



Barratt David Wilson Homes, South Counties

# Proposed Residential Development located on Land South of Crawley Down Road, Felbridge (SA19)

Air Quality Assessment

Project No: 444669-02 (04)

JULY 2025

**RSK**

## RSK GENERAL NOTES

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**Project No.:** 444669-02(04)

**Title:** Proposed Residential Development located on Land South of Crawley Down Road, Felbridge (SA19) - Air Quality Assessment

**Client:** Barratt David Wilson Homes, South Counties

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Date: 29<sup>th</sup> July 2025

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Date: 29<sup>th</sup> July 2025

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## Abbreviations

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|                   |                                                                      |
|-------------------|----------------------------------------------------------------------|
| AADT              | Annual Average Daily Traffic                                         |
| AQAP              | Air Quality Action Plan                                              |
| AQMA              | Air Quality Management Area                                          |
| AQO               | Air Quality Objective                                                |
| AQS               | Air Quality Standard                                                 |
| ASR               | Annual Status Report                                                 |
| CHP               | Combined Heat and Power                                              |
| CO <sub>2</sub>   | Carbon Dioxide                                                       |
| CO                | Carbon Monoxide                                                      |
| DEFRA             | Department for Environment, Food and Rural Affairs                   |
| DMP               | Dust Management Plan                                                 |
| EC                | European Commission                                                  |
| EPUK              | Environmental Protection UK                                          |
| EU                | European Union                                                       |
| HDV               | Heavy Duty Vehicle                                                   |
| IAQM              | Institute of Air Quality Management                                  |
| LAQM              | Local Air Quality Management                                         |
| LDV               | Light Duty Vehicle                                                   |
| MSDC              | Mid Sussex District Council                                          |
| NAQS              | National Air Quality Strategy                                        |
| NPPF              | National Planning Policy Framework                                   |
| NO <sub>2</sub>   | Nitrogen dioxide                                                     |
| NO <sub>x</sub>   | Oxides of nitrogen                                                   |
| O <sub>3</sub>    | Ozone                                                                |
| PM <sub>2.5</sub> | Particulate matter of size fraction approximating to <2.5µm diameter |
| PM <sub>10</sub>  | Particulate matter of size fraction approximating to <10µm diameter  |
| RSK               | RSK Environment Limited                                              |
| TDC               | Tandridge District Council                                           |
| VOC               | Volatile Organic Compounds                                           |

# CONTENTS

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|          |                                                                                    |           |
|----------|------------------------------------------------------------------------------------|-----------|
| <b>1</b> | <b>INTRODUCTION .....</b>                                                          | <b>6</b>  |
| 1.1      | Background .....                                                                   | 6         |
| <b>2</b> | <b>LEGISLATION, PLANNING POLICY &amp; GUIDANCE .....</b>                           | <b>7</b>  |
| 2.1      | Key Legislation .....                                                              | 7         |
| 2.1.1    | Air Quality Strategy.....                                                          | 7         |
| 2.1.2    | Air Quality Standards.....                                                         | 7         |
| 2.1.3    | The Environment Act, 1995 .....                                                    | 8         |
| 2.1.4    | The Environment Act, 2021 .....                                                    | 8         |
| 2.1.5    | The Environmental Targets (Fine Particulate Matter) (England) Regulations, 2023 .. | 8         |
| 2.2      | Planning Policy .....                                                              | 8         |
| 2.2.1    | National Planning Policy Framework.....                                            | 9         |
| 2.2.2    | Local Planning Policy .....                                                        | 9         |
| 2.3      | Best Practice Guidance .....                                                       | 10        |
| 2.3.1    | Guidance on the Assessment of Dust from Demolition and Construction .....          | 10        |
| 2.3.2    | Local Air Quality Management Technical Guidance .....                              | 10        |
| 2.3.3    | Land-Use Planning & Development Control: Planning for Air Quality .....            | 10        |
| 2.3.4    | Air Quality and Emissions Mitigation Guidance for Sussex (2021).....               | 11        |
| <b>3</b> | <b>ASSESSMENT SCOPE .....</b>                                                      | <b>12</b> |
| 3.1      | Overall Approach .....                                                             | 12        |
| 3.2      | Baseline Characterisation .....                                                    | 12        |
| 3.3      | Construction Phase Assessment .....                                                | 12        |
| 3.3.1    | Construction Dust and Particulate Matter .....                                     | 12        |
| 3.3.2    | Emissions to Air from Construction Traffic and Plant.....                          | 13        |
| 3.4      | Operational Phase Impact Assessment .....                                          | 13        |
| 3.4.1    | Emissions to Air from Operational Phase Traffic .....                              | 13        |
| 3.4.2    | Emissions to Air from Operational Phase Combustion Plant.....                      | 14        |
| 3.4.3    | Exposure of Future Occupants to Air Pollution .....                                | 14        |
| 3.5      | Emission Mitigation Assessment.....                                                | 14        |
| <b>4</b> | <b>BASELINE AIR QUALITY CHARACTERISATION .....</b>                                 | <b>15</b> |
| 4.1      | Emissions Sources and Key Air Pollutants .....                                     | 15        |
| 4.2      | Presence of AQMAs .....                                                            | 15        |
| 4.3      | Local Authority Air Quality Monitoring Data .....                                  | 15        |
| 4.4      | LAQM Background Data .....                                                         | 17        |
| <b>5</b> | <b>ASSESSMENT OF IMPACTS.....</b>                                                  | <b>19</b> |
| 5.1      | Construction Phase .....                                                           | 19        |
| 5.1.1    | Exhaust Emissions from Plant and Vehicles .....                                    | 19        |
| 5.1.2    | Fugitive Dust Emissions .....                                                      | 19        |
| 5.1.3    | Potential Dust Emission Magnitude.....                                             | 20        |
| 5.1.4    | Sensitivity of the Area .....                                                      | 21        |
| 5.1.5    | Risk of Impacts .....                                                              | 23        |
| 5.2      | Operational Phase .....                                                            | 24        |
| 5.2.1    | Emissions to Air from Operational Phase .....                                      | 24        |
| <b>6</b> | <b>MITIGATION MEASURES .....</b>                                                   | <b>25</b> |

|                       |                                                                  |           |
|-----------------------|------------------------------------------------------------------|-----------|
| 6.1                   | Construction Phase Mitigation.....                               | 25        |
| 6.2                   | Operational Phase Mitigation .....                               | 25        |
| 6.2.1                 | Emission Mitigation Assessment.....                              | 25        |
| <b>7</b>              | <b>CONCLUSIONS .....</b>                                         | <b>29</b> |
| <b>8</b>              | <b>REFERENCES .....</b>                                          | <b>30</b> |
| <br><b>APPENDICES</b> |                                                                  |           |
|                       | <b>APPENDIX A CONSTRUCTION DUST ASSESSMENT METHODOLOGY .....</b> | <b>31</b> |
|                       | <b>APPENDIX B SITE-SPECIFIC MITIGATION MEASURES .....</b>        | <b>36</b> |

# 1 INTRODUCTION

## 1.1 Background

RSK were commissioned by Barratt David Wilson Homes, South Counties to undertake an air quality assessment of the potential air quality impacts associated with a proposed residential development located land off Crawley Down Road, Felbridge. Figure 1.1 shows the proposed site location and layout.

The proposed development comprises the erection of 200 dwellings across two parcels of land. The approximate centre of the site is 536412, 139278. The site is located within the administration area of both Mid Sussex District Council (MSDC) and Tandridge District Council (TDC).

This report presents the findings of an assessment of existing/baseline air quality conditions, potential air quality impacts during the construction phase of the proposed development and anticipated impacts on local air quality resulting from traffic emissions generated by the development once it is fully operational.

**Figure 1.1: Proposed Development Site Location**



## 2 LEGISLATION, PLANNING POLICY & GUIDANCE

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### 2.1 Key Legislation

#### 2.1.1 Air Quality Strategy

UK air quality policy is published under the umbrella of the Environment Act 1995, Part IV and specifically Section 80, the National Air Quality Strategy. The latest *Air Quality Strategy for England, Scotland, Wales and Northern Ireland – Working Together for Clean Air*, published in July 2007 sets air quality standards and objectives for ten key air pollutants to be achieved between 2003 and 2020.

