9. Air Quality

9.1. INTRODUCTION

9.1.1. This chapter summarises the assessment work carried out to date on the proposed ‘Northampton Gateway’ project with respect to air quality. A site location plan including key air quality features is included in Figure 9.1. This chapter also sets out the ongoing and future assessment work which will be undertaken, and some of the key expected issues.

9.1.2. It should be noted that the assessment methodology described in this preliminary report will be carried out in full at a later date with the results included in the air quality Environmental Statement (ES) Chapter to be issued in 2017.

9.1.3. The main site area consists of: Junction 15 itself; sections of the M1 to the north-west and south-east of the junction; a section of the A45 to the north; the A508 to the south; and a parcel of land to the west of the west of the junction. The total area of the main site is approximately 247ha.

9.1.4. With the exception of highway and railway land, the main site itself is predominantly under arable use at present. There are suburban areas on the outskirts of Northampton to the north and east of the main site, including Grange Park and Collingtree village. Agricultural uses predominate in all other directions.

9.1.5. In terms of air quality, the main pollution sources are vehicles travelling on the local road network, including the roads mentioned above.

9.1.6. The proposals also include the construction of a bypass for the village of Roade, to the south of the main site. This is intended to prevent any adverse transport impacts on the village, but is also likely to lead to predominantly beneficial local air quality impacts. An indicative corridor for the bypass, allowing for different alignments, is included on Figure 9.2.

9.1.7. A number of air quality management areas (AQMAs) have been declared in the area as a result of elevated concentrations of nitrogen dioxide (NO₂). These include Northampton AQMAs No.1 and No.5 on the M1 and A45, respectively, as indicated on Figure 9.1. There are further AQMAs in the centre of Northampton, which is 4.5km to the north of the main site, and 7.0km to the south-west of the main site on the A5 in Towcester.
9.1.8. The assessment of air quality for the proposed development will focus on the potential for traffic generated to significantly affect pollution concentrations at sensitive receptor locations in the local area, including the AQMAs.

9.2. RELEVANT POLICY

9.2.1. A summary of the key legislation that is applicable to the air quality assessment for the proposed development is provided below.

*The UK Air Quality Strategy*

9.2.2. The UK Air Quality Strategy (UKAQS) (Ref: 9.1) sets a number of “standard” concentrations that are to be achieved at sensitive receptor locations across the UK by various “objective” dates. The sensitive locations at which the standards and objectives apply are places where the population is expected to be exposed to the various pollutants over the particular averaging period. Thus, for those objectives to which an annual mean standard applies, the most common sensitive receptor locations used to measure concentrations against the set standards are areas of residential housing, since it is reasonable to expect that people living in their homes could be exposed to pollutants over such a period of time. For shorter averaging periods of between 15 minutes, 1 hour or 1 day, the sensitive receptor location can be anywhere where the public could be exposed to the pollutant over these shorter periods of time.

9.2.3. The objectives adopted in the UK are based on the Air Quality Regulations 2000 (Ref: 9.2) and (Amendment) Regulations 2002 (Ref: 9.3) for the purpose of Local Air Quality Management (LAQM). These Air Quality Regulations have adopted into UK law the limit values required by European Union Daughter Directives on air quality.

9.2.4. Obligations under the Environment Act 1995 require local authorities to declare an AQMA at sensitive receptor locations where an objective concentration has been predicted to be exceeded. In setting an AQMA, the local authority must then formulate an Air Quality Action Plan (AQAP) to seek to reduce pollution concentrations to values below the objective levels.

9.2.5. Following the publication of several Review and Assessment reports under the Local Air Quality Management (LAQM) regime, informed by the requirements of the Environment Act 1995, a number of AQMAs were declared by Northampton Borough Council (NBC) due to elevated concentrations of NO₂. These include AQMA No.1, to the north of the site, which is described as:
“the area of land which runs alongside the southbound carriageway of the M1 motorway within the boundaries of Northampton Borough Council. The area varies in depth from between 40 and 54 metres when measured from the central reservation on the M1.”

9.2.6. South Northamptonshire Council (SNC) has also declared an AQMA due to elevated concentrations of NO₂ in Towcester, 7km to the south of the site.

**National Policy Statement for National Networks (NPSNN)**

9.2.7. The NPSNN provides policy guidance regarding NSIPs on the national networks, and also includes guidance regarding the assessment of impacts.

9.2.8. With regard to air quality, the NPSNN sets out what the Environmental Statement should describe and this will be taken directly into account when the Air Quality chapter of the ES is prepared.

9.2.9. The NPSNN also refers to some of the key considerations when assessing impact on air quality, with an emphasis on AQMAs, and also identifies some of the key mitigation measures which may be considered.

9.2.10. Separate, but related guidance is also given regarding carbon emissions, albeit with a focus on climate change as opposed to air quality.

**National Planning Practice Guidance (NPPG)**

9.2.11. PPG32 (Air Quality) (Ref: 9.5), which was updated in March 2014, provides guiding principles on how planning can take account of the impact of new development on air quality. The PPG summarises the importance of air quality in planning and the key legislation relating to it.

9.2.12. As well as describing the importance of International, National and Local Policies (detailed elsewhere in this report), it summarises the key sources of air quality information. It also explains when air quality is likely to be relevant to a planning decision:

“Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in
particular, lead to a breach of EU legislation (including that applicable to wildlife) […]

When deciding whether air quality is relevant to a planning application, considerations could include whether the development would:

- **Significantly affect traffic in the immediate vicinity of the proposed development site or further afield.** This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to turnover in a large car park; or result in construction sites that would generate Heavy Goods Vehicle flows over a period of a year or more.

