Tillbridge Solar

# Tillbridge Solar Project

## EN010142

## Volume 6
## 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 an assessment of the likely significant effects on air quality as a result of the Tillbridge Solar Project (hereafter referred to as 'the Scheme'). For more details about the Scheme, refer to **Chapter 3: Scheme Description** of this Environmental Statement (ES) **[EN010142/APP/6.1]**.

6.1.2 The following aspects of air quality assessment have been scoped in and are presented within this chapter:

a. Dust risk assessment during construction;

b. Construction traffic assessment; and

c. Decommissioning assessment.

6.1.3 This chapter is supported by the following appendices of this ES:

a. **Appendix 6-1: Air Quality Legislation, Policy and Guidance [EN01042/APP/6.2]**;

b. **Appendix 6-2: Dust Risk Assessment [EN01042/APP/6.2]**; and

c. **Appendix 6-3: Air Quality Modelling [EN01042/APP/6.2]**.

6.1.4 This chapter is supported by the following figures of this ES:

a. **Figure 6-1: Air Quality Baseline Monitoring Locations and Receptors [EN010142/APP/6.3]**; and

b. **Figure 6-2: Dust Risk Assessment Zones [EN010142/APP/6.3]**.

## 6.2 Legislation and Planning Policy

6.2.1 **Appendix 6-1: Air Quality Legislation, Policy and Guidance** of this ES **[EN01042/APP/6.2]** identifies the legislation, policy, and guidance of relevance to the assessment of likely significant air quality effects of the Scheme.

## 6.3 Assessment Assumptions and Limitations

6.3.1 A dust risk assessment (DRA) (**Appendix 6-2: Dust Risk Assessment [EN01042/APP/6.2]**) has been undertaken on a whole-site basis, assuming site preparation and construction works can be undertaken at any location within the Order limits. A description of the intended works is included in **Chapter 3: Scheme Description** of this ES **[EN010142/APP/6.1]**. This provides a worst-case assessment, ensuring that if works are undertaken in a different location than anticipated, then the assessment has covered this potential.

6.3.2 In line with Institute of Air Quality Management (IAQM) guidance (Ref. 6-1), the presence of sensitive ecological receptors holding a National or European designation within 50m of the Order limits, or within 50m from a route used by construction vehicles on the public highway (up to 500m from the access points to the Order limits) have been reviewed. There is a designated Ancient Woodland 550m north of the Order limits, however, in line with IAQM guidance, as this is over 250m from the Order limits and over 500m from any Access Location, as indicated on **Figure 3-7: Access Locations [EN010142/APP/6.3]**, this can be scoped out of the dust risk assessment. As such ecological receptors are not considered further as part of this assessment. This approach was agreed by the Planning Inspectorate in the EIA Scoping Opinion, **Appendix 1-2: EIA Scoping Opinion** of this ES **[EN010142/APP/6.2]**

6.3.3 The assessment of operational traffic impacts has been scoped out as agreed by the Planning Inspectorate in the Environmental Impact Assessment (EIA) Scoping Opinion, **Appendix 1-2: EIA Scoping Opinion** of this ES **[EN010142/APP/6.2]**. During operation, as set out in **Chapter 16: Transport and Access** of the ES **[EN010142/APP/6.1]**, the Scheme is expected to support 10 to 12 staff on-site. In addition, there is anticipated to be an average of five visits per week (one trip per day) from four-wheel drive vehicles, heavy good vehicles (HGVs) or transit vans for maintenance. Traffic generation from operational staff is not expected to induce significant changes to traffic flows on the local road network. If full panel and Battery Energy Storage System (BESS) replacement is required at some point during the lifetime of the Scheme, activity would be considerably less intensive than during construction, and is anticipated to generate approximately 10% of the daily HGV/coach and car/LGV movements estimated to be generated during peak construction of the Principal Site and Cable Route Corridor. The operation of the Scheme does not involve any significant emissions of $NO_2$ or $PM_{10}$ on-site. As such no effects are anticipated due to the low number of vehicle movements anticipated to be required for operation and maintenance.

6.3.4 A construction period of 24 months has been assumed, starting in 2025 and concluding in 2027. Whilst construction of the Scheme may take longer (up to 36 months), a 24-month duration has been considered as the worst-case as it represents a scenario during which construction across the Scheme is undertaken concurrently and therefore the construction activity across the Scheme is most intense. This scenario also generates the highest peak in construction traffic, assumed to occur in 2026.

# 6.4 Assessment Methodology

6.4.1 There is currently no statutory guidance on the methodology for air quality assessments. Several non-statutory bodies have published their own guidance relating to air quality and development control. This assessment has been undertaken with consideration to the relevant guidance, including:

a. IAQM Guidance on the Assessment of Dust from Demolition and Construction (Ref. 6-1);

b. IAQM & Environmental Protection UK (EPUK) Land-Use Planning & Development Control: Planning for Air Quality (Ref. 6-2); and

c. Defra LAQM Technical Guidance (LAQM.TG22) (Ref. 6-3).

6.4.2 The current assessment criteria applicable to the protection of human health and Local Air Quality Management (LAQM) are outlined in the UK's Air Quality Strategy. Under the LAQM regime, local authorities have a duty to carry out regular assessments of air quality against the national air quality objective values and if it is unlikely that the objective values will be met in the given timescale, they must designate an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) with the aim of achieving the objective values. The boundary of an AQMA is set by the local authority to define the geographical area that is to be subject to the management measures to be set out in a subsequent action plan. It is not unusual for the boundary of an AQMA to include within it, relevant locations where air quality is not at risk of exceeding an objective value.

6.4.3 The objective values for the pollutants of relevance to this assessment are presented in **Table 6-1**.

**Table 6-1 National Air Quality Strategy Objective**

| Pollutant | Objective ($\mu g/m^3$) | Averaging Period | Not to be Exceeded More Than |
|---|---|---|---|
| Nitrogen dioxide ($NO_2$) | 40 | Annual | Not applicable |
| | 200 | 1-hour | 18 times per year (i.e. $99.79^{th}$ percentile) |
| Particulate matter ($PM_{10}$) | 40 | Annual | Not applicable |
| | 50 | 24-hour | 35 times per year (i.e. $90.4^{th}$ percentile) |
| Particulate matter ($PM_{2.5}$)[1] | 20 | Annual | Not applicable |

*Note 1: The air quality objective for $PM_{2.5}$ was amended to its 'Stage 2' value following the publication of 'The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020.*

# Dust Risk Assessment Methodology

6.4.4 Construction activities associated with the Scheme have the potential to generate dust emissions that could result in dust soiling and/or air quality impacts at nearby sensitive receptors. The main impacts that may occur due to construction phase activities are:

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

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

c. Elevated $PM_{10}$ concentrations as a result of dust-generating activities on site.

6.4.5 A qualitative construction dust assessment has been undertaken in with consideration to the IAQM guidance on the Assessment of Dust from Demolition and Construction (Ref. 6-1).

6.4.6 Activities on construction sites with the potential to generate dust and emissions can be categorised into four types of activities, which are:

a. Demolition – any activities associated with the removal of existing structures on site;
b. Earthworks – including the processes of soil-stripping, ground-levelling, excavation and landscaping;
c. Construction – any activities relating to the provision of new structures on site; and
d. Track-out – the transport of dust and dirt from the construction site onto the public road network where it may be deposited and resuspended by traffic using the network.

6.4.7 The potential for dust emissions has been assessed for each activity that is likely to take place. The guidance has been used to assess the risk and significance of any impacts associated with the construction phase and to identify appropriate mitigation measures to be adopted to reduce any potential impacts.

6.4.8 An assessment is required where a sensitive human or ecological receptor is located within 350m or 50m respectively from a site boundary and/or within 50m of the route(s) used by vehicles on a public highway, up to 500m from the site entrance(s). This represents the Study Area for the dust risk assessment.

6.4.9 Sensitive receptors for air quality are generally public exposure receptors (sensitive locations where relevant exposure for the air quality criteria being assessed could occur, e.g. residential properties or schools).

6.4.10 For the purposes of the dust risk assessment, potentially affected air quality sensitive receptors have been identified for the assessment through a review of Ordnance Survey (OS) mapping and aerial photography.

6.4.11 The access locations for the Principal Site are three points along the A631, and another access point on Middle Street. In addition, there will be four secondary accesses, two off School Lane and two off Common Lane. Two emergency accesses will also be included off Common Lane. There will be 24 access locations for Cable Route Corridor. Access locations for the Principal Site and Cable Route Corridor are described in further detail in **Chapter 3: Scheme Description** of this ES **[EN010142/APP/6.1]**.

6.4.12 The first step of the assessment is to assess the risk of dust impacts. This is undertaken separately for each of the four activities (demolition, earthworks, construction and trackout) and takes account of:

a. The scale and nature of the works, which determine the potential dust emission magnitude; and

b. The sensitivity of the area, which is dependent on the presence of sensitive receptors within certain distance bands of the Order limits, shown in **Figure 6-2: Dust Risk Assessment Zones [EN010142/APP/6.3]**.