The EU (European Unit) Air Quality Framework Directive (1996) established a framework under which the EU could set limit or target values for specified pollutants. The directive identified several pollutants for which limit or target values have been, or will be set in subsequent ‘daughter directives’. The framework and daughter directives were consolidated by Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe, which retains the existing air quality standards and introduces new objectives for fine particulates (PM<sub>2.5</sub>).

The Clean Air Strategy 2019 supersedes the policies outlined in the 2007 strategy. This latest strategy aims to have a more joined-up approach, outlining actions the Government plans to take to reduce emissions from transport, homes, agriculture and industry. However, the air quality objectives remain as previously detailed within the 2007 strategy.

#### 2.1.2 Air Quality Standards

The air quality standards (AQSs) in the United Kingdom are derived from European Commission (EC) directives and are adopted into English law via the Air Quality (England) Regulations 2000 and Air Quality (England) Amendment Regulations 2002. The Air Quality Limit Values Regulations 2003 and subsequent amendments implement the Air Quality Framework Directive into English Law. Directive 2008/50/EC was translated into UK law in 2010 via the Air Quality Standards Regulations 2010.

The relevant<sup>1</sup> AQS to England and Wales to protect human health are summarised in Table 2.1.

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<sup>1</sup> Relevance, in this case, is defined by the scope of the assessment.

**Table 2.1: Air Quality Standards (AQSS) Relevant to the Proposed Development**

| Substance                            | Averaging period | Exceedances allowed per year | Ground level concentration limit ( $\mu\text{g}/\text{m}^3$ ) |
|--------------------------------------|------------------|------------------------------|---------------------------------------------------------------|
| Nitrogen dioxide ( $\text{NO}_2$ )   | 1 calendar year  | -                            | 40                                                            |
|                                      | 1 hour           | 18                           | 200                                                           |
| Fine particles ( $\text{PM}_{10}$ )  | 1 calendar year  | -                            | 40                                                            |
|                                      | 24 hours         | 35                           | 50                                                            |
| Fine particles ( $\text{PM}_{2.5}$ ) | 1 year           | -                            | 20                                                            |

### 2.1.3 The Environment Act, 1995

These objectives are to be used in the review and assessment of air quality by local authorities under Section 82 of the Environment Act (1995). If exceedances are measured or predicted through the review and assessment process, the local authority must declare an Air Quality Management Area (AQMA) under Section 83 of the act, and produce an Air Quality Action Plan (AQAP) to outline how air quality is to be improved.

### 2.1.4 The Environment Act, 2021

On the 10<sup>th</sup> of November 2021, the new Environment Act (2021) passed Royal Assent, which amends the Environment Act (1995) to reinforce the local air quality management (LAQM) framework in order to encourage cooperation at the local level and broaden the range of organisations that play a role in improving local air quality. The Environment Act requires targets to be set for fine particulate matter  $\text{PM}_{2.5}$ , but at the time of writing, these have not been finalised.

### 2.1.5 The Environmental Targets (Fine Particulate Matter) (England) Regulations, 2023

The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 was published on 31<sup>st</sup> January 2023, and came into force the following day. The 2023 Regulations introduce a reduced long-term annual average Air Quality Objective for  $\text{PM}_{2.5}$  of 10  $\mu\text{g}/\text{m}^3$  by 2040, a reduction from the current Air Quality objective of 20  $\mu\text{g}/\text{m}^3$  set out within the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020. Additionally, the 2023 Regulations introduce an interim target of 12  $\mu\text{g}/\text{m}^3$  by January 2028 and 35% reduction in average population exposure by 2040, with an interim target of a 22% reduction by January 2028, both compared to a 2018 baseline.

## 2.2 Planning Policy

The land use planning process is a key means of improving air quality, particularly in the long term, through the strategic location and design of new developments. Any air quality concern that relates to land use and its development can, depending on the details of the proposed development, be a material consideration in the determination of planning applications.

## 2.2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) was revised and published in July 2021, superseding the previous NPPF with immediate effect. The NPPF includes a presumption in favour of sustainable development.

Section 15 of the NPPF deals with Conserving and Enhancing the Natural Environment, and states that the intention is that the planning system should prevent *‘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 or land instability’* and goes on to state that *‘new development [should be] appropriate for its location’* and *‘the effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account.’*

With specific regard to air quality, the NPPF states that: *“Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.”*

## 2.2.2 Local Planning Policy

### Mid Sussex District Plan 2014-2031 (March 2018)

Mid Sussex District Plan 2014-2031 has been adopted in 2018, replaces the Mid Sussex Local Plan 2014. MSDC policies for managing developments are laid out in the Mid Sussex District Plan 2014-2031 for Mid Sussex District which include MSDC policies relating to air quality. Policy DP29 Noise, Air and Light Pollution states the following:

*“The environment, including nationally designated environmental sites, nationally protected landscapes, areas of nature conservation or geological interest, wildlife habitats, and the quality of people’s life will be protected from unacceptable levels of noise, light and air pollution by only permitting development where:*

*....*

*Air pollution:*

- *It does not cause unacceptable levels of air pollution;*
- *Development on land adjacent to an existing use which generates air pollution or odour would not cause any adverse effects on the proposed development or can be mitigated to reduce exposure to poor air quality to recognised and acceptable levels;*
- *Development proposals (where appropriate) are consistent with Air Quality Management Plans.*

....”

### **Tandridge District Council Core Strategy (October 2008)**

#### **Tandridge Local Plan Part 2: Detailed Policies 2014-2029 (July 2014)**

Tandridge District Council Core Strategy has been adopted in 2008, which sets out key planning policies for the district. The Core Strategy is read in conjunction with the Tandridge Local Plan. Policy DP22 Minimising Contamination, Hazards & Pollution in the Tandridge Local Plan states the following:

“....

#### *Air Pollution*

*H. Development will be permitted provided it would not:*

- 1. Have an adverse impact on health, the natural or built environment or amenity of existing or proposed uses by virtue of odour, dust and/or other forms of air pollution;*
- or*
- 2. Be likely to suffer unacceptable nuisance as a result of proximity to existing sources of odour, dust and/or other forms of air pollution.”*

## **2.3 Best Practice Guidance**

### **2.3.1 Guidance on the Assessment of Dust from Demolition and Construction**

The Institute of Air Quality Management (IAQM) published a guidance document (Holman *et al.*, 2014) on the assessment of construction phase impacts (herein the ‘IAQM construction dust guidance’). The guidance was produced to provide advice to developers, consultants and environmental health officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM<sub>10</sub> impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measure appropriate to the level of risk identified.

### **2.3.2 Local Air Quality Management Technical Guidance**

The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their air quality review and assessment work. This guidance, referred to in this document as the Local Air Quality Management Technical Guidance (Defra, 2022) (‘LAQM TG.22’).

### **2.3.3 Land-Use Planning & Development Control: Planning for Air Quality**

Environmental Protection UK’s (EPUK) and the IAQM jointly published a revised version of the guidance note ‘Land-Use Planning & Development Control: Planning for Air Quality’ in 2017 (herein the ‘EPUK-IAQM guidance’) to facilitate consideration of air quality within local development control processes. It provides a framework for air quality considerations, promoting a consistent approach to the treatment of air quality issues within development control decisions.

The guidance includes methods for undertaken an air quality assessment and an approach for assessing the significance of effects. The guidance note is widely accepted as an appropriate reference method for this purpose.

#### **2.3.4 Air Quality and Emissions Mitigation Guidance for Sussex (2021)**

MSDC is a participating member of Sussex-air partnership. As part of the Sussex-air partnership, Sussex local authorities have developed a guidance to developers on how to assess and mitigate the air quality impacts from development and transport-related emissions.

## **3 ASSESSMENT SCOPE**

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### **3.1 Overall Approach**

The approach taken for assessing the potential air quality impacts of the proposed development may be summarised as follows:

- Baseline characterisation of local air quality;
- Qualitative impact assessment of the construction phase of the development using the 2014 IAQM guidance;
- Qualitative assessment of the operational phase impact of the development, with reference to the 2017 EPUK-IAQM guidance;
- Emission mitigation assessment; and
- Recommendation of mitigation measures, where appropriate, to ensure any adverse effects on air quality are minimised.

### **3.2 Baseline Characterisation**

Existing or baseline air quality refers to the concentrations of relevant substances that are already present in ambient air. These substances are emitted by various sources, including road traffic, industrial, domestic, agricultural and natural sources.

