

Appendix 6A: Construction Phase Assessment

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6A. Air Quality - Construction Phase Assessment

6A.1 Introduction

- 6A.1.1 This Technical Appendix accompanies Chapter 6: Air Quality (ES Volume I) and describes the details of the construction dust assessment, and assessment of road traffic emissions from the Proposed Developments during the construction phase. Decommissioning impacts are assumed to be similar to construction impacts.
- 6A.1.2 Emissions to air during the construction phase of the Proposed Developments have the potential to adversely affect human health, sensitive ecosystems and amenity as a result of localised air quality effects caused by dust and traffic generation, if not appropriately controlled. This Technical Appendix identifies and proposes measures to address the potential impacts and effects of the Proposed Developments on air quality during enabling works, construction, and decommissioning.
- 6A.1.3 The assessment has assessed the combined impacts of the two Proposed Developments, as this represents the worst-case scenario for construction dust and construction traffic, and therefore if these can be demonstrated to be not significant, then the impacts of either Proposed Development proceeding in isolation, would also be not significant.
- 6A.1.4 Emissions to air from the Proposed Developments during operation, are covered in Appendix 6B: Air Quality – Operational Assessment (ES Volume II).

6A.2 Scope

- 6A.2.1 The construction phase air quality assessment has considered the impact of emissions during the construction and decommissioning of the Proposed Developments on local air quality. As noted above, decommissioning impacts are assumed to be similar to construction impacts. The assessment includes a review of the impacts of dust emissions from the various activities associated with the construction phase of the Proposed Developments during planned construction works on site and the impacts associated with the emissions from construction traffic. Impacts on sensitive human and ecological receptors in the vicinity of the Proposed Developments have also been assessed.
- 6A.2.2 The purpose of the construction dust assessment is to determine the potential risk of dust impacts occurring at sensitive receptors due to construction related activities associated with the Proposed Developments. The potential risk of impacts occurring then defines the scale of mitigation and control measures required to avoid any identified potential impacts, thereby ensuring that there will be no significant impacts at sensitive receptors beyond the Sites' boundaries. The mitigation and control measures required will be delivered via the Construction Environmental Management Plan (CEMP) an outline of which is presented Appendix 4A (ES Volume II). Further information on the construction activities to be carried out and methods proposed are provided within Chapter 4: Construction Programme and Management (ES Volume I).
- 6A.2.3 There is a risk that there could be cumulative impacts at dust sensitive receptors screened into the construction dust assessment for the Proposed Developments, due to the construction of other committed developments happening simultaneously in the area. The assessment of construction dust impacts reported in this assessment has been undertaken in line with industry-standard guidance to demonstrate the level of dust control required to mitigate any potential for significant effects. It is reasonable to assume therefore, that any other construction site in the vicinity of the Proposed Developments will have done the same and will control dust through mitigation that is standard practice on all well managed construction

sites across the UK. It is therefore concluded that the risk of cumulative construction dust impacts is low and therefore is not considered to be significant.

- 6A.2.4 The traffic data used in this assessment includes predicted traffic growth on modelled roads between the current baseline and the future year baseline. The methodology to determine the growth in traffic on the local road network is described in Chapter 8: Traffic and Transportation (ES Volume I) and Appendix 8A: Transport Assessment (ES Volume II). The predicted growth includes increases in traffic associated with other committed developments in the area and consequently the air quality assessment of road traffic emissions is inherently cumulative. There is therefore no separate assessment of cumulative impacts of construction traffic related emissions to air as part of this ES.
- 6A.2.5 The information that has been used within this assessment includes pertinent information from:
- Chapter 3: Proposed Developments Description, Need and Alternatives (ES Volume I);
 - Chapter 4: Construction Programme and Management (ES Volume I);
 - details on the site layout (see Figures 3.1 and 3.2 in ES Volume III);
 - Ordnance Survey mapping;
 - construction traffic data taken from Chapter 8: Traffic and Transportation (ES Volume I); and
 - baseline air quality data from published sources and Local Authorities.

6A.3 Methodology

Overview

- 6A.3.1 This section describes the approach that has been taken to the assessment of emissions associated with the construction phase of the Proposed Developments, which includes:
- a qualitative assessment of construction dust effects and
 - an assessment of construction phase road traffic emissions on local roads.
- 6A.3.2 The construction dust assessment utilised the IAQM ‘Guidance on the assessment of dust from demolition and construction’ (IAQM, 2014).
- 6A.3.3 The construction traffic assessment has been conducted utilising the following guidance:
- Design Manual for Roads and Bridges (DMRB) LA 105 (National Highways, 2019); and
 - Institute of Air Quality Management (IAQM)/ Environmental Protection UK (EPUK) ‘Land-Use planning and development control: planning for air quality’ (IAQM and EPUK, 2017).

Construction Dust Assessment

- 6A.3.4 The following four activities involved in the construction phase of the Proposed Developments have been screened as potentially significant, based on the nature of construction activities proposed:
- demolition (buildings and structures);
 - earthworks (soil stripping, spoil movement and stockpiling);
 - construction (including on-site concrete batching); and
 - trackout (Heavy Goods Vehicle (HGV) movements on unpaved roads and offsite mud on the highway).
- 6A.3.5 It is anticipated that only relatively minor site clearance works, excluding building demolition, would be required as part of the Preliminary Works activities associated with the construction of the Proposed Developments. Such site clearance works are not explicitly contained in the

guidance (IAQM 2014), and for the purposes of this assessment, the closest assessment category available in the IAQM 2014 guidance is considered to be ‘Demolition’. For this reason, the term ‘Demolition’ is used throughout the remainder of the report to refer to site clearance and potential demolition activities.

6A.3.6 Further information on anticipated construction activities are available within Chapter 4: Construction Programme and Management (ES Volume I).

Magnitude Definitions

6A.3.7 The categorisation detailed in the IAQM (2014) guidance for the potential magnitude of construction activities to generate dust emissions is provided in Table 6A.1. This categorisation has been used in the assessment carried out.

Table 6A.1: Example definitions of the magnitude of construction/ demolition activities

Magnitude	Demolition	Earthworks	Construction	Trackout
Large	Total building volume >50,000 m ³ , potentially dust construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level	Site area >1 ha potentially dusty soil type (e.g. clay). >10 heavy earth moving vehicles at once, bunds >8 m high, total material moved >100,000 tonnes	Total building volume >100,000 m ³ , on-site concrete batching, sandblasting	>50 HDV peak outward movements per day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m
Medium	Total building volume 20,000 – 50,000 m ³ , potentially dusty construction material, demolition activities 10 to 20 m above ground level	Site area 0.25 – 1 ha, moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles at once, bunds 4-8 m high, total material moved 20,000 – 100,000 tonnes	Total building volume 25,000 – 100,000 m ³ , potentially dusty materials e.g. concrete, on-site concrete batching	10 – 50 HDV peak outward movements per day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 – 100 m
Small	Total building volume <20,000 m ³ , construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10 m above ground level, demolition during wetter months	Site area <0.25 ha, large grain soil type (e.g. sand), <5 heavy earth moving vehicles at once, bunds <4 m high, total material moved <20,000 tonnes	Total building volume <25,000 m ³ , low dust potential construction materials. e.g. metal/timber	<10 HDV peak outward movements per day, surface material low dust potential, unpaved road length <50 m

HDV = Heavy duty vehicles, defined as vehicles with a gross weight greater than 3.5 tonnes.