6.4.13 The guidance assigns sensitivities to receptors with respect to dust soiling, human health, and ecological effects. These are set out in **Table 6-2, Table 6-3** and **Table 6-4**.

**Table 6-2 Receptor Sensitivity Descriptors with Respect to Dust Soiling**

| Sensitivity | Descriptor |
|---|---|
| High | • Locations where users can reasonably expect enjoyment of a high level of amenity; or<br>• Appearance, aesthetics or value of property would be diminished by soiling; or<br>• People / property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land<br>• e.g. residential dwellings, museums, medium/long-term car parks, car showrooms. |
| Medium | • Locations where users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or<br>• Appearance, aesthetics or value of property could be diminished by soiling; or<br>• People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work. |
| Low | • Enjoyment of amenity would not reasonably be expected; or<br>• Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or<br>• There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land e.g. playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads. |

**Table 6-3 Receptor Sensitivity Descriptors with Respect to Human Health Effects of Construction Related $PM_{10}$ Emissions (non-road traffic related)**

| Sensitivity | Descriptor |
|---|---|
| High | • Locations where members of the public are exposed over a time period relevant to the 24-hour objective for $PM_{10}$ (a relevant location would be where individuals may be exposed for 8 hours or more in a day). e.g. residential dwellings, schools, residential care homes. |
| Medium | • Locations where the people exposed are workers, and exposure is over a time period relevant to the 24-hour objective for $PM_{10}$ (a relevant location would be where individuals may be exposed for 8 hours or more in a day). e.g. office and shop workers, generally excludes workers occupationally exposed to $PM_{10}$, as protection is covered by Health and Safety at Work legislation. |
| Low | • Locations where human exposure is transient, e.g. public footpaths, playing fields, parks and shopping streets. |

**Table 6-4 Receptor Sensitivity Descriptors with Respect to Ecological Effects of Construction Related $PM_{10}$ Emissions (non-road traffic related)**

| Sensitivity | Descriptor |
|---|---|
| High | • Locations with an international or national designation and the designated features may be affected by dust soiling; or<br>• Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain. |
| Medium | • Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or<br>• Locations with a national designation where the features may be affected by dust deposition. |
| Low | • Locations with a local designation where the features may be affected by dust deposition. |

6.4.14 Representative Dust Receptor Locations are shown in **Table 6-5**. Dust receptor locations were chosen representing areas of residential properties. D4, D5 and D7 represent properties to the north of the Principal Site. D6 and D8 represent properties to the south of the Principal Site and D1, D2, D3, D9 and D10 represent properties along the south-west border of the Principal Site (from south to north). All receptors are located within 25m of the Order limits except for D5 at a distance of 230m. D1, D2, D3, D9 and D10 are representative of the Cable Route Corridor.

**Table 6-5 Representative Dust Receptor Locations**

| Receptor ID | X Coordinate | Y Coordinate | Description |
|---|---|---|---|
| D1 | 481899.7 | 380246 | Wells Lane Cottage, Cottam, Retford DN22 0EZ |
| D2 | 484164.1 | 381208.8 | 63 High Street, Marton, Gainsborough DN21 5AL |
| D3 | 488211.9 | 383059.4 | 2 Normanby Road, Gainsborough DN21 5LQ |
| D4 | 490887.9 | 390708.6 | Grange Cottage, Harpswell Lane, Hemswell DN21 5UP |
| D5 | 493483.7 | 389723 | Moat House, Common Lane, Harpswell DN21 5UW |
| D6 | 492013.9 | 387100 | Orchard House, Glentworth, Gainsborough DN21 5DP |
| D7 | 489286.3 | 390136.6 | 33 School Ln, Springthorpe, Gainsborough DN21 5TP |
| D8 | 488890.7 | 387300.4 | Cow Ln, Upton, Gainsborough DN21 5DT |
| D9 | 487757.3 | 384584.4 | 26 High Street, Willingham by Stow, Gainsborough DN21 5JZ |
| D10 | 490173.9 | 385127.8 | Ivy Cottage, Fillingham Lane, Willingham by Stow DN21 5LN |

6.4.15 The IAQM guidance requires that the level of significance is determined by the type of receptor that may be affected and on their distance from a site boundary. Receptors within set distance bands from the Order limits (<20m, 20–50m, 50-100m, 100-200m and 200-350m), illustrated in **Figure 6-2: Dust Risk Assessment Zones [EN010142/APP/6.3]**, are estimated and used to calculate the overall sensitivity of the area to dust soiling, human health and ecological effects.

6.4.16 For assessing the sensitivity of an area in terms of human health, the guidance requires that in addition to the number of high/medium/low sensitivity receptors within each distance band, consideration is also given to the existing background $PM_{10}$ concentration.

6.4.17 These factors are combined to give an estimate of the risk of dust impacts occurring. Risks are described in terms of there being a low, medium or high risk of dust impact for each of the four separate potential activities. To ensure good practice procedures are followed, standard IAQM “high risk” mitigation will be followed, with the requirement of additional site specific mitigation being assessed through the dust risk impacts.

6.4.18 The guidance sets the magnitude of effects dependent on the scale of works that is being undertaken with respect to the key activities, demolition, earthworks, construction, and track-out. For demolition, the magnitude is scaled based on guided building volumes, construction materials and the type and height of demolition activities. For earthworks, the magnitude is scaled based on guided applicable area size, soil type, the amount of heavy earth moving vehicles and stockpile sizes. For construction, the magnitude is scaled based on guided building volumes, and construction materials and methods. For trackout, the magnitude is scaled based on guided quantities of HDVs, surface materials and unpaved road lengths. Assessing receptor sensitivities and using the Order limits as the starting point to determine receptor distance measurements, a combined sensitivity for dust soiling, human health and ecological effects can be determined. Then for each construction activity, a risk level can be calculated from the sensitivity level and the potential dust emission magnitude.

6.4.19 Based on the threshold criteria and professional judgment, one or more of the groups of activities may be assigned a 'negligible' risk. Professional judgment is employed to examine the residual dust effects assuming mitigation is undertaken to determine significance.

6.4.20 The full Dust Risk Assessment is presented in **Appendix 6-2: Dust Risk Assessment** of this ES **[EN01042/APP/6.2]**.

6.4.21 Mitigation measures following IAQM guidance are discussed and presented in the **Framework Construction Environmental Management Plan (CEMP) [EN010142/APP/7.8]** submitted with the Development Consent Order (DCO) Application.

## Emissions of Non-Road Mobile Machinery

6.4.22 Emissions from construction Non-Road Mobile Machinery (NRMM) will have the potential to increase $NO_2$ and $PM_{10}$ concentrations locally when in use during construction. IAQM guidance (Ref. 6-1) states that:

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

6.4.23 This suggests that NRMM are unlikely to have a significant effect on local air quality and will not need to be quantitatively assessed. Emissions from

NRMM are controlled through EU legislation[1], and further controlled on-site through best-practice mitigation measures. The IAQM assessment approach already includes the use of NRMM to undertake earthworks and other construction activities and, therefore, these emissions have not been modelled separately nor are required to be considered in isolation within this assessment.

## Assessment of Construction Phase Road Traffic Emissions

6.4.24 The construction phase of the Scheme is likely to lead to an increase in the number of vehicles on the local highway network for the duration of the construction works.

6.4.25 The IAQM and EPUK Guidance on Land-Use Planning and Development Control (Ref. 6-2) states that an air quality assessment is required if the development will "*cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors*" or if the development will generate "*a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors*".

6.4.26 The indicative criteria to proceed with an assessment for LDVs:

*"A change of LDV flows of:*

a. *more than 100"* Average Annual Daily Total *(*AADT*)* traffic flows "*within or adjacent to an AQMA; or*

b. *more than 500 AADT elsewhere."*

6.4.27 The indicative criteria to proceed with an assessment for HDVs:

*"A change in HDV flows of:*

a. *more than 25 AADT within or adjacent to an AQMA; or*

b. *more than 100 AADT elsewhere."*

6.4.28 It is anticipated that as a worst case during the peak construction period, there could be up to a peak of 120 AADT of HDV (see **Chapter 16: Transport and Access** of this ES **[EN010142/APP/6.1]**). It is therefore likely that the average daily HDV volume will be above the 100 AADT screening criteria. As such a detailed assessment is required.

[1] Since 1 January 2021, the UK has operated a Provisional GB type approval scheme covering motor vehicles to be placed on the market in Great Britain. The Provisional GB scheme is a temporary arrangement intended to enable vehicles to be placed on the market in Great Britain for an interim period until a full GB type approval scheme is available for the vehicle categories in question. Provisional GB type approval applications for NRMM may be based on either EU or UNECE R96.05 type approvals (the United Nations equivalent of EU regulations on type approvals).