A desk-based study has been undertaken including a review of monitoring data available from MSDC and TDC, and estimated background data from the LAQM Support website maintained by Defra. Consideration has also been given to potential sources of air pollution and the presence of AQMAs .

### **3.3 Construction Phase Assessment**

#### **3.3.1 Construction Dust and Particulate Matter**

Demolition and construction works for the proposed development have the potential to lead to the release of fugitive dust and particulate matter. An assessment of the likely significant effects of construction phase dust and particulate matter at sensitive receptors has therefore been undertaken following the IAQM's construction dust guidance.

Three separate dust impacts were considered:

- Disamenity due to dust soiling;
- The risk of health effects due to an increase in exposure to PM<sub>10</sub>; and
- Harm to ecological receptors.

In order to assess the potential impacts of construction, activities are divided into four types:

- Demolition;
- Earthworks;
- Construction; and
- Trackout<sup>2</sup>.

The risk of dust and PM<sub>10</sub> arising to cause disamenity and/or health or ecological impacts was based on an assessment of likely emissions magnitude and the sensitivity of the surrounding environment. The risk category may be different for each of the four 'construction' activities.

Appendix A sets out the construction dust assessment methodology in detail as per IAQM construction dust guidance. Once the level of risk has been determined, then site specific mitigation proportionate to the level of risk can be identified (as detailed in Appendix B).

The Magic Map application available online by Defra was used to identify statutory ecological receptors near the proposed development site area.

### **3.3.2 Emissions to Air from Construction Traffic and Plant**

Exhaust emissions from construction phase vehicles and plant may have an impact on local air quality adjacent to the routes used by these vehicles to access the proposed development site and in the vicinity of the proposed development site itself. Detailed information on the number of vehicles and plant associated with the construction phase is not available at this stage (and would not be until after appointment of the main construction contractors). Therefore, a qualitative impact assessment has been undertaken based on professional judgement and considering the following factors:

- The likely duration of the construction phase;
- The potential number and type of construction traffic and plant that could be required; and
- The number and proximity of sensitive receptors to the proposed development site and along the likely construction vehicle routes.

## **3.4 Operational Phase Impact Assessment**

### **3.4.1 Emissions to Air from Operational Phase Traffic**

The EPUK-IAQM guidance provides indicative criteria for when an air quality assessment is required, if none of the criteria are exceeded, it is considered unlikely

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<sup>2</sup> Trackout is defined as the transport of dust and dirt from the construction / demolition sites onto public road network, where it may be deposited and then re-suspended by vehicles using the network.

that there will be any significant impacts on air quality during the operational phase. A screening level assessment against these criteria has been undertaken in Section 5 of this report.

### **3.4.2 Emissions to Air from Operational Phase Combustion Plant**

It is understood that no significant combustion sources such as combined heat and power (CHP) plant or biomass boilers are proposed as part of the scheme. All dwellings will be powered by air source heat pumps (ASHP) and electric. Therefore, this report has not considered emissions related to energy generation any further.

### **3.4.3 Exposure of Future Occupants to Air Pollution**

The potential exposure of future users of the proposed development has been considered by reviewing the baseline conditions (Section 4) and the locations of sensitive receptors within the proposed development, as well as considering the EPUK-IAQM guidance.

## **3.5 Emission Mitigation Assessment**

In accordance with the Sussex-air 2021 guidance, the development is classified as a major development. Therefore, an emission mitigation assessment has been undertaken with reference to the Sussex-air partnership guidance document 'Air Quality and Emissions Mitigation Guidance for Sussex (2021)'. The emission mitigation assessment is undertaken to quantify the monetised health damage value associated with transport emissions from the proposed development over a 5-year period.

The approach taken for the emission mitigation assessment for the proposed development may be summarised as follows:

- Quantify change in emissions for NO<sub>x</sub> and PM<sub>2.5</sub> using Defra 'Emission Factors Toolkit'; and
- Calculate damage costs for NO<sub>x</sub> and PM<sub>2.5</sub> using Defra 'Air Quality Appraisal: Damage Cost Toolkit'.

## 4 BASELINE AIR QUALITY CHARACTERISATION

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Existing or baseline air quality refers to the concentrations of relevant substances that are already present in ambient air. These substances are emitted by various sources, including road traffic, industrial, domestic, agricultural and natural sources. Baseline air quality data employed in this study have been obtained from the diffusion tube monitoring stations maintained by MSDC and TDC, and from the LAQM Support website operated by the Department for Environment, Food and Rural Affairs (Defra).

### 4.1 Emissions Sources and Key Air Pollutants

The proposed development is surrounded by residential areas to the north. The site is bounded by Crawley Down Road to the north. The principal pollutants relevant to this assessment are considered to be NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>, generally regarded as the most significant air pollutants released by vehicular combustion processes, or subsequently generated by vehicle emissions in the atmosphere through chemical reactions.

### 4.2 Presence of AQMAs

MSDC has one Air Quality Management Area (AQMA), which is the Mid Sussex AQMA No.1. The AQMA is declared for exceedance of the annual mean NO<sub>2</sub> air quality objectives. The proposed development is located approximately 24.7km to the northeast of the Mid Sussex AQMA No.1, and the proposed development is not located in an AQMA. Currently TDC has not declared any AQMA.

### 4.3 Local Authority Air Quality Monitoring Data

According to the MSDC's 2022 Air Quality Annual Status Report (ASR), there was a network of 33 nitrogen dioxide (NO<sub>2</sub>) diffusion tube monitoring locations across the district in 2021 and no automatic monitoring station. There were seven diffusion tubes within 3km of the proposed development site. The monitoring data from sites within 3km from the proposed development site are reproduced in Table 4.1 below.

The data from these tubes show that there were no exceedances of the annual mean NO<sub>2</sub> AQS during 2017 – 2021 except at one monitoring location (MSDC ref: MSAQ29), where the NO<sub>2</sub> concentration exceeded the AQS in 2019. However, MSAQ29 is located closed to a main road (A-road) and is not considered representative of conditions at the proposed development site. Particulate Matter monitoring data are not available in the vicinity (within 3km) of the site.

Based on TDC's 2022 Air Quality Annual Status Report (ASR), there was a network of 30 diffusion tube monitoring locations across the district in 2021 and no automatic monitoring station. There were two diffusion tubes within 3km of the proposed development site. The monitoring data from sites within 3km from the proposed development site are reproduced in Table 4.2 below.

The data from these tubes show that there were no exceedances of the annual mean NO<sub>2</sub> AQS during 2017 – 2021.

Figure 4.1 shows all nine monitoring locations within 3km of the development site.

**Table 4.1: Mid Sussex District Council Annual Mean Measured NO<sub>2</sub> Concentrations within 3km of the Proposed Development Site**