- **Introduce new point sources of air pollution.** This could include furnaces which require prior notification to local authorities; or extraction systems (including chimneys) which require approval under pollution control legislation or biomass boilers or biomass-fuelled CHP plant; centralised boilers or CHP plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area.

- **Expose people to existing sources of air pollutants.** This could be by building new homes, workplaces or other development in places with poor air quality.

- **Give rise to potentially unacceptable impact (such as dust) during construction for nearby sensitive locations.**

- **Affect biodiversity.** In particular, this is likely to result in deposition or concentration of pollutants that significantly affect a European-designated wildlife site, and is not directly connected with or necessary to the management of the site, or does it otherwise affect biodiversity, particularly designated wildlife sites.”

9.2.13. Details are also provided of what should be included within an air quality assessment. Key considerations include:

- Baseline local air quality;
• Whether the Proposed Development could significantly affect local air quality during construction/operation; and

• Whether the development is likely to expose more people to poor air quality.

9.2.14. Examples of potential air quality mitigation measures are also provided in the PPG.

Local Planning Policy

9.2.15. Northampton Borough Council and South Northamptonshire have been working in partnership with Daventry District Council to compile future planning policy for the region, coordinated by the West Northamptonshire Joint Planning Unit.

The West Northamptonshire Joint Core Strategy was adopted in December 2014 and forms a key part of the Local Development Framework. The Joint Core Strategy (Ref: 9.6) contains a number of specific policies of relevance to air quality, including Policy S10 (Sustainable Development Principles), and Policy BN9 (Planning for Pollution Control). Throughout the document there is a theme of improving, rather than just maintaining, the existing air quality in the area.
9.3. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Guidance

9.3.1. Defra Technical Guidance LAQM.TG16 (Ref: 9.7) will be followed in carrying out the assessment. Guidance published by the IAQM (Ref: 9.8) on the ‘Assessment of Dust from Demolition and Construction’ will be used when assessing the construction phase of the proposed development. The Greater London Authority’s supplementary planning guidance (Ref: 9.9) for the control of dust from construction will also be referred to. Whilst produced for development in London, it is seen as a high standard for developments across the UK. It suggests a number of mitigation measures that should be adopted to minimise impacts of dusts and fine particles.

9.3.2. The latest Environmental Protection UK (EPUK) & IAQM guidance, published in May 2015 on ‘Planning For Air Quality’ (Ref: 9.10) will also be followed in assessing air quality at the site and is particularly important for determining the significance of effects at each stage. These significance criteria are included in Appendix 9.1.

Assessment Methodology

Construction Phase

9.3.3. The construction phase of the proposed development will involve a number of activities that could produce polluting emissions to air. Predominantly, these will be emissions of dust. However, they could also include releases of odours and/or more harmful gases and particles. The IAQM’s guidance to assess the impacts of construction on human and ecological receptors will be followed in carrying out the air quality assessment. The guidance suggests that where a receptor is located within 350m of a site boundary and/or within 100m of a route used by construction vehicles, up to 500m from the site entrance, a dust assessment should be undertaken. High sensitivity receptors are considered particularly sensitive when located within 20m of a works area. Figure 9.3 shows receptors that could be sensitive to dust that are located within 350m of the boundaries of the proposed development.

9.3.4. Review of Defra’s Multi Agency Geographic Information for the Countryside (MAGIC) website (www.magic.gov.uk), which incorporates Natural England’s interactive maps, has not identified any statutory ecologically sensitive receptors within 1km of the application site. The Roade Cutting Site of Special Scientific Interest (SSSI) lies 70m to the south of the main site’s southern boundary. However, it is noted that this site is designated for its geological, rather than ecological importance.
9.3.5. There are no statutory ecological receptors within 100m of the proposed development or the potential construction routes. Therefore, the proposed development will have a negligible impact on statutory ecological receptors and this will not be considered further within this assessment. Non-statutory ecological receptors are considered to be of very low sensitivity and are also not considered further. Note that the ecological assessment is referred to in Chapter 5.

9.3.6. The annual mean concentration of PM$_{10}$ is well below the AQS, according to the UK-AIR background maps. This provides a good indication that both annual mean and daily mean PM$_{10}$ concentrations are likely to be below their respective AQSs at the proposed development and adjacent uses.

9.3.7. The IAQM guidance suggests Demolition, Earthworks, Construction, and Trackout should all be assessed separately to determine the overall significance of the construction phase.

**Operational Phase**

9.3.8. In order to determine the effects on local air pollution concentrations from the operation of the proposed development, emissions from local roads will be assessed using a detailed air dispersion model. The modelling will use ADMS-Roads (version 4.0), which is produced by CERC and has been validated and approved by Defra for use as an assessment tool for calculating the dispersion of pollutants from traffic on UK roads. The assessment will be based on the detailed traffic data being used to underpin the Transport Assessment, when available – this is expected during the first quarter of 2017.

9.3.9. Detailed, hourly sequential meteorological data are used by the model to determine pollutant transportation and levels of dilution by the wind and vertical air movements. Meteorological data used in the model will be obtained from Bedford meteorological station as it is considered to provide the most representative data of similar conditions to the application site and surrounding area. The meteorological data used will be from 2015, being the most recent data available. The surface roughness applied to the model for the meteorological station and application site will be 0.5m, which is typically used for “open suburbia”.