## Vehicle Emissions

6.4.29 The incomplete combustion of fuel in vehicle engines results in the presence of hydrocarbons (HC) such as benzene and 1,3-butadiene, and $SO_2$, carbon monoxide (CO), $PM_{10}$ and $PM_{2.5}$ in exhaust emissions. In addition, at the high temperatures and pressures found within vehicle engines, some of the nitrogen in the air and the fuel is oxidised to form $NO_x$, mainly in the form of nitric oxide (NO), which is then converted to $NO_2$ in the atmosphere. The principal pollutants of concern in terms of air quality at sensitive receptors in the vicinity of the Scheme are $NO_2$, $PM_{10}$ and $PM_{2.5}$, and are therefore the focus of this assessment.

6.4.30 This assessment follows current guidance for the determination of pollutant concentrations and uses emissions factors for road traffic calculated with the latest information as provided in Defra's Emissions Factors Toolkit (EFT) version 11.0 (Ref. 6-4).

## Traffic Data

6.4.31 An Automatic Traffic Count (ATC) survey was carried out by AECOM in July 2022. This data was utilised in the assessment, alongside traffic modelling. Further detail of the data are presented in **Appendix 6-3: Air Quality Modelling [EN01042/APP/6.2]**.

6.4.32 Traffic data was provided in the 24-hour AADT format for the following scenarios:

a. 2022 Baseline – 2022 traffic flows, for verification.

b. 2026 Do Minimum (DM) – 2026 traffic flows, without development traffic (Construction).

c. 2026 Do Something (DS) – 2026 traffic flows, including development traffic (Construction).

d. 2026 Cumulative - 2026 traffic flows, including development traffic (Construction) and cumulative developments traffic (Construction)

## Road Traffic Emission Receptors

6.4.33 Sensitive receptors for air quality are generally public exposure receptors (sensitive locations where relevant exposure for the air quality criteria being assessed could occur, e.g. residential properties or schools) sensitive to dust deposition and nitrogen deposition. Model outputs have been presented at individual representative receptor locations, as summarised in **Table 6-6**. Receptor locations were selected to represent worst case exposure and were chosen within 200m of the modelled road links. This represents the Study Area for the dispersion assessment. Further details of receptor locations can be found in **Appendix 6-3: Air Quality Modelling [EN01042/APP/6.2]**.

**Table 6-6 Representative Road Traffic Emissions Receptor Locations**

| Receptor ID | X Coordinate | Y Coordinate | Location Description |
|---|---|---|---|
| R14 | 484634.1 | 390624.8 | 17 Apley Close, Gainsborough DN21 1SQ |
| R9 | 491327.3 | 390473.3 | Low Farm Cottage, Harpswell, Gainsborough DN21 5UW |
| R7 | 493479.7 | 390086.7 | Heritage Farms, Harpswell, Gainsborough, DN21 5UX |
| R152 | 491062.3 | 385281.0 | Turpin Bungalow, Willingham Road, Gainsborough, DN21 5BJ |
| R55 | 495249.2 | 387607.6 | 4 Middle St, Glentworth, Gainsborough DN21 5BZ |
| R124 | 496624.8 | 390258.8 | The Cottage, Spatial in the Street, Market Rasen, LN8 2AU |
| R130 | 494871.5 | 379338.4 | 10 High St, Scampton, Lincoln LN1 2SE |
| R181 | 486684.9 | 381148.6 | White House, Till Bridge Lane, Stow Park, LN1 2AL |
| R107 | 481676.3 | 379774.0 | Floss Lane, Cottam, Retford, DN22 0EY |
| R66 | 492013.5 | 387100.1 | Orchard House, Glentworth, Gainsborough DN21 5DP |
| R63 | 488167.1 | 388364.8 | The Poplars, Heapham, Gainsborough DN21 5PT |
| R70 | 487041.7 | 386937.9 | 2 Lodge Ln, Upton, Gainsborough DN21 5NW |
| R79 | 487153.0 | 385694.3 | Tennyson House, Kexby, Gainsborough DN21 5ND |
| R42 | 483002.3 | 386641.6 | 3a Anderson Way, Lea, Gainsborough DN21 5EF |
| R43 | 482955.4 | 384754.0 | Knaith Hill, Knaith, Gainsborough DN21 5PF |
| R84 | 483825.7 | 382540.0 | 4 Gainsborough Road, Gate Burton, DN21 5BB |

## Dispersion Model Input Data and Conditions

6.4.34 This assessment has used the dispersion model software 'ADMS-Roads' version 5.0.0.1 to quantify 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 and verification studies (Ref. 6-5).

6.4.35 Further details of general model conditions set up in ADMS-Roads are provided in **Appendix 6-3: Air Quality Modelling [EN01042/APP/6.2]**.

## Meteorological Data

6.4.36 One year (2022) of hourly sequential observation data from Humberside meteorological station has been used in the roads modelling assessment. 2022 data has been used to correspond with the model verification year. The station is located approximately 26km northeast of the Order limits and experiences meteorological conditions that are representative of the Principal Site.

6.4.37 Further details of the meteorological data are provided in **Appendix 6-3: Air Quality Modelling [EN01042/APP/6.2]**.

## Model Verification

6.4.38 Predicted results from an air quality dispersion model may differ from measured concentrations for a number of reasons, including uncertainties associated with traffic flows and emissions factors, meteorology and limitations inherent to the modelling software. In light of this, and in accordance with advice in LAQM.TG(22) (Ref. 6-4), for roads-based air quality assessments, it is best-practice to perform a comparison of modelled results with local monitoring data to minimise these modelling uncertainties. This provides a verification factor, by which the output of the ADMS-Roads model is adjusted, to gain greater confidence in the final results. The verification of the modelling output was carried out as prescribed in LAQM.TG(22).

6.4.39 The modelling has been verified against the site-specific diffusion tube monitoring undertaken by AECOM in 2022 following the methodology set out in LAQM.TG(22). Further details are provided in **Appendix 6-3: Air Quality Modelling [EN01042/APP/6.2]**.

## Exceedance of the $PM_{10}$ 24-hour Mean Objective

6.4.40 The guidance document LAQM.TG(22) sets out the method by which the number of days in which the $PM_{10}$ 24-hour objective is exceeded can be obtained based on a relationship with the predicted $PM_{10}$ annual mean concentration. As such, the formula used within this assessment is:

No. of Exceedances = 0.0014 * $C^3$ + 206/C - 18.5

Where C is the annual mean concentration of $PM_{10}$.

6.4.41 An annual mean $PM_{10}$ concentration of 32µg/$m^3$ is, therefore, broadly equivalent to 35 days of exceedance; and as such, if the predicted annual mean is less than 32µg/$m^3$ the short-term (daily) $PM_{10}$ AQS objective can be considered to have been achieved.

## Exceedance of the Short Term $NO_2$ Objective

6.4.42 Research projects completed on behalf of Defra and the Devolved Administrations, have concluded that the hourly mean $NO_2$ objective is unlikely to be exceeded if annual mean concentrations are predicted to be less the 60µg/$m^3$. In 2003, Laxen and Marner (Ref. 6-6) 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 60µg/$m^3$ and above."*

6.4.43 The findings presented by Laxen and Marner are further supported by AEA Technology (Ref. 6-6) 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 60µg/$m^3$ $NO_2$ as the trigger for considering a likely exceedance of the hourly mean nitrogen dioxide objective."*

6.4.44 This means that where predicted concentrations are below 60µg/$m^3$, it can be concluded that the hourly mean $NO_2$ objective (200µg/$m^3$ $NO_2$ not more than 18 times per year) will likely be achieved.

## Method for the Assessment of Significance

## Air Quality Effects Descriptors

6.4.45 The potential change in pollutant concentrations relative to the baseline concentrations attributable to road traffic emissions has been described at receptors that are representative of exposure to impacts on local air quality within the Study Area (350m from the Order limits for the Dust Risk Assessment and 200m from the modelled road links for the traffic assessment). The assessment also presents the total concentration of the assessed pollutants, in order to identify the risk of the air quality objective values being exceeded.

6.4.46 For consideration of a change in annual mean concentration of a given magnitude, the EPUK and IAQM have published recommendations for describing the effects of such impacts at individual receptors as set out in **Table 6-7** and **Table 6-8**.

