# Taylor Wimpey, Welbeck Land & C G Fry & Sons

# Strategic Land Allocation, Gillingham

# Air Quality Assessment

# December 2017

Executive Park, Avalon Way, Anstey, Leicester, LE7 7GR
Tel: +44 (0)116 234 8000
Nigel.mann@wyg.com

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| | | | |
| Contributor: | Haley Clowes<br>*Environmental Technician* | Initialled: | HC |
| | | | |
| Checked by: | Daniel Clampin<br>*Senior Environmental Scientist* | Initialled: | DC |
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## Executive Summary

WYG have undertaken an Air Quality Assessment for the proposed multipurpose development at Gillingham, North Dorset.

The potential effects during the construction phase include fugitive dust emissions from site activities, such as demolition, earthworks, construction and trackout. The impacts during the operational phase take into account of exhaust emissions from additional road traffic generated due to the proposed development.

During the construction phase, it is anticipated that dust sensitive receptors will potentially experience increased levels of dust and particulate matter before using any mitigation and control measures. However, these are predicted to be short term and temporary impacts. Throughout this period, the potential impacts from construction on air quality will be managed through site specific mitigation measures detailed within this assessment. With these mitigation measures in place, the effects from the construction phase are not predicted to be significant.

An assessment has been made in future years of 2021 and 2031.,For both scenarios, the assessment of the significance of the effects associated with both the committed and proposed developments with respect to $NO_2$ exposure is determined to be 'negligible' for all existing receptors. With respect to predicted $PM_{10}$ exposure, the significance of the proposed development is determined to be 'negligible' all receptors.

Following the adoption of the recommended mitigation measures during the construction and operational phases, the development is not considered to be contrary to any of the national, regional or local planning policies.

Based on the assessment undertaken and data, methodology and assumptions used within this assessment, it is concluded that the site is suitable for the proposed development.

# 1. Introduction

WYG Environment Planning Transport (WYG) have been commissioned to prepare an Air Quality Assessment to support an application for the proposed strategic land allocation at Gillingham, North Dorset.

## 1.1 Site Location and Context

The approximate United Kingdom National Grid Reference (NGR) is approximately 381852, 125391. Reference should be made to Figure 1 for a map of the proposed development site and surrounding area.

The following assessment stages have been undertaken as part of this assessment:

- Baseline evaluation;
- Assessment of potential air quality impacts during the construction phase;
- Assessment of potential air quality impacts during the operational phase; and,
- Identification of mitigation measures (as required).

The results of the assessment are detailed in the following sections of this report.

The construction phase assessment considers the potential effects of dust and particulate emissions from site activities and materials movement based on a qualitative risk assessment method based on the Institute of Air Quality Management's (IAQM) 'Guidance on the Assessment of Dust from Demolition and Construction' document, published in 2014.

The assessment of the potential air quality impacts that are associated with the operational phase has focused on the predicted impact of changes in ambient nitrogen dioxide ($NO_2$) and particulate matter with an aerodynamic diameter of less than 10µm ($PM_{10}$) as a result of the development at key local receptor locations. The changes have been referenced to EU air quality limits and UK air quality objectives and the magnitude and significance of the changes have been referenced to non-statutory guidance issued by Environmental Protection UK (EPUK).

# 2. Policy and Legislative Context

## 2.1 Documents Consulted

The following documents were consulted during the undertaking of this assessment:

Legislation and Best Practice Guidance

- National Planning Policy Framework, Department for Communities and Local Government, March 2012;
- Planning Practice Guidance: Air Quality, March 2014;
- The Air Quality Standards Regulations (Amendments 2016);
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, 2007;
- The Environment Act, 1995;
- Local Air Quality Management Technical Guidance LAQM.TG16, DEFRA, 2016;
- Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1, HA 207/07 - Air Quality, Highways Agency, 2007;
- Land-Use Planning & Development Control: Planning for Air Quality, EPUK & IAQM, 2017; and,
- Guidance on the Assessment of Dust from Demolition and Construction, IAQM, 2014.

Websites Consulted

- Google maps (maps.google.co.uk);
- The UK National Air Quality Archive (www.airquality.co.uk);
- Department for Transport Matrix (www.dft.go.uk/matrix);
- emapsite.com;
- Multi-Agency Geographic Information for the Countryside (http://magic.defra.gov.uk/);
- Planning Practice Guidance (http://planningguidance.planningportal.gov.uk/); and
- North Dorset Council (http://www.dorsetforyou.gov.uk)

Site Specific Reference Documents

- North Dorset District Council Air Quality Updating, Screening and Assessment, 2015;
- North Dorset Local Plan, Adopted January 2016.

## 2.2 Air Quality Legislative Framework

### European Legislation

European air quality legislation is consolidated under Directive 2008/50/EC, which came into force on $11^{th}$ June 2008. This Directive consolidates previous legislation which was designed to deal with specific pollutants in a consistent manner and provides new air quality objectives for fine particulates. The consolidated Directives include:

- **Directive 1999/30/EC** – the First Air Quality "Daughter" Directive – sets ambient air limit values for $NO_2$ and oxides of nitrogen, sulphur dioxide, lead and $PM_{10}$;
- **Directive 2000/69/EC** – the Second Air Quality "Daughter" Directive – sets ambient air limit values for benzene and carbon monoxide; and,
- **Directive 2002/3/EC** – the Third Air Quality "Daughter" Directive – seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.

The fourth daughter Directive was not included within the consolidation and is described as:

- **Directive 2004/107/EC** – sets health-based limits on polycyclic aromatic hydrocarbons, cadmium, arsenic, nickel and mercury, for which there is a requirement to reduce exposure to as low as reasonably achievable.

### UK Legislation

The Air Quality Standards Regulations (Amendments 2016) seek to simplify air quality regulation and provide a new transposition of the Air Quality Framework Directive, First, Second and Third Daughter Directives and also transpose the Fourth Daughter Directive within the UK. The Air Quality Limit Values are transposed into the updated Regulations as Air Quality Standards, with attainment dates in line with the European Directives. SI 2010 No. 1001, Part 7 Regulation 31 extends powers, under Section 85(5) of the Environment Act (1995), for the Secretary of State to give directions to Local Authorities (LAs) for the implementation of these Directives.

The UK Air Quality Strategy is the method for implementation of the air quality limit values in England, Scotland, Wales and Northern Ireland and provides a framework for improving air quality and protecting human health from the effects of pollution.

For each nominated pollutant, the Air Quality Strategy sets clear, measurable, outdoor air quality standards and target dates by which these must be achieved; the combined standard and target date is referred to as the Air Quality Objective (AQO) for that pollutant. Adopted national standards are based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS) and have been translated into a set of Statutory Objectives within the Air Quality (England) Regulations (2000) SI 928, and subsequent amendments.

The AQOs for pollutants included within the Air Quality Strategy and assessed as part of the scope of this report are presented in Table 2.1 along with European Commission (EC) Directive Limits and World Health Organisation (WHO) Guidelines.

**Table 2.1 Air Quality Standards, Objectives, Limit and Target Values**

| Pollutant | Applies | Objective | Concentration Measured as[10] | Date to be achieved and maintained thereafter | European Obligations | Date to be achieved and maintained thereafter | New or existing |
|---|---|---|---|---|---|---|---|
| $PM_{10}$ | UK | 50µg/m³ by end of 2004 (max 35 exceedances a year) | 24-hour mean | 1st January 2005 | 50µg/m³ by end of 2004 (max 35 exceedances a year) | 1st January 2005 | Retain Existing |
| | UK | 40µg/m³ by end of 2004 | Annual mean | 1st January 2005 | 40µg/m³ | 1st January 2005 | |
| $PM_{2.5}$ | UK | 25µg/m³ | Annual Mean | 31st December 2010 | 25µg/m³ | 1st January 2010 | Retain Existing |
| $NO_2$ | UK | 200µg/m³ not to be exceeded more than 18 times a year | 1-Hour Mean | 31st December 2005 | 200µg/m³ not to be exceeded more than 18 times a year | 1st January 2010 | Retain Existing |
| | UK | 40µg/m³ | Annual Mean | 31st December 2005 | 40µg/m³ | 1st January 2010 | |

Within the context of this assessment, the annual mean objectives are those against which residential receptors will be assessed and the short term objectives apply to all receptor locations, both residential and non-residential.

### Local Air Quality Management

Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves assessing present and likely future air quality against the AQOs. If it is predicted that levels at the façade of buildings where members of the public are regularly present (normally residential properties) are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

## 2.3 Planning and Policy Guidance

### National Policy

The National Planning Policy Framework (NPPF) principally brings together and summarises the suite of Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) which previously guided planning policy making. The NPPF broadly retains the principles of PPS 23: Planning and Pollution Control and 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.'*

The Planning Practice Guidance (PPG) web-based resource was launched by the Department for Communities and Local Government (DCLG) on 6 March 2014 to support the National Planning Policy Framework and make it more accessible. A review of PPG: Air Quality identified the following guidance:

> *'When deciding whether air quality is relevant to a planning application, local planning authorities should consider whether the development would:*
>
> *Significantly affect traffic in the immediate vicinity of the proposed development site or further afield. This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to turnover in a large car park; or result in construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more.*
>
> *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; or extraction systems (including chimneys) which require approval under pollution control legislation or biomass boilers or biomass-fuelled CHP plant; centralised boilers or CHP plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area.*
>
> *Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality.*
>
> *Give rise to potentially significant impact (such as dust) during construction for nearby sensitive locations.'*

**Local Policy**

No specific policies were identified relating to Air Quality in the North Dorset Local Plan.

# 3. Assessment Methodology

The potential environmental effects of the operational phase of the proposed development are identified in so far as current knowledge of the site and development allows. The significance of potential environmental effects is assessed according to the latest guidance produced by EPUK and IAQM in January 2017.

The methodology used to determine the potential air quality effects of the construction phase of the proposed development has been derived from the IAQM 'Guidance on the Assessment of the Impacts of Dust from Demolition and Construction' document and is summarised in Section 5.

### 3.1 Determining Significance of the Air Quality Effects

The significance of the effects during the operational phase of the development is based on the latest guidance produced by EPUK and IAQM in January 2017. The guidance provides a basis for a consistent approach that could be used by all parties associated with the planning process to professionally judge the overall significance of the air quality effects based on severity of air quality impacts.

The following rationale is used in determining the severity of the air quality effects at individual receptors:

1. The change in concentration of air pollutants, air quality effects, are quantified and evaluated in the context of AQOs. The effects are provided as a percentage of the Air Quality Assessment Level (AQAL), which may be an AQO, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)';
2. The absolute concentrations are also considered in terms of the AQAL and are divided into categories for long term concentration. The categories are based on the sensitivity of the individual receptor in terms of harm potential. The degree of harm potential to change increases as absolute concentrations are close to or above the AQAL;
3. Severity of the effect is described as qualitative descriptors; negligible, slight, moderate or substantial, by taking into account in combination the harm potential and air quality effect. This means that a small increase at a receptor which is already close to or above the AQAL will have higher severity compared to a relatively large change at a receptor which is significantly below the AQAL;
4. The effects can be adverse when air quality concentration increase or beneficial when concentration decrease as a result of development;
5. The judgement of overall significance of the effects is then based on severity of effects on all the individual receptors considered; and,

6. Where a development is not resulting in any change in emissions itself, the significance of effect is based on the effect of surrounding sources on new residents or users of the development, i.e., will they be exposed to levels above the AQAL.

**Table 3.1 Significance of Effects Matrix**

| Long term average concentration at receptor in assessment year | % Change in concentration relative to AQAL | | | |
|---|---|---|---|---|
| | 1 | 2-5 | 6-10 | >10 |
| ≤75% of AQAL | Negligible | Negligible | Slight | Moderate |
| 76-94% of AQAL | Negligible | Slight | Moderate | Moderate |
| 95-102% of AQAL | Slight | Moderate | Moderate | Substantial |
| 103-109 of AQAL | Moderate | Moderate | Substantial | Substantial |
| ≥110 of AQAL | Moderate | Substantial | Substantial | Substantial |

In accordance with explanation note 2 of Table 6.3 of the EPUK & IAQM guidance. The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5%, will be described as 'Negligible'.

# 4. Baseline Conditions

## 4.1 Air Quality Review

This section provides a review of the existing air quality in the vicinity of the proposed development site in order to provide a benchmark against which to assess potential air quality impacts of the proposed development. Baseline air quality in the vicinity of the proposed development site has been defined from a number of sources, as described in the following sections.

### Local Air Quality Management (LAQM)

As required under section 82 of the Environment Act 1995, North Dorset District Council (NDDC) has conducted an ongoing exercise to review and assess air quality within its area of jurisdiction. The assessments have indicated that concentrations of $NO_2$ and $PM_{10}$ are not above the relevant AQOs at a number of locations of relevant public exposure within the Council. NDDC has no designated AQMAs.

There are no AQMAs within a 20 km radius of the proposed development site.

### Air Quality Monitoring

Monitoring of air quality within NDDC has not been undertaken through continuous or non-continuous monitoring methods since 2009.

### WYG Air Quality Monitoring

Due to air quality monitoring within the area of the proposed development site, WYG conducted a period of diffusion tube monitoring between the 1st to 8th March 2017 to get indicative $NO_2$ levels around the site. The results are shown below in Table 4.1.

**Table 4.1 WYG Diffusion Tube Monitoring Results**

| Site ID | Grid Reference | | Site Type | 2017 Monitored $NO_2$ concentration (µg/m$^3$) |
|---|---|---|---|---|
| | X | Y | | |
| D1 | 381015 | 125144 | Roadside | 17.6 |
| D2 | 382046 | 125523 | Roadside | 22.6 |
| D3 | 381057 | 125851 | Roadside | 17.4 |
| D5 | 380518 | 126473 | Roadside | 29.3 |
| B1 | 381687 | 125667 | Background | 8.5 |

All monitored locations have been period and national bias adjusted. All monitored locations were below the relative AQO of 40 in 2017. All roadside locations have been used for model verification.

