CHAPTER 14: AIR QUALITY & DUST

Introduction

14.1 This chapter assesses the environmental effects of the proposed development on air quality and dust. In particular, it considers the potential effects of the construction and operational phases of the proposed development on local air quality and dust at relevant public exposure locations.

14.2 The chapter describes the methods used to assess the effects, the baseline conditions currently existing at the site and surroundings, the potential direct and indirect impacts of the development arising from dust and particulates generated by construction activities and emissions from traffic generated during both the construction and operation of the site, the mitigation measures required to prevent, reduce, or offset the impacts and the residual impacts. It has been written by WSP | Parsons Brinckerhoff.

Planning Policy Context

14.3 A summary of legislation and guidance relevant to this chapter is provided in **Appendix 14.1**.

National Planning Policy

National Planning Policy Framework[i]

14.4 The Government's overall planning policies for England are described in the National Planning Policy Framework (NPPF). This document also outlines the means by which Government intends to apply these policies at various levels to achieve its aim of contributing to sustainable development. The Framework acknowledges the importance of appropriate and robust planning at a local level and thus promotes opportunities for communities to engage in plan making at a neighbourhood level. The core underpinning principle of the framework is the presumption in favour of sustainable development, defined as:

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

14.5 One of the 12 core planning principles in the NPPF is that planning should *"contribute to conserving and enhancing the natural environment and reducing pollution"*. The following paragraphs/policies are considered relevant to this assessment:

- **Paragraph 109**, which states *"The planning system should contribute to and enhance the natural and local environment by:…preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water, or noise pollution.."*;
- **Paragraph 110**, which states *"In preparing plans to meet development needs, the aim should be to minimise pollution and other adverse effects on the local and natural environment. Plans should allocate land with the least environmental or amenity value, where consistent with other policies in this Framework."*;
- **Paragraph 122**, which states *"..local planning authorities should focus on whether the development itself is an acceptable use of the land, and the*

impact of the use, rather than the control of processes or emissions themselves where these are subject to approval under pollution control regimes. Local planning authorities should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities"; and

- **Paragraph 124**, which states *"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan"*;
- **Paragraph 203**, which states *"Local Planning authorities should consider where otherwise unacceptable development could be made acceptable though the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition."*

Local Planning Policy

Staffordshire Moorlands Core Strategy[ii]

14.6 The Staffordshire Moorlands Core Strategy contains two policies relevant to air quality and the proposed development.

14.7 Policy SD4 (Pollution and Flood Risk) states that:

"The Council will ensure that the effects of pollution (air, land, noise, water, light) are avoided or mitigated by refusing schemes which are deemed to be (individually or cumulatively) environmentally unacceptable and by avoiding unacceptable amenity impacts by refusing schemes which are pollution sensitive adjacent to polluting developments or polluting schemes adjacent to pollution sensitive areas, in accordance with national guidance…"

14.8 Policy R1 (Rural Diversification) states that:

"… Appropriate development should not harm rural character and environmental quality of the area or any sites designated for their nature conservation, or historical interest by virtue of the scale, nature and level of activity involved and the type and amount of traffic generated or by other effects such as noise and pollution."

Churnet Valley Masterplan Supplementary Planning Document (SPD) [iii]

14.9 The Churnet Valley Masterplan SPD identifies opportunities and measures to help regenerate and manage the Churnet Valley based around sustainable tourism. It details the principles of sustainable tourism including that visitors and businesses should seek to minimise pollution, especially from transport.

Approach

Consultation and Scope of Assessment

14.10 An EIA Scoping Report was submitted to Staffordshire Moorlands District Council (SMDC) in July 2014; their formal Scoping Opinion (**Appendix 2.2**) was received in October 2014.

14.11 In addition to the Environmental Scoping Report, further consultations were undertaken with SMDC to clarify the approach to the air quality assessment and obtain local monitoring data for use in the assessment. **Table 14.1** provides a summary of the consultation activities undertaken in support of the preparation of this Chapter. This section also provides an update on the scope of the assessment.

Table 14.1: Summary of Consultation Undertaken to Date

Body/ organisation	Individual/s at body/organisation	Summary of outcome of discussions
Staffordshire Moorlands District Council	Dr. Daniel McCrory, Pollution Officer	▪ Agreed assessment methodology for the assessment. ▪ Agreed, as worst-case scenario, no improvement in background concentrations and emission factors would be assumed, and therefore they were kept constant with those used for model verification (2013). ▪ NO_2 monitoring data and latest monitoring reports provided.

Potentially Significant Effects

14.12 The scope of works considers the following key potential effects:

Construction

- Generation and deposition of dust arising from on-site construction activities (at nearby sensitive receptors);
- Generation of particulate matter (PM_{10}) arising from on-site construction activities (on local air quality at nearby sensitive receptors);
- Change in local pollutant concentrations (nitrogen dioxide (NO_2) and PM_{10}) generated by construction traffic and plant exhaust emissions (on local air quality at nearby sensitive receptors);

Completed Development

- Change in local pollutant concentrations (NO_2 and PM_{10}) generated from road traffic exhaust emissions associated with the completed development.

Insignificant Effects

14.13 It is understood that a Revised Restoration Plan (**Figure 3.1**) for the application site, which was formally a quarry, was approved by Staffordshire County Council (SCC) in March 2014. Any demolition activities required for the former quarry site will therefore be undertaken as part of the restoration scheme and consequently assessment of demolition has been scoped out of further consideration within this assessment.

Extent of Study Area

14.14 For the construction phase, in accordance with the Institute of Air Quality Management (IAQM) guidance[iv], consideration has been given to the area of up to 350m from the proposed development site boundary and 500m from the site

entrance along the anticipated haulage routes and site assess points used by construction traffic.

14.15 For the purposes of the operational phase assessment, traffic flow data have been provided for the surrounding road network (details of which are provided in **Appendix 14.2**). The study area has been defined by the extent of the traffic network for which data have been provided. The modelling considers sensitive receptors close to each of the road links.

Assessment Methodology

Baseline Desk Study

14.16 A desk study was undertaken to obtain baseline data to inform the assessment. This study included the following:

- Collation and review of local monitoring data and air quality data for the area surrounding the site, including monitoring data provided directly by SMDC[v] and DEFRA's online Local Air Quality Management (LAQM) support pages[vi];
- Review of information relating to existing industrial pollutant sources in the local area including the Environment Agency's (EA) website[vii]; and
- A study of local mapping data available for the Study Area and the parameter plans for the proposed development to identify local receptors that may be sensitive to a change in local air quality. This included the review of information available regarding relevant ecological receptors from the Multi-Agency Geographic Information for the Countryside (MAGIC) on-line mapping website[viii].