9.3.10. Modelled receptor locations will be indicated in a later iteration of the Air Quality assessment. Discrete model receptors will be positioned at the façades of existing residential dwellings and other receptors closest to the main pollution sources. These are considered worst-case locations, as pollutant concentrations would be expected to reduce further within the properties with increased distance from the roads. All of
the receptors will be modelled at the “breathing height” which is, by convention, 1.5m above ground level.

9.3.11. Traffic data used in the assessment will be provided by the project’s transport consultants and derived from project specific traffic counts and Department for Transport (DfT) Traffic Counts. Flows will be modelled for 2017 (the baseline year) and 2021 (the completion year), with and without the proposed development.

9.3.12. Traffic model inputs are expected in 2017 once the Northampton Strategy Transport Model is available. Modelled opening year scenario will include:

- do nothing – baseline data with flows increased to account for general development in the broader area;
- do nothing + committed developments; and
- do nothing + committed developments + proposed development.

Model Verification

9.3.13. Following guidance set out in LAQM.TG16, model results will be compared with monitoring data to determine whether they need adjusting to more accurately reflect local air quality. This process is known as verification and reduces the uncertainty associated with local effects on pollution dispersion and allows the model results to be more site-specific.

9.3.14. A comparison of modelled and monitored total annual mean NO₂ will be carried out using the project specific diffusion tubes when a year’s monitoring data are available.

Consultations

9.3.15. The air quality officer at NBC has been contacted in order to discuss the approach to the air quality assessment, as outlined in the proposed development Environmental Statement Scoping Report.

9.3.16. The officer’s key concern was that the assessment should cover any roads with a significant change in traffic flows, and in particular the potential effect of heavy goods vehicles serving the proposed development on residential properties along the M1 motorway.

9.3.17. NBC and SNC both provided recent air quality monitoring data, which have been included in the baseline section.

9.3.18. Further consultation with both NBC and SNC will be undertaken in due course.

Significance Criteria
Construction

9.3.19. In the IAQM dust guidance, the first step in assessing the risk of impacts is to define the potential dust emission magnitude. This can be considered ‘Negligible’, ‘Small’, ‘Medium’ or ‘Large’ for each of the construction stages. Whilst the IAQM provides examples of criteria that may be used to assess these magnitudes, the vast number of potential variables mean that every site is different and therefore professional judgement must be applied by what the IAQM refer to as a “technically competent assessor”. The construction phase assessment therefore relies on the experience of the appraiser.

9.3.20. As such, attempts to define precisely what constitutes a negligible, small, medium or large dust emission magnitude should be treated with caution. Factors such as the scale of the work, both in terms of size and time, the construction materials and the plant to be used must be considered.

9.3.21. The second step is to define the sensitivity of the area around the construction site. As stated in the IAQM guidance:

“the sensitivity of the area takes into account a number of factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM$_{10}$, the local background concentrations; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.”

9.3.22. Based on these factors, the area should be categorised as being of ‘Low’, ‘Medium’ or ‘High’ sensitivity.

9.3.23. When dust emission magnitudes for each stage and the sensitivity of the area have been defined, the risk of dust impacts can be determined. The IAQM provides a risk of impacts matrix for each construction stage. The overall significance for the construction phase can then be judged from the construction stages assessed. Again, this is subject to professional judgement, but often the highest risk stage will predominate in influencing the overall level of risk.

9.3.24. Combustion exhaust gases from diesel-powered plant and construction vehicles accessing the application site will also be released. However, the volumes and periods over which these releases will occur are unlikely to result in any significant
peaks in local air pollution concentrations and therefore this has been scoped out of this assessment.

**Operational**

9.3.25. Guidance published by the EPUK & IAQM in May 2015 (Ref: 9.10) provides impact descriptors, which are derived from both the magnitude of change in pollution concentrations and the long term average concentrations at the receptor, with reference to the appropriate UK air quality standards. A table illustrating the operational phase impact descriptors is included in Appendix 9.1.

### 9.4. BASELINE CONDITIONS

9.4.1. Defra provides estimated background concentrations of the UKAQS pollutants on the world wide web at the UK Atmospheric Information Resource (UK-AIR) website ([www.airquality.co.uk](http://www.airquality.co.uk)). These estimates are produced using detailed modelling tools and are presented as concentrations at central 1km² National Grid square locations across the UK. These were updated in July 2016 and are based on monitoring data from 2013.

9.4.2. Being background concentrations, the UK-AIR data are intended to represent a homogenous mixture of all emission sources in the general area of a particular grid square location. Concentrations of pollutants at various sensitive receptor locations can, therefore, be calculated by modelling the emissions from a nearby pollution source, such as a busy road, and then adding this to the appropriate UK-AIR background datum.

9.4.3. For the proposed development site in the baseline year the predicted background pollution concentrations for the two main UKAQS pollutants of interest are presented in Table 9.1. These data were taken from the central grid square location closest to Junction 15 of the M1 (i.e. grid reference: 475500, 254500).
Table 9.1: Background concentrations of pollutants at the main site from the UK-AIR

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Predicted background concentration (µg.m⁻³)</th>
<th>Averaging period</th>
<th>Air quality standard concentration (µg.m⁻³)</th>
<th>Objective to achieve the standard by</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO₂</td>
<td>20.9 19.6 18.5</td>
<td>annual mean</td>
<td>40.00</td>
<td>31.12.05</td>
</tr>
<tr>
<td>PM₁₀</td>
<td>18.9 18.5 18.4</td>
<td>(gravimetric)</td>
<td>40.00</td>
<td>31.12.04</td>
</tr>
</tbody>
</table>

*Proposed PM₁₀ objectives for 2010 were dropped in the 2007 Air Quality Strategy, but are generally still referred to in the Review and Assessment process (For PM₂.₅, there are no specific AQSs applicable in England, however TG(16) states that local authorities should consider PM₂.₅ as part of the LAQM process and should work towards its reduction).