Receptor Sensitivity Definitions

6A.3.8 The assessment of the significance of the effects of construction dust has been made with respect to the receptor and area sensitivity definitions as outlined in Table 6A.2 to Table 6A.5. Sensitivity definitions have been made with reference to the IAQM guidance (IAQM, 2014);

receptors beyond 100 m are defined as low sensitivity to construction impacts; locations of ecological receptors (including statutory designations, and non-statutory ecological receptors of location importance such as Local Wildlife Sites (LWS), national and local nature reserves) have been reviewed, and included within the assessment where the ecological sites are within the designated 50 m¹ screening distance.

Table 6A.2: Receptor sensitivity to construction/ demolition dust effects

Potential Dust Effect	Human Perception of Dust Soiling Effects	PM ₁₀ Health Effects	Ecological Effects
High sensitivity	Enjoy a high level of amenity; appearance/ aesthetics/ value of property would be diminished by soiling; receptor expected to be present continuously	Public present for 8 hours per day or more, e.g. residential, schools, care homes	Locations with an international or national designation and the designated features may be affected by dust soiling
Moderate sensitivity	Enjoy a reasonable level of amenity; appearance/ aesthetics/ value of property could be diminished by soiling; receptor not expected to be present continuously	Only workforce present (no residential or high sensitivity receptors) 8-hours per day or more	Locations where there is a particularly important plant species, where dust sensitivity is uncertain or unknown or locations with a national designation where the features may be affected by dust deposition
Low sensitivity	Enjoyment of amenity not reasonably expected; appearance/ aesthetics/ value of property not diminished by soiling; receptors are transient / present for limited period of time; e.g. playing fields, farmland, footpaths, short term car parks*	Transient human exposure, e.g. footpaths, playing fields and parks.	Locations with a local designation which may be affected by dust deposition.

* depending on the duration and frequency that people would be expected to park their cars there.

6A.3.9 Distances have been measured from source to receptor in bands of less than 20 m, less than 50 m, less than 100 m and less than 350 m for earthworks and construction in accordance with the IAQM guidance for the Proposed Developments. For trackout, the receptor distances have been measured from receptor to trackout route (up to 50 m) and up to 500 m from the construction site exit. These distance bands have been applied in Table 6A.3 and Table 6A.4. For sensitivity of an area to ecological impacts, the distance bands are for less than 20 m and less than 50 m.

¹ Ecological receptors assessed are those located within 50m of the nearest construction activity and/ or within 50m of a public road used by construction traffic that is within 500m of the construction site entrance (A18).

Table 6A.3: Sensitivity of the area to dust soiling effects on people/ property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Moderate	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 6A.4: Sensitivity of the area to human health impacts

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High (annual mean PM ₁₀ concentration <24 µg/m ³)	>100	Medium	Low	Low	Low
	10-100	Low	Low	Low	Low
	1-10	Low	Low	Low	Low
Medium (annual mean PM ₁₀ concentration <24 µg/m ³)	>10	Low	Low	Low	Low
	1-10	Low	Low	Low	Low
Low	≥1	Low	Low	Low	Low

Table 6A.5: Sensitivity of the area to ecological impacts

Receptor sensitivity	Distance from source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Risk Definitions

6A.3.10 The potential risks from emissions from unmitigated demolition and construction activities have been defined with reference to the magnitude of the potential emission and the sensitivity of the highest receptor(s) within the effect area, as summarised in Table 6A.6.

Table 6A.6: Classification of risk of unmitigated impacts

Area Sensitivity to Activity	Magnitude		
	Large	Medium	Small
Demolition			
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible
Earthworks			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Construction			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Trackout			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Low risk	Negligible
Low	Low risk	Low risk	Negligible

Magnitude Assessment

6A.3.11 For the purpose of this assessment, the Sites are considered to be a large emissions source for fugitive dust emissions from construction related activities, as defined in Table 6A.1.

Receptor Identification

6A.3.12 Human health and ecological receptors have been identified within the Study Area and are shown in Table 6A.7 (CD = Construction Dust Receptor).

Table 6A.7: Identification of receptors for construction dust assessment

ID	Receptor Name	Receptor Type	Approx. Distance (m) from Sites Boundaries or Exits*	Approx. Distance to Construction Route (m)	Within Screening Distance?	Receptor Sensitivity to Dust and Particulate Matter
CD1	Humber Refinery	Industrial	0	320	Yes	Medium
CD2	VPI Immingham	Industrial	0	300	Yes	Medium
CD3	Lindsey Oil Refinery	Industrial	100	900	Yes	Medium
CD4	Staple Road, South Killingholme	Residential	500	330	No	High
CD5	Town Street, South Killingholme	Residential	760	120	Yes	High
CD6	Killingholme Primary School	School	865	75	No	High
CD7	Church Lane, North Killingholme	Residential	680	1,300	No	High
CD8	Mill Lane, Immingham	Residential	1,850	1,600	No	High
CD9	Church Lane, Immingham	Residential	1,850	1,600	No	High
CD10	Woodlands Avenue, Immingham	Residential	1,770	1,600	No	High
CD11	Manby Road, Immingham	Commercial	280	35	Yes	Medium
CD12	Marsh Lane, South Killingholme	Residential	370	300	No	High
CD13	Baptist Chapel Lane	Residential	1,000	500	No	High
CD14	Faulding Lane	Residential	1,060	500	No	High
CD15	Brick Lane	Residential	1,920	2,600	No	High
CD16	Immingham Road/ Habrough Road	Residential	2,400	1,950	No	High
CD17	Killingholme Road	Residential	1,700	1,030	No	High
CD18	East Halton Road	Residential	1,900	2,600	No	High
CD19	Rosper Road Pools	Ecological	80	25	Yes	Low
CD20	Eastfield Road Pit	Ecological	75	900	No	Low

* rounded to nearest 5 m

Area Sensitivity Assessment

6A.3.13 The receptor sensitivity to the effects of dust soiling and PM₁₀ (human health) impacts has been determined for all activities, based on the closest distance from the identified receptors to those activities, as summarised in Table 6A.8. The overall area sensitivity to dust soiling and PM₁₀ (dust soiling and human health) is considered to be 'low'², whilst the area sensitivity to ecological dust impacts is also considered to be 'low'.