**Table 6-7 Effects Descriptors at Individual Receptors – Annual Mean $NO_2$ and $PM_{10}$.**

| Annual Mean Concentration at Receptor in Assessment Year | | Change in Concentration Relative to Air Quality Assessment Level (AQAL)[a] | | | | |
|---|---|---|---|---|---|---|
| | | 0% | 1% | 2% – 5% | 6% – 10% | > 10% |
| As % of AQAL | $NO_2$ / $PM_{10}$ (µg/m$^3$)[b] | <0.2µg/m$^3$ | 0.2 – <0.6µg/m$^3$ | 0.6 – <2.2µg/m$^3$ | 2.2 – ≤4.0µg/m$^3$ | >4.0µg/m$^3$ |
| ≤75% | ≤30.2 | Negligible | Negligible | Negligible | Slight | Moderate |
| 76% - 94% | 30.2 – 37.8 | Negligible | Negligible | Slight | Moderate | Moderate |
| 95% - 102% | 37.8 – 41.0 | Negligible | Slight | Moderate | Moderate | Substantial |
| 103% - 109% | 41.0 – 43.8 | Negligible | Moderate | Moderate | Substantial | Substantial |
| ≥110% | ≥43.8 | Negligible | Moderate | Substantial | Substantial | Substantial |

*Notes:*

*[a] The percentage change in pollutant concentration is calculated and rounded to the nearest whole number to make it clearer which column the impacts fall within. Changes of less than 0.5% are rounded down to zero and therefore described as negligible.*

*[b] Concentrations quoted were obtained from EPUK/IAQM (Ref. 6-2)*

**Table 6-8 Effects Descriptors at Individual Receptors – Annual Mean $PM_{2.5}$**

| Mean Concentration at Receptor in Assessment Year | Change in Annual Mean Concentration of $PM_{2.5}$ (µg/m$^3$) and Percentage (%) as a Proportion of the AQS Objective | | | | |
|---|---|---|---|---|---|
| | 0% | 1% | 2% – 5% | 6% – 10% | > 10% |
| As % of AQAL | <0.1µg/m$^3$ | 1.4– <0.4µg/m$^3$ | 0.4 – <1.4µg/m$^3$ | 1.4 – ≤2.5µg/m$^3$ | >2.5µg/m$^3$ |
| ≤75% | Negligible | Negligible | Negligible | Slight | Moderate |
| 76% - 94% | Negligible | Negligible | Slight | Moderate | Moderate |
| 95% - 102% | Negligible | Slight | Moderate | Moderate | Substantial |
| 103% - 109% | Negligible | Moderate | Moderate | Substantial | Substantial |
| ≥110% | Negligible | Moderate | Substantial | Substantial | Substantial |

6.4.47 A change in predicted annual mean concentrations of $NO_2$ or $PM_{10}$ of less than 0.2µg/$m^3$ is considered to be so small as to be imperceptible. Concentrations that are 11% - 21%, 21% - 50% and greater than 50% of the objectives have small, moderate or large impacts, respectively. A change (impact) that is imperceptible, 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.

6.4.48 All of the relevant receptors have been selected to represent locations where people are likely to be present. The air quality objective values have been set at concentrations that provide protection to all members of society, including more vulnerable groups such as the very young, elderly or unwell. As such the sensitivity of receptors was considered in the definition of the air quality objective values, and, therefore, no additional subdivision of human health receptors on the basis of building or location type is necessary.

**Significance of effects**

6.4.49 The significance of the reported effects is then considered for the Scheme in overall terms. The potential for the Scheme to contribute to or interfere with the successful implementation of policies and strategies for the management of local air quality are considered, if relevant, however the principal focus is any change to the likelihood of future achievement of the AQS objective values for $NO_2$, $PM_{10}$ and $PM_{2.5}$.

6.4.50 The achievement of local authority goals for local air quality management are directly linked to the achievement of the air quality objective values described above, and as such, this assessment focuses on the likelihood of achievement of these objectives as a result of the Scheme.

6.4.51 In terms of the significance of any adverse impacts, an effect is reported as being either ‘not significant’ or as being ‘significant’. If the overall effect of the Scheme on local air quality or on amenity is found to be ‘moderate’ or ‘substantial’ this is deemed to be ‘significant’. Effects found to be ‘slight’ are considered to be ‘not significant’, although they may be a matter of local concern. ‘Negligible’ effects are considered to be ‘not significant’.

6.4.52 Where a single development can be judged in isolation, it is likely that a ‘moderate’ or ‘substantial’ impact will give rise to a significant effect and a ‘negligible’ or ‘slight’ impact will not have a significant effect, but such judgements are always more likely to be valid at the two extremes of impact severity. An exceedance of the objective / limit value is likely to be considered significant.

6.4.53 The EPUK/IAQM guidance notes that overall significance is determined using professional judgement and should consider:

a. The existing and future air quality in the absence of the Scheme.

b. The extent of current and future population exposure to any air quality impacts associated with the Scheme; and

c. The influence and validity of any assumptions made in the assessment approach including the cumulative effects arising from other committed developments in the Study Area.

## Decommissioning Assessment

6.4.54 The duration of, and operations required for, decommissioning are similar to those required for construction and consequently the effects of decommissioning are usually similar to, or of a lesser magnitude than, construction effects. Therefore, the preliminary assessment of construction phase effects on air quality also represents the likely significant effects which would be experienced at decommissioning. It should be noted that prior to decommissioning, there will likely be a requirement for a dust risk assessment and dust management plan to be agreed with the planning authority prior to any works taking place. However, due to the estimated lifespan of the Scheme the process may be different.

## Sources of Information

### Desktop Review

6.4.55 Sources of information consulted include:

a. The Order limits as shown in **Figure 6-1: Air Quality Baseline Monitoring Locations and Receptors** of this ES **[EN010142/APP/6.3]**;

b. Review of Defra Air Quality Background Concentration Maps (Ref. 6-8); and

c. Examination of Local Authority Review and Assessment Reports (Ref. 6-9).

### Field Survey

6.4.56 A three-month nitrogen dioxide ($NO_2$) diffusion tube monitoring survey was undertaken at nine roadside sites (refer to **Figure 6-1: Air Quality Baseline Monitoring Locations and Receptors** of this ES **[EN010142/APP/6.3]**) in the vicinity of the Principal Site in 2022. The monitoring results are presented in this chapter to establish baseline pollutant concentrations. However, it should be noted, locations have been selected on the basis of their suitability for model verification of the dispersion model rather than purely the consideration of public exposure.

# 6.5 Stakeholder Engagement

6.5.1 A request for an EIA Scoping Opinion, **Appendix 1-2: EIA Scoping Opinion** of this ES **[EN010142/APP/6.2]**, was sought from the Secretary of State through the Planning Inspectorate in 2022 as part of the EIA Scoping Process. A summary of consultation responses in relation to air quality are presented in **Table 6-9**.

**Table 6-9 Main matters raised through the Scoping Opinion**

| Consultee | Summary of Scoping Opinion made by Planning Inspectorate | How has the matter been addressed? | Location of response in the chapter |
|---|---|---|---|
| Planning Inspectorate | The Applicant proposes to scope out an assessment of plant related emissions on the basis that the scale of construction required and number of plant vehicles means that the anticipated emissions would represent a small source relative to ambient local conditions. However, a qualitative construction phase dust assessment and a CEMP taking account of Institute of Air Quality Management (IAQM) guidance are proposed... | The ES has included a qualitative dust risk assessment following IAQM Guidance and set out proposed mitigation measures to be considered in a CEMP for a high-risk site. | This is presented in Dust Risk Assessment in **Section 6.8** of this chapter.<br>Embedded mitigation is presented in **Section 6.7** of this chapter.<br>Further information can be found within **Appendix 6-2: Dust Risk Assessment of this ES [EN010142/APP/6.2]**. |
| Planning Inspectorate | Paragraph 3.58 of the Scoping Report states that at this stage of the application process, the anticipated peak construction period will give rise to 64 to 66 HGV deliveries per day as a worst case based on a 24-month construction period. On the basis that the predicted HGV movements of the project alone do not exceed the 200 HGV per day thresholds set out in guidance, the Inspectorate is content to scope this matter out from further quantitative assessment. The ES | As requested by PINS, up to date estimates of construction road traffic movements were undertaken. These are above the IAQM screening threshold, and therefore a quantitative assessment of construction traffic has been undertaken. This is in line with the Scoping Report. | The assessment is presented within **Section 6.8** of this chapter.<br>Further information can be found within **Appendix 6-3: Air Quality Modelling** of the ES **[EN010142/APP/6.2]**. |

| Consultee | Summary of Scoping Opinion made by Planning Inspectorate | How has the matter been addressed? | Location of response in the chapter |
|---|---|---|---|
| | must provide up to date information on the anticipated construction programme and the predicted number of HGV movements to confirm that the thresholds are not exceeded.<br>In light of other proposed developments within the area, the ES must also demonstrate that the thresholds for further assessment are not exceeded cumulatively on relevant links. | | |
| Planning Inspectorate | The Applicant proposes to scope out air quality impacts associated with the operational phase on the basis that traffic movements would be minimal, limited to maintenance activities and infrequent heavier traffic movements associated with repairs or replacements of infrastructure.<br>Paragraph 3.64 of the Scoping Report states that there would be a maximum of 10 to 12 staff on-site daily for monitoring, maintenance, and servicing activities during the operational phase and an average of 10 to 20 visits per year with four- | Operational traffic generated by the Scheme will be so small that the emissions to air will be negligible. The contribution of the Scheme to any cumulative air quality effects during the operational phase would be limited, due to the minimal contribution of the Scheme and other developments to road traffic emissions during operation. | Confirmation of the scoping out of operational traffic is noted above at **Section 6.4** of this chapter. Cumulative effects are considered in **Chapter 18: Cumulative Effects and Interactions** of the ES **[EN010142/APP/6.1].** |

