The Havebury Housing Partnership

Land off Brick Lane, Mepal

# Air Quality Assessment

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# Document History

Client: The Havebury House Partnership
Project: Land off Brick Lane, Mepal
Document Title: Air Quality Assessment
Document Reference: 777156-MLM-ZZ-XX-RP-J-0001
MLM Reference: DG/777156/AC

| Revision | Status | Description | Author | Checked | Approved | Date |
|---|---|---|---|---|---|---|
| P01 | S2 | First Draft | Alex Crayton | Karunakar Nagula | Karunakar Nagula | 24/09/2019 |
| C01 | S2 | Final | Alex Crayton | Karunakar Nagula | Karunakar Nagula | 10/10/2019 |
| C02 | S2 | Minor amendments to layout | Joshua Jones | Karunakar Nagula | Karunakar Nagula | 06/12/2019 |

# Contents

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# 1 Executive Summary

MLM Consulting Engineers Ltd (MLM) was commissioned by PlanSurv Limited on behalf of The Havebury Housing Partnership ('The Client'), to undertake an Air Quality Assessment (AQA) to support the planning application for the proposed residential development at Land off Brick Lane, Mepal ('Site'). The proposal involves the construction of 55 properties with associated landscaping and car parking ('Proposed Development'). The Local Authority responsible for determining the planning application is the East Cambridgeshire District Council (ECDC).

This assessment considers whether the proposals are likely to result in any significant impact on air quality.

In regards to impacts during the construction phase of the development, a qualitative assessment on the construction phase activities has been carried out following the relevant Institute of Air Quality Management (IAQM) guidance. This identified that there is a 'Low to Medium Risk' of dust soiling impacts and 'Negligible Risk' of increases in particulate matter concentrations that could affect human health due to construction activities. However, through good site practice and the implementation of suitable mitigation measures, the effect of dust and particulate matter releases would be significantly reduced. The residual effects of the construction phase on air quality are considered to be '**Negligible**'. The air quality impacts from the Proposed Development during the construction phase would be '**Not Significant'**.

A screening assessment of the operational phase was undertaken, in line with the applicable guidance. The proposals would generate an additional 504 daily trips. However, based on observed turning data produced by the project transport consultant, no single road link is predicted to experience an Annual Average Daily Traffic (AADT) flow increase in excess of 500. Each residential unit will have an individual low $NO_x$ boiler, and no centralised combustion or energy plant is proposed within the designs. As such, the guidance criteria for further assessment are not met. Based on the qualitative assessment undertaken, air quality impacts from the Proposed Development during the operational phase would be '**Not Significant'**.

The Ouse Washes Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area (SPA) and RAMSAR site is located approximately 0.5km north-west of the Proposed Development. Given the site's low sensitivity to changes in nitrogen deposition, and existing background $NO_x$ concentrations well below the critical level, alongside the minor increase in AADT on the road network, the impact on the designated site as a result of increased transport emissions is predicted to be negligible.

With regards to site suitability, future users of the Proposed Development are unlikely to experience concentrations above the Air Quality Objectives (AQOs), given the background concentrations of Nitrogen Dioxide ($NO_2$) and Particulate Matter ($PM_{10}$ and $PM_{2.5}$) in the vicinity of the Proposed Development are expected to be well below the relevant AQOs.

Based on the results of the AQA, it is considered that the Proposed Development complies with national and local planning policy for air quality.

# 2 Limitations and Exceptions

This report and its findings should be considered in relation to the terms and conditions proposed and scope of works agreed between MLM and the Client.

The Executive Summary, Conclusions and Recommendations sections of the report provide an overview and guidance only, and should not be specifically relied upon until considered in the context of the whole report.

This report provides available factual data for the site and the surrounding area at the time of the study and as obtained by the means described in the text. The data is related to the site on the basis of the site location information provided by the Client.

It should be appreciated that the information that has been made available to date, is not necessarily exhaustive and that further information relevant to the proposed site usage may be provided which could change the overall findings.

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This report is prepared and written in the context of the proposals stated in the introduction to this report and should not be used in a differing context. Furthermore, new information, improved practices and legislation may necessitate an alteration to the report in whole or in part after its submission. Therefore, with any change in circumstances or after the expiry of one year from the date of the report, the report should be referred to us for re-assessment and, if necessary, re-appraisal.

# 3 Introduction

MLM Consulting Engineers Ltd (MLM) was commissioned by PlanSurv Limited on behalf of The Havebury Housing Partnership ('The Client'), to undertake an Air Quality Assessment (AQA) to support the planning application for the Proposed Development at Land off Brick Lane, Mepal ('Site'). The proposal involves the construction of 55 properties with associated landscaping and car parking ('Proposed Development').

The approximate central grid reference for the site is 544147 (Easting) and 280497 (Northing).

The Local Authority responsible for determining the planning application is the East Cambridgeshire District Council (ECDC).

## 3.1 Location and Proposals

The Proposed Development site is located on the south western edge of the village of Mepal and is currently used for agricultural production. The Site has a tree belt planted along the southern and western edges of the perimeter. The Site is bordered by the A142 Brangehill Lane to the west, Sutton Road to the south and east and Brick Lane to the north. The wider surrounding area is predominantly agricultural interspersed with rural villages.

The Site was an emerging allocation in the Draft Local Plan with the policy located within Section 7.24 of document CD05A[1] published November 2017 stating that:

*"Mepal4: Site MEP.H1 – Land at Brick Lane*

*The following special considerations/requirements apply to proposals for site MEP.H1:*

*a) To be delivered as a housing led scheme for approximately 50 dwellings;*

*b) Access to the site should be provided from Brick Lane, which will require improvement to ensure safe and suitable access for all users;*

*c) Provide a safe crossing point at Sutton Road for pedestrians travelling to and from the village centre; and*

*d) Retention, and where necessary, enhancement of the significant landscape buffer adjacent to the western and southern boundaries to screen the site and mitigate noise impacts from the A142."*

The draft plan was withdrawn in February 2019.

The Proposed Development includes the construction of 55 dwellings with the associated landscaping and appropriate car parking. Highways improvements to Brick Lane will occur with an access point to the new development added and a number of roads creating cul-de-sacs added.

The location of the Site is shown within Figure 1 with an illustrative masterplan shown in Figure 2.

[1] Available at: https://www.eastcambs.gov.uk/local-development-framework/core-documents-pslp-document-library

## 3.2 Report Structure

The structure of the report is summarised below:

- A brief description of the site and Proposed Development;
- A brief description of the legislation governing air quality in England;
- Details of the method and the input data used for the following assessments:
    - Demolition/Construction dust impact assessment;
    - Operation Phase impact assessment;
- Results of each assessment; and,
- Conclusions.

## 3.3 Objectives

The proposed residential development is not in an area where the existing air quality currently exceeds, or is at risk of exceeding, the relevant AQOs. The main objectives of the assessment are to:

- Assess the suitability of the Site for the Proposed Development in terms of potential exposure of future residents; and,
- Assess the impact on the local air quality and existing residential receptors during the construction and operational phases of the development.

# 4 Legislation, Policy & Guidance

## 4.1 Air Quality Legislation & Policy

A summary of the relevant air quality legislation and policy is provided below.

### 4.1.1 UK Air Quality Strategy

The Government's policy on air quality within the UK is set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS)[2] . The AQS provides a framework for reducing air pollution in the UK with the aim of meeting the requirements of European Union legislation.

The AQS also sets standards and objectives for nine key air pollutants to protect health, vegetation and ecosystems. These are benzene ($C_6H_6$), 1,3 butadiene ($C_4H_6$), carbon monoxide (CO), lead (Pb), nitrogen dioxide ($NO_2$), particulate matter ($PM_{10}$ and $PM_{2.5}$), sulphur dioxide ($SO_2$), ozone ($O_3$), and polycyclic aromatic hydrocarbons (PAHs). The relevant standards and objectives for the pollutants considered in this assessment are presented in Table 4.1.

Table 4.1 Relevant Objectives set out in the Air Quality Strategy

| Pollutant | Concentrations | Measured As |
|---|---|---|
| Nitrogen Dioxide ($NO_2$) | 200µg/m$^3$ not to be exceeded more than 18 times per year | One hour mean |
| | 40µg/m$^3$ | Annual mean |
| Particulate Matter ($PM_{10}$) | 50 µg/m$^3$ not to be exceeded more than 35 times per year | 24 hour mean |
| | 40µg/m$^3$ | Annual mean |
| Particulate Matter ($PM_{2.5}$) | 25µg/m$^3$ | Annual Mean |

The air quality standards are levels recommended by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO) with regards to current scientific knowledge about the effects of each pollutant on health and the environment.