Table 6A.8: Area sensitivity for receptors of construction dust

Activity	Potential impact	Receptor sensitivity and distance to activity	Area sensitivity ³
Demolition (Site clearance and preparatory works)	Dust soiling	Medium sensitivity (<10 receptors) <100 m	Low
	Health PM ₁₀	Medium sensitivity (<10 receptors) <100 m	Low
	Ecological impact	Medium sensitivity <50 m	Low
Earthworks	Dust soiling	Medium sensitivity (<10 receptors) <100 m	Low
	Health PM ₁₀	Medium sensitivity (<10 receptors) <100 m	Low
	Ecological impact	Medium sensitivity <50 m	Low
Construction	Dust soiling	Medium sensitivity (<10 receptors) <100 m	Low
	Health PM ₁₀	Medium sensitivity (<10 receptors) <100 m	Low
	Ecological impact	Medium sensitivity <50 m	Low
Trackout	Dust soiling	Medium sensitivity (<10 receptors) <100 m	Low
	Health PM ₁₀	Medium sensitivity (<10 receptors) <100 m	Low
	Ecological impact	Medium sensitivity <50 m	Low

Construction Traffic Assessment

6A.3.14 The assessment of construction traffic has used the latest version of dispersion model software ADMS-Roads (v5) to quantify baseline pollution levels at selected receptors due to road traffic emissions. ADMS-Roads is a modern dispersion model that has an extensive published track record of use in the UK for the assessment of local air quality impacts, including model validation studies (CERC, 2022).

6A.3.15 Data used in dispersion modelling, as provided in Chapter 8: Traffic and Transportation (ES Volume I) have been for the following scenarios:

- Baseline Scenario 2022: Baseline traffic for the year 2022;
- Baseline Scenario 2025: Baseline traffic for the year 2025;

² Using Table 2 of IAQM 2014 guidance on the assessment of dust from demolition and construction

³ Defined in accordance with Step 2B of IAQM 2014 taking into account the specific sensitivities of receptors in the area; the proximity and number of those receptors; in the case of PM₁₀, the local background concentration; and site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust

- Do Something (DS) Scenario 1: Baseline traffic for the year 2025 + traffic associated with Peak Construction Vehicle Movements, which occurs for the Phillips 66 Proposed Development (Month 23); and
- DS Scenario 2: Baseline traffic for the year 2025 + traffic associated with Peak HGV Movements (Month 27).

Model Inputs

6A.3.16 The general model conditions applicable to all the model scenarios assessed are summarised Table 6A.9.

Table 6A.9: ADMS-Roads model inputs

Variable	Model Input
Surface roughness at source	0.5 m
Surface roughness at meteorological site	0.2 m
Receptors	Selected discrete receptors (as detailed in Table 6A.10)
Receptor locations	X, Y co-ordinates determined by GIS
	z (ground level) = 1.5 m for residential receptors
	z = 0 m for ecological receptors
Source locations	X, Y co-ordinates determined by GIS
Meteorological data	Humberston Airport Meteorological Station 2021
Terrain data	Not required

Emission Factors

6A.3.17 Emissions for each scenario were calculated using Defra’s Emissions Factors Toolkit (EFT) (Defra, 2022a). The EFT is widely used in the industry to calculate emissions from road traffic. Within the tool, users can specify a range of different parameters to best estimate the fleet of road vehicles for a given location within the UK. The tool applies several useful assumptions, including failure percentage of engine abatement to avoid underestimating emissions. COPERT emission factors are used by the tool to ultimately calculate emissions per road link.

6A.3.18 The emissions year used in the assessment was 2022 for the baseline scenario and 2025 for all other scenarios. The area parameter used by the tool was set to “England (not London)”.

Modelled Domain and Discreet Receptors

6A.3.19 The modelling assessment has used a domain consistent with the traffic assessment, Chapter 8: Traffic and Transportation (ES Volume I), where the following roads were included for detailed assessment: Rosper Road, Eastfield Road, A160, A180 (between the A15 and the Station Road flyover at Habrough), Manby Road and A15.

6A.3.20 The model domain does not extend as far as Grimsby, and notably does not include the Grimsby AQMA. The closest part of the model domain to the Grimsby AQMA, is approximately 12km west on the A180 at the Station Road flyover, Habrough. At this location in the model domain, the change in traffic as a result of the Proposed Developments for Scenario DS1 (scenario with largest predicted increase in traffic) is 199 LDVs and 24 HDVs. It is likely that the traffic change on this link as a result of the Proposed Developments would be considerably different to that in the AQMA. The traffic change in the AQMA is likely to be far less than the screening criteria described previously.

6A.3.21 When selecting receptor locations for a roads assessment, a screening distance of 200m is used (National Highways, 2019), beyond which, the effects of air quality pollutants from road

traffic is expected to be negligible. There are relatively few receptors along the construction traffic route. Receptors used in the Construction Traffic Assessment are presented in Table 6A.10. Receptors CTR5 and CTR6, are used in the operational assessment and are referred to as OR9 and OR10 in Chapter 6: Air Quality (ES Volume I) and Appendix 6B: Air Quality – Operational Phase. Similarly, CTE1, CTE2 and CTE3 in this assessment are referred to as OE5, OE7 and OE11 in Chapter 6: Air Quality (ES Volume I) and Appendix 6B: Air Quality – Operational Phase.

Table 6A.10: Human and ecological receptors used in the construction traffic assessment

Receptor I.D	Receptor Description	Grid Reference	
		x	y
CTR1	Kesteven Court, Habrough	514736	414051
CTR2	Willows Farm, Habrough	515086	414243
CTR3	Grange Farm, Croxton	509462	413134
CTR4	Village Farm, Elsham	504134	414064
CTR5	Town Street/ Humber Road, South Killingholme	515516	416120
CTR6	South Killingholme Primary School	514880	416120
CTE1	Eastfield Road Railway Embankment, Local Wildlife Site	515313	417108
CTE2	Rosper Road Pools, Local Wildlife Site	517224	416937
CTE3	Eastfield Road Pit, Site of Importance for Nature Conservation	515350	417040

Meteorological Data

- 6A.3.22 Actual measured hourly-sequential meteorological data is available for input into dispersion models, and it is important to select data as representative as possible for the site that will be modelled. This is usually achieved by selecting a meteorological station as close to the site as possible, although other stations may be used if the local terrain and conditions vary considerably, or if the station does not provide sufficient data.
- 6A.3.23 The meteorological site selected for the assessment is Humberside Airport, located approximately 8.4 km south-west of the Proposed Development Sites, at a flat airfield in a principally agricultural area. A surface roughness of 0.2 m (representative of an agricultural area) has been selected for the meteorological site within the model.
- 6A.3.24 Only 2021 meteorological data is used for the Construction Traffic Assessment. Use of one meteorological year is common practice for roads assessments as there is little variation in annual meteorological trends at any given location in the UK and only annual mean pollutant concentrations can be accurately predicted from 24-hour AADT traffic data.

