LIDL GREAT BRITAIN LTD
NEW LIDL STORE
ROMAN WAY, STROOD, MEDWAY,
ME2 2GA

AIR QUALITY ASSESSMENT

APRIL 2021

the journey is the reward

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Lidl Great Britain Ltd
New Lidl Store
Roman Way, Strood, Medway,
ME2 2GA
Air Quality Assessment

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1 Introduction

1.1 Mayer Brown Limited has been instructed by Lidl Great Britain Ltd to undertake an Air Quality Assessment (AQA) in respect of the planning application for a proposed new Lidl Store on Roman Way, Strood.

1.2 This AQA has been undertaken in order to assess any likely air quality impacts upon any local sensitive receptors as a result of the construction and/or operation of the proposed new store.

1.3 Where potential significant impacts are identified, specific mitigation measures have been recommended in order to minimise significant pollution impacts and help safeguard the health and wellbeing of sensitive receptors within the local area.

1.4 The AQA is divided up into the following sections:

- **Section 2** - Existing Site and Proposed Development;
- **Section 3** - Legislation and Policy Context;
- **Section 4** - Assessment Methodology and Significance Criteria;
- **Section 5** - Baseline Site Conditions;
- **Section 6** - Evaluation of Potential Effects;
- **Section 7** - Road Traffic Emissions;
- **Section 8** - Mitigation Measures; and
- **Section 9** - Residual Effects and Conclusions

1.5 The appendices consist of the following:

- **Appendix A** – Construction Dust Assessment
- **Appendix B** – Hourly Time Emission Factors

2 Existing Site and Proposed Development

2.1 The development site is located within Strood, Medway, approximately 2km south west of Rochester train station.

2.2 The site location in relation to the local highway network is illustrated in **Figure 2.1** below.

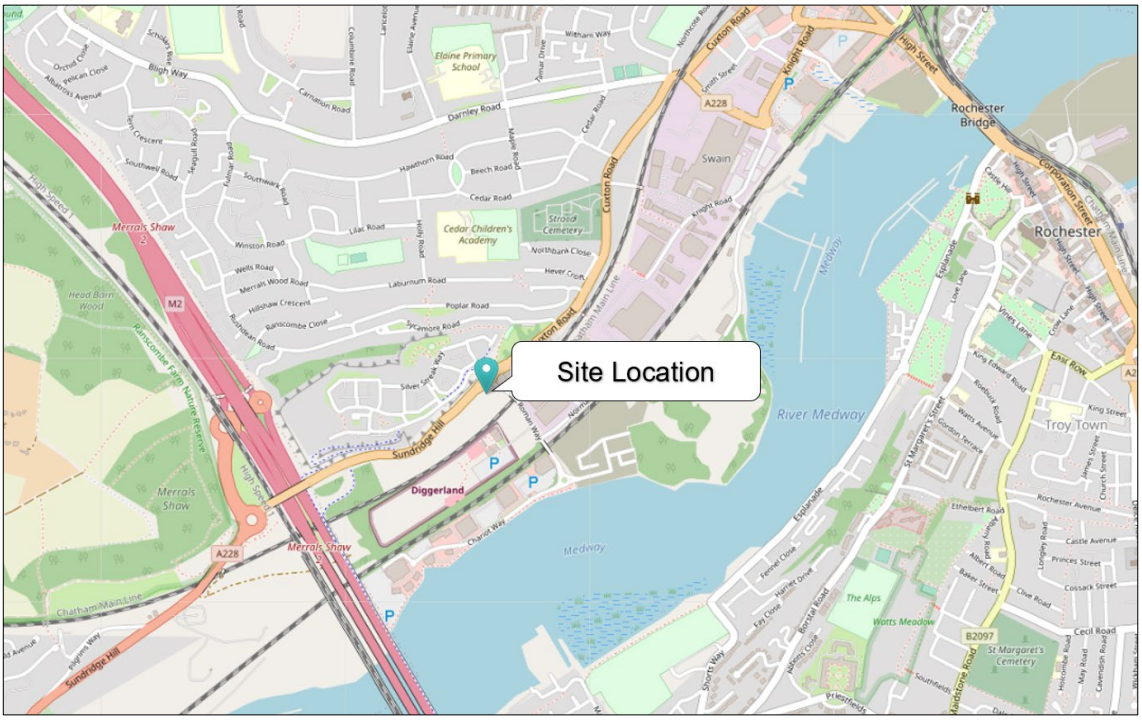

Figure 2.1: Site Location in Relation to the Local Highway Network

2.3 The locality comprises a mix of commercial uses and residential properties.

2.4 To the north runs Cuxton Road, with Roman Way running along the eastern boundary.

2.5 To the south runs the railway line followed by Diggerland Kent and there is currently some open land to the west.

2.6 The proposals seek the development of a new Lidl store to include 117 standard car parking spaces, 6 disabled and 2 electric vehicle spaces.

2.7 The proposed site plan layout is illustrated in **Figure 2.2** below.

Figure 2.2: Proposed Site Plan

3 Legislation and Policy Context

3.1 This section provides a summary of all the relevant legislation and policies that are applicable to the proposed development.

National Planning Policy

The Air Quality Strategy[1]

3.1 The Air Quality Strategy (AQS) has been prepared following obligations imposed upon the UK Government to produce standards, objectives and measures for improving ambient air quality, following The Environment Act 1955.

3.2 The AQS sets out a framework for Local Authorities to reduce adverse health effects from ambient air pollution and ensures that international and national commitments are met, using the Local Air Quality Management (LAQM) system.

3.3 The AQS sets standards and objectives for pollutants to protect human health, vegetation and ecosystems. The pollutant objectives are the future dates by which each standard is to be achieved, taking into account economic considerations, practical and technical feasibility.

3.4 The main air quality pollutants of concern with regards to new developments such as this one is the traffic related pollutants of Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10} and $PM_{2.5}$).

3.5 The relevant air quality objectives, as they currently apply in the United Kingdom are presented in **Table 3.1** below.

Pollutant	Air Quality Objectives		Date to be achieved by
	Objectives	Measured as	
Nitrogen Dioxide (NO_2)	200 µg m^{-3}	1-hour mean. Not to be exceeded more than 18 times a year	31 December 2005
	40 µg m^{-3}	Annual mean	

[1] Department of Environment, Food and Rural Affairs in Partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2011). The Stationery Office (TSO). Norwich.

Particles (PM_{10})	50 µg m^{-3}	24-hour mean. Not to be exceeded more than 35 times a year	31 December 2004
	40 µg m^{-3}	Annual mean	
Particles – Except Scotland ($PM_{2.5}$)	25 µg m^{-3}	Annual mean	2020
Particles – UK Urban Areas ($PM_{2.5}$)	Target of 15% reduction in concentrations at urban background		Between 2010 and 2020

Table 3.1: Air Quality Objectives in the UK

Air Quality Standards Regulations 2010

3.6 The binding limits for concentrations in outdoor air of key air pollutants that impact public health was set by the 2008 ambient air quality directive (2008/50/EC) which replaced nearly all previous EU air quality legislation. The limit values were made law in England through the Air Quality Standards Regulations 2010. This imposes duties on the Secretary of State relating to achieving limit values.

3.7 With regards to dust, it is recognised that major construction works may give rise to dust emissions within the PM_{10} and $PM_{2.5}$ size fraction and it is noted within section 79 of the Environmental Protection Act 1990 that a statutory nuisance is defined as:

'Any dust or effluvia arising from an industrial, trade or business premises and being prejudicial to health or a nuisance'

National Planning Policy Framework (NPPF) 2019[2]

3.8 The NPPF was updated in February 2019 and supersedes all the previous versions. The purpose of the document is to set out the Government's policies in relation to planning for England and how these should be applied.

3.9 Section 9 of the NPPF refers to promoting sustainable transport. In relation to air quality, paragraph 102 states that:

[2] Ministry of Housing, Communities and Local Government, February 2019, National Planning Policy Framework, London

"Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:

….

c) opportunities to promote walking, cycling and public transport use are identified and pursued;

d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains

…"

3.10 Additionally, it states:

"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…"

3.11 Section 15 of the document also refers to air quality within planning. Paragraph 180 states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development…"

3.12 Paragraph 181 adds 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…"

3.13 In relation to the planning conditions and obligations, paragraphs, 54 and 55 state the following:

"Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition.

Planning conditions should be kept to a minimum and only imposed where they are necessary, relevant to planning and to the development to be permitted, enforceable, precise and reasonable in all other respects. Agreeing conditions early is beneficial to all parties involved in the process and can speed up decision making. Conditions that are required to be discharged before development commences should be avoided, unless there is a clear justification."

Planning Practice Guidance – Air Quality[3]

3.14 The Planning Practice Guidance (PPG) is used to support the National Planning Policy Framework and is published online. The guidance on air quality was originally published in 2014 and updated in November 2019. The PPG provides various principles on how planning can take account of the impact of new development on air quality.

3.15 The guidance refers to the specific issues that may need to be considered when assessing air quality impacts. It states:

"Considerations that may be relevant to determining a planning application include whether the development would:

- *Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield…*
- *Introduce new point sources of air pollution…*
- *Expose people to harmful concentrations of air pollutants…*
- *Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations;*
- *Have a potential adverse effect on biodiversity…"*

3.16 Guidance on how detailed an air quality assessment need to be is provided and states:

"Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions", and because of this are likely to be locationally specific…"

[3] Ministry of Housing, Communities and Local Government, November 2019, Planning Practice Guidance-Air Quality, Ministry of Housing, Communities and Local Government, London. Available on: https://www.gov.uk/guidance/air-quality--3#history

3.17 Reference to how air quality can be mitigated states that:

"Mitigation option will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with the applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented…"

Local Air Quality Management Technical Guidance (TG16)[4]

3.18 The Local Air Quality Management (LAQM) Technical Guidance 16 (TG16) is aimed at providing local authorities with the guidance and support required to carry out their duties under the Environment act 1995, the Environment (Northern Ireland Order 2002) and subsequent regulations.

