Hammond Rutts Investments Ltd

Haverhill Business Park

Air Quality Assessment

Final | 9 November 2015

Job number 238826-00

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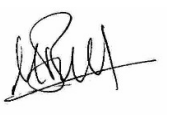
		Signature			
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Appendices

Appendix A

Air Quality - Appendix

1 Introduction

Ove Arup & Partners Limited (Arup) has been commissioned by Stutchbury Associates Limited to undertake an air quality appraisal for a proposed development at Haverhill Business Park, Haverhill. The site is located within both St Edmundsbury Borough Council and Braintree District Council. However, it has been agreed that St Edmundsbury Borough Council will act as the lead authority on this site.

Air quality studies are concerned with the presence of airborne pollutants in the atmosphere. This report assesses the potential impact of the proposed development on air quality in the vicinity of the development. This report outlines relevant air quality management policy and legislation, describes the existing air quality conditions in the vicinity of the site, and outlines the nature of the development and the potential air quality impacts associated with its construction and operation. Mitigation measures are also proposed where necessary, which would be implemented to reduce the impact of the proposed development on air quality, as far as practicable.

1.1 Description of the Development

The indicative plan for the outline development will comprise of an area of a 27 acre platform area containing units for a mix of business uses with parking facilities. There are no existing developments on this site.

The proposed site location is in the south of Haverhill adjacent to the Haverhill Days Inn. The A1017 and the B1057 (Bumpstead Road) are the main roads adjacent to the site. The location of the development is shown in Figure 1.

A3

Legend

Site Boundary

Revision	Date	By	Chkd	Appd
P1	22-01-15	LAS	MK	MAB

Metres
0 60 120 240

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Client

Stutchbury Associates Limited

Job Title

Stutchbury Associates Limited

Drawing Title

Construction Dust Buffers

Scale at A3

1:5,000

Job No	Drawing Status
071756-04	Draft

Drawing No	Revision
001	P1

MXD Location

2 Policy, Legislation and Guidance

2.1 European Air Quality Management

In 1996 the European Commission published the Air Quality Framework Directive on ambient air quality assessment and management (96/62/EC)[1]. This Directive defined the policy framework for 12 air pollutants known to have harmful effects on human health and the environment. Limit values (pollutant concentrations not to be exceeded by a certain date) for each specified pollutant were set through a series of Daughter Directives, including Directive 1999/30/EC (the 1st Daughter Directive)[2] which sets limit values for sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and oxides of nitrogen (NO_x), particulate matter (PM_{10}) and lead in ambient air.

In May 2008 the Directive 2008/50/EC[3] on ambient air quality and cleaner air for Europe came into force. This Directive consolidates the above (apart from the 4th Daughter Directive, which will be brought within the new Directive at a later date), provides a new regulatory framework for $PM_{2.5}$ and makes provision for extended compliance deadlines for NO_2 and PM_{10}.

The Directives were transposed into national legislation in England by the Air Quality Standards Regulations 2010[4]. The Secretary of State for the Environment has the duty of ensuring the air quality limit values are complied with.

2.2 Environment Act 1995

Part IV of the Environment Act 1995[5] places a duty on the Secretary of State for the Environment to develop, implement and maintain an Air Quality Strategy with the aim of reducing atmospheric emissions and improving air quality. The Air Quality Strategy[6] for England, Scotland, Wales and Northern Ireland provides the framework for ensuring the air quality limit values are complied with based on a combination of international, national and local measures to reduce emissions and improve air quality. This includes the statutory duty, also under Part IV of the Environment Act 1995, for local authorities to undergo a process of local air quality management and declare Air Quality Management Areas (AQMA) where necessary.

2.3 Air Quality Objectives and Limit Values

Air quality limit values and objectives are quality standards for clean air. Some pollutants have standards expressed as annual average concentrations due to the

[1] Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management
[2] Directive 1999/30/EC of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air
[3] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe
[4] The Air Quality Standards Regulations 2010, SI 2010/1001
[5] Environment Act 1995, Chapter 25, Part IV Air Quality
[6] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Volume 1, July 2007

chronic way in which they affect health or the natural environment (i.e. effects occur after a prolonged period of exposure to elevated concentrations) and others have standards expressed as 24-hour, 1-hour or 15-minute average concentrations due to the acute way in which they affect health or the natural environment (i.e. after a relatively short period of exposure). Some pollutants have standards expressed in terms of both long-term and short-term concentrations. Table 1 sets out these EU air quality limit values and national air quality objectives for the pollutants relevant to this study (NO_2 and PM_{10}).

In the majority of cases the air quality limit values and air quality objectives have the same pollutant concentration threshold and date for compliance. The key difference is that the Secretary of State for the Environment is required under European Law to ensure the air quality limit values are complied with whereas local authorities are only obliged under national legislation to undertake best efforts to comply with the air quality objectives. To assist local authorities in demonstrating best efforts, the Environment Act 1995 requires that when carrying out their local air quality management functions, local authorities shall have regard to guidance issued by the Secretary of State.

Table 1 Air Quality Standards

Pollutant	Averaging period	Limit value / Objective
Nitrogen Dioxide (NO_2)	Annual mean	40µg/m^3
	1-hour mean	200µg/m^3 not to be exceeded more than 18 times a year (99.8th percentile)
Particulate Matter (PM_{10})	Annual mean	40µg/m^3
	24-hour mean	50µg/m^3 not to be exceeded more than 35 times a year (90.4th percentile)

2.4 Dust Nuisance

Dust is the generic term used in the British Standard document BS 6069 (Part Two) to describe particulate matter in the size range 1–75µm in diameter. Dust nuisance is the result of the perception of the soiling of surfaces by excessive rates of dust deposition. Under provisions in the Environmental Protection Act 1990[7], dust nuisance is defined as a statutory nuisance.

There are currently no standards or guidelines for dust nuisance in the UK, nor are formal dust deposition standards specified. This reflects the uncertainties in dust monitoring technology and the highly subjective relationship between deposition events, surface soiling and the perception of such events as a nuisance. In law, complaints about excessive dust deposition would have to be investigated by the local authority and any complaint upheld for a statutory nuisance to occur. However, dust deposition is generally managed by suitable on-site practices and mitigation rather than by the determination of statutory nuisance and/or prosecution or enforcement notice(s).

[7]Environmental Protection Act 1990, Chapter 43, Part III Statutory Nuisances and Clean Air

3 Planning Policy and Guidance

3.1 National Policy and Guidance

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 consideration that relates to land use and its development can be a material planning consideration in the determination of planning applications, dependent upon the details of the proposed development.