Construction

Generation and deposition of dust and PM_{10} arising from on-site construction activities (at nearby sensitive receptors)

14.17 A qualitative assessment of the likely significant effect on local air quality associated with the generation and dispersion of dust and dispersion of PM_{10} during the construction phase has been undertaken using the relevant assessment methodology published by the IAQM[iv], the available information for this phase of the proposed development and professional judgement.

14.18 As part of the assessment consideration has been given to the following factors:

- the size of the proposed development site and the areas where construction activities are likely to take place;
- the types of activities associated with the construction phase of the proposed development that could generate dust, and their likely duration;
- the proximity and type of sensitive receptors (e.g. schools, residential properties, etc.) to the proposed development site boundary;
- the prevailing wind direction in the area in which the proposed development construction site is located;
- the presence of vegetation surrounding the proposed development site boundary, which might act as a buffer;
- the potential distance which the construction traffic will travel across unpaved roads on the construction site, prior to accessing the local road network and contributing to 'track-out'); and
- current background PM_{10} concentration at the proposed development site.

Change in local pollutant concentrations (NO_2 and PM_{10}) generated from construction traffic and plant exhaust emissions (on local air quality at nearby sensitive receptors)

14.19 Exhaust emissions from construction vehicles and plant may have an impact on local air quality both on-site and adjacent to the routes used by construction vehicles to access the construction site. At the time of assessment, detailed information on type and volume of site traffic and plant during the construction phase was not known. A qualitative evaluation of their overall impact on local air quality has therefore been undertaken by considering:

- the level of construction traffic likely to be generated by this phase of the proposed development;
- the type and number of plant likely to be used in this phase of the proposed development;
- the number and distance of sensitive receptors in the vicinity of the proposed development site boundary and along the likely routes to be used by construction vehicles; and
- the likely duration of the construction phase and the nature of the construction activities undertaken.

Completed Development

Change in local pollutant concentrations (NO_2 and PM_{10}) generated from road traffic exhaust emissions associated with the completed development

14.20 In order to predict the effect on local air quality of emissions arising from additional road traffic generated by the proposed development is complete and operational, the detailed dispersion model ADMS Roads has been used (version 4.0.1.0). This model requires various input data, including the emissions for each section of road (determined from traffic flows, as described below), and road characteristics (including road width, height above ground, and street canyon height, where applicable) to predict pollutant concentrations at specific receptor locations, as determined by the user.

14.21 The model also requires meteorological data, including wind speed and direction. Meteorological data used in the model were obtained from the Met Office observing station at Leek Thorncliffe, which is located approximately 12km north of the study area, and is considered to be representative. The meteorological data used for this assessment are for 2013. A windrose presenting the wind speed and direction at this meteorological station is presented in **Appendix 14.3**.

14.22 Traffic data have been provided by Royal Haskoning DHV for road links in the vicinity of the proposed development, supplemented by traffic data from the Department for Transport[ix]. A summary of the traffic data used in the assessment and associated assumptions are presented in **Appendix 14.2**. Data includes the Annual Average Daily Traffic flow (AADT), vehicle speed (kph) and the percentage of Heavy Duty Vehicles (HDVs) for each road link included within the model for each of the assessment scenarios considered. Traffic speeds were provided by Royal Haskoning and where appropriate were reduced at junctions in line with guidance provided in LAQM.TG(16)[x].

14.23 For the assessment of operational road traffic effects, five scenarios were modelled:

- 2016 – Baseline Conditions;
- 2020 – Without Development i.e. Future Baseline (1); and

- 2020 – With Development i.e. Future Baseline (1) plus proposed development flows.
- 2035 – Without Development i.e. Future Baseline (2); and
- 2035 – With Development i.e. Future Baseline (2) plus proposed development flows.

14.24 Model verification has been carried out for the year 2013, as this is the most recent year for which SMDC monitoring data were available. No monitoring is currently undertaken within the study area, but monitoring was previously undertaken at a location in Whiston (SMDC Site Id 22, between 2007 and 2009). Across SMDC, monitored annual mean NO_2 concentrations have decreased on average by less than 5% between 2009 and 2013 and, for model verification purposes, it was considered appropriate to assume the concentrations remained constant to the verification year of 2013.

14.25 Acknowledging that the use of 2009 monitoring data introduces a level of uncertainty into the assessment, an additional model (based on DfT traffic counts) was set up for the Cellarhead junction (A52 and A520). Monitoring data were available for this junction for 2013. The model verification factors derived from the 2009 Whiston data and the 2013 Cellarhead junction 2013 data were consistent, which confirms the robustness of the approach.

14.26 Further details of the model verification process, and the factors obtained, are presented in **Appendix 14.4**.

14.27 The future year traffic data, in both the Future Baseline and Future Baseline plus proposed development scenarios, take into account the committed developments in the area including Bolton Copperworks. The assessment is, therefore, inherently a cumulative assessment, ensuring that the modelled roadside pollutant concentrations presented in this chapter are a worst case.

Vehicle Emission Factors

14.28 The vehicle emission factors adopted for use in the assessment were obtained using the Emission Factor Toolkit (EFT) Version 6.0.1 available on the DEFRA website[xi]. Emission factors are available for all years between 2008 and 2030 and take into account the most recent evidence relating to factors such as advances in vehicle and exhaust technology and changes in composition of the vehicle fleet; the emission factors consequently reduce over time. There is currently some uncertainty over how representative future predictions are, with greater uncertainty the further into the future predictions are made. To address this uncertainty, it was assumed that there would be no improvement in emission factors from the model verification year of 2013 in future years. This represents a worst-case approach to the assessment and was agreed with the EHO at SMDC prior to commencement of the assessment.

Processing of Background Concentrations

14.29 Background concentrations of NO_2 and PM_{10} for the study area have been taken from the recently updated national maps provided by DEFRA[xii]. These maps provide estimated background concentrations for the whole of the UK at a grid resolution of 1x1km, for all years between 2011 and 2030. The maps also assume that background concentrations will improve (i.e. reduce) over time, in line with the predicted reduction in vehicle emissions as well as reductions in emissions from other sources. Due to the uncertainty discussed above, and in line with the findings of many local authorities that measured concentrations have not reduced as anticipated, background concentrations for 2013 have been

utilised within the assessment for all scenarios (including future years). This is again considered a worst-case approach.

