## 13.0 AIR QUALITY: REPLACEMENT CHAPTER

### 13.1 INTRODUCTION AND METHODOLOGY

13.1.1 This Chapter assesses the likely significant effects of the Project on local air quality, particularly in relation to existing sensitive receptors surrounding the Site (e.g. residential, education and health facilities) and its future occupants. It assesses the likely effects from dust and road traffic exhaust emissions generated during the construction phase, together with road traffic exhaust emissions resulting from the Project, once completed and operational.

13.1.2 The policy context and methods used to assess the effects are described, together with the 'baseline' conditions that would be likely to exist in the area in the absence of the proposed Project. The potential effects of the Project are discussed, together with mitigation measures that have been developed to prevent, reduce or offset these effects. Finally, the likely residual effects that would arise with the mitigation measures in place are described.

13.1.3 The Chapter was written by Waterman Energy Environment and Design. Appendix 13B provides the modelling detail, and traffic data, used to support the assessment.

#### Methodology

13.1.4 This air quality assessment was undertaken using a variety of information and procedures as follows:-

- Consultation with Blaby District Council (BDC) to agree the methodology to be used within the assessment;
- Review of BDC air quality review and assessment documents in order to identify baseline conditions in the area and identify monitoring data to be used to verify the air quality model;
- Review of the local area to identify potentially sensitive receptor locations, both existing and proposed, that could be affected by changes in air quality that result from the proposed Project;
- Traffic flow data provided by the Project Transportation Consultants, WSP Property and Development (WSP), in relation to the Transport Assessment for the Project (see Chapter 15: Traffic and Transport);
- Application of atmospheric dispersion modelling using the ADMS-Roads model[1] to predict the effect of the completed Project on the future local air quality, as agreed with the EHO at BDC. The $NO_2$ from $NO_x$ Calculator (Version 2.1, January 2010) available from the Air Quality Archive website[2] has been applied to derive the road-related $NO_2$ emissions from $NO_x$ outputs;
- Comparison of the predicted levels with the UK air quality objectives and the Environmental Protection UK[3] significance criteria;

1 Cambridge Environmental Research Consultants Ltd, ADMS-Roads, 2008, Version 2.3.
2 AEA, $NO_X$ to $NO_2$ Calculator, http://laqm1.defra.gov.uk/review/tools/monitoring/calculator.php Version 2.1, 22nd January 2010
3 Environmental Protection UK, 2010, 'Development Control: Planning for Air Quality'.

- Consideration of likely construction plant, activities and environmental management controls likely to be employed during the demolition and construction phase of the works;
- Review of heating plant and ventilation systems within the completed Project; and
- Identification of mitigation measures, where appropriate.

**Construction**

13.1.5 Construction-derived dust emission effects cannot be easily quantified. Therefore, a more qualitative approach was employed to predict potential effects from these works. The emphasis of this approach lies in the minimisation of potential effects at source through appropriate environmental management controls relating to, at least, 'good practice' site management practices. The approach included:-

- Consideration of the assumed construction activities and their potential to generate emissions; and
- Identification of good working practices and suitable mitigation measures in order to minimise the potential for dust emissions and nuisance risk.

13.1.6 During the construction phase the potential for dust effects would be mitigated at source, through appropriate site management and control practices. Premises and occupants within 100m of a construction site are generally considered to be most likely to suffer dust nuisance.

13.1.7 Examples of dust-sensitive receptors are listed in Table 13a below (taken from Minerals Policy Statement 2[4]).

**Table 13a: Dust Sensitive Receptors**

| High Sensitivity | Medium Sensitivity | Low Sensitivity |
|---|---|---|
| Hospitals and Clinics | Schools | Farms |
| Retirement Homes | Residential Areas | Light and Heavy Industry |
| Hi-Tech Industries | Food Retailers | Outdoor Storage |
| Food Processing | Offices | |

13.1.8 The proximity of sensitive receptors and their orientation in relation to the prevailing wind, in addition to the scale and duration of demolition and construction activities, would have a bearing on potential nuisance effects.

**Operation**

13.1.9 The effect on local air quality in relation to the completed development was assessed using the advanced atmospheric dispersion model, ADMS-Roads, as agreed with the EHO at BDC.

4 Office of the Deputy Prime Minister, Minerals Policy Statement 2: Controlling and mitigating the environmental effects of mineral extraction in England - Annex 1: Dust, 2005.

This included the effect of traffic generated by the proposed development on the road network. Appendix 13B presents the details of the ADMS-Roads modelling.

13.1.10 Traffic data for the local road network were provided by WSP (refer to Appendix 13B for further details). The baseline year of 2010 was assessed and the 'without development' and 'with development' scenarios for the year 2026, to represent the anticipated year of completion of the development. The traffic data was used within the ADMS-Roads model to assess the potential for significant effects from additional traffic movements generated by the development on future local air quality.

13.1.11 The ADMS-Roads dispersion model predicts how emissions from roads combine with local background pollution levels, taking account of meteorological conditions, to affect local air quality. The ADMS-Roads model has been run for the completion year, 2026, and therefore used 2026 background data and 2026 vehicle emission rates as inputs. For the verification assessment (refer to later in this report), in 2010, 2010 background data and 2010 vehicle emission rates have been used, which would be higher than the 2026 data. The model output allows pollution levels to be quantified at a number of specific receptor locations which facilitates the assessment of impacts at potentially sensitive receptor locations.

**Model Uncertainty**

13.1.12 Recent analyses of historical monitoring data by Defra have identified a disparity between measured $NO_x$ and $NO_2$ concentrations and the projected decline associated with emission forecasts which form the basis of air quality modelling as described above[5]. The precise reason for the disparity is not fully understood but is thought to be related to the on-road performance of certain vehicles compared to calculations based on Euro standards which inform emission forecasts.

13.1.13 There is no formal guidance in relation to this issue, and Defra are currently investigating it. Therefore, this air quality assessment has been based on current guidance, i.e., with reduced emission rates and background concentration to the completion year of 2026. However, in addition, a sensitivity analysis has been undertaken on the basis of no future reductions (i.e. considering the potential effect of the development against the current baseline, 2010, conditions).

**Pollutant Background Concentrations**

13.1.14 The ADMS-Roads model requires the use of background pollutant concentration data to which the model adds contributions from nearby roads. Full details in relation to the background data used within the air quality assessment are included in Appendix 13B.

**Model Verification**

13.1.15 Model verification is the process of comparing monitored and modelled pollutant concentrations in order to give confidence in the accuracy of the modelling results. The model was verified by comparing the modelled annual mean $NO_2$ concentrations for 2010 (the latest year for which BDC air quality monitoring data is available) with monitored annual mean $NO_2$ concentrations from the BDC automatic monitor at Sandhill Drive and a number of diffusion

5 http://laqm.defra.gov.uk/faqs/faqs.html

tubes within the vicinity of the Site, as agreed with the EHO at BDC. The adjustment of the model outputs was then undertaken. The verification and adjustment process is described in detail in Appendix 13B.

**Significance Criteria**

**Construction**

13.1.16 The assessment of construction effects was based on:-

- A review of likely construction activities; and
- A review of the sensitive uses in the area immediately surrounding the Site in relation to their distance and orientation.

13.1.17 The significance of effect was concluded through professional judgement based on the following:

- The baseline air quality conditions in the area surrounding the Site;
- The mitigation measures that would be proposed; and
- The knowledge of how such mitigation measures are routinely and successfully applied to construction projects throughout the UK.

13.1.18 In addition to the above, the classification system provided in Table 13b below was adopted, again based on professional judgement, for the assessment of potential adverse air quality effects arising from dust generated by construction activities associated with the proposed Project.