3.1.1 National Planning Policy Framework (2012)

The National Planning Policy Framework[8] (NPPF) was published in March 2012 with the purpose of planning to achieve sustainable development. Paragraph 124 of the NPPF on air quality states that:

"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."

3.1.2 Planning Practice Guidance (2014)

As part of the NPPF, planning practice guidance on various topics was recently published[9]. In relation to air quality, the guidance refers to the significance of air quality assessments to determine the impacts of proposed developments in the area and describes the role of local and neighbourhood plans with regard to air quality. It also provides a flowchart method to assist local authorities to determine how considerations of air quality fit into the development management process. This is shown in Appendix A.

3.1.3 Local Air Quality Management Policy Guidance (2009)

Policy guidance note LAQM.PG(09)[10] provides additional guidance on the links between transport and air quality. LAQM.PG(09) describes how road transport contributes to local air pollution and how transport measures may bring improvements in air quality. Key transport related Government initiatives are set out, including regulatory measures and standards to reduce vehicle emissions and improve fuels, tax-based measures and the development of an integrated transport strategy.

LAQM.PG(09) also provides guidance on the links between air quality and the land use planning system. The guidance advises that air quality considerations should be integrated within the planning process at the earliest stage and is intended to aid local authorities in developing action plans to deal with specific air

[8] Department for communities and local government (2012) National Planning Policy Framework
[9] Department for communities and local government (2014) Planning Practice Guidance: Air Quality
[10] Defra (2009) Local Air Quality Management Policy Guidance PG(09)

quality problems and create strategies to improve air quality. It summarises the main ways in which the land use planning system can help deliver compliance with the air quality objectives.

3.2 Local Policy and Guidance

3.2.1 The Core Strategy

The St Edmundsbury Core Strategy Development Plan Document was adopted in 2010[11] and now forms part of the Local Plan for the St Edmundsbury Borough Council. The Core Strategy sets out the vision, objectives, spatial strategy and overarching policies for the provision of new development in the Borough up to 2031.

The Core Strategy looks at air quality by proposing the following measures:

- Conserving, and wherever possible enhancing natural resources, including air quality.
- Across the town there will be a balanced approach to catering for motorised journeys and other methods of travel in order to manage levels of congestions, air quality and road safety.
- Incorporating the principles of sustainable design and construction in accordance with recognised appropriate national standards and codes of practice to cover the following schemes: Energy and CO_2 emissions and; Pollution.

These policies have been considered throughout the completion of this Air Quality Assessment.

3.2.2 Joint Development Management Policies Document

The Joint Development Management Policies Document[12] was adopted by St Edmundsbury Borough Council on 24 February 2015. Policy DM14 focuses on air quality and pollution and provides guidance on when assessments should be undertaken.

"Development will not be permitted where, individually or cumulatively, there are likely to be unacceptable impacts arising from the development on: air quality".

3.3 Other Relevant Policy and Guidance

3.3.1 Institute of Air Quality Management Dust Guidance

The latest Institute of Air Quality Management (IAQM) guidance[13] was produced in consultation with industry specialists and the Greater London Authority (GLA) and gives guidance to development consultants and environmental health officers

[11] St Edmundsbury Borough Council (2010) *St Edmundsbury Core Strategy: Local Development Framework*
[12] Forest Heath District Council and St Edmundsbury Borough Council (2015) *Joint Development Management Policies Document*
[13] IAQM (2014) *Guidance on the Assessment of Dust from Demolition and Construction*

on how to assess air quality impacts from construction. The IAQM guidance provides a method for classifying the significance of effect from construction activities based on the 'dust magnitude' (high, medium or low) and proximity of the site to the closest receptors. The guidance recommends that once the significance of effect from construction is identified, the appropriate mitigation measures are implemented. Experience has shown that once the appropriate mitigation measures are applied in most cases the resulting dust impacts can be reduced to negligible levels.

3.3.2 EPUK/IAQM Land-Use Planning & Development Control (2015)

The 2015 Land-Use Planning & Development Control guidance document[14] produced by Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) provides a framework for professionals operating within the planning system to provide a means of reaching sound decisions, having regard to the air quality implications of development proposals.

The document provides guidance on when air quality assessments are required by providing screening criteria regarding the size of a development, changes to traffic flows/composition energy facilities or combustion processes associated with the development.

4 Methodology

The overall approach to the air quality assessment comprises:

- A review of the existing air quality conditions at, and in the vicinity of, the proposed development site;
- An assessment of the potential changes in air quality arising from the construction and operation of the proposed development; and
- Formulation of mitigation measures, where appropriate, to ensure any adverse effects on air quality are minimised.

4.1 Consultation

Consultation was undertaken with the local authority Environmental Health Officer. It was agreed a qualitative approach would be appropriate to assess impacts from the site. Relevant correspondence is reproduced within Appendix A2.

4.2 Method of Baseline Assessment

Existing or baseline ambient air quality refers to the concentration of relevant substances that are already present in the environment. These are present from

[14] IAQM (2015) Land-Use Planning & Development Control: Planning for Air Quality

various sources, such as industrial processes, commercial and domestic activities, traffic and natural sources.

A desk-based review of the following data sources has been undertaken to determine baseline conditions of air quality in this assessment:

- Local authority review and assessment reports and local air quality monitoring data;
- The UK Air Information Resource website[15]; and
- The Environment Agency (EA) website[16].

4.3 Method of Construction Assessment

The construction effects have been assessed using the qualitative approach described in the latest IAQM guidance[13]. The guidance applies to the assessment of dust from construction activities.

An 'impact' is described as a change in pollutants concentrations or dust deposition, while an 'effect' is described as the consequence of an impact. The main impacts that may arise during construction of the proposed development are:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes;
- Elevated PM_{10} concentrations as a result of dust generating activities on site; and
- An increase in NO_2 and PM_{10} concentrations due to exhaust emissions from non-road mobile machinery (NRMM) and vehicles accessing the site.

The IAQM guidance considers the potential for dust emissions from dust-generating activities, such as demolition of existing structures, earthworks, construction of new structures and trackout. Earthworks refer to the processes of soil stripping, ground levelling, excavation and land capping, while trackout is the transport of dust and dirt from the site onto the public road network where it may be deposited and then re-suspended by vehicles using the network. This arises when vehicles leave the site with dusty materials, which may then spill onto the road, or when they travel over muddy ground on site and then transfer dust and dirt onto the road network.