| Consultee | Summary of Scoping Opinion made by Planning Inspectorate | How has the matter been addressed? | Location of response in the chapter |
|---|---|---|---|
| | wheel drive vehicles, HGVs, or transit vans for maintenance.<br>Based on the characteristics of the operational phase of the Proposed Development the Inspectorate is content that minimal traffic movements would occur during operation. The ES must however provide information on the cumulative nature of traffic movements during the operational phases and confirm these projections fall below the relevant thresholds set out in guidance. On this basis, the Inspectorate is content to scope this matter out. | | |
| Planning Inspectorate | The ES should be accompanied by a plan showing the location of sensitive air quality receptors within the vicinity of the Proposed Development to aid understanding of the extent of effects. | **Figure 6-1: Air Quality Baseline Monitoring Locations and Receptors [EN010142/APP/6.3]**; and **Figure 6-2: Dust Risk Assessment Zones [EN010142/APP/6.3]** show the monitoring sites around the Study Area, modelled sensitive air quality receptors and dust risk assessment zones. | Figures are presented in **Appendix 6-3: Air Quality Modelling [EN01042/APP/6.2]**. |
| Planning Inspectorate | The Scoping Report makes reference to information about existing air quality levels that is available from local authority monitoring | Diffusion tube monitoring for nitrogen dioxide has been undertaken as there was no local authority monitoring in the vicinity of the Principal Site. Locations were selected for | This is presented in **Sections 6.6** and **6.8** of this chapter. |

| Consultee | Summary of Scoping Opinion made by Planning Inspectorate | How has the matter been addressed? | Location of response in the chapter |
|---|---|---|---|
| | programmes, primarily for nitrogen dioxide ($NO_2$). Paragraph 7.26 confirms that in the absence of monitoring near the scheme and in accordance with the Local Air Quality Management (LAQM) Technical Guidance, nitrogen dioxide diffusion tubes are currently being undertaken in the vicinity of the Proposed Development for a period of three months in order to verify the model. Effort should be made to reach agreement with the local authorities as to the location and number of the diffusion tubes. Agreement must also be sought with these bodies as to whether any further monitoring is required to provide a baseline for other pollutants. | model verification purposes and used a very restricted number of locations that met technical requirements and could be accessed safely. The locations were not agreed in advance with stakeholders due to a lack of viable alternatives. The locations and the use of the data for dispersion verification is included in full within the assessment. Modelling has been used to determine the current and future baseline concentrations and the change at sensitive receptors. | |
| Planning Inspectorate | The Inspectorate notes that there is potential for air quality impacts on designated nature conservation sites (as noted in paragraph 10.34 of the Scoping Report). Baseline information from the Air Pollution Information System (APIS) may also be of relevance to the assessment. | Paragraph 10.34 within the ecology section of the EIA Scoping Report identified dust deposition as a potential impact within a list of generic examples. The potential for dust deposition effects is considered in more detail at paragraph 7.36 of the EIA Scoping Report. The dust risk assessment in this chapter considers ecological sites. Further consideration of the potential effects associated with the findings of the dust risk | **Section 6.4** of this chapter identifies criteria relevant to ecological receptors.<br>**Chapter 9: Ecology and Nature Conservation** of the ES **[EN01042/APP/6.1]** |

| Consultee | Summary of Scoping Opinion made by Planning Inspectorate | How has the matter been addressed? | Location of response in the chapter |
|---|---|---|---|
| | Paragraph 7.36 of the Scoping Report states that ecological sites, apart from some areas of ancient woodland, are not considered sensitive receptors due to their distance from the Proposed Development. However, paragraph 10.34 of the Scoping Report lists degradation due to dust deposition as a potential impact on ecological sites. As such there is inconsistency across the different chapters of the Scoping Report and it is unclear whether air quality impacts on ecological receptors will be assessed.<br>For the avoidance of doubt, the ES should assess the potential for likely significant effects relating to air quality on ecological receptors. The Applicant should seek agreement on the sensitive receptors from relevant consultation bodies. | assessment on ecological receptors is discussed within **Chapter 9: Ecology and Nature Conservation** of the ES **[EN01042/APP/6.1].**<br>The nearest ecological site (an ancient woodland) is more than 500m from the Order limits of access locations and, therefore emissions would have become too dilute to cause significant effects. There were also no sensitive ecological receptors within 50m of the routes used by vehicles on a public highway. It can therefore be concluded with confidence that the Scheme is not capable of having a significant effect at any ecological sites without the need for more detailed assessment.<br><br>No comments on the air quality assessment of ecological receptors were received during subsequent stages of consultation from the relevant body (Natural England). | |

6.5.2 Further consultation in response to formal pre-application engagement was undertaken through the Preliminary Environmental Information Report (PEIR). **Table 6-10** outlines the statutory consultation responses relating to Air Quality and how these have been addressed through the ES. No additional comments were received during the subsequent round of targeted consultation.

**Table 6-10 Main matters raised through the Statutory Consultation.**

| Consultee | Summary of main matter raised | How has the matter been addressed? | Location of response in the chapter |
|---|---|---|---|
| Stow Parish Council | Stow Parish Council requested information relating to the agreed locations for the monitoring of Nitrogen Dioxide pollutants that had been carried out and queried whether any other pollutants had been monitored. | Diffusion tube monitoring for nitrogen dioxide has been undertaken as there was no local authority monitoring in the vicinity of the Principal Site. Locations were selected for model verification purposes and used a very restricted number of locations that met technical requirements and could be accessed safely. The locations were not agreed in advance with stakeholders due to a lack of viable alternatives. The locations and the use of the data for dispersion verification is included in full within the assessment. Modelling has been used to determine the current and future baseline concentrations and the change at sensitive receptors. | This is presented in **Sections 6.6 and 6.8** of this chapter. |
| Stow Parish Council | Stow Parish Council requested further information relating to the location and timings of the baseline monitoring. | Nitrogen dioxide monitoring has been undertaken. Monitoring results including locations and timings are presented in this chapter. | This is presented in **Section 6.6** of this chapter. |
| Stow Parish Council | Stow Parish Council requested further information regarding mitigation measures that will be implemented regarding air pollution and dust. | Section 6.7 of this chapter sets out the embedded mitigation measures that are to be taken forward into the Construction Environmental Management Plan (CEMP) in respect of air pollutions and dust. These are based on IAQM guidance (Ref. 6-1). | This is presented in **Section 6.7** of this chapter. |

# 6.6 Baseline Conditions

## Existing Baseline

6.6.1 There are no AQMAs declared in West Lindsey District Council or Bassetlaw District Council. Concentrations of $NO_2$ and $PM_{10}$ are considered to meet the UK objectives across the districts, which is rural with no large conurbations.

6.6.2 West Lindsey District Council undertakes routine ongoing monitoring of $NO_2$ as part of their LAQM responsibilities under Part IV of the Environment Act 1995 (Ref. 6-10 at 12 locations in the district. All monitoring sites have recorded concentrations below the annual mean objective value of 40 micrograms per cubic metre ($\mu g/m^3$) since monitoring began (Ref. 6-9). These monitoring locations are all in Gainsborough (approximately 5km west of the Principal Site) and Market Rasen (approximately 15km east of the Principal Site).

6.6.3 Bassetlaw District Council also conducts routine monitoring of $NO_2$ via a network of 23 diffusion tube monitoring sites as part of their LAQM responsibilities (Ref. 6-11). All monitoring sites have recorded concentrations below the annual mean $NO_2$ objective from 2015 to 2019, with no data currently available on the Council's website after this date. Bassetlaw's monitoring locations are primarily in Worksop, Retford, Harworth and Tuxford. The nearest monitoring location is approximately 4km south of the Cable Route Corridor, and 15km south-west of the Principal Site. Whilst these sites are not located within the Study Area, they are included for reference.

6.6.4 As no monitoring data was available within the Study Area, a three-month $NO_2$ diffusion tube monitoring survey was undertaken at nine roadside sites in the vicinity of the Scheme in 2022. The location of these monitoring locations is presented in **Figure 6-1: Air Quality Baseline Monitoring Locations and Receptors** of this ES **[EN010142/APP/6.3]**. These short-term monitoring results have been adjusted following guidance in LAQM.TG (22) (Ref. 6-3) to produce annual mean 2021 equivalent concentration as presented in **Table 6-11** Results are presented here to establish baseline pollutant concentrations. However, it should be noted, locations have been selected on the basis of their suitability for model verification (due to the lack of appropriate monitoring sites) rather than to consider public exposure.