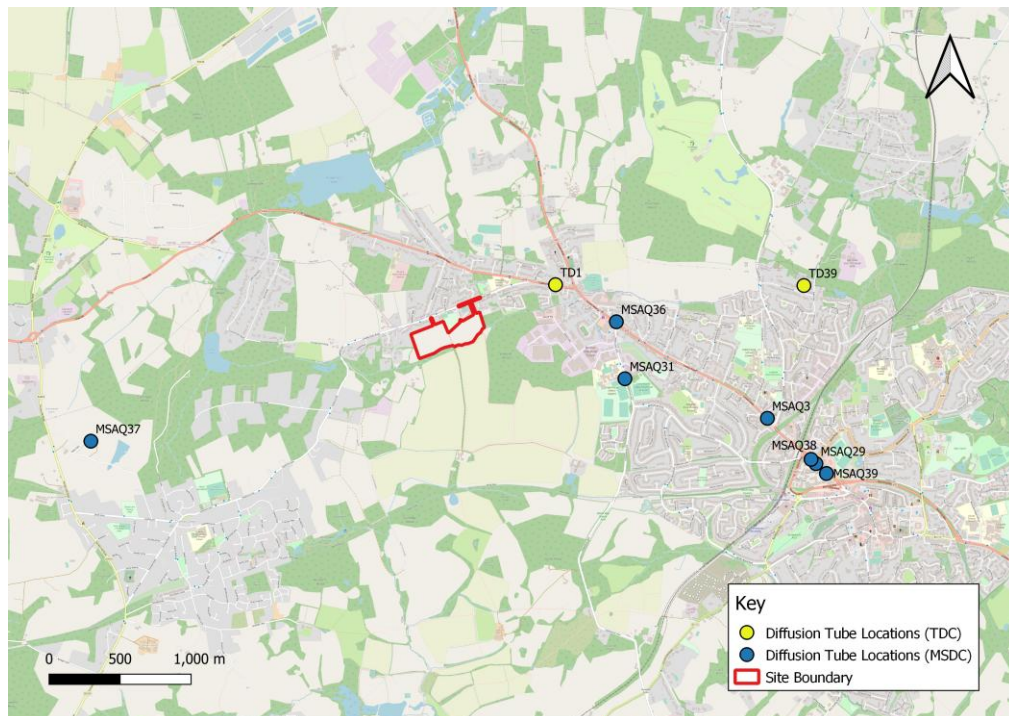
| Site ID | Location                                                                          | Site type | Approximate Distance from Site (km) | Annual Mean NO <sub>2</sub> Concentrations (µg/m <sup>3</sup> ) |      |             |      |      |
|---------|-----------------------------------------------------------------------------------|-----------|-------------------------------------|-----------------------------------------------------------------|------|-------------|------|------|
|         |                                                                                   |           |                                     | 2017                                                            | 2018 | 2019        | 2020 | 2021 |
| MSAQ36  | Lamp Post adjacent Bridgeway London Road East Grinstead                           | Roadside  | 1.2                                 | -                                                               | -    | -           | 31.6 | 32.7 |
| MSAQ31  | Traffic sign outside entrance to Imberhorne School Imberhorne Lane East Grinstead | Roadside  | 1.3                                 | -                                                               | -    | 13.2        | 10.3 | 11.2 |
| MSAQ3   | Southwick House London Road East Grinstead                                        | Kerbside  | 2.3                                 | 35.8                                                            | 34.4 | 31.7        | 22.7 | 23.4 |
| MSAQ38  | Lamp Post adjacent to La Farola London Road East Grinstead                        | Roadside  | 2.7                                 | -                                                               | -    | -           | 20.4 | 20.6 |
| MSAQ29  | 184 London Road East Grinstead                                                    | Roadside  | 2.8                                 | -                                                               | -    | <b>44.1</b> | 32.5 | 33.4 |
| MSAQ39  | Highway sign adjacent to 1 to 45 White Lion Close East Grinstead                  | Roadside  | 2.8                                 | -                                                               | -    | -           | 23.6 | 25.0 |
| MSAQ37  | Lamp post adjacent 10 Station Road East Grinstead                                 | Roadside  | 2.6                                 | -                                                               | -    | -           | 29.8 | 31.9 |

Note: Results shown in **bold** exceed the air quality objective.

**Table 4.2: Tandridge District Council Annual Mean Measured NO<sub>2</sub> Concentrations within 3km of the Proposed Development Site**

| Site ID | Location                     | Site type | Approximate Distance from Site (km) | Annual Mean NO <sub>2</sub> Concentrations (µg/m <sup>3</sup> ) |      |      |      |      |
|---------|------------------------------|-----------|-------------------------------------|-----------------------------------------------------------------|------|------|------|------|
|         |                              |           |                                     | 2017                                                            | 2018 | 2019 | 2020 | 2021 |
| TD1     | 16 Copthorne Road, Felbridge | Roadside  | 0.8                                 | -                                                               | -    | 29.5 | 22.1 | 24.3 |
| TD39    | Copthorne Road Felbridge     | Kerbside  | 2.5                                 | 26.5                                                            | 25.1 | 23.4 | 17.8 | 21.6 |

**Figure 4.1 Monitoring Locations within 3km of the Proposed Development Site**



@OpenStreetMap contributors, available under the Open Database Licence

## 4.4 LAQM Background Data

In addition to the local monitoring data, estimated background air quality data available from the Local Air Quality Management (LAQM) website operated by Defra, may also be used to establish likely background air quality conditions at the proposed development site.

This website provides estimated annual average background concentrations of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> on a 1km<sup>2</sup> grid basis. Table 4.3 reproduces estimated annual average background concentrations for the grid square containing the proposed development site for years from 2023 to 2025. No exceedances of the NO<sub>2</sub>, PM<sub>10</sub> or PM<sub>2.5</sub> AQs are

predicted. As background concentrations are predicted to fall with time, background concentrations in future years would not be expected to exceed their respective annual mean standards.

**Table 4.3: Estimated Background Annual Average NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> Concentrations at Proposed Development Site (from 2018 base map)**

| Assessment Year             | Estimated Annual Average Pollutant Concentrations Derived from the LAQM Website (µg/m <sup>3</sup> ) |                                 |                                  |
|-----------------------------|------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------|
|                             | Annual Average NO <sub>2</sub>                                                                       | Annual Average PM <sub>10</sub> | Annual Average PM <sub>2.5</sub> |
| <b>2023</b>                 | 8.9                                                                                                  | 13.0                            | 8.8                              |
| <b>2024</b>                 | 8.5                                                                                                  | 12.8                            | 8.6                              |
| <b>2025</b>                 | 8.2                                                                                                  | 12.6                            | 8.5                              |
| <b>Air Quality Standard</b> | <b>40</b>                                                                                            | <b>40</b>                       | <b>20</b>                        |

Note: Presented concentrations for 1 km<sup>2</sup> grid centred on 536500, 139500; approximate centre of development site is 536412, 139278.

## 5 ASSESSMENT OF IMPACTS

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### 5.1 Construction Phase

Atmospheric emissions from construction activities will depend on a combination of the potential for emissions (the type of activity and prevailing conditions) and the effectiveness of control measures. In general terms, there are two sources of emissions that will need to be controlled to minimise the potential for adverse environmental effects:

- exhaust emissions from site plant, equipment and vehicles; and
- fugitive dust emissions from site activities.

#### 5.1.1 Exhaust Emissions from Plant and Vehicles

The operation of vehicles and equipment powered by internal combustion engines results in the emission of exhaust gases containing the pollutants NO<sub>x</sub>, PM<sub>10</sub>, volatile organic compounds (VOCs) and carbon monoxide (CO). The quantities emitted depend on factors such as engine type, service history, pattern of usage and fuel composition.

Construction traffic will comprise haulage/construction vehicles and vehicles used for workers' trips to and from the site. The greatest impact on air quality due to emission from construction phase vehicles will be in areas adjacent to the application site access and nearby road network.

At this stage, it is estimated that there will be 10-50 HDV outward movements per day, which is considered unlikely to cause a significant impact on local air quality, in accordance with the EPUK-IAQM guidance.

The operation of site equipment and machinery will result in emissions to atmosphere of exhaust gases, but with suitable controls and site management such emissions are unlikely to be significant (as per LAQM. TG.22).

#### 5.1.2 Fugitive Dust Emissions

Fugitive dust emissions arising from construction activities are likely to be variable in nature and will depend upon the type and extent of the activity, soil type and moisture content, road surface conditions and weather conditions. Periods of dry weather combined with higher than average wind speeds have the potential to generate more dust.

The construction activities anticipated as part of the proposed development that are often the most significant potential sources of fugitive dust emissions are:

- Earthworks comprising of levelling, construction of foundations, haulage, tipping, stockpiling, landscaping and tree removal;
- Construction of proposed development and hard landscaped areas; and

- Trackout, involving the movement of vehicles over surfaces where muddy materials have been transferred off-site (for example, on to public highways).

### 5.1.3 Potential Dust Emission Magnitude

With reference to the IAQM guidance criteria outlined in Appendix A, the dust emissions magnitude for earthworks, construction and trackout activities are summarised in Tables 5.1, 5.2 and 5.3. There is no demolition proposed, hence the assessment for demolition is not included. Risk categories for the four construction activities are summarised in Table 5.4.

Worst-case assumptions have been made, where information is not currently available, for a conservative assessment.