Model Verification

- 6A.3.25 Model verification is the exercise undertaken to account for dispersion model bias. This involves aligning model output data for the Baseline Scenario with actual measurements gathered at locations within the Construction Traffic Study Area. The factor of the difference between modelled output and measured data is then applied to all representative locations in the model domain.
- 6A.3.26 Table 6A.11 shows the monitoring data which were used for the verification process, all of which were part of the AECOM diffusion tube survey described in Chapter 6: Air Quality (ES Volume I).

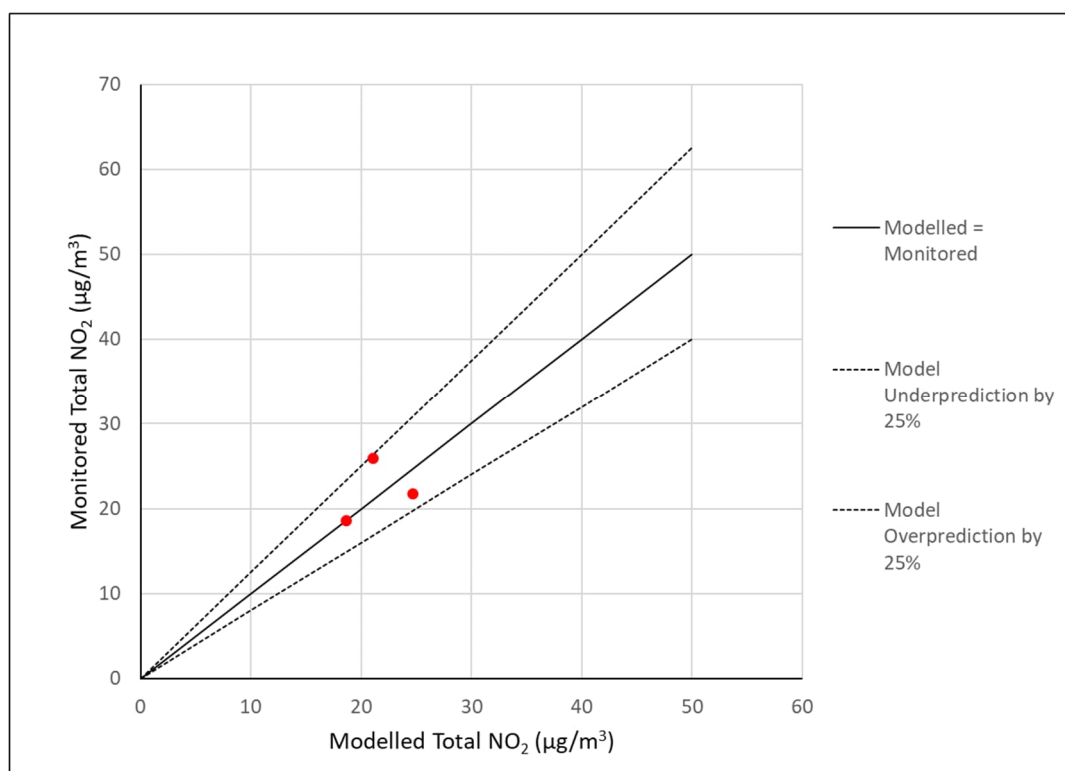
Table 6A.11: Summary of verification

Diffusion Tube ID	Total monitored NO ₂ (µg/m ³)	Unadjusted Modelled Total NO ₂ (µg/m ³)	Adjusted Total Modelled NO ₂ (µg/m ³)
DT1	18.55	16.16	18.65
DT2	21.74	18.13	24.69
DT4	25.91	16.93	21.05

6A.3.27 The monitoring sites listed above were used for the model verification as they were situated adjacent to the modelled road network at locations that are representative of relevant exposure.

6A.3.28 The verification process has been undertaken following the methodology described in Local Air Quality Management Technical Guidance (TG22) (Defra, 2022b). Modelled predictions were made for all suitable monitoring locations. A comparison of the monitored road NO_x and modelled road NO_x was done, a slope of 3.19 through the intercept was achieved. Total modelled NO₂ was then re-calculated based on this adjustment factor. Adjusted predictions and the measured concentrations at these locations are illustrated by Plate 6A.1.

Plate 6A.1: Monitored vs. modelled total NO₂ concentrations after adjustment



6A.3.29 The red dots on Plate 6A.1 show the variation of the adjusted modelled concentrations of total annual mean NO₂ for all locations were within 25% of monitored concentrations. This exceeds the requirements of TG22, where the requirement is that modelled concentrations of most sites should be within 25% of the monitored concentration. The root mean square error for verification was 3.3 µg/m³, which is within 10% of the annual mean air quality objective value for NO₂, described as ideal by TG22.

NO_x to NO₂ Conversion

6A.3.30 Conversion of model output NO_x was performed after model verification using the Defra NO_x to NO₂ conversion tool (Defra, 2022c). The tool uses a one-dimensional finite difference model of the atmospheric boundary layer reactions of NO, NO₂ and O₃. The default fraction of primary NO₂ and O₃ concentrations were used for this assessment.

Calculation of Deposition at Sensitive Ecological Receptors

- 6A.3.31 The deposition of nutrient nitrogen at sensitive ecological receptors has been calculated using the modelled concentrations predicted at the relevant receptor points. The deposition rates are determined using conversion rates and factors contained within published guidance (Highways England, 2019) (IAQM, 2020), which takes into account variations in the deposition mechanisms for different types of habitat. Acid deposition is not considered in the Construction Traffic Assessment as the project ecologist has confirmed there are no appropriate critical load values for the ecological sites which are within the assessment domain.
- 6A.3.32 Conversion rates and factors used in the assessment are shown in Table 6A.12.

Table 6A.12: Deposition conversion rates ecological receptors

Pollutant	Deposition Velocity Grassland (m/s)	Deposition Velocity Woodlands (m/s)	Nutrient Nitrogen Deposition Conversion Factor (µg/m³/s to kg/ha/yr)
NO _x as NO ₂	0.0015	0.003	95.9

Predicting the Number of Days the Particulate Matter 24-Hour Mean Objective is Exceeded

- 6A.3.33 The guidance document TG22 (Defra, 2022b) sets out the method by which the number of days in which the particulate matter 24-hour objective is exceeded can be obtained based on a relationship with the predicted particulate matter annual mean concentration. The formula used within this assessment is:

$$Number\ of\ Exceedances = 0.00145 \times C^3 + \frac{206}{C} - 18.5$$

- 6A.3.34 Where C is the annual mean concentration of PM₁₀.

