NRMM emissions	Low Not significant	Standard practice mitigation as recommended by the IAQM, outlined in **Section 6.7**	Low Not significant	High – assessment based on industry standard guidance and precautionary assumptions
	Marine vessel emissions	Low Not significant	Good practice mitigation outlined in **Section 6.7**	Low Not significant	Medium – conclusion drawn on professional judgement informed by the number of construction vessels and the distance between those vessels and the nearest highly sensitive receptors
	Road traffic emissions	Negligible Not significant	Good practice mitigation outlined in **Section 6.7**	Negligible Not significant	High – detailed assessment screened following criteria provided in industry standard guidance
Operational Phase					
Human health and amenity sensitive receptors	Marine-side vessel and landside combustion and process emissions	Negligible Not significant	Good practice mitigation outlined in **Section 6.7**	Negligible Not significant	High – assessment based on industry standard guidance and

Receptor	Impact Pathway	Effect (unmitigated)	Mitigation Measure	Residual Effect	Confidence
					precautionary assumptions
	Road traffic emissions	Negligible Not significant	Good practice mitigation outlined in **Section 6.7**	Negligible Not significant	High – detailed assessment screened following criteria provided in industry standard guidance
	Odour emissions	Negligible Not significant	Standard practice odour mitigation as recommended by the IAQM, outlined in **Section 6.7**	Negligible Not significant	High – assessment based on industry standard guidance
Nature conservation sensitive receptors	Marine-side vessel and landside combustion and process emissions	Insignificant See **Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]**	Good practice mitigation outlined in **Section 6.7**	Insignificant See **Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]**	High – assessment based on industry standard guidance a
	Road traffic emissions	Negligible Not significant	Good practice mitigation outlined in **Section 6.7**	Negligible Not significant	High – detailed assessment screened following criteria provided in industry standard guidance

6.12 References

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Ref 6-3 Bull et al. (2018) Guidance on the assessment of odour for planning. Version 1.1.

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Ref 6-7 Department for Environment, Food and Rural Affairs. (2019), Clean Air Strategy 2019.

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Ref 6-16 H.M. Government (1995), The Environment Act.

Ref 6-17 H.M. Government (2010) The Air Quality Standards Regulations 2010.

Ref 6-18 H.M. Government (2016) The Air Quality Standards (Amendment) Regulations 2016.

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Ref 6-20 H.M. Government (2021), The Environment Act.

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Ref 6-26 International Convention for the Prevention of Pollution from Ships (MARPOL) (1997), Annex VI: Regulations for the Prevention of Air Pollution from Ships – NOX emission standards,

Ref 6-27 International Convention for the Prevention of Pollution from Ships (MARPOL) (1997), Annex VI: Regulations for the Prevention of Air Pollution from Ships – SOX emission standards,

Ref 6-28 Joint Nature Conservation Committee (2020), Nitrogen Futures Project.

Ref 6-29 Laxen and Marner (2003), Analysis of the Relationship Between 1-Hour and Annual Mean Nitrogen Dioxide at UK Roadside and Kerbside Monitoring Sites.

Ref 6-30 Marine Management Organisation (2016), Marine Plan for the UK East Inshore region

Ref 6-31 Ministry of Housing, Communities & Local Government (2021), National Planning Policy Framework – updated 2021.

Ref 6-32 Moorcroft and Barrowcliffe et al. (2017), Land-Use Planning & Development Control: Planning For Air Quality. Version 1.2.

Ref 6-33 National Highways guidance (2019), Design Manual for Roads and Bridges

Ref 6-34 Natural England guidance (2018) Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations

Ref 6-35 North East Lincolnshire Council. (2016). North East Lincolnshire Local Transport Plan.

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