The air quality objectives are medium-term policy based targets set by the Government, which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

For the pollutants considered in this assessment, there are both long-term (annual mean) and short-term standards. In the case of $NO_2$, the short-term standard is for a one hour averaging period, whereas for $PM_{10}$ it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants, for example temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road.

[2] Department for Environment, Food and Rural Affairs (Defra) and the Devolved Administrations (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2)

The AQS contains a framework for considering the effects of a finer group of particles known as '$PM_{2.5}$' as there is increasing evidence that this size of particles can be more closely associated with observed adverse health effects than $PM_{10}$. Local Authorities are required to work towards reducing emissions/concentrations of particulate matter within their administrative area. However, there is no statutory objective given in the AQS for $PM_{2.5}$ at this time.

### 4.1.2 Air Quality Regulations

Many of the objectives in the AQS have been made statutory in England with the Air Quality (England) Regulations 2000[3] and the Air Quality (England) (Amendment) Regulations 2002[4] for the purpose of Local Air Quality Management (LAQM).

The Air Quality Standards (Amendment) Regulations 2016[5] transpose the European Union Ambient Air Quality Directive (2008/50/EC) into law in England. This Directive sets legally binding limit values for concentrations in outdoor air of major air pollutants that impact public health such as $PM_{10}$, $PM_{2.5}$ and $NO_2$. The limit values for $NO_2$ and $PM_{10}$ are the same concentration levels as the relevant AQS objectives, the annual mean limit value for $PM_{2.5}$ is a concentration of 25µg/m$^3$.

### 4.1.3 Environmental Protection Act 1990 – Control of Dust and Particulates Associated with Construction

Section 79 of the Environmental Protection Act (1990)[6] states that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Statutory nuisance is defined as:

> *'Any dust or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance.'*
>
> *'Any accumulation or deposition which is prejudicial to health or a nuisance'.*

Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

In the context of the Proposed Development, the main potential for nuisance of this nature will arise during the construction phase - potential sources being demolition, clearance, earthworks, construction and landscaping processes.

There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist - 'nuisance' is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred. However, research has been undertaken by a number of parties to determine community responses to such impacts and correlate these to dust deposition rates. However, impacts remain subjective and statutory limits have yet to be derived.

### 4.1.4 Environment Act 1995

Under Part IV of the Environment Act 1995, local authorities must review and document local air quality within their area by way of staged appraisals and respond accordingly, with the aim of meeting the air quality objectives defined in the Regulations. Where the objectives are not likely to be achieved, an authority is required to designate an Air Quality Management Area (AQMA). For each AQMA the local authority is required to draw up an Air Quality Action Plan (AQAP) to secure improvements in air quality and show how it intends to work towards achieving air quality standards in the future.

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[3] The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No.928
[4] The Air Quality (England) (Amendment) Regulations 2002- Statutory Instrument 2002 No.3043
[5] The Air Quality Standards (Amendment) Regulations 2016- Statutory Instrument 2016 No. 1184
[6] Available at https://www.legislation.gov.uk/ukpga/1990/43/pdfs/ukpga_19900043_en.pdf

## 4.2 Planning Policy

A summary of the national and local planning policy relevant to the Proposed Development and air quality is provided below.

### 4.2.1 National Planning Policy Framework

The latest guidance published in February 2019, the National Planning Policy Framework (NPPF)[7] sets out the Government's planning policies for England and how these are expected to be applied. It replaces Planning Policy Statement 23: Planning and Pollution Control and NPPF 2012 which provided planning guidance for local authorities with regards to air quality.

At the heart of the NPPF is a presumption in favour of sustainable development.

It provides a framework within which locally-prepared plans for housing and other development can be produced. It requires Local Plans to be consistent with the principles and policies set out in the Framework with the objective of contributing to the achievement of sustainable development.

Current planning law requires that application for planning permissions must be determined in accordance with the relevant development plan (ie Local Plan or Neighbourhood Plan). The NPPF should be taken into account in the preparation of development plans and therefore the policies set out within the Framework are a material consideration in planning decisions.

Under paragraph 103, it states that:

> *"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making."*

Under paragraph 170(e), it states that:

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."*

Under paragraph 181, it 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."*

[7] Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/740441/National_Planning_Policy_Framework_web_accessible_version.pdf

## 4.3 Local Planning Policy

### 4.3.1 Adopted East Cambridgeshire Local Plan

The East Cambridgeshire Local Plan[8] was adopted in April 2015 and sets out the blueprint for future growth and development in East Cambridgeshire up to the year 2031 and replaces the East Cambridgeshire Core Strategy adopted in 2009.

With specific regards to Air Quality, Policy ENV 9 states that:

> *"All development proposals should minimise, and where possible, reduce all emissions and other forms of pollution, including light and noise, and ensure no deterioration in air and water quality. All applications for development where pollution is suspected must contain sufficient information to enable the Council to make a full of potential hazards and impacts.*
>
> *Proposals will be refused where, individually or cumulatively, there are unacceptable impacts arising from the development on: […] air quality […].*
>
> *In exceptional cases, development proposals may be permitted where it can be clearly demonstrated that the environmental of the development and the wider social and economic need for the development substantially outweigh any adverse impact in terms of pollution. In such cases, where pollution is unavoidable, mitigation measures to reduce pollution levels will be required in order to meet acceptable standards.*
>
> *Conditions may be attached to any planning permission, or Section 106 agreements used, to ensure adequate reduction and management of impacts."*

## 4.4 Guidance

A summary of the publications referred to in the undertaking of this assessment is provided below.

### 4.4.1 Local Air Quality Management Review and Assessment Technical Guidance

The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance[9] for use by local authorities in their review and assessment work. This guidance, referred to in this document as LAQM.TG (16), has been used where appropriate in the assessment presented herein.

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

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance[10] that offers comprehensive advice on: when an air quality assessment may be required; what should be included in an assessment; how to determine the significance of any air quality impacts associated with a development; and, the possible mitigation measures that may be implemented to minimise these impacts.

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[8] Available at https://www.eastcambs.gov.uk/local-development-framework/east-cambridgeshire-local-plan-2015

[9] Defra (2016) Part IV The Environment Act 1995 and Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management Technical Guidance LAQM.TG16

[10] Environmental Protection UK and Institute of Air Quality Management (Version 1.2 Updated January 2017). Land Use Planning & Development Control: Planning for Air Quality

### 4.4.3 Guidance on the Assessment of Dust from Demolition and Construction

This document[11] published by the IAQM was produced to provide guidance 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, $PM_{10}$ impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measures appropriate to the level of risk identified.

### 4.4.4 National Planning Practice Guidance – Air Quality National Planning Practice Guidance – Air Quality

This guidance[12] provides a number of guiding principles on how the planning process can take into account the impact of new development on air quality, and explains how much detail air quality assessments need to include for proposed developments, and how impacts on air quality can be mitigated. It also provides information on how air quality is taken into account by Local Authorities in both the wider planning context of Local Plans and neighbourhood planning, and in individual cases where air quality is a consideration in a planning decision.

[11] Institute of Air Quality Management (Version 1.1 Updated June 2016). Guidance on the Assessment of Dust from Demolition and Construction
[12] Department of Communities and Local Government (DCLG) (March 2014). National Planning Practice Guidance

# 5 Scope & Methodology

## 5.1 Scope

The scope of the assessment has been determined in the following way:

- Review of ECDC's latest review and assessment reports and air quality data for the area surrounding the Site, including data from ECDC and Defra;
- Desk study to confirm the locations of nearby existing receptors that may be sensitive to changes in local air quality, and a review of the master plan for the Proposed Development to establish the location of any new sensitive receptors; and
- Review of the traffic data associated with the Proposed Development.

The scope of the assessment includes consideration of the potential impacts on local air quality resulting from:

- Dust and particulate matter generated by on-site activities during the construction phase; and,
- Increases in pollutant concentrations as a result of exhaust emissions arising from the proposed individual boilers.

The report also presents a screening assessment of air quality following the EPUK/IAQM screening criteria to confirm that no detailed air quality assessment is required as no impacts on air quality are anticipated during the operational phase.

## 5.2 Methodology

### 5.2.1 Construction Phase

Dust comprises particles typically in the size range 1-75 micrometres (µm) in aerodynamic diameter and is created through the action of crushing and abrasive forces on materials. The larger dust particles fall out of the atmosphere quickly after initial release and therefore tend to be deposited in close proximity to the source of emission. Dust therefore, is unlikely to cause long-term or widespread changes to local air quality; however, its deposition on property and cars can cause 'soiling' and discolouration. This may result in complaints of nuisance through amenity loss or perceived damage caused, which is usually temporary.