14.30 The nitrogen oxides (NO_x) and PM_{10} background maps present both the 'total' estimated background concentrations and the individual contributions from a range of emission sources (for example, motorways, aircraft, domestic heating etc.). When detailed modelling of an individual sector is required as part of an air quality assessment, the respective contribution can be subtracted from the overall background estimate to avoid the potential for 'double-counting'. To ensure a worst-case assessment the total estimated background concentrations have been used in this assessment.

14.31 The background concentrations used in the assessment are presented later in this Chapter (**Table 14.7**).

Model Verification and Results Processing

14.32 The ADMS Roads detailed dispersion model has been widely validated for this type of assessment and is considered to be fit for purpose. Model validation undertaken by the software developer will not, however, have included validation in the vicinity of the proposed development considered in this assessment. To determine the performance of the model at a local level, a comparison of modelled results with local monitoring data at relevant locations was undertaken. This process of verification aimed to minimise modelling uncertainty and systematic error by correcting modelled results by an adjustment factor to gain greater confidence in the final results.

14.33 The SMDC Whiston diffusion tube used in the verification process is noted as being very close to the edge of the road and could be considered as a kerbside location (within 1m from the road edge). LAQM.TG(16) notes that kerbside sites can lead to over-adjustment of modelling at roadside sites and therefore would not normally be recommended for use in verification at non kerbside sites. The verification has also taken into account monitoring at a property façade in Cellarhead. This monitoring location is at a busy junction where queuing traffic may also result in over-adjustment of model results for the study area. However, as noted previously, the two verification factors are consistent and the approach is considered robust. Using the Whiston monitoring data for verification has been agreed with the Environmental Health Officer at SMDC.

14.34 Details of the verification calculations are presented in **Appendix 14.4**. A factor of **4.59** was obtained during the verification process and applied to the modelled road-NO_x component at receptors, before conversion to annual mean NO_2 concentrations utilising the NO_x from NO_2 calculator provided by DEFRA[xiii].

14.35 As local roadside monitoring data are not available for PM_{10}, the modelled road-PM_{10} component has been adjusted using the same factor, before adding to the appropriate background concentration. The number of days with PM_{10} concentrations greater than 50µg/m^3 was then estimated using the relationship with the annual mean concentration described in LAQM.TG(16).

14.36 LAQM.TG(16) advises that an exceedence of the 1 hour mean NO_2 objective is unlikely to occur where the annual mean concentration is below 60µg/m_3, where road transport is the main source of pollution. This concentration has been used to screen whether the hourly mean objective is likely to be achieved.

14.37 For the assessment of the effect on ecological receptors, background NO_x concentrations were added to the verified modelled road contribution NO_x concentrations to give total NO_x concentrations.

14.38 Once processed, the predicted concentrations have been compared against the current statutory limit values and objectives for NO_2, NO_x and PM_{10} set out in **Appendix 14.1**.

Selection of Sensitive Receptors

14.39 Sensitive locations are those where the public or sensitive ecological habitats may be exposed to pollutants resulting from activities associated with the proposed development. These will include locations sensitive to an increase in dust deposition and PM_{10} exposure as a result of on-site construction activities, or exposure to pollutants from exhaust emissions from construction site traffic and plant and traffic associated with the proposed development once it becomes operational.

14.40 The sensitivity of the area to dust and PM_{10} generated by construction activities has been determined qualitatively using professional judgement and the criteria provided in the IAQM guidance[iv] (see **Appendix 14.5**). The IAQM construction assessment methodology is undertaken where there are 'human receptors' within 350m of the site boundary; or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s); and/or 'ecological receptors' within 50m of the site boundary; or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s). It is within these distances that the impacts of dust soiling and increased PM_{10} in the ambient air will have the most significant impact on sensitive receptors.

14.41 In terms of locations that are sensitive to pollutants emitted from engine exhausts, these will include places where sensitive members of the public are likely to be regularly present and are likely to be exposed to air pollution over the relevant period of time prescribed in current legislation and in the UK Air Quality Objectives (AQO) specified in the UK Air Quality Strategy (AQS). Examples of areas representative of public exposure in terms of sensitivity to NO_2 and PM_{10}, over the relevant averaging periods for these pollutants, are provided in DEFRA guidance LAQM.TG(16) in Box 1.1.

14.42 To carry out the assessment of operational phase impacts, a number of 'receptors' were identified at which pollution concentrations were predicted. The receptors were chosen based on a review of local detailed mapping information and following advice in LAQM.TG(16). The locations of the assessment receptors are shown in **Figure 14.1** and are summarised in **Table 14.2**. They include locations adjacent to the routes that are likely to be affected by changes in traffic volume as a result of the proposed development.

Table 14.2: Receptor Locations Used in the Assessment of the Operational Phase Effects

Receptor Number	Description	X	Y	Height (m)	Relevant AQS Objective Averaging Period
1	Leys Heath Farm	403545.8	347149.2	1.5	Annual Mean NO_2 and PM_{10} Hourly Mean NO_2 Daily (24-hour) Mean PM_{10}
2	Bank House A52	403680.6	347138.8	1.5	
3	Brook Cottage A52	403733.5	347194.5	1.5	
4	1 Moorland House Cottages A52	403951.5	347234	1.5	
5	1 Whiston Eaves Lane	403764.1	347154.4	1.5	
6	8 Whiston Eaves Lane	403753.8	347133.2	1.5	
7	5 Whiston Eaves Lane	403762.9	347104.8	1.5	
8	Whiston Grange	403888.5	346775.4	1.5	
9	Cottage Farm Eaves Lane	404137.7	346429.6	1.5	
10	Cowtrees Farm Eaves Lane	404890.2	346010.9	1.5	
11	1 Eaves Lane	405399.2	345711.7	1.5	
12	Springhill Carr Bank	405460.5	345086.4	1.5	
13	17 The Square Carr Bank	405439	344981.6	1.5	
14	1 Starwood Terrace Carr Bank	405463.3	344931.9	1.5	
15	Stornaway B5417	405461.8	344896.3	1.5	
16	Old Bank Cottage B5417	405494.1	344887.8	1.5	
17	Rose Bank B5417	405562.8	344884	1.5	
18	Foxbank Croft B5417	405288.6	344775.1	1.5	
19E	Whiston Eaves SSSI	403941	346289	0	Annual Mean NO_x

14.43 For all human receptors pollutant concentrations were predicted at a height of 1.5m to broadly represent the average height of an adult. For the ecological receptor considered, concentrations have been predicted at ground level (0m).