### 4.2 Meteorology

Meteorological conditions have significant influence over air pollutant concentrations and dispersion. Pollutant levels can vary significantly from hour to hour as well as day to day, thus any air quality predictions need to be based on detailed meteorological data. The ADMS model calculates the dispersion of pollutants on an hourly basis using a year of local meteorological data. The 2016 meteorological data used in the assessment is derived from Southampton Meteorological Station. This is considered representative of the development site conditions, with all the complete parameters necessary for the ADMS model. Reference should be made to Figure 2 for an illustration of the prevalent wind conditions at the Southampton Meteorological Station site.

### 4.3 Emission Sources

A desktop assessment has identified that traffic movements are likely to be the most significant local source of pollutants affecting the site and its surroundings. The principal traffic derived pollutants likely to impact local receptors are $NO_2$ and $PM_{10}$.

The assessment has therefore modelled all roads within the immediate vicinity of the proposed development site which are considered likely to experience significant changes in traffic flow as a result of the proposed development. Reference should be made to Figure 1 for a graphical representation of the traffic data utilised within the ADMS Roads 4.0 model.

It should be noted that the pollutant contribution of minor roads and rail sources that are not included within the dispersion model is considered to be accounted for via the use of background air quality levels.

### 4.4 Sensitive Receptors

Receptors that are considered as part of the air quality assessment are primarily those existing receptors that are situated along routes predicted to experience significant changes in traffic flow as a result of the proposed development.

The existing receptor locations are summarised in Table 4.2 and the spatial locations of all of the receptors are illustrated in Figure 1.

**Table 4.2 Modelled Existing Sensitive Receptor Locations**

| Discrete Sensitive Receptor | | UK NGR (m) | |
|---|---|---|---|
| | | X | Y |
| R1 | Saint Mary the Virgin Church of England VA Primary School | 381622 | 125660 |
| R2 | Newhouse Farm | 381095 | 125024 |
| R3 | 53 The Meadows | 381188 | 125856 |
| R4 | Shearstock Farm | 382707 | 124769 |
| R5 | 3 Shaftesbury Road | 381695 | 125993 |
| R6 | Meadow Brook Farm | 381957 | 125084 |

| Discrete Sensitive Receptor | | UK NGR (m) | |
|---|---|---|---|
| | | X | Y |
| R7 | Gillingham Primary School | 380957 | 126538 |
| R8 | Gilingham School | 381203 | 126525 |
| R9 | Jasmine Cottage | 380822 | 124724 |
| R10 | Primrose Farm | 380544 | 124006 |
| R11 | 51 Church View | 380539 | 126349 |
| R12 | 3 Wyke Court | 380354 | 126520 |
| R13 | Ham Cottage | 382185 | 125273 |
| R14 | 25 Lockwood Terrace | 381959 | 125736 |
| R15 | Madjeston Farm | 380690 | 125118 |

## 4.5 Ecological Receptors

Air quality impacts associated with the proposed re-development have the potential to impact on receptors of ecological sensitivity within the vicinity of the site. The Conservation of Habitats and Species Regulations (2010) require competent authorities to review planning applications and consents that have the potential to impact on European designated sites (e.g. Special Protection Areas).

A study was undertaken to identify any statutory designated sites of ecological or nature conservation importance within the extents of the dispersion modelling assessment. This was completed using the Multi-Agency Geographic Information for the Countryside (MAGIC) web-based interactive mapping service, which draws together information on key environmental schemes and designations. Following a search within a 1km radius of the site boundary no ecological receptors were identified.

# 5. Assessment of Air Quality Impacts - Construction Phase

## 5.1 Pollutant Sources

Other than negligible emissions from construction vehicles and equipment, the main emissions during construction are likely to be dust and particulate matter generated during earth moving (particularly during dry months) or from construction materials. The main potential effects of dust and particulate matter are:

- Visual - dust plume, reduced visibility, coating and soiling of surfaces leading to annoyance, loss of amenity, the need to clean surfaces;
- Physical and/or chemical contamination and corrosion of artefacts;
- Coating of vegetation and soil contamination; and,
- Health effects due to inhalation e.g. asthma or irritation of the eyes.

A number of other factors such as the amount of precipitation and other meteorological conditions will also greatly influence the amount of particulate matter generated.

Construction activities can give rise to short-term elevated dust/$PM_{10}$ concentrations in neighbouring areas. This may arise from vehicle movements, soiling of the public highway, demolition or windblown stockpiles.

## 5.2 Particulate Matter ($PM_{10}$)

The UK Air Quality Standards seek to control the health implications of respirable $PM_{10}$. However, the majority of particles released from construction will be greater than this in size.

Construction works on site have the potential to elevate localised $PM_{10}$ concentrations in the area. On this basis, mitigation measures should still be taken to minimise these emissions as part of good site practice.

## 5.3 Dust

Particles greater than 10μm are likely to settle out relatively quickly and may cause annoyance due to their soiling capability. There are no formal standards or criteria for nuisance caused by deposited particles, however, a deposition rate of 200mg/m$^2$/day is often presented as a threshold for serious nuisance though this is usually only applied to long term exposure as people are generally more tolerant of dust for a short or defined period. Significant nuisance is likely when the dust coverage of surfaces is visible in contrast with adjacent clean areas, especially when it happens regularly. Severe dust nuisance occurs when the dust is perceptible without a clean reference surface.

Construction activities have the potential to suspend dust, which could result in annoyance of residents surrounding the site. Measures will be taken to minimise the emissions of dust as part of good site practice.

Recommended mitigation measures proportionate to the risk associated with the development and based on best practice guidance are discussed in the following sections.

### 5.4 Methodology

The construction phase assessment utilises the IAQM Guidance on the Assessment of Dust from Demolition and Construction document published in February 2014.

Four construction processes are considered; these are demolition, earthworks, construction and trackout. For each of these phases, the significance of the potential dust impacts is derived following the determination of a dust emission magnitude and the distance of activities to the nearest sensitive receptor, therefore assessing worst case impacts. A full explanation of the methodology is contained in Appendix A.

### 5.5 Assessment Results

Based on the methodology detailed in Appendix A, the scale of the anticipated works has determined the potential dust emission magnitude for each process, as presented in the Table 5.1 below.

**Table 5.1 Dust Emission Magnitude**

| Construction Process | Dust Emission Magnitude |
|---|---|
| Demolition | N/A |
| Earthworks | Large |
| Construction | Large |
| Trackout | Large |

The sensitivity of the surrounding area to each construction process has been determined following stage 2B of the IAQM guidance. The assessment has determined the area sensitivities as shown in the Table 5.2.

**Table 5.2 Sensitivity of the Area**

| Source | Area Sensitivity | | |
|---|---|---|---|
| | Dust Soiling | Health Effects of $PM_{10}$ | Ecological |
| Demolition | N/A | N/A | N/A |
| Earthworks | Medium | Low | N/A |
| Construction | Medium | Low | N/A |
| Trackout | Medium | Low | N/A |

The dust emission magnitude determined in Table 5.1 has been combined with the sensitivity of the area determined in Table 5.2, to determine the risk of impacts prior to the implementation of appropriate mitigation measures. The potential impact significance of dust emissions associated with the construction phase, without mitigation, is presented below in Table 5.3.

**Table 5.3 Impact Significance of Construction Activities without Mitigation**

| Source | Summary Risk of Impacts Prior to Mitigation | | |
|---|---|---|---|
| | Dust Soiling | Health Effects of $PM_{10}$ | Ecological |
| Demolition | N/A | N/A | N/A |
| Earthworks | Medium | Low | N/A |
| Construction | Medium | Low | N/A |
| Trackout | Medium | Low | N/A |

Appropriate mitigation measures are detailed and presented in Section 7. Following the adoption of these measures, the subsequent impact significance of the construction phase is not predicted to be significant.

## 6. Assessment of Air Quality Impacts - Operational Phase

In the context of the proposed development, transportation is identified as the dominant emission source that is likely to cause potential risk of exposure of air pollutants at receptors.

The operational phase assessment therefore consists of the quantified predictions of the change in $NO_2$ and $PM_{10}$ for the operational phase of the development due to changes in traffic movement. Predictions of air quality at the site have been undertaken for the operational phase of the development using ADMS Roads.

In accordance with the provided traffic data, as contained within the supporting Traffic Assessment (TA), the operational phase assessment has been undertaken with an assumed operational opening year of 2021 and 2031. The assessment scenarios are therefore:

- 2016 Baseline = Existing baseline conditions;
- 2021 "Do Minimum" = Baseline conditions + committed development flows;
- 2021 "Do Something" = Baseline conditions + committed development flows + proposed development flows (no traffic mitigation measures);
- 2031 "Do Minimum" = Baseline conditions + committed development flows;
- 2031 "Do Something" = Baseline conditions + committed development flows + proposed development flows + proposed traffic mitigation.

### 6.1 Existing and Predicted Traffic Flows

Baseline 2016 data and projected 2021 and 2031 'do minimum' and 'do something' traffic data has been obtained for the operational phase assessment in the form of Annual Average Daily Traffic figures (AADT). Baseline, 'do minimum' and 'do something' traffic data were provided by i-Transport consultants.

It is assumed the average vehicle speeds on the local road network in an opening year of 2021 and 2031 will be broadly the same as the ones in 2016 as well.

Emission factors for the 2016 baseline and 2021 and 2031 projected 'do minimum' and 'do something' scenarios have been calculated using the Emission Factor Toolkit Version 7.0 (2016).

For the purposes of the air quality assessment, only roads predicted to experience significant changes in flows have been included in the air quality model. These represent the primary access routes to the proposed development site. Where unavailable, traffic speeds have been estimated based on site observations and national speed limits.

A 50m 20km/hr slow down phase is included on each link at every junction and roundabout within the assessment. All of the roads within the dispersion model are illustrated in Figure 1. Detailed traffic figures are provided in the Table 6.1 and Table 6.2.

**Table 6.1 2021 Traffic Data**

| Link | Speed (km/h) | 2016 | | 2021 | | | |
|---|---|---|---|---|---|---|---|
| | | AADT | HGV % | Without Proposed Development | | With Development | |
| | | | | AADT | %HGV | AADT | %HGV |
| B3081 South of Access | 48 | 11,485 | 3.3 | 13,265 | 2.9 | 14,238 | 2.2 |
| B3081 North of Access | 42 | 11,495 | 3.3 | 13,273 | 2.9 | 15,327 | 2.0 |
| B3092 South of Principal Access (South of Cole St Lane) | 49 | 5,611 | 2.7 | 5,908 | 2.6 | 6,637 | 2.3 |
| B3092 North of Brickyard Lane | 27 | 7,185 | 2.7 | 7,583 | 2.5 | 9,099 | 2.0 |
| B3081 South of B3092 | 32 | 12,917 | 2.8 | 14,692 | 2.5 | 17,737 | 1.6 |
| B3081 North of B3092 | 36 | 17,402 | 2.9 | 19,086 | 2.6 | 21,562 | 2.0 |
| B3092 between Wyke Rd and Station Rd | 38 | 14,851 | 3.6 | 15,755 | 3.4 | 16,767 | 2.9 |
| B3081 Wyke Rd | 22 | 9,716 | 3.0 | 10,291 | 2.8 | 11,179 | 2.4 |
| B3092 North of Wyke Rd | 51 | 11,962 | 2.2 | 12,764 | 2.1 | 13,315 | 1.8 |
| Newbury (High Street) | 29 | 4,868 | 0.6 | 5,429 | 0.5 | 6,248 | 0.4 |
| B3092 south of Brickfields Business Park | 51 | 5,612 | 2.7 | 5,905 | 2.6 | 7,038 | 2.1 |
| Principal Street (East) | 44 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Principal Street (West) | 51 | 0 | 0.0 | 0 | 0.0 | 3,762 | 0.0 |

**Table 6.2 2031 Traffic Data**

| Link | Speed (km/h) | 2016 | | 2031 | | | |
|---|---|---|---|---|---|---|---|
| | | AADT | HGV % | Without Proposed Development | | With Development | |
| | | | | AADT | %HGV | AADT | %HGV |
| B3081 South of Access | 48 | 11,485 | 3.3 | 13,825 | 2.9 | 17,987 | 2.7 |
| B3081 North of Access | 42 | 11,495 | 3.3 | 13,832 | 2.9 | 16,216 | 2.9 |
| B3092 South of Principal Access (South of Cole St Lane) | 49 | 5,611 | 2.7 | 6,163 | 2.6 | 7,678 | 2.7 |
| B3092 North of Brickyard Lane | 27 | 7,185 | 2.7 | 7,911 | 2.5 | 10,167 | 2.5 |
| B3081 South of B3092 | 32 | 12,917 | 2.8 | 15,283 | 2.5 | 16,441 | 2.8 |
| B3081 North of B3092 | 36 | 17,402 | 2.9 | 19,878 | 2.6 | 25,642 | 2.6 |
| B3092 between Wyke Rd and Station Rd | 38 | 14,851 | 3.6 | 16,287 | 3.4 | 21,156 | 3.1 |
| B3081 Wyke Rd | 22 | 9,716 | 3.0 | 10,752 | 2.8 | 12,308 | 2.7 |
| B3092 North of Wyke Rd | 51 | 11,962 | 2.2 | 13,325 | 2.1 | 14,568 | 2.4 |
| Newbury (High Street) | 29 | 4,868 | 0.6 | 5,737 | 0.5 | 4,605 | 0.6 |
| B3092 south of Brickfields Business Park | 51 | 5,612 | 2.7 | 6,160 | 2.5 | 9,186 | 2.3 |
| Principal Street (East) | 44 | 0 | 0.0 | 0 | 0.0 | 5,642 | 1.2 |
| Principal Street (West) | 51 | 0 | 0.0 | 0 | 0.0 | 6,465 | 1.1 |

## 6.2 Background Concentrations

The use of background concentrations within the modelling process ensures that pollutant sources other than traffic are represented appropriately. Background sources of pollutants include industrial, domestic and rail emissions within the vicinity of the study site.

Background concentrations as used within the prediction calculations were referenced from the UK National Air Quality Information Archive database based on the National Grid Co-ordinates of 1 x 1 km grid squares nearest to the development site. In June 2014, DEFRA issued revised 2013 based background maps for nitrogen oxide ($NO_X$), $NO_2$, $PM_{10}$ and $PM_{2.5}$ which incorporate updates to the input data used for modelling. 2016 background maps have been utilised throughout the assessment to provide a conservative assessment. The updated mapped background concentrations used in the assessment are summarised in Table 6.3.