9.4.4. The data in Table 9.1 show that background annual mean concentrations of NO₂ and PM₁₀ in the vicinity of the application site are predicted to be well below their 40µg.m⁻³ AQSs. In 2016 NO₂ and PM₁₀ concentrations are both predicted to be below the AQS by 54%.

Local Sources of Monitoring Data

Automatic Monitoring

9.4.5 Monitoring at background locations is considered an appropriate source of data for the purposes of describing baseline air quality. NBC and SNC both have widespread monitoring networks for NO₂, including a number of real time monitors. The most recent available data from these monitors are included in Table 9.2. It should be noted that neither council undertakes monitoring of PM₁₀, and to date have not identified the need to do so. As such, NO₂ is considered to be the primary pollutant of concern in the area.

Table 9.2: NBC and SNC Annual Mean NO₂ Concentrations from Automatic Monitors

<table>
<thead>
<tr>
<th>Site name</th>
<th>Site Type</th>
<th>Distance from main site (km)</th>
<th>Annual mean concentration (µg.m⁻³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2011</td>
</tr>
<tr>
<td>Northampton Borough</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UCN</td>
<td>B</td>
<td>9.0</td>
<td>-</td>
</tr>
</tbody>
</table>
The data in Table 9.2 indicate that annual mean concentrations of NO₂ in Northampton and South Northamptonshire tend to be below the 40µg.m⁻³ AQS, even at busy roadside and town centre locations. The highest recorded concentration was 36.5µg.m⁻³ in 2011, at both Northampton roadside monitors. This is 9% below the AQS.

There appears to be a slight downward trend in NO₂ concentrations at the Northampton monitors, broadly in line with that indicated in the UK-AIR data in Table 9.1.

At the background monitor, annual mean NO₂ concentrations were 65% below the AQS in 2013. This is broadly comparable to the UK-AIR data in Table 9.1. Despite being some distance away from the main site, this monitor is likely to be generally representative of the application site, being on the edge of the town.

Non-Automatic Monitoring

NBC and SNC carry out non-automatic (passive) NO₂ diffusion tube monitoring at numerous locations across their respective districts. A summary of the most recent available data is included in Table 9.3 for the tubes closest to the main site.

Table 9.3: NO₂ Concentrations from Local Diffusion Tubes

<table>
<thead>
<tr>
<th>Site name</th>
<th>Site type</th>
<th>Distance from main site (km)</th>
<th>Annual mean concentration (µg.m⁻³)</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northampton Borough</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crematorium</td>
<td>R</td>
<td>1.5</td>
<td></td>
<td>38.8</td>
<td>33.3</td>
<td>35.3</td>
<td>34.1</td>
</tr>
<tr>
<td>Hermitage Way (triplicate)</td>
<td>R</td>
<td>1.9</td>
<td></td>
<td>41.2</td>
<td>37.1</td>
<td>38.0</td>
<td>38.1</td>
</tr>
<tr>
<td>Chestnut Av</td>
<td>R</td>
<td>1.5</td>
<td></td>
<td>36.7</td>
<td>30.2</td>
<td>30.3</td>
<td>31.6</td>
</tr>
<tr>
<td>A45</td>
<td>R</td>
<td>1.3</td>
<td></td>
<td>43.0</td>
<td>42.4</td>
<td>44.6</td>
<td>40.9</td>
</tr>
<tr>
<td>High St Collingtree</td>
<td>R</td>
<td>0.1</td>
<td></td>
<td>33.3</td>
<td>32.4</td>
<td>35.4</td>
<td>34.0</td>
</tr>
<tr>
<td>South Northamptonshire</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPKa – Saxon Av Junction</td>
<td>R</td>
<td>&lt;0.1</td>
<td></td>
<td>32.5</td>
<td>28</td>
<td>28.3</td>
<td>28.2</td>
</tr>
</tbody>
</table>
9.4.10 The data in Table 9.3 show that annual mean NO\textsubscript{2} concentrations sometimes exceed the 40µg.m\textsuperscript{-3} AQS at busy roadside locations. The highest concentrations were recorded at the A45 tube, which is located in Northampton AQMA No.5, exceeding the AQS by 2% to 12% between 2012 and 2015. However, it is noted that this tube is located at a roadside location where the long term AQS would not apply, as people would not be expected to spend long periods of time in such a location.

9.4.11 It is also noted that NBC state in their 2013 Progress Report (Ref: 9.11) that: “there is promising evidence building with regard to local air quality in this AQMA...” and that monitored pollution concentrations indicate that the annual mean AQS for NO\textsubscript{2} is generally complied with at sensitive receptors near the A45.

9.4.12 There are no background tubes near the proposed development site. However, annual mean NO\textsubscript{2} concentrations in South Northamptonshire were generally well below the 40µg.m\textsuperscript{-3} AQS. Concentrations at the closest tube, at Saxon Avenue, which is adjacent to M1 Junction 15, were 19% to 30% below the AQS between 2012 and 2015.