3.19 LAQM (TG16) details the statutory process by which local authorities monitor, assess and take action to improve local air quality.

3.20 Where areas of non-compliance with the air quality objectives are identified, following a detailed assessment, and there is relevant public exposure, an Air Quality Management Area (AQMA) must be declared and an Air Quality Action Plan (AQAP) prepared identifying all the remedial measures necessary to address the problem.

Local Planning Policy

Medway Local Plan (2003)[5]

3.21 Policy BNE2: Amenity Protection states:

"All development should secure the amenities… and protect those amenities enjoyed by nearby and adjacent properties. The design off development, should have regard to:

…

(ii) noise, vibration, light, heat, smell and airborne emissions consisting of fumes, smoke, soot, ash, dust and grit; and

…"

3.22 Policy BNE24: Air Quality adds:

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[4] Department of Environment, Food and Rural Affairs (DEFRA). (2018). Local Air Quality Management Technical Guidance (TG16). DEFRA, London

[5] Medway Council (MC), 2003, Medway Local Plan, MC Available at https://www.medway.gov.uk/downloads/file/2400/medway_local_plan_2003. Accessed on 05/11/2020

"Development likely to result in airborne emissions should provide a full and detailed assessment of the likely impact of these emissions. Development will not be permitted when it is considered that unacceptable effects will be imposed on the health, amenity or natural environment of the surrounding area, taking into account the cumulative effects of other proposed or existing sources of air pollution in the vicinity."

Medway New Local Plan

3.23 Medway Council are currently working on a new local plan which will replace the 2003 Medway Local Plan once adopted.

3.24 The plan will contain policies, land allocations, minerals and waste and a policies map and cover the period up to 2037.

3.25 This air quality assessment has taken into consideration all the above policies and guidelines.

4 Assessment Methodology and Significance Criteria

4.1 This section outlines the assessment methodology and the criteria that have been used to assess the significance of risk associated with the proposed development.

4.2 **Table 4.1** below summarises the key information sources used in this assessment.

Data Sources	Details
Department for Environment, Food and Rural Affairs (Defra)	The Local Air Quality Management Tools contain information pertaining to monitoring networks across the UK and provides tools, which aid in the estimation of pollutant concentrations with reference to the year of study.
	Defra (2018). LAQM Background Maps - 1 x 1 km grid background maps for NO_x, NO_2, PM_{10} and $PM_{2.5}$
Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM)	EPUK (2010). Development Control: Planning For Air Quality, (2010 Update) This guidance has been produced to help ensure that air quality is properly accounted for in local development control processes.
	IAQM (2014). Guidance on the assessment of dust from demolition and construction
	The EPUK & IAQM Land-Use Planning & Development Control: Planning for Air Quality (2017) [6] provides advice and guidance on how an air quality assessment should be undertaken.
The National Atmospheric Emissions Inventory (NAEI)[7]	This is a website run by Ricardo AEA Technology where emission data can be obtained which relates the vehicle fleet composition for the year of study.
London Councils	Air Quality and Planning Guidance[8]. This guidance is aimed at local authorities, developers and their consultants, and provides technical advice on how to deal with planning applications that could have an impact on air quality.

Table 4.1: Key Information Sources

Scope of Air Quality Assessment

4.3 This Air Quality Assessment assesses whether any significant air quality impacts are anticipated as a result of the construction and/or the operation of the proposed development.

4.4 A staged assessment approach has been adopted. This ensures that the approach taken for the assessment of risk is proportional to the risk of an unacceptable impact being caused. Where a simple review of the likely impacts associated with the proposed development clearly demonstrates that the risk of a health/annoyance impact is negligible, this will be sufficient to conclude that no further or detailed assessment is necessary.

[6] Environmental Protection UK & Institute of Air Quality Management (EPUK & IAQM) (2017) Land-Use Planning & Development Control: Planning for Air Quality, EPUK & IAQM, London
[7] http://naei.defra.gov.uk
[8] London Councils. (2007),Air Quality and Planning Guidance, The London Air Pollution Planning and the Local Environment (APPLE) working group, London

4.5 In cases where the risk involved cannot be regarded as negligible, a more detailed and quantitative assessment will be undertaken.

4.6 The specific methodology and impact criteria used in this assessment is detailed below.

Dust Assessment

4.7 The Institute of Air Quality Management (IAQM) published the 'Guidance on the assessment of dust from demolition and construction' in February 2014 which provides guidance on how to assess and mitigate the impacts of dust emissions from demolition and construction sites. This document was updated in June 2016 (Version 1.1) and supersedes the 2012 IAQM guidance on the assessment of the impacts of construction on air quality and the determination of their significance.

4.8 The potential impacts associated with construction activities will be assessed in accordance with the IAQM Guidance. IAQM Guidance provides a five-step assessment procedure to assess the potential impacts of construction dust pre-mitigation, provide mitigation measures specific to the risk and assess the post-mitigation impacts.

4.9 It recommends that the assessment procedure follows the following framework:

- Screen the requirement for a more detailed assessment;
- Assess the risk of dust impacts of the four phases of construction (demolition, earthworks, construction and trackout), taking into account:
    - the scale and nature of the works, which determines the potential Dust Emission Magnitude; and
    - the sensitivity of the area.
- Determine the site-specific mitigation for the potential activities;
- Examine the residual effects and determine whether or not these are significant; and
- Prepare the Construction Dust Assessment.

4.10 In the process of screening the need for a detailed assessment, the following criteria is used:

"An assessment will normally be 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).*
- *an 'ecological receptor' within:*
    - *50m of the boundary of the site; or*

- *50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).”*

4.11 When defining the sensitivity of an area/receptor, the factors within **Table 4.2** below are used.

Area Sensitivity	Human Receptors	Ecolgoical Receptors
High	People would be present continuously, 10-100 dwellings within 20m of the site, exposed over a time period relevant to the air quality objective for PM_{10}, very sensitive receptors (e.g. residential properties, hospitals, schools, care homes)	International or national designation, locations where there is a community of a particularly dust sensitive species (e.g. Special Area of Conservation SAC)
Medium	People would not be expected to be present here continously for extended periods, locations where people exposed are workers and exposure is over a time period relevant to the air quality objective for PM_{10}, 1-10 dwellings within 20m of the site, medium sensitive receptors (e.g. parks, place of work- office and shop workers)	Locations where there is particularly important plant species, national designation where the features may be affected by dust deposition (e.g. Sites of Special Scientific Interest SSSI
Low	People would be expeceted to be present only for limited periods, human exposure is transient,	Locations with a local designation where the features may be affected by dust deposition (e.g. Local Nature Reserve)

Table 4.2: IAQM Factors for Defining the Sensitivity of an Area

Building Emissions

4.12 At this early stage, it is not possible to undertake a quantitative assessment of any operational plant due to the detailed technical specifications required in order to undertake this work not being available.

4.13 Due to the scale of the proposed Lidl store, any operational plant effects are expected to be insignificant.

4.14 However, if considered required, any potential operational plant effects should be assessed, at the appropriate stage, when all the required plant technical information is available. Compliance to relevant regulations and standards should be secured through planning conditions, where necessary.

Transport Emissions.

4.15 The EPUK & IAQM Guidance – 'Planning For Air Quality' has been used to assess potential traffic impacts associated with the development.

4.16 **Table 4.3** below provides the criteria used for screening the need for an Air Quality Assessment.

The Development will:	Indicative Criteria to Proceed to an Air Quality Assessment
Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans <3.5t gross vehicle weight).	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere.
Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.
Realign roads, i.e. changing the proximity of receptors to traffic lanes	Where the change is 5m or more and the road is within an AQMA
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, e.g. traffic lights, or roundabouts.
Introduce or change a bus station	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere
Have an underground car park with extraction system	The ventilation extract for the car park will be within 20m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out)

Table 4.3: Indicative Criteria for Requiring an Air Quality Assessment

4.17 If any of the above criteria are met, then the significance of air pollution impacts must be assessed. This may either be a Simple or a Detailed Assessment. In accordance with the EPUK & IAQM Guidance, a Simple Assessment is one relying on already published information and without quantification of impacts, in contrast to a Detailed Assessment that must be completed with the aid of a dispersion model.

Impact Criteria

4.18 In the event that the initial screening indicates that there is a potential risk of impact, guidance is provided also by EPUK & IAQM on how to determine the magnitude and the significance of any changes in air pollutant concentrations and/or exposure as a result of a proposed development.

4.19 This process takes the following into account:

- the magnitude of the change (% change of annual mean concentration);
- the concentration relative to the Air Quality Strategy (AQS) objective (above or below the objective); and
- the direction of change (adverse or beneficial).

4.20 The magnitude of an impact should be described by using the criteria set out in **Table 4.4** below. The criteria are based upon the change in pollutant concentration resulting from the proposed development as a percentage of the Air Quality Action Level (AQAL) which in this case is NO_2 and PM_{10} annual mean objective levels of 40 µgm^3.

Change Magnitude	NO_2/PM_{10} Annual Mean	No Days PM_{10}> µg m^{-3}
Large	Increase/decrease >10% (>4 µg m^3)	Increase/decrease >4 days
Medium	Increase/decrease 6-10% (2.4-4 µg m^3)	Increase/decrease 2-4 days
Small	Increase/decrease 2-5% (0.8-2 µg m^3)	Increase/decrease 1-2 days
Imperceptible	Increase/decrease <1% (<0.4 µg m^3)	Increase/decrease <1 day

Table 4.4: Impact Magnitude for Changes in NO_2 and PM_{10} Concentrations

4.21 The significance of the impact will be dependent upon the magnitude of change in relation to the relevant AQAL. This is set out in **Table 4.5** below.