The smaller particles of dust (less than 10µm in aerodynamic diameter) are known as particulate matter ($PM_{10}$) and represent only a small proportion of total dust released; this includes a finer fraction, known as $PM_{2.5}$ (with an aerodynamic diameter less than 2.5µm). As these particles are at the smaller end of the size range of dust particles they remain suspended in the atmosphere for a longer period of time than the larger dust particles, and can therefore be transported by wind over a wider area. $PM_{10}$ and $PM_{2.5}$ are small enough to be drawn into the lungs during breathing, which in sensitive members of the public could have a potential impact on health.

An assessment of the likely significant impacts on local air quality due to the generation and dispersion of dust and $PM_{10}$ during the construction phase has been undertaken using the relevant assessment methodology published by the IAQM, the available information for this phase of the Proposed Development provided by the Client and Project Team and professional judgement.

The IAQM methodology assesses the risk of potential dust and $PM_{10}$ impacts from the following four sources: demolition; earthworks; general construction activities and trackout. It takes into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to increases in dust deposition and $PM_{10}$ concentrations to assign a level of risk. Risks are described in terms of there being a low, medium or high risk of dust impacts. Once the level of risk has been ascertained, then site specific mitigation proportionate to the level of risk is identified, and the significance of residual effects determined. A summary of the IAQM assessment methodology is provided in Appendix A.

In addition to impacts on local air quality due to on-site construction activities, exhaust emissions from construction vehicles and plant may have an impact on local air quality adjacent to the routes used by these vehicles to access the Site and in the vicinity of the Site itself. As information on the number of vehicles and plant associated with the construction phase was not available at the time of writing, a qualitative assessment of their impact on local air quality has been undertaken using professional judgement and by considering the following:

- The number and type of construction traffic and plant likely to be generated by this phase of the Development;
- The number and proximity of sensitive receptors to the Site and along the likely routes to be used by construction vehicles; and
- The likely duration of the construction phase and the nature of the construction activities undertaken.

### 5.2.2 Operational Phase

An air quality screening assessment has been undertaken following the IAQM/EPUK Guidance screening criteria to establish whether the proposals warrant the need for a detailed air quality assessment. The guidance provides a decision making process which assists with the understanding of air quality impacts and implications as a result of development proposals. It provides a framework for air quality considerations within local development control processes, promoting a consistent approach to the treatment of air quality issues within development control decisions.

The guidance includes a method for screening the requirement for an air quality assessment, the undertaking of an air quality assessment, the determination of the air quality impact associated with a development proposal and whether this impact is significant.

The IAQM/EPUK guidance also provides some clarification as to when air quality constitutes a material consideration and highlights the linkage with other relevant issues (for example traffic speed reduction measure and the use of alternative technology to provide energy) and the importance of the understanding of these with the input from other discipline specialists. The 'creeping baseline' is another issue raised with regard to cumulative impacts.

The guidance note is widely accepted as the most appropriate reference method for this purpose. This guidance makes reference to the Town and Country Planning (Development Management Procedure) Order (England) 2010 [(Wales) 2012] definition of a 'major' development when scoping assessments required for the planning process.

A 'major' development includes developments where:

- The number of dwellings is ten or above;
- The residential development is carried out of a site of more than 0.5ha where the number of dwellings is unknown;
- The provision of more than 1,000m$^2$ commercial floor space; or
- Development carried out on land of 1ha or more.

There are two types of air quality impacts to be considered:

- The impact of existing sources in the local area on the Proposed Development (governed by background pollutant levels and proximity to sources of air pollution); and
- The impacts of the Proposed Development on the local area.

With regard to the changes in air quality or exposure to air pollution, the guidance indicates that each local authority will be likely to have their own view on the significance of this; these are to be described in relation to whether an AQO is predicted to be met, or at risk of not being met. Exceedances of these objectives are considered as significant, if not mitigated.

As part of the impact of the Proposed Development on the local area, a two-staged assessment is recommended as per guidance:

**Stage 1**: Review of the development proposals, including number of residential units, floor space, car park spaces and the presence of an energy centre or other combustion processes on site, against the screening criteria. In the event that the Stage 1 criteria are exceeded we will proceed to Stage 2; and,

**Stage 2**: Review of the changes in Light Duty Vehicles (LDVs) and Heavy Duty Vehicles (HDVs), road alignment, and the introduction of new junctions and bus stops (if applicable) due to the Proposed Development. As part of Stage 2 a comparison of the AADT flows associated with the consented development and Proposed Development has also been undertaken to assess if there is a potential for further air quality impacts.

A full list of the screening criteria are presented in Appendix B.

# 6 Baseline Conditions

## 6.1 Local Air Quality Management

ECDC currently has no AQMAs declared within its jurisdiction and the district is predominantly rural in nature. The latest Annual Status Report[13] confirms that the main sources of pollution in the district are traffic emissions from the local road network.

## 6.2 Local Authority Automatic Monitoring

During 2017, ECDC did not undertake any automatic monitoring, with the one monitor located in Ely decommissioned in January 2017.

## 6.3 Local Authority Non-Automatic Monitoring

Non-automatic monitoring using passive diffusion tube samplers was carried out at 21 locations within the district in 2017. Monitored data for 2015 to 2017 from the monitoring locations representative of the Site are summarised in Table 6.1.

Table 6.1 Annual Mean $NO_2$ Concentrations from Diffusion Tube Sites 2015 – 2017

| Site ID | Site Name | Site Type | Distance from the Development Site (in km) | Annual Mean $NO_2$ Concentration (µg/m³) | | |
|---|---|---|---|---|---|---|
| | | | | 2015 | 2016 | 2017 |
| NAS10 | Tramar Drive, Sutton | Urban Background | 1.4 | 15.1 | 16.3 | 14.3 |
| NAS12 | A142, Witcham Toll | Roadside | 2.5 | 26.7 | 27.2 | 27.0 |

The available diffusion tube monitoring data shows that $NO_2$ concentrations are well below the annual mean $NO_2$ AQO at locations representative of conditions at the Site. NAS10 is an urban background site located in a residential area. The diffusion tube is located approximately 70m from the A142, a comparable distance from the nearest proposed receptor to the A142, and is in close proximity to a roundabout junction from the A142 into Sutton. As such, it is considered that this is an indicative location of existing concentrations at the Proposed Development Site. NAS12 presents roadside concentrations near the main source of pollution to the A142 at the Witcham Toll junction and can be considered the worst case concentrations at the Site, still well below the AQO. The location of the diffusion tubes in related to the Site are shown in Figure 3.

## 6.4 Defra Background Maps

Additional information on estimated background pollutant concentrations has been obtained from the DEFRA background maps provided on UK-AIR, the Air Quality Information Resource[14]. These maps are available in 1km x 1km grid squares and provide an estimate of concentrations between 2017 and 2030. Concentrations have been taken from the grid square 544500, 280500; which includes the Proposed Development site. Estimated air pollution concentrations for $NO_2$, $PM_{10}$ and $PM_{2.5}$ have been extracted from the 2017 background pollution maps for 2018 - 2021, and are set out in Table 6.2, below. All of the annual mean background concentrations are well below the relevant objectives.

[13] East Cambridgeshire District Council, 2018. East Cambridgeshire District Council 2018 Air Quality Annual Status Report
[14] Available at http://uk-air.defra.gov.uk

Table 6.2 Annual Mean Background Concentrations for Pollutants $NO_2$, $PM_{10}$ and $PM_{2.5}$ from Defra, based on 2017 Background Maps.

| Pollutant | Background Concentrations (µg/m³) | | | |
|---|---|---|---|---|
| | 2018 | 2019 | 2020 | 2021 |
| $NO_x$ | 11.2 | 10.7 | 10.2 | 9.8 |
| $NO_2$ | 8.4 | 8.1 | 7.7 | 7.5 |
| $PM_{10}$ | 15.2 | 15.0 | 14.8 | 14.7 |
| $PM_{2.5}$ | 9.4 | 9.2 | 9.0 | 8.9 |

## 6.5 Designated Ecological Site

The Ouse Washes, designated as a Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area (SPA) and RAMSAR Site, forms a band running approximately from the southwest at Earith to the northeast at Downham Market, lies adjacent to the north western edge of Mepal, approximately 0.5km from the Proposed Development and crosses the A142.

Critical levels are defined as concentrations of pollutants in the atmosphere above which direct adverse effects on receptors, such as human beings, plants, ecosystems or materials, may occur according to present knowledge.

Critical Loads are defined as a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge.

Critical levels refer to the gaseous concentration in the air, whereas critical loads refer to the deposition of a pollutant from the air to the ground.