For each of these dust-generating activities, the guidance considers three separate effects: annoyance due to dust soiling; harm to ecological receptors; and the risk of health effects due to a significant increase in PM_{10} exposure. The receptors can be human or ecological and are chosen based on their sensitivity to dust soiling and PM_{10} exposure.

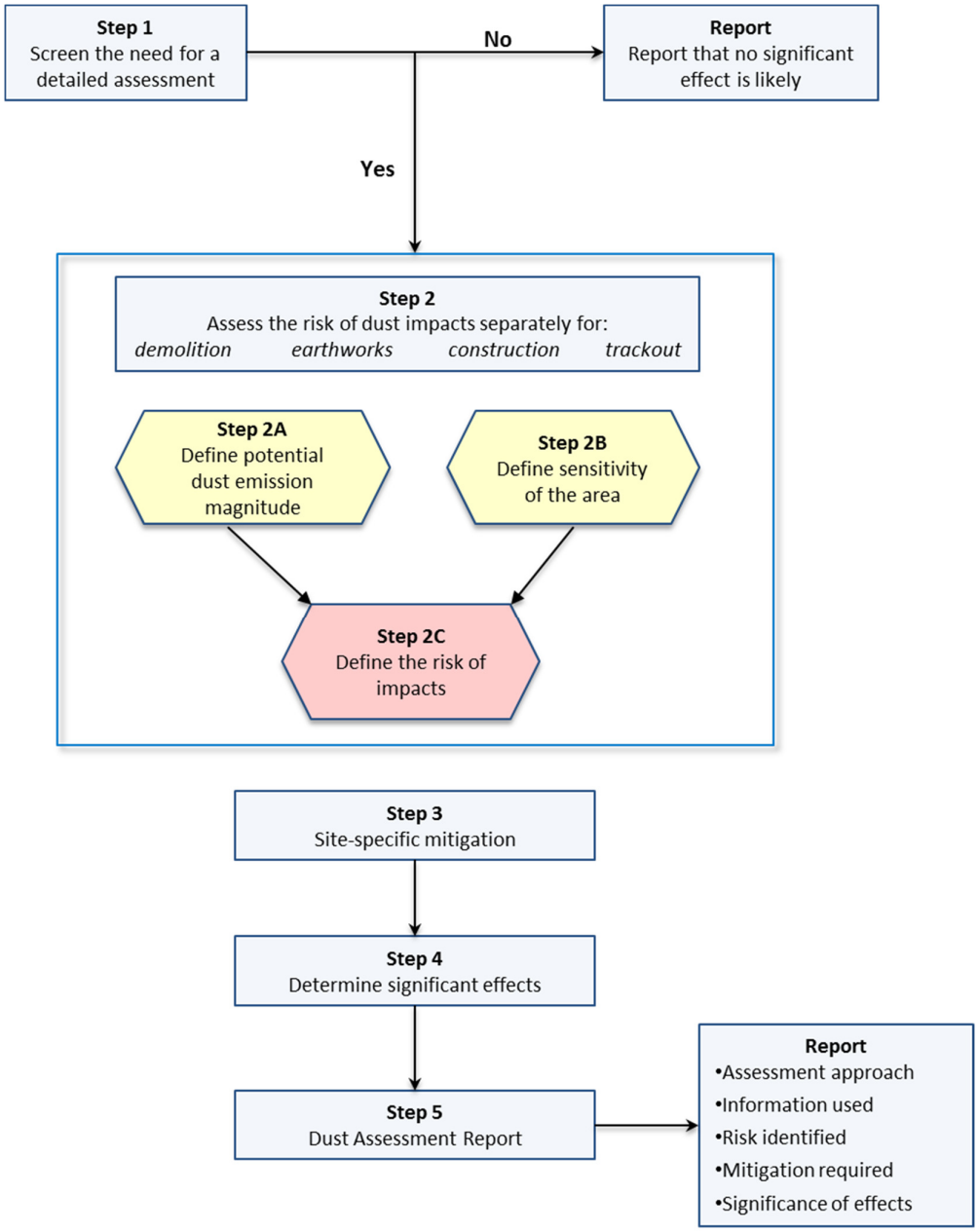
The methodology takes into account the scale to which the above effects are likely to be generated (classed as small, medium or large), along with the levels of background PM_{10} concentrations and the distance to the closest receptor, in order to determine the sensitivity of the area. This is then taken into consideration when

[15] Defra, http://uk-air.defra.gov.uk, Accessed January 2014
[16] Environment Agency, http://www.environment-agency.gov.uk, Accessed January 2014

deriving the overall risk for the site. Suitable mitigation measures are also proposed to reduce the risk of the site where necessary.

There are five steps in the assessment process described in the IAQM guidance. These are summarised in Figure 2 and a further description is provided in the following sections.

Figure 2 IAQM dust assessment methodology



Step 1: Need for assessment

The first step is the initial screening for the need for a detailed assessment. According to the IAQM guidance, an assessment is required where there are sensitive receptors within 350m of the site boundary (for ecological receptors that is 50m) and/or within 50m of the route(s) used by the construction vehicles on the public highway and up to 500m from the site entrance(s).

Step 2: Assess risk of dust impacts

This step is split into three sections as follows:

2A. Define the potential dust emission magnitude;

2B. Define the sensitivity of the area; and

2C. Define the risk of impacts.

Each of the dust-generating activities is given a dust emission magnitude depending on the scale and nature of the works (step 2A) based on the criteria shown in Table 2.

Table 2 Categorisation of dust emission magnitude

Dust Emission Magnitude		
Small	Medium	Large
Demolition		
• total building volume <20,000m^3 • construction material with low potential for dust release (e.g. metal cladding or timber) • demolition activities <10m above ground • demolition during wetter months	• total building volume 20,000 - 50,000m^3 • potentially dusty construction material • demolition activities 10 - 20m above ground level	• total building volume >50,000m^3 • potentially dusty construction material (e.g. concrete) • on-site crushing and screening • demolition activities >20m above ground level
Earthworks		
• total site area <2,500m^2 • 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	• total site area 2,500m^2 - 10,000m^2 • 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	• total site area >10,000m^2 • potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • >10 heavy earth moving vehicles active at any one time • formation of bunds >8m in height • total material moved >100,000 tonnes
Construction		
• total building volume <25,000 m^3 • construction material with low potential for dust release (e.g. metal cladding or timber)	• total building volume 25,000 - 100,000m^3 • potentially dusty construction material (e.g. concrete) • on-site concrete batching	• total building volume >100,000m^3 • on-site concrete batching • sandblasting
Trackout		
• <10 HDV (>3.5t) outward movements in any one day • surface material with low potential for dust release • unpaved road length <50m	• 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;	• >50 HDV (>3.5t) outward movements in any one day • potentially dusty surface material (e.g. high clay content) • unpaved road length >100m

The sensitivity of the surrounding area is then determined (step 2B) for each dust effect from the above dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust, the local PM_{10} background concentrations and any other site-specific factors. Tables 3, 4 and 5 show the criteria for defining the sensitivity of the area to different dust effects.