**Table 13b: Construction Significance Criteria**

| Effect Significance | Definition |
|---|---|
| **Major adverse** | Receptor is less than 10m from a major active construction or demolition site. |
| **Moderate adverse** | Receptor is between 10m and 100m of a major active construction or demolition site or less than 10m from a minor active construction or demolition site. |
| **Minor adverse** | Receptor is between 100m and 200m from a major active construction or demolition site or up to 100m from a minor active construction site or demolition site. |
| **Negligible** | Receptor is over 100m from any minor construction or demolition site or over 200m from any major construction or demolition site. |

**Operation**

13.1.19 The significance of any changes in local air quality that are predicted, based on background pollutant concentrations and predicted traffic flows, can be established through the consideration of the following factors:

- Geographical extent (local, district or regional);
- Duration (temporary or long term);
- Reversibility (reversible or permanent);
- Magnitude of pollutant concentration changes;
- Exceedance of standards (e.g. Air Quality Objectives); and
- Changes in pollutant exposure.

13.1.20 The Environmental Protection UK Guidance 'Development Control: Planning for Air Quality (2010) provides an approach to defining magnitude of changes and describing the air quality effects at specific receptors recommended by the Institute of Air Quality Management (IAQM).

13.1.21 Table 13c below presents the magnitude of change descriptors, based on the change in concentration predicted to be brought about by a scheme as a percentage of the assessment level (i.e. the UK Objective, Limit Value of Environmental Assessment Level). Tables 13d and 13e present the effect significance descriptors that take account of the magnitude of changes (both positive and negative) given in Table 13c, and the concentration in relation to the air quality objective. The term 'slight' has been replaced with the term 'minor'.

**Table 13c: Magnitude of Change Descriptor in Relation to Changes in Concentrations of $NO_2$ and $PM_{10}$**

| Magnitude of Change | Annual Mean $NO_2/PM_{10}$ | Days $PM_{10}$ > 50μg/m$^3$ |
|---|---|---|
| Large | Increase/decrease > 10% (>4μg/m$^3$) | Increase/decrease >4 days |
| Medium | Increase/decrease 5 - 10% (2 - 4μg/m$^3$) | Increase/decrease 2 - 4 days |
| Small | Increase/decrease 1 - 5% (0.4 - 2μg/m$^3$) | Increase/decrease 1 - 2 days |
| Imperceptible | Increase/decrease < 1% (<0.4μg/m$^3$) | Increase/decrease <1 days |

Note: Percentage calculated as a change of the level of assessment

**Table 13d: Effect Significance Criteria for Annual Mean $NO_2$ and $PM_{10}$**

| Concentration in Relation to Standard | Small | Medium | Large |
|---|---|---|---|
| **Decrease with Development** | | | |
| Above objective ***without*** development (>40µg/$m^3$) | **Minor beneficial** | **Moderate beneficial** | **Substantial beneficial** |
| Just below ***without*** development (36 - 40µg/$m^3$) | **Minor beneficial** | **Moderate beneficial** | **Moderate beneficial** |
| Below objective ***without*** development (30 - 36µg/$m^3$) | **Negligible** | **Minor beneficial** | **Minor beneficial** |
| Well below objective ***without*** scheme (<30µg/$m^3$) | **Negligible** | **Negligible** | **Minor beneficial** |
| **Increase with Development** | | | |
| Above objective ***with*** development (>40µg/$m^3$) | **Minor adverse** | **Moderate adverse** | **Substantial adverse** |
| Just below ***with*** development (36 - 40µg/$m^3$) | **Minor adverse** | **Moderate adverse** | **Moderate adverse** |
| Below objective ***with*** development (30 - 36µg/$m^3$) | **Negligible** | **Minor adverse** | **Minor adverse** |
| Well below objective ***with*** scheme (<30µg/$m^3$) | **Negligible** | **Negligible** | **Minor adverse** |

Note: an imperceptible change would be described as 'negligible'

**Table 13e: Effect significance criteria for $PM_{10}$ daily mean**

| Concentration in Relation to Standard | Small | Medium | Large |
|---|---|---|---|
| **Decrease with Development** | | | |
| Above objective ***without*** development (>35days) | **Minor beneficial** | **Moderate beneficial** | **Substantial beneficial** |
| Just below ***without*** development (32 - 35 days) | **Minor beneficial** | **Moderate beneficial** | **Moderate beneficial** |
| Below objective ***without*** development (26 - 32 days) | **Negligible** | **Minor beneficial** | **Minor beneficial** |
| Well below objective ***without*** scheme (<26 days) | **Negligible** | **Negligible** | **Minor beneficial** |
| **Increase with Development** | | | |
| Above objective ***with*** development (>35days) | **Minor adverse** | **Moderate adverse** | **Substantial adverse** |
| Just below ***with*** development (32 - 35 days) | **Minor adverse** | **Moderate adverse** | **Moderate adverse** |
| Below objective ***with*** development (26 - 32 days) | **Negligible** | **Minor adverse** | **Minor adverse** |
| Well below objective ***with*** scheme (<26 days) | **Negligible** | **Negligible** | **Minor adverse** |

Note: an imperceptible change would be described as 'negligible'

## 13.2 PLANNING CONTEXT

### National

13.2.1 Air pollutants at high concentrations can give rise to adverse effects on the health of people and ecosystems. European Union (EU) legislation on air quality forms the basis for national UK legislation and policy on air quality. The EU air quality 'framework' Directive on Ambient Air Quality Assessment and Management[6] came into force in September 1996. This is a framework for addressing air quality through setting European–wide air quality limit values in a series of daughter directives. The first four 'daughter' directives have been transposed into national legislation and recently consolidated in the Air Quality Standards Regulations 2007[7].

6 EC, Council Directive 96/62/EC on Ambient Air Quality Assessment and Management, 1996.
7 HMSO, 'The Air Quality Standards Regulations 2007 (Statutory Instrument 2007 No. 64)', 2007.

A new air quality directive came into force in June 2008[8]. This has been transposed into national legislation through the Air Quality Standards Regulations 2010[9] and came into force on 11th June 2010.

**The UK Air Quality Strategy**

13.3.2 In a parallel process, the Environment Act 1995[10] required the preparation of a national air quality strategy setting health–based air quality objectives for specified pollutants and outlining measures to be taken by Local Planning Authorities (LPAs) in relation to meeting these (the Local Air Quality Management (LAQM) system).

13.2.3 The UK Air Quality Strategy, adopted in 1997[11], was subsequently reviewed and revised in 2000 as the Air Quality Strategy for England, Scotland, Wales and Northern Ireland[12]. An amendment to the Strategy was published in 2003[13]. In 2007 a new Air Quality Strategy for England, Scotland, Wales and Northern Ireland was published, introducing a national level policy framework for exposure reduction for fine particulates[14].

13.2.4 The standards and objectives relevant to local air quality management have been prescribed through the Air Quality (England) Regulations (2000)[15] and the Air Quality (England) (Amendment) Regulations 2002[16]. The most significant pollutants associated with road traffic emissions (and LPA review and assessment of air quality, see below), in relation to human health, are nitrogen dioxide ($NO_2$) and particulates, the assessment therefore focuses on these two pollutants. The limit values and objectives of air pollutants relevant to this assessment are summarised in Table 13f. LPAs are obliged to assess against, and work towards, these air quality objectives.