The critical level for the designated site is 30 µg/m³ $NO_x$ measured as an annual average. Data obtained from the APIS website, provides 3 year background concentration averages for each designated site between 2015 and 2017. For the Ouse Washes, the background $NO_x$ concentration is predicted to be 13.44 µg/m³. The Defra background $NO_x$ concentration for the 1km grid square which covers the area nearest to the Proposed Development site is 10.2 µg/m³, both values well below the critical level.

Critical loads are given as ranges (eg 10-20 kgN/ha/yr). These ranges reflect variation in ecosystem response across Europe. The range for the Ouse Washes is 20 – 30kgN/ha/yr, which represents a site which is not highly sensitive to nitrogen deposition. Existing maximum deposition provided by the APIS website is 20.2kgN/ha/yr with an average across the site of 17.2kg/N/ha/yr, below the lower critical load range.

## 6.6 Summary

Defra background concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$ in the vicinity of the Proposed Development are well below the relevant AQOs. Diffusion tube monitoring data in the vicinity of the Proposed Development shows that existing concentrations of $NO_2$ are well below the annual mean AQO, even at a worst location at a busy A road junction.

Background $NO_x$ and nitrogen deposition concentrations are below their respective critical level and critical load functions.

Therefore, it is considered that future users are unlikely to experience concentrations above the AQS objectives.

# 7 Construction Phase Impacts

## 7.1 Dust and $PM_{10}$ from On-Site Activities

Construction activities that have the potential to generate and/or re-suspend dust and $PM_{10}$ include:

- Site clearance and preparation;
- Preparation of temporary access/egress to the Site and haulage routes;
- Earthworks;
- Materials handling, storage, stockpiling, spillage and disposal;
- Movement of vehicles and construction traffic within the Site (including excavators and dumper trucks);
- Use of crushing and screening equipment/plant;
- Exhaust emissions from site plant, especially when used at the extremes of their capacity and during mechanical breakdown;
- Construction of buildings, roads and areas of hard standing alongside fabrication processes;
- Internal and external finishing and refurbishment; and
- Site landscaping after completion.

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

## 7.2 Assessment of Potential Dust Emission Magnitude

The IAQM assessment methodology has been used to determine the potential dust emission magnitude for the following four different dust and $PM_{10}$ sources: demolition; earthworks; construction; and, trackout. The findings of the assessment are presented below.

### 7.2.1 Demolition

There are no existing buildings on the site, as such no demolition works are required.

### 7.2.2 Earthworks

The total area of the Proposed Development is approximately 20,000m$^2$. Assuming the whole site is excavated to a depth of 1m, the total material that will be moved is estimated to be approximately 20,000 tonnes with fewer than five heavy earth moving vehicles being active at any one time and bunds to be formed less than 4m in height. Therefore, the potential dust emission magnitude is conservatively considered to be **medium** for earthwork activities.

### 7.2.3 Construction

The total volume of buildings to be constructed on the Proposed Development will be less than 25,000m$^3$ with potentially dusty construction materials being used. On site concrete batching is not proposed. Therefore, the potential dust emission magnitude is considered to be **small** for construction activities.

### 7.2.4 Trackout

The maximum unpaved section of road within the site is predicted to be 100m and there would not be more than ten heavy vehicle (>3.5 tonnes) outward movements in a day, it is considered that the potential dust emission magnitude of is **medium** for trackout.

Table 7.1 provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 7.1 Summary of Dust Emission Magnitude for Each Activity

| Source | Magnitude |
|---|---|
| Demolition | N/A |
| Earthworks | Medium |
| Construction | Small |
| Trackout | Medium |

## 7.3 Sensitivity of the Surrounding Area

The typical predominant wind direction in the UK is from the south west. Therefore any receptors north east of the Proposed Development are more likely to be affected by dust and particular matter emitted and re-suspended during the construction phase. There are a number of residential receptors located north east of the Proposed Development.

Based on the IAQM guidance, residential dwellings and schools are considered as 'High' sensitivity receptors in relation to both dust soiling and health effects of $PM_{10}$. As seen in Figure 4, the closest residential properties are within 50m of the Proposed Development site boundary. As a result, given the distance and number of residential receptors within 50m of the site boundary, the sensitivity of the surrounding area is considered to be 'Medium' in relation to dust soiling effects on people and property from the earthworks and construction activities.

The Site is medium in size, and trackout may occur up to 50m from the edge of the roads route taken by construction traffic up to 200m from the Site exit without site specific mitigation. There are a number of residential receptors located along the routes likely to be taken by construction traffic to and from the Proposed Development (Brick Lane and Sutton Road), as seen in Figure 5. As a result, the sensitivity of the surrounding area is considered to be 'High' in relation to dust soiling effects on people and property from construction vehicle trackout.

As there are no automatic monitors within the vicinity of the Proposed Development monitoring $PM_{10}$, Defra background values have been utilised for the assessment of sensitivity to changes in $PM_{10}$ concentrations on human health. Defra background values were also below 24µg/m$^3$ for 2018 and future years. Therefore, the sensitivity of the area for impact upon human health from all activities is considered to be 'Low'.

As per the data available on Magic Maps[15], there are no relevant ecological receptors within 50 m of the boundary of the Proposed Development, or 50m of the route(s) to be used by construction vehicles on the public highway (up to 200m from the site entrance).

Taking the above into account and following the IAQM assessment methodology, the sensitivity of the area to changes in dust and $PM_{10}$ has been derived for each of the construction activities considered. The results are shown in Table 7.2.

Table 7.2 Summary of Sensitivity of Surrounding Area

| Potential Impact | Sensitivity of Surrounding Area | | | |
|---|---|---|---|---|
| | Demolition | Earthworks | Construction | Trackout |
| Dust Soiling | N/A | Medium | Medium | High |
| Human Health | N/A | Low | Low | Low |

[15] Available at https://magic.defra.gov.uk/magicmap.aspx

## 7.4 Defining the Risk of Impacts

The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation. Table 7.3 below provides a summary of the risk of dust impacts for the Proposed Development. The risk category identified for each construction activity has been used to determine the level of mitigation required, which is presented in Appendix C.

Table.7.3 Summary of Risk Effects to Define Site Specific Mitigation

| Potential Impact | Risk | | | |
|---|---|---|---|---|
| | Demolition | Earthworks | Construction | Trackout |
| Dust Soiling | N/A | Medium | Low | Medium |
| Human Health | N/A | Negligible | Negligible | Negligible |

## 7.5 Construction Vehicles & Plant

The greatest impact on air quality due to emissions from vehicles and plant associated with the construction phase will be in the areas immediately adjacent to the Site access. It is anticipated that construction traffic will access the Site via Brick Lane, from Sutton Road and the A142. It is considered likely that the construction traffic will be of low volume in comparison to the existing traffic flows on these roads.

Final details of the exact plant and equipment likely to be used on Site will be determined by the appointed contractor, it is considered likely to comprise dump trucks, tracked excavators, diesel generators, asphalt spreaders, rollers, compressors and trucks. The number of plant and their location within the Site are likely to be variable over the construction period.

Based on the current local air quality in the area, the proximity of sensitive receptors to the roads likely to be used by construction vehicles, and the likely numbers of construction vehicles and plant that will be used, the impacts are considered to be of negligible significance according to the assessment significance criteria.

# 8 Operational Phase Impacts

## 8.1 Air Quality Impacts from Traffic

### 8.1.1 EPUK/IAQM Air Quality Screening

A qualitative assessment has been undertaken following the EPUK/IAQM screening criteria. The results of Stage 1 of the screening assessment is presented in Table 8.1. A full list of the screening criteria are presented in Appendix B.

Table.8.1 EPUK/IAQM Stage 1 Screening Assessment

| Screening Criteria | Development Proposal |
|---|---|
| **A: If any of the following apply**<br>> 10 residential units or a site area of > 10ha or 250 residential units | 55 residential units |
| > 1,000 $m^2$ of floor space for all other uses or a site area > 1 ha | N/A |
| **B. Coupled with any of the following** | |
| Development > 10 parking spaces | Parking provision for > 10 parking spaces |
| Central energy facility or centralised combustion process | Individual low $NO_x$ boilers are proposed |

Table 8.1 indicates that the development proposals exceed the Stage 1 criteria and the assessment needs to proceed to Stage 2 (see Table 8.2).

EPUK/IAQM guidance includes a number of indicative criteria that should be used to assess whether there is a need to proceed to a detailed air quality assessment. The criteria also states that exceeding the criteria does not automatically lead to a requirement to undertake a detailed assessment using air dispersion modelling. However, if a qualitative assessment is used it will need to provide a robust conclusion on whether the development is likely to significantly affect air quality.