Table 3 Sensitivity of the area to dust soiling effects on people and property

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		< 20	< 50	< 100	< 350
High	> 100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	< 10	Medium	Low	Low	Low
Medium	> 1	Medium	Low	Low	Low
Low	> 1	Low	Low	Low	Low

Table 4 Sensitivity of the area to human health impacts

Background PM_{10} concentrations (annual mean)	Number of receptors	Distance from the source (m)				
		< 20	< 50	< 100	< 200	< 350
High receptor sensitivity						
> 32µg/m^3	> 100	High	High	High	Medium	Low
	10 – 100			Medium	Low	
	< 10		Medium	Low		
28 – 32µg/m^3	> 100	High	High	Medium	Low	Low
	10 – 100		Medium	Low		
	< 10					
24 – 28µg/m^3	> 100	High	Medium	Low	Low	Low
	10 – 100					
	< 10	Medium	Low			
< 24µg/m^3	> 100	Medium	Low	Low	Low	Low
	10 – 100	Low				
	< 10					
Medium receptor sensitivity						
–	> 10	High	Medium	Low	Low	Low
	< 10	Medium	Low			
Low receptor sensitivity						
–	> 1	Low	Low	Low	Low	Low

Table 5 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

The overall risk of the impacts for each activity is then determined (step 2C) prior to the application of any mitigation measures (Table 6) and an overall risk for the site derived.

Table 6 Risk of dust impacts

Sensitivity of area	Dust emission magnitude		
	Large	**Medium**	**Small**
Demolition			
High	High risk site	Medium risk site	Medium risk site
Medium	High risk site	Medium risk site	Low risk site
Low	Medium risk site	Low risk site	Negligible
Earthworks			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Construction			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Trackout			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Low risk site	Negligible
Low	Low risk site	Low risk site	Negligible

Step 3: Determine the site-specific mitigation

Once each of the activities is assigned a risk rating, appropriate mitigation measures are identified. Where the risk is negligible, no mitigation measures beyond those required by legislation are necessary.

Step 4: Determine any significant residual effects

Once the risk of dust impacts has been determined and the appropriate dust mitigation measures identified, the final step is to determine whether there are any residual significant effects. Experience indicates that once mitigation measures are applied, in most cases the dust effects will be reduced to negligible levels.

Step 5: Prepare a dust assessment report

The last step of the assessment is the preparation of a Dust Assessment Report, which is covered within this report.

4.4 Method of Operational Assessment

4.4.1 Road Traffic Emissions

The development has the potential to impact on existing air quality as a result of road traffic exhaust emissions, such as NO_2 and PM_{10}, associated with vehicles travelling to and from the site during the operational phase. A screening assessment was therefore undertaken using the criteria contained within the Design Manual for Roads and Bridges (DMRB) and Environmental Protection UK (EPUK) Land-Use Planning and Development Control: Planning for Air

Quality (2015)[17] guidance documents to determine the potential for trips generated by the development to affect local air quality. The DMRB provides the following criteria for determination of road links potentially affected by changes in traffic flow:

- Daily Annual Average Daily Traffic (AADT) flows change by 1,000 or more;
- Daily HDV AADT flows change by 200 or more;
- Daily average speed changes by 10km/hr or more; or,
- Peak hour speed changes by 20km/hr or more.

The EPUK guidance document states the following criteria to help establish when an air quality assessment is likely to be considered necessary:

- Cause significant change in light duty vehicle (LDV) numbers, a change in over 100 AADT within or adjacent to an AQMA or 500 AADT elsewhere;
- Cause a significant change in heavy duty vehicle (HDV) numbers, a change in 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;

Should these criteria not be met, then the DMRB and EPUK guidance documents consider that it may not be necessary to carry out a detailed air quality assessment.

Should screening of the traffic data indicate that any of the above criteria are met, then potential impacts at sensitive receptor locations can be assessed by calculating the predicted change in NO_2 and PM_{10} concentrations as a result of the proposed development. The significance of predicted impacts can then be determined in accordance with the methodology outlined in the EPUK guidance.

4.5 Traffic Data

In recent decades, transport atmospheric emissions, on a national basis, have grown to match or exceed other sources in respect of many pollutants, particularly in urban areas. Vehicle emissions are likely to be the dominant source of air pollutants in the vicinity of the development. The main pollutants associated with road traffic and considered in this assessment are:

- Nitrogen dioxide (NO_2); and
- Fine particulate matter (PM_{10}).

Traffic data was provided by the transport consultants, Vectos. Traffic data as Annual Average Daily Traffic (AADT) and percentage of Heavy Goods Vehicles (HGVs) for the surrounding road network was provided. Traffic flows in the assessed road network are provided in Appendix A3.

Screening of potential impacts used the DMRB screening methodology along with the emission factors from the Defra EFT v6.0.2[18]. As a worst case emissions and background concentrations from 2015 were used within the EFT and results.

[17] Environmental Protection UK, Institute of Air Quality Management, Land-Use Planning and Development Control: Planning for Air Quality (May 2015)
[18] http://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html [accessed October 2015]

Emission factors and backgrounds would be expected to be lower in the opening year as newer lower emission vehicles enter the fleet.

4.6 Receptors

Pollutant concentrations have been forecast at selected sensitive receptors where exposure to traffic emissions from vehicles travelling to/from the site is the greatest; i.e. properties in close proximities to roads/junctions with the greatest predicted changes in traffic flows. One receptor has been selected, its location is shown in Figure 3. This receptor represents a worst case conservative location along Bumpstead Road. The location is the closest to the proposed development as a worst case the receptor location has been assumed to be close to the roadside.

4.7 NO_X to NO_2 Conversion

The DMRB screening model predicts NO_X roadside concentrations which comprise principally nitric oxide (NO) and primary NO_2. The emitted NO reacts with ozone in the atmosphere to form more NO_2. Since only NO_2 is associated with effects on human health, the air quality standards are based on NO_2 rather than NO_X or NO. Thus, a suitable NO_X to NO_2 conversion needs to be applied to the modelled NO_X concentrations.