**Table 13f: National Air Quality Strategy Objectives for the Purposes of Local Air Quality Management**

| Pollutant | Standard | | Objective Date |
|---|---|---|---|
| | Concentration | Measured as | |
| Nitrogen dioxide ($NO_2$) | 200µg/m$^3$ | 1 hour mean not to be exceeded more than 18 times per year | 31/12/2005 |
| | 40µg/m$^3$ | Annual mean | 31/12/2005 |

8 EC, Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on Ambient Air Quality and Cleaner Air for Europe
9 HMSO, 2010, 'The Air Quality Standards Regulations 2010 (Statutory Instrument 2010 No. 1001)'.
10 Office of the Deputy Prime Minister (ODPM), The Environment Act 1995
11 HMSO, London. Department of the Environment (DoE), 1997, 'The UK National Air Quality Strategy'. HMSO
12 Department of the Environment, Transport and the Regions, 'UK Air Quality Strategy for England, Scotland, Wales and Northern Ireland'. HMSO, London, 2000.
13 Department for the Environment, Food and Rural Affairs (DEFRA), Scottish Executive, Welsh Assembly Government and the Department of the Environment in Northern Ireland, 2003, 'The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: (Addendum)'. DEFRA, London.
14 Department of the Environment, Food and Rural Affairs (DEFRA), 2007. The Air Quality Strategy for England, Scotland, Wales & Northern Ireland
15 HSMO, The Air Quality (England) Regulations 2000 (Statutory Instrument 928 No.), 2000.
16 HMSO, 'The Air Quality (England) (Amendment) Regulations 2002 (Amended Statutory Instrument 2002 No. 3034)'. HMSO, London, 2002.

| Pollutant | Standard | | Objective Date |
|---|---|---|---|
| | Concentration | Measured as | |
| Particles ($PM_{10}$) | | 24–hour mean not to be exceeded more than 35 times per year | |
| | | Annual mean | |
| Particulate Matter ($PM_{2.5}$) | Target of 15% reduction in concentrations at urban background locations | Annual mean | Between 2010 and 2020 |
| | Variable target of up to 20% reduction in concentrations at urban background locations* | Annual mean | Between 2010 and 2020 |
| | 25 µg/$m^3$ | Annual mean | 01/01/2020 |

13.2.5 There are currently no statutory UK standards in relation to deposited dust and its propensity to cause nuisance. A deposition rate of 200mg/$m^2$/day (averaged over a month) is sometimes used as a threshold value for potentially significant nuisance effects[17].

**Local Authority Responsibility**

13.2.6 Part IV of the Environment Act 1995 provides a system of Local Air Quality Management (LAQM) under which LPAs are required to review and assess the existing and future quality of the air within their administrative boundaries by way of a staged process. In the event that this process suggests that any of the Air Quality Strategy Objectives will not be met by the target dates, the LPA must consider the declaration of an Air Quality Management Area (AQMA) and the subsequent preparation of an Air Quality Action Plan to improve the air quality in that area in pursuit of the Objectives. Details in relation to AQMAs declared by BDC are provided in the Baseline Conditions section below, and details in relation to the BDC Air Quality Action Plan are provided in the Local section below.

**Planning Policy Statement 23: Planning and Pollution Control, 2004**

13.2.7 Planning Policy Statement 23 (PPS 23)[18] states that "*LPAs must be satisfied that planning permission can be granted on land use grounds taking full account of environmental effects* [so as to] *ensure that in the case of potentially polluting developments:*

17 Bate, K. J. and Coppin, N. J. (1991) 'Dust impacts from mineral workings', Mine and Quarry, 20 (3), 1991, pp31 – 35.
18 Planning Policy Statement 23: Planning and Pollution Control, 2004

- *The relevant pollution control authority is satisfied that potential releases can be adequately regulated under the pollution control framework; and*
- *The effects of existing sources of pollution in and around the site are not such that the cumulative effects of pollution when the proposed development is added would make that development unacceptable.*"

13.2.8 Further emphasis is given to the importance of air quality objectives and AQMAs in the Appendices to PPS23 which states that "*the impact of a development on air quality is likely to be particularly important:-*

- *Where the development is proposed inside, or adjacent to an AQMA;*
- *Where the development could in itself result in the designation of an AQMA; and*
- *Where to grant planning permission would conflict with, or render unworkable, elements of a LA's air quality action plan*".

13.2.9 In addition, PPS23 states that "*it is not the case that all planning applications for developments inside or adjacent to AQMAs should be refused if the developments would result in a deterioration of local air quality. Such an approach could sterilise development, particularly where authorities have designated their entire areas as AQMAs*".

**Regional**

**East Midlands Regional Plan, March 2009**

13.2.10 Policy 1 'Regional Core Objective' of the East Midlands Regional Plan (Regional Spatial Strategy)[19] states that, "*to secure the delivery of sustainable development within the East Midlands, all strategies, plans and programmes having a spatial impact should meet the following core objectives ….*

*d) to improve health and mental, physical and spiritual well being of the Region's residents through improvements in:-*

- *Air quality…*

*k) to minimise the adverse environmental impacts of new development and promote optimum social and economic benefits through the promotion of sustainable design and construction techniques.*"

13.2.11 Policy 36 'Regional Priorities for Air Quality' states that "*Local Development Frameworks and the strategies of relevant bodies should:-*

- *Contribute to reducing air pollution in the region;*
- *Consider the potential effect of new development and increased traffic levels on air quality…"*

19 Government Office for the East Midlands, East Midlands Regional Plan, March 2009

**Leicestershire, Leicester and Rutland Structure Plan 1996 to 2016, published 2005**

13.2.12 None of the saved policies of the Leicestershire, Leicester and Rutland Structure Plan[20] relate to air quality.

**Local**

**Blaby District Local Plan, 1999 (saved policies)**

13.2.13 Policy T3 of the saved policies of the BDC Local Plan[21] states that "*Where the district council is the determining authority for development involving a new access, road scheme or improvement, planning permission will only be granted if the proposed access, road scheme or improvement incorporates:.. (ii) safeguards for living and working conditions and the environment in general including considerations of visibility, access, layout, privacy, light, noise, disturbance, emissions, congestion, overbearing effect and the character or appearance of the area*".

**Blaby District Council Core Strategy Development Plan Document Submission Version, January 2012**

13.2.14 The BDC Core Strategy[22] will set out the spatial plan for the District up to 2029.

13.2.15 Policy 3 'Sustainable Urban Extension' of the BDC Core Strategy states that the Masterplan for the Sustainable Urban Extension at the Site "*will need to include appropriate measures to mitigate the noise and air quality impacts of traffic using the M1 and M69 motorways".* Policy 10 'Transport Infrastructure' of the BDC Core Strategy states that "*The Council will require Travel Plans to be submitted for new developments in accordance with the requirements of the 6C's Guide. Car share facilities, car clubs, and use of low emission motor vehicles in order to reduce congestion and pollution will be encouraged."*

13.2.16 Refer to Chapter 3: Planning Policy for a more detailed summary of the current local planning policy position in relation to air quality.