Predicting the Number of Days the NO₂ Hourly Mean Objective is Exceeded

- 6A.3.35 Research projects completed on behalf of Defra and the Devolved Administrations (Laxen and Marner, 2003; and AEAT, 2008) have concluded that the hourly mean NO₂ objective is unlikely to be exceeded if annual mean concentrations are predicted to be less the 60 µg/m³.
- 6A.3.36 In 2003, Laxen and Marner concluded: “...local authorities could reliably base decisions on likely exceedances of the 1-hour objective for nitrogen dioxide alongside busy streets using an annual mean of 60 µg/m³ and above.”
- 6A.3.37 The findings presented by Laxen and Marner (2003) are further supported by AEAT (2008) who revisited the investigation to complete an updated analysis including new monitoring results and additional monitoring sites. The recommendations of this report are: “Local authorities should continue to use the threshold of 60 µg/m³ NO₂ as the trigger for considering a likely exceedance of the hourly mean nitrogen dioxide objective.”
- 6A.3.38 Therefore, this assessment will evaluate the likelihood of exceeding the hourly mean NO₂ objective by comparing predicted annual mean NO₂ concentrations at all receptors to an annual mean equivalent threshold of 60 µg/m³ NO₂. Where predicted concentrations are below this value, it can be concluded that the hourly mean NO₂ objective (200 µg/m³ NO₂ not to be exceeded more than 18 times per year) will be achieved.

6A.4 Existing Air Quality

Background Air Quality

6A.4.1 This section presents the information used to evaluate the background and baseline ambient air quality in the area surrounding the Proposed Developments. The following steps have been taken in the determination of background values:

- Identification of Air Quality Management Areas (AQMA);
- Review of North Lincolnshire Council (NLC) ambient monitoring data;
- Review of data from Defra's background mapping database; and
- Review of ecological receptor background data and site relevant critical loads from the Air Pollution Information System (APIS) website.

Full details on the existing air quality are provided in Chapter 6: Air Quality (ES Volume I), however the specific background (ambient) data that has been used for the operational assessment is provided in Table 6A.13 to

6A.4.2 Table 6A.15.

Table 6A.13: Background pollutant concentrations for human health receptors

Pollutant	Background Concentration used for Assessment ($\mu\text{g}/\text{m}^3$)	Source of Data
NO ₂	15.0	North Killingholme School Urban Industrial (Automatic) Monitor 2019.
Particulates (PM ₁₀)	19	North Killingholme School Urban Industrial (Automatic) Monitor 2019.
Particulates (PM _{2.5})	11.8	Defra background mapping from 2018 (with no future adjustment applied). Maximum concentration at all receptor locations.

Table 6A.14: Background pollutant concentrations for ecological receptors

Receptor I.D.	Ecology Site	NO _x ($\mu\text{g}/\text{m}^3$)
CTE1	Eastfield Road Railway Embankment	15.7
CTE2	Rosper Road Pools	17.5
CTE3	Eastfield Road Pit	15.7

Table 6A.15: Background deposition data for ecological receptors

Receptor I.D.	Ecology Site	Habitat Type and Location	Grid Reference x, y	N-Deposition (kg/Ha/Yr)
CTE1	Eastfield Road Railway Embankment	Neutral grassland	515313, 417108	20.4
CTE2	Rosper Road Pools	Broadleaved woodland	517224, 416937	20.4
CTE3	Eastfield Road Pit	Neutral grassland	515350, 417040	20.4

- 6A.4.3 Data on APIS is only pertinent to statutory ecological sites, however advice from the project ecologists has provided the lowest appropriate critical load for the non-statutory sites included in the assessment. There are no equivalent values for acid deposition, therefore acid deposition data presented in this report is limited to statutory ecological sites only.
- 6A.4.4 In order to represent a conservative approach, it has been assumed that background concentrations, particularly of NO₂ and NO_x, would not decrease in future years. Therefore, the current background concentrations have been assumed to apply to the projected opening year of 2025.

Baseline Air Quality

- 6A.4.5 Baseline concentrations of air pollutants at each of the receptor locations considered in this assessment are presented in this section. These are the background concentrations referred to in the previous section combined with predicted concentrations from the Construction Traffic model outputs for the Baseline Scenario 2022 (the predicted road traffic contribution for 2022 as it exists) and Baseline Scenario 2025 (the predicted road traffic contribution for 2025 without development).

Baseline 2022

- 6A.4.6 Baseline pollutant concentrations for 2022 human receptors are presented in Table 6A.16. It is shown that the baseline air pollutant climate is good, the highest predicted annual mean NO₂ concentration at any location is 19.7 µg/m³, which is 49% of the AQAL. The highest predicted annual mean PM₁₀ concentration at any location is 20.3 µg/m³, which is 51% of the AQAL.
- 6A.4.7 The highest predicted annual mean PM_{2.5} concentration at any location is 12.6 µg/m³, which is 63% of the AQAL. The number of days where PM₁₀ concentrations are predicted to exceed 50 µg/m³, is at most 4, which is well below the AQAL of 35. There are no predicted exceedances of the 1-hour mean AQAL.

Table 6A.16: 2022 Baseline pollutant concentrations at human receptors

Receptor ID	Baseline Annual Mean NO ₂ Concentration (µg/m ³)	Baseline Annual Mean PM ₁₀ Concentration (µg/m ³)	Baseline Annual Mean PM _{2.5} Concentration (µg/m ³)	No. Days predicted PM ₁₀ exceeds 50 µg/m ³	Exceedance of 1-hour mean NO ₂ AQAL
CTR1	15.9	19.2	11.9	2	No
CTR2	17.4	19.5	12.1	3	No
CTR3	16.9	19.5	12.1	3	No
CTR4	16.2	19.2	11.9	2	No
CTR5	19.7	20.3	12.6	4	No
CTR6	16.9	19.5	12.1	3	No

- 6A.4.8 Baseline pollutant concentrations for 2022 ecological receptors are presented in Table 6A.17. The baseline air pollutant climate for NO_x is good, the maximum predicted concentration at any ecological site is 21.6 µg/m³, which is 72% of the AQAL.
- 6A.4.9 Table 6A.17 shows that 2022 baseline nitrogen deposition concentrations are exceeding the site relevant critical load by 209% to 263% based on prediction from the air quality modelling assessment as the site currently exists.