**Table 6-11 AECOM Measured Annual Mean $NO_2$ Concentrations**

| Site ID | OS Grid Ref (Northing, Easting,) | Site Type | Annualised 2022 Mean $NO_2$ Concentration ($\mu g/m^3$) |
|---|---|---|---|
| M1 | 487347.2, 391010.7 | Roadside | 11.9 |
| M2 | 489370.2, 390796.0 | Roadside | 9.9 |
| M3 | 493786.3, 389987.3 | Roadside | 15.4 |
| M4 | 496687.3, 389530.0 | Roadside | 27.8 |

| Site ID | OS Grid Ref (Northing, Easting,) | Site Type | Annualised 2022 Mean $NO_2$ Concentration (µg/m$^3$) |
|---|---|---|---|
| A14 | 493992.3, 387583.5 | Roadside | 8.8 |
| A15 | 494977.8, 388227.4 | Roadside | 19.3 |
| A16 | 495330.7, 387362.7 | Roadside | 11.2 |
| A17 | 495233.0, 385865.1 | Roadside | 8.5 |
| A18 | 495604.9, 384841.2 | Roadside | 11.6 |

6.6.5 Annual mean $NO_2$ concentrations for 2022 at monitoring sites within the vicinity of the Order limits are all below the annual mean $NO_2$ objective of 40µg/m$^3$. Concentrations range from 8.5µg/m$^3$ to 27.8µg/m$^3$. The highest annual mean $NO_2$ concentration was recorded at M4, located near the Caenby Corner roundabout, approximately 2.5km east of the Principal Site.

## Background Pollutant Concentrations

6.6.6 To determine the background pollutant concentrations, explicit local emission sources and indeterminate sources must be considered. The total concentration of a pollutant comprises those contributions from explicit local emission sources such as roads, chimney-stacks, etc., and those that are transported into an area from indeterminate sources (e.g. by wind from further away). If all the explicit local sources were removed, all that would remain is that which comes from indeterminate sources; it is this component that is called ‘background’. A good understanding of background concentrations is important when completing air quality assessments as it allows for a good understanding of local pollutant sources.

6.6.7 Background data for the relevant 1km x 1km grid squares (related to the Study Area) has been sourced from Defra Background Maps for 2022, in line with the assessment baseline year. Concentrations are below the relevant air quality objectives across all grid squares which encompass the Scheme, as shown in **Table 6-12**.

**Table 6-12 Defra Mapped Background Pollutant Concentrations for 2022**

| | Annual Mean Concentration (µg/m$^3$) | | | |
|---|---|---|---|---|
| **OS Grid Ref (Northing, Easting,)** | **$NO_x$** | **$NO_2$** | **$PM_{10}$** | **$PM_{2.5}$** |
| 488500, 390500 | 7.2 | 9.2 | 15.6 | 8.4 |
| 489500, 390500 | 7.1 | 9.1 | 15.6 | 8.4 |
| 490500, 390500 | 9.0 | 7.0 | 15.5 | 8.4 |
| 491500, 390500 | 9.0 | 7.0 | 15.5 | 8.4 |
| 488500, 389500 | 8.5 | 6.6 | 15.3 | 8.3 |
| 489500, 389500 | 8.4 | 6.6 | 15.3 | 8.2 |
| 490500, 389500 | 8.6 | 6.7 | 15.3 | 8.3 |
| 491500, 389500 | 8.5 | 6.7 | 15.3 | 8.3 |
| 488500, 388500 | 8.4 | 6.6 | 15.3 | 8.3 |
| 489500, 388500 | 8.4 | 6.5 | 15.3 | 8.2 |
| 490500, 388500 | 8.5 | 6.7 | 15.3 | 8.3 |
| 491500, 388500 | 8.5 | 6.6 | 15.3 | 8.3 |
| 488500, 387500 | 8.4 | 6.6 | 15.3 | 8.3 |
| 489500, 387500 | 8.3 | 6.5 | 15.3 | 8.2 |
| 490500, 387500 | 8.5 | 6.7 | 15.3 | 8.3 |
| 491500, 387500 | 8.5 | 6.6 | 15.3 | 8.3 |
| 488500, 386500 | 8.4 | 6.6 | 15.3 | 8.3 |
| 489500, 386500 | 8.4 | 6.5 | 15.3 | 8.2 |
| 490500, 386500 | 8.5 | 6.7 | 15.3 | 8.3 |
| 491500, 386500 | 8.5 | 6.6 | 15.3 | 8.3 |
| Average | 8.5 | 6.7 | 15.3 | 8.3 |

## Baseline Dust Climate

6.6.8 A background level of dust exists in all urban and rural locations in the UK. Dust can be generated on a local scale from vehicle movements and from the action of wind on exposed soils and surfaces. Dust levels can be affected by long range transport of dust from distant sources into the local vicinity.

6.6.9 This baseline rate of soiling is considered normal (based on professional judgement and current background levels) and varies dependent on prevailing climatic conditions. The tolerance of individuals to deposited dust is therefore shaped by their experience of baseline conditions.

6.6.10 Existing local sources of particulate matter includes wind-blown dust from exhaust emissions from energy plant and road vehicles, brake and tyre wear from road vehicles and the long-range transport of material from outside the Study Area.

## Future Baseline

6.6.11 In the future, based on projections, it is anticipated that local air quality will improve as emissions continue to decline due to improvements in the vehicle fleet and a reduction in background pollution levels. Future projections by Defra for the construction year 2026 are in **Table 6-13** which shows all pollutants are expected to be below relevant objectives.

**Table 6-13 Defra Mapped Background Pollutant Concentrations for 2026**

| | Annual Mean Concentration (µg/m$^3$) | | | |
|---|---|---|---|---|
| **OS Grid Ref (Northing, Easting,)** | **$NO_2$** | **$NO_x$** | **$PM_{10}$** | **$PM_{2.5}$** |
| 488500, 390500 | 7.9 | 6.2 | 15.0 | 8.0 |
| 489500, 390500 | 7.9 | 6.2 | 15.0 | 8.0 |
| 490500, 390500 | 8.0 | 6.3 | 15.0 | 8.0 |
| 491500, 390500 | 8.0 | 6.3 | 15.0 | 8.0 |
| 488500, 389500 | 7.6 | 6.0 | 14.9 | 7.9 |
| 489500, 389500 | 7.6 | 6.0 | 14.8 | 7.9 |
| 490500, 389500 | 7.7 | 6.1 | 14.9 | 7.9 |
| 491500, 389500 | 7.7 | 6.0 | 14.9 | 7.9 |
| 488500, 388500 | 7.6 | 6.0 | 14.8 | 7.9 |
| 489500, 388500 | 7.5 | 5.9 | 14.8 | 7.9 |
| 490500, 388500 | 7.7 | 6.0 | 14.9 | 7.9 |
| 491500, 388500 | 7.6 | 6.0 | 14.9 | 7.9 |
| 488500, 387500 | 7.6 | 6.0 | 14.9 | 7.9 |
| 489500, 387500 | 7.5 | 5.9 | 14.8 | 7.9 |
| 490500, 387500 | 7.7 | 6.0 | 14.9 | 7.9 |
| 491500, 387500 | 7.6 | 6.0 | 14.9 | 7.9 |
| 488500, 386500 | 7.6 | 6.0 | 14.9 | 7.9 |
| 489500, 386500 | 7.5 | 5.9 | 14.8 | 7.9 |
| 490500, 386500 | 7.7 | 6.1 | 14.9 | 7.9 |
| 491500, 386500 | 7.7 | 6.0 | 14.9 | 7.9 |

| | Annual Mean Concentration (µg/m$^3$) | | | |
|---|---|---|---|---|
| **OS Grid Ref (Northing, Easting,)** | **$NO_2$** | **$NO_x$** | **$PM_{10}$** | **$PM_{2.5}$** |
| Average | 7.7 | 6.0 | 14.9 | 7.9 |

# 6.7 Embedded Mitigation

6.7.1 This section contains the mitigation measures relevant to this chapter that are already incorporated into management plans submitted with the DCO Application. These measures will be secured through the **Framework CEMP [EN010142/APP/7.8]** and the **Framework DEMP [EN010142/APP/7.10]**.

6.7.2 Mitigation measures appropriate to the assessed level of risk of dust nuisance (high, see Section 6.8) will be implemented. Recommended measures are set out below in **Table 6-14** and **Table 6-15** and are included within the **Framework CEMP [EN010142/APP/7.8]** the **Framework DEMP [EN010142/APP/7.10]**. These are considered to be embedded mitigation as they are required in order to ensure no off-site impacts from dust.

6.7.3 Decommissioning is assumed to generate similar effects to those anticipated during the construction phase, and therefore the mitigation measures proposed for implementation during the construction phase will be appropriate for application to decommissioning.