**Blaby District Council Air Quality Action Plan, 2004**

13.2.17 An Air Quality Action Plan[23] was prepared by BDC detailing options for improving air quality under the following groups, specific to the different locations where problems are or may be experienced in Blaby:-

1. "*Controlling exposure to $NO_X$ emissions from traffic on the M1*
2. *Controlling exposure to $NO_X$ emissions from traffic in the vicinity of the Narborough Road South AQMA*

a. *Improving traffic flows*

b. *Reducing traffic volumes through diversion to other modes or routes, reducing demand for transport, etc.*

20 Leicestershire, Leicester, and Rutland Structure Plan 1996-2016, Adopted 2005
21 Blaby District Council Adopted Local Plan 1999
22 Blaby District Council, Core Strategy Development Plan Document Submission Version, January 2012
23 Blaby District Council Air Quality Action Plan May 2004

*c. Use of cleaner vehicles*

*d. Driver training*

*e. etc.*

*3. General measures to control emissions;*

*a. Planning conditions*

*b. Public information campaigns*

*c. Environmental management*

*d. etc.*

4. *Control of $PM_{10}$ emissions from the various activities carried out at Croft Quarry.*"

## 13.3 BASELINE CONDITIONS

### Blaby District Council Review and Assessment of Air Quality

13.3.1 The major source of emissions in BDC is road traffic and as a result of their first round of review and assessment of air quality, BDC declared three AQMAs in 1999 for annual mean $NO_2$[24] as follows:-

- AQMA1: A5460 Narborough Road South;
- AQMA2: The M1 corridor in Enderby and Narborough; and
- AQMA3: The M1 corridor between Thorpe Astley and Kirby Muxloe.

13.3.2 Consequent to the designations of the AQMAs, an Air Quality Action Plan was prepared by BDC detailing options for improving air quality as outlined above.

13.3.3 A further review and assessment of air quality (i.e. stage 4 review and assessment) in relation to these AQMAs, and a further detailed assessment of air quality within a wider area, was undertaken by BDC[21]. The outcome of these assessments recommended alterations to the existing AQMA 3 boundary and the designation of further AQMAs in relation to $NO_2$ as follows:-

- AQMA 4 - St Johns, Enderby and Enderby Road, Whetstone; and
- AQMA 5 - Branting Hill.

13.3.4 The nearest AQMAs to the Site are shown in Figure 13.1.

### Local Air Quality Monitoring

13.3.5 BDC measures air quality in the Borough using three automatic monitors and 29 $NO_2$ diffusion tubes. The nearest automatic continuous monitor is located at Sandhill Drive. Table 13g presents the latest monitoring data available for the automatic monitoring located at Sandhill Drive.

24 Blaby District Council Air Quality Detailed Assessment Final Copy July 2005

**Table 13g: Annual Mean $NO_2$ and $PM_{10}$ Concentrations at the Blaby automatic monitoring locations (µg/m3)**

| Site I.D. and Grid Reference | Pollutant | 2008 | 2009 | 2010 | Objective |
|---|---|---|---|---|---|
| Sandhill Drive (454482, 298573) | $NO_2$ | 35.5 | 34.3 | 37.7 | **40** |
| | $PM_{10}$ | 19.1 | 16.7 | 16.7 | **40** |

13.3.6 BDC monitors $NO_2$ concentrations using diffusion tubes at 29 locations throughout the Borough. The diffusion tube monitoring results at locations close to the Site, which are all classed as kerbside locations by BDC, are shown in **Table 13h**, and in **Figure 13.2**.

**Table 13h: Annual Mean $NO_2$ Concentrations at Kerbside Diffusion Tube Sites (µg/m$^3$)**

| Site I.D. and Grid Reference | 2007 | 2008 | 2009 | 2010 | $NO_2$ Objective |
|---|---|---|---|---|---|
| Hinckley Road, M1 Bridge (453593,303384)* | **47** | **45** | **48** | **-**** | **40** |
| Priestman Road, Thorpe Astley (454300,302229) | 32 | 35 | 31 | 32 | **40** |
| St Andrews Church, Hinckley Road (453137,303321)* | 29 | 31 | 30 | 32 | **40** |
| 64 Packer Avenue (453488,303637)* | **42** | **43** | **44** | **42** | **40** |
| $NO_X$ Box A (454482,298573)* | 33 | 33 | 31 | 33 | **40** |
| $NO_X$ Box B (454482,298573)* | 33 | 34 | 32 | 32 | **40** |
| $NO_X$ Box C (454482,298573)* | 32 | 34 | 33 | 33 | **40** |
| K Edward Avenue (454521,298151)* | **45** | **50** | **49** | **51** | **40** |
| Cumberwell Drive (454507,298338)* | **40** | **40** | 38 | 37 | **40** |
| St Johns, Enderby (454968,298825)* | 34 | 36 | 34 | 37 | **40** |

Notes: *Sites an AQMA
**Site experienced poor data capture (67%) and has therefore not been included;
Source: 2010 Air Quality Progress Report

13.3.7 The monitoring results in Table 13g indicate that there have been no exceedences of the annual mean objectives for either $NO_2$ or $PM_{10}$ at the automatic monitor located at Sandhill Drive. The results in Table 13h indicate that there are exceedences of the annual mean $NO_2$

objective at two of the diffusion tube monitoring sites in 2010, which is consistent with the AQMA designations.

**Background Pollutant Concentrations**

13.3.8 The ADMS-Roads methodology requires the use of background pollutant concentration data to which the model adds contributions from nearby roads. Background concentrations of $NO_X$, $NO_2$, $PM_{10}$ and $PM_{2.5}$ are available from Defra for the UK as 1 x 1km grid squares for assessment years between 2006 and 2020.

13.3.9 The Site and assessment study area covers a number of 1 x 1km grid squares and therefore all of the pollutant background concentrations used within this assessment are presented in Appendix 13B.

## 13.4 PROJECT DESIGN

13.4.1 The Project and its design has responded to constraints analysis work undertaken in relation to a number of technical topics, in order to establish a project that seeks to minimise any adverse environmental impact, and to maximise environmental benefits. This included analysis work in relation to air quality, and also noise.

13.4.2 The adjacent M1 and M69 Motorways were identified as the key source of air pollutants affecting the Site. In addition, it was determined that noise associated with the M1 and M69 is a key constraint associated with the Site.

13.4.3 In order to minimise the potential impacts of these noise sources upon proposed sensitive receptors, a number of key design measures were incorporated into the parameter plans as outlined in Chapter 12: Noise and Vibration. Given that air quality at the Site would be affected by the same key sources, the design measures incorporated directly in relation to noise would also affect air quality particularly, limiting the numbers of residential units located in proximity to the M1 and M69.

## 13.5 ASSESSMENT OF EFFECTS

**Construction**

13.5.1 At this stage, a detailed construction programme has not been developed. However, the construction plan is a three phased approach with the first phase developing the most northern and southern portions of the Site and the second and third phases concentrating on upper and lower middle areas. The number of dwellings per phase is set out in the phasing section of the Design and Access Statement. Associated infrastructure would be triggered at set stages of the development.

13.5.2 Given it is estimated that the Project would not be complete and operational until 2026, together with the size of the Site, it is considered that it would constitute a major construction site in accordance with Table 13b. The works have the potential to affect local air quality conditions, as follows:-

- Dust generated from construction activities;

- Emissions from construction plant e.g. piling rigs, compressors, excavators, concrete mixers and generators; and
- Emissions from vehicles (e.g. lorries, cars and vans) associated with the demolition of the existing building, construction of the Project, import of building materials and removal of waste materials, accessing and leaving the Site on the local road network.

13.5.3 The National Air Quality Objectives seek to address the health implications of fine particulate matter (e.g. $PM_{10}$), which comes largely from combustion sources such as motor vehicle engines. The majority of particles released from ground excavation works, demolition and construction tend to be larger and generally settle out close to the works where they may cause annoyance due to their soiling capability. However, there are no formal standards or criteria for adverse effects caused by deposited particulate matter.

13.5.4 Dust from construction activities within the urban environment generally does not arise at distances beyond approximately 200m from the works (in the absence of mitigation), and the majority of any deposition that might give rise to significant soiling tends to occur within 50 to 100m[25]. In addition, in built up areas, neighbouring buildings would limit the movement of dust by acting as a screen.