Table 6A.17: 2022 Baseline pollutant concentrations at ecological receptor

Receptor ID	Baseline Annual Mean NO _x	Site Relevant Lower value of Critical	Total Nitrogen Deposition
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	Concentration ($\mu\text{g}/\text{m}^3$)	Load Nitrogen Deposition	(kg/ha/yr)
CTE1	20.0	8	21.0
CTE2	20.8	10	20.9
CTE3	21.6	10	22.1

Baseline 2025

6A.4.10 2025 baseline pollutant concentrations for human receptors are presented in Table 6A.18. It is shown that the baseline air pollutant climate is good, the highest predicted annual mean NO_2 concentration at any location is $18.2 \mu\text{g}/\text{m}^3$, which is 46% of the AQAL. The highest predicted annual mean PM_{10} concentration at any location is $20.3 \mu\text{g}/\text{m}^3$, which is 51% of the AQAL. The highest predicted annual mean $\text{PM}_{2.5}$ concentration at any location is $12.5 \mu\text{g}/\text{m}^3$, which is 63% of the AQAL. The number of days where PM_{10} concentrations are predicted to exceed $50 \mu\text{g}/\text{m}^3$, is at most 4, which is well below the AQAL of 35. There are no predicted exceedances of the 1-hour mean AQAL.

Table 6A.18: 2025 Baseline pollutant concentrations at human receptors

Receptor ID	Baseline Annual Mean NO_2 Concentration ($\mu\text{g}/\text{m}^3$)	Baseline Annual Mean PM_{10} Concentration ($\mu\text{g}/\text{m}^3$)	Baseline Annual Mean $\text{PM}_{2.5}$ Concentration ($\mu\text{g}/\text{m}^3$)	No. Days predicted PM_{10} exceeds $50 \mu\text{g}/\text{m}^3$	Exceedance of 1-hour mean NO_2 AQAL
CTR1	15.6	19.2	11.9	2	No
CTR2	16.7	19.5	12.1	3	No
CTR3	16.3	19.5	12.1	3	No
CTR4	15.8	19.2	11.9	2	No
CTR5	18.2	20.3	12.5	4	No
CTR6	16.2	19.5	12.1	3	No

6A.4.11 2025 baseline pollutant concentrations for ecological receptors are presented in Table 6A.19. The baseline air pollutant climate for NO_x is good, the maximum predicted concentration at any ecological site is $19.9 \mu\text{g}/\text{m}^3$, which is 76.4% of the AQAL.

6A.4.12 Table 6A.19 shows that 2025 baseline nitrogen deposition concentrations are exceeding the site relevant critical load by 207% to 260% based on prediction from the air quality modelling assessment as the site currently exists.

Table 6A.19: 2025 Baseline pollutant concentrations at ecological receptors

Receptor ID	Baseline Annual Mean NO_x Concentration ($\mu\text{g}/\text{m}^3$)	Site Relevant Lower value of Critical Load Nitrogen Deposition	Total Nitrogen Deposition (kg/ha/yr)
CTE1	18.8	8	20.8
CTE2	19.8	10	20.7
CTE3	19.9	10	21.6

6A.4.13 In comparison to the 2022 baseline, pollutant concentrations will decrease in 2025. For the sites in this assessment, this is predicted to be as much as $1.5 \mu\text{g}/\text{m}^3$ for NO_2 and $1.7 \mu\text{g}/\text{m}^3$ for NO_x with smaller improvements for PM_{10} and $\text{PM}_{2.5}$ predicted. This is due to improvements in emission rates in the general traffic fleet.

6A.5 Assessment Results

Construction Dust

6A.5.1 The risk of impacts from unmitigated activities from the Proposed Developments has been determined through combination of the potential dust emission magnitude and the sensitivity of the area, for each activity to determine the appropriate level of mitigation to be applied. The risk of impacts from unmitigated activities are summarised in Table 6A.20.

Table 6A.20: Risk of impacts from unmitigated activities from the Proposed Developments

Activity	Demolition/ Site Preparation	Earthworks	Construction	Trackout
Dust Emission Magnitude	Large	Large	Large	Medium
Risk of impacts from unmitigated activities				
Dust soiling (low sensitivity)	Low Risk	Low Risk	Low Risk	Low Risk
Health PM ₁₀ (low sensitivity)	Low Risk	Low Risk	Low Risk	Low Risk
Ecological impact	Low Risk	Low Risk	Low Risk	Low Risk

6A.5.2 The risk assessment for construction dust indicates that there would be a low risk of unmitigated dust impacts on human health (PM₁₀) and a low to medium risk for dust soiling from unmitigated demolition/ site preparation, earthworks, construction and track out activities for the Proposed Developments. The assessment also shows that the impact of unmitigated construction activities on ecological sites is likely to be a low risk.

6A.5.3 As detailed previously, these risk classifications are solely used to select the appropriate schedule of mitigation measures, examples of which are set out in guidance published by the IAQM (2014). For all but the smallest of sites the use of the high-risk schedule of measures represents good working practice.

6A.5.4 On consideration of the likely effectiveness of these measures, additional site-specific measures will be identified in the contractors' CEMPs if required but at this stage the requirement for any such measures has not been identified. If required, measures may include:

- cutting and grinding operations, if required, will be conducted using equipment and techniques that reduce emissions and incorporate appropriate dust suppression measures;
- damping down of dust-generating equipment and vehicles within the Sites and the provision of dust suppression in all areas of the Sites that are likely to generate dust;
- use water suppression and regular cleaning during earth moving activities;
- materials stockpiles likely to generate dust enclosed or securely sheeted, damped down or stabilised as appropriate;
- covering materials, deliveries or loads entering and leaving the construction site;
- mixing of grout or cement-based materials will be undertaken using appropriate techniques/ mitigation;
- haul routes will be surfaced and maintained;
- enforcement of speed limits on haul roads;
- measures will be taken to keep roads and accesses clean; and
- vehicle, plant and equipment maintenance records will be kept on-site and reviewed regularly.

6A.5.5 It is considered that with the implementation of appropriate mitigation and control measures set out in the Outline CEMP, the potential effect from fugitive emissions of construction dust would not be significant.

Construction Traffic

6A.5.6 Results for each of the Construction Traffic Assessment scenarios are presented in this section of the report. Impact descriptors applied are based on the criteria presented in the Chapter 6: Air Quality (ES Volume I).

DS Scenario1

Human Health Receptor Results

6A.5.7 Predicted concentrations of NO₂ at receptor human receptor locations are presented in Table 6A.21. The maximum predicted change in NO₂ as a result of the DS Scenario 1 is 0.1 µg/m³, which is a change of less than 1% of the AQAL. The air quality effects due the predicted concentration changes at all receptor locations are considered to be negligible. Based on these predicted results it is highly unlikely that there will be any exceedance of the 1-hour mean AQAL for NO₂.