**Project Specific Diffusion Tubes**

9.4.13 Given the scale of the development and the potential for impacts on receptors in nearby AQMAs, particularly at Collingtree, the decision was made to undertake a programme of diffusion tube monitoring at key locations around the proposed development site. The diffusion tubes have been sited as indicated on Figures 9.2 and 9.4. These include: four locations in Collingtree, to monitor emissions from the M1; one adjacent to West Lodge Cottages on the A508; and one on the main site, as a background location.

9.4.14 The tubes were located in triplicate in order to ensure precision, and reduce the chance of any erroneous results being included in the analysis. It is intended that the tubes will be in situ for 12 months, in order to collect representative annual mean concentrations (pollution concentrations tend to vary throughout the year, as the

<table>
<thead>
<tr>
<th>RO1 – 40 Stratford Rd</th>
<th>R</th>
<th>2.9</th>
<th>24.5</th>
<th>22</th>
<th>23.1</th>
<th>22.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>RO2 – 16 London Rd</td>
<td>R</td>
<td>2.2</td>
<td>36.5</td>
<td>32</td>
<td>31.2</td>
<td>31.1</td>
</tr>
<tr>
<td>RO3 – 1 London Rd</td>
<td>R</td>
<td>2.5</td>
<td>28.3</td>
<td>27</td>
<td>27.5</td>
<td>26.6</td>
</tr>
<tr>
<td>RO4 – 30 High St</td>
<td>R</td>
<td>2.3</td>
<td>18.9</td>
<td>17</td>
<td>15.5</td>
<td>16.4</td>
</tr>
<tr>
<td>RO6 – A508 / Chaplin Yard</td>
<td>R</td>
<td>2.9</td>
<td>31.4</td>
<td>23</td>
<td>22.7</td>
<td>31.7</td>
</tr>
</tbody>
</table>

Note: “R” = roadside. **Bold** denotes exceedance of the AQS. “Data Capture <75% so result may be unreliable.
result of seasonal patterns in both meteorological conditions and emissions). The data for the first three months of monitoring are included in Table 9.4. Raw results from the laboratory are included in Appendix 9.3.

### Table 9.4: Project Specific Diffusion Tube NO$_2$ Records from 2016

<table>
<thead>
<tr>
<th>Location (see Figure 9.2/9.4)</th>
<th>Site Type</th>
<th>Distance from Road (m)</th>
<th>Period Mean Concentration (µg.m$^{-3}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Aug</td>
</tr>
<tr>
<td>1</td>
<td>R</td>
<td>49 (M1)</td>
<td>26.5</td>
</tr>
<tr>
<td>2</td>
<td>R/B</td>
<td>91 (M1)</td>
<td>25.4</td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>132 (M1)</td>
<td>23.3</td>
</tr>
<tr>
<td>4</td>
<td>R</td>
<td>19.5 (M1)</td>
<td>28.7</td>
</tr>
<tr>
<td>5</td>
<td>B</td>
<td>98 (M1)</td>
<td>12.7</td>
</tr>
<tr>
<td>6</td>
<td>R</td>
<td>1.5 (A508)</td>
<td>26.6</td>
</tr>
</tbody>
</table>

Note: “R” = roadside; “B” = background.

9.4.15 As the data in Table 9.4 only cover three months, and have not be annualised/adjusted, they only provide a broad indication of the conditions at these locations. However, some clear patterns are emerging.

9.4.16 For the tubes in Collingtree it is clear that concentrations decline rapidly with distance from the M1. At Location 4, which is approximately the same distance from the M1 as the closest dwelling, the period mean concentration is roughly equal to the 40µg.m$^{-3}$ AQS. As pollution concentrations tend to be lower in the summer months, it is likely that the annual mean concentration at this location will exceed the AQS.

9.4.17 Location 1 is co-located with NBC’s Collingtree tube. With reference to Table 9.3, the period mean at this tube is broadly similar to the annual mean for recent years at the council’s tube.

9.4.18 It is noticeable that the concentrations at Tube 5, to the west of the M1, are somewhat lower than those at Tube 2, which is a similar distance from the road, to the east. This is likely to be the result of pollution from the M1 being carried north-easterly by the prevailing south-westerly wind, as well as emissions from local sources including vehicles using the High Street. As such, Tube 5 is thought to be most representative of true background concentrations in the vicinity.

### Summary of Data Used in the Assessment

9.4.19 To ensure conservative predictions of pollution concentrations, the most appropriate annual mean background NO$_2$ and PM$_{10}$ concentrations will be used in this assessment (i.e. reasonably representative of the key receptors) and importantly, no
reduction will be assumed for future years. Reductions are forecast by Defra as a result of the gradual replacement of the UK vehicle fleet with cleaner-engined vehicles, however, such improvements have not been universally realised.

9.5 LIKELY SIGNIFICANT EFFECTS

Construction Effects

Dust Emissions

9.5.1 A preliminary assessment of the potential risk of dust effects occurring at nearby sensitive receptors is set out below and is based on professional judgement and the IAQM guidance (Ref: 9.8), as previously outlined. At this stage, the assessment relates only to the main site. The Roade bypass will be assessed separately when more details become available.

Demolition

9.5.2 The vast majority of the main site is currently agricultural and does not contain built structures. However, some demolition will be required for scattered farm buildings and other structures, plus the break-up of existing road surfaces around Junction 15.