13.5.5 A number of residential properties exist, and would be retained, within the Site. Abbey Cottages and the Bungalow (ER2), Abbey Farm (ER3), and Hopyard Farm (ER4) are not located in proximity to any proposed major construction works, being surrounded by open space and Scheduled Monument land uses within the Project. Therefore, there would be negligible effects from Site construction activities at these properties. However, Lawn Cottages (ER1) is located adjacent to proposed residential uses R7. Therefore, it is likely that without mitigation, there would be the potential for temporary major adverse effects from Site construction activities in relation to R7 at the ER1 properties, particularly during dry and windy conditions.

13.5.6 Residential properties are located along much of the northern boundary of the Site. The properties along/off Forest House Lane, Guinevere Way and Lancelot Close are located between 100m and 200m of areas of the proposed Project where major construction works are likely (i.e. construction of residential uses and a school). Therefore, it is likely that without mitigation, there would be the potential for temporary moderate adverse effects from Site construction activities at these properties, particularly during dry and windy conditions.

13.5.7 Specific management controls would be implemented to reduce the potential for dust effects on these properties (see mitigation section below).

13.5.8 Plant operating on the Site and construction vehicles entering and leaving the Site would have the potential to contribute to local levels of air pollution, particularly $NO_2$ and $PM_{10}$.

13.5.9 Although data relating to anticipated construction vehicle movements are not available at this stage, it is anticipated that the effect of construction traffic on local air quality is likely to be at worst minor adverse on roads closest to/accessing the Site but negligible on the wider main road network and in context of local background concentrations and existing vehicles emissions.

25 Arup Environmental/Ove Arup and Partners, 1995, 'The Environmental Effects of Dust from Surface Mineral Workings' (HMSO, 1995).

13.5.10 Any emissions from plant operating on the Site would be small in comparison to the emissions from the road traffic movements on the roads adjacent to the Site, and therefore would be negligible. In addition, the proposed mitigation measures (described below) would further reduce any effect.

**Operation**

**Plant**

13.5.11 Potential operational air quality effects can result from emissions from space heating and other building plant that is provided. Most modern space heating is achieved either through burning gas, which results in only low gaseous or particulate emissions or by using electricity, which gives rise to indirect emissions, at the power generation facility only.

13.5.12 The Project would include the use of modern plant and facilities which would have improved efficiencies and low emissions as a result of tightened legislation. The detailed specification and installation of this plant would be in line with requirements of current Building Regulations, and would be designed to comply with Her Majesty's Inspectorate of Pollution, HMIP Technical Guidance Note (Dispersion) D1 (often referred to as a D1 Calculation)[26]. This document and calculation complements the Third Edition of the 1956 Clean Air Act Memorandum on Chimney Heights[27] and is intended to ensure that flue systems comply with the Clean Air Act 1993[28] and Environmental Protection Act 1990[29]. Consequently, no unacceptable effects on air quality at local existing and proposed receptors would occur as a result of this plant. Therefore, the operation of the Project's proposed plant would have a negligible effect on local air quality.

**Traffic**

13.5.13 The approach adopted by the Air Quality Strategy is to focus on areas at locations close to ground level where members of the public (in a non–workplace area) are likely to be exposed to pollutants over the averaging time of the objective in question (i.e. over 1–hour, 24–hour or annual periods) as appropriate. Objective exceedances principally relate to annual mean $NO_2$ and $PM_{10}$, and daily mean $PM_{10,}$ so that potentially sensitive locations relate mainly to residential properties and other sensitive locations (such as schools) where the public may be exposed for protracted periods.

13.5.14 Table 13i presents existing potentially sensitive receptors (residential properties) that were selected for their proximity to the road network that may be affected by the proposed Project (Receptor 1 to 11) and two locations representing cumulative schemes that are not yet built but have consent for residential uses (Receptors 12 and 13). In addition, locations within the Site, closest to the M1, were selected to represent 'worst case' future potential sensitive (residential) locations within the Project itself (Receptors 14 to 18). It should be noted that no sensitive (residential or school) land uses are proposed within the Project within 200m of the

26 Her Majesty's Inspectorate of Pollution (HIMP), 'Guidelines on Discharge Stack Heights of Polluting Emissions'. Technical Guidance Note (Dispersion) D1,1993.
27 HMSO, Third Edition of the 1956 Clean Air Act Memorandum on Chimney Heights, 1981.
28 HMSO, Clean Air Act, 1993.
29 HMSO. Environmental Protection Act,1990.

M69, hence similar consideration in relation to the M69 is not required. The location of these receptors is presented in Figure 13.3.

**Table 13i: Selected Receptor Locations**

| Receptor Number | Address of Receptor | Grid Reference |
|---|---|---|
| 1 | 77 Hinckley Road* | 453493, 303383 |
| 2 | 12 Beggar's Lane | 452322, 302626 |
| 3 | 259 Hinckley Road | 452206, 302725 |
| 4 | Willows Farm | 452933, 300252 |
| 5 | 20 Mill Hill | 453432, 299731 |
| 6 | 25 Priestman Road | 454369, 302156 |
| 7 | 55 Owen Close | 454768, 302143 |
| 8 | 119 Westover Road | 455073, 302677 |
| 9 | 89 St Johns | 455277, 299420 |
| 10 | 98 Leicester Road* | 454517, 298142 |
| 11 | 11 St Johns* | 454970, 298813 |
| 12 | Taylor Wimpey Development, Beggar's Lane | 452231, 302695 |
| 13 | Nelson, St Johns, Enderby | 454975, 298936 |
| 14 | Proposed Development R17 | 454222, 301658 |
| 15 | Proposed Development R15 | 453912, 302282 |
| 16 | Proposed Development R14 | 453457, 302151 |
| 17 | Proposed Development R12 | 453172, 301380 |
| 18 | Proposed Development R1 | 452509, 301969 |

Note: * Receptors located within an AQMA

13.5.15 The results of the ADMS Roads assessment are presented in Table 13j. For accuracy, the changes arising from the Project were calculated using the exact output from the ADMS-Road model (i.e. numbers to at least 10 decimal places) rather than the rounded numbers presented, which is the reason for any discrepancies in Table 13j between the results and the stated changes.

**Table 13j: Results of the ADMS-Roads Modelling at Sensitive Receptors**

| | $NO_2$ Annual Mean ($\mu g/m^3$) | $PM_{10}$ Annual Mean ($\mu g/m^3$) | $PM_{10}$ - Number of Days >50$\mu g/m^3$ | $PM_{2.5}$ Annual Mean ($\mu g/m^3$) |
|---|---|---|---|---|
| **Receptor 1: 77 Hinckley Road** | | | | |
| 2010 Existing | 44.80 | 21.49 | 5 | 12.45 |
| 2026 Without Development | 19.65 | 16.46 | 0 | 10.36 |
| 2026 With Development | 19.61 | 16.45 | 0 | 10.35 |
| **2026 Change** | **-0.04** | **-0.01** | **0** | **-** |
| **Receptor 2: 12 Beggar's Lane** | | | | |
| 2010 Existing | 17.76 | 17.22 | 1 | 10.82 |
| 2026 Without Development | 9.60 | 15.99 | 0 | 9.63 |
| 2026 With Development | 10.07 | 16.11 | 0 | 9.70 |
| **2026 Change** | **0.47** | **0.12** | **0** | **0.07** |
| **Receptor 3: 259 Hinckley Road** | | | | |
| 2010 Existing | 19.48 | 17.34 | 1 | 10.90 |
| 2026 Without Development | 10.11 | 16.11 | 0 | 9.70 |
| 2026 With Development | 10.30 | 16.16 | 0 | 9.73 |
| **2026 Change** | **0.19** | **0.05** | **0** | **0.03** |
| **Receptor 4: Willows Farm** | | | | |
| 2010 Existing | 18.39 | 17.46 | 1 | 10.77 |
| 2026 Without Development | 9.36 | 16.19 | 0 | 9.56 |
| 2026 With Development | 9.86 | 16.32 | 0 | 9.63 |
| **2026 Change** | **0.50** | **0.13** | **0** | **0.07** |
| **Receptor 5: 20 Mill Hill** | | | | |
| 2010 Existing | 21.78 | 17.59 | 1 | 11.35 |
| 2026 Without Development | 11.01 | 16.17 | 0 | 9.95 |