The approach for calculating the roadside conversion of NO_X to NO_2 has followed the Defra Local Air Quality Management Technical Guidance . This approach allows the calculation of NO_2 from NO_X concentrations, taking into account the difference between ambient NO_X concentrations with and without the

development, the concentrations of ozone and the different proportions of primary NO_2 emissions in different years. This approach is available as a spreadsheet calculator, with the most recent version having been released in June 2014 (v3.2)[19].

4.8 Assessment of Significance

The 2015 EPUK/IAQM guidance note 'Land-Use Planning & Development Control' provides an approach to determining the air quality impacts resulting from a proposed development and the overall significance of local air quality effects arising from a proposed development.

Firstly, impact descriptors are determined based on the magnitude of incremental change as a proportion of the relevant assessment level, in this instance the annual mean NO_2 objective. The change is then examined in relation to the predicted total pollutant concentrations in the assessment year and its relationship with the annual mean NO_2 objective.

The assessment framework for determining impact descriptors at each of the assessed receptors is shown in Table 7.

Table 7: Impact Descriptors

Annual average concentrations at receptor in the assessment year	**% Change in concentrations relative to annual mean NO_2 and PM_{10} objectives**			
	1	**2-5**	**6-10**	**>10**
75% or less of objective	Negligible	Negligible	Slight	Moderate
76-94% of objective	Negligible	Slight	Moderate	Moderate
95-102% of objective	Slight	Moderate	Moderate	Substantial
103-109% of objective	Moderate	Moderate	Substantial	Substantial
110% of more of objective	Moderate	Substantial	Substantial	Substantial

Note: Changes in pollutant concentrations of less than 0% i.e. <0.5% would be described as negligible

The impact descriptors at each of the assessed receptors can then be used as a starting point to making a judgement on the overall significance of effect of a proposed development, however other influences would also need to accounted for, such as:

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

Professional judgement should be used to determine the overall significance of effect of the proposed development, however in circumstances where the proposed development can be judged in isolation, it is likely that a 'moderate' or

[19] http://laqm.defra.gov.uk/documents/NOx-NO2-Calculator-v4.1.xls

'substantial' impact will give rise to a significant effect and a 'negligible' or 'slight' impact will not result in a significant effect.

5 Baseline assessment

5.1 Sources of Air Pollution

Industrial processes

Industrial air pollution sources are regulated through a system of operating permits or authorisations, requiring stringent emission limits to be met and ensuring that any releases to the environment are minimised or rendered harmless. Regulated (or prescribed) industrial processes are classified as Part A or Part B processes, and are regulated through the Pollution Prevention and Control (PPC) system[20] [21]. The larger more polluting processes are regulated by the Environment Agency (EA), and the smaller less polluting ones by the local authorities. Local authorities tend also to regulate only for emissions to air, whereas the EA regulates emissions to air, water and land.

There are three Part A processes with releases to air within 2km of the development site, as determined by a review of the EA website[22], see Table 8.

Table 8 Part A processes

Site	Grid Reference		Distance (direction) from Site
	X	Y	
International Flavours and Fragrances IFF (Great Britain) LTD	566888	244803	0.9km (north west)
Deltech Europe Ltd	567506	244404	0.5km (north west)
Genzyme Ltd	567443	244683	0.7 km (north-east)

Road traffic

In recent decades, transport atmospheric emissions on a national basis have grown to match or exceed other sources in respect of many pollutants, particularly in urban areas. Vehicle emissions are likely to be the dominant source of air pollutants in the vicinity of the proposed development site.

The proposed development is adjacent to the Haverhill Bypass, A1017, a main route in the area as well as smaller suburban roads including the B1057. The Department for Transport (DfT) undertake traffic counts throughout the UK, which include a location on the A1017. Annual average daily flows (AADF) from the DfT for 2014 are listed in Table 9.

[20] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)
[21] The Environmental Permitting (England and Wales) (Amendment) Regulations 2013, SI 2013/390
[22] http://maps.environment-agency.gov.uk/wiyby/wiybyController

Table 9 Annual Average Daily Traffic Flows for 2014[23]

Road Name	Count Point ID	Distance from Site to Count Point	2014 Annual Average Daily Flows for All Vehicles	2014 % HDV
A1017	73508	~400m	5,269	7.06

5.2 Local Air Quality

As mentioned in Section 2, the Environment Act 1995 requires local authorities to review and assess air quality with respect to the objectives for seven pollutants specified in the National Air Quality Strategy. Local authorities are required to carry out an Updating and Screening Assessment (USA) of their area every three years. If the USA identifies potential areas likely to exceed air quality objectives, then a Detailed Assessment of those areas is required. Where objectives are not predicted to be met, local authorities must declare the area as an AQMA. In addition, local authorities are required to produce an Air Quality Action Plan (AQAP) which includes measures to improve air quality within the AQMA.