Table.8.2 EPUK/IAQM Stage 2 Screening Assessment

| Screening Criteria | Development Proposal | Criteria Met for Detailed Assessment? |
|---|---|---|
| 1. Change of LDV[1] flows of either:<br><br>> 100 AADT[2] in an AQMA; or<br><br>> 500 AADT[2] not in an AQMA. | Net gain of 504 AADT.<br><br>Once distributed onto the road network, changes to existing flows will be < 500 AADT on every road link except brick lane. | No |
| 2. Change of HDV[3] flows of either:<br><br>> 25 AADT[2] in an AQMA; or<br><br>> 100 AADT[2] not in an AQMA | The development is not anticipated to generate HDV flows. Existing refuse collection vehicles for the wider area are predicted to service the Proposed Development. | No |
| 3. Change of 5m in road alignment | Not applicable | Not applicable |

| Screening Criteria | Development Proposal | Criteria Met for Detailed Assessment? |
|---|---|---|
| 4. Introduce new junction or remove junction causing significant change in traffic speeds. | New junction onto Brick Lane will be insignificant. Minor queueing may occur at the junction of Sutton Road and A142, not predicted to affect network that is not at capacity. | No |
| 5. Introduce/Change bus station causing bus flows to change by > 100 AADT. | Not applicable | Not applicable |
| 6. Underground car park with ventilation within 20m of receptor, with car park movements > 100 (in and out). | Not Applicable | Not Applicable |
| 7. Substantial Combustion process. | Low NOx individual boilers are to be installed for each new residential unit. Therefore, no centralised provision. | No |
| **Notes:** [1]Light Duty Vehicle (less than 3.5 tonnes); [2]Annual Average Daily Traffic; [3]Heavy Duty Vehicle (greater than 3.5 tonnes) | | |

Table 8.2 indicates that the increase in AADT as a result of the Proposed Development does exceed the 500 AADT criteria. Further details have therefore been provided below as to why a more detailed assessment is not required.

## 8.2 Transport Emissions

Transport data has been provided by the project transport consultant (Richard Jackson Engineering Consultants). The transport consultant has confirmed that the Proposed Development will generate 504 AADT, with a trip rate of 9.169 movements per dwelling per day. It is noted that HGV movements are predicted to be negligible as the development is fully residential in nature. Existing refuse collections for the wider area are likely to service the Proposed Development.

Significant speed changes are not predicted on the network as there are no existing capacity issues. Some very minor increases in junction delays may occur.

Observed existing weekday turning proportions at the junction of Sutton Road and the A142 and the junction of Sutton Road, Brick Lane and Rectory Fields were undertaken by the project transport consultant. For vehicles existing Sutton Road onto the A142 out of Mepal, during the morning peak (07:00 – 10:00), 71% of vehicles turned left towards Sutton and Ely, with 29% turning right towards Chatteris. Similarly during the evening peak, 69% of vehicles turned left with 31% turning right.

Assuming that all vehicle trips would broadly return from the direction they left the junction, a 70/30 split would produce 353 additional vehicle trips to the south of Mepal on the A142 and 151 vehicle trips to the north of Mepal on the A142.

The majority of vehicle trips from the Proposed Development are anticipated to turn right from Brick Lane onto Sutton Road towards the A142, however not all vehicle trips will do so. As such, no road link is predicted to experience an increase of greater than 500 AADT with the exception of a minor section of Brick Lane between the junction and entrance to the development. Given the good existing air quality in the area, the impact of the Proposed Development's transport emissions on local sensitive receptors is predicted to be negligible.

## 8.3 Energy Emissions

Each dwelling will have an individual low $NO_x$ Boiler, with emissions rating of <40mg/kWh. As such no centralised combustion process will be installed and the impact from energy emissions is predicted to be 'negligible'.

## 8.4 Impact on Ecologically Designated Sites

The Ouse Washes SSSI, SAC, SPA and RAMSAR site is located approximately 0.5km north-west of the Proposed Development. The A142 west of the Sutton Road junction passes through an area of the designated site. The increased transport movements in the area will be 151 AADT, applying the turning factors used above. Given the Site's low sensitivity to changes in nitrogen deposition, and existing background $NO_x$ concentrations well below the critical level, as presented in Section 6.5, alongside the minor increase in AADT on the road network, the impact on the designated site as a result of increased transport emissions is predicted to be negligible.

## 8.5 Exposure to Future Residents

Diffusion Tube NAS10, located 70m from the A142 and close to the junction entering Sutton, is considered to be indicative of existing conditions at the Proposed Development site, with diffusion tube NAS12 offering a worst case assumption of $NO_2$ concentrations at a roadside junction location to the A142.

Figure 2 shows the layout of the Site in relation to the A142. It is noted that the nearest plots to the main road, plots 17 – 26, are located at a significant distance from the road, with the existing vegetation barrier between the road and the Site retained. As such concentrations of $NO_2$ are predicted to be well below those seen at diffusion tube NAS12.

Defra background concentrations of $PM_{10}$ and $PM_{2.5}$ are well below their respective annual mean AQOs. As such, future residents of the Site are not predicted to experience unacceptable levels of air quality.

# 9 Mitigation and Residual Impact

## 9.1 Construction Phase

Particle generation from construction activities can be substantially reduced through carefully selected mitigation techniques and effective management. The most effective technique is to control at source, as once particles are airborne, it is difficult to prevent them from dispersing into the surrounding area. However, once airborne, water sprays are probably the most effective method for suppression.

Pre-project planning, implementation and on-site management issues are an essential requirement for effective dust control. This includes, for example environmental risk assessments, method statements, training and satisfying planning requirements. Before the start of a project, it is also important to identify which construction activities are likely to generate dust and to draw up action plans to minimise emissions to the atmosphere. Dust emissions from construction sites will mainly be the sum of a large number of small activities. Therefore, attention to detail is a critical feature of effective management of the total site emissions.

Once granted approval, the appointed contractor should follow the best practice mitigation measures. This will ensure that the construction phase will cause minimal disruption to the surrounding area and neighbours.

Site specific mitigation measures should be set up based on the risk effects as outlined in Table 7.3. Examples of these measures are provided in the IAQM guidance document as 'highly recommended' or 'desirable' measures. Specific measures proposed for this development are presented in Appendix C.

Construction related transport, NRMM and construction plant have the potential to increase pollutant concentrations over the duration of the construction works at nearby sensitive receptors. NRMM and construction plant should meet the relevant emissions standards and a travel plan should be implemented for all construction workers accessing the site.

## 9.2 Operational Phase

Based on the information provided in Section 8, the Proposed Development is not expected to lead to significant impacts on local air quality and it is unlikely that future users during the operational phase would be exposed to air quality levels above the relevant AQOs. Each dwelling should have a low $NO_x$ boiler with an emissions rating of <40mg/kWh.

## 9.3 Residual Impacts

With mitigation measures applied to the construction phase, the risk of impacts will be reduced from 'small – medium' to 'negligible'. The impact is predicted to be not significant.

No further measure to the operational phase are required. As such the impact is predicted to be not significant.

# 10 Conclusions

MLM Consulting Engineers Ltd (MLM) was commissioned by PlanSurv Limited on behalf of The Havebury Housing Partnership, to undertake an Air Quality Assessment (AQA) to support the planning application for the Proposed Development at Land off Brick Lane, Mepal. The proposal involves the construction of 55 properties with associated landscaping and car parking.

In regards to impacts during the construction phase of the development, a qualitative assessment on the construction phase activities has been carried out following the relevant IAQM guidance. This identified that there is a 'Low to Medium Risk' of dust soiling impacts and 'Negligible Risk' of increases in particulate matter concentrations that could affect human health due to construction activities. However, through good site practice and the implementation of suitable mitigation measures, the effect of dust and particulate matter releases would be significantly reduced. The residual effects of the construction phase on air quality are considered to be '**Negligible**'. The air quality impacts from the Proposed Development during the construction phase would be '**Not Significant'**.

A screening assessment of the operational phase was undertaken, in line with the applicable guidance. The proposals would generate an additional 504 daily trips. However, based on observed turning data produced by the project transport consultant, no single road link is predicted to experience an AADT increase in excess of 500. Each residential unit will have an individual low $NO_x$ boiler, and no centralised combustion or energy plant is proposed within the designs. As such, the guidance criteria for further detailed dispersion modelling are not met. Based on the qualitative assessment undertaken, air quality impacts from the Proposed Development during the operational phase would be '**Not Significant'**.

The Ouse Washes SSSI, SAC, SPA and RAMSAR site is located approximately 0.5km north-west of the Proposed Development. Given the Site's low sensitivity to changes in nitrogen deposition, and existing background $NO_x$ concentrations well below the critical level, as presented in Section 6.5, alongside the minor increase in AADT on the road network, the impact on the designated site as a result of increased transport emissions is predicted to be negligible.

With regards to site suitability, future users of the Proposed Development are unlikely to experience concentrations above the AQOs, given the background concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$ in the vicinity of the Proposed Development are expected to be well below the relevant AQOs.