Significance Criteria

14.44 The assessment of potential effects as a result of the proposed development has taken into account both the construction phase and the operational phase. The significance level attributed to each effect has been assessed based on the magnitude of change due to the proposed development and the sensitivity to change of the affected receptor/receiving environment.

14.45 Criteria specific to air quality assessments are provided by the IAQM and the Environmental Protection UK (EPUK)[xiv] and have been used in this assessment, where appropriate, as detailed below. Where appropriate the terminology in the EPUK and IAQM documents has been adapted to ensure consistency with the

terminology used in this ES chapter (Chapter 2: Approach); this is discussed further in the following section.

14.46 For the purposes of this assessment, the significance of effects is described as either 'negligible', or of 'minor', 'moderate' or 'major' significance where:

- Major adverse effect: the proposed development could be expected to have a very significant adverse effect on local air quality conditions in the study area;
- Moderate adverse effect: the proposed development could be expected to have a noticeable adverse effect on local air quality conditions in study area;
- Minor adverse effect: the proposed development could be expected to result in a small, barely noticeable adverse effect on local air quality conditions in the study area; and
- Negligible: no discernible effect is expected as a result of the proposed development on local air quality conditions in the study area.

Construction

Generation and deposition of dust and PM_{10} arising from on-site construction activities (at nearby sensitive receptors)

14.47 The significance of effects associated with dust and PM_{10} generated from on-site construction activities has been determined through professional judgement and the findings of the assessment carried out in accordance with the IAQM assessment methodology[iv] summarised in **Appendix 14.5**.

14.48 The IAQM assessment methodology recommends that significance criteria is only assigned to the identified risk of dust impacts occurring from a construction activity with appropriate mitigation measures in place, as mitigation is assumed to be secured by planning conditions, legal requirements or required by regulations. For almost all construction activities, the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effect will normally be negligible.

14.49 However, for the purposes of this ES, the significance of effects has been considered both before and after the application of mitigation. The criteria in **Table 14.3** have been used for defining the significance of the pre-mitigation impacts identified in this Chapter.

Table 14.3: Significance Matrix

Sensitivity	**Dust Emission Magnitude[1]**		
	Large	**Moderate**	**Slight**
High	Major adverse	Moderate adverse	Minor adverse
Medium	Moderate adverse	Minor adverse	Negligible
Low	Minor adverse	Negligible	Negligible
[1] IAQM terminology has been adapted to ensure consistency with the terminology used in this ES.			

Change in local pollutant concentrations (NO_2 and PM_{10}) generated from construction traffic and plant exhaust emissions (on local air quality at nearby sensitive receptors)

14.50 The significance of effects of exhaust emissions (NO_2 and PM_{10}) arising from vehicles and plant during this phase of the proposed development have been evaluated qualitatively using professional judgement, the principles of the EPUK guidance and the significance criteria described below for the completed development effects.

Completed Development

Change in local pollutant concentrations (NO_2 and PM_{10}) generated from road traffic exhaust emissions associated with the completed development

14.51 The approach provided in the IAQM/EPUK guidance has been used within this assessment to assist in describing the air quality effects of additional emissions from traffic generated by the proposed development once operational and assessing their significance.

14.52 The EPUK guidance sets out a three staged approach:

- determining the magnitude of change at each receptor (the change in pollutant concentration, as predicted by the detailed modelling);
- describing the impact (relative to the air quality objective or limit value); and
- assessing the overall significance.

14.53 **Table 14.4** presents the impact magnitude descriptors, whilst **Table 14.5** describes the severity of the impact. Where appropriate the terminology used in the IAQM/EPUK document has been adapted to ensure consistency with the terminology used in this ES. There is no distinction in the sensitivity of different human receptors to air quality. In applying the IAQM/EPUK criteria, all percentages are rounded to zero decimal places.

Table 14.4: Operational Phase Magnitude of Change

Magnitude of Change	**Quantitative Definition**	**Annual Mean NO_2 and PM_{10}**	**Number of Days PM_{10} >50µg/m^3**
Imperceptible	Increase or decrease of <1%	<0.2µg/m^3	
Very Small	Increase or decrease of 1% of AQS objective level	0.2 – <0.6µg/m^3	<1 day
Small	Increase or decrease of between 1 – 5% of AQS objective level	0.6 – <2.2µg/m^3	1 – 2 days
Medium	Increase of decrease of between 5 – 10% of AQS objective level	2.2 – <4.2µg/m^3	3 – 4 days
Large	Increase of decrease of > 10% of AQS objective level	>=4.2µg/m^3	>4 days

14.54 Where there is an increase in concentrations, the absolute concentration relates to the 'with development' air quality. Where there is a decrease in concentrations, the absolute concentration relates to the 'without development' air quality; where concentrations increase, the effect is described as adverse, and where it decreases, as beneficial.

14.55 The IAQM/EPUK guidance states that the assessment of overall significance (Stage 3) should be based on professional judgement, taking into factors such as:

- the existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

Table 14.5: Operational Phase Severity of Impacts at a Receptor

Long Term Average Concentration	% Change in concentration relative to Air Quality Objective				
	0%	1%	2-5%	6-10%	>10%
75% or less of standard	Negligible	Negligible	Negligible	Slight	Moderate
76 – 94% of standard	Negligible	Negligible	Slight	Moderate	Moderate
95 – 102% of standard	Negligible	Slight	Moderate	Moderate	Substantial
103 – 109% of standard	Negligible	Moderate	Moderate	Substantial	Substantial
110% or more of standard	Negligible	Moderate	Substantial	Substantial	Substantial

14.56 The IAQM/EPUK guidance above applies to long term concentrations only.

14.57 The EPUK guidance also does not provide criteria for determining the significance of the impact of increased pollutant concentrations on sensitive habitats and ecological receptors. The significance of the impacts on these habitats has therefore been determined using professional judgement and the principles of the criteria provided by the EPUK.