**Table 6.3 Published Background Air Quality Levels (µg/m$^3$)**

| UK NGR(m) | | 2016 | | | |
|---|---|---|---|---|---|
| X | Y | $NO_2$ | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| 381500 | 124500 | 6.2 | 8.2 | 14.7 | 10.0 |
| 382500 | 124500 | 6.2 | 8.1 | 13.2 | 9.3 |
| 381500 | 125500 | 7.0 | 9.3 | 14.8 | 10.2 |
| 382500 | 125500 | 6.4 | 8.4 | 13.6 | 9.5 |

## 6.3 Model Verification

Model verification involves the comparison of modelled data to monitored data in order to gain the best possible representation of current pollutant concentrations for the assessment years. The verification process is in general accordance with that contained in Section 7 of the TG16 guidance note and uses the most recently available diffusion tube monitoring data to best represent this.

The verification process consists of using the monitoring data and the published background air quality data in the UK National Air Quality Information Archive to calculate the road traffic contribution of $NO_X$ at the monitoring locations. Outputs from the ADMS Roads model are provided as predicted road traffic contribution $NO_X$ emissions. These are converted into predicted roadside contribution $NO_2$ exposure at the relevant receptor locations based on the updated approach to deriving $NO_2$ from $NO_X$ for road traffic sources published in Local Air Quality Management TG16. The calculation was derived using the $NO_X$ to $NO_2$ worksheet in the online LAQM tools website hosted by DEFRA.

A model correction factor of 2.93 was applied to roadside predicted $NO_X$ concentrations before converting to $NO_2$. This figure demonstrates that the model predictions were in line with the road traffic emissions at the monitoring locations. Table 6.4 summarises the final model/monitored data correlation following the application of the model correction factor.

**Table 6.4 Comparison of Roadside Modelling & Monitoring Results for $NO_2$**

| Tube location | $NO_2$ µg/m$^3$ | | |
|---|---|---|---|
| | Modelled $NO_2$ | Monitored $NO_2$ | Difference (%) |
| D1 | 18.32 | 17.60 | -4.12 |
| D2 | 22.62 | 22.60 | -0.07 |

| Tube location | $NO_2$ µg/m$^3$ | | |
|---|---|---|---|
| | Modelled $NO_2$ | Monitored $NO_2$ | Difference (%) |
| D3 | 17.77 | 17.40 | -2.10 |
| D5 | 28.70 | 29.30 | 2.06 |

The final model produced data at the monitoring locations to within 10% of the monitoring results, as the requirement by TG16 guidance.

The final verification model correlation coefficient (representing the model uncertainty) is 1.01. The 'ideal value' correlation coefficient recommended in Box 7.17 of TG16 is 1.00. The model is therefore considered to be verified and suitably representative of local emissions and exposures.

## 6.4 Summary of Model Inputs

### Table 6.5 Summary of ADMS Roads Model Inputs

| Parameter | Description | Input Value |
|---|---|---|
| **Chemistry** | A facility within ADMS-Roads to calculate the chemical reactions in the atmosphere between Nitric Oxide (NO), $NO_2$, Ozone ($O_3$) and Volatile organic compounds (VOCs). | No atmospheric chemistry parameters included |
| **Meteorology** | Representative meteorological data from a local source | **Southampton Meteorological Station**, hourly sequential data |
| **Surface Roughness** | A setting to define the surface roughness of the model area based upon its location. | **1m** representing a typical surface roughness for **Cities, and Woodlands**. |
| **Latitude** | Allows the location of the model area to be set | United Kingdom = **51.02°** |
| **Monin-Obukhov Length** | This allows a measure of the stability of the atmosphere within the model area to be specified depending upon its character. | Cities and Large Towns= **30m.** |
| **Elevation of Road** | Allows the height of the road link above ground level to be specified. | All road links were set at ground level = **0m**. |
| **Road Width** | Allows the width of the road link to be specified. | Road width used depended on data obtained from OS map data for the specific road link. |
| **Topography** | This enables complex terrain data to be included within the model in order to account for turbulence and plume spread effects of topography | No topographical information used |
| **Time Varied Emissions** | This enables daily, weekly or monthly variations in emissions to be applied to road sources | No time varied emissions used |
| **Road Type** | Allows the effect of different types of roads to be assessed. | **Urban (Not London)** settings were used for the relevant links |
| **Road Speeds** | Enables individual road speeds to be added for each road link | Based on national speed limits |
| **Canyon Height** | Allows the model to take account turbulent flow patterns occurring inside a street with relatively tall buildings on both sides, known as a "street canyon". | No canyons used within the model. |
| **Road Source Emissions** | Road source emission rates are calculated from traffic flow data using the in-built EfT database of traffic emission factors. | The **EFT** Version **7.0 (2016)** dataset was used. |
| **Year** | Predicted EfT emissions rates depend on the year of emission. | **2016** data for verification and baseline operational phase assessment<br>**2021 and 2031** data for the operational phase assessment. |

## 6.5 ADMS Modelling Results

### Traffic Assessment

The ADMS Model has predicted concentrations of $NO_2$ and $PM_{10}$ at relevant receptor locations adjacent to roads likely to be effected by the development, as summarised in the following tables. Only receptors close to roads where there is predicted to be a change in emissions have been assessed.

### Assessment Scenario:

For the operational year of 2021 and 2031, assessment of the effects of emissions from the proposed traffic associated with the scheme, has been undertaken using the Defra Emissions Factor Toolkit 2021 and 2031 emissions rates which take into account of the rate of reduction in emission from road vehicles into the future with the following factors

- 2016 Baseline = (201 Traffic) Existing baseline conditions;
- 2021 "Do Minimum" = Baseline conditions + committed development flows;
- 2021 "Do Something" = Baseline conditions + committed development flows + proposed development flows (no traffic mitigation);
- 2031 "Do Minimum" = Baseline conditions + committed development flows;
- 2031 "Do Something" = Baseline conditions + committed development flows + proposed development flows + traffic mitigation.

An additional theoretical scenario has also been undertaken using emission factors from 2016 for the 'do minimum' and 'do something' based on a recent appeal decision that favoured the uncertainty of emissions forecasts. It should be noted that this is a theoretical scenario which assumes that the government (Defra) predictions for reduction in emissions over the forthcoming years will not occur. However, this should be not be considered as a 'more correct' scenario in accordance with the 2010 note [http://laqm.defra.gov.uk/laqm-faqs/faq5.html] which confirms that: '*There is no evidence to suggest that background concentrations associated with the other (non-traffic) source contributions should not behave as forecast. This disparity in the historical data highlights the uncertainty of future year projections of both $NO_x$ and $NO_2$, but at this stage there is no robust evidence upon which to base any revised road traffic emissions projections*'.

- 2021 'Do Minimum' Theoretical Scenario = Baseline + committed development (**using 2016 traffic emission factors**);
- 2021 'Do Something' Theoretical Scenario = Baseline + committed development + Proposed development (no traffic mitigation measures) (**using 2016 traffic emission factors**);
- 2031 'Do Minimum' Theoretical Scenario = Baseline + committed development (**using 2016 traffic emission factors**);and
- 2031 'Do Something' Theoretical Scenario = Baseline + committed development + proposed development (**using 2016 traffic emission factors**).

The additional theoretical scenario assessment results are presented in Appendix B.

**2021 Scenarios**

<u>Nitrogen Dioxide</u>

Table 6.5 presents a summary of the predicted change in $NO_2$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

### Table 6.5 Predicted Annual Average Concentrations of $NO_2$ at Receptor Locations

| Receptor | | $NO_2$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | Baseline 2016 | No development 2021 | With development 2021 | Development Contribution |
| R1 | Saint Mary the Virgin Church of England VA Primary School | 9.25 | 8.71 | 9.27 | 0.56 |
| R2 | Newhouse Farm | 7.85 | 8.31 | 8.83 | 0.52 |
| R3 | 53 The Meadows | 11.67 | 10.06 | 10.71 | 0.65 |
| R4 | Shearstock Farm | 6.57 | 12.29 | 13.52 | 1.23 |
| R5 | 3 Shaftesbury Road | 22.61 | 17.81 | 21.08 | 3.27 |
| R6 | Meadow Brook Farm | 7.84 | 8.13 | 8.70 | 0.57 |
| R7 | Gillingham Primary School | 13.09 | 11.35 | 11.76 | 0.41 |
| R8 | Gilingham School | 10.86 | 9.62 | 9.97 | 0.35 |
| R9 | Jasmine Cottage | 7.00 | 12.10 | 12.82 | 0.72 |
| R10 | Primrose Farm | 6.74 | 9.38 | 9.74 | 0.37 |
| R11 | 51 Church View | 24.30 | 18.30 | 19.03 | 0.73 |
| R12 | 3 Wyke Court | 31.71 | 22.85 | 23.77 | 0.91 |
| R13 | Ham Cottage | 7.49 | 15.65 | 17.69 | 2.03 |
| R14 | 25 Lockwood Terrace | 18.78 | 15.27 | 18.23 | 2.97 |
| R15 | Madjeston Farm | 8.81 | 8.92 | 9.14 | 0.22 |
| PR1 | Proposed Residential Receptor | 11.87 | 10.30 | 11.79 | 1.49 |
| PR2 | Proposed Residential Receptor | 9.89 | 9.08 | 9.89 | 0.81 |
| PR3 | Proposed Residential Receptor | 9.24 | 8.66 | 9.24 | 0.58 |
| PR4 | Proposed Residential Receptor | 9.73 | 8.93 | 9.51 | 0.58 |
| PR5 | Proposed Residential Receptor | 9.13 | 8.58 | 9.08 | 0.50 |
| PR6 | Proposed Residential Receptor | 9.26 | 8.65 | 9.13 | 0.48 |
| PR7 | Proposed Residential Receptor | 9.65 | 8.86 | 9.36 | 0.50 |
| PR8 | Proposed Residential Receptor | 12.18 | 10.36 | 11.08 | 0.72 |
| PR9 | Proposed Residential Receptor | 10.64 | 9.44 | 10.00 | 0.56 |
| PR10 | Proposed Residential Receptor | 10.32 | 9.27 | 9.79 | 0.52 |
| PR11 | Proposed Residential Receptor | 9.91 | 9.03 | 9.52 | 0.50 |
| PR12 | Proposed Residential Receptor | 9.55 | 8.81 | 9.29 | 0.48 |
| PR13 | Proposed Residential Receptor | 8.74 | 9.29 | 18.26 | 8.97 |
| PR14 | Proposed Residential Receptor | 8.24 | 8.47 | 10.34 | 1.87 |
| PR16 | Proposed Residential Receptor | 8.03 | 8.43 | 9.26 | 0.83 |
| PR17 | Proposed Residential Receptor | 7.90 | 8.05 | 8.81 | 0.76 |
| PR18 | Proposed Residential Receptor | 7.93 | 7.95 | 10.02 | 2.07 |
| PR19 | Proposed Residential Receptor | 8.29 | 8.24 | 12.51 | 4.27 |
| PR20 | Proposed Residential Receptor | 8.08 | 8.03 | 11.78 | 3.75 |
| PR21 | Proposed Residential Receptor | 7.79 | 7.78 | 8.86 | 1.09 |
| PR22 | Proposed Residential Receptor | 6.98 | 6.97 | 7.74 | 0.77 |
| PR23 | Proposed Residential Receptor | 8.06 | 7.94 | 9.00 | 1.07 |
| PR24 | Proposed Residential Receptor | 8.16 | 8.00 | 8.79 | 0.79 |
| PR25 | Proposed Residential Receptor | 8.27 | 8.08 | 8.75 | 0.67 |
| PR26 | Proposed Residential Receptor | 8.43 | 8.15 | 8.71 | 0.56 |
| PR27 | Proposed Residential Receptor | 8.58 | 8.25 | 8.76 | 0.51 |
| PR28 | Proposed Residential Receptor | 8.40 | 8.14 | 8.71 | 0.57 |
| PR29 | Proposed Residential Receptor | 8.22 | 8.03 | 8.76 | 0.73 |
| PR30 | Proposed Residential Receptor | 8.09 | 7.96 | 9.56 | 1.61 |
| PR31 | Proposed Residential Receptor | 8.00 | 7.91 | 10.40 | 2.49 |
| PR32 | Proposed Residential Receptor | 8.32 | 8.11 | 8.81 | 0.70 |