**Table 5.1: Summary of Dust Emissions Magnitude of Earthworks Activities (Before mitigation)**

| Earthworks Criteria                   | Dust Emissions Class | Evaluation of the Effects                           |
|---------------------------------------|----------------------|-----------------------------------------------------|
| Total site area                       | Large                | >10,000 m <sup>2</sup>                              |
| Soil type                             | Large                | Clay, slit, sand                                    |
| Earth moving vehicles at any one time | Small                | <5 vehicles                                         |
| Work times                            | medium               | Wet and dry seasons                                 |
| <b>Overall Rating</b>                 | <b>Large</b>         | Conservative rating based on professional judgement |

**Table 5.2: Summary of Dust Emissions Magnitude of Construction Activities (Before mitigation)**

| Construction Criteria                    | Dust Emissions Class | Evaluation of the Effects                           |
|------------------------------------------|----------------------|-----------------------------------------------------|
| Total building volume                    | Medium               | >100,000m <sup>3</sup>                              |
| Dust potential of construction materials | Medium               | Yes                                                 |
| <b>Overall Rating</b>                    | <b>Medium-Large</b>  | Conservative rating based on professional judgement |

**Table 5.3: Summary of Dust Emissions Magnitude of Trackout Activities (Before mitigation)**

| Trackout Criteria          | Dust Emissions Class | Evaluation of the Effects                           |
|----------------------------|----------------------|-----------------------------------------------------|
| Number of HDV>3.5t per day | Medium               | 10-50                                               |
| Surface type of the site   | Large                | Clay, slit, sand                                    |
| <b>Overall Rating</b>      | <b>Medium-Large</b>  | Conservative rating based on professional judgement |

**Table 5.4: Summary of Dust Emission Magnitude of the Site (Before mitigation)**

| Construction Activities | Dust Emissions Class |
|-------------------------|----------------------|
| Demolition              | N/A                  |
| Earthworks              | Large                |
| Construction            | Medium-Large         |
| Trackout                | Medium-Large         |

#### 5.1.4 Sensitivity of the Area

As per the IAQM Guidance, the sensitivity of the area takes into account a number of factors, including:

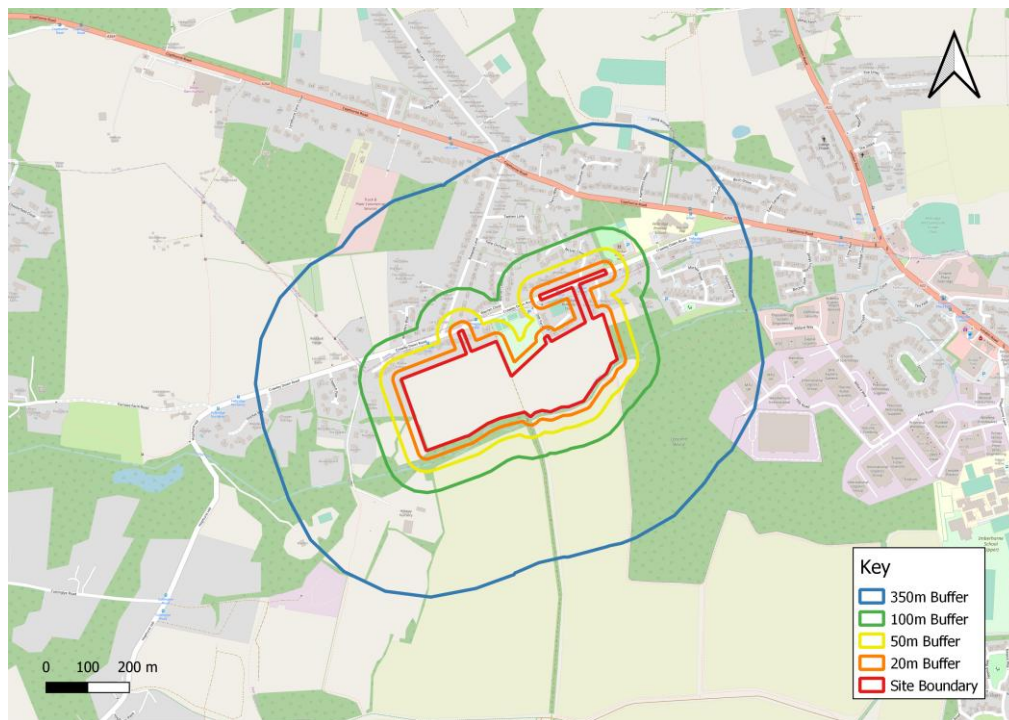
- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of PM<sub>10</sub>, the local background concentration; and
- Site specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Consideration is given to human and ecological receptors, distances are calculated from the construction site boundary and the trackout route proposed. Where necessary, for example, the trackout route is not yet known, a conservative view on the likely route has been taken.

Figure 5.1 and Figure 5.2 show maps indicating the earthworks/construction and trackout buffers, respectively, for identifying the sensitivity of the area. Table 5.5 presents the determined significance of the area. Construction activities are relevant up to 350m from the proposed development site boundary whereas trackout activities are only considered relevant up to 50m from the edge of the road, as per the IAQM guidance. Only 20m and 50m buffers have been included for trackout for this reason.

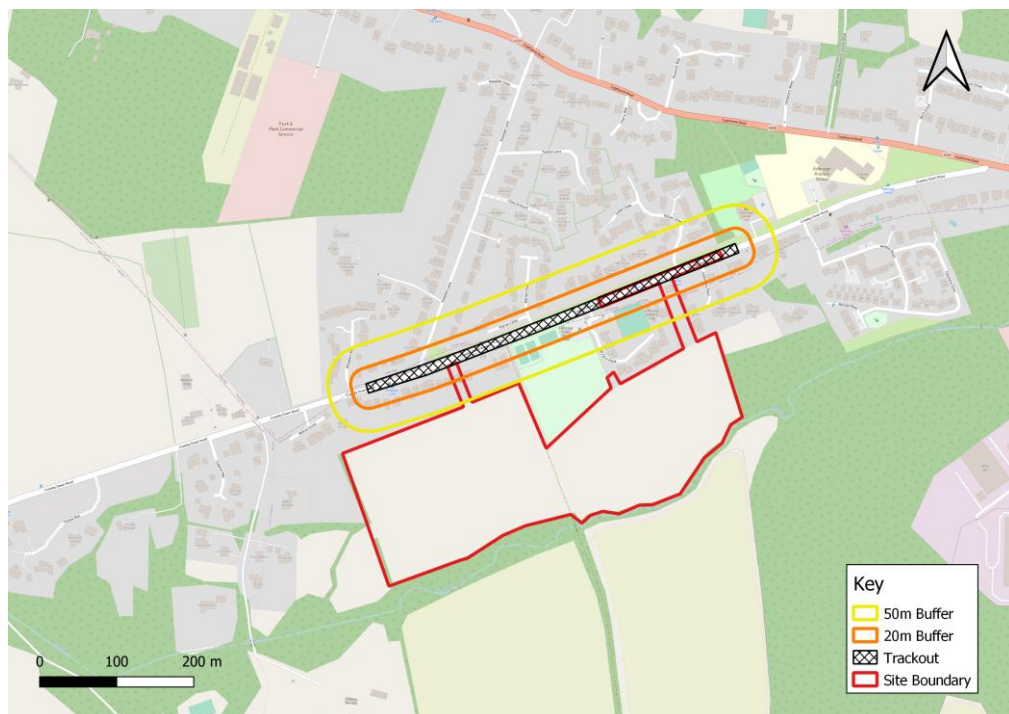
No designated ecological receptors have been identified within 50m of the application site boundary or the anticipated trackout route, therefore following the IAQM guidance ecological receptors have been screened out of the assessment and are not considered further.