Long term average Concentration at receptor in assessment year.	% Change in concentration relative to Air Quality Action Level (AQAL)*			
	1	2-5	6-10	>10
75% of less of AQAL (<30 µg m^{-3})	Negligible	Negligible	Slight	Moderate
76 – 94% of AQAL (30-38 µg m^{-3})	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL (38-41 µg m^{-3})	Slight	Moderate	Moderate	Substantial
103 – 109% of AQAL (41 - 44 µg m^{-3})	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL (>44 µg m^{-3})	Moderate	Substantial	Substantial	Substantial

*Air Quality Action Level – in this case the objective levels.

Table 4.5: Impact Descriptors for Individual Receptors

4.22 Therefore, once the magnitude and the significance of the change has been established, the impact at each relevant receptor can be described. The impact magnitude at each receptor location can be described using the changes stated above as being of Imperceptible, Small, Medium or Large magnitude, or Negligible, Slight Moderate or Substantial significance and also as being either Temporary or Permanent.

4.23 It should be noted that air quality is not well suited to the rigid application of a generic significance matrix to determine the overall significance of a development and individual receptor sensitivity should also be taken into account. Therefore, professional judgement should be employed throughout, and the assessment should take into account any site-specific considerations.

5 Baseline Site Conditions

Local Air Quality Management

5.1 The proposed development site falls within the jurisdiction of Medway Council (MC).

5.2 Under the Air Quality Strategy, there is a duty on all Local Authorities to consider the air quality within their boundaries and prepare an annual update report.

5.3 A review of the latest Air Quality Assessments undertaken and published by MC indicates that the council has declared four Air Quality Management Areas (AQMA's), all as a result of exceedances of the annual mean objective for Nitrogen Dioxide (NO_2). The site is located adjacent to Central Medway AQMA, as illustrated in **Figure 5.1** below.

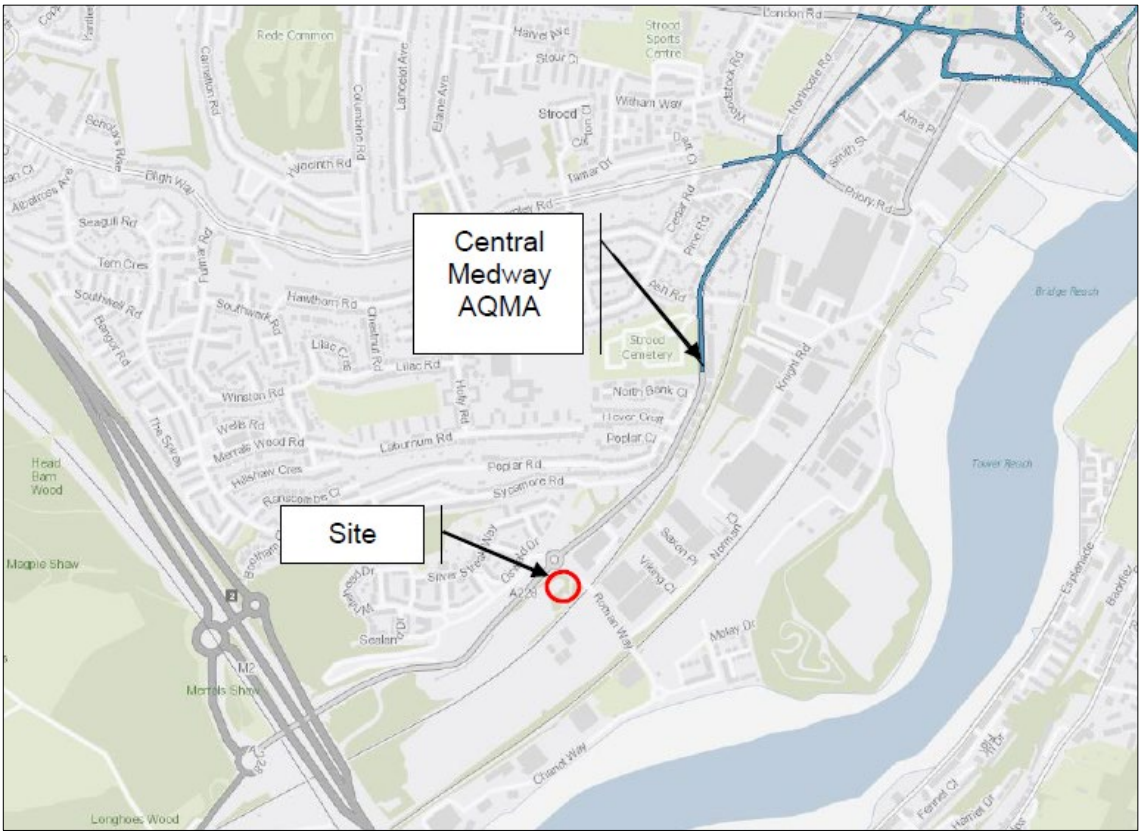

Figure 5.1: Site Location in Relation to Central Medway AQMA

Background

5.4 The Defra mapping tool (reference year 2018) has been used to establish the pollutant background concentrations. Due to the development site falling between two 1km grid squares (X:572500; Y:168500 and X:572500; Y:167500) an average of both has been calculated and used.

5.5 The NOx, NO_2, PM_{10} and $PM_{2.5}$ background concentrations for 2019 and 2022 are provided in **Table 5.1** below.

Pollutant	2019 (µg/m^3)	2022 (µg/m^3)
NOx	24.48	21.14
NO_2	17.46	15.34
PM_{10}	17.36	16.69
$PM_{2.5}$	11.73	11.22

Table 5.1: Defra Annual Background Concentrations for 2019 and 2022

Local Monitoring

5.6 In June 2020, MC published their latest Air Quality Annual Status Report which provides monitoring data for 2019.

Automatic Monitoring

5.7 MC operated two automatic monitoring stations in 2019. The automatic monitoring locations in relation to the site are illustrated in **Figure 5.2** below.

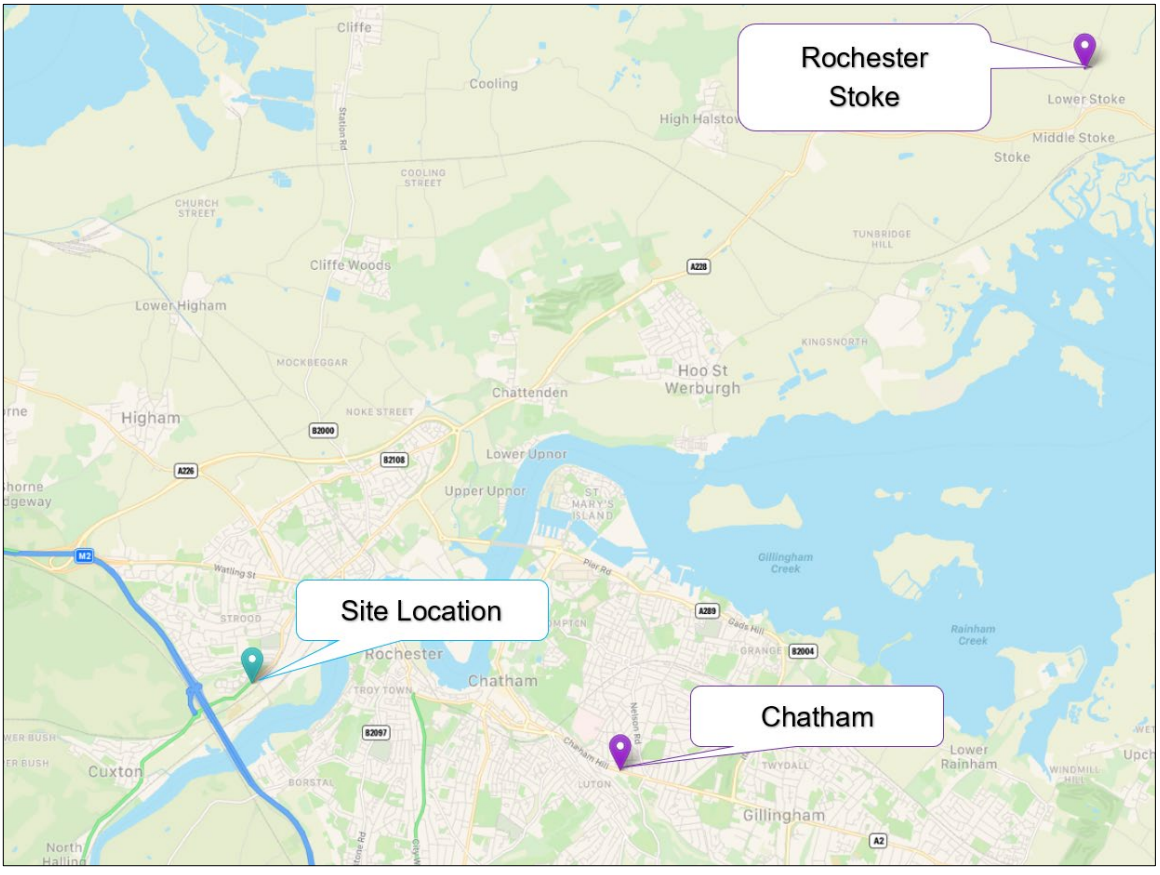

Figure 5.2: Site Location in Relation to the Automatic Monitoring Locations

5.8 The latest results for both automatic monitors are provided within **Table 5.2** below.

ID	Site Name	Coordinates (X;Y)	Site Type	2019 Annual Mean Concentration (µg/m³)		
				NO_2	PM_{10}	$PM_{2.5}$
Chatham	Chatham (AURN)	577437; 166993	Urban Centre	24.4	23.0	13.7
Rochester Stoke	Rochester Stoke (AURN)	583158; 176314	Rural	12.3	15.0	10.9

Table 5.2: Latest Annual Mean Concentrations for Automatic Monitoring Locations

5.9 **Tables 5.2** above demonstrates that the concentrations for both automatic monitors are considerably below the objective level for NO_2, PM_{10} and $PM_{2.5}$.