| Receptor | | $NO_2$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | **Baseline 2016** | **No development 2021** | **With development 2021** | **Development Contribution** |
| PR33 | Proposed Residential Receptor | 8.63 | 8.35 | 9.00 | 0.65 |
| PR34 | Proposed Residential Receptor | 8.47 | 8.27 | 9.08 | 0.80 |
| PR35 | Proposed Residential Receptor | 8.23 | 8.06 | 9.05 | 0.99 |
| PR36 | Proposed Residential Receptor | 8.79 | 8.40 | 8.91 | 0.52 |
| PR37 | Proposed Residential Receptor | 8.96 | 8.54 | 9.11 | 0.57 |
| PR38 | Proposed Residential Receptor | 8.61 | 8.30 | 8.87 | 0.57 |
| PR39 | Proposed Residential Receptor | 9.49 | 8.93 | 9.66 | 0.72 |
| PR40 | Proposed Residential Receptor | 9.27 | 8.82 | 9.55 | 0.73 |
| PR41 | Proposed Residential Receptor | 9.15 | 8.79 | 9.58 | 0.79 |
| PR42 | Proposed Residential Receptor | 9.06 | 8.91 | 9.96 | 1.05 |
| PR43 | Proposed Residential Receptor | 8.42 | 8.42 | 10.39 | 1.97 |
| PR44 | Proposed Residential Receptor | 8.62 | 8.75 | 11.00 | 2.25 |
| PR45 | Proposed Residential Receptor | 8.63 | 9.31 | 16.06 | 6.75 |
| PR46 | Proposed Residential Receptor | 8.17 | 8.25 | 10.02 | 1.77 |
| PR47 | Proposed Residential Receptor | 8.21 | 8.52 | 10.00 | 1.48 |
| PR48 | Proposed Residential Receptor | 8.01 | 8.32 | 9.17 | 0.84 |
| PR49 | Proposed Residential Receptor | 8.09 | 8.18 | 9.37 | 1.19 |
| PR50 | Proposed Residential Receptor | 7.91 | 7.99 | 8.69 | 0.70 |
| PR51 | Proposed Residential Receptor | 10.26 | 9.41 | 10.55 | 1.14 |
| PR52 | Proposed Residential Receptor | 8.52 | 8.16 | 8.80 | 0.64 |
| PR53 | Proposed Residential Receptor | 7.60 | 7.77 | 8.20 | 0.44 |
| PR54 | Proposed Residential Receptor | 7.57 | 7.57 | 7.95 | 0.38 |
| PR55 | Proposed Residential Receptor | 7.31 | 7.29 | 7.56 | 0.27 |
| PR56 | Proposed Residential Receptor | 7.25 | 7.30 | 7.56 | 0.26 |
| PR57 | Proposed Residential Receptor | 7.41 | 7.49 | 7.84 | 0.35 |
| PR58 | Proposed Residential Receptor | 7.75 | 7.62 | 8.02 | 0.41 |
| PR59 | Proposed Residential Receptor | 7.46 | 7.37 | 7.68 | 0.30 |
| PR60 | Proposed Residential Receptor | 7.25 | 7.19 | 7.42 | 0.23 |
| PR61 | Proposed Residential Receptor | 7.55 | 7.37 | 7.69 | 0.32 |
| PR62 | Proposed Residential Receptor | 8.00 | 7.69 | 8.13 | 0.45 |
| PR63 | Proposed Residential Receptor | 8.70 | 8.09 | 8.67 | 0.58 |
| PR64 | Proposed Residential Receptor | 8.62 | 8.01 | 8.53 | 0.52 |
| PR65 | Proposed Residential Receptor | 9.55 | 8.89 | 9.37 | 0.48 |
| PR66 | Proposed Residential Receptor | 8.18 | 7.69 | 8.10 | 0.41 |
| PR67 | Proposed Residential Receptor | 8.18 | 7.73 | 8.15 | 0.43 |
| PR68 | Proposed Residential Receptor | 7.59 | 7.31 | 7.59 | 0.28 |
| PR69 | Proposed Residential Receptor | 7.31 | 7.12 | 7.35 | 0.22 |
| PR70 | Proposed Residential Receptor | 7.09 | 6.99 | 7.16 | 0.17 |
| PR71 | Proposed Residential Receptor | 7.17 | 7.07 | 7.28 | 0.20 |
| PR72 | Proposed Residential Receptor | 7.41 | 7.25 | 7.50 | 0.25 |
| **Annual Mean AQO not to be exceeded** | | **40 µg/m$^3$** | | | |

All modelled existing and proposed receptors are predicted to meet the AQO for $NO_2$ in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 6.5, the maximum predicted increase in the annual average exposure to $NO_2$ at any existing receptor, due to changes in traffic movements associated with the development, is 3.27 $\mu g/m^3$ at 3 Shaftesbury Road (R5). All proposed receptors modelled were predicted to be within the AQO.

The significance of changes in traffic flow associated with the development with respect to annual mean $NO_2$ exposure has been assessed with reference to the criteria in Section 3. The outcomes of the assessment are summarised in Table 6.6.

**Table 6.6 Significance of Effects at Key Receptors ($NO_2$)**

| $NO_2$ Significance Effects at Key Receptors | | | | |
|---|---|---|---|---|
| **Receptor** | **Change Due to Development (DS-DM) ($\mu g/m^3$)** | **% Change in Concentration Relative to AQAL** | **% Annual Mean Concentration in Assessment Year** | **Significance** |
| R1 | 0.56 | 1% | <75% of AQAL | Negligible |
| R2 | 0.52 | 1% | <75% of AQAL | Negligible |
| R3 | 0.65 | 2-5% | <75% of AQAL | Negligible |
| R4 | 1.23 | 2-5% | <75% of AQAL | Negligible |
| R5 | 3.27 | 6-10% | <75% of AQAL | Slight |
| R6 | 0.57 | 1% | <75% of AQAL | Negligible |
| R7 | 0.41 | 1% | <75% of AQAL | Negligible |
| R8 | 0.35 | 1% | <75% of AQAL | Negligible |
| R9 | 0.72 | 2-5% | <75% of AQAL | Negligible |
| R10 | 0.37 | 1% | <75% of AQAL | Negligible |
| R11 | 0.73 | 2-5% | <75% of AQAL | Negligible |
| R12 | 0.91 | 2-5% | <75% of AQAL | Negligible |
| R13 | 2.03 | 2-5% | <75% of AQAL | Negligible |
| R14 | 2.97 | 6-10% | <75% of AQAL | Slight |
| R15 | 0.22 | 1% | <75% of AQAL | Negligible |
| *0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance. | | | | |

The magnitude of the effects of changes in traffic flow as a result of the proposed development, with respect to $NO_2$ exposure for existing residential receptors is determined to be 'imperceptible'. The significance is determined to be 'negligible' to 'slight' at all receptors, based on the methodology outlined in section 3. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

Particulate Matter

Table 6.7 presents a summary of the predicted change in annual mean $PM_{10}$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'no development' and 'with development' scenarios.

### Table 6.7 Predicted Annual Average Concentrations of $PM_{10}$ at Receptor Locations

| Receptor | | $PM_{10}$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | Baseline 2016 | No development 2021 | With development 2021 | Development Contribution |
| R1 | Saint Mary the Virgin Church of England VA Primary School | 15.10 | 15.26 | 15.36 | 0.10 |
| R2 | Newhouse Farm | 14.92 | 15.18 | 15.31 | 0.13 |
| R3 | 53 The Meadows | 15.39 | 15.58 | 15.72 | 0.14 |
| R4 | Shearstock Farm | 13.23 | 15.01 | 15.14 | 0.14 |
| R5 | 3 Shaftesbury Road | 16.97 | 17.80 | 18.26 | 0.45 |
| R6 | Meadow Brook Farm | 14.92 | 15.12 | 15.24 | 0.12 |
| R7 | Gillingham Primary School | 14.46 | 14.66 | 14.75 | 0.09 |
| R8 | Gilingham School | 14.72 | 14.87 | 14.95 | 0.07 |
| R9 | Jasmine Cottage | 15.20 | 16.83 | 17.05 | 0.22 |
| R10 | Primrose Farm | 15.17 | 16.00 | 16.11 | 0.11 |
| R11 | 51 Church View | 15.98 | 16.56 | 16.73 | 0.17 |
| R12 | 3 Wyke Court | 16.68 | 17.34 | 17.60 | 0.26 |
| R13 | Ham Cottage | 13.71 | 16.38 | 16.64 | 0.26 |
| R14 | 25 Lockwood Terrace | 16.44 | 17.12 | 17.49 | 0.37 |
| R15 | Madjeston Farm | 15.23 | 15.39 | 15.44 | 0.05 |
| PR1 | Proposed Residential Receptor | 15.49 | 15.77 | 16.14 | 0.37 |
| PR2 | Proposed Residential Receptor | 15.20 | 15.39 | 15.59 | 0.20 |
| PR3 | Proposed Residential Receptor | 15.10 | 15.26 | 15.40 | 0.14 |
| PR4 | Proposed Residential Receptor | 15.17 | 15.34 | 15.47 | 0.14 |
| PR5 | Proposed Residential Receptor | 15.08 | 15.23 | 15.34 | 0.11 |
| PR6 | Proposed Residential Receptor | 15.10 | 15.24 | 15.35 | 0.11 |
| PR7 | Proposed Residential Receptor | 15.14 | 15.30 | 15.41 | 0.11 |
| PR8 | Proposed Residential Receptor | 15.45 | 15.66 | 15.82 | 0.15 |
| PR9 | Proposed Residential Receptor | 15.26 | 15.44 | 15.56 | 0.12 |
| PR10 | Proposed Residential Receptor | 15.22 | 15.39 | 15.50 | 0.11 |
| PR11 | Proposed Residential Receptor | 15.17 | 15.33 | 15.43 | 0.10 |
| PR12 | Proposed Residential Receptor | 15.13 | 15.28 | 15.38 | 0.10 |
| PR13 | Proposed Residential Receptor | 15.04 | 15.47 | 18.00 | 2.54 |
| PR14 | Proposed Residential Receptor | 14.97 | 15.22 | 15.72 | 0.50 |
| PR16 | Proposed Residential Receptor | 14.94 | 15.21 | 15.43 | 0.22 |
| PR17 | Proposed Residential Receptor | 14.92 | 15.10 | 15.29 | 0.19 |
| PR18 | Proposed Residential Receptor | 14.93 | 15.07 | 15.61 | 0.55 |
| PR19 | Proposed Residential Receptor | 14.98 | 15.15 | 16.31 | 1.15 |
| PR20 | Proposed Residential Receptor | 14.95 | 15.09 | 16.10 | 1.01 |
| PR21 | Proposed Residential Receptor | 14.91 | 15.02 | 15.30 | 0.28 |
| PR22 | Proposed Residential Receptor | 14.76 | 14.87 | 15.06 | 0.19 |
| PR23 | Proposed Residential Receptor | 14.94 | 15.06 | 15.33 | 0.27 |
| PR24 | Proposed Residential Receptor | 14.96 | 15.08 | 15.27 | 0.19 |
| PR25 | Proposed Residential Receptor | 14.97 | 15.10 | 15.26 | 0.16 |
| PR26 | Proposed Residential Receptor | 14.99 | 15.12 | 15.24 | 0.12 |
| PR27 | Proposed Residential Receptor | 15.01 | 15.14 | 15.25 | 0.11 |
| PR28 | Proposed Residential Receptor | 14.99 | 15.11 | 15.24 | 0.13 |
| PR29 | Proposed Residential Receptor | 14.96 | 15.09 | 15.26 | 0.17 |
| PR30 | Proposed Residential Receptor | 14.95 | 15.07 | 15.48 | 0.41 |
| PR31 | Proposed Residential Receptor | 14.94 | 15.05 | 15.71 | 0.65 |
| PR32 | Proposed Residential Receptor | 14.98 | 15.11 | 15.27 | 0.16 |

| Receptor | | $PM_{10}$ (µg/m³) | | | |
|---|---|---|---|---|---|
| | | Baseline 2016 | No development 2021 | With development 2021 | Development Contribution |
| PR33 | Proposed Residential Receptor | 15.02 | 15.17 | 15.30 | 0.13 |
| PR34 | Proposed Residential Receptor | 15.00 | 15.15 | 15.33 | 0.18 |
| PR35 | Proposed Residential Receptor | 14.97 | 15.09 | 15.33 | 0.24 |
| PR36 | Proposed Residential Receptor | 15.04 | 15.18 | 15.28 | 0.10 |
| PR37 | Proposed Residential Receptor | 15.06 | 15.22 | 15.32 | 0.11 |
| PR38 | Proposed Residential Receptor | 15.01 | 15.16 | 15.27 | 0.12 |
| PR39 | Proposed Residential Receptor | 15.13 | 15.33 | 15.45 | 0.12 |
| PR40 | Proposed Residential Receptor | 15.10 | 15.30 | 15.43 | 0.13 |
| PR41 | Proposed Residential Receptor | 15.09 | 15.29 | 15.43 | 0.14 |
| PR42 | Proposed Residential Receptor | 15.08 | 15.33 | 15.54 | 0.21 |
| PR43 | Proposed Residential Receptor | 14.99 | 15.20 | 15.68 | 0.48 |
| PR44 | Proposed Residential Receptor | 15.02 | 15.29 | 15.83 | 0.54 |
| PR45 | Proposed Residential Receptor | 13.86 | 14.39 | 16.12 | 1.73 |
| PR46 | Proposed Residential Receptor | 14.96 | 15.15 | 15.59 | 0.43 |
| PR47 | Proposed Residential Receptor | 14.96 | 15.23 | 15.57 | 0.35 |
| PR48 | Proposed Residential Receptor | 14.94 | 15.18 | 15.36 | 0.18 |
| PR49 | Proposed Residential Receptor | 14.95 | 15.13 | 15.41 | 0.28 |
| PR50 | Proposed Residential Receptor | 14.92 | 15.08 | 15.24 | 0.16 |
| PR51 | Proposed Residential Receptor | 14.08 | 14.39 | 14.55 | 0.16 |
| PR52 | Proposed Residential Receptor | 13.85 | 14.05 | 14.14 | 0.09 |
| PR53 | Proposed Residential Receptor | 13.72 | 13.95 | 14.01 | 0.07 |
| PR54 | Proposed Residential Receptor | 13.72 | 13.89 | 13.95 | 0.06 |
| PR55 | Proposed Residential Receptor | 13.69 | 13.81 | 13.85 | 0.04 |
| PR56 | Proposed Residential Receptor | 13.68 | 13.81 | 13.85 | 0.04 |
| PR57 | Proposed Residential Receptor | 13.70 | 13.87 | 13.92 | 0.05 |
| PR58 | Proposed Residential Receptor | 13.74 | 13.90 | 13.96 | 0.06 |
| PR59 | Proposed Residential Receptor | 13.71 | 13.83 | 13.88 | 0.05 |
| PR60 | Proposed Residential Receptor | 13.68 | 13.78 | 13.82 | 0.04 |
| PR61 | Proposed Residential Receptor | 13.72 | 13.83 | 13.88 | 0.05 |
| PR62 | Proposed Residential Receptor | 13.78 | 13.92 | 13.98 | 0.07 |
| PR63 | Proposed Residential Receptor | 13.87 | 14.02 | 14.11 | 0.08 |
| PR64 | Proposed Residential Receptor | 13.86 | 14.00 | 14.07 | 0.08 |
| PR65 | Proposed Residential Receptor | 14.56 | 14.69 | 14.77 | 0.07 |
| PR66 | Proposed Residential Receptor | 13.82 | 13.93 | 13.99 | 0.06 |
| PR67 | Proposed Residential Receptor | 13.80 | 13.92 | 13.99 | 0.07 |
| PR68 | Proposed Residential Receptor | 13.74 | 13.83 | 13.88 | 0.05 |
| PR69 | Proposed Residential Receptor | 13.70 | 13.78 | 13.82 | 0.04 |
| PR70 | Proposed Residential Receptor | 13.68 | 13.75 | 13.78 | 0.03 |
| PR71 | Proposed Residential Receptor | 13.69 | 13.77 | 13.81 | 0.03 |
| PR72 | Proposed Residential Receptor | 13.70 | 13.79 | 13.84 | 0.04 |
| **Annual Mean AQO not to be exceeded** | | **40 µg/m³** | | | |

As indicated in Table 6.7, the maximum predicted increase in the annual average exposure to $PM_{10}$ at any existing and proposed receptors, due to changes in traffic movements associated with the development, is 0.45 µg/m³ at 3 Shaftesbury Road (R5).