**Table 6-14 Mitigation for a High-Risk Site (adapted from IAQM, Ref. 6-1)**

| Activity | Mitigation Measure |
|---|---|
| Communications | Develop and implement a stakeholder communications plan that includes community engagement before work commences on-site. |
| | Display the name and contact details of person(s) accountable for air quality and dust issues on the Scheme. This may be the environment manager/engineer or the site manager. |
| | Display the head or regional office contact information. |
| | Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, real-time $PM_{10}$ continuous monitoring and/or visual inspections. |
| Site Management | Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. |
| | Make the complaints log available to the local authority when asked. |
| | Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook. |
| | Hold regular liaison meetings with other high-risk construction sites within 500m of the Scheme (or greater, if applicable), 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. |
| Monitoring | Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of Scheme, with cleaning to be provided if necessary. |
| | 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. |

| Activity | Mitigation Measure |
|---|---|
| | 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. |
| | Agree approach to monitoring with the Local Authority ahead of construction commencing. Data will be collected before any work commences on-site to provide a comparative baseline should real-time airborne particulate or dust deposition monitoring be required. |
| Preparing and Maintaining the Site | Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. |
| | Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period where operations are within 100m of receptors. |
| | Avoid site runoff of water or mud. |
| | Keep site fencing, barriers and scaffolding clean using wet methods. |
| | Remove materials that have a potential to produce dust from the Order limits as soon as possible, unless being re-used on-site. If they are being re-used on-site cover as described below |
| Operating vehicle/machinery and sustainable travel* | Ensure all vehicles switch off engines when stationary - no idling vehicles. |
| | Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. |
| | Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph 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). |
| | Produce a Construction Traffic Management Plan to manage the sustainable delivery of goods and materials. |
| | Implement an integrated Travel Plan within the Traffic Management Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing). |

| Activity | Mitigation Measure |
|---|---|
| Operations | 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. |
| | Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water from temporary water tanks where practicable and appropriate. |
| | 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. |
| Waste Management | Burning of waste or unwanted materials will not be permitted on site. |

**Table 6-15. Activity-Specific Mitigation Measures**

| Activity | Embedded Dust Good Practice Measures |
|---|---|
| Earthworks | Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. |
| | Use Hessian, mulches or tackifiers where it is not practicable to re-vegetate or cover with topsoil, as soon as practicable. |
| | Only remove the cover in small areas during work and not all at once. |
| Construction | Avoid scabbling (roughening of concrete surfaces) where practicable. |
| | 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. |
| | 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. |
| | For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust. |
| Trackout | Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. |
| | Avoid dry sweeping of large areas. |
| | Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. |
| | Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. |
| | Record all inspections of haul routes and any subsequent action in a site logbook. |
| | Implement temporary matt covered haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers (sourced via water from the temporary water tanks) and regularly cleaned. |

| Activity | Embedded Dust Good Practice Measures |
|---|---|
| | Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). |
| | Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. |
| | Access gates to be located at least 10m from receptors where practicable. |

# 6.8 Assessment of Likely Impacts and Effects

6.8.1 The Scheme as outlined in **Chapter 3: Scheme Description** of this ES **[EN010142/APP/6.1]** has been considered in assessing the likely impacts and effects of the Scheme, whilst considering the embedded mitigation described in the previous section.

## Dust Risk Assessment (Construction and Decommissioning)

6.8.2 The assessment considers the potential dust risk across a set of pre-defined zones, up to 250m from the Scheme. These zones are presented in **Figure 6-2: Dust Risk Assessment Zones** of this ES **[EN010142/APP/6.3]**.

6.8.3 The dust risk assessment is provided in **Appendix 6-2: Dust Risk Assessment** of this ES **[EN010142/APP/6.2]** and includes a full description and justification of categorisations applied.

6.8.4 The dust risk assessment has been undertaken based on construction activities. The duration of, and operations required for, decommissioning are similar to those required for construction and consequently the effects of decommissioning are usually similar to, or of a lesser magnitude than, construction effects. Therefore, the assessment of construction phase effects on air quality also represents the likely significant worst-case effects which would be experienced at decommissioning. As detailed in the **Framework DEMP [EN010142/APP/7.10]**, it should be noted that prior to decommissioning, there will likely be a requirement for a dust risk assessment and dust management plan to be agreed with the planning authority prior to any works taking place. Due to the estimated lifespan of the Scheme, changes could have occurred that would affect the conclusion of the assessment.

6.8.5 The potential impact is assessed for dust soiling, human health. Human receptors, such as residential housing, were found within an appropriate distance from the Order limits for dust soiling and human health effects to be considered.

6.8.6 The overall risk rating for the Scheme takes into account all four activity categories, demolition, earthworks, construction and trackout, on a worst-case basis, with the embedded good practice measures in place, and therefore at this stage the overall risk rating is considered to apply to the decommissioning phase as well as the construction phase.

### Demolition

6.8.7 The Scheme will not require any demolition during the construction phase. Demolition has therefore been scoped out and will not be considered further within this assessment. Demolition will be required during decommissioning. However, due to the timescale of when this will occur, it is likely that guidance will have changed in the intervening years, and a dust risk

assessment will be undertaken prior to the decommissioning works based on current guidance at that time.

## Earthworks

6.8.8 The total area of earthworks is <2,500m$^2$. The method of working only requires small numbers of plant and small temporary stockpiles and therefore the potential dust emissions magnitude associated with earthworks is considered to be small.

6.8.9 The sensitivity of the area to dust soiling during the earthworks phase is high due to the proximity of residential properties, which are high sensitivity receptors within 20m of the Order limits. With the implementation of good practice measures set out in **Section 6.7** such as re-vegetating earthworks and exposed areas as soon as practicable, the risk of dust impact for earthworks activities is classified as low risk to dust soiling.

6.8.10 The sensitivity of the area is medium for human health impacts due to receptor sensitivity and low background particulate matter concentrations. With the implementation of good practice measures set out in **Section 6.7** such as and only removing covers in small areas and not all at once, the risk of dust impact for earthworks activities is classified as a low risk to human health.

## Construction

6.8.11 Due to small building volume and the use of pre-assembled materials, the potential dust emissions magnitude for construction activities is expected to be small.

6.8.12 The sensitivity of the area to dust soiling is high due to the presence of high sensitivity receptors within 20m of the Order limits at a small number of locations. With the implementation of good practice measures set out in **Section 6.7** such as avoiding the use of scabbling (roughening of concrete surfaces) if possible, the risk of dust impact during construction is classified as low risk to dust soiling.

6.8.13 The sensitivity of the area to human health impacts is medium. With the implementation of good practice measures set out in **Section 6.7** such as ensuring that 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, the risk of dust impact during construction is classified as low risk to human health.

## Trackout

6.8.14 Due to the use of unpaved routes, the potential dust emissions magnitude for trackout is assumed to be large.

6.8.15 The sensitivity of the area to dust soiling is high. With the implementation of good practice measures set out in **Section 6.7** such as avoiding dry

sweeping of large areas., the risk of dust impact due to trackout is low risk to dust soiling.

6.8.16 The sensitivity of the area to human health is medium. With the implementation of good practice measures set out in **Section 6.7** such as ensuring that access gates are located at least 10m from receptors where possible., the risk of dust impacts due to trackout is low risk to human health.

6.8.17 A summary of the magnitude of emissions is presented in **Table 6-16**.

**Table 6-16 Summary of Potential Dust Emission Magnitudes for Construction Activities following the Embedded Good Practice Measures.**

| Activity | Potential Dust Emission Magnitude |
|---|---|
| Demolition | N/A |
| Earthworks | Small |
| Construction | Small |
| Trackout | Large |

6.8.18 The sensitivity of receptors is shown in **Table 6-17**.

**Table 6-17 Summary of Area Sensitivity to Construction Phase Activities**

| | Sensitivity of the Surrounding Area | | | |
|---|---|---|---|---|
| **Potential Impact** | **Demolition** | **Earthworks** | **Construction** | **Trackout** |
| Dust Soiling | N/A | High | High | High |
| Human Health ($PM_{10}$ effects) | N/A | Medium | Medium | Medium |

6.8.19 The overall risk of dust effect is provided in **Table 6-18**. These values are derived using the effects matrix based on IAQM guidance (Table 1-6 in **Appendix 6-2: Dust Risk Assessment** of this ES **[EN010142/APP/6.2]**) which combines the potential magnitude of dust emissions from works with embedded mitigation measures in place (**Table 6-16**), with the sensitivity of the area to dust effects (**Table 6-17**). The risk of dust soiling effects and human health effects are both low risks, with the implementation of mandatory good practice measures for a “high risk” site. This leads to the overall risk from dust for the Scheme to be identified as low risk. With the implementation of the recommended level of good practice, the overall significance of effect will be **negligible** to **minor adverse (not significant)**.

**Table 6-18 Summary of Risk of Dust Effects for Construction Phase Activities on Human Receptors without Mitigation**

| | Summary of Dust Risk | | | |
|---|---|---|---|---|
| **Potential Impact** | **Demolition** | **Earthworks** | **Construction** | **Track out** |
| Dust Soiling | N/A | Low | Low | Low |
| Human Health ($PM_{10}$ effects) | N/A | Low | Low | Low |

# Construction Traffic

6.8.20 The full details of the assessment of construction traffic is outlined in **Appendix 6-3: Air Quality Modelling [EN01042/APP/6.3]**. A detailed dispersion model was carried out using peak construction traffic flows. A summary of key receptors representative of the overall effect of the Scheme is provided in **Table 6-18**. The annual mean $NO_2$ Concentrations ($\mu g/m^3$) were modelled at key receptors in 2026 with the addition of the Scheme traffic and without. **Table 6-20** shows the modelled annual mean change in concentration of $NO_2$, $PM_{10}$ and $PM_{2.5}$ at each receptor.