5.3 Local Monitoring

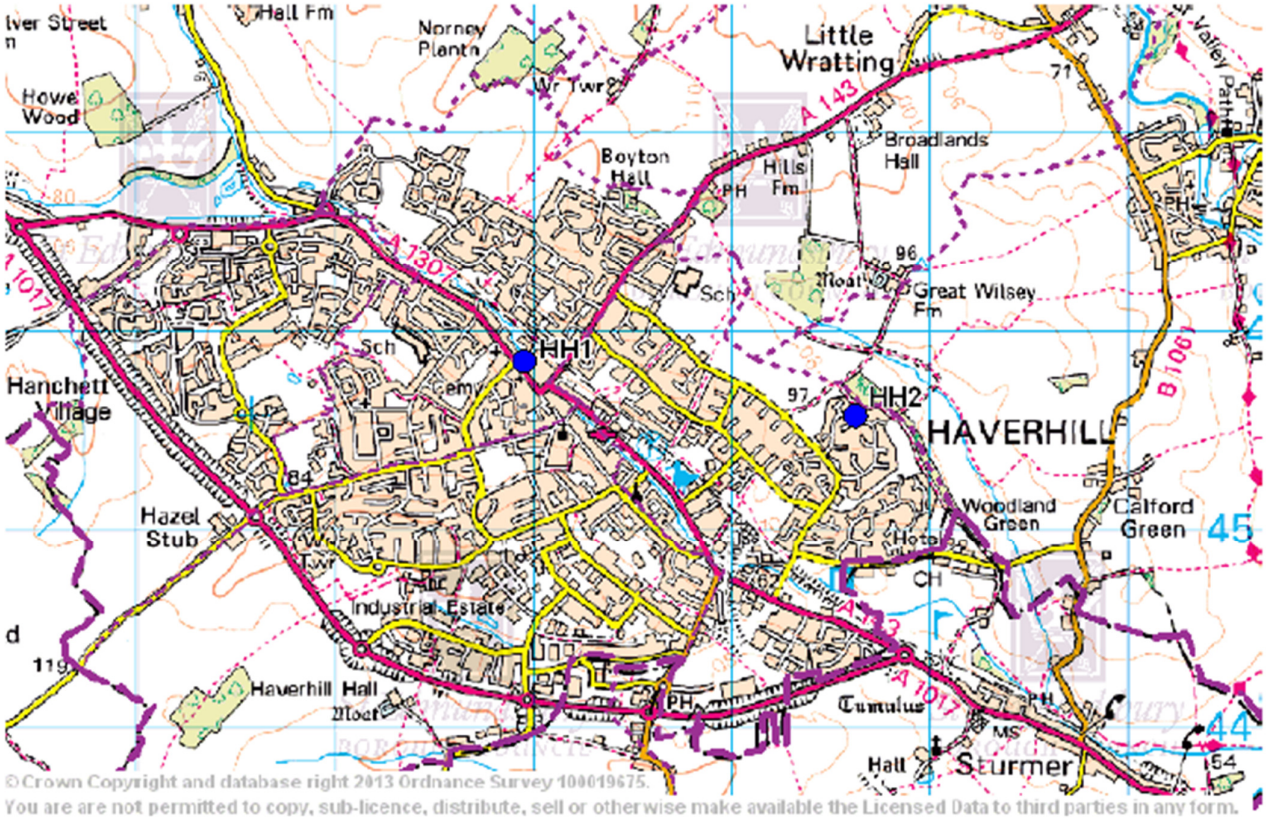
St Edmundsbury undertake monitoring of air quality using diffusion tubes at eleven sites. The nearest monitoring location within St Edmundsbury to the proposed development is the monitoring undertaken on Shetland Road. This site is located over 1km to the north east. This is monitoring location HH2 and it is an urban background site type which monitored annual mean NO_2 concentrations of 13.7µg/m^3 in 2014[24]. There is another monitoring location 1.5km to the north west of the proposed development. This is monitoring location HH1 and it is an urban roadside site type which monitored annual mean NO_2 concentrations of 38.3µg/m^3 in 2014.

There are no monitoring sites for PM_{10} in the local authority's area.

A map of monitoring sites in Haverhill is shown in Figure 3.

[23] Accessed from www.dft.gov.uk
[24] St Edmundsbury Borough Council, Updating and Screening Assessment 2015

Figure 3 Map of local monitoring (source: St Edmundsbury LAQM reporting)



5.4 Background concentrations

The DEFRA website[25] includes estimated background air pollution data for a baseline year of 2015 for NO_x, NO_2 and PM_{10} for each 1km by 1km OS grid square. The site is located in grid square 567500, 244500 which is listed in the St Edmundsbury authority area. The estimated pollutant concentrations are shown in Table 10.

Table 10 2015 baseline background pollutant concentrations (µg/m^3)

OS grid square		2015 Concentration (µg/m^3)	
X	Y	NO_2	PM_{10}
567500	244500	16.8	19.0

As indicated in Table 10, Defra background concentrations for the relevant grid square are predicted to be below the air quality objective for annual mean NO_2 and PM_{10}.

The concentrations provided within the Defra maps are higher than the monitored urban background concentrations as recorded by the local authority. The Defra concentrations in Table 10 have been used within the assessment to ensure a robust approach is taken.

6 Construction Assessment

The total site area subject to the earthworks operation is 11 ha. There are no buildings on the site therefore demolition will not be required to enable the development. The effects of earthworks, construction and trackout activities, are considered in the following sections.

Sensitive Receptors

Sensitive receptors are defined as those properties/schools/hospitals that are likely to experience a change in pollutant concentrations and/or dust nuisance due to the construction and operation of the proposed development. There are 1 to 10 receptors within 20m of the site boundary (Figure 4). As such, the areas sensitivity has been classified as *high* according to the IAQM guidance.

Dust Emission Magnitude

Following the methodology outlined in Section 4.3, each dust-generating activity has been assigned a dust emission magnitude as shown in Table 11. For earthworks, it has been assumed that these will occur in the whole site area as a worst case assumption. For trackout, it has been assumed that construction vehicles will use the Haverhill Bypass (A1017).

[25] http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html

Table 11 Dust emission magnitude for construction activities

Activity	Dust emission magnitude	Reasoning
Earthworks	Large	Total site area >10,000m^2 Clay and Chalk soil type
Construction	Large	Total building volume > 100,000m^3 Potentially dusty construction material (e.g. concrete)
Trackout	Medium	10-50 HGV movements in any one day Moderately dusty surface

Sensitivity of the Area

The sensitivity of the area to dust soiling has been assigned as *high*, as there are 1-10 receptors located around 20m from the site.

The annual mean background PM_{10} concentration is taken to be less than 24µg/m^3. As there are between 1 and 10 receptors within 20m of the site, the sensitivity of the area to human health impacts has been assigned as *medium*. The overall sensitivity has been summarised as shown in Table 12.

Table 12 Sensitivity of the surrounding area to impacts on dust soiling and human health

Potential Impact	Sensitivity of the surrounding area		
	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium
Human Health	Medium	Medium	Medium

Using the criteria set out in the risk of dust impacts table (Table 6) the impacts on the area without mitigation are defined.