Table 6A.21: NO₂ pollutant concentrations human receptors

Receptor ID	2025 Baseline Annual Mean NO ₂ Concentration (µg/m ³)	DS S1 Annual Mean NO ₂ Concentration (µg/m ³)	Change in NO ₂ (µg/m ³)	Change % of AQAL	Impact Descriptor
CTR1	15.6	15.7	<0.1	<1	Negligible
CTR2	16.7	16.7	0.1	<1	Negligible
CTR3	16.3	16.3	0.1	<1	Negligible
CTR4	15.8	15.9	<0.1	<1	Negligible
CTR5	18.2	18.5	0.3	<1	Negligible
CTR6	16.2	16.4	0.1	<1	Negligible

6A.5.8 Predicted concentrations of PM₁₀ at receptor human receptor locations are presented in Table 6A.22. All changes in PM₁₀ as a result of the DS Scenario 1 are predicted to be less than 0.1 µg/m³, which as a percentage of the AQAL is less than 1%. The air quality effects due to the predicted concentration changes at all receptor locations are considered to be negligible. In addition, it has been calculated that there are no changes in the number of days where 24-hour mean PM₁₀ will exceed 50 µg/m³

Table 6A.22: PM₁₀ pollutant concentrations human receptors

Receptor ID	2025 Baseline Annual Mean PM ₁₀ Concentration (µg/m ³)	DS S1 Annual Mean PM ₁₀ Concentration (µg/m ³)	Change in PM ₁₀ (µg/m ³)	Change % of AQAL	Impact Descriptor
CTR1	19.2	19.2	<0.1	<1	Negligible
CTR2	19.5	19.5	<0.1	<1	Negligible
CTR3	19.5	19.5	<0.1	<1	Negligible
CTR4	19.2	19.2	<0.1	<1	Negligible
CTR5	20.3	20.4	<0.1	<1	Negligible
CTR6	19.5	19.5	<0.1	<1	Negligible

6A.5.9 Predicted concentrations of PM_{2.5} at receptor human receptor locations are presented in Table 6A.22. The highest predicted change in PM_{2.5} as a result of the DS Scenario 1 is 0.1 µg/m³, which is 1% of the AQAL. The air quality effect due to the predicted concentration changes at all receptor locations are considered to be negligible.

Table 6A.23: PM_{2.5} pollutant concentrations human receptors

Receptor ID	2025 Baseline Annual Mean PM _{2.5} Concentration (µg/m ³)	DS S1 Annual Mean PM _{2.5} Concentration (µg/m ³)	Change in PM _{2.5} (µg/m ³)	Change % of AQAL	Impact Descriptor
CTR1	11.9	11.9	<0.1	<1	Negligible
CTR2	12.1	12.1	<0.1	<1	Negligible
CTR3	12.1	12.1	<0.1	<1	Negligible
CTR4	11.9	11.9	<0.1	<1	Negligible
CTR5	12.5	12.6	0.1	<1	Negligible
CTR6	12.1	12.1	<0.1	<1	Negligible

Ecological Receptor Results

6A.5.10 Predicted concentrations of NO_x at ecological receptor locations are presented in Table 6A.24. The maximum predicted change in NO_x as a result of the DS Scenario 1 is 1 µg/m³, which is a change of 3.2% of the AQAL. The predicted concentration changes cannot be screened out as unlikely to give rise to significant effects, however the total concentration is less than 70% of the AQAL, and it is considered that this is considered to be acceptable and unlikely to give rise to significant effects at ecological receptors.

Table 6A.24: NO_x pollutant concentrations ecological receptors

Receptor ID	2025 Baseline Annual Mean NO _x Concentration (µg/m ³)	DS S1 Annual Mean NO _x Concentration (µg/m ³)	Change in NO _x (µg/m ³)	Change % of AQAL	Impact Descriptor
CTE1	18.8	19.4	0.7	2.2	Negligible
CTE2	9.8	19.9	<0.1	0.3	Negligible
CTE3	19.9	20.9	1	3.2	Negligible

6A.5.11 Predicted concentrations of deposited nitrogen at receptor ecological receptor locations are presented in Table 6A.25. The maximum predicted change in deposited nitrogen as a result of the DS Scenario 1 is 0.3 kg/ha/year, which is a change of 3.0% of the site relevant AQAL. Predicted concentration changes at all receptor locations can be assigned as moderate for all locations except CTE3, which has an impact descriptor of major. For all receptors, this is due to the site already recording a nutrient nitrogen deposition rate above the AQAL.

Table 6A.25: Nitrogen deposition pollutant concentrations ecological receptors

Receptor ID	2025 Baseline Annual Mean Nitrogen Deposition Concentration (kg/ha/year)	DS S1 Annual Mean Nitrogen Deposition Concentration (kg/ha/year)	Change in Nitrogen Deposition (kg/ha/year)	Change % of AQAL	Impact Descriptor
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CTE1	20.8	20.9	0.1	1.2	Moderate
CTE2	20.7	20.7	<0.1	<0.1	Moderate
CTE3	21.6	21.9	0.3	3.0	Major

DS Scenario 2

Human Health Receptor Results

6A.5.12 Predicted concentrations of NO₂ at receptor human receptor locations are presented in Table 6A.26. The maximum predicted change in NO₂ as a result of the DS Scenario 2 is 0.1 µg/m³, which is a change of 0.7% of the AQAL. The air quality effects due the predicted concentration changes at all receptor locations are considered to be negligible. Based on these predicted results it is highly unlikely that there will be any exceedance of the 1-hour mean AQAL for NO₂.

Table 6A.26: NO₂ pollutant concentrations human receptor

Receptor ID	2025 Baseline Annual Mean NO ₂ Concentration (µg/m ³)	DS S1 Annual Mean NO ₂ Concentration (µg/m ³)	Change in NO ₂ (µg/m ³)	Change % of AQAL	Impact Descriptor
CTR1	15.6	15.7	<0.1	<0.1	Negligible
CTR2	16.7	16.7	<0.1	0.1	Negligible
CTR3	16.3	16.3	0.1	0.1	Negligible
CTR4	15.8	15.9	<0.1	<0.1	Negligible
CTR5	18.2	18.4	0.2	0.7	Negligible
CTR6	16.2	16.4	0.1	0.3	Negligible

Predicted concentrations of PM₁₀ at receptor human receptor locations are presented in Table 6A.27. All changes in PM₁₀, as a result of the DS Scenario 2, are predicted to be less than 0.1 µg/m³, which as a percentage of the AQAL is less than 0.1%. The air quality effects due the predicted concentration changes at all receptor locations are considered to be negligible. In addition, it has been calculated that there are no changes in the number of days where 24-hour mean PM₁₀ will exceed 50 µg/m³

Table 6A.27: PM₁₀ pollutant concentrations human receptors

Receptor ID	2025 Baseline Annual Mean PM ₁₀ Concentration (µg/m ³)	DS S1 Annual Mean PM ₁₀ Concentration (µg/m ³)	Change in PM ₁₀ (µg/m ³)	Change % of AQAL	Impact Descriptor
CTR1	19.2	19.2	<0.1	<0.1	Negligible
CTR2	19.5	19.5	<0.1	<0.1	Negligible
CTR3	19.5	19.5	<0.1	<0.1	Negligible
CTR4	19.2	19.2	<0.1	<0.1	Negligible
CTR5	20.3	20.4	0.1	<0.1	Negligible
CTR6	19.5	19.5	<0.1	<0.1	Negligible

6A.5.13 Predicted concentrations of PM_{2.5} at receptor human receptor locations are presented in Table 6A.28. All changes in PM_{2.5} as a result of the DS Scenario 2 are predicted to be less than 0.1

$\mu\text{g}/\text{m}^3$, which as a percentage of the AQAL is less than 0.1%. The air quality effects due the predicted concentration changes at all receptor locations are considered to be negligible.