All modelled receptor locations are predicted to meet the AQO for $PM_{10}$ in both the 'do minimum' and 'do something' scenarios.

The significance of changes in traffic flow associated with the development with respect to annual mean $PM_{10}$ exposure has been assessed with reference to the criteria in section 3. The outcomes of the assessment are summarised in Table 6.8.

**Table 6.8 Significance of Effects at Key Receptors (Particulate Matter)**

| $PM_{10}$ Significance Effects at Key Receptors | | | | |
|---|---|---|---|---|
| Receptor | Change Due to Development (DS-DM) (µg/m³) | % Change in Concentration Relative to AQAL | % Annual Mean Concentration in Assessment Year | Significance |
| R1 | 0.10 | 0% | <75% of AQAL | Negligible |
| R2 | 0.13 | 0% | <75% of AQAL | Negligible |
| R3 | 0.14 | 0% | <75% of AQAL | Negligible |
| R4 | 0.14 | 0% | <75% of AQAL | Negligible |
| R5 | 0.45 | 1% | <75% of AQAL | Negligible |
| R6 | 0.12 | 0% | <75% of AQAL | Negligible |
| R7 | 0.09 | 0% | <75% of AQAL | Negligible |
| R8 | 0.07 | 0% | <75% of AQAL | Negligible |
| R9 | 0.22 | 1% | <75% of AQAL | Negligible |
| R10 | 0.11 | 0% | <75% of AQAL | Negligible |
| R11 | 0.17 | 0% | <75% of AQAL | Negligible |
| R12 | 0.26 | 1% | <75% of AQAL | Negligible |
| R13 | 0.26 | 1% | <75% of AQAL | Negligible |
| R14 | 0.37 | 1% | <75% of AQAL | Negligible |
| R15 | 0.05 | 0% | <75% of AQAL | Negligible |
| *0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance. | | | | |

The magnitude of the effects of changes in traffic as a result of the proposed development, with respect to annual mean $PM_{10}$ exposure, for existing residential receptors is determined to be 'imperceptible'. The significance has been determined to be 'negligible' based on the methodology outlined in section 3. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

**2031 Scenarios**

<u>Nitrogen Dioxide</u>

Table 6.9 presents a summary of the predicted change in $NO_2$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

### Table 6.9 Predicted Annual Average Concentrations of $NO_2$ at Receptor Locations

| Receptor | | $NO_2$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | Baseline 2016 | No development 2031 | With development 2031 | Development Contribution |
| R1 | Saint Mary the Virgin Church of England VA Primary School | 9.25 | 8.04 | 8.42 | 0.38 |
| R2 | Newhouse Farm | 7.85 | 7.81 | 8.49 | 0.68 |
| R3 | 53 The Meadows | 11.67 | 8.83 | 9.44 | 0.61 |
| R4 | Shearstock Farm | 6.57 | 9.96 | 11.03 | 1.07 |
| R5 | 3 Shaftesbury Road | 22.61 | 13.79 | 14.93 | 1.14 |
| R6 | Meadow Brook Farm | 7.84 | 7.69 | 8.18 | 0.49 |
| R7 | Gillingham Primary School | 13.09 | 10.11 | 10.29 | 0.18 |
| R8 | Gilingham School | 10.86 | 8.70 | 8.96 | 0.26 |
| R9 | Jasmine Cottage | 7.00 | 9.95 | 10.88 | 0.92 |
| R10 | Primrose Farm | 6.74 | 8.25 | 8.70 | 0.46 |
| R11 | 51 Church View | 24.30 | 14.29 | 15.71 | 1.42 |
| R12 | 3 Wyke Court | 31.71 | 16.96 | 17.92 | 0.97 |
| R13 | Ham Cottage | 7.49 | 12.21 | 13.98 | 1.77 |
| R14 | 25 Lockwood Terrace | 18.78 | 12.19 | 13.24 | 1.06 |
| R15 | Madjeston Farm | 8.81 | 8.56 | 8.80 | 0.24 |
| PR1 | Proposed Residential Receptor | 11.87 | 9.04 | 10.81 | 1.78 |
| PR2 | Proposed Residential Receptor | 9.89 | 8.27 | 9.20 | 0.92 |
| PR3 | Proposed Residential Receptor | 9.24 | 8.01 | 8.64 | 0.63 |
| PR4 | Proposed Residential Receptor | 9.73 | 8.18 | 8.82 | 0.64 |
| PR5 | Proposed Residential Receptor | 9.13 | 7.96 | 8.47 | 0.51 |
| PR6 | Proposed Residential Receptor | 9.26 | 8.00 | 8.46 | 0.46 |
| PR7 | Proposed Residential Receptor | 9.65 | 8.13 | 8.61 | 0.48 |
| PR8 | Proposed Residential Receptor | 12.18 | 9.02 | 9.70 | 0.68 |
| PR9 | Proposed Residential Receptor | 10.64 | 8.48 | 8.99 | 0.52 |
| PR10 | Proposed Residential Receptor | 10.32 | 8.36 | 8.82 | 0.46 |
| PR11 | Proposed Residential Receptor | 9.91 | 8.22 | 8.63 | 0.41 |
| PR12 | Proposed Residential Receptor | 9.55 | 8.10 | 8.52 | 0.42 |
| PR13 | Proposed Residential Receptor | 8.74 | 8.42 | 17.57 | 9.16 |
| PR14 | Proposed Residential Receptor | 8.24 | 7.90 | 10.65 | 2.75 |
| PR16 | Proposed Residential Receptor | 8.03 | 7.88 | 9.14 | 1.26 |
| PR17 | Proposed Residential Receptor | 7.90 | 7.64 | 8.51 | 0.86 |
| PR18 | Proposed Residential Receptor | 7.93 | 7.58 | 9.61 | 2.03 |
| PR19 | Proposed Residential Receptor | 8.29 | 7.77 | 12.02 | 4.26 |
| PR20 | Proposed Residential Receptor | 8.08 | 7.63 | 11.25 | 3.62 |
| PR21 | Proposed Residential Receptor | 7.79 | 7.48 | 8.51 | 1.03 |
| PR22 | Proposed Residential Receptor | 6.98 | 6.68 | 7.40 | 0.72 |
| PR23 | Proposed Residential Receptor | 8.06 | 7.57 | 8.58 | 1.01 |
| PR24 | Proposed Residential Receptor | 8.16 | 7.61 | 8.35 | 0.74 |
| PR25 | Proposed Residential Receptor | 8.27 | 7.66 | 8.30 | 0.64 |
| PR26 | Proposed Residential Receptor | 8.43 | 7.70 | 8.21 | 0.51 |
| PR27 | Proposed Residential Receptor | 8.58 | 7.77 | 8.20 | 0.44 |
| PR28 | Proposed Residential Receptor | 8.40 | 7.69 | 8.20 | 0.51 |
| PR29 | Proposed Residential Receptor | 8.22 | 7.63 | 8.29 | 0.66 |
| PR30 | Proposed Residential Receptor | 8.09 | 7.59 | 9.08 | 1.48 |
| PR31 | Proposed Residential Receptor | 8.00 | 7.56 | 9.89 | 2.33 |
| PR32 | Proposed Residential Receptor | 8.32 | 7.68 | 8.29 | 0.61 |

| Receptor | | $NO_2$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | **Baseline 2016** | **No development 2031** | **With development 2031** | **Development Contribution** |
| PR33 | Proposed Residential Receptor | 8.63 | 7.83 | 8.33 | 0.51 |
| PR34 | Proposed Residential Receptor | 8.47 | 7.78 | 8.44 | 0.66 |
| PR35 | Proposed Residential Receptor | 8.23 | 7.65 | 8.53 | 0.87 |
| PR36 | Proposed Residential Receptor | 8.79 | 7.86 | 8.25 | 0.40 |
| PR37 | Proposed Residential Receptor | 8.96 | 7.94 | 8.34 | 0.41 |
| PR38 | Proposed Residential Receptor | 8.61 | 7.80 | 8.25 | 0.46 |
| PR39 | Proposed Residential Receptor | 9.49 | 8.19 | 8.62 | 0.43 |
| PR40 | Proposed Residential Receptor | 9.27 | 8.12 | 8.59 | 0.47 |
| PR41 | Proposed Residential Receptor | 9.15 | 8.10 | 8.63 | 0.53 |
| PR42 | Proposed Residential Receptor | 9.06 | 8.17 | 8.95 | 0.78 |
| PR43 | Proposed Residential Receptor | 8.42 | 7.87 | 9.61 | 1.75 |
| PR44 | Proposed Residential Receptor | 8.62 | 8.08 | 10.04 | 1.96 |
| PR45 | Proposed Residential Receptor | 8.63 | 8.19 | 14.43 | 6.24 |
| PR46 | Proposed Residential Receptor | 8.17 | 7.78 | 9.35 | 1.58 |
| PR47 | Proposed Residential Receptor | 8.21 | 7.93 | 9.23 | 1.30 |
| PR48 | Proposed Residential Receptor | 8.01 | 7.82 | 8.54 | 0.72 |
| PR49 | Proposed Residential Receptor | 8.09 | 7.72 | 8.78 | 1.06 |
| PR50 | Proposed Residential Receptor | 7.91 | 7.61 | 8.22 | 0.61 |
| PR51 | Proposed Residential Receptor | 10.26 | 8.27 | 8.81 | 0.55 |
| PR52 | Proposed Residential Receptor | 8.52 | 7.49 | 7.84 | 0.35 |
| PR53 | Proposed Residential Receptor | 7.60 | 7.24 | 7.53 | 0.29 |
| PR54 | Proposed Residential Receptor | 7.57 | 7.13 | 7.37 | 0.24 |
| PR55 | Proposed Residential Receptor | 7.31 | 6.95 | 7.13 | 0.17 |
| PR56 | Proposed Residential Receptor | 7.25 | 6.95 | 7.14 | 0.18 |
| PR57 | Proposed Residential Receptor | 7.41 | 7.08 | 7.30 | 0.22 |
| PR58 | Proposed Residential Receptor | 7.75 | 7.15 | 7.40 | 0.25 |
| PR59 | Proposed Residential Receptor | 7.46 | 7.00 | 7.20 | 0.20 |
| PR60 | Proposed Residential Receptor | 7.25 | 6.88 | 7.05 | 0.16 |
| PR61 | Proposed Residential Receptor | 7.55 | 7.01 | 7.20 | 0.19 |
| PR62 | Proposed Residential Receptor | 8.00 | 7.20 | 7.44 | 0.24 |
| PR63 | Proposed Residential Receptor | 8.70 | 7.44 | 7.73 | 0.28 |
| PR64 | Proposed Residential Receptor | 8.62 | 7.39 | 7.65 | 0.25 |
| PR65 | Proposed Residential Receptor | 9.55 | 8.26 | 8.50 | 0.24 |
| PR66 | Proposed Residential Receptor | 8.18 | 7.18 | 7.40 | 0.21 |
| PR67 | Proposed Residential Receptor | 8.18 | 7.22 | 7.44 | 0.22 |
| PR68 | Proposed Residential Receptor | 7.59 | 6.95 | 7.11 | 0.16 |
| PR69 | Proposed Residential Receptor | 7.31 | 6.84 | 6.98 | 0.14 |
| PR70 | Proposed Residential Receptor | 7.09 | 6.76 | 6.87 | 0.11 |
| PR71 | Proposed Residential Receptor | 7.17 | 6.81 | 6.94 | 0.13 |
| PR72 | Proposed Residential Receptor | 7.41 | 6.92 | 7.09 | 0.16 |
| **Annual Mean AQO not to be exceeded** | | **40 µg/m$^3$** | | | |

All modelled existing receptors are predicted to meet the AQO for $NO_2$ in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 6.9, the maximum predicted increase in the annual average exposure to $NO_2$ at any existing or proposed receptor, due to changes in traffic movements associated with the development, is 1.14 µg/m$^3$ at 3 Shaftesbury Road (R5). All proposed receptors modelled were predicted to be within the AQO.

The significance of changes in traffic flow associated with the development with respect to annual mean $NO_2$ exposure has been assessed with reference to the criteria in Section 3. The outcomes of the assessment are summarised in Table 6.10.

**Table 6.10 Significance of Effects at Key Receptors ($NO_2$)**

| $NO_2$ Significance Effects at Key Receptors | | | | |
|---|---|---|---|---|
| **Receptor** | **Change Due to Development (DS-DM) (µg/m³)** | **% Change in Concentration Relative to AQAL** | **% Annual Mean Concentration in Assessment Year** | **Significance** |
| R1 | 0.38 | 1% | <75% of AQAL | Negligible |
| R2 | 0.68 | 2-5% | <75% of AQAL | Negligible |
| R3 | 0.61 | 2-5% | <75% of AQAL | Negligible |
| R4 | 1.07 | 2-5% | <75% of AQAL | Negligible |
| R5 | 1.14 | 2-5% | <75% of AQAL | Negligible |
| R6 | 0.49 | 1% | <75% of AQAL | Negligible |
| R7 | 0.18 | 0% | <75% of AQAL | Negligible |
| R8 | 0.26 | 1% | <75% of AQAL | Negligible |
| R9 | 0.92 | 2-5% | <75% of AQAL | Negligible |
| R10 | 0.46 | 1% | <75% of AQAL | Negligible |
| R11 | 1.42 | 2-5% | <75% of AQAL | Negligible |
| R12 | 0.97 | 2-5% | <75% of AQAL | Negligible |
| R13 | 1.77 | 2-5% | <75% of AQAL | Negligible |
| R14 | 1.06 | 2-5% | <75% of AQAL | Negligible |
| R15 | 0.24 | 1% | <75% of AQAL | Negligible |
| *0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance. | | | | |

The magnitude of the effects of changes in traffic flow as a result of the proposed development, with respect to $NO_2$ exposure for existing residential receptors is determined to be 'imperceptible'. The significance is determined to be 'negligible' at all receptors, based on the methodology outlined in section 3. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

<u>Particulate Matter</u>

Table 6.11 presents a summary of the predicted change in annual mean $PM_{10}$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'no development' and 'with development' scenarios.