Non-Automatic Monitoring

5.10 Additionally, MC also undertakes non-automatic monitoring of NO_2, at various locations within the Borough, using diffusion tubes. The closest non-automatic monitoring locations in relation to the development site are illustrated in **Figure 5.3** below.

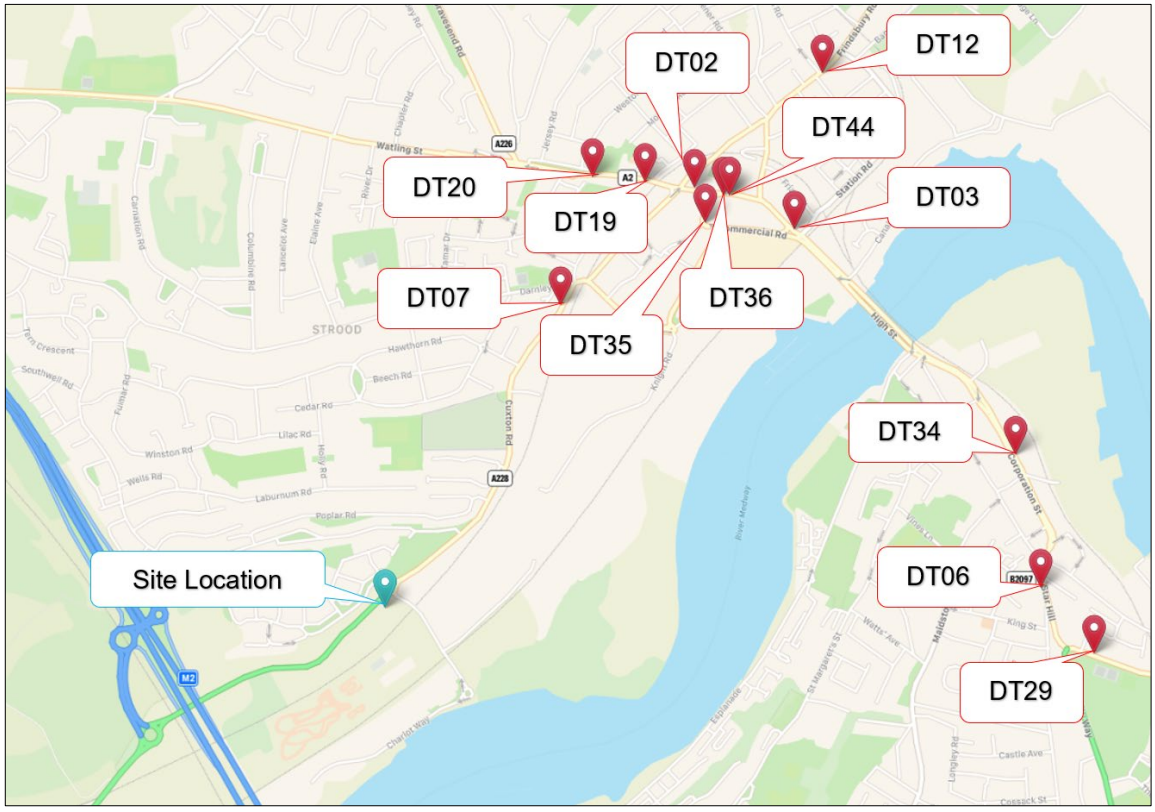

Figure 5.3: Site Location in Relation to the Closest Non-Automatic Monitoring Locations

5.11 The latest results for the closest non-automatic monitoring locations are provided within **Table 5.3** below.

ID	Site Name	Coordinates (X;Y)	Site Type	NO_2 Annual Mean Concentration (µg/m3)
				2019
DT02	High Street, Strood (Tanning studio)	573482;169282	Roadside	30.8
DT03	46 High Street, Strood (Heating shop)	573793;169164	Roadside	**43.6**
DT06	18 Star Hill	574589;168087	Roadside	**47.8**
DT07	92 Cuxton Road, Strood	573078;168908	Roadside	34.6
DT12	28 Frindsbury Road	573865;169646	Roadside	33.2
DT19	5 London Road, Strood (Dentist)	573329;169294	Roadside	**42.1**
DT20	Lamp post adjacent 33 London Road, Strood	573168;169305	Roadside	**43.3**
DT29	Lamp post NDJ4 adjacent Trinity College,	574760;167892	Roadside	32.5
DT34	Lamp post CP019, Corporation Street	574499;168495	Roadside	36.1
DT35	Sign post adjacent McDonalds, Commercial	573518;169176	Roadside	29.4
DT36	Lamp post HKA8, High Street, Strood	573573;169262	Roadside	38.6
DT44	Lamp post adjacent Strood Hub, High Street, Strood	573590;169263	Roadside	**48.3**

Table 5.3: Annual NO_2 Concentrations for the Closest Non-Automatic Monitoring Locations

5.12 **Table 5.3** above demonstrates that the majority of the closest non-automatic monitoring locations are below the annual mean objective for NO_2 with the exception of DT03, DT06, DT19, DT20 and DT44. However, none of these locations are in proximity of the proposed development site.

5.13 Where necessary, suitable mitigation measures have been identified within **Section 8** of this AQA.

6 Evaluation of Potential Effects

Construction

Construction Dust

6.1 During the construction phases, there is the potential for emissions of dust to cause annoyance, nuisance and health effects to sensitive receptors, both human and ecological if located close to the site.

6.2 The construction activities associated with the proposed development can be separated into four stages:

- Site Clearance;
- Earthworks;
- Construction; and
- Trackout.

6.3 There are a number of human receptors within 350m of the site boundary therefore a dust assessment has been undertaken in order to evaluate and minimise potential dust effects during the aforementioned four stages.

6.4 The construction dust assessment is included in **Appendix A.**

Construction Traffic and Plant

6.5 Throughout the construction period, there will be a number of construction vehicles, stationary plant and vehicles used by the construction workforce. These may potentially present an additional source of air pollutants in the vicinity of the proposed development site.

6.6 Any likely pollutant impacts should be addressed through Best Available Techniques (BAT) mitigation measures. Likely BAT are provided in **Section 8**.

Completed Development

Development Traffic

6.7 Development traffic air quality impacts have been quantitatively assessed by modelling the effect of the development traffic flows along the local highway network.

6.8 All modelling undertaken is included in **Section 7** of this report.

Building Emissions

6.9 As previously stated, at this early outline stage, the proposed energy strategy has not been confirmed yet. Any emissions associated with the proposed energy strategy should be reviewed and assessed, if required, at the appropriate stage, when all the technical specifications for the proposed plant are confirmed.

6.10 Compliance with relevant regulations and standards, at this stage, should be secured through planning conditions, where necessary.

7 Road Traffic Emissions

Vehicular Traffic Assessment Model

7.1 A quantitative assessment of traffic related air quality impacts has been undertaken. The modelling tool which has been used is the dispersion model ADMS-Roads (Extra), which has been developed by the Cambridge Environmental Research Consultants.

7.2 This model uses the following input data:

- Annual Average Daily Traffic (AADT) Flows and Speeds;
- Averaged Defra background concentrations for 2019 and 2022 using two of the 1km grid squares the site is located in (X:572500; Y:168500 and X:572500; Y:167500)
- Latest relevant Emission Factor Toolkit (v.10);
- Geo-referenced mapping data; and
- 2019 Hourly Sequential ADMS format MET data for the most suitable site (Gatwick), as advised by Met Office.

Emissions

7.3 There are numerous sources of NO_2, PM_{10} and $PM_{2.5}$ which include for example, industry and domestic origins. However, the main source is usually road transport. For the purpose of this assessment only road traffic emissions have been modelled.

Study Scenarios

7.4 Traffic related air quality impacts associated with the operation of the Proposed Development have been assessed for the following scenarios:

- **Baseline** - The predicted levels for NO_2, PM_{10} and $PM_{2.5}$ in the locality in 2019;
- **Proposed Opening Year 2022 (Do Nothing)** - This includes 2022 baseline without the proposed development; and
- **Proposed Opening Year 2022 (Do Something)** - This includes 2022 baseline with the proposed development included.

Traffic Data

7.5 Traffic data for all the above scenarios has been provided by the Transport Consultants at SCP. Also, Department for Transport (DfT) count point 73649 has been used.

7.6 Development traffic air quality impacts have been quantitatively assessed by modelling the effect of the development traffic flows along the proposed routes for the three above mentioned scenarios.

7.7 The resultant predicted changes in air quality have then been compared against the stated assessment criteria, in **Section 5,** in order to establish the significance of the impact.

7.8 The Annual Average Daily Traffic (AADT) used in this assessment is listed in **Table 7.1** below.

ID/Road	Speed (kph)	Baseline 2019		Proposed Completion Year (2022) 'Do Nothing'		Proposed Completion Year (2022) 'Do Something'	
		Lights	Heavies	Lights	Heavies	Lights	Heavies
Cuxton Road (n)	5/30	17142	757	17891	790	18740	790
Cuxton Road (s)	10/30	19499	689	20351	719	20594	723
Butlers Park Way	10/20	2581	0	2694	0	2718	0
Roman Way North of Site Access	10	8000	400	8349	417	10678	421
Roman Way South of Site Access	20	8000	400	8349	417	8495	417
DfT Count Point 73649	20/25	959	68	959	68	959	68

Table 7.1: Average Annual Daily Traffic Flows

7.9 Time variation hourly factors have been derived from the DfT Car Traffic Distribution on all roads by time of the day in Great Britain and applied to the roads in all the scenarios modelled. This is included in **Appendix B**.