Assumptions/Limitations

Construction

14.58 At the time of the assessment full details regarding the construction phase (i.e. exact duration, phasing, activities, equipment etc.) had not been fixed and therefore the assessment has been based on the available information provided by the Applicant, a number of assumptions and previous experience of similar sized schemes.

Completed Development

14.59 There are uncertainties associated with both measured and predicted concentrations. The model (ADMS Roads) used in this assessment relies on input data (including predicted traffic flows), which also have uncertainties associated with them. In addition, the model itself simplifies complex physical systems into a range of algorithms. Local micro-climatic conditions may affect the concentrations of pollutants that the ADMS Roads model will not take into account.

14.60 In order to reduce the uncertainty associated with predicted concentrations, model verification has been carried out following the methodology set out in LAQM.TG(16). It is noted that the monitoring sites used in the model verification procedure were identified as being at a kerbside position (Whiston) and at a signalised junction (Cellarhead). Both sites could lead to an over-adjustment of the modelling results at roadside assessment receptors. This approach is considered to provide a worst-case approach to the prediction of NO_2 and PM_{10} concentrations at roadside assessment receptors.

14.61 Due to the uncertainty surrounding the accuracy of future year vehicle emissions and background concentrations, a precautionary approach has been taken whereby for future scenarios, an assumption of no improvement in vehicle emissions or background concentrations has been adopted. This approach is

considered to provide a conservative assessment and has been agreed with the EHO at SMDC. In addition, the most recent information relating to vehicle emissions has been utilised (EFT v6.0; June 2014).

Baseline Conditions

Staffordshire Moorlands District Council's Review and Assessment of Air Quality

14.62 SMDC has not declared any Air Quality Management Areas (AQMAs) within their administrative area as part of their review and assessment work.

Local Emission Sources

14.63 The proposed development site is located in an area where there are few local emission sources in the immediate vicinity of the Site. None of the roads in the immediate vicinity represent a significant impact on local air quality due to the relatively low traffic flows using them; instead these sources will characterise background pollutants concentrations in the area. The closest a-road to the proposed development site is the A52 located approximately 750m north.

14.64 There are no industrial pollution sources in the immediate vicinity of the site that are likely to significantly influence the local air quality.

Local Monitoring Data & Background Air Quality Data

14.65 There are currently no local air quality monitoring stations (either automatic or passive) within the vicinity of the Site. Between 2007 and 2009 SMDC had a NO_2 diffusion tube located on Whiston Eaves Lane, approximately 0.7km north of the proposed development site. The monitoring results for this diffusion tube between 2007 and 2009, as shown in **Table 14.6**, indicate annual mean NO_2 concentrations were well below the annual mean objective level, with measured concentrations ranging from 15 to 17µg/m^3.

Table 14.6: SMDC Monitoring Data

Site ID	Site Name	Grid Reference	Annual mean NO_2 concentration (µg/m^3)		
			2007	2008	2009
22	Whiston	403761, 347105	17	15	16

14.66 **Table 14.7** summarises the background pollutant concentrations for 2013, utilised within the assessment. The concentrations are well below the relevant objectives. The data were interpolated from the 1km x 1km resolution of the Defra dataset to the receptor locations. This approach avoids step changes in concentration at the boundary between dataset squares.

Table 14.7: Background Concentrations Use in the Assessment

ID	Name	NO_x µg/m^3	PM_{10} µg/m^3
1	Leys Heath Farm	12.6	13.9
2	Bank House A52	12.5	14.0
3	Brook Cottage A52	12.5	14.0
4	1 Moorland House Cottages A52	12.4	14.1
5	1 Whiston Eaves Lane	12.5	14.0
6	8 Whiston Eaves Lane	12.5	14.0
7	5 Whiston Eaves Lane	12.5	14.0
8	Whiston Grange	12.4	14.2
9	Cottage Farm Eaves Lane	12.3	14.5
10	Cowtrees Farm Eaves Lane	12.1	14.3
11	1 Eaves Lane	12.0	13.9
12	Springhill Carr Bank	12.1	13.9
13	17 The Square Carr Bank	12.1	13.9
14	1 Starwood Terrace Carr Bank	12.1	14.0
15	Stornaway B5417	12.1	14.0
16	Old Bank Cottage B5417	12.1	14.0
17	Rose Bank B5417	12.1	13.9
18	Foxbank Croft B5417	12.2	14.0
19E	Whiston Eaves SSSI	12.4	14.2

Potential Impacts

Construction

Change in local pollutant concentrations (NO_2 and PM_{10}) generated from road traffic exhaust emissions associated with the completed development

14.67 Construction activities associated with the proposed development have the potential to generate and/or re-suspend dust are likely to include:

- Preparation of temporary access/egress to the site and haulage routes;
- Earthworks;
- Materials handling, storage, stockpiling, spillage and disposal;
- Movement of vehicles and construction traffic within the site (including excavators and dumper trucks);

- Construction of buildings, roads and areas of hard standing alongside fabrication processes;
- Internal and external finishing and refurbishment; and
- Site restoration after completion.

14.68 The majority of the releases are likely to occur during the 'working week'. However, for some potential release sources (e.g. exposed soil produced from significant earthwork activities / stockpiles) in the absence of dust control mitigation measures, dust generation has the potential to occur 24 hours per day over the period during which such activities are to take place.

14.69 It is understood that the construction period will be phased and likely to take place over a period of up to five years. However as a worst-case scenario, the assessment has been based on the entire development site coming forward as a single phase of development.

Assessment of Potential IAQM Dust and PM_{10} Magnitude

14.70 The IAQM assessment methodology has been used to determine the potential dust and PM_{10} emission magnitude for the following three different stages of the proposed development: earthworks, construction and trackout. The findings of the assessment are presented below.

Earthworks

14.71 It understood that as part of the Revised Restoration Plan, which has already been approved by SCC, the site will be fully restored and any major earthworks (e.g. excavation, ground levelling, etc.) will have been considered as part of the restoration plan. Therefore any remaining earthworks required as part of the proposed development are considered likely to be small and therefore the potential dust emission magnitude is considered to be small for earthwork activities.

Construction

14.72 It is anticipated that the total volume of the buildings to be constructed on the site will be between 25,000 to 100,000m^3. A combination of construction material will be used but it is noted that the lodge buildings will be prefabricated off-site and once delivered to site placed onto a concrete plinth (with services installed) and therefore should be minimal dust or particulate matter related to the lodge construction materials. As a worst-case assessment, based on the total volume of buildings to be constructed, the potential dust emission magnitude is considered to be medium for the construction activities.