9.5.3 Overall, the dust emission magnitude for the demolition stage is considered to be Small.

Earthworks

9.5.4 Ground clearance works, site levelling and excavations for foundations will be performed during this stage.

9.5.5 Sites greater than 10,000m² are considered ‘Large’ with reference to the IAQM guidance. As the site is far larger than this threshold (circa 25,000,000m²) it is anticipated that significant earthworks will be required and the dust emission magnitude is considered to be Large.

Construction

9.5.6 During construction, activities which may have the potential to cause significant dust emissions may include concrete batching, sandblasting and piling, in addition to the general handling of construction materials and windblow from stockpiles of friable materials, particularly during higher wind speeds.

9.5.7 Primary construction materials will be concrete, steel framework and metal cladding to roof and walls. These materials and methods of construction are of relatively low dust generating potential.
9.5.8 However, the scale of the proposed development will be in excess of the IAQM’s 100,000m³ ‘Large’ threshold. As such, the dust emission magnitude for construction is considered to be Large.

Trackout

9.5.9 Construction traffic, when traveling over soiled road surfaces, has the potential to generate dust emissions and also to soil the local road network. During dry weather, unsurfaced and soiled roads can lead to dust being emitted due to pick-up by vehicle wheels. The potential for roads to be soiled is dependent on the length of the on-site unpaved roads.

9.5.10 Given the scale of the site, it is likely that trackout will have a Large dust emission magnitude, regardless of the nature of onsite road surfaces.

Construction Emissions Summary

9.5.11 A summary of the dust emission magnitude as a result of the activities of Demolition, Earthworks, Construction and Trackout, as specified in the IAQM guidance and discussed above, are listed in Table 9.6 below. Overall, the dust emission magnitude is predicted to be Large.
Table 9.6: Dust Emission Magnitude Summary

<table>
<thead>
<tr>
<th>Construction Stage</th>
<th>Dust Emission Magnitude</th>
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<tbody>
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<td>Demolition</td>
<td>Small</td>
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<tr>
<td>Earthworks</td>
<td>Large</td>
</tr>
<tr>
<td>Construction</td>
<td>Large</td>
</tr>
<tr>
<td>Trackout</td>
<td>Large</td>
</tr>
</tbody>
</table>


**Sensitivity of the Area**

9.5.12 Having established the emission magnitude for dust above, the sensitivity of the area must be considered to establish the significance of effects. The effect of dust emissions depends on the sensitivity of each receptor. High sensitivity human receptors include residential dwellings, schools and hospitals.

9.5.13 The impacts of dust emissions from the sources discussed above have the potential to cause an annoyance to human receptors living in the local area. Within distances of 20m of the site boundary there is a high risk of dust impacts, regardless of the prevailing wind direction. Up to 100m from the construction site, there may still be a high risk, particularly if the receptor is downwind of the dust source.

9.5.14 With the exponential decline in dust with distance from dust generating activities, it is considered that for receptors more than 350m from the site boundary, the risk is negligible. Furthermore, the risks at over 100m are only likely to be significant in certain weather conditions, e.g. downwind of the source during dry periods.

9.5.15 The approximate number of high sensitivity human receptors in the vicinity of the application site is detailed in Table 9.7 below, with distance contours shown in Figure 9.3. Most sensitive receptors in the vicinity are located to the east. These include numerous residential dwellings and a nursery school. There are, however, no highly sensitive receptors with 20m of the site boundary.
### Table 9.7: Sensitive Receptors within 350m of the site

<table>
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<tr>
<th>Distance to site (m)</th>
<th>Approx. Number of High Sensitivity Receptors</th>
<th>Details</th>
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<td>-</td>
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<tr>
<td>20-100</td>
<td>20</td>
<td>Residential dwellings in Collingtree.</td>
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</table>

9.5.16 Plate 9.1, below, shows the prevailing wind is from the south-west. A large proportion of the potentially sensitive receptors identified in Table 9.7 are to the north-east of the development, downwind of the prevailing wind. It is considered, therefore, that although there are very few sensitive receptors in the immediate vicinity of the site, the potential sensitivity of the area to dust soiling effects is Medium. The likelihood of exceedances of the PM$_{10}$ AQSs is considered to be Low, due to relatively low background concentrations, in comparison to the 40µg.m$^{-3}$ annual mean AQS.

**Plate 9.1: Wind Rose for Bedford, 2013**

**Risk Effects and Significance of the Construction Phase**

Having established the likely dust emission magnitude and sensitivity of the area, the risk of impacts can be determined in accordance with the IAQM guidance. These are
summarised in Table 9.8. **Table 9.8: Summary risk effects of construction, based on the IAQM’s dust guidance**

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<tr>
<th>Source</th>
<th>Dust Soiling Effects</th>
<th>PM$_{10}$ Effects</th>
<th>Ecological Effects</th>
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<td>Low Risk</td>
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<tr>
<td>Trackout</td>
<td>Medium Risk</td>
<td>Low Risk</td>
<td>Negligible</td>
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</tbody>
</table>

9.5.17 Overall, the development is considered *Medium Risk* for dust soiling effects and *Negligible Risk* for PM$_{10}$ health effects, in the absence of any mitigation.

**Vehicle Emissions**

9.5.18 Combustion exhaust gases from diesel-powered plant and construction vehicles accessing the site will also be released. Given the scale of the proposed development, the volumes and periods over which these releases will occur are likely to have the potential to cause significant impacts at nearby existing sensitive receptors.