| | $NO_2$ Annual Mean ($\mu g/m^3$) | $PM_{10}$ Annual Mean ($\mu g/m^3$) | $PM_{10}$ - Number of Days >50$\mu g/m^3$ | $PM_{2.5}$ Annual Mean ($\mu g/m^3$) |
|---|---|---|---|---|
| 2026 With Development | 11.01 | 16.17 | 0 | 9.95 |
| **2026 Change** | **-** | **-** | **0** | **-** |
| **Receptor 6: 25 Priestman Road** | | | | |
| 2010 Existing | 26.91 | 19.85 | 3 | 12.94 |
| 2026 Without Development | 14.07 | 17.98 | 1 | 11.06 |
| 2026 With Development | 14.46 | 18.08 | 1 | 11.11 |
| **2026 Change** | **0.39** | **0.10** | **0** | **0.05** |
| **Receptor 7: 55 Owen Close** | | | | |
| 2010 Existing | 26.99 | 19.98 | 3 | 12.99 |
| 2026 Without Development | 13.80 | 18.18 | 2 | 11.15 |
| 2026 With Development | 14.61 | 18.38 | 2 | 11.26 |
| **2026 Change** | **0.81** | **0.19** | **0** | **0.11** |
| **Receptor 8: 119 Westover Road** | | | | |
| 2010 Existing | 28.06 | 18.35 | 2 | 12.12 |
| 2026 Without Development | 14.12 | 16.77 | 1 | 10.52 |
| 2026 With Development | 14.32 | 16.82 | 1 | 10.55 |
| **2026 Change** | **0.20** | **0.05** | **0** | **0.03** |
| **Receptor 9: 89 St Johns** | | | | |
| 2010 Existing | 26.01 | 18.14 | 2 | 11.94 |
| 2026 Without Development | 12.49 | 16.58 | 1 | 10.34 |
| 2026 With Development | 12.48 | 16.58 | 1 | 10.34 |
| **2026 Change** | **-0.01** | **-** | **-0** | **-** |
| **Receptor 10: 98 Leicester Road** | | | | |
| 2010 Existing | 47.00 | 20.99 | 5 | 14.12 |

| | $NO_2$ Annual Mean ($\mu g/m^3$) | $PM_{10}$ Annual Mean ($\mu g/m^3$) | $PM_{10}$ - Number of Days >50$\mu g/m^3$ | $PM_{2.5}$ Annual Mean ($\mu g/m^3$) |
|---|---|---|---|---|
| 2026 Without Development | 20.89 | 18.53 | 2 | 11.54 |
| 2026 With Development | 20.93 | 18.54 | 2 | 11.55 |
| **2026 Change** | **0.04** | **0.02** | **0** | **0.01** |
| **Receptor 11: 11 St Johns** | | | | |
| 2010 Existing | 28.90 | 19.82 | 3 | 13.12 |
| 2026 Without Development | 13.14 | 18.01 | 1 | 11.19 |
| 2026 With Development | 13.15 | 18.02 | 1 | 11.19 |
| **2026 Change** | **0.01** | **-** | **0** | **-** |
| **Receptor 12: Taylor Wimpey Development, Beggar's Lane** | | | | |
| 2026 Without Development | 11.89 | 16.57 | 1 | 9.95 |
| 2026 With Development | 12.77 | 18.81 | 1 | 10.08 |
| **2026 Change** | **0.88** | **0.24** | **-** | **0.13** |
| **Receptor 13: Nelson, St Johns, Enderby** | | | | |
| 2026 Without Development | 14.45 | 18.25 | 2 | 11.28 |
| 2026 With Development | 14.45 | 18.26 | 2 | 11.28 |
| **2026 Change** | **-** | **-** | **-** | **-** |
| **Proposed Receptor 14:** R17 | | | | |
| 2026 With Development | 15.27 | 17.93 | 2 | 11.21 |
| **Proposed Receptor 15:** R15 | | | | |
| 2026 With Development | 12.59 | 18.73 | 2 | 10.95 |
| **Proposed Receptor 16:** R14 | | | | |
| 2026 With Development | 10.16 | 18.65 | 2 | 10.88 |
| **Proposed Receptor 17:** R12 | | | | |
| 2026 With Development | 9.58 | 16.57 | 1 | 9.79 |

| | $NO_2$ Annual Mean ($\mu g/m^3$) | $PM_{10}$ Annual Mean ($\mu g/m^3$) | $PM_{10}$ - Number of Days >50$\mu g/m^3$ | $PM_{2.5}$ Annual Mean ($\mu g/m^3$) |
|---|---|---|---|---|
| **Proposed Receptor 18:** R1 | | | | |
| 2026 With Development | 9.43 | 16.15 | 0 | 9.43 |

Note:

Receptors 12 and 13 do not currently exist and therefore concentrations for 2010 have not been predicted. Receptors 14 to 18 would exist only as part of the Project and therefore concentrations at these are only predicted for the 2026'With Development' scenario,

13.5.16 The results in Table 13j indicate that in 2010 the annual mean $NO_2$ objective is exceeded at two of the existing locations (Receptor 1: 77 Hinckley Road and Receptor 10: 98 Leicester Road) which is consistent with the monitoring concentrations measured by BDC where these receptors are located. There are no predicted exceedences of the annual mean objective for $PM_{10}$ or $PM_{2.5}$ or daily mean $PM_{10}$ at any of the existing receptor locations.

13.5.17 The results of the modelling indicate that annual mean $NO_2$ and $PM_{10}$ concentrations predicted for 2026 'without' and 'with' the proposed development in place are below the objective level of 40$\mu g/m^3$ in both scenarios. There are also no predicted exceedences of the annual mean objective for $PM_{2.5}$ or the daily mean objective for $PM_{10}$ in either the 'without' or 'with' the proposed development scenarios.

13.5.18 As discussed in Appendix 13B, the hourly mean objective for $NO_2$ is unlikely to be exceeded at a roadside location where the annual-mean $NO_2$ concentration is less than 60$\mu g/m^3$. As shown in Table 13j, the predicted concentrations in 2010 and in 2026 are less than 60$\mu g/m^3$ at all the existing locations and as such it is unlikely that the hourly objective is exceeded. Therefore, hourly mean $NO_2$ is not considered further.

13.5.19 The Project is predicted to result in increases in pollutants concentrations at nine of the existing modelled receptors and decreases at two of the existing modelled receptors. The following changes, in relation to the magnitude of change descriptors outlined in Table 13c, were predicted:

- An 'imperceptible' change in annual mean $NO_2$ at nine receptor locations (Receptors 1, 3, 5-6, 8-11 and 13);
- A 'Small' change in annual mean $NO_2$ at four receptor locations (Receptors 2, 4, 7 and 12);
- An 'Imperceptible' change in annual mean $PM_{10}$ at all thirteen receptors; and
- An 'Imperceptible' change in daily mean $PM_{10}$ at all thirteen receptors.

13.5.20 Table 13k summarises the significance of the effects on $NO_2$ and $PM_{10}$ in accordance with the significance criteria identified in Table 13d and Table 13e.