Based on the results of the AQA, it is considered that the Proposed Development complies with national and local planning policy for air quality.

# Figures

## LEGEND

🟥 SITE BOUNDARY
🟩 OUSE WASH SSSI, SPA, RAMSAR
▨ OUSE WASH SAC

0 100 200 300 m

THIS DRAWING IS INDICATIVE ONLY

COORDINATE SYSTEM: BRITISH NATIONAL GRID
UNITS: METRE
SCALE: 1:5000
BASEMAP SOURCE: OPEN STREET MAP

| REV | DATE | DESCRIPTION | MADE | CKD |
|---|---|---|---|---|

MLM. Group
Part of Sweco

DRAWING STATUS: FINAL

DRAWING TITLE: SITE LOCATION

CLIENT: THE HAVEBURY HOUSING PARTNERSHIP

DRAWN/DESIGN: AC
DATE: 23/09/2019
STATUS: S2

CHECKED: KN
APPROVED: KN
REVISION: C01

PROJECT: LAND OFF BRICK LANE, MEPAL

DRAWING NO: 777156-MLM-ZZ-XX-DR-J-FIGURE 1

| REV | DATE | DESCRIPTION | MADE | CKD |
|---|---|---|---|---|
| | | | | |

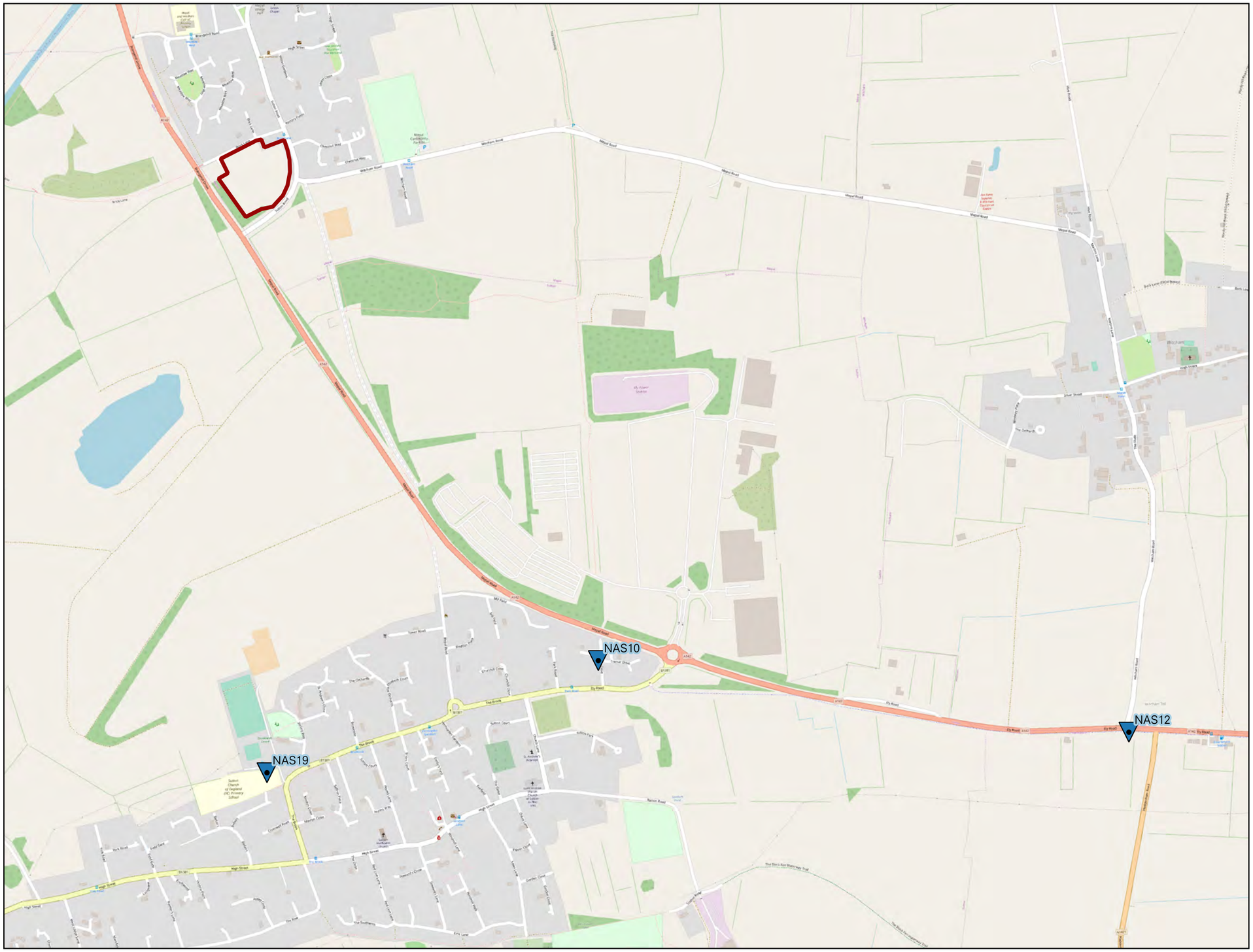
MLM. Group
Part of Sweco

| | | | | | |
|---|---|---|---|---|---|
| DRAWING STATUS: FINAL | | DRAWING TITLE: SITE LAYOUT | | | |
| CLIENT: THE HAVEBURY HOUSING PARTNERSHIP | | DRAWN/DESIGN: JJ | DATE: 06/12/2019 | STATUS: S2 | |
| | | CHECKED: KN | APPROVED: KN | REVISION: C02 | |
| PROJECT: LAND OFF BRICK LANE, MEPAL | | DRAWING NO: 777156-MLM-ZZ-XX-DR-J-FIGURE 2 | | | |