Receptor Locations

7.10 The receptors, which have been assessed, relate to existing potentially sensitive receptors in the vicinity of the site. For the purpose of the air quality assessment, sensitive human receptors have been identified where the public is regularly present and likely to be exposed over the averaging period of the objective. This assessment focuses on modelling annual mean concentrations.

7.11 All the receptor locations have been modelled at 1.5m. The receptors that have been assessed are listed in **Table 7.2** and illustrated in **Figure 7.1** below.

No.	Coordinates (X, Y)		Description
1	572284	167900	Receptor located at 56 Butlers Park Way, approximately 7m from the road.
2	572191	167904	Receptor located at Windrush House Butlers Park Way, approximately 1m from the road.
3	572277	167755	Receptor located approximately 3m south of Sundridge Hill.
4	572277	167749	Receptor located approximately 9m south of Sundridge Hill.

No.	Coordinates (X, Y)		Description
5	572553	167959	Receptor located approximately 10m south of Cuxton Road.
6	572617	167977	Receptor located approximately 6m west of Roman Way.
7	572614	167974	Receptor located approximately 10m west of Roman Way.
8	572806	167794	Receptor located approximately 15m east of Roman Way.
9	572764	168150	Receptor located at Esso Rontec Temple Farm, approximately 4m south of Cuxton Road.
10	572823	168243	Receptor located at 15 Poplar Road, approximately 16m north of Cuxton Road.
11	572876	168263	Receptor located at 201 Cuxton Road, approximately 7m south of the road.
12	572936	168396	Receptor located at 181 Cuxton Road, approximately 4m south of the road.
13	572962	168747	Receptor located at 156 Cuxton Road, approximately 10m north of the road.
14	573049	168859	Receptor located at 114 Cuxton Road, approximately 5m north of the road.
15	573066	168852	Receptor located opposite 114 Cuxton Road, approximately 6m south of the road.

Table 7.2: Receptor Locations

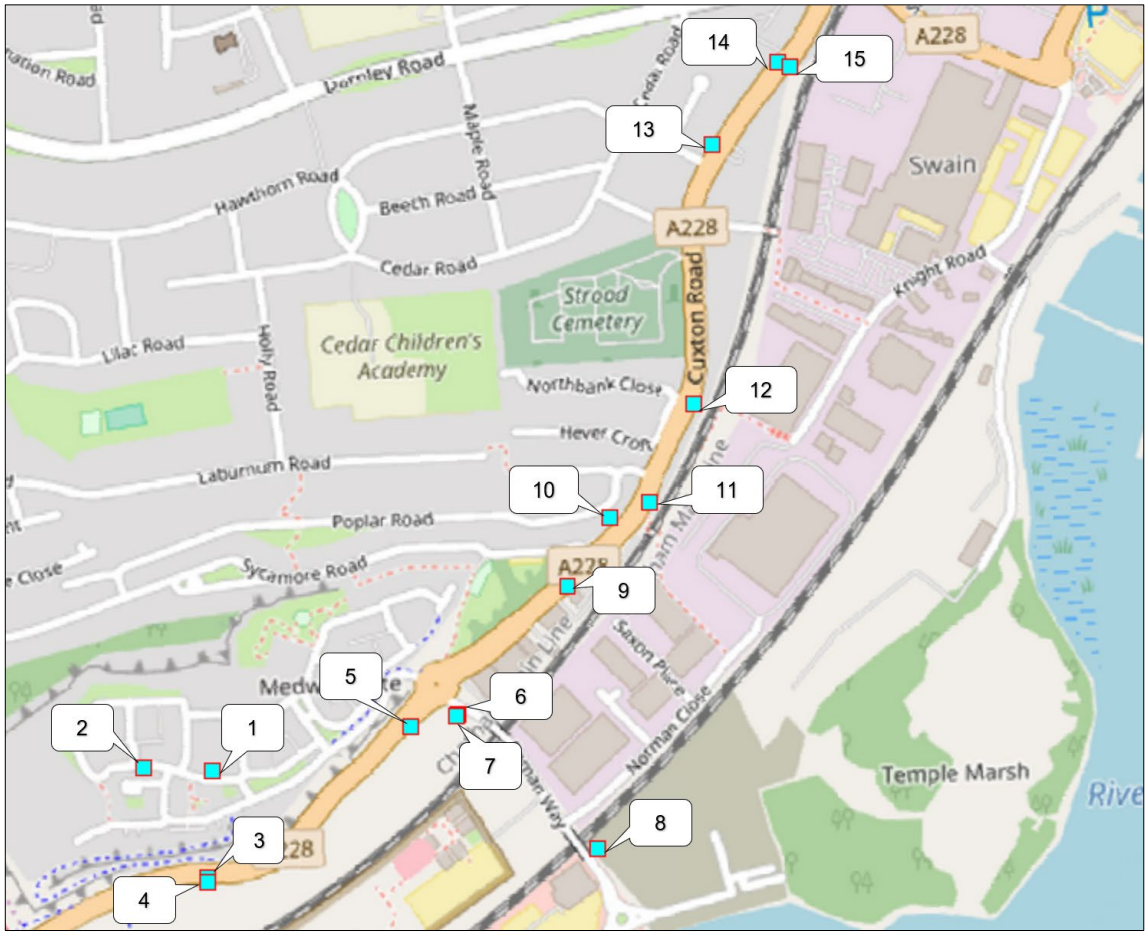

Figure 7.1: Receptor Locations

Meteorological Data

7.12 The meteorological data required for the ADMS model must be from a representative location to the site and include a full year of sequential readings.

7.13 The MET office has advised that the most suitable site with the most complete/representative set of data is located at Gatwick. Subsequently, 2019 data has been obtained and used.

7.14 The 2019 Windrose for Gatwick is illustrated in **Figure 7.2** below.

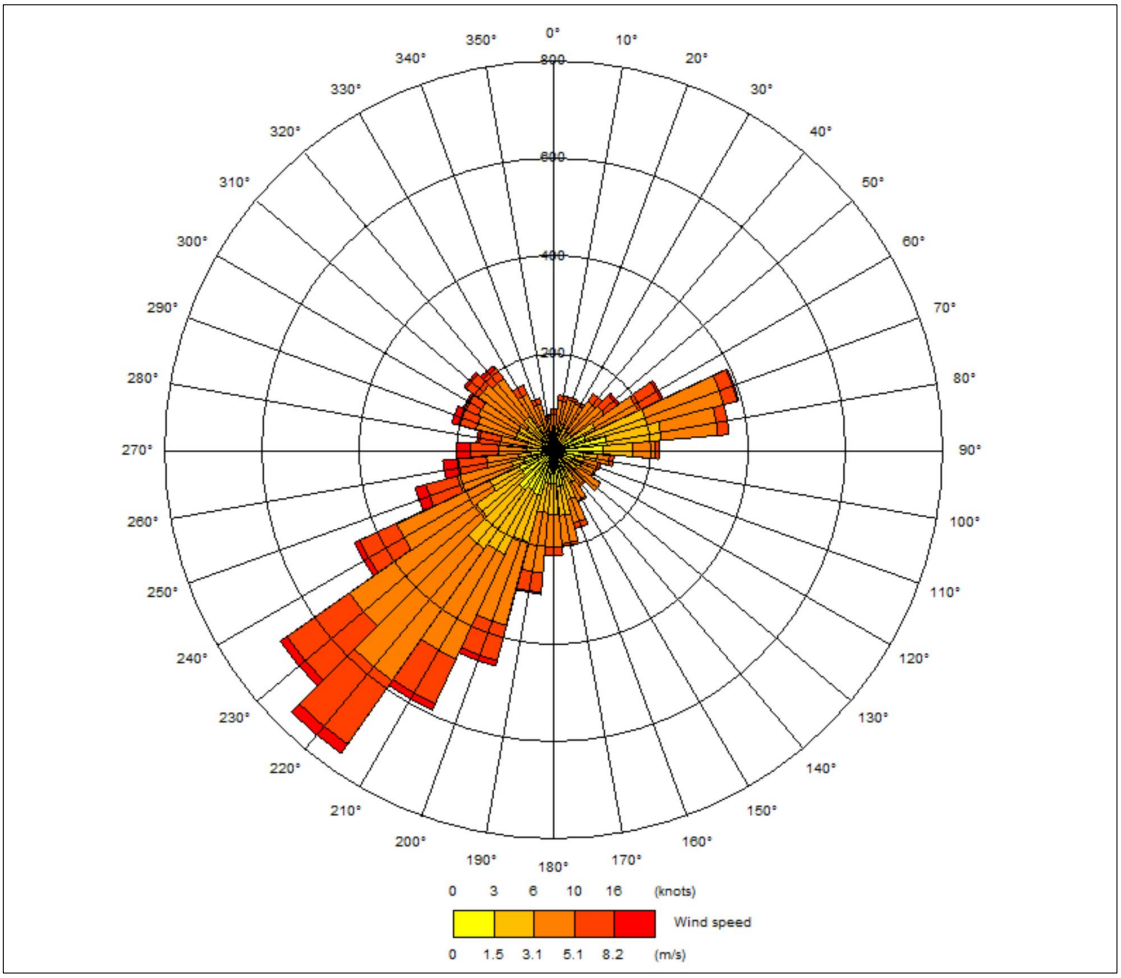

Figure 7.2: Gatwick Windrose, 2019

Background

7.15 As previously discussed in Section 6, the following background data has been used.

Pollutant	2019 ($\mu g/m^3$)	2022 ($\mu g/m^3$)
NOx	24.48	21.14
NO_2	17.46	15.34
PM_{10}	17.36	16.69
$PM_{2.5}$	11.73	11.22

Table 7.3: Annual Mean Background Concentrations Used in all Modelling

NO_x: NO_2 Chemistry

7.16 Vehicles emit NO_x with different proportions of NO_2. In the atmosphere, chemical reactions take place between NO, NO_2 and Ozone. In this assessment the screening of NOx emissions has taken place and the resulting NO_2 concentration has been calculated post modelling using the DEFRA NO_x to NO_2 Calculator.