Risk of Impacts

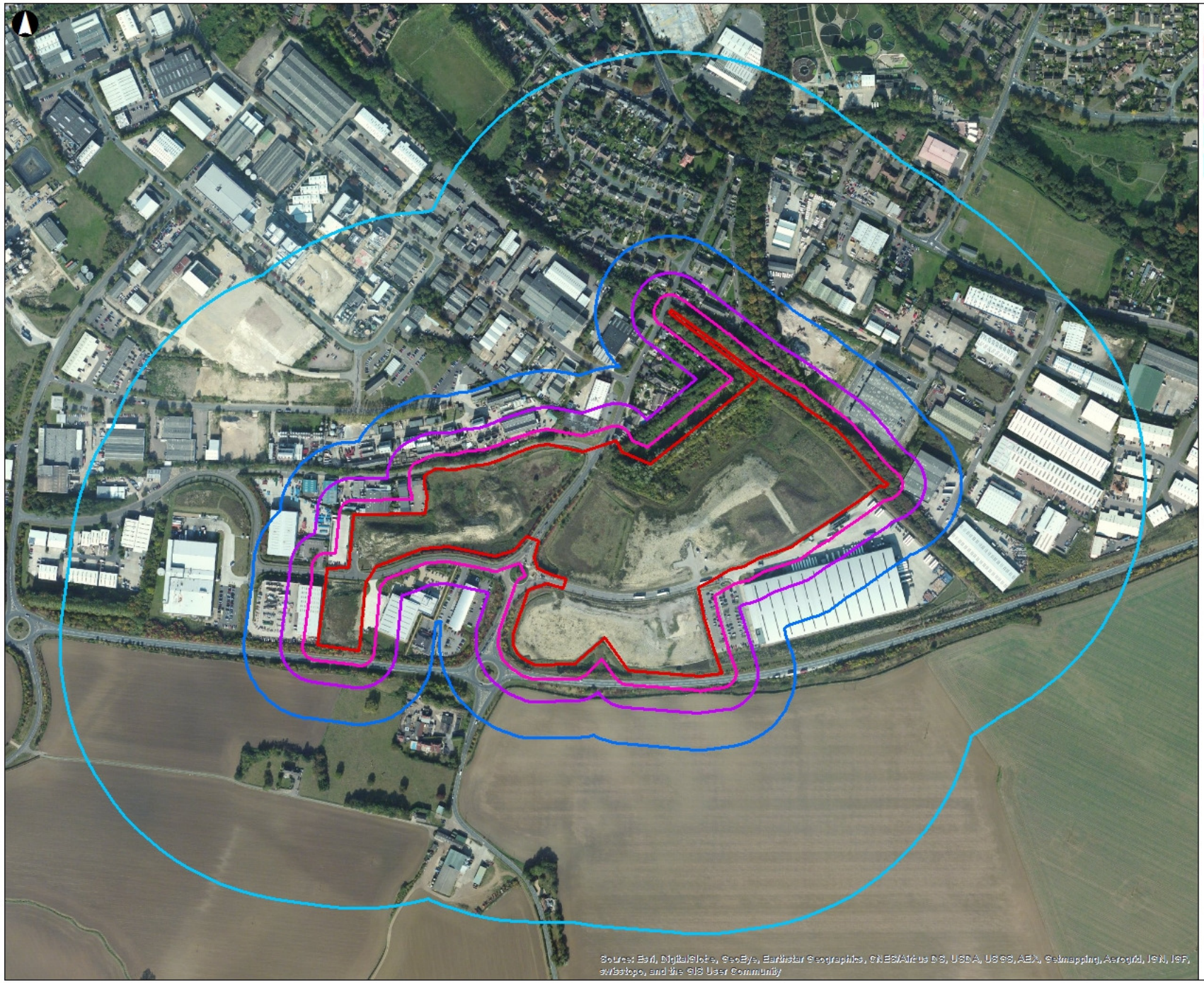
Taking into consideration the dust emission magnitude and the sensitivity of the area, the site has been classified as medium for all activities at worst (Table 13). Specific mitigation is described in Section 8.1.

With the appropriate best practice mitigation measures as outlined in Section 8.1 in place, there is likely to be a negligible effect from the dust-generating activities on site. Appropriate mitigation measures will be included within the construction plans.

Table 13 Summary dust risk table prior to mitigation

Activity	Dust risk prior to mitigation
Earthworks	Medium
Construction	Medium
Trackout	Low

A3



Legend

- Site Boundary
- 20m Buffer
- 50m Buffer
- 100m Buffer
- 350m Buffer

Revision	Date	By	Chkd	Appd
P1	22-01-15	LAS	MK	MAB

Metres
0 65 130 260

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www.arup.com

Client
Stutchbury Associates Limited

Job Title
Stutchbury Associates Limited

Drawing Title
Construction Dust Buffers

Scale at A3
1:4,860

Job No	Drawing Status
071756-04	Draft

Drawing No	Revision
001	P1

MKD Location

7 Operational Assessment

7.1 Road Traffic Emissions

Transport consultants for the scheme, Vectos, calculated the change in vehicle numbers likely to be created by the proposed scheme in comparison to the existing site use. The change in vehicle travel to and from the site is estimated to be an increase in 1,258 vehicles per day on Bumpstead Road. Change in vehicles on the bypass is estimated to be only 314 vehicles per day.

Based on the above information, the proposed development is anticipated to result in a change in AADT flows of more than 1000 but, produce no increase in HGV movements per day. As the criteria as set out in section 4.4 for DMRB and EPUK are exceeded an assessment using the DMRB screening methodology has been undertaken for a worst case receptor location on Bumpstead Road.

7.1.1 Assessment of pollutant concentrations

Predicted annual mean concentrations for NO_2 are provided in Table 14 for the receptor location on Bumpstead Road. The maximum predicted annual mean for NO_2 at all modelled receptors is well below 60µg/m^3. Therefore, following the methodology mentioned previously, it is unlikely that NO_2 concentrations would breach the 1-hour mean AQS objective at the façade of the residential properties.

Table 14 Predicted NO_2 concentrations

Receptor	Annual Mean NO_2 ($\mu g/m^3$)		Change ($\mu g/m^3$)	Significance Descriptor
	2020 DM	2020 DS		
Bumpstead Road	21.2	21.8	0.6	Negligible

The results based on worst case assumptions for emission factors, backgrounds and location of receptors show that the change in concentrations as a result of the scheme would be negligible. The total concentrations will remain well below the air quality objectives at the receptor locations along Bumpstead Road.

Predicted annual mean concentrations for PM_{10} are provided in Table 15.

Table 15 Predicted PM_{10} concentrations

Receptor	Annual Mean PM_{10} ($\mu g/m^3$)		Change ($\mu g/m^3$)	Significance Descriptor
	2020 DM	2020 DS		
Bumpstead Road	19.7	19.8	0.1	Negligible

The change is PM_{10} concentrations will also be negligible as a result of the scheme. As total concentrations of PM_{10} are well below the air quality objective there is no risk the 24hr objective would be exceeded at this location as a result of the proposed development.

7.1.2 Model Verification and Adjustment

Model verification, an assessment of the accuracy of the model, can be undertaken where monitoring sites are located within the modelled area. The objectives of the model verification are to evaluate model performance and to provide confidence in the assessment.

Given the lack of local monitoring data for NO_2 and PM_{10} in the vicinity of the site it has not been possible to compare the modelled results against real world monitoring data. However, the predicted concentrations are well below the air quality objectives and the lack of model verification is not considered to affect the overall conclusions of the assessment.