Trackout

14.73 Exact numbers of HDV movements likely to be generated by the construction of the proposed development are expected to be between 10 to 50 HDV outward movements per day. The unpaved road length within the proposed development site during the construction phase is expected to be greater than 100m. Therefore, the potential dust emission magnitude for trackout is considered to be medium.

14.74

14.75

14.76 Table 14.8 provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 14.8: Potential Dust and PM_{10} Emission Magnitude

Activity	Dust and PM_{10} Emission Magnitude
Earthworks	Slight
Construction	Moderate
Trackout	Moderate

Assessment of Sensitivity of Study Area

14.77 A windrose generated using the meteorological data used for the dispersion modelling of operational phases effects is provided in **Appendix 14.3**. This shows that the prevailing wind direction is from the east, although there are also fairly significant components from the southern and western sectors. Therefore, receptors located to west of the construction activities are more likely to be affected by dust emitted and re-suspended during the construction phase, but there is also a risk for those properties to the north and east of the site. There are only a small number of properties within the immediate vicinity of the proposed development to the west, north or east of the site; further detail is provided below.

14.78 Depending on wind speed and turbulence, it is likely that the majority of dust would be deposited in the area immediately surrounding the source. There are approximately thirty residential properties within 350m of the site. However none of these residential properties are within 20m and only 2 are within 50m of the site boundary. Due to the number of residential properties within 50m of the site, the sensitivity of the area to dust soiling is considered to be medium for earthworks and construction activities. There are a limited number of residential properties (less than 10) within 20m of Eaves Lane up to 500m from the site entrance along which construction traffic may travel. Therefore, the surrounding area has also been considered to be of medium sensitivity for trackout activities.

14.79 Taking the above into account and the background concentrations of PM_{10} in the local area which are well below the AQS objective, the sensitivity of the surrounding area to generation of PM_{10} is considered to be low for earthworks, construction and trackout activities.

14.80 The Whiston Eaves Site of Special Scientific Interest (SSSI) and Ashbourne Hey Site of Biological Importance (SBI) are located immediately adjacent to the southwest boundary of the proposed development site. Most earthworks and construction activities at the site are expected to be undertaken at a distance of greater than 20m from these two sites and therefore the overall sensitivity of these ecological receptors during earthworks and construction has been considered as medium. There are no designated ecological sites within 50m of Eaves Lane up to 500m from the site entrance along which construction traffic may travel; therefore ecological receptors have not been considered in relation to trackout activities.

14.81 A summary of the sensitivity of the surrounding area to dust soiling and PM_{10} generation is shown in

14.82 **Table** 14.9.

Table 14.9: Sensitivity of the Study Area

Potential Effect	Sensitivity of Surrounding Area		
	Earthworks	Construction	Trackout

Dust Soiling	Medium	Medium	Medium
Generation of PM_{10}	Low	Low	Low
Ecological	Medium	Medium	N/A

IAQM Risk of Impacts

14.83 The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation. **Table 14.10** below provides a summary of the risk of dust impacts for the proposed development. The risk category identified for each construction activity has been used to determine the level of mitigation required.

Table 14.10: Summary of IAQM Dust Risk

Potential Effect	Risk		
	Earthworks	Construction	Trackout
Dust Soiling	Low Risk	Medium Risk	Low Risk
Generation of PM_{10}	Negligible	Low Risk	Low Risk
Ecological	Low Risk	Medium Risk	N/A

Significance of Effects

14.84 A summary of the effect significance, prior to mitigation, for each relevant source of dust is provided in **Table 14.11**.

Table 14.11: Pre-mitigation Summary of Significance Table for Dust and PM_{10} Generated during the Construction Phase

Potential Effect	Significance		
	Earthworks	Construction	Trackout
Dust Soiling	Negligible	Minor Adverse	Minor Adverse
Generation of PM_{10}	Negligible	Negligible	Negligible
Ecological	Negligible	Minor Adverse	NA

14.85 The sensitivity of the surrounding area in terms of dust soiling is medium, and the overall magnitude of change prior to mitigation is considered to range between slight to moderate. Therefore, there is considered to be a direct, temporary, short to medium-term effect on nearby receptors of **negligible** to **minor adverse significance** prior to the implementation of mitigation measures.

14.86 The sensitivity of the surrounding area in terms of PM_{10} generation is low, and the overall magnitude of change prior to mitigation is considered to range between slight to moderate. Therefore, there is considered to be a direct, temporary, short to medium-term effect on nearby receptors of **negligible significance** prior to the implementation of mitigation measures.

14.87 The sensitivity of the surrounding area in terms of ecological receptors is medium, and the overall magnitude of change prior to mitigation is considered to range between slight to moderate. Therefore, there is considered to be a direct, temporary, short to medium-term effect on nearby receptors of **negligible** to **minor adverse significance** prior to the implementation of mitigation measures.

Change in local pollutant concentrations (NO_2 and PM_{10}) generated from construction traffic and plant exhaust emissions (on local air quality at nearby sensitive receptors)

14.88 Exhaust emissions from construction vehicles will have an effect on local air quality both on the site and adjacent to the routes used by vehicles to access the site. The greatest potential for effects on air quality from traffic associated with the construction phase will be in areas immediately adjacent to the principal site access for construction traffic.

14.89 It is anticipated that a range of typical plant and equipment will be employed on site, including excavators and dumpers. There will also be a requirement to deliver equipment and materials to the site. Additional vehicle movements will also be generated by construction staff travelling to and from the site.

14.90 It is understood that a Construction Traffic Management Plan will be prepared for the site and construction traffic would travel to and from the site via Eaves Lane and the A52. There are a small number of residential properties and a school located close to these roads that may be affected by an increase in local pollutant concentrations. However, background pollutant concentrations in the area are well below the AQS objectives and any effects will be temporary and will not result in long-term changes in local air quality.

14.91 The sensitivity of residential receptors along the surrounding road networks is high and the magnitude of change, prior to mitigation, is negligible. Therefore, there is likely to be a direct, temporary, short-term effect on local air quality (at locations where members of the public are present) of **negligible significance** prior to the implementation of mitigation measures.