**Table 13k: Magnitude of Change Descriptor in Relation to Changes in Concentrations of $NO_2$ and $PM_{10}$**

| | Receptor Location | $NO_2$ Annual Mean | $PM_{10}$ Annual Mean | Days $PM_{10}$ |
|---|---|---|---|---|
| 1 | 77 Hinckley Road | Negligible | Negligible | Negligible |
| 2 | 12 Beggar's Lane | Negligible | Negligible | Negligible |
| 3 | 259 Hinckley Road | Negligible | Negligible | Negligible |
| 4 | Willows Farm | Negligible | Negligible | Negligible |
| 5 | 20 Mill Hill | Negligible | Negligible | Negligible |
| 6 | 25 Priestman Road | Negligible | Negligible | Negligible |
| 7 | 55 Owen Close | Negligible | Negligible | Negligible |
| 8 | 119 Westover Road | Negligible | Negligible | Negligible |
| 9 | 89 St Johns | Negligible | Negligible | Negligible |
| 10 | 98 Leicester Road | Negligible | Negligible | Negligible |
| 11 | 11 St Johns | Negligible | Negligible | Negligible |
| 12 | Taylor Wimpey Development, Beggar's Lane | Negligible | Negligible | Negligible |
| 13 | Nelson, St Johns, Enderby | Negligible | Negligible | Negligible |

13.5.21 As shown in Table 13k, the Project is predicted to have a negligible effect at all receptor locations in relation to annual mean $NO_2$ concentrations and a negligible effect on daily and annual mean $PM_{10}$ at all existing receptors modelled.

13.5.22 There are no significance criteria in relation to annual mean $PM_{2.5}$ concentrations. However, given that the predicted annual mean $PM_{2.5}$ concentrations are well below the objective at all receptors with the development in place, and there is (at worst) only a slight increase in annual mean $PM_{2.5}$ of 0.13µg/$m^3$ at Receptor 12 as a result of the development, it is considered that the proposed development would result in negligible effects on annual mean $PM_{2.5}$.

13.5.23 In relation to the proposed Project itself (Receptors 14 - 18) concentrations are predicted to be well below the relevant $NO_2$, $PM_{10}$ and $PM_{2.5}$ objectives. It is therefore considered that introducing residential uses to the Site would be of negligible significance.

### $NO_2$ Sensitivity Analysis

13.5.24 The results of the sensitivity analysis on the basis of no future reduction in emission rates and background concentrations (i.e. considering the potential effect of the development against the current baseline 2010 conditions) are presented in Table 13l and the significance of these effects are presented in Table 13m.

**Table 13l: Results of the ADMS-Roads Modelling at Sensitive Receptors, Assuming No Improvement in NOx and NO2**

| Site ID | Receptor Name | 2010 Existing | 2026 without development | 2026 with development | 2026 change |
|---|---|---|---|---|---|
| 1 | 77 Hinckley Road | 44.80 | 51.25 | 50.13 | -1.12 |
| 2 | 12 Beggar's Lane | 17.76 | 19.60 | 21.03 | 1.43 |
| 3 | 259 Hinckley Road | 19.48 | 22.34 | 22.50 | 0.16 |
| 4 | Willows Farm | 18.39 | 20.33 | 21.91 | 1.58 |
| 5 | 20 Mill Hill | 21.78 | 24.38 | 23.37 | -1.01 |
| 6 | 25 Priestman Road | 26.91 | 29.10 | 30.72 | 1.62 |
| 7 | 55 Owen Close | 26.99 | 29.21 | 32.49 | 3.28 |
| 8 | 119 Westover Road | 28.06 | 30.66 | 31.24 | 0.58 |
| 9 | 89 St Johns | 26.01 | 27.30 | 28.20 | 0.90 |
| 10 | 98 Leicester Road | 47.00 | 53.47 | 54.28 | 0.81 |
| 11 | 11 St Johns | 28.90 | 30.92 | 32.28 | 1.36 |
| 12 | Taylor Wimpey Development, Beggar's Lane | - | 29.11 | 32.48 | 3.37 |
| 13 | Nelson, St Johns, Enderby | - | 37.31 | 37.31 | - |
| 14 | R17 | - | - | 34.61 | - |
| 15 | R15 | - | - | 28.42 | - |
| 16 | R14 | - | - | 20.01 | - |
| 17 | R12 | - | - | 19.02 | - |
| 18 | R1 | - | - | 18.47 | - |

**Table 13m: Magnitude of Change and Significance of Effects for Annual Mean $NO_2$ Concentrations with the Development in 2026, Assuming No Improvement in NOx and $NO_2$**

| Site ID | Receptor Location | Magnitude of Change (see Table 13c) | Significance (see Table 13d) |
|---|---|---|---|
| 1 | 77 Hinckley Road | Small | Minor Beneficial |
| 2 | 12 Beggar's Lane | Small | Negligible |
| 3 | 259 Hinckley Road | Imperceptible | Negligible |
| 4 | Willows Farm | Small | Negligible |
| 5 | 20 Mill Hill | Small | Negligible |
| 6 | 25 Priestman Road | Small | Negligible |
| 7 | 55 Owen Close | Medium | Minor Adverse |
| 8 | 119 Westover Road | Small | Negligible |
| 9 | 89 St Johns | Small | Negligible |
| 10 | 98 Leicester Road | Small | Minor Adverse |
| 11 | 11 St Johns | Small | Negligible |
| 12 | Taylor Wimpey Development, Beggar's Lane | Medium | Minor Adverse |
| 13 | Nelson, St Johns, Enderby | Imperceptible | Negligible |

13.5.25 The overall predicted concentrations in Table 13l are higher than those presented for 2026 due to higher background concentrations and vehicle emissions rates in 2010 than 2026. The higher emission rates also lead to higher changes in pollutants concentrations at some receptors. The Project is predicted to result in increases in pollutants concentrations at nine of the existing modelled receptors and decreases at two of the existing modelled receptors.

13.5.26 In accordance with the magnitude of change descriptors (as outline in Table 13c) and the significance of impacts (Table 13d), assuming no improvements to $NO_x$ and $NO_2$, the assessment predicted a medium change in annual mean $NO_2$ at two receptor locations (Receptors 7 and 12), a small change at nine receptor locations and an imperceptible change at the two remaining receptor locations as shown in Table 13m. Therefore taking into account uncertainty in future $NO_x$ and $NO_2$ reductions, the proposed development is predicted to result in a minor adverse to minor beneficial effect on air quality.

13.5.27 In relation to the proposed Project itself (Receptors 14 - 18), assuming no improvements to $NO_x$ and $NO_2$, concentrations are predicted to be well below the annual mean $NO_2$ objective. It is therefore considered that introducing residential uses to the Site would be of negligible significance.

13.5.28 The exceedences of the annual mean objective for $NO_2$ within the sensitivity analysis occur in the both with and without development scenarios and not as a result of the proposed development. In addition, the guidance published by Defra is that there may be reductions in $NO_x$ and $NO_2$ concentrations post 2015 when the Euro 6 emission standards begin to take effect. It is therefore considered that concentrations are likely to be lower than those presented in the sensitivity analysis.

**Cumulative Effects**

**Construction**

13.5.29 A number of sites have been identified as requiring consideration as part of the cumulative assessment. These include the two SUEs at Barwell and Earl Shilton as well as the developments at Meridian Way; Narborough Road; Grove Park; Grove Park Triangle; Oak Spinney Park, Ratby Lane, the Next car park, Taylor Wimpey (west of Beggar's Lane), St John's, Enderby residential development at Thorpe Astley and Glenfield Park which are identified at Figure 16 of the supplementary Transport Assessment.