Assumptions and Limitations

7.17 This assessment focuses on modelling annual mean concentrations. This is because it is inherently more difficult to make satisfactory predictions for short-term behaviour of pollutants than it is to model an annual mean value.

7.18 It should also be noted that the modelling process is dependant in the first instance upon projected traffic data. Where this data is subject to change, this may affect the results of the modelling process. There are then additional uncertainties, as models are required to simplify real-world conditions into a series of algorithms.

7.19 An important stage in the process is model verification, which involves comparing the model output with measured concentrations. Because the model has been verified, there can be reasonable confidence in the prediction of baseline year concentrations.

7.20 Predicting pollutant concentrations in a future year will always be subject to greater uncertainty. For obvious reasons, the model cannot be verified in the future, and it is necessary to rely on a series of projections provided by DfT and Defra as to what will happen to traffic volumes, background pollutant concentrations and vehicle emissions.

7.21 The above limitations have been taken into consideration in the assessment.

Model Verification

7.22 Model verification is required to demonstrate that the model is performing within an acceptable margin of error. Therefore, it is necessary to undertake modelling at a location where air quality levels are known (and for where traffic data is available for), and to compare the result with ratified monitored data for that location.

7.23 Although not considered ideal due to risk of overestimation, kerbside monitoring sites may be used within the model verification process where there is relevant exposure, for example properties fronting directly onto the road.

7.24 The model verification exercise is set out in **Table 7.4** below.

Site	Coordinates	Monitored NO_2	Modelled NO_2*	% Diff**
DT07	573078; 168908	34.6	29.75	14.0%
DT40	570615; 166065	43.4	35.09	19.1%
DT41	570281; 164949	23.1	24.76	-7.2%
DT42	570276; 165016	18.8	21.91	-16.5%

*calculated using modelled results for road-NO_x and NOx to NO_2 calculator.
**(Monitored-Modelled)/Monitored*100)

Table 7.4: Results of Verification Exercise

7.25 The model was found to under/over-estimate NO_2 concentrations at the diffusion tube sites by a maximum of approximately 20%.

7.26 Ideally, modelled results should be within 25% margin of error when compared to the monitored values at the same location, which is considered acceptable within TG16. Therefore, no adjustment to the modelled results is considered necessary.

Potential Impacts

7.27 The likely significant impacts of traffic from the development on the receptors have been assessed. The Baseline and 2022 NO_2 modelling results for all receptors are represented in **Table 7.5** below.

ID	'Baseline' NO_2 (µg m^{-3})	2022 'Do Nothing' NO_2 (µg/m^{-3})	2022 'Do Something' NO_2 (µg/m^{-3})	Impact between 'Do Nothing' and 'Do Something'	% Difference in Relative to Annual Mean Objective (40 µg/m^{-3})	Impact Significance
1	19.01	16.55	16.56	0.01	0%	Negligible
2	18.89	16.46	16.47	0.01	0%	Negligible
3	23.24	19.78	19.82	0.04	0%	Negligible
4	21.10	18.13	18.16	0.03	0%	Negligible
5	22.20	18.98	19.05	0.07	0%	Negligible
6	22.00	18.78	19.10	0.32	1%	Negligible
7	21.26	18.22	18.46	0.24	1%	Negligible
8	19.52	16.87	16.89	0.02	0%	Negligible
9	23.81	20.21	20.39	0.18	0%	Negligible
10	21.06	18.09	18.19	0.10	0%	Negligible
11	22.40	19.10	19.24	0.14	0%	Negligible

ID	'Baseline' NO_2 (µg m^{-3})	2022 'Do Nothing' NO_2 (µg/m^{-3})	2022 'Do Something' NO_2 (µg/m^{-3})	Impact between 'Do Nothing' and 'Do Something'	% Difference in Relative to Annual Mean Objective (40 µg/m^{-3})	Impact Significance
12	24.01	20.32	20.51	0.19	0%	Negligible
13	21.51	18.41	18.53	0.12	0%	Negligible
14	24.56	20.85	21.04	0.19	0%	Negligible
15	23.58	20.09	20.26	0.17	0%	Negligible

Table 7.5: Baseline and 2022 Modelled Annual Mean Concentrations for NO_2

7.28 **Table 7.5** demonstrates that 2022 NO_2 levels for 'Do Something' are likely to have a 0-1% increase relative to the annual mean objective, when compared to the 'Do Nothing'. Additionally, the modelled results show that NO_2 levels are significantly under the national objective level for all the receptors assessed. Therefore, in accordance with **Tables 5.4 and 5.5** in Section 5, NO_2 impacts are considered to be of imperceptible magnitude and negligible significance.

7.29 The PM_{10} modelling results for all receptors are represented in **Table 7.6** below

ID	'Baseline' PM_{10} (µg m^{-3})	2022 'Do Nothing' PM_{10} (µg/m^{-3})	2022 'Do Something' PM_{10} (µg/m^{-3})	Impact between 'Do Nothing' and 'Do Something'	% Difference in Relative to Annual Mean Objective (40 µg/m^{-3})	Impact Significance
1	17.60	16.93	16.93	0.00	0%	Negligible
2	17.58	16.91	16.91	0.00	0%	Negligible
3	18.33	17.66	17.67	0.01	0%	Negligible
4	17.97	17.29	17.30	0.01	0%	Negligible
5	18.07	17.40	17.41	0.01	0%	Negligible
6	17.89	17.21	17.27	0.05	0%	Negligible
7	17.81	17.13	17.17	0.04	0%	Negligible
8	17.64	16.97	16.97	0.00	0%	Negligible
9	18.34	17.67	17.70	0.04	0%	Negligible
10	17.93	17.25	17.27	0.02	0%	Negligible
11	18.16	17.49	17.52	0.03	0%	Negligible
12	18.45	17.77	17.81	0.04	0%	Negligible
13	18.02	17.35	17.37	0.03	0%	Negligible
14	18.37	17.69	17.73	0.04	0%	Negligible
15	18.23	17.55	17.58	0.03	0%	Negligible

Table 7.6: Baseline and 2022 Modelled Annual Mean Concentrations for PM_{10}

7.30 **Table 7.6** demonstrates that PM_{10} levels for 'Do Something' are likely to have a 0% increase relative to the annual mean objective when compared to the 'Do Nothing'. In addition, all modelled results are still considerably below the annual mean objective level for all the receptors assessed. Therefore, in accordance with **Tables 5.4** and **5.5** in Section 5, PM_{10} impacts are considered to be of imperceptible magnitude and negligible significance.

7.31 The $PM_{2.5}$ modelling results for all receptors are represented in **Table 7.7** below.

ID	'Baseline' $PM_{2.5}$ (µg m^{-3})	2022 'Do Nothing' $PM_{2.5}$ (µg/m^{-3})	2022 'Do Something' $PM_{2.5}$ (µg/m^{-3})	Impact between 'Do Nothing' and 'Do Something'	% Difference in Relative to Annual Mean Objective (25 µg/m^{-3})	Impact Significance
1	11.87	11.36	11.36	0.00	0%	Negligible
2	11.86	11.35	11.35	0.00	0%	Negligible
3	12.30	11.77	11.78	0.01	0%	Negligible
4	12.09	11.57	11.57	0.00	0%	Negligible
5	12.15	11.63	11.63	0.01	0%	Negligible
6	12.06	11.53	11.56	0.03	0%	Negligible
7	12.01	11.48	11.50	0.02	0%	Negligible
8	11.90	11.38	11.38	0.00	0%	Negligible
9	12.31	11.78	11.80	0.02	0%	Negligible
10	12.06	11.54	11.55	0.01	0%	Negligible
11	12.20	11.68	11.69	0.02	0%	Negligible
12	12.37	11.84	11.86	0.02	0%	Negligible
13	12.12	11.59	11.61	0.02	0%	Negligible
14	12.33	11.80	11.82	0.02	0%	Negligible
15	12.25	11.71	11.73	0.02	0%	Negligible

Table 7.7: Baseline and 2022 Modelled Annual Mean Concentrations for $PM_{2.5}$

7.32 **Table 7.7** demonstrates that $PM_{2.5}$ levels for 'Do Something' are likely to have a 0% increase relative to the annual mean objective when compared to the 'Do Nothing'. In addition, all modelled results are still considerably below the annual mean objective level for all the receptors assessed, existing and proposed. Therefore, in accordance with **Tables 5.4** and **5.5** in Section 5, $PM_{2.5}$ impacts are considered to be of imperceptible magnitude and negligible significance.

7.33 **Tables 7.5, 7.6 and 7.7** clearly demonstrate that NO_2, PM_{10} and $PM_{2.5}$ concentration for all receptors modelled are well within their national objective levels.

8 Mitigation Measures

Construction Dust

8.1 A construction dust assessment has been completed for the proposed development in accordance with IAQM guidance and is presented in **Appendix A**. Within the assessment, site specific mitigation measures have been identified which ensure compliance with relevant standards.

8.2 The role of air quality monitoring within the package of mitigation measures that is proposed has also been considered since monitoring proposals are frequently incorporated into planning conditions.