9.5.19 An assessment of emissions from construction traffic will be undertaken when the data for this is available. However, at this stage it is anticipated that the effects will be less significant than any impacts during the operational phase and as such it may be that detailed dispersion modelling of construction traffic is not required.

**Operational Effects**

Results from the ADMS-Roads assessment of the proposed development will be presented when available with calculated pollution concentrations provided under the appropriate pollutant headings. The significance of impact derived from the table in the EPUK & IAQM guidance provided in Appendix 9.1 will also be provided for each receptor.

**9.6 MITIGATION**

**Construction**

9.6.1 The Greater London Authority guidance, which is used as a benchmark across the UK, suggests a number of best practice measures that should be adopted in order to minimise impacts from dusts and fine particles; these include:
• ideally cutting, grinding and sawing should not be conducted on-site and pre-fabricated material and modules should be brought in where possible;

• where such work must take place, water suppression should be used to reduce the amount of dust generated;

• skips, chutes and conveyors should be completely covered and, if necessary enclosed to ensure that dust does not escape;

• no burning of any materials should be permitted on site;

• any excess material should be reused or recycled on-site in accordance with appropriate legislation;

• developers should produce a waste or recycling plan;

• following earthworks, exposed areas and soil stockpiles should be re-vegetated to stabilise surfaces, or otherwise covered with hessian or mulches;

• stockpiles should be stored in enclosed or bunded containers or silos and kept damp where necessary;

• hard surfaces should be used for haul routes where possible;

• haul routes should be swept/washed regularly;

• vehicle wheels should be washed on leaving the site;

• all vehicles carrying dusty materials should be securely covered; and

• delivery areas, stockpiles and particularly dusty items of construction plant should be kept as far away from neighbouring properties as possible.

9.6.2 In addition, the IAQM lists recommended mitigation measures for low, medium and high Dust Impact Risks. The highly recommended measures for Medium Risk sites are included in Appendix 9.4 of this report.

9.6.3 The highest risk activities will be avoided in the areas of the site closest to sensitive receptors. These are shown as a Priority Dust Mitigation Zone on Figure 9.2. Where dust generation cannot be avoided in areas close to neighbouring properties,
additional mitigation measures should be put in place, such as: windbreaks, sprinklers, and/or time/weather condition limits on the operation of some items of plant or the carrying out of potentially dust-generating activities.

9.6.4 After the implementation of the mitigation measures listed above, the significance of each phase of the construction programme will be reduced and its overall significance will be assessed.

Operational

9.6.5 This section will be completed once the Air quality Assessment has been completed including the transport modelling data.

9.6.6 A Travel Plan will be produced for the site, and is expected to include a number of measures that will align with the requirements of NBC’s emerging Low Emissions Strategy. An additional issue in assessing the effects will be the strategic context of the wider air quality benefits delivered by a shift from road to rail. With each freight train expected to remove between 40-70 HGVs from the roads, at the strategic level, the proposals will bring air quality and congestion benefits which will also feature in the assessment once complete.

9.7 RESIDUAL EFFECTS

Construction

9.7.1 The construction of the proposed development could potentially cause emissions of dust that might pose a nuisance to adjacent property. However, by adopting appropriate and best practice mitigation measures to reduce any such emissions and their potential effect on the surrounding area, there should be no significant nuisance effects.

9.7.2 A Construction Environmental Management Plan (CEMP) will provide the framework for measures to mitigate and minimise dust effects.

Operational

9.7.3 The proposed development will result in an increase in traffic on the local road network. The changes in air pollution concentrations in the local area will be assessed once the transport modelling is complete.
9.8 CUMULATIVE EFFECTS

9.8.1 The traffic data in the Northamptonshire Strategy Transport Model includes committed developments in the wider area, including Rail Central. The results presented in the Air Quality ES Chapter (in 2017) will therefore consider the cumulative effect of other, relevant, sites' generated traffic.

9.9 CONCLUSIONS

9.9.1 The existing quality of air in the location of the proposed development has been determined to be within the standards and objectives set out in the UKAQS.

9.9.2 The proposed development is not within an AQMA, but there are several AQMAs on the road network close to the site. Existing air quality data held by the local authorities is being used to help establish a baseline position, with additional monitoring data also being collected at present.

9.9.3 The likely impacts on the AQMAs and other receptors will be fully assessed once the Transport modelling data is available.

9.9.4 The construction of the proposed development could give rise to emissions of dust. However, by adopting appropriate mitigation measures to reduce any such emissions, there should be no significant effects caused by dust.
References


9.5 Planning Policy Guidance (PPG), 2014, *Air Quality*.


Figure 9.1: Site Location

Legend

- NBC Diffusion Tubes
  - Points
- NBC Automatic Monitors
  - Points
- SNC Diffusion Tubes
  - Points
- AQMAs
  - Areas
- Red Line (November 2016)
  - Areas

Job No: 6254.S
Drawn by: PH
Date: 18/11/2016
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Figure 9.2: Road Bypass (Indicative)

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Figure 9.3: Construction Phase Receptors

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Figure 9.4: Project Diffusion Tubes (Collingtree)

Contains Ordnance Survey data © Crown copyright and database right 2016
Appendix 9.1: EPUK & IAQM Significance Criteria
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<th>Long term average Concentration at receptor in assessment year</th>
<th>% Change in concentration relative to Air Quality Assessment Level (AQAL)</th>
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<td>110% or more of AQAL</td>
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**Explanation**

1. AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.
2. The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5% will be described as Negligible.
3. The Table is only designed to be used with annual mean concentrations.
4. Descriptors for individual receptors only; the overall significance is determined using professional judgement (see Chapter 7). For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.
5. When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme' concentration for an increase.
6. The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.
7. It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.
Appendix 9.2: Raw Laboratory Results
# LABORATORY ANALYSIS REPORT

**NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY**

**REPORT NUMBER:** K05261R  
**BOOKING IN REFERENCE:** K05261  
**DESPATCH NOTE:** 31432  
**CUSTOMER:** Phlorum Limited  
Attn: PAUL HAYWARD  
Unit 12, Hunns Mere Way  
Woodingdean  
Brighton  
BN2 6AH

**DATE SAMPLES RECEIVED:** 23/08/2016  
**JOB NUMBER:** 6254-S  

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**Limit of Detection:** 0.017 μgNO₂  
**Tube Preparation:** 20% TEA / Water

The Diffusion Tubes have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures calculations and assessments involving the exposure procedures and periods provided by the client are not within the scope of our UKAS accreditation. Those results obtained using exposure data shall be indicated by an asterisk. Any queries concerning the data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

Form LQF32b Issue 6 – February 2015  
Report Number K05261R  
Page 1 of 2

**Report Signature:**  
L. Gates, Laboratory Manager
LABORATORY ANALYSIS REPORT

Analysed on UV 04 Camspec M550

Analyst Name: Jess Crow

Date of Analysis: 31/08/2016
Date of Report: 01/09/2016

Analysis carried out in accordance with documented in-house Laboratory Method GLM7.

The Diffusion Tubes have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures calculations and assessments involving the exposure procedures and periods provided by the client are not within the scope of our UKAS accreditation. Those results obtained using exposure data shall be indicated by an asterisk. Any queries concerning the data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.
**LABORATORY ANALYSIS REPORT**

**NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY**

**REPORT NUMBER** K05896R

**BOOKING IN REFERENCE** K05896

**DESPATCH NOTE** 31457

**CUSTOMER** Phlorum Limited, Attn: PAUL HAYWARD

Unit 12, Hunns Mere Way

Woodingdean

Brighton

BN2 6AH

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Comment: Results are not blank subtracted

Results have been corrected to a temperature of 293 K (20°)

Overall M.U.: 5.2% +/-

Limit of Detection: 0.010 µg NO₂

Tube Preparation: 20% TEA / Water

The Diffusion Tubes have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures calculations and assessments involving the exposure procedures and periods provided by the client are not within the scope of our UKAS accreditation. Those results obtained using exposure data shall be indicated by an asterisk. Any queries concerning the data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

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Report Number K05896R

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[Signature]

L. Gates, Laboratory Manager
LABORATORY ANALYSIS REPORT

Analysed on UV05 Camspec M550

Analyst Name          Charlotte Grove

Date of Analysis      23/09/2016       Date of Report    23/09/2016

Analysis carried out in accordance with documented in-house Laboratory Method
GLM7

The Diffusion Tubes have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures calculations and assessments involving the exposure procedures and periods provided by the client are not within the scope of our UKAS accreditation. Those results obtained using exposure data shall be indicated by an asterisk. Any queries concerning the data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

Form LQF32b Issue 6 – February 2015
LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

**REPORT NUMBER**
K06661R

**BOOKING IN REFERENCE**
K06661

**DESPATCH NOTE**
31456

**CUSTOMER**
Phlorum Limited  Attn: PAUL HAYWARD
Unit 12, Hunns Mere Way
Woodingdean
Brighton
BN2 6AH

**DATE SAMPLES RECEIVED**
25/10/2016

**JOB NUMBER**
6254.5

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Comment: Results are not blank subtracted

Results have been corrected to a temperature of 293 K (20°)

Overall M.U. 7.8% +/-

Limit of Detection 0.017µgNO₂

Tube Preparation: 20% TEA / Water
Analysed on UV 04 Camspec M550
Analyst Name Ben Whitmarsh

The Diffusion Tubes have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures calculations and assessments involving the exposure procedures and periods provided by the client are not within the scope of our UKAS accreditation. Those results obtained using exposure data shall be indicated by an asterisk (*). Any queries concerning the data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.
LABORATORY ANALYSIS REPORT

Date of Analysis  31/10/2016  Date of Report  31/10/2016

Analysis carried out in accordance with documented in-house Laboratory Method GLM7

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Appendix 9.3: IAQM Highly Recommended Mitigation Measures for sites with a Medium Risk of Dust Impacts

Please refer to the IAQM’s Construction Dust Guidance for further, “desirable”, mitigation measures.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this Appendix. The DMP may include monitoring of dust deposition, dust flux, real-time PM$_{10}$ continuous monitoring and/or visual inspections.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exception incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.

Monitoring

- Carry out regular site inspections to monitor compliance with the Dust Management Plan, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition, dust flux, or real-time PM$_{10}$ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. Further guidance is provided by the IAQM$^1$ on monitoring during demolition, earthworks and construction.

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 as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

**Operating Vehicle/Machinery and Sustainable Travel**

- Ensure all vehicles switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

**Operations**

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water 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 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 of waste materials.

**Demolition**

- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

**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 additional control measures are in place.

**Trackout**

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10m from receptors where possible.