LEGEND

SITE BOUNDARY

ECDC DIFFUSION TUBES




0 250 500 750 m

THIS DRAWING IS INDICATIVE ONLY

COORDINATE SYSTEM: BRITISH NATIONAL GRID
UNITS: METRE
SCALE: 1:10000
BASEMAP SOURCE: OPEN STREET MAP

| REV | DATE | DESCRIPTION | MADE | CKD |
|---|---|---|---|---|
| | | | | |

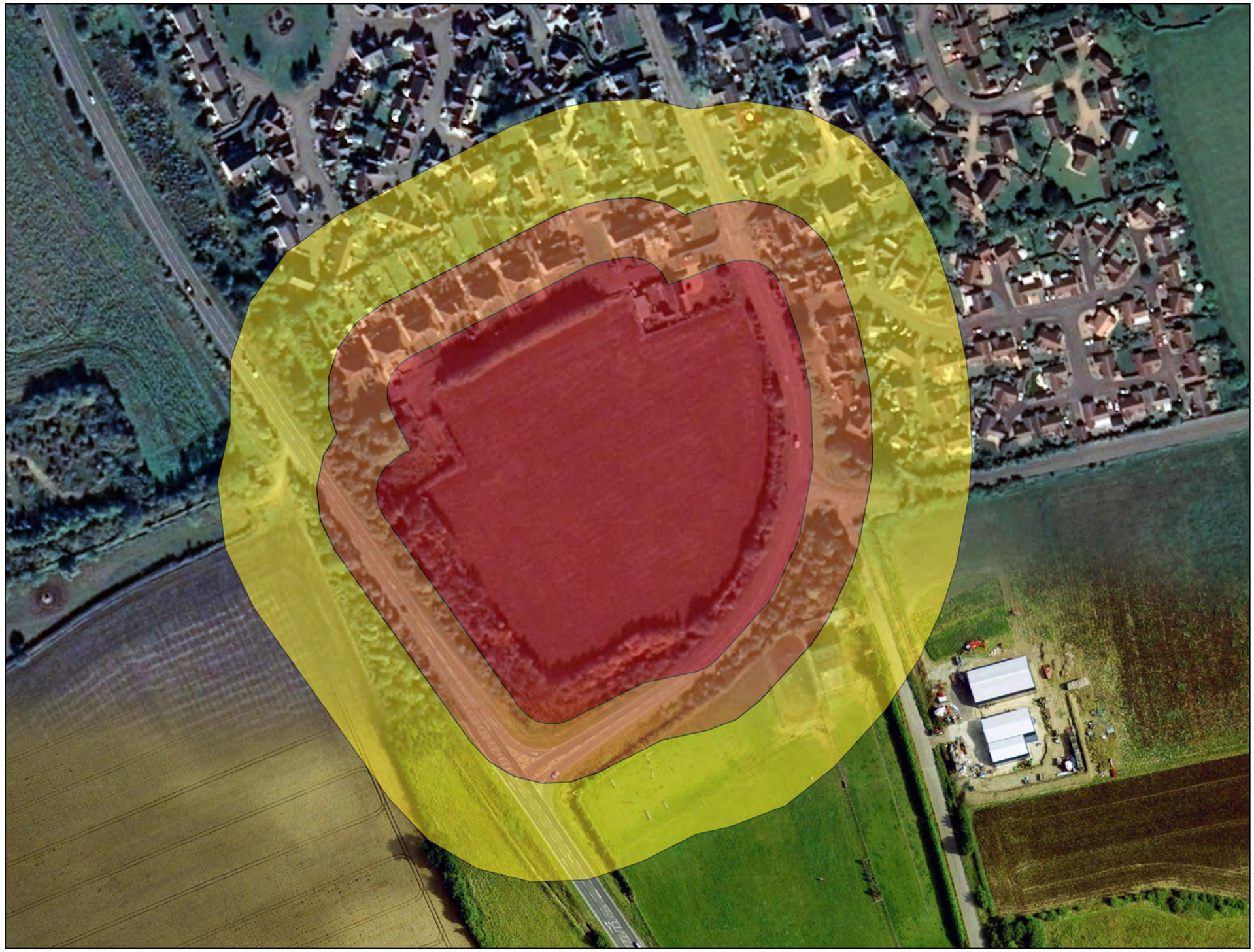
MLM. Group Part of Sweco

| | | | | | |
|---|---|---|---|---|---|
| DRAWING STATUS: FINAL | | DRAWING TITLE: LOCAL AUTHORITY MONITORING IN RELATION TO PROPOSED DEVELOPMENT SITE | | | |
| CLIENT: THE HAVEBURY HOUSING PARTNERSHIP | | DRAWN/DESIGN: AC | DATE: 23/09/2019 | STATUS: S2 | |
| | | CHECKED: KN | APPROVED: KN | REVISION: C01 | |
| PROJECT: LAND OFF BRICK LANE, MEPAL | | DRAWING NO: 777156-MLM-ZZ-XX-DR-J-FIGURE 3 | | | |

LEGEND

CONSTRUCTION BUFFER

- 20M
- 50M
- 100M



0 50 100 150 m

THIS DRAWING IS INDICATIVE ONLY

COORDINATE SYSTEM: BRITISH NATIONAL GRID
UNITS: METRE
SCALE: 1:2000
BASEMAP SOURCE: GOOGLE SATELLITE

| REV | DATE | DESCRIPTION | MADE | CKD |
|---|---|---|---|---|
| | | | | |

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| | | | | | |
|---|---|---|---|---|---|
| DRAWING STATUS: FINAL | | DRAWING TITLE: CONSTRUCTION DUST BUFFERS | | | |
| CLIENT: THE HAVEBURY HOUSING PARTNERSHIP | | DRAWN/DESIGN: AC | DATE: 23/09/2019 | STATUS: S2 | |
| | | CHECKED: KN | APPROVED: KN | REVISION: C01 | |
| PROJECT: LAND OFF BRICK LANE, MEPAL | | DRAWING NO: 777156-MLM-ZZ-XX-DR-J-FIGURE 4 | | | |

LEGEND

TRACKOUT BUFFER

- 20M
- 50M

0 50 100 150 m

THIS DRAWING IS INDICATIVE ONLY

COORDINATE SYSTEM: BRITISH NATIONAL GRID
UNITS: METRE
SCALE: 1:2000
BASEMAP SOURCE: GOOGLE SATELLITE

| REV | DATE | DESCRIPTION | MADE | CKD |
|---|---|---|---|---|
| | | | | |

MLM. Group Part of Sweco

| | | | | | |
|---|---|---|---|---|---|
| DRAWING STATUS: FINAL | | DRAWING TITLE: TRACKOUT DUST BUFFERS | | | |
| CLIENT: THE HAVEBURY HOUSING PARTNERSHIP | | DRAWN/DESIGN: AC | DATE: 23/09/2019 | STATUS: S2 | |
| | | CHECKED: KN | APPROVED: KN | REVISION: C01 | |
| PROJECT: LAND OFF BRICK LANE, MEPAL | | DRAWING NO: 777156-MLM-ZZ-XX-DR-J-FIGURE 5 | | | |

# Appendix A - IAQM Construction Assessment Methodology

It is inevitable that with any development, demolition and construction activities would cause some disturbance to those nearby. Dust arising from most construction activities tends to be of a coarse nature, which through dispersion by the wind, can lead to soiling of property including windows, cars, external paintwork and laundry.

The ability of dust particles to remain suspended in the air depends on its shape, size and density. Coarse particles (>30µm) tend to be deposited within 100m of source. Finer particles, between 10-30µm, are generally deposited within 200 to 500m of source, while very fine particles (<10 µm), which remain suspended for longer, can travel up to 1km from source. The greatest proportion of construction dust is made up of coarse particles, thus the majority of dust emissions are deposited within 100m of source.

However, as well as giving rise to annoyance due to soiling of surfaces from dust emissions, there is evidence of major construction activities causing increases in long term $PM_{10}$ concentrations and in the number of days exceeding the short term $PM_{10}$ objective of 50µg/m$^3$. The potential for impacts to occur during the construction of a proposed development must therefore be considered, to ensure appropriate mitigation measures are applied to reduce potential impacts at adjacent receptors. However, it should be noted that disruption due to demolition and construction is a localised phenomenon and is temporary in nature.

During the construction of the proposed development, Lorries would require access to the site to deliver and remove materials; earthmoving plant and other mobile machinery will work on site and generators and cranes will also be in operation. These machines produce exhaust emissions; of particular concern are emissions of $NO_2$ and $PM_{10}$.

The assessment of construction impacts has followed the methodology set out within guidance produced by Institute of Air Quality Management (IAQM) on assessing impacts from construction activities and is set out below.

### Prediction Method and Approach

In order to assess the potential impacts, the activities on construction sites are divided into four categories. These are:

- Demolition (removal of existing structures);
- Earthworks (soil-stripping, ground-levelling, excavation and landscaping);
- Construction (activities involved in the provision of a new structure); and
- Trackout (the transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the network).

For each activity, the risk of dust annoyance, health and ecological impact is determined using three risk categories: low, medium and high risk. The risk category may be different for each of the four activities. The risk magnitude identified for each of the construction activities is then compared to the number of sensitive receptors in the near vicinity of the site in order to determine the risks posed by the construction activities to these receptors.

### Step 1: Screen the Need for an Assessment

The first step is to screen the requirement for a more detailed assessment. An assessment is required where there is:

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

### Step 2A: Define the Potential Dust Emission Magnitude

This is based on the scale of the anticipated works and the proximity of nearby receptors. The risk is classified as small, medium or large for each of the four categories.

**Demolition**: The potential dust emission classes for demolition are:

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

**Earthworks**: This involves excavating material, haulage, tipping and stockpiling. The potential dust emission classes for earthworks are:

- Large: Total site area >10,000m$^2$, potentially dusty soil type (eg clay, which would be prone to suspension when dry due to small particle size), >ten 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 2,500m$^2$ - 10,000m$^2$, moderately dusty soil (eg silt), five - ten heavy earth moving vehicles active at any one time, formation of bunds 4m - 8m in height, total material moved 20,000 tonnes- 100,000 tonnes; and
- Small: Total site area <2,500m$^2$, soil type with large grain size (eg sand), <five heavy earth moving vehicles active at any one time, formation of bunds <4m in height, total material moved <20,000 tonnes, earthworks during wetter months.