**Table 6.11 Predicted Annual Average Concentrations of $PM_{10}$ at Receptor Locations**

| **Receptor** | | **$PM_{10}$ (µg/m$^3$)** | | | |
|---|---|---|---|---|---|
| | | **Baseline 2016** | **No development 2031** | **With development 2031** | **Development Contribution** |
| R1 | Saint Mary the Virgin Church of England VA Primary School | 15.10 | 15.26 | 15.43 | 0.17 |

| Receptor | | $PM_{10}$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | **Baseline 2016** | **No development 2031** | **With development 2031** | **Development Contribution** |
| R2 | Newhouse Farm | 14.92 | 15.26 | 15.43 | 0.17 |
| R3 | 53 The Meadows | 15.39 | 15.18 | 15.51 | 0.32 |
| R4 | Shearstock Farm | 13.23 | 15.59 | 15.84 | 0.25 |
| R5 | 3 Shaftesbury Road | 16.97 | 15.03 | 15.59 | 0.56 |
| R6 | Meadow Brook Farm | 14.92 | 17.86 | 18.37 | 0.51 |
| R7 | Gillingham Primary School | 14.46 | 15.12 | 15.36 | 0.23 |
| R8 | Gilingham School | 14.72 | 14.66 | 14.74 | 0.07 |
| R9 | Jasmine Cottage | 15.20 | 14.88 | 14.98 | 0.11 |
| R10 | Primrose Farm | 15.17 | 16.87 | 17.34 | 0.48 |
| R11 | 51 Church View | 15.98 | 16.01 | 16.25 | 0.23 |
| R12 | 3 Wyke Court | 16.68 | 16.59 | 17.27 | 0.68 |
| R13 | Ham Cottage | 13.71 | 17.39 | 17.90 | 0.51 |
| R14 | 25 Lockwood Terrace | 16.44 | 16.44 | 17.38 | 0.94 |
| R15 | Madjeston Farm | 15.23 | 17.15 | 17.63 | 0.48 |
| PR1 | Proposed Residential Receptor | 15.49 | 15.39 | 15.50 | 0.12 |
| PR2 | Proposed Residential Receptor | 15.20 | 15.78 | 16.56 | 0.78 |
| PR3 | Proposed Residential Receptor | 15.10 | 15.40 | 15.81 | 0.41 |
| PR4 | Proposed Residential Receptor | 15.17 | 15.27 | 15.55 | 0.28 |
| PR5 | Proposed Residential Receptor | 15.08 | 15.34 | 15.63 | 0.28 |
| PR6 | Proposed Residential Receptor | 15.10 | 15.23 | 15.46 | 0.23 |
| PR7 | Proposed Residential Receptor | 15.14 | 15.25 | 15.45 | 0.20 |
| PR8 | Proposed Residential Receptor | 15.45 | 15.30 | 15.52 | 0.21 |
| PR9 | Proposed Residential Receptor | 15.26 | 15.67 | 15.95 | 0.28 |
| PR10 | Proposed Residential Receptor | 15.22 | 15.44 | 15.66 | 0.22 |
| PR11 | Proposed Residential Receptor | 15.17 | 15.39 | 15.59 | 0.19 |
| PR12 | Proposed Residential Receptor | 15.13 | 15.34 | 15.51 | 0.18 |
| PR13 | Proposed Residential Receptor | 15.04 | 15.28 | 15.47 | 0.18 |
| PR14 | Proposed Residential Receptor | 14.97 | 15.48 | 20.19 | 4.71 |
| PR16 | Proposed Residential Receptor | 14.94 | 15.22 | 16.56 | 1.33 |
| PR17 | Proposed Residential Receptor | 14.92 | 15.21 | 15.82 | 0.60 |
| PR18 | Proposed Residential Receptor | 14.93 | 15.10 | 15.51 | 0.41 |
| PR19 | Proposed Residential Receptor | 14.98 | 15.07 | 16.06 | 0.99 |
| PR20 | Proposed Residential Receptor | 14.95 | 15.16 | 17.26 | 2.10 |
| PR21 | Proposed Residential Receptor | 14.91 | 15.09 | 16.88 | 1.78 |
| PR22 | Proposed Residential Receptor | 14.76 | 15.02 | 15.52 | 0.50 |
| PR23 | Proposed Residential Receptor | 14.94 | 14.87 | 15.22 | 0.34 |
| PR24 | Proposed Residential Receptor | 14.96 | 15.06 | 15.55 | 0.48 |
| PR25 | Proposed Residential Receptor | 14.97 | 15.08 | 15.43 | 0.35 |
| PR26 | Proposed Residential Receptor | 14.99 | 15.10 | 15.40 | 0.30 |
| PR27 | Proposed Residential Receptor | 15.01 | 15.12 | 15.35 | 0.23 |
| PR28 | Proposed Residential Receptor | 14.99 | 15.14 | 15.34 | 0.20 |
| PR29 | Proposed Residential Receptor | 14.96 | 15.12 | 15.35 | 0.23 |
| PR30 | Proposed Residential Receptor | 14.95 | 15.09 | 15.40 | 0.31 |
| PR31 | Proposed Residential Receptor | 14.94 | 15.07 | 15.79 | 0.72 |
| PR32 | Proposed Residential Receptor | 14.98 | 15.06 | 16.19 | 1.14 |
| PR33 | Proposed Residential Receptor | 15.02 | 15.11 | 15.40 | 0.29 |
| PR34 | Proposed Residential Receptor | 15.00 | 15.17 | 15.41 | 0.23 |
| PR35 | Proposed Residential Receptor | 14.97 | 15.15 | 15.47 | 0.31 |

| Receptor | | $PM_{10}$ (µg/m³) | | | |
|---|---|---|---|---|---|
| | | Baseline 2016 | No development 2031 | With development 2031 | Development Contribution |
| PR36 | Proposed Residential Receptor | 15.04 | 15.10 | 15.51 | 0.42 |
| PR37 | Proposed Residential Receptor | 15.06 | 15.18 | 15.36 | 0.18 |
| PR38 | Proposed Residential Receptor | 15.01 | 15.22 | 15.40 | 0.18 |
| PR39 | Proposed Residential Receptor | 15.13 | 15.16 | 15.37 | 0.21 |
| PR40 | Proposed Residential Receptor | 15.10 | 15.33 | 15.53 | 0.20 |
| PR41 | Proposed Residential Receptor | 15.09 | 15.30 | 15.52 | 0.22 |
| PR42 | Proposed Residential Receptor | 15.08 | 15.30 | 15.54 | 0.24 |
| PR43 | Proposed Residential Receptor | 14.99 | 15.34 | 15.70 | 0.36 |
| PR44 | Proposed Residential Receptor | 15.02 | 15.20 | 16.04 | 0.84 |
| PR45 | Proposed Residential Receptor | 13.86 | 15.30 | 16.25 | 0.95 |
| PR46 | Proposed Residential Receptor | 14.96 | 14.40 | 17.43 | 3.03 |
| PR47 | Proposed Residential Receptor | 14.96 | 15.16 | 15.92 | 0.76 |
| PR48 | Proposed Residential Receptor | 14.94 | 15.23 | 15.86 | 0.62 |
| PR49 | Proposed Residential Receptor | 14.95 | 15.18 | 15.52 | 0.34 |
| PR50 | Proposed Residential Receptor | 14.92 | 15.13 | 15.64 | 0.50 |
| PR51 | Proposed Residential Receptor | 14.08 | 15.08 | 15.37 | 0.29 |
| PR52 | Proposed Residential Receptor | 13.85 | 14.40 | 14.64 | 0.24 |
| PR53 | Proposed Residential Receptor | 13.72 | 14.05 | 14.21 | 0.16 |
| PR54 | Proposed Residential Receptor | 13.72 | 13.95 | 14.08 | 0.13 |
| PR55 | Proposed Residential Receptor | 13.69 | 13.89 | 14.00 | 0.11 |
| PR56 | Proposed Residential Receptor | 13.68 | 13.81 | 13.89 | 0.08 |
| PR57 | Proposed Residential Receptor | 13.70 | 13.82 | 13.90 | 0.08 |
| PR58 | Proposed Residential Receptor | 13.74 | 13.87 | 13.98 | 0.10 |
| PR59 | Proposed Residential Receptor | 13.71 | 13.90 | 14.01 | 0.11 |
| PR60 | Proposed Residential Receptor | 13.68 | 13.83 | 13.92 | 0.09 |
| PR61 | Proposed Residential Receptor | 13.72 | 13.78 | 13.85 | 0.07 |
| PR62 | Proposed Residential Receptor | 13.78 | 13.83 | 13.92 | 0.09 |
| PR63 | Proposed Residential Receptor | 13.87 | 13.92 | 14.03 | 0.11 |
| PR64 | Proposed Residential Receptor | 13.86 | 14.02 | 14.15 | 0.12 |
| PR65 | Proposed Residential Receptor | 14.56 | 14.00 | 14.11 | 0.11 |
| PR66 | Proposed Residential Receptor | 13.82 | 14.70 | 14.80 | 0.10 |
| PR67 | Proposed Residential Receptor | 13.80 | 13.93 | 14.03 | 0.09 |
| PR68 | Proposed Residential Receptor | 13.74 | 13.92 | 14.02 | 0.10 |
| PR69 | Proposed Residential Receptor | 13.70 | 13.83 | 13.91 | 0.07 |
| PR70 | Proposed Residential Receptor | 13.68 | 13.78 | 13.85 | 0.06 |
| PR71 | Proposed Residential Receptor | 13.69 | 13.75 | 13.80 | 0.05 |
| PR72 | Proposed Residential Receptor | 13.70 | 13.77 | 13.83 | 0.06 |
| **Annual Mean AQO not to be exceeded** | | **40 µg/m³** | | | |

As indicated in Table 6.11, the maximum predicted increase in the annual average exposure to $PM_{10}$ at any existing and proposed receptors, due to changes in traffic movements associated with the development, is 0.56 µg/m³ at Shearstock Farm (R4).

All modelled receptor locations are predicted to meet the AQO for $PM_{10}$ in both the 'do minimum' and 'do something' scenarios.

The significance of changes in traffic flow associated with the development with respect to annual mean $PM_{10}$ exposure has been assessed with reference to the criteria in section 3. The outcomes of the assessment are summarised in Table 6.12.

**Table 6.12 Significance of Effects at Key Receptors (Particulate Matter)**

| $PM_{10}$ Significance Effects at Key Receptors | | | | |
|---|---|---|---|---|
| Receptor | Change Due to Development (DS-DM) (µg/m³) | % Change in Concentration Relative to AQAL | % Annual Mean Concentration in Assessment Year | Significance |
| R1 | 0.17 | 0% | <75% of AQAL | Negligible |
| R2 | 0.32 | 1% | <75% of AQAL | Negligible |
| R3 | 0.25 | 1% | <75% of AQAL | Negligible |
| R4 | 0.56 | 1% | <75% of AQAL | Negligible |
| R5 | 0.51 | 1% | <75% of AQAL | Negligible |
| R6 | 0.23 | 1% | <75% of AQAL | Negligible |
| R7 | 0.07 | 0% | <75% of AQAL | Negligible |
| R8 | 0.11 | 0% | <75% of AQAL | Negligible |
| R9 | 0.48 | 1% | <75% of AQAL | Negligible |
| R10 | 0.23 | 1% | <75% of AQAL | Negligible |
| R11 | 0.68 | 2-5% | <75% of AQAL | Negligible |
| R12 | 0.51 | 1% | <75% of AQAL | Negligible |
| R13 | 0.94 | 2-5% | <75% of AQAL | Negligible |
| R14 | 0.48 | 1% | <75% of AQAL | Negligible |
| R15 | 0.12 | 0% | <75% of AQAL | Negligible |
| *0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance. | | | | |

The magnitude of the effects of changes in traffic as a result of the proposed development, with respect to annual mean $PM_{10}$ exposure, for existing residential receptors is determined to be 'imperceptible'. The significance has been determined to be 'negligible' based on the methodology outlined in section 3. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

## 7. Mitigation

### 7.1 Construction Phase

The dust risk categories have been determined in Section 5 for each of the four construction activities. The assessment has determined that the potential impact significance of dust emissions associated with the construction phase of the proposed development is 'high risk' at the worst affected receptors.

Using the methodology described in Appendix A, appropriate site specific mitigation measures associated with the determined level of risk can be found in Section 8.2 of the IAQM Guidance on the Assessment of Dust from Demolition and Construction. The mitigation measures have been divided into general measures applicable to all sites and measures applicable specifically to demolition, earthworks, construction and trackout. They are categorised into 'highly recommended' and 'desirable' measures. In the absence of appropriate regional guidance, to ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.

The mitigation measures for the proposed development are detailed in Table 7.1 and Table 7.2 below:

**Table 7.1 Highly Recommended Construction Phase Mitigation Measures**

| **Communications** |
|---|
| Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. |
| Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. |
| Display the head or regional office contact information |
| **Dust Management** |
| Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real time $PM_{10}$ continuous monitoring and/or visual inspections. |
| 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 offsite, and the action taken to resolve the situation in the log book. |
| Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes. |
| 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 DMP, 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 a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction. |
| Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. |
| Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. |
| Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period |

| |
|---|
| Avoid site runoff of water or mud. |
| Keep site fencing, barriers and scaffolding clean using wet methods. |
| Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. |
| Cover, seed or fence stockpiles to prevent wind whipping. |
| Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable |
| 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 15 mph on surfaced and 10 mph on un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate) |
| Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials. |
| Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing) |
| Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems |
| Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. |
| Use enclosed chutes and conveyors and covered skips |
| Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. |
| Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods |
| Avoid bonfires and burning of waste materials. |
| **Demolition** |
| Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). |
| Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground. |
| Avoid explosive blasting, using appropriate manual or mechanical alternatives. |
| Bag and remove any biological debris or damp down such material before demolition. |
| **Earthworks** |
| No action required. |
| **Construction** |
| Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. |
| **Trackout** |
| Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. |
| Avoid dry sweeping of large areas. |
| Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. |
| Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. |
| Record all inspections of haul routes and any subsequent action in a site log book. |
| Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned. |
| Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). |
| Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. |
| Access gates to be located at least 10m from receptors where possible. |

**Table 7.2 Desirable Construction Phase Mitigation Measures**

| **Communication** |
|---|
| No action required. |
| **Dust Management** |
| No action required. |
| **Demolition** |
| No action required. |
| **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 (roughening of concrete surfaces) if possible. |
| Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. |
| For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust |
| **Trackout** |
| No action required. |

Following the implementation of the mitigation measures detailed in the tables above, the impact significance of the construction phase is not considered to be significant.