**Figure 5.1: Earthworks/Construction Activities Buffer Map**



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**Figure 5.2: Trackout Activities Buffer Map**



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**Table 5.5: Sensitivity of the area**

| Potential Impact    |                                            | Sensitivity of the surrounding area |                      |                      |                      |
|---------------------|--------------------------------------------|-------------------------------------|----------------------|----------------------|----------------------|
|                     |                                            | Demolition                          | Earthworks           | Construction         | Trackout             |
| <b>Dust soiling</b> | Receptor sensitivity                       | N/A                                 | High                 | High                 | High                 |
|                     | Number of receptors                        | N/A                                 | 10-100               | 10-100               | 10-100               |
|                     | Distance from the source                   | N/A                                 | <20m                 | <20m                 | <20m                 |
|                     | <b>Sensitivity of the area</b>             | N/A                                 | <b>High</b>          | <b>High</b>          | <b>High</b>          |
| <b>Human health</b> | Receptor sensitivity                       | N/A                                 | High                 | High                 | High                 |
|                     | Annual mean PM <sub>10</sub> concentration | N/A                                 | <24µg/m <sup>3</sup> | <24µg/m <sup>3</sup> | <24µg/m <sup>3</sup> |
|                     | Number of receptors                        | N/A                                 | 10-100               | 10-100               | 10-100               |
|                     | Distance from the source                   | N/A                                 | <20m                 | <20m                 | <20m                 |
|                     | <b>Sensitivity of the area</b>             | N/A                                 | <b>Low</b>           | <b>Low</b>           | <b>Low</b>           |
| <b>Ecological</b>   | Receptor sensitivity                       | N/A                                 |                      |                      |                      |

### 5.1.5 Risk of Impacts

The dust emission magnitude is combined with the sensitivity of the area to determine the risk of impacts of construction activities before mitigation; these are evaluated based on risk categories of each activity in Appendix A. The risk of dust impacts from construction activities is identified in Table 5.6.

Site specific mitigation measures to reduce construction phase impacts are defined based on this assessment in Section 6 and Appendix B.

**Table 5.6: Summary of the Dust Risk from Construction Activities**

| Potential Impact | Dust Risk Impact |            |                  |                  |
|------------------|------------------|------------|------------------|------------------|
|                  | Demolition       | Earthworks | Construction     | Trackout         |
| Dust soiling     | N/A              | High Risk  | Medium-High Risk | Medium-High Risk |
| Human health     | N/A              | Low Risk   | Low Risk         | Low Risk         |
| Ecological       | N/A              |            |                  |                  |

## **5.2 Operational Phase**

### **5.2.1 Emissions to Air from Operational Phase**

No significant combustion sources such as combined heat and power (CHP) plant or large boilers are proposed as part of the scheme. All dwellings will be powered by ASHP and electric.

The principal operational phase air quality impact is likely to be associated with traffic emissions as a result of any changes in traffic flows or flow composition the development may bring.

Based on the traffic data provided by the project Transport Consultants, Motion, it is understood that the proposed development is expected to generate a total of 1,597 annual average daily traffic (AADT) of light duty vehicles (LDVs) and negligible heavy duty vehicles (HDVs) movements. The increase in LDVs exceeded the EPUK-IAQM screening criteria for developments outside an AQMA and therefore it is considered that further assessment of the operational phase traffic is required.

## 6 MITIGATION MEASURES

### 6.1 Construction Phase Mitigation

The dust emitting activities outlined in section 5.1 can be effectively controlled by appropriate dust control measures and any adverse affects can be greatly reduced or eliminated.

It is recommended that a dust management plan (DMP, which may be as part of a Construction Environmental Management Plan (CEMP)) for the construction phase should be prepared and agreed with the Local Authority to ensure that the potential for adverse environmental effects on local receptors is minimised. The DMP should include *inter alia*, measures for controlling dust and general pollution from site construction operations and include details of any monitoring scheme, if appropriate. Controls should be applied throughout the construction period to ensure that emissions are mitigated.

The dust risk categories identified have been used to define appropriate, site-specific mitigation methods. More detailed, site-specific mitigation measures are contained in Appendix B.

The traffic effects of the proposed development during the construction phase will be limited to a relatively short period and will be along traffic routes employed by haulage/construction vehicles and workers. Any effects on air quality will be temporary i.e. during the construction and demolition period only, and can be suitably controlled by the employment of mitigation measures appropriate to the development project.

With implementation of the proposed construction phase mitigation measures (detailed in Appendix B), the residual impacts are considered to be negligible.

### 6.2 Operational Phase Mitigation

#### 6.2.1 Emission Mitigation Assessment

In accordance with the Sussex-air 2021 guidance, the development is classified as a major development. Therefore, an emission mitigation assessment has been undertaken to provide a valuation of additional emissions related to traffic from the development scheme. The following tools were used for the damage cost calculation:

- Defra 'Emission Factors Toolkit v11.0' (available online at: <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/>); and
- Defra 'Air quality appraisal: damage cost toolkit' (available online at: <https://www.gov.uk/government/publications/assess-the-impact-of-air-quality>).

#### Step 1: Quantify change in emissions for NO<sub>x</sub> and PM<sub>2.5</sub>

- **Pollutants: NO<sub>x</sub> and PM<sub>2.5</sub>** – road traffic is expected to be the main source of air pollutants once the development is operational. The principal pollutants relevant to this assessment are therefore considered to be nitrogen oxides (NO<sub>x</sub>) and particulate matter (PM), which are generally regarded as the most significant air pollutant released by vehicular combustion processes. PM<sub>2.5</sub> has been used for PM in line with the Defra Air Quality Appraisal guidance.
- **Road Type: Urban (not London)**
- **Traffic Flow: 1,597 Annual Average Daily Trips (AADT) for Light Duty Vehicles (LDVs)** – data provided by project Transport Consultants, Motion
- **Cars only** (that is, 0% HGV)
- **Average speed: 50 kph** (in accordance with Sussex-air 2021 guidance)
- **Trip length used: 10km**
- **Years: 2026-2030** - 2026 is the anticipated opening year of the development. 5 years of emissions, in line with the Sussex-air guidance, have then been used up to 2030.

Table 6.1 presents the EFT output with the emissions converted from kg/yr to tonnes/yr.

**Table 6.1: Converted EFT output**

| Emissions (tonnes/yr)   |        |        |        |         |        |
|-------------------------|--------|--------|--------|---------|--------|
|                         | 2026   | 2027   | 2028   | 2029    | 2030   |
| <b>NO<sub>x</sub></b>   | 0.886  | 0.793  | 0.711  | 0.641   | 0.582  |
| <b>PM<sub>2.5</sub></b> | 0.1012 | 0.1008 | 0.1005 | 0.01002 | 0.1000 |

## Step 2: Calculate damage costs for NO<sub>x</sub> and PM<sub>2.5</sub>

The Defra Damage Cost Appraisal Toolkit (updated February 2023) was used with the following input:

- Start year: 2026
- End year: 2030
- Price Based Year: 2023
- Number of Pollutants: 2 (NO<sub>x</sub> and PM<sub>2.5</sub>)
- Source: Road transport

Table 6.2 presents the damage cost calculation outputs. The damage cost calculation is considered to provide a basis for quantifying the financial commitment required for offsetting potential development-generated emissions. The calculated central damage cost value over a five-year period is **£85,285**.

**Table 6.2 Damage Cost Appraisal Toolkit Output**

| Output from Damage Cost Appraisal Toolkit |         |        |        |        |        |                |
|-------------------------------------------|---------|--------|--------|--------|--------|----------------|
|                                           | 2026    | 2027   | 2028   | 2029   | 2030   | Total          |
| <b>Central Value NO<sub>x</sub></b>       | £10,712 | £9,453 | £8,350 | £7,413 | £6,627 | <b>£42,555</b> |
| <b>Central Value PM<sub>2.5</sub></b>     | £8,858  | £8,694 | £8,539 | £8,391 | £8,248 | <b>£42,730</b> |
| <b>Total Central Value Costs</b>          |         |        |        |        |        | <b>£85,285</b> |

The damage cost calculation is considered to provide a basis for quantifying the financial commitment required for offsetting potential development-generated emissions. The calculated central damage cost value over a five-year period is £85,285, which can be used to fund onsite mitigation measures or towards off site mitigation measures. It should be noted that, how the money is allocated will need to be discussed and agreed with MSDC, and the extent of the total money for Air Quality mitigation should be equal to/greater than the value determined by the damage cost calculation (i.e. £85,285).

It is understood that the following measures will be implemented to offset the air quality impacts as a result of the operational phase of the development. The final budget for the proposed mitigation measures is £245,000 excluding the costs associated with the installation of ASHP.

- All dwellings will be powered by ASHP and electric;
- Electric vehicle charging points (EVCP) will be installed to every dwelling (i.e. 200 dwellings) in line with Building Regulations Part S. Each charger costs £725;
- Individual secure and covered cycle stores will be provided for every dwelling either in the form of a dedicated cycle store, garage or communal cycle store. 100 individual cycle stores will be provided across the development and the costs for each cycle store is £700. Figure 6.1 below shows the parking and cycle storage plan; and
- £150 travel vouchers will be offered to each household (i.e. 200 dwellings).