**Construction**: The important issues when determining the potential dust emission magnitude include the size of the building(s)/infrastructure, method of construction, construction materials, and duration of build. The categories are:

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

**Trackout**: The risk of impacts occurring during trackout is predominantly dependent on the number of vehicles accessing the Site on a daily basis. However, vehicle size and speed, the duration of activities and local geology are also factors which are used to determine the emission class of the Site as a result of the trackout. The categories are:

- Large: >50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (eg high clay content), unpaved road length > 100m;
- Medium: 10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (eg 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 ($PM_{10}$) and ecological receptors. The sensitivity of the area takes into account the following factors:

- The specific sensitivities of receptors in the area;
- The proximity and number of receptors
- In the case of $PM_{10}$, 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 A1.1 is used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Table A1.1 Examples of Factors Defining Sensitivity of an Area

| Sensitivity of Area | Dust Soiling | Human Receptors | Ecological Receptors |
|---|---|---|---|
| High | Users can reasonably expect enjoyment of a high level of amenity.<br>The appearance, aesthetics or value of their property would be diminished by soiling.<br>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.<br>eg dwellings, museums and other important collections, medium and long-term car parks and car showrooms. | 10 – 100 dwellings within 20m of site.<br><br>Local $PM_{10}$ concentrations close to the objective (eg annual mean 36 -40µg/m$^3$), eg residential properties, hospitals, schools and residential care homes. | Locations with an international or national designation and the designated features may be affected by dust soiling.<br>Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red List for Great Britain.<br>eg A Special Area of Conservation (SAC). |
| Medium | 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.<br>The appearance, aesthetics or value of their property could be diminished by soiling.<br>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.<br>eg parks and places of work. | Less than 10 receptors within 20m.<br><br>Local $PM_{10}$ concentrations below the objective (eg annual mean 30-36µg/m$^3$).<br><br>eg office and shop workers but would generally not include workers occupationally exposed to $PM_{10}$ as protection is covered by the Health and Safety at Work legislation | Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown.<br>Locations with a national designation where the features may be affected by dust deposition<br>eg A Site of Special Scientific Interest (SSSI) with dust sensitive features. |

| Sensitivity of Area | Dust Soiling | Human Receptors | Ecological Receptors |
|---|---|---|---|
| Low | The enjoyment of amenity would not reasonably be expected.<br>Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling.<br>There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.<br>eg playing fields, farmland unless commercially sensitive horticultural, footpaths, short lived car parks and roads. | Locations where human exposure is transient.<br>No receptors within 20m.<br>Local $PM_{10}$ concentrations well below the objectives (less than 75%).<br>eg public footpaths, playing fields, parks and shopping streets. | Locations with a local designation where the features may be affected by dust deposition.<br><br>eg Local Nature Reserve with dust sensitive features. |

Based on the sensitivities assigned to the different receptors surrounding the site and numbers of receptors within certain distances of the site, a sensitivity classification can be defined for each. Tables A1.2 to A1.4 indicate the criteria used to determine the sensitivity of the area to dust soiling, human health and ecological impacts.

Table A1.2 Sensitivity of the Area to Dust Soiling on People and Property

| Pollutant | Concentrations | Distance 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 A1.3 Sensitivity of the Area to Human Health Impacts

| Receptor Sensitivity | Annual Mean $PM_{10}$ Concentrations | Number of Receptors | Distance from the Source (m) | | | | |
|---|---|---|---|---|---|---|---|
| | | | <20 | <50 | <100 | <200 | <350 |
| High | >32µg/m³ | >100 | High | High | High | Medium | Low |
| | | 10-100 | High | High | Medium | Low | Low |
| | | 1-10 | High | Medium | Low | Low | Low |
| | 28-32µg/m³ | >100 | High | High | Medium | Low | Low |
| | | 10-100 | High | Medium | Low | Low | Low |
| | | 1-10 | High | Medium | Low | Low | Low |

| Receptor Sensitivity | Annual Mean $PM_{10}$ Concentrations | Number of Receptors | Distance from the Source (m) | | | | |
|---|---|---|---|---|---|---|---|
| | | | <20 | <50 | <100 | <200 | <350 |
| | 24-28µg/m³ | >100 | High | Medium | Low | Low | Low |
| | | 10-100 | High | Medium | Low | Low | Low |
| | | 1-10 | Medium | Low | Low | Low | Low |
| | <24µg/m³ | >100 | Medium | Low | Low | Low | Low |
| | | 10-100 | Low | Low | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low | Low |
| Medium | >32µg/m³ | >10 | High | Medium | Low | Low | Low |
| | | 1-10 | Medium | Low | Low | Low | Low |
| | 28-32µg/m³ | >10 | Low | Low | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low | Low |
| | 24-28µg/m³ | >10 | Low | Low | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low | Low |
| | <24µg/m³ | >10 | Low | Low | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low | Low |
| Low | | ≥1 | Low | Low | Low | Low | Low |

Table A1.4 Sensitivity of the Area to Ecological Impacts

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

### Step 2C: Define the Risk of Impacts

The final step is to combine the dust emission magnitude determined in step 2A with the sensitivity of the area determined in step 2B to determine the risk of impacts with no mitigation applied. Tables A1.5 to A1.7 indicate the method used to assign the level of risk for each construction activity.

The identified risk of impact is then used to identify appropriate mitigation measures for inclusion with a Dust Management Plan (DMP) which is usually incorporated within the Site's Construction Environmental Management Plan (CEMP).

Table A1.5 Risk of Dust Impacts from Demolition

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

Table A1.6 Risk of Dust Impacts from Earthworks/Construction

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

Table A1.7 Risk of Dust Impacts from Trackout

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

# Appendix B - IAQM Screening Criteria

### Stage 1 Criteria to proceed to Stage 2

| Criteria to Proceed to Stage 2 |
|---|
| A. If any of the following apply:<br>• 10 or more residential units of a site area of more than 0.5ha<br>• More than 1,000m$^2$ of floor space for all other uses or a site area greater than 1ha |
| B. Coupled with any of the following:<br>• The development has more than 10 parking spaces<br>• The development will have a centralised energy facility or other centralised combustion process |

### Indicative Criteria at Stage 2 to determine if an Air Quality Assessment is required

| The Development will | Indicative Criteria to Proceed to an Air Quality Assessment |
|---|---|
| 1 Cause a significant change in Light Duty Vehicle (LDV) traffic slows on local roads with relevant receptors. | A change of LDV flows of:<br>• More than 100 AADT within or adjacent to an AQMA;<br>• More than 500 AADT elsewhere. |
| 2 Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. | A Change of HDV flows of:<br>• More than 25 AADT within or adjacent to an AQMA;<br>• More than 100AADT elsewhere. |
| 3 Realign roads, ie changing the proximity of receptors to traffic lanes. | Where the change is 5m or more and the road is within an AQMA. |
| 4 Introduce a new junction or remove an existing junction near to relevant receptors. | Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, egg traffic-lights, or roundabouts. |
| 5 Introduce or change a bus station. | Where bus flows will change by:<br>• More than 25 AADT within or adjacent to an AQMA;<br>• More than 100AADT elsewhere. |

| The Development will | Indicative Criteria to Proceed to an Air Quality Assessment |
|---|---|
| 6 Have an underground car park with extraction system. | The ventilation extract for the car park will be within 20m of a relevant receptor.<br>Coupled with the car park having more than 100 movements per day (total in and out). |
| 7 Have one or more substantial combustion processes. | Where the combustion unit is:<br>• Any centralised plant using bio fuel;<br>• Any combustion plant with single or combined thermal input >300kWh;<br>• A standby emergency generator associated with a centralised energy centre (if likely to be tested/used >18 hours a year). |
| 8 Have a combustion process of any size. | Where the pollutants are exhausted from a vent or stack in a location and at a height that may give rise to impacts at receptors through insufficient dispersion. This criterion is intended to address those situations where a new development may be close to other buildings that could be residential and/or which could adversely affect the plume's dispersion by way or their size and/or height. |

# Appendix C - Construction Phase Dust Mitigation Measures

It is suggested that the 'highly recommended' measures set out in the IAQM's 'Guidance on the assessment of dust from demolition and construction 1.1' are incorporated into a Dust Management Plan (DMP) by the appointed contractor, which is approved by ECDC prior to the commencement of any work at the Site. The level of detail will depend on the risk and should include, as a minimum, the highly recommended measures in this document. 'Desirable' measures from the IAQM Guidance should be included as appropriate for the Site, and are shown below in italics.

## General Measures – Communications

- Display the name and contact details of the person(s) accountable for air quality and dust issues on the site boundary (ie the environment manager/engineer or site manager); and,
- Display the head or regional office contact information.

## General Measures – Dust Management

### Dust Management Plan

- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by East Cambridgeshire District Council. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site.

### Site Management

- Record all dust and air quality complaints in a log, 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; and,
- 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.

### 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 100 m of site boundary, with cleaning to be provided if necessary;*
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results and make inspection log available to East Cambridgeshire District Council when asked; and,
- Increase frequency of site inspection 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 periods of dry or windy conditions.

### Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles;
- Fully enclose site or specific operations where there is a high potential for dust production and the activities are being undertaken 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 being re-used on site, cover; and,
- 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;
- *Impose and signpost a maximum speed limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas;*
- Produce a construction logistics plan (CLP) to manage the sustainable delivery of goods and materials; and,
- *Implement a travel plan which supports and encourages sustainable transport methods.*

### Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction egg suitable local exhaust ventilation systems;
- Ensure an adequate water supply on site for effective dust and particulate matter suppression or 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; and,
- 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; and,
- Reuse and recycle waste to reduce dust from waste materials.

### Measures 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; and,*
- *Only remove the cover in small areas during work and not all at once.*

### Measures specific to Construction

- *Avoid scabbling (roughening of concrete surfaces) if possible; and*
- 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 small supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.*

### Measures specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a site log book; and,
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Access gates to be located 10m for receptors where possible.

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