## 7.2 Operational Phase

### Traffic

Although an assessment of road traffic exhaust emissions has predicted no exceedances of the AQO, implementing measures to promote sustainable travel could result in fewer vehicle trips and therefore a reduction in associated vehicle emissions. This is likely to result in reductions of the mean roadside concentrations of traffic-related pollutant concentrations.

The following mitigation measures aim to increase the number of residents travelling to and from the site on foot, by cycle and/or by public transport. As such the number of trips to and from the site made by private car, and especially the single occupancy private car, will be reduced. The following measures are considered best practice but should not be regarded as an exhaustive list of potential mitigation options:

- Minimise reliance upon motor vehicle use through a Framework Travel Plan;
- Promote local transport facilities;
- Inclusion of integrated cycle paths into surrounding environments; and,
- Inclusion of pedestrian walkways into surrounding environments.

# 8. Conclusions

WYG have undertaken an Air Quality Assessment for proposed multipurpose development at the Strategic Land Allocation south of Gillingham, North Dorset in accordance with the methodology and parameters described within this report.

Prior to the implementation of appropriate mitigation measures, the potential impact significance of dust emissions associated with the construction phase of the proposed development has potential as 'high' at some worst affected receptors without mitigation. However, appropriate site specific mitigation measures have been recommended based on Section 8.2 of the IAQM Guidance on the Assessment of Dust from Demolition, Earthworks, Construction and Trackout. It is anticipated that with these appropriate mitigation measures along with the Construction Environmental Management Plan in place,the risk of adverse effects due to emissions from the construction phase will not be significant.

For the operational year of 2021, assessment of the effects of emissions from the proposed traffic associated with the scheme, has been undertaken under two scenarios:

- Scenario 1: Using the Department for Transport (DfT) 2021 and 2031 emissions rates which take into account of the rate of reduction in emission from road vehicles into the future; and
- Scenario 2: Using the theoretical assessment with emission factors of the year of 2016 for the future 2021 and 2031 'with and without' development scenarios. This scenario assumes no reduction in emissions rates from road vehicles from 2016 to 2021 and 2031.

<u>2021 Assessment Results</u>

For Scenario 1, the 2021 assessment of the effect of emissions from traffic associated with the scheme, has determined that the maximum predicted increase in the annual average exposure to $NO_2$ at any existing residential receptors is likely to be 3.27 $\mu g/m^3$ at 3 Shaftesbury Road (R5).

For $PM_{10}$, the maximum predicted increase in the annual average exposure is likely to be 0.45 $\mu g/m^3$ at 3 Shaftesbury Road (R5).

All modelled residential and proposed residential receptors are predicted to meet the AQO for $NO_2$ and $PM_{10}$ in the 'do minimum' and 'do something' scenarios operational year scenarios.

The assessment of the significance of the effects of the proposed development with respect to $NO_2$ exposure is determined to be 'negligible' to 'slight' for all receptors.

With respect to predicted $PM_{10}$ exposure, the significance of the proposed development is determined to be 'negligible'.

2031 Assessment Results

For Scenario 1, the 2031 assessment of the effect of emissions from traffic associated with the scheme, has determined that the maximum predicted increase in the annual average exposure to $NO_2$ at any existing residential receptors is likely to be 1.14 µg/m$^3$ at 3 Shaftesbury Road (R5).

For $PM_{10}$, the maximum predicted increase in the annual average exposure is likely to be 0.56 µg/m$^3$ at Shearstock Farm (R4).

All modelled residential and proposed residential receptors are predicted to meet the AQO for $NO_2$ and $PM_{10}$ in the 'do minimum' and 'do something' scenarios operational year scenarios.

The assessment of the significance of the effects of the proposed development with respect to $NO_2$ exposure is determined to be 'negligible' for all receptors.

With respect to predicted $PM_{10}$ exposure, the significance of the proposed development is determined to be 'negligible'.

In conclusion, the proposed development is not considered to be contrary to any of the national and local planning policies.