**Figure 6.1 Parking and Cycle Storage Plan**



## 7 CONCLUSIONS

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An air quality assessment for the proposed residential development located land off Crawley Down Road, Felbridge, has been prepared.

An assessment of construction phase impacts has been undertaken following the IAQM construction dust guidance. Mitigation measures are recommended to reduce the risk of dust and particulate matter being generated and re-suspended. With implementation of the appropriate measures, no significant impacts are anticipated during the construction phase.

No significant combustion sources such as combined heat and power (CHP) plant or biomass boilers are proposed as part of the scheme, all dwellings will be powered by air ASHP and electric.

A qualitative assessment of the operational impacts had been undertaken by comparing the traffic data of the development against the screening criteria outlined in the EPUK-IAQM guidance. Based on the traffic data provided by the project transport consultant, it is considered that the proposed development is expected to generate an increase in LDVs exceeding the EPUK-IAQM criteria, therefore further assessment of the operational phase road traffic emissions is required.

In accordance with the Sussex-air partnership guidance document 'Air Quality and Emissions Mitigation Guidance for Sussex (2021)', the development is classified as a major development. Therefore, an Emission Mitigation Assessment has also been undertaken. The damage cost calculation has been undertaken for both NO<sub>x</sub> and PM, as these are the major pollutants associated with road traffic emission. The calculated central damage cost value is **£85,285**. It is understood that all dwellings will be powered by ASHP and electric, EVCP will be installed to every dwelling, individual secure and covered cycle stores will be provided for every dwelling and travel vouchers will be offered to each household. These mitigation measures will be implemented to offset the air quality impacts as a result of the operational phase of the proposed development and the final budget for the proposed mitigation measures is £245,000 excluding the costs associated with the installation of ASHP.

## 8 REFERENCES

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- Air Quality (England) Regulations 2000, 928. London, Her Majesty's Stationery Office.
- Air Quality (England) (Amendment) Regulations 2002, 3043. London, Her Majesty's Stationery Office.
- Department for Environment, Food and Rural Affairs, 2007. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 1), London: The Stationary Office.
- Department for Environment, Food and Rural Affairs, 2007. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 2), London: The Stationary Office.
- Department for Environment, Food and Rural Affairs, 2022. Part IV of the Environment Act 1995: Local Air Quality Management: Technical Guidance LAQM.TG.22.
- Department for Environment, Food and Rural Affairs, 2014. LAQM Support [online] Available at: <http://laqm.defra.gov.uk/> [Accessed July 2023].
- Department for Environment, Food and Rural Affairs, 2014. *MAGIC Map* [online] Available at: <http://magic.defra.gov.uk/> [Accessed July 2023].
- Department of Environment, Food and Rural Affairs, 2018. Background Mapping Data for Local Authorities-2018. [online] Available at <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>. [Assessed July 2023].
- Department of Environment, Food and Rural Affairs, 2021. Air Quality Appraisal: Damage Cost Guidance. [online] Available at: <https://www.gov.uk/government/publications/assess-the-impact-of-air-quality/air-quality-appraisal-damage-cost-guidance>. [Assessed July 2023].
- Environmental Act 1995. London, Her Majesty's Stationery Office.
- Her Majesty's Stationery Office, 2010. Environmental Protection: The Air Quality Standards Regulations 2010, [online] Available at: [http://www.legislation.gov.uk/uksi/2010/1001/pdfs/uksi\\_20101001\\_en.pdf](http://www.legislation.gov.uk/uksi/2010/1001/pdfs/uksi_20101001_en.pdf). [Accessed July 2023].
- Institute of Air Quality Management, 2014. Guidance of the Assessment of dust from demolition and construction.
- Mid Sussex District Council, 2018. Mid Sussex District Plan 2014-2031.
- Mid Sussex District Council, 2022. 2022 Air Quality Annual Status Report (ASR).
- Ministry of Housing Communities and Local Government, 2021. National Planning Policy Framework: Crown.
- Moorcroft et al. 2017. Land-Use Planning & Development Control: Planning for Air Quality. Environmental Protection UK and Institute of Air Quality Management, London.
- Sussex Air, 2021. Air Quality and Emissions Mitigation Guidance for Sussex (2021), [online] Available at <https://www.midsussex.gov.uk/media/5608/sussex-aq-guidance-2021.pdf>. [Accessed July 2023].
- Tandridge District Council, 2008. Tandridge District Core Strategy.
- Tandridge District Council, 2014. Tandridge Local Plan Part 2: Detailed Policies 2014-2029.
- Tandridge District Council, 2022. 2022 Air Quality Annual Status Report (ASR).
- The Air Quality Limit Values Regulations 2001, 2315. London, Her Majesty's Stationery Office.

# APPENDIX A

## CONSTRUCTION DUST ASSESSMENT

### METHODOLOGY

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This appendix contains the construction dust assessment methodology used in the assessment.

To assess the potential impacts, construction activities are divided into demolition, earthworks, construction and trackout. The descriptors included in this section are based upon the IAQM construction dust guidance. The assessment follows the steps recommended in the guidance.

#### **Step 1: Screen the requirement for assessment**

The first step is to screen out the requirement for a construction dust assessment, this is usually a somewhat conservative level of screening. An assessment is usually required where there is:

- a 'human receptor' within:
  - 350m of the boundary of the site; or
  - 50m of the route used by construction vehicles on the public highway, up to 500m from the site entrance(s).
- an 'ecological receptor':
  - 50m of the boundary of the site; or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

#### **Step 2A: Defining the Potential Dust Emission Magnitude**

##### **Demolition**

The dust emission magnitude category for demolition is varied for each site in terms of timing, building type, duration and scale. Examples of the potential dust emission classes are provided in the guidance as follows:

- **Large:** Total building volume >50,000m<sup>3</sup>, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20m above ground level;
- **Medium:** Total building volume 20,000m<sup>3</sup> – 50,000m<sup>3</sup>, potentially dusty construction material, demolition activities 10m – 20m above ground level; and
- **Small:** Total building volume <20,000m<sup>3</sup>, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.

##### **Earthworks**

The dust emission magnitude category for earthworks is varied for each site in terms of timing, geology, topography and duration. Examples of the potential dust emission classes are provided in the guidance as follows:

- **Large:** Total site area >10,000m<sup>2</sup>, potentially dusty soil type (e.g. clay), >10 heavy earth moving vehicles active at any one time, formation of bunds >8m in height, total material moved >100,000 tonnes;

- **Medium:** Total site area 2,500 – 10,000m<sup>2</sup>, moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8m in height, total material moved 20,000 – 100,000 tonnes; and
- **Small:** Total site area < 2,500m<sup>2</sup>, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height, total material moved <10,000 tonnes, earthworks during wetter months.

### Construction

The dust emission magnitude category for construction is varied for each site in terms of timing, building type, duration, and scale. Examples of the potential dust emissions classes are provided in the guidance as follows:

- **Large:** Total building volume >100,000m<sup>3</sup>, on site concrete batching, sandblasting;
- **Medium:** Total building volume 25,000 – 100,000m<sup>3</sup>, potentially dusty construction material (e.g. concrete), on site concrete batching; and
- **Small:** Total building volume <25,000m<sup>3</sup>, construction material with low potential for dust release (e.g. metal cladding or timber).

### Trackout

Factors which determine the dust emission magnitude class of trackout activities are vehicle size, vehicle speed, vehicle number, geology and duration. Examples of the potential dust emissions classes are provided in the guidance as follows:

- **Large:** >50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m;
- **Medium:** 10 – 50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 – 100m; and
- **Small:** <10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m.

### Step 2B: Defining the Sensitivity of the Area

The sensitivity of the area is defined for dust soiling, human health and ecosystems. The sensitivity of the area takes into account the following factors:

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of PM<sub>10</sub>, the local background concentration; and
- Site-specific factors, such as whether there are natural shelters such as trees, to reduce the risk of wind-blown dust.