Completed Development

Change in local pollutant concentrations (NO_2 and PM_{10}) generated from road traffic exhaust emissions associated with the completed development

14.92 Full results of the dispersion modelling are presented in **Appendix 14.6** and are summarised below.

Annual Mean NO_2 Concentrations

14.93 The AQS objective for annual mean NO_2 concentrations is 40µg/m^3. The results of the assessment show that, in the 2016 baseline case, concentrations meet the objective at all of the assessment receptor locations. The highest predicted concentration is 17.3µg/m^3 at Receptor 15 (Stornaway). These results agree with the conclusions of the LAQM work undertaken by SMDC, which concluded that no AQMAs need to be designated for this pollutant as exceedence of the objective for this pollutant would not be expected in this area.

14.94 Predicted concentrations in the 2020 opening year scenarios are higher than those predicted for the 2016 baseline scenario at all receptors. This is consistent with the precautionary approach adopted which assumes no improvement (reduction) in vehicle emissions or background concentrations with time, and reflects the increase in traffic flows brought about by growth in the area, even without the proposed development in place.

14.95 In 2020, predicted concentrations at all of the assessment receptors, both with and without the proposed development, still meet the AQS objective. The highest concentrations are predicted at Receptor 2 (Banks House, A52) where the predicted concentrations are 20.8µg/m^3 "without development" and 21.7µg/m^3 "with development". In 2035, these concentrations are 21.7µg/m^3 "without development" and 22.6µg/m^3 "with development".

14.96 **Table 14.12** presents a summary of the magnitude of change in annual mean NO_2 concentrations predicted at each of the assessment receptors, along with the effect significance (based on the criteria presented in **Table 14.4** and **Table 14.5**) for the opening year of 2020. The conclusions are the same for 2035.

Table 14.12: Summary of Annual Mean NO_2 Results

Number of receptors	Magnitude of Change	Severity
Increase at 18 receptors	Imperceptible at 8 receptors Very Small at 3 receptors Small at 4 receptors Moderate at 3 receptor	Negligible at 15 receptors Slight adverse at 3 receptor

14.97 The annual mean NO_2 concentrations predicted by the model were all well below 60µg/m^3, and therefore exceedences of the hourly mean NO_2 concentration objective are unlikely to occur. The conclusions are the same for 2035.

Annual Mean PM_{10} Concentrations

14.98 The AQS objective for annual mean PM_{10} concentrations is a concentration of 40µg/m^3 to be achieved by the end of 2004 and thereafter. The results of the assessment show that, in the 2016 baseline case, concentrations at all of the receptors are predicted to meet the objective. This is consistent with SMDC's findings of their LAQM work. The highest predicted concentration is 14.7µg/m^3 at Receptor 15 (Stornaway, B5417).

14.99 In the opening year of 2020, predicted annual mean PM_{10} concentrations still easily meet the objective at all of the assessment receptors, both with and without the proposed development. The highest predicted concentrations are 15.4µg/m^3 "without development" and 15.5µg/m^3 "with development". In 2035, these concentrations are 15.5µg/m^3 "without development" and 15.6µg/m^3 "with development".

14.100 **Table 14.13** presents a summary of the magnitude of change in annual mean PM_{10} concentrations predicted at each of the assessment receptors, along with the effect significance (based on the criteria presented in **Table 14.4** and **Table 14.5**) for the opening year of 2020.

Table 14.13: Summary of Annual Mean PM_{10} Results

Number of receptors	Magnitude of Change	Severity
Increase at 18 receptors	imperceptible at 14 receptors Very Small at 4 receptors	Negligible at 18 receptors

Daily Mean PM_{10} Concentrations

14.101 The objective for 24-hour mean PM_{10} concentrations is 50µg/m^3 to be exceeded no more than 35 times a year by the end of 2004 and thereafter. The results of the dispersion modelling indicate that this objective is easily met at all assessment receptors, with no days of exceedence predicted for any of the assessment scenarios.

14.102 The magnitude of change is negligible at all 18 assessment receptors, and therefore the significance of change is considered to be negligible.

Annual Mean NO_x Concentrations

14.103 The AQS objective for the protection of vegetation and ecosystems for annual mean NO_x concentrations is 30µg/m^3. The results of the assessment indicate that for all assessment scenarios, the objective was met at the Whiston SSSI (Receptor 19E).

14.104 In the opening year of 2020 with the proposed development completed, the annual mean NO_x concentrations are predicted to increase by 0.2µg/m^3, giving a total concentration of 12.9µg/m^3 at the Whiston Eaves SSSI, which is still well below the objective.

Overall Significance

14.105 Overall, the effect of road traffic generated by the proposed development on local air quality is judged to be negligible. This judgement is made in accordance with the guidance set out in paragraph 14.55, in particular that the proposed development does not cause any exceedences of the objectives, the severity of the impacts are judged to be negligible at the majority of receptors (for NO_2, and at all receptors for PM_{10}) and in particular, that a worst-case approach has been taken assuming that future year vehicle emissions and background concentrations do not reduce, and in terms of the verification factor used to adjust the model output. Therefore, there is considered to be a direct, permanent, long-term effect on local air quality of **negligible** significance, prior to the implementation of mitigation measures.

Mitigation Measures

Construction

Generation and deposition of dust and PM_{10} arising from on-site construction activities (at nearby sensitive receptors)

14.106 Based on the assessment results, the recommended mitigation measures to be implemented to eliminate the identified risk of dust and PM_{10} impacts associated with the various activities of the construction phase of the proposed development are detailed below. It is noted that these mitigation measures are recommendations only, based on IAQM guidance and it is recommended that mitigation measures are formulised in a Dust Management Plan (DMP) or Construction Environmental Management Plan (CEMP) taking into account any further relevant information that becomes available at the detailed design stage and in agreement with SMDC.

General Communication

- A stakeholder communications plan, that includes community engagement before work commences on site, should be developed and implemented.
- The name and contact details of person(s) accountable for air quality and dust issues needs to be displayed on the site boundary. This may be the environment manager/engineer or the site manager. The head or regional office contact information should also be displayed.

General Dust Management

- A CEMP, which may include measures to control other emissions in addition to the dust and PM_{10} mitigation measures given in this assessment, should be developed and implemented, and approved by the Local Authority prior to construction works.

Site Management

- Record all dust and air quality complaints and identify the 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.
- Any exceptional incidents that cause dust and/or air emissions, either on- or off-site need to be recorded, and the action taken to resolve the situation recorded in the log book.