**Table 6-19 Summary of Annual Mean $NO_2$ Concentrations (µg/m$^3$) Modelled in 2026 at key receptors.**

| ID | X Coordinate | Y Coordinate | Location | Modelled $NO_2$ annual mean change in 2026 | Modelled $PM_{10}$ annual mean change in 2026 | Modelled $PM_{2.5}$ annual mean change in 2026 | Effect |
|---|---|---|---|---|---|---|---|
| R7 | 493479.7 | 390086.7 | Heritage Farms, Harpswell | 0.4 | 0.2 | 0.1 | Negligible |
| R9 | 491327.3 | 390473.3 | A631 | 0.1 | <0.1 | <0.1 | Negligible |
| R14 | 484634.1 | 390624.8 | 17 Apley Close, Gainsborough | 0.2 | 0.1 | <0.1 | Negligible |
| R42 | 483002.3 | 386641.6 | 3A Anderson Way, Lea | 0.1 | 0.1 | <0.1 | Negligible |
| R43 | 482955.4 | 384754 | Knaith Hill, Knaith | 0.2 | 0.1 | 0.1 | Negligible |
| R55 | 495249.2 | 387607.6 | 4 B1398 | 0.2 | 0.1 | <0.1 | Negligible |
| R63 | 488167.1 | 388364.8 | The Poplars, Heapham | <0.1 | <0.1 | <0.1 | Negligible |
| R66 | 492013.5 | 387100.1 | Orchard House, Treswell | <0.1 | <0.1 | <0.1 | Negligible |
| R70 | 487041.7 | 386937.9 | 2 Lodge Lane, Upton | <0.1 | <0.1 | <0.1 | Negligible |
| R79 | 487153 | 385694.3 | Tennyson House, Kexby | <0.1 | <0.1 | <0.1 | Negligible |
| R84 | 483825.7 | 382540 | Gainsborouugh Road, Gate Burton | 0.2 | 0.1 | 0.1 | Negligible |
| R107 | 481676.3 | 379774 | Floss Lane, Cottam | 0.4 | 0.2 | 0.1 | Negligible |
| R124 | 496624.8 | 390258.8 | The Cottage | 0.2 | 0.1 | 0.1 | Negligible |

| ID | X Coordinate | Y Coordinate | Location | Modelled $NO_2$ annual mean change in 2026 | Modelled $PM_{10}$ annual mean change in 2026 | Modelled $PM_{2.5}$ annual mean change in 2026 | Effect |
|---|---|---|---|---|---|---|---|
| R130 | 494871.5 | 379338.4 | 10 High Street, Scampton | 0.1 | <0.1 | <0.1 | Negligible |
| R152 | 491062.3 | 385281 | Turpin Bungalow | 0.3 | 0.2 | 0.1 | Negligible |
| R181 | 486684.9 | 381148.6 | White House | 0.5 | 0.2 | 0.1 | Negligible |

6.8.21 The modelled results at all receptors, detailed in full in **Appendix 6-3: Air Quality Modelling [EN01042/APP/6.3]**, show that that all predicted annual mean concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$ are well below their respective AQS objectives. All modelled annual mean $NO_2$ concentrations are additionally predicted to be below 60µg/m$^3$, the hourly AQS objective for $NO_2$ is also anticipated to be achieved with the construction traffic as a result of the Scheme. Likewise, daily $PM_{10}$ concentrations are predicted to be well below 32µg/m$^3$ and, as such, the 24 hour $PM_{10}$ AQS objective is also anticipated to be achieved at all modelled receptor locations.

6.8.22 The predicted change in concentration as a result of increased construction traffic from the Scheme is estimated to be negligible at all modelled receptors. As such the increased construction traffic will have **no effect** on air quality in the areas surrounding the Order limits and no mitigation is required. Further details of the predicted annual mean concentrations are presented in **Appendix 6-3: Air Quality Modelling [EN01042/APP/6.2]**.

### Decommissioning Traffic

6.8.23 Section 16.4 of **Chapter 16: Transport and Access [EN010142/APP/6.1]** concludes that decommissioning is expected to be shorter in duration, less intensive and with fewer road trips. Thus, the assessment presented above for construction traffic is considered to represent the worst case effects during decommissioning.

6.8.24 As such, effects from decommissioning traffic are also considered to be **not significant**.

## 6.9 Additional Mitigation and Enhancements

6.9.1 This assessment considered the possible impacts of the Scheme on air quality in the area. No mitigation over and above that already set out in this assessment will be required for air quality.

## 6.10 Residual Effects

6.10.1 This section summarises the residual effects of the Scheme on air quality following the implementation of embedded and additional mitigation.

6.10.2 The dust assessment has identified the potential for high risk associated with dust deposition, and low risk to human health. Following implementation of the **Framework CEMP [EN010142/APP/7.8]** and **Framework DEMP [EN010142/APP/7.10]**, which will incorporate the mitigation measures outlined above, the effect on dust deposition and human health is anticipated to be **not significant**.

**Table 6-20 Residual Effects (Air Quality)**

| Description of Effect (on receptor) | Sensitivity of Receptor | Nature of Effect | Magnitude of Impact | Environmental Design and Management | Classification of Effect | Further Mitigation and Monitoring | Residual Effect |
|---|---|---|---|---|---|---|---|
| Dust effects on residential properties and human health during construction and decommissioning | High | Emissions from construction and decommissioning activities affecting human health. Short-term Temporary (During the construction or decommissioning phase only). Temporary, short term | Small | Best practice site dust management good practice in line with IAQM “High Risk” sites. Set out in **Framework CEMP [EN010142/APP/7.8]** and **Framework DEMP [EN010142/APP/7.10]**. | Negligible to minor adverse | Not applicable | Not significant |
| Effect of emissions from construction and decommissioning traffic on human health | High | Emissions from construction and decommissioning traffic affecting human health. Short-term Temporary (During the construction or decommissioning phase only). Temporary, short term | Negligible | Measures set out in **Framework CEMP [EN010142/APP/7.8]** and **Framework DEMP [EN010142/APP/7.10].** | Negligible | Not applicable | Not significant |

# 6.11 Cumulative Effects

6.11.1 An assessment of cumulative air quality effects with consideration of other schemes is provided in **Chapter 18: Cumulative Effects and Interactions** of the ES **[EN010142/APP/6.1]**.

## 6.12 References

Ref. 6-1. Institute of Air Quality Management (IAQM) (2024). Guidance on the assessment of dust from demolition and construction. Institute of Air Quality Management. Available at: [redacted] [Accessed 25 January 2024]

Ref. 6-2. Institute of Air Quality Management (IAQM) (2017). Land-use Planning & Development Control: Planning for Air Quality. Institute of Air Quality Management. Available at: [redacted] [Accessed 19 December 2023]

Ref. 6-3. Department for Environment, Food and Rural Affairs (DEFRA) (2022) Local Air Quality Management Technical Guidance (TG22), August 2022. Available at: https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf [Accessed 18 December 2023]

Ref. 6-4. Department for Environment, Food and Rural Affairs (DEFRA) (2022) "LAQM Tools Emission Factors Toolkit, Version 11.0", Available: https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html [Accessed 18 December 2023]

Ref. 6-5. Cambridge Environmental Research Consultants (CERC) (2022) "ADMS-Roads Validation Papers,". Available at: [redacted] 18 December 2023]

Ref. 6-6. Laxen D and Marner B (2003) Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites, Available: https://uk-air.defra.gov.uk/assets/documents/reports/cat06/1hr_NO2_rpt_Final_b.pdf [Accessed 18 December 2023]

Ref. 6-7. AEA Technology (2008) Analysis of the relationship between annual mean nitrogen dioxide concentration and exceedances of the 1-hour mean AQS Objective (May 2008), AEAT/ENV/R/2641 Issue 1, Available: https://laqm.defra.gov.uk/documents/NO2relationship_report.pdf [Accessed 18 December 2023]

Ref. 6-8. DEFRA (2020). DEFRA Air quality Background Concentration Maps 2018. Available at [redacted] December 2023]

Ref. 6-9. WLDC, (2022). West Lindsey District Council 2022 Annual Progress Report. Available at https://www.west-lindsey.gov.uk/sites/default/files/2022-06/Air%20Quality%20Report%202022.pdf [Accessed 18 December 2023]

Ref. 6-10. H.M Government (q1995). The Environment Act. Available at: https://www.legislation.gov.uk/ukpga/1995/25/contents [Accessed 18 December 2023]

Ref. 6-11. Bassetlaw District Council (2019), 2020 Air Quality Annual Status Report (ASR). Available at: https://data.bassetlaw.gov.uk/air-quality-management.aspx [Accessed 18 December 2023]