8.3 The mitigation measures outlined below, should make up part of a Construction Environmental Management Plan (CEMP) that should be implemented to minimise the potential adverse construction dust impacts throughout all the relevant construction stages.

Site Clearance:

- Bag and remove any biological debris; and
- Cover, seed or fence stockpiles to prevent wind whipping.

Earthworks:

- Avoid scabbling (roughening of concrete surfaces) if possible;
- Avoid carrying out any earthworks during dry weather if reasonably practicable having regard to programme and contracting arrangements for the relevant works or provide and ensure appropriate use of water to control dust; and
- Re-vegetate any earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.

Construction:

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out unless required for a particular process;
- Mix large quantities of cement, grouts and other similar materials in enclosed areas remote from site boundaries and potential receptors;
- 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; and

- For small supplies of fine powder ensure bags are sealed after use and are stored appropriately to prevent dust.

Trackout:

- Ensure any vehicles arriving and leaving site are securely covered to prevent escape of materials during transport;
- Routinely clean public roads and any access routes using wet sweeping methods; and
- Avoid dry sweeping.

General Mitigation Measures:

- Ensure regular cleaning of hardstanding surfaces using wet sweeping methods;
- Display the head or regional office contact information, and the name and contact details of person(s) accountable for air quality on the site boundary;
- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- Log all air quality complaints, identify the cause(s), take appropriate measures to reduce emissions in a timely manner and record all measures taken. Make the complaints log available to the Local Authority when requested;
- Carry out regular on-site and off-site inspections to monitor dust soiling effects, with cleaning to be provided if necessary. Increase the frequency of inspections when activities with a high potential to produce dust are being carried out;
- Erect barriers around the site, any dusty activities and stockpiles (the last of which should be covered);
- Screen areas of the building, where dust producing activities are taking place, with debris screens or sheeting;
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- Remove materials that have a potential to produce dust as soon as possible, unless they are being re-used. If they are to be re-used, on site covers should be used;
- Ensure all vehicles switch off engines when stationary, so that there are no idling vehicles;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine sprays on such equipment wherever possible; and
- Avoid bonfires and the burning of waste materials

8.4 It is important that attention is paid to any construction activity that takes place in close proximity to the site boundary, potentially at the closest location to sensitive receptors.

Dust Monitoring:

8.5 The dust monitoring requirements are usually split in three categories as follows:

- **Negligible/Low risk** category sites- should not normally be necessary to undertake any quantitative air quality monitoring, although in some circumstances it may be applicable to undertake occasional surveys in the vicinity of the site boundary at least once on each working day.
- **Medium risk** category sites- should normally be adequate to undertake surveys of dust flux over the site boundary, and/or dust deposition/soiling rates around the site at nearby receptors, although this may have resource implications, and an approach based on continuous particulate matter monitoring may be preferred.
- **High risk** category sites- normally be necessary to supplement the monitoring for medium risk sites with monitoring of ambient PM concentrations. It is recommended that priority be assigned to the measurement of PM_{10}, as emissions of dust from construction sites are predominantly in the coarser fractions.

8.6 The proposed development site has been classified as having a **low to medium risk** of dust soiling.

8.7 Therefore, dust monitoring, as specified above, should be undertaken during the relevant stages of construction to ensure that:

- The construction activities do not give rise to any exceedances of the air quality objectives for PM_{10} or $PM_{2.5}$;
- The agreed mitigation measures to control dust emissions are being applied and are effective and
- Any high levels of dust is attributed to specific activities on site to ensure that appropriate corrective measures take place.

8.8 The implementation of the specific mitigation measures given above within the CEMP will ensure that any potential adverse impacts from construction dust during all construction stages are avoided. It is noted by the IAQM that, through the use of effective mitigation, the effects of dust from construction activity will normally not be considered significant.

8.9 Compliance should be secured through planning conditions, where necessary.

Construction Traffic and Plant

8.10 As previously stated, there is potential for air pollutant impacts to arise from construction plant and vehicles associated with the scheme. The following BAT should still be implemented during the construction phase.

- All vehicles should switch off engines when stationary, no idling vehicles;
- Ensure any vehicles arriving and leaving site are securely covered to prevent escape of materials during transport;
- Minimise the movement of construction traffic around the site;
- Maximising efficiency (this may include alternative modes of transport, maximising vehicle utilisation by ensuring full loading and efficient routing);
- Vehicles should be well maintained and kept in a high standard of working order;
- Avoid the use of diesel or petrol powered generators by using mains electricity or battery powered equipment where possible; and
- Locate plant away from boundaries close to residential areas.

Operational

Traffic Emissions

8.11 The AQA has demonstrated that the predicted net traffic increase associated with the operation of the proposed new store is unlikely to result in a detrimental pollution impact upon the local road network and the current pollution levels. Therefore, it is not anticipated that mitigation measures will be required.

Building Emissions

8.12 Any operational plant effects should be reviewed and assessed, if required, at the appropriate stage, when all the required detailed plant technical information is available.

8.13 However, it is recommended that, any boilers being used on site should be either electric or highly efficient low NOx boilers, ideally with emissions <40 mgNOx/kWh. Any CHP plant should ideally meet the following minimum emissions standards:

- Spark ignition engine: 250mgNOx/Nm^3;
- Compression ignition engine: 400mgNOx/Nm^3;
- Gas turbine: 50mgNOx/Nm^3

8.14 This will ensure that any additional NOx contributions associated with proposed heating strategy are kept as low as possible.

9 Residual Effects and Conclusions

9.1 Medway Council (MC) has indicated that four Air Quality Management Areas (AQMA's) have been declared in the local area, all as a result of exceedances of the annual mean objective for Nitrogen Dioxide (NO_2). The site is located adjacent to Central Medway AQMA.

9.2 A review of monitoring sites within MC has been undertaken. It was concluded that the automatic monitoring locations and majority of the non-automatic monitoring locations are below the annual mean objective for NO_2.

9.3 A construction dust assessment has been undertaken for the four stages of construction activities associated with the proposed development in accordance with IAQM guidance on the assessment of dust from demolition and construction (**Appendix A**).

9.4 Mitigation measures have been proposed for construction traffic and stationary plant associated with the proposed development.

9.5 Following the successful implementation of the specific mitigation measures, the residual effects of construction dust and emissions from construction plant/vehicles upon the local area and sensitive receptors although adverse, will be temporary and considered to be 'not significant'.

9.6 The predicted net traffic increase associated with the operation of the proposed development has been quantitively assessed. Impacts have been identified to be of imperceptible magnitude and negligible significance throughout, and as such unlikely to have a detrimental pollution impact on the local transport network and the current pollution levels.

9.7 Any operational plant effects should be reviewed and assessed, if required, at the appropriate stage, when all the required plant specification information is available.

9.8 Compliance to relevant regulations and standards should be secured, at this stage, through planning conditions, where necessary.

Conclusion

9.9 Therefore, it is concluded that at this stage, based on the information available, the proposed development does not raise any significant or other residual adverse impacts on the health and/or quality of life for any existing or proposed receptors, as a result of any anticipated changes to air quality.

9.10 It is therefore concluded that the proposed development is likely to comply fully with air quality related national and local planning policy and any mitigation can, if considered necessary, be enforced by means of appropriate planning conditions, consistent with paragraph 54 and 55 of the National Planning Policy Framework

Appendix A:
Construction Dust Assessment

CONSTRUCTION DUST ASSESSMENT

A.1 The construction dust assessment has been completed in accordance with 2014 IAQM guidance and follows the procedures as outlined in Section 5 of this report.

Screen the Need for a Detailed Assessment

A.2 The following screening criterion has been applied to the assessment: An assessment will normally be 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).
- an 'ecological receptor' within:
  - 50m of the boundary of the site; or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

A.3 There are a number of human receptors within 350m of the site boundary. Therefore, a dust assessment is required due to the proposed development location meeting some of the above criteria.

Assess the Risk of Dust Impacts

A.4 The construction activities associated with the proposed development have been separated into four stages:

- Site Clearance;
- Earthworks;
- Construction; and
- Trackout.

A.5 The assessment of the risk of dust impacts has been completed in two stages:

- Determine the potential dust emission magnitude; and
- Determine the sensitivity of the area to dust impacts.

A.6 The potential dust emission magnitude for all four of the construction stages have been determined to be either Small, Medium or Large according to the criteria presented in **Table A1** below.

Construction Activity	Dust Emission Magnitude Scale		
	Small	Medium	Large
Site Clearance/ Demolition	Total building volume <20,000m^3, construction material with low potential for dust release, demolition activities <10m above ground, works 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 material, on-site crushing and screening, activities >20m above ground level.
Earthworks	Total site area <2,500m^2, soil type with large grain size, <5 heavy earth moving vehicles active at one time, bunds <4m high, total material moved <20,000t, works during wetter months.	Total site area 2,500-10,000m^2, moderately dusty soil type, 5-10 heavy earth moving vehicles active at one time, bunds 4-8m high, total material moved 20,000-100,000t.	Total site area >10,000m^2, potentially dusty soil type, >10 heavy earth moving vehicles active at one time, bunds >8m high, total material moved >100,000t.
Construction	Total building volume <25,000m^3, construction material with low potential for dust release.	Total building volume 25,000-100,000m^3, potentially dusty construction material, on site concrete batching.	Total building volume >100,000m^3, on site concrete batching, sandblasting.
Trackout	<10 HDV* outwards movements in any one day, surface material with low potential for dust release, unpaved road length <50m.	10-50 HDV outward movements in any one day, moderately dusty surface material, unpaved road length 50-100m.	>50 HDV outward movements in any one day, potentially dusty surface material, unpaved road length >100m.
* HDV – Heavy Duty Vehicle (>3.5t), Note – In each case, not all the criteria need to be met, and that other criteria may be used if justified.			