Monitoring

- Regular site inspections to monitor compliance with the CEMP should be carried out, inspection results recorded, and an inspection log made available to the local authority when asked.
- 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.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on site cover appropriately.
- Cover, seed or fence stockpiles, where possible, to prevent wind whipping.

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, where practicable.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever 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

- Avoid bonfires and burning waste materials.

Measures specific to earthworks

- Stockpile surface areas to be minimised (subject to health and safety and visual constraints regarding slope gradients and visual intrusion) to reduce area of surfaces exposed to wind pick-up.
- Where appropriate, windbreak netting/screening can be positioned around material stockpiles and vehicle loading/unloading areas, as well as exposed excavation and material handling operations, to provide a physical barrier between the site and the surroundings.
- Where practicable, stockpiles of soils and materials should be located as far as possible from sensitive properties, taking account of the prevailing wind direction.
- During dry or windy weather, material stockpiles and exposed surfaces should be dampened down using a water spray to minimise the potential for wind pick-up.

Measures specific to construction

- 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 alternative 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.
- All construction plant and equipment should be maintained in good working order and not left running when not in use.

Measures specific to trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

Change in local pollutant concentrations (NO_2 and PM_{10}) generated from construction traffic and plant exhaust emissions (on local air quality at nearby sensitive receptors)

14.107 To minimise any effect of exhaust emissions associated with construction traffic and plant, it is suggested that the following measures should also be implemented:

- All plant and equipment should be maintained in good working order and should not be left running when not in use (no idling);
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials, identifying routes for all construction traffic;

- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment wherever possible;
- On-site construction vehicle movements and location of plant should be well within the site and away from the site boundary, wherever possible;
- A maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas should be imposed; and
- A Travel Plan should be implemented for construction workers that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

Completed Development

14.108 Based on the assessment results, no specific mitigation is considered to be necessary given the negligible effect of the completed development on local air quality.

Residual Impacts

Construction

Generation and deposition of dust and PM_{10} arising from on-site construction activities (at nearby sensitive receptors)

14.109 The overall significance of dust and PM_{10} effects arising during the construction phase, following the appropriate use of mitigation measures and good site practice, is summarised in **Table 14.14** below.

Table 14.14: Post Mitigation Summary of Significance Table for Dust and PM_{10} Generated During the Construction Phase

Potential Effect	Risk		
	Earthworks	Construction	Trackout
Dust Soiling	Negligible	Negligible	Negligible
Generation of PM_{10}	Negligible	Negligible	Negligible
Ecological	Negligible	Negligible	NA

14.110 The overall sensitivity of the surrounding area, including ecological receptors, is medium for dust soiling, and low for PM_{10} generation. With appropriate use of mitigation measures and good site management, the likely magnitude of change for dust soiling, PM_{10} generation and ecological effects will be reduced to negligible. Therefore, there is likely to be a direct, temporary, short to medium-term residual effect of **negligible** significance following the implementation of mitigation measures.

Change in local pollutant concentrations (NO_2 and PM_{10}) generated from construction traffic and plant exhaust emissions (on local air quality at nearby sensitive receptors)

14.111 The sensitivity of residential receptors remains high and the magnitude of change, following mitigation, is anticipated to remain negligible. Therefore, there is considered to be a direct, temporary, short to medium-term effect, of **negligible** significance following implementation of mitigation.

Completed Development

14.112 The residual effects are considered to remain a direct, permanent, long-term effect on local air quality of **negligible** significance.

Conclusions

14.113 A qualitative assessment of the potential effects on local air quality from construction activities has been carried out. This assessment identified that during construction works, releases of dust and PM_{10} were likely to occur. However, through good site practice and the implementation of suitable mitigation measures, the residual effect of dust and PM_{10} releases will be reduced to an acceptable level and be of **negligible** significance.

14.114 A qualitative assessment of the potential effects of emissions from vehicles and plant associated with the construction phase has also been carried out. The effects of these emissions are considered to be of **negligible** significance before applying mitigation measures. The development of a construction traffic management plan will further reduce any impacts.

14.115 In addition, a quantitative assessment of the potential effects once the proposed development is completed was undertaken using ADMS Roads dispersion model to predict the changes in NO_x, NO_2 and PM_{10} concentrations at the assessment receptors in the local area. According to the assessment criteria, the effect of the proposed development is predicted to be direct, permanent, long-term and of **negligible** significance, without application of scheme specific mitigation measures. Furthermore, the assessment has been undertaken using worst case assumptions in relation to future improvements in vehicle technologies.

14.116 It is, therefore, considered that the development proposals comply with national and local policy for air quality.

References

[i] Department for Communities and Local Government (2012) *National Planning Policy Framework,* DCLG, London.

[ii] Staffordshire Moorland District Council (2014). *Core Strategy Development Plan Document.*

[iii]. Staffordshire Moorland District Council (2014). *Churnet Valley Masterplan, Supplementary Planning Document.*

[iv] IAQM (2014). *Guidance on the Assessment of Dust from Demolition and Construction*

[v] Staffordshire Moorlands District Council (2014). *2014 Air Quality Progress Report*.

[vi] Department for Environment, Food and Rural Affairs. (2013). Local Air Quality Management Support Pages [Online] Available at: http://laqm.defra.gov.uk/ [Date accessed: 10.06.16].

[vii] Environment Agency (2013). 'What's in your backyard?' [Online] Available at http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e [Date accessed: 13.06.16].

[viii] Multi-Agency Geographic Information for the Countryside (MAGIC) on-line mapping website. [Online] Available at: http://magic.defra.gov.uk/ [Date accessed 13.06.16]

[ix] Department for Transport Traffic Counts, http://www.dft.gov.uk/traffic-counts/cp.php [Date accessed: 10.06.16]

[x] Department for Environment, Food and Rural Affairs. (2016). Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(16)

[xi] Department for Environment, Food and Rural Affairs. (2014). Emission Factor Toolkit v6. [Online] Available at: http://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html [Date accessed: 05.08.14].

[xii] DEFRA, (2014). Local Air Quality Management (LAQM) Support Pages. [Online] Available at: http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2011 [Date accessed: 10.06.16]

[xiii] DEFRA (2014). LAQM Support Pages [Online] Available at: http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOXNO2calc [Date accessed: 10.06.16].

[xiv] Institute of Air Quality Management / Environmental Protection UK (2015). *Land-Use planning and Development Control: Planning for Air Quality.*