8 Mitigation

8.1 Construction

The dust emitting activities assessed in section 6 can be greatly reduced or eliminated by applying the site specific mitigation measures for *high risk* sites according to the IAQM guidance. High risk mitigation measures are included as a precautionary measure and to ensure best practice is followed for all on site activities. The following measures from the guidance are relevant and should be included in the Construction Management Plan for the site.

8.1.1 General

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan, which will include measures to control other emissions, approved by the local authority.

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.

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_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

Site maintenance

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

- Cover, seed or fence stockpiles to prevent wind whipping.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out.

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 un-surfaced haul roads and work areas.
- Implement a Travel Plan than supports and encourages sustainable travel (public transport, cycling, walking and car-sharing).
- Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport.
- Produce a construction Logistics Plan to manage the sustainable delivery of goods and materials.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques, such as water sprays or local extraction.
- 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 the fine water sprays on such equipment wherever appropriate.
- Avoid scabbling (roughening of concrete surfaces) if possible.
- 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

- Fires will not be held on site.

8.1.2 Specific Measures

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

Construction

- Avoid scabbling if possible.

- Ensure bulk cement and other fine powder material bags are sealed after use and stored appropriately to prevent dust.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out.
- For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.

Trackout

- Regularly use water-assisted dust sweeper(s) on the access and local roads, to remove, as soon as practicable any material tracked out of the site.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water browsers and regularly cleaned.
- Inspect 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.
- 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 at least 10m from receptors where possible.

8.2 Operation

The scheme related transport emissions do not require any mitigation as impacts are predicted to be negligible and all concentrations remain well below the air quality objectives.

It would be recommended to encourage sustainable transport use at the site with electric charging points being installed at car park locations.

9 Summary

This report presents the air quality assessment for the proposed Haverhill Business Park development. A review of the current legislation and planning policy has been undertaken, along with a baseline assessment describing the current air quality conditions in the vicinity of the proposed development and an assessment of air quality impacts associated with the construction and operation of the scheme.

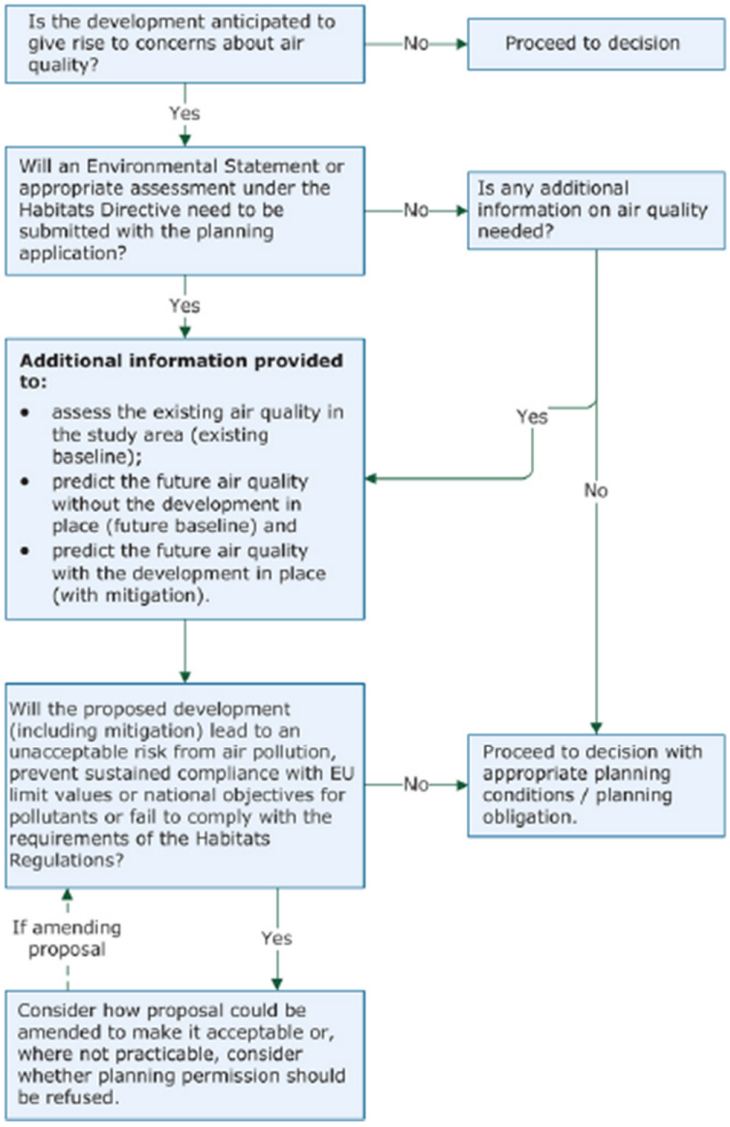
The construction effects have been assessed using the qualitative approach described in the latest IAQM guidance and it was concluded that with appropriate best practice mitigation measures in place, there is likely to be a *negligible effect* from the dust-generating activities on site.

The scheme is likely to increase the amount of traffic at the development site in the operational phase. Assessment of the potential impacts has shown the effects of the scheme would be negligible at worst case receptor locations. As such no operational phase mitigation is required.

Appendix A

Air Quality - Appendix

A1 PPG Flowchart



A2 Consultation

Dear Martyn,

Further to our discussion of last week regarding the exact requirements for an air quality assessment for your potential future outline planning application at Haverhill Business Park, I can confirm the following:

- Given the likely uses of the sites, the size of the development and the likely increase in HDV movements, several of our criteria for requiring an air quality assessment would likely be met and therefore an assessment would be required to ensure that we are meeting our statutory requirements.
- However, we appreciate that the sites location at the edge of the town, adjacent to the bypass and distant from residential properties makes the site relatively low risk in terms of significant air quality concerns.
- Therefore, the assessment could take the form of a qualitative screening report and does not need to include detailed dispersion modelling.
- If the initial screening assessment does identify any areas where levels of pollutants are likely to approach the national objective levels at relevant receptors, then it may be necessary to increase the scope of the assessment, although at this stage I would consider the likelihood of this as being low.

I trust the above is clear, however, if you require any further assistance, please do not hesitate to contact me.

Kind regards

Matthew Axton
Environment Officer

A3 Traffic data from Vectos

AADT

Location	2015 Observed			2020 Base			2020 Base+Development		
	Total	HGV	% HGV	Total	HGV	% HGV	Total	HGV	% HGV
Bumpstead Road 2-way	5715	442	0	6165	477	7.7%	7423	477	6.4%
A1017 WEST 2-WAY	7839	941	0	8456	1015	12.0%	8769	1015	11.6%
A1017 EAST 2-WAY	6412	941	0	6916	1015	14.7%	7230	1015	14.0%