13.5.30 The main impacts on air quality during the demolition and construction of developments are in relation to dust. Due to the typical dispersal and deposition rates of dust over distances, it is considered that the potential for dust to create a cumulative effect is only likely to be an issue for the closest developments, i.e. those within 50 to 100m of the Project, if they were to be constructed at the same time. The proposed SUEs at Barwell and Earl Shilton, and the other identified developments, except Taylor Wimpey (west of Beggar's Lane), are located further than 100m from the Site and therefore there would be no cumulative effects. Whilst the Taylor Wimpey scheme is located within 100m of the Site boundary, it is located over 100m from areas of the proposed Project where major construction works are likely, and therefore, there would be no cumulative effects.

13.5.31 It is expected that demolition and construction traffic routes for each of the cumulative schemes would be agreed with the LPA and thus traffic could be re-routed to minimise or avoid potential impacts if the schemes were to be constructed at the same time. On that basis, the impact of generated traffic on local air quality would be at worst minor adverse. However, these impacts would be temporary in nature.

**Completed Project**

13.5.32 The air quality assessment is inextricably linked to the Transport Assessment (TA) and the predicted changes in traffic flows. It is considered that the traffic data used to establish the impacts of the completed and operational Project on air quality accounted for cumulative schemes, through the growth applied to the base network, as outlined in the TA.

13.5.33 Therefore, the traffic data used within the air quality assessment for the future year of 2026 includes traffic related to other cumulative schemes in the surrounding area and therefore comprises a cumulative impact assessment in this regard. For these reasons, the cumulative effects on local air quality of the Project and the cumulative schemes are those predicted in this Chapter.

**Mitigation**

**Construction**

13.5.34 A range of environmental management controls (mitigation measures) would be developed with reference to the Building Research Establishment (BRE) guidance 'Controlling Particles, Vapour and Noise Pollution from Construction Sites'[30]. Particular attention would be paid to operations which must unavoidably take place in proximity to where the closest residential properties are located (i.e. close to the northern Site boundary, and adjacent to Lawn Cottages). Such measures would include:-

- Routine dust monitoring at sensitive residential locations, especially around the northern boundary of the Site, with the results and effectiveness of controls reviewed at regular meetings;
- Damping down surfaces during dry weather;
- Providing appropriate hoarding and / or fencing to reduce dust dispersion and restrict public access;
- Sheeting buildings, chutes, skips and vehicles removing wastes with the potential for dust generation;
- Appropriate handling and storage of materials;
- Minimising the amount of, and length of time, materials are stockpiled on the Site and covering all stockpiles wherever possible;
- Restricting drop heights onto lorries and other equipment;
- Fitting all equipment with dust control measures such as water sprays wherever possible;
- Using a wheel wash, limiting speeds on the Site to 5mph (8kph), avoiding of unnecessary idling of engines and routing of Site vehicles as far from sensitive properties as possible;
- Using gas powered generators rather than diesel if possible (these are also quieter) and ensuring that all plant and vehicles are well maintained so that exhaust emissions do not breach statutory emission limits;
- Switching off all plant when not in use;
- Prohibiting fires on the Site; and
- Ensuring that a road sweeper is available to clean mud and other debris from hardstanding roads and footpaths.

13.5.35 Such measures are routinely and successfully applied to construction projects throughout the UK and are capable of significantly reducing the potential for adverse nuisance dust effects associated with the various stages of construction work.

13.5.36 With the implementation of a range of appropriate site management practices to control dust emissions, the likely residual effects associated with construction activities would be negligible

30 Building Research Establishment (BRE), 2003, 'Controlling particles, vapour and noise from pollution from construction sites'.

to, at worst (particularly during dry and windy conditions) moderate adverse (at residential properties closest/adjacent to the Site boundary).

13.5.37 Any emissions from plant operating on the Site would be small in comparison to the emissions from the road traffic movements on the roads adjacent to the Site such that the residual effects would therefore be negligible.

**Completed Project**

13.5.38 As outlined in Chapter 15: Traffic and Transport in order to maintain and further improve accessibility to the Site a Travel Pack would be issued to all new residents to encourage the use of more sustainable modes of transport such as walking, cycling and using public transport, reduce unnecessary travel especially over short distances and encourage the use of sustainable travel by improving the facilities that are available and providing up to date information.

13.5.39 As part of the proposed employment use, a Travel Plan would be prepared which would include the information provided within the Travel Pack but also include monitoring and targets in which to reduce single car occupancy.

13.5.40 These measures would reduce travel by car and thus reduce further the predicted impact of the Project on air quality.

**Residual Effects**

**Demolition and Construction**

13.5.41 The effects of plant operating on the construction site would be negligible in the context of local background concentrations or existing adjacent road traffic emissions.

13.5.42 The effects of construction vehicles entering and leaving the Site would be negligible (on the wider main road network) to minor adverse (on roads closest to/accessing the Site) in context of local background concentrations and existing vehicles emissions.

13.5.43 Following the employment of appropriate environmental management controls as described above, it is envisaged that the effects of the demolition and construction works upon local air quality would be significantly reduced. As such, the worst-case (anticipated during dry and windy conditions only) residual effects resulting from demolition and construction related dust would be:-

- Temporary, short to medium term and of moderate adverse significance at Lawn Cottages (ER1); and
- Temporary, short to medium term and of minor adverse significance at properties along/off Forest House Lane, Guinevere Way and Lancelot Close.

**Completed Project**

13.5.44 The residual effect of operational phase heating plant systems on local air quality, with the imposition of suitable conditions to control effects, is considered to be negligible.

13.5.45 Taking into account the uncertainty in future $NO_x$ and $NO_2$ concentrations, the development is not predicted to cause any new exceedances of the air quality objectives or lead to an extension of any of the existing AQMAs. The operational traffic associated with the proposed development is predicted to result in, at worst, a minor adverse to, at best, a minor beneficial residual effect on local air quality.

13.5.46 The effect of introducing new sensitive receptors within the Site is considered to be of negligible significance.

## 13.6 STATEMENT OF EFFECTS

13.6.1 An assessment of the effect of the Project on local air quality arising from the construction and operational phases was undertaken. The construction effects of the Project would be related to dust and exhaust emissions from construction vehicles and plant. The effects of the completed Project could include emissions from traffic associated with the Project, and operational heating plant. A summary of the potential effects, mitigation measures and resulting residual effects are presented in Table 13n.

**Table 13n: Summary of Potential Effects, Mitigation and Residual Effects**

| Issue | Potential Effect / Significance | Mitigation Measures | Residual Effect / Significance |
|---|---|---|---|
| **Demolition and Construction** | | | |
| Dust emissions from demolition and construction activities | **Moderate** to **major adverse** | Routine environmental management control measures to prevent and control dust | **Minor** to **moderate adverse** |
| Emissions from on-site plant | **Negligible** | None required | **Negligible** |
| Emissions from construction vehicles | **Minor adverse** to **Negligible** | Routine environmental management control measures | **Minor adverse** to **Negligible** |
| **Completed Project** | | | |
| Operational plant emissions | **Negligible** | Use of routine controls on plant and ventilation systems | **Negligible** |
| Emissions from traffic associated with the completed Project | **Minor adverse** to **minor beneficial** in terms of $NO_2$ concentrations and **Negligible** in terms of $PM_{10}$ concentrations | Travel Pack and Travel Plan | **Minor adverse** to **minor beneficial** in terms of $NO_2$ concentrations and **Negligible** in terms of $PM_{10}$ concentrations |
| Introduction of new residential uses to the site | **Negligible** | None. | **Negligible** |