Table A1: Dust Emission Magnitude Criteria

A.7 The completed assessment of Dust Emission Magnitude is shown in **Table A2** below.

Construction Activity	Dust Emission Magnitude	Justification
Demolition/ Site Clearance	Small	Total building volume <20,000m^3
Earthworks	Medium	Total site area is 9,018m^2
Construction	Medium	Estimated total building volume 25,000-100,000m^3
Trackout	Medium	Estimated 10-50 HDV outward movements in any one day

Table A2: Dust Emission Magnitude Assessment

A.8 Due to the scale of the proposed development the magnitude of dust emissions has been assessed as medium.

A.9 The sensitivity of the area has been assessed in relation to a number of factors such as; the specific sensitivities of receptors in the area, the proximity and number of those receptors and in the case of PM_{10}, the local background concentration and by following the significance criteria in **Tables A3, A4 and A5** below.

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
	1-10	Medium	Low	Low	Low
Medium	**>1**	Medium	Low	Low	Low
Low	**>1**	Low	Low	Low	Low

Table A3: Sensitivity of the Area to Dust Soiling Effects of People and Property

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the source (m)				
			<20	<50	<100	<200	<350
High	>32 µg m^{-3}	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg m^{-3}	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg m^{-3}	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg m^{-3}	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32 µg m^{-3}	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32 µg m^{-3}	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28 µg m^{-3}	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg m^{-3}	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table A4: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Distance from the source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Table A5: Sensitivity of the Area to Ecological Impacts

A.10 In addition to **Tables A3, A4 and A5** any site-specific factors have been taken into account when defining the sensitivity of the area:

- any history of dust generating activities in the area;
- the likelihood of concurrent dust generating activity on nearby sites;
- any pre-existing screening between the source and the receptors; and
- the duration of the potential impact, as a receptor may become more sensitive over time.

A.11 The sensitivity of the area assessment has been completed based on the following:

- No buildings to be demolished;
- >1 'medium' sensitive receptors within 20m of the site;
- Low PM_{10} background; and
- No 'high' ecological receptors within 50m. However, Cobham Woods (SSSI) is located to the north west and Halling to Trottisdiffe Escarpment (SSSI) located south west.

A.12 The completed assessment of Sensitivity of the Area in **Table A.6** below.

Receptor Sensitivity	Sensitivity of the Surrounding Area			
	Site Clearance	Earthworks	Construction	Trackout
Dust Soiling	Low	Medium	Medium	Medium
Human Health	Low	Low	Low	Low
Ecological	Low	Low	Low	Low

Table A6: Sensitivity of the Surrounding Area Assessment

A.13 The completed pre-mitigation impact risk assessment incorporating the sensitivity of the area (**Table A6**) and the dust emissions magnitude (**Table A2**) for the four construction activities is shown in **Table A7** below.

Potential Impact	Risk			
	Site Clearance	Earthworks	Construction	Trackout
Dust Soiling	Negligible	Medium	Medium	Low
Human Health	Negligible	Low	Low	Low
Ecological	Negligible	Low	Low	Low

Table A7: Summary of Dust Risk (pre-mitigation)

A.14 As a result, the pre-mitigation risk of dust soiling has been assessed low to medium. The human health risk was considered low and the ecological risk has been assessed as low.

Site-specific Mitigation

A.15 From the identification of the risk of impacts with no mitigation applied in **Table A7**, it is possible to determine the specific mitigation measures that can be applied in relation to the level of risk associated with the construction activity.

A.16 Additionally, the role of air quality monitoring within the package of mitigation measures that is proposed needs to be considered since monitoring proposals are frequently incorporated into planning conditions.

A.17 The mitigation measures described below are suggested as measures that should be included in a site-specific Construction Environmental Management Plan (CEMP).

Site Clearance:

- Bag and remove any biological debris
- Cover, seed or fence stockpiles to prevent wind whipping

Earthworks:

- Avoid scabbling (roughening of concrete surfaces) if possible;
- Avoid carrying out any earthworks during dry weather if reasonably practicable having regard to programme and contracting arrangements for the relevant works or provide and ensure appropriate use of water to control dust.

Construction:

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out unless required for a particular process;
- Mix large quantities of cement, grouts and other similar materials in enclosed areas remote from site boundaries and potential receptors;
- 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; and
- For small supplies of fine powder ensure bags are sealed after use and are stored appropriately to prevent dust.

Trackout:

- Ensure any vehicles arriving and leaving site are securely covered to prevent escape of materials during transport;
- Routinely clean public roads and any access routes using wet sweeping methods; and
- Avoid dry sweeping.

General Mitigation Measures:

- Ensure regular cleaning of hardstanding surfaces using wet sweeping methods;
- Display the head or regional office contact information, and the name and contact details of person(s) accountable for air quality on the site boundary;
- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- Log all air quality complaints, identify the cause(s), take appropriate measures to reduce emissions in a timely manner and record all measures taken. Make the complaints log available to the Local Authority when requested;
- Carry out regular on-site and off-site inspections to monitor dust soiling effects, with cleaning to be provided if necessary. Increase the frequency of inspections when activities with a high potential to produce dust are being carried out;
- Erect barriers around the site, any dusty activities and stockpiles (the last of which should be covered);
- Screen areas of the building, where dust producing activities are taking place, with debris screens or sheeting;
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- Remove materials that have a potential to produce dust as soon as possible, unless they are being re-used. If they are to be re-used, on site covers should be used;
- Ensure all vehicles switch off engines when stationary, so that there are no idling vehicles;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine sprays on such equipment wherever possible; and
- Avoid bonfires and the burning of waste materials

A.18 It is important that attention is paid to any construction activity that takes place in close proximity to the site boundary, potentially at the closest location to sensitive receptors.

Dust Monitoring:

A.19 The dust monitoring requirements are usually split into three categories as follows:

- **Negligible/Low risk** category sites- should not normally be necessary to undertake any quantitative air quality monitoring, although in some circumstances it may be applicable to undertake occasional surveys in the vicinity of the site boundary at least once on each working day.
- **Medium risk** category sites- should normally be adequate to undertake surveys of dust flux over the site boundary, and/or dust deposition/soiling rates around the site at nearby receptors, although this may have resource implications, and an approach based on continuous particulate matter monitoring may be preferred.
- **High risk** category sites- normally be necessary to supplement the monitoring for medium risk sites with monitoring of ambient PM concentrations. It is recommended that priority be assigned to the measurement of PM10, as emissions of dust from construction sites are predominantly in the coarser fractions.

A.20 The proposed development site has been classified as having a low to medium risk of dust soiling.

A.21 Therefore, dust monitoring in accordance with the above criteria should ideally be undertaken during the relevant stages of construction to ensure that:

- The construction activities do not give rise to any exceedances of the air quality objectives for PM_{10} or $PM_{2.5}$.
- The agreed mitigation measures to control dust emissions are being applied and are effective.
- Any high levels of dust are attributed to specific activities on site to ensure that appropriate corrective measures take place.

A.22 The implementation of the specific mitigation measures given above within a CEMP will ensure that the potential adverse impacts from construction dust during all construction stages are avoided. It is noted by the IAQM that through the use of effective mitigation, the effects of dust from construction activity will normally be considered 'not significant'.

Determine Significant Effects

A.23 Prior to the implementation of any mitigation measures the highest significance of adverse effects was medium risk for dust soiling, low risk for human health and low risk for ecological, with dust emissions magnitude considered to be medium.

A.24 The mitigation measures listed above have been chosen due to their suitability to the site and to reduce the risk of adverse effects from the four stages of construction.

A.25 Through the implementation of site-specific mitigation measures (listed above), which are designed to mitigate potential dust impacts, will ensure that potential significant adverse dust effects will not occur, and the residual effect will normally be 'not significant'. Appropriate mitigation measures should be secured by planning condition where necessary.

Conclusions of Construction Dust Assessment

A.26 The completion of the construction dust assessment has shown that the residual effect of the proposed development in the context of construction dust emissions will be 'not significant'. This conclusion has been made based on the small dust emissions magnitude related to the scale of development and the assumption that the suggested mitigation measures will be implemented (secured by planning condition) and is relevant for all sensitive receptors within 350m of the site.

A.27 It should be noted that even with a rigorous CEMP in place, it is not possible to guarantee that all mitigation measures will be effective at all times. If there is an interruption in the water supply used for dust suppression or adverse weather conditions are experienced that exacerbate dust emissions, the receptors may experience occasional, short term dust annoyance.

A.28 However, the likely scale of this would not normally be considered sufficient to change the conclusion of this assessment. It is therefore important to consider all mitigation measures and provide a frequent review and assessment procedure at each stage, to ensure that mitigation measures continue to provide the maximum attenuation level possible.

Appendix B:
Hourly Time Emission Factors

Hourly Time Emission Factors

Local time (hours)	Weekdays	Saturdays	Sundays
1	0.12	0.24	0.32
2	0.07	0.15	0.19
3	0.06	0.11	0.13
4	0.07	0.1	0.11
5	0.13	0.12	0.11
6	0.36	0.22	0.17
7	0.9	0.39	0.28
8	1.67	0.68	0.45
9	1.86	1.11	0.7
10	1.43	1.52	1.21
11	1.35	1.84	1.72
12	1.39	2	2.01
13	1.44	2.03	2.14
14	1.46	1.93	2.06
15	1.56	1.81	1.98
16	1.77	1.71	1.94
17	1.95	1.69	1.91
18	1.97	1.62	1.7
19	1.52	1.38	1.45
20	1.05	1.06	1.18
21	0.72	0.76	0.91
22	0.53	0.59	0.64
23	0.39	0.52	0.43
24	0.23	0.4	0.26