Table 6A.28: PM_{2.5} pollutant concentrations human receptors

Receptor ID	2025 Baseline Annual Mean PM _{2.5} Concentration ($\mu\text{g}/\text{m}^3$)	DS S1 Annual Mean PM _{2.5} Concentration ($\mu\text{g}/\text{m}^3$)	Change in PM _{2.5} ($\mu\text{g}/\text{m}^3$)	Change % of AQAL	Impact Descriptor
CTR1	11.9	11.9	<0.1	<0.1	Negligible
CTR2	12.1	12.1	<0.1	<0.1	Negligible
CTR3	12.1	12.1	<0.1	<0.1	Negligible
CTR4	11.9	11.9	<0.1	<0.1	Negligible
CTR5	12.5	12.6	<0.1	<0.1	Negligible
CTR6	12.1	12.1	<0.1	<0.1	Negligible

Ecological Receptor Results

6A.5.14 Predicted concentrations of NO_x at ecological receptor locations are presented in Table 6A.29. The maximum predicted change in NO_x as a result of the DS Scenario 2 is 0.7 $\mu\text{g}/\text{m}^3$, which is a change of 2.4% of the AQAL. The predicted concentration changes cannot be screened out as unlikely to give rise to significant effects, however the total concentration is less than 70% of the AQAL, and it is considered that this is considered to be acceptable and unlikely to give rise to significant effects at ecological receptors.

Table 6A.29: NO_x pollutant concentrations ecological receptors

Receptor ID	2025 Baseline Annual Mean NO _x Concentration ($\mu\text{g}/\text{m}^3$)	DS S1 Annual Mean NO _x Concentration ($\mu\text{g}/\text{m}^3$)	Change in NO _x ($\mu\text{g}/\text{m}^3$)	Change % of AQAL	Impact Descriptor
CTE1	18.8	19.3	0.5	1.7	Negligible
CTE2	19.8	20.0	0.2	0.6	Negligible
CTE3	19.9	20.7	0.7	2.4	Negligible

6A.5.15 Predicted concentrations of deposited nitrogen at receptor ecological receptor locations are presented in Table 6A.30. The maximum predicted change in deposited nitrogen as a result of the DS Scenario 2 is 0.2 kg/ha/year at CTE3, which is a change of 2.1% of the site relevant AQAL. The change in concentration at CTE1 is 0.07 kg/ha/year, which is a change in 0.9% of the site relevant AQAL. The change in traffic under DS Scenario 2 leads to an impact which is described as moderate at CTE1 and major at CTE3 according to the criteria set out in Chapter 6: Air Quality (ES Volume I). the change in concentration at CTE2 is less than 0.02kg/ha/year and is considered to be negligible.

Table 6A.30: Nitrogen deposition pollutant concentrations ecological receptors

Receptor ID	2025 Baseline Annual Mean Nitrogen Deposition Concentration (kg/ha/year)	DS S1 Annual Mean Nitrogen Deposition Concentration (kg/ha/year)	Change in Nitrogen Deposition (kg/ha/year)	Change % of AQAL	Impact Descriptor
CTE1	20.8	20.9	0.07	0.9	Moderate

CTE2	20.7	20.8	0.02	0.2	Negligible
CTE3	21.6	21.8	0.21	2.1	Major

6A.6 Conclusion

- 6A.6.1 This report has assessed the impact on local air quality arising from the construction phases of the Proposed Developments in-combination. The assessment has used a sensitivity assessment methodology to assess the likelihood and scale of impact on sensitive receptors located in the vicinity of the Proposed Developments of the anticipated dust arising from the construction activities and associated road traffic.
- 6A.6.2 The evaluation of expected dust arising from the proposed construction works has shown that without mitigation, there could be a low risk of significant impacts due to dust emissions associated with the construction phase on human health and a low risk of significant impacts on the ecological receptors.
- 6A.6.3 The construction traffic modelling assessment has shown that changes in traffic as a result of the Proposed Developments cause a very small increase in traffic pollutants as human and ecological receptors. At human receptor locations, where background pollutant concentrations are below AQALs, the impact is described as negligible and therefore not significant. At ecological sites, the impact of change in NO_x concentrations due to the Proposed Development is small and the effect is considered to be negligible. For nitrogen deposition, however, despite the small change in concentration as a result of the Proposed Developments, the high baseline concentrations, which are more than double the AQAL mean that some of the impacts are described as major using the methodology outlined in Chapter 6: Air Quality (ES Volume I).
- 6A.6.4 As referred to earlier in Chapter 6: Air Quality (ES Volume I), the assumption that traffic flows used in this assessment will be at peak level for a year is conservative. Coupled with other conservative assumptions made for the Construction Traffic Assessment methodology, detailed in this document, predicted results presented are highly unlikely to be worse than in reality.
- 6A.6.5 As the existing nitrogen deposition already far exceeds the minimum critical load for this habitat, it is considered that additional nitrogen will have a limited effect as there is likely to already be ample nitrogen for more competitive plants to respond. Therefore, any botanical effect, while it might occur, is likely to be significantly less than it would be if background nitrogen deposition rates were lower. This is supported by Natural England commissioned report (NE 2016), Table 21 and Appendix 5 of which show that the scale of change in various parameters from adding a given dose of nitrogen is smaller when the existing deposition rates are higher.
- 6A.6.6 Further consideration of the potential effects of this increase in nitrogen deposition at these locations is provided in Chapter 13: Ecology and Biodiversity (ES Volume I).
- 6A.6.7 As the worst-case impacts of both Proposed Developments occurring at the same time can be demonstrated to be not significant, it is considered that the impacts of either Proposed Development proceeding in isolation, would also be not significant. Within the context of the current NLC Core Strategy document, these assessments have shown that the impact of the Proposed Developments on air quality does not pose a danger or create detrimental environmental conditions.

6A.7 References

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