**Table A1** has been used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

**Table A1: Sensitivity of the Area Surrounding the Site**

| Sensitivity of Area | Dust Soiling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Human Receptors                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Ecological Receptors                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>High</b>         | <ul style="list-style-type: none"> <li>Users can reasonably expect enjoyment of a high level of amenity.</li> <li>The appearance, aesthetics or value of their property would be diminished by soiling.</li> <li>The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.</li> <li>Examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.</li> </ul>                          | <ul style="list-style-type: none"> <li>Locations where members of the public are exposed over a time period relevant to the air quality objective for PM<sub>10</sub> (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day)</li> <li>Examples include residential properties, hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.</li> </ul>       | <ul style="list-style-type: none"> <li>Locations with an international or national designation <i>and</i> the designated features may be affected by dust soiling.</li> <li>Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain.</li> <li>Examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.</li> </ul> |
| <b>Medium</b>       | <ul style="list-style-type: none"> <li>Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home.</li> <li>The appearance, aesthetics or value of their property could be diminished by soiling.</li> <li>The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.</li> <li>Examples include parks and places of work.</li> </ul>                                      | <ul style="list-style-type: none"> <li>Locations where the people exposed are workers and exposure is over a time period relevant to the air quality objective for PM<sub>10</sub> (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).</li> <li>Examples include office and shop workers, but will generally not include workers occupationally exposed to PM<sub>10</sub>, as protection is covered by Health and Safety at Work legislation.</li> </ul> | <ul style="list-style-type: none"> <li>Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown.</li> <li>Locations with a national designation where the features may be affected by dust deposition.</li> <li>Example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.</li> </ul>                                                                                                                                                                                            |
| <b>Low</b>          | <ul style="list-style-type: none"> <li>The enjoyment of amenity would not reasonably be expected.</li> <li>Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling.</li> <li>There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.</li> <li>Examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.</li> </ul> | <ul style="list-style-type: none"> <li>Locations where human exposure is transient.</li> <li>Indicative examples include public footpaths, playing fields, parks and shopping streets.</li> </ul>                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Locations with a local designation where the features may be affected by dust deposition.</li> <li>Example is a local Nature Reserve with dust sensitive features.</li> </ul>                                                                                                                                                                                                                                                                                                                                                   |

Based on the sensitivities assigned of the different types of receptors surrounding the site and numbers of receptors within certain distances of the site, a sensitivity classification for the area can be defined for each. **Tables A2 to A4** indicate the method used to determine the sensitivity of the area for dust soiling, human health and ecological impacts, respectively.

For trackout, as per the IAQM construction dust guidance, it is only considered necessary to consider trackout impacts up to 50m from the edge of the road.

**Table A2: Sensitivity of the area to dust soiling effects on people and property**

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

**Table A3: Sensitivity of the area to Human Health Impacts**

| Receptor Sensitivity | Annual Mean PM <sub>10</sub> Conc. | Number of Receptors | Distances from the Source (m) |        |        |        |      |
|----------------------|------------------------------------|---------------------|-------------------------------|--------|--------|--------|------|
|                      |                                    |                     | <20                           | <50    | <100   | <200   | <350 |
| High                 | >32µg/m <sup>3</sup>               | >100                | High                          | High   | High   | Medium | Low  |
|                      |                                    | 10-100              | High                          | High   | Medium | Low    | Low  |
|                      |                                    | 1-10                | High                          | Medium | Low    | Low    | Low  |
|                      | 28-32µg/m <sup>3</sup>             | >100                | High                          | High   | Medium | Low    | Low  |
|                      |                                    | 10-100              | High                          | Medium | Low    | Low    | Low  |
|                      |                                    | 1-10                | High                          | Medium | Low    | Low    | Low  |
|                      | 24-28µg/m <sup>3</sup>             | >100                | High                          | Medium | Low    | Low    | Low  |
|                      |                                    | 10-100              | High                          | Medium | Low    | Low    | Low  |
|                      |                                    | 1-10                | Medium                        | Low    | Low    | Low    | Low  |
|                      | <24 µg/m <sup>3</sup>              | >100                | Medium                        | Low    | Low    | Low    | Low  |
|                      |                                    | 10-100              | Low                           | Low    | Low    | Low    | Low  |
|                      |                                    | 1-10                | Low                           | Low    | Low    | Low    | Low  |
| Medium               | >32µg/m <sup>3</sup>               | >10                 | High                          | Medium | Low    | Low    | Low  |
|                      |                                    | 1-10                | Medium                        | Low    | Low    | Low    | Low  |
|                      | 28-32µg/m <sup>3</sup>             | >10                 | Medium                        | Low    | Low    | Low    | Low  |
|                      |                                    | 1-10                | Low                           | Low    | Low    | Low    | Low  |
|                      | 24-28µg/m <sup>3</sup>             | >10                 | Low                           | Low    | Low    | Low    | Low  |
|                      |                                    | 1-10                | Low                           | Low    | Low    | Low    | Low  |
|                      | <24 µg/m <sup>3</sup>              | >10                 | Low                           | Low    | Low    | Low    | Low  |
|                      |                                    | 1-10                | Low                           | Low    | Low    | Low    | Low  |
| Low                  | -                                  | >1                  | Low                           | Low    | Low    | Low    | Low  |

**Table A4: Sensitivity of the area to Ecological Impacts**

| Receptor Sensitivity | Distances from the Source (m) |        |
|----------------------|-------------------------------|--------|
|                      | <20                           | <50    |
| High                 | High                          | Medium |
| Medium               | Medium                        | Low    |
| Low                  | Low                           | Low    |

### **Step 2C: Defining the Risk of Impacts**

The final step is to use both the dust emission magnitude classification with the sensitivity of the area, to determine a potential risk of impacts for each construction activity, before the application of mitigation. **Tables A5** to **A7** indicate the method used to assign the level of risk for each construction activity.

**Table A5: Risk of Dust Impacts from Demolition**

| Sensitivity of Area | Dust Emission Magnitude |             |             |
|---------------------|-------------------------|-------------|-------------|
|                     | Large                   | Medium      | Small       |
| High                | High Risk               | Medium Risk | Medium Risk |
| Medium              | High Risk               | Medium Risk | Low Risk    |
| Low                 | Medium Risk             | Low Risk    | Negligible  |

**Table A6: Risk of Dust Impacts from Earthworks/Construction**

| Sensitivity of Area | Dust Emission Magnitude |             |            |
|---------------------|-------------------------|-------------|------------|
|                     | Large                   | Medium      | Small      |
| High                | High Risk               | Medium Risk | Low Risk   |
| Medium              | Medium Risk             | Medium Risk | Low Risk   |
| Low                 | Low Risk                | Low Risk    | Negligible |

**Table A7: Risk of Dust Impacts from Trackout**

| Sensitivity of Area | Dust Emission Magnitude |             |            |
|---------------------|-------------------------|-------------|------------|
|                     | Large                   | Medium      | Small      |
| High                | High Risk               | Medium Risk | Low Risk   |
| Medium              | Medium Risk             | Low Risk    | Negligible |
| Low                 | Low Risk                | Low Risk    | Negligible |

## APPENDIX B

# SITE-SPECIFIC MITIGATION MEASURES

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Site-specific mitigation measures are divided into general measures, applicable to all sites and measures specific to demolition, earthworks, construction and trackout. Depending on the level of risk assigned to each site, different mitigation is assigned. The method of assigning mitigation measures as detailed in the IAQM guidance has been used.

For those mitigation measures that are general, the highest risk has been applied. In this case, the 'high risk' site mitigation measures have been applied, as determined by the dust risk assessment in Section 5. There are two categories of mitigation measure – 'highly recommended' and 'desirable', which are indicated according to the dust risk level identified in Table 5.6. Desirable measures are presented in *italics*.

### **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.

### **Dust Management**

- 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. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM<sub>10</sub> continuous monitoring and/ or visual inspections.

### **Site Management**

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site and the action taken to resolve the situation in the log book.
- Hold regular liaison meetings with other high risk construction sites within 50m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

### **Monitoring**

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as

street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.

- 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 site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition, dust flux, or real-time PM<sub>10</sub> continuous monitoring locations with the local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences.

### **Preparing and maintaining the site**

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- 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 Vehicles/Machinery and Sustainable Travel**

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

### **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 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 or burning of waste material.

**Specific to Demolition** – No demolition is proposed.

### **Specific to Earthworks**

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.

### **Specific to Construction**

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- *For similar supplies of fine powder material ensure bags are sealed after use and stored appropriately to prevent dust.*

### **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. This may require the sweeper being continuously in use.
- Avoid any dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.

- Access gates to be located at least 10 m from receptors where possible.