# Figures

**Figure 1 Air Quality Assessment Area**

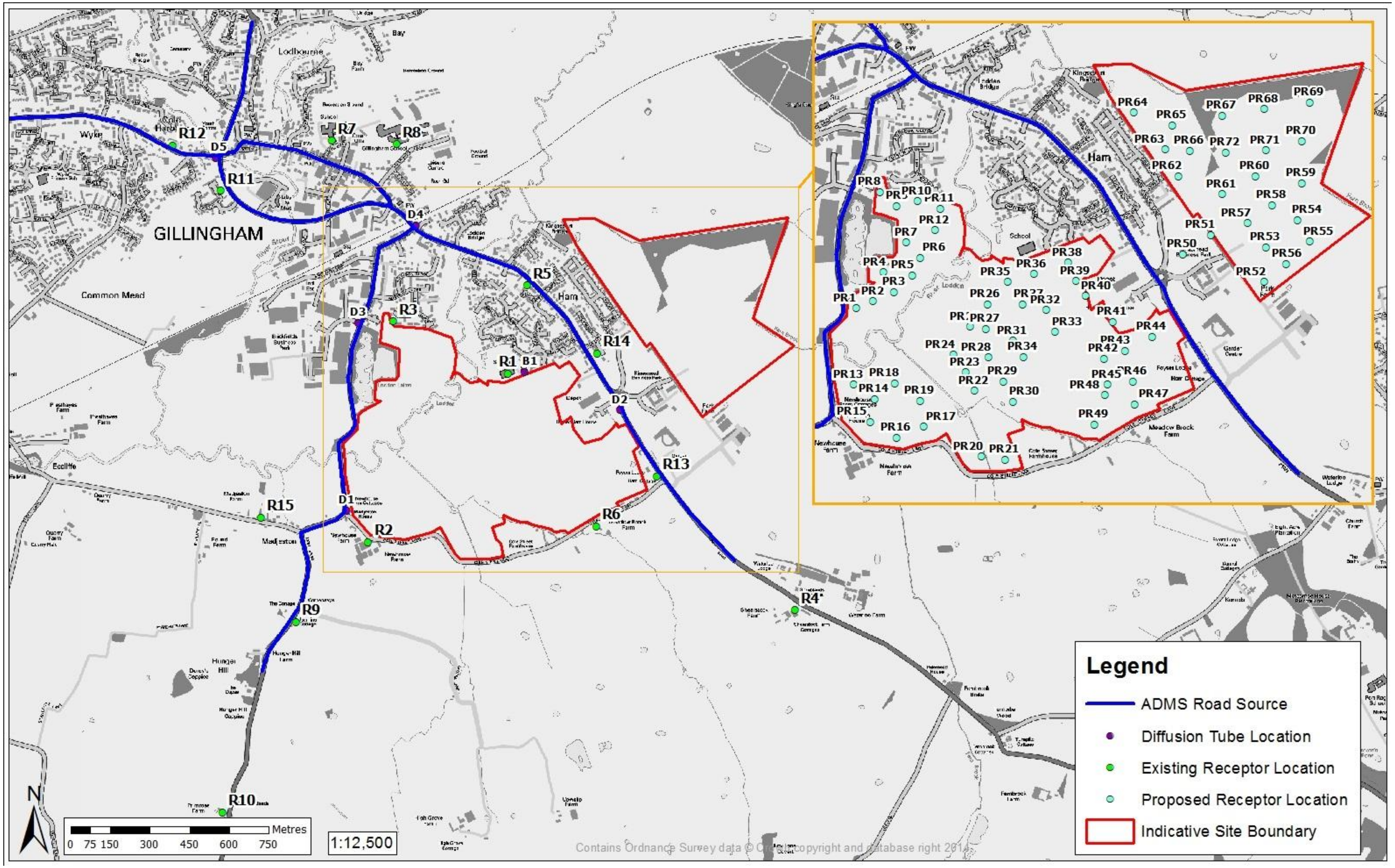


**Figure 2** **Southampton 2016 Meteorological Station Wind Rose**

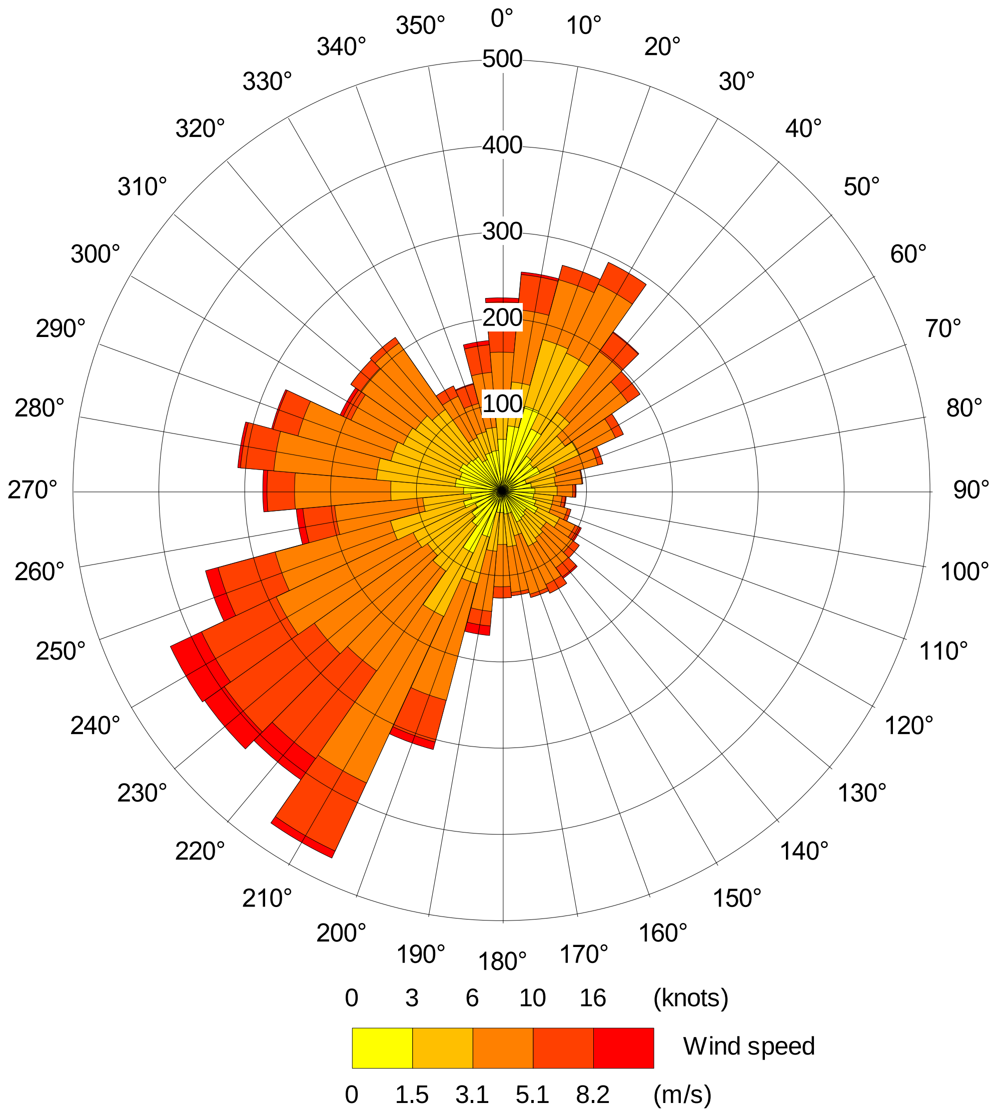


**Figure 3 2021 Predicted Environmental Concentration of $NO_2$ – Contour Map**

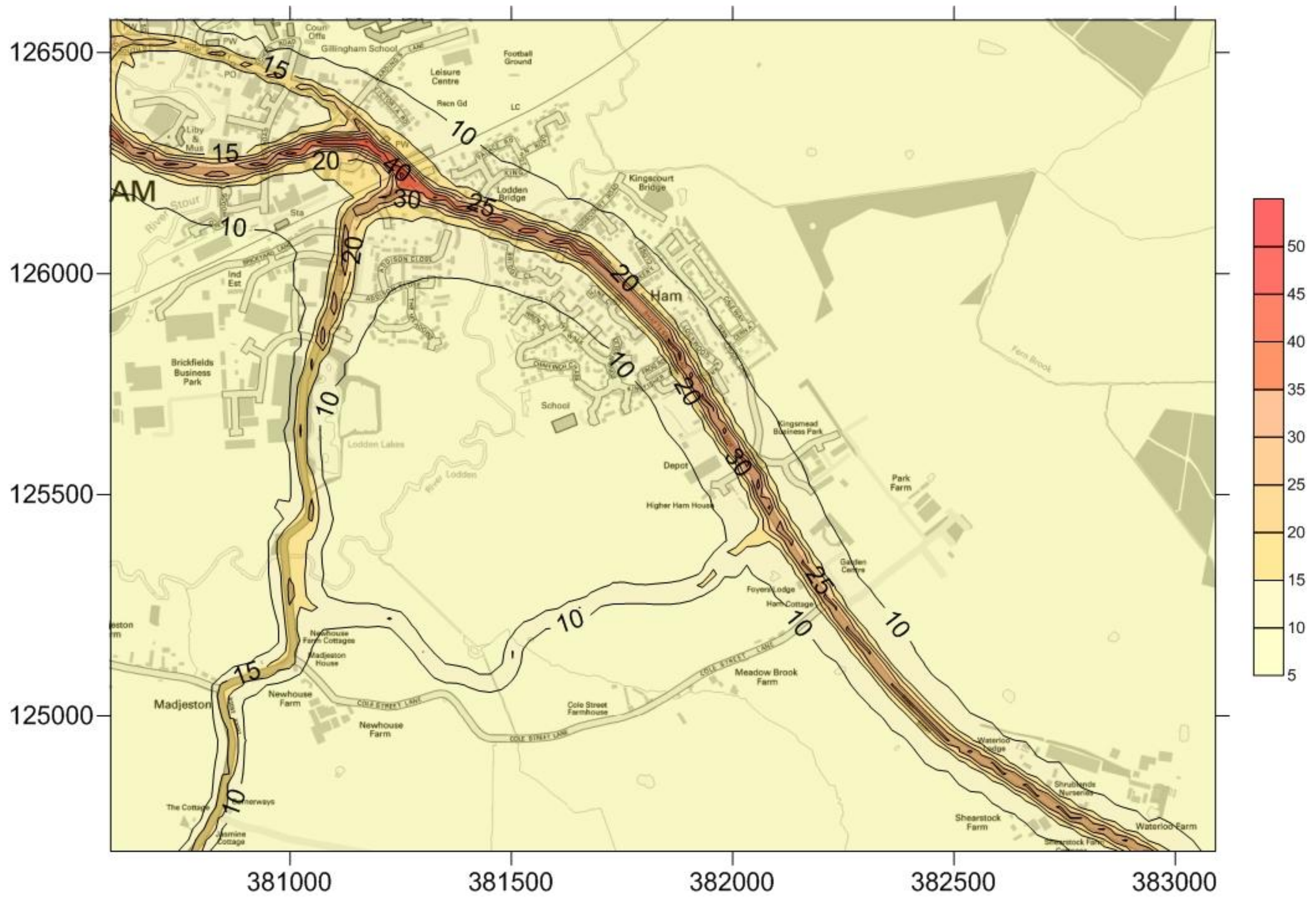
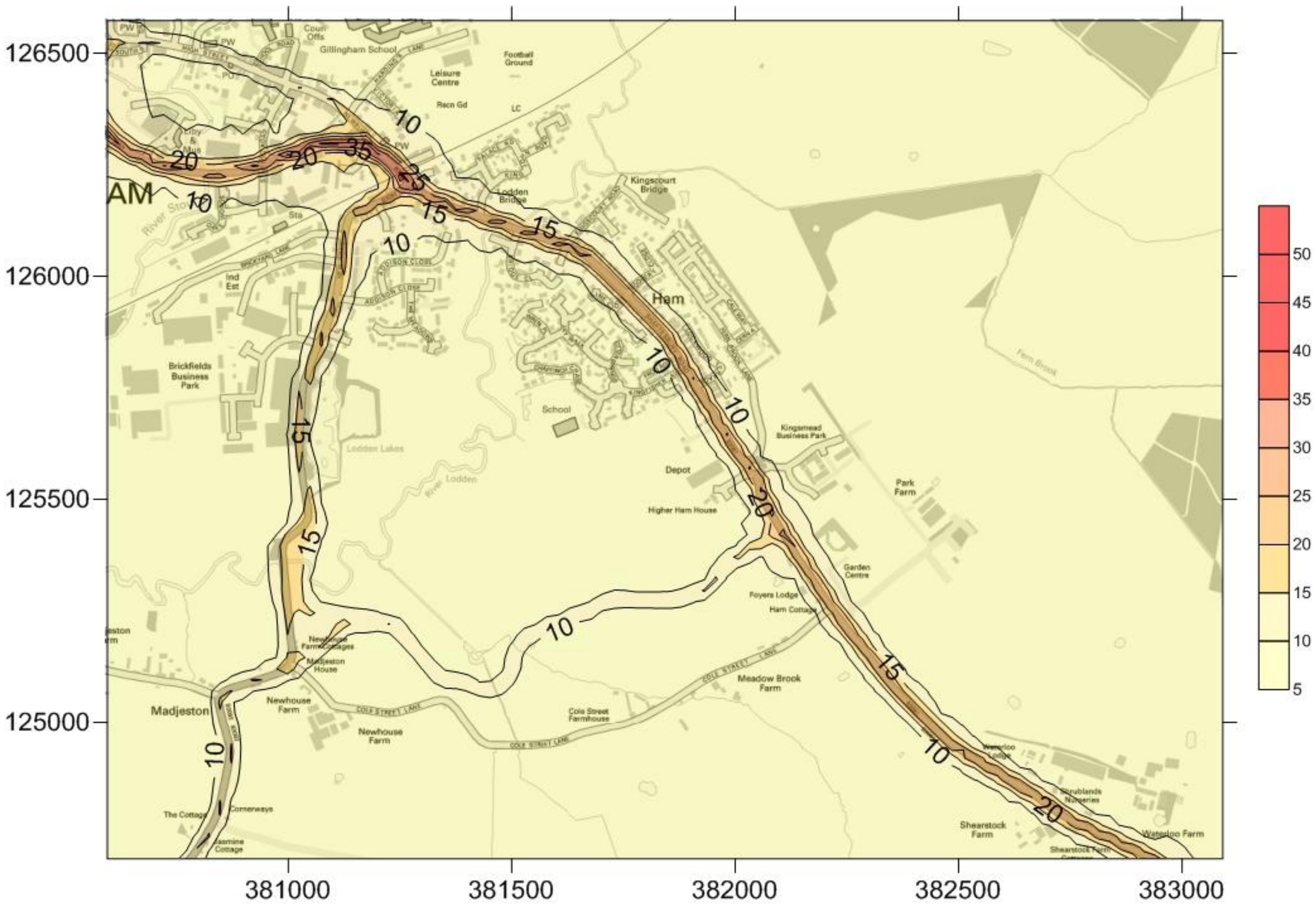


**Figure 4 2031 Predicted Environmental Concentration of $NO_2$ – Contour Map**



# Appendix A Construction Phase Assessment Methodology

The following information sets out the adopted approach to the construction phase impact assessment in accordance with the aforementioned IAQM guidance[1].

**Step 1 – Screen the Requirement for a more Detailed Assessment**

An assessment is required if there are sensitive receptors within 350m of the site boundary, within 50m of the route(s) used by construction vehicles on the surrounding road network, or within 500m from the site entrance. A detailed assessment is also required if there is an ecological receptor within 50m of the site boundary.

**Step 2A – Define the Potential Dust Emission Magnitude**

*Demolition*

The dust emission magnitude for the demolition phase has been determined based on the below criteria:

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

*Earthworks*

The dust emission magnitude for the planned earthworks has been determined based on the below criteria:

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

*Construction*

The dust emission magnitude for the construction phase has been determined based on the below criteria:

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

*Trackout*

The dust emission magnitude for trackout has been determined based on the below criteria:

- *Large:* >50 HGV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m;
- *Medium:* 10-50 HGV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100m; and,

[1] Institute of Air Quality Management 2014. *Guidance on the Assessment of dust from demolition and construction.*

- *Small:* <10 HGV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m.

**Step 2B - Defining the Sensitivity of the Area**

*Sensitivities of People to Dust Soiling Effects*

- *High:*
  - Users can reasonably expect a enjoyment of a high level of amenity;
  - The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably expect to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land; and,
  - Indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.
- *Medium:*
  - Users can reasonably expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home;
  - The appearance, aesthetics or value of their property could be diminished by soiling;
  - The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land; and,
  - Indicative examples include parks and places of work.
- *Low:*
  - The enjoyment of amenity would not reasonably be expected;
  - Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling;
  - There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land; and,
  - Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout, using the following table:

**Table A1 – 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 |
| | 1-10 | Medium | Low | Low | Low |
| Medium | >1 | Medium | Low | Low | Low |
| Low | >1 | Low | Low | Low | Low |

*Note* - The likely routes the construction traffic will use should also be included to enable the presence of trackout receptors to be included in the assessment. As a general guidance, without site-specific mitigation, trackout may occur along the public highway up to 500 m from large sites (as defined in step 2A), 200 m from medium sites and 50 m from small sites, as measured from the site exit.

*Sensitivities of People to the Health Effects of* $PM_{10}$

- *High:*
  - Locations where members of the public are exposed over a time period relevant to the air quality objective for $PM_{10}$ (in the

case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day);

  * Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.

- *Medium:*
  * Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for $PM_{10}$ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day); and,
  * Indicative examples include office and shop workers, but will generally not include workers occupationally exposed to $PM_{10}$, as protection is covered by Health and Safety at Work legislation.
- *Low:*
  * Locations where human exposure is transient; and,
  * Indicative examples include public footpaths, playing fields, parks and shopping streets.

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout, using the following table:

**Table A2 - Sensitivity of the Area to Human Health Impacts**

| Receptor Sensitivity | Annual Mean $PM_{10}$ Concentration | Number of Receptors | Distance from the Source (m) | | | | |
|---|---|---|---|---|---|---|---|
| | | | <20 | <50 | <100 | <200 | <350 |
| High | >32 ·g/m$^3$ | >100 | High | High | High | Medium | Low |
| | | 10-100 | High | High | Medium | Low | Low |
| | | 1-10 | High | Medium | Low | Low | Low |
| | 28 - 32 ·g/m$^3$ | >100 | High | High | Medium | Low | Low |
| | | 10-100 | High | Medium | Low | Low | Low |
| | | 1-10 | High | Medium | Low | Low | Low |
| | 24 – 28 ·g/m$^3$ | >100 | High | Medium | Low | Low | Low |
| | | 10-100 | High | Medium | Low | Low | Low |
| | | 1-10 | Medium | Low | Low | Low | Low |
| | <24 ·g/m$^3$ | >100 | Medium | Low | Low | Low | Low |
| | | 10-100 | Low | Low | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low | Low |
| Medium | - | >10 | High | Medium | Low | Low | Low |
| | - | 1-10 | Medium | Low | Low | Low | Low |
| Low | - | >1 | Low | Low | Low | Low | Low |

*Note* - The likely routes the construction traffic will use should also be included to enable the presence of trackout receptors to be included in the assessment. As a general guidance, without site-specific mitigation, trackout may occur along the public highway up to 500 m from large sites (as defined in step 2A), 200 m from medium sites and 50 m from small sites, as measured from the site exit.

*Sensitivities of Receptors to Ecological Effects*

- *High:*
  * Locations with an international or national designation and the designated features may be affected by dust soiling;
  * Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain; and,
  * Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
- *Medium:*

- Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown;
- Locations with a national designation where the features may be affected by dust deposition; and,
- Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.

- *Low:*
  - Locations with a local designation where the features may be affected by dust deposition; and,
  - Indicative example is a local Nature Reserve with dust sensitive features.

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout, using the following table:

**Table A3 - Sensitivity of the Area to Ecological Impacts**

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

*Note* - The likely routes the construction traffic will use should also be included to enable the presence of trackout receptors to be included in the assessment. As a general guidance, without site-specific mitigation, trackout may occur along the public highway up to 500 m from large sites (as defined in step 2A), 200 m from medium sites and 50 m from small sites, as measured from the site exit.

**Step 2C - Defining the Risk of Impacts**

The risk of impacts with no mitigation is determined by combining the dust emission magnitude determined in Step 2A and the sensitivity of the area determined in Step 2B.

The following tables provide a method of assigning the level of risk for each activity.

*Demolition*

**Table A4 - Risk of Dust Impacts, Demolition**

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

*Earthworks*

**Table A5 - Risk of Dust Impacts, Earthworks**

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

*Construction*

**Table A6 - Risk of Dust Impacts, Construction**

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

*Trackout*

**Table A7 - Risk of Dust Impacts, Trackout**

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

**Step 3 – Site Specific Mitigation**

The dust risk categories for each of the four activities determined in Step 2C should be used to define the appropriate, site-specific mitigation measures to be adopted.

These mitigation measures are contained within section 8.2 of the IAQM Guidance on the Assessment of Dust from Demolition and Construction.

# Appendix B Theoretical Scenario Results

### Scenario 2 (Theoretical Scenario) Results

For Theoretical Scenario 2 using the 2016 traffic emission rate, the assessment has determined that all modelled existing and proposed receptors predicted to meet the AQO, in both the 'do minimum' and 'do something' scenario for $NO_2$ in the 2021 and 2031 assessment scenarios. All receptor locations are expected to meet the AQO, in both the 'do minimum' and 'do something' scenario for $PM_{10}$ in the 2021 and 2031 assessment scenarios. This assessment can be seen as 'worst case' and for information only, and the findings in the main body of the report should be used for informing appropriate mitigation.

**Table B1 2021 Theoretical Scenario $NO_2$ Results**

| Receptor | | $NO_2$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | Baseline 2016 | No development 2021 | With development 2021 | Development Contribution |
| R1 | Saint Mary the Virgin Church of England VA Primary School | 9.25 | 9.85 | 10.71 | 0.86 |
| R2 | Newhouse Farm | 7.85 | 9.17 | 9.94 | 0.77 |
| R3 | 53 The Meadows | 11.67 | 12.08 | 13.06 | 0.98 |
| R4 | Shearstock Farm | 6.57 | 16.16 | 17.98 | 1.82 |
| R5 | 3 Shaftesbury Road | 22.61 | 24.26 | 28.84 | 4.58 |
| R6 | Meadow Brook Farm | 7.84 | 8.87 | 9.76 | 0.88 |
| R7 | Gillingham Primary School | 13.09 | 13.34 | 13.93 | 0.59 |
| R8 | Gilingham School | 10.86 | 11.14 | 11.63 | 0.50 |
| R9 | Jasmine Cottage | 7.00 | 15.58 | 16.61 | 1.04 |
| R10 | Primrose Farm | 6.74 | 11.25 | 11.79 | 0.55 |
| R11 | 51 Church View | 24.30 | 24.59 | 25.51 | 0.91 |
| R12 | 3 Wyke Court | 31.71 | 31.65 | 32.72 | 1.07 |
| R13 | Ham Cottage | 7.49 | 21.19 | 24.07 | 2.88 |
| R14 | 25 Lockwood Terrace | 18.78 | 20.44 | 24.83 | 4.39 |
| R15 | Madjeston Farm | 8.81 | 9.53 | 9.86 | 0.33 |
| PR1 | Proposed Residential Receptor | 11.87 | 12.40 | 14.61 | 2.22 |
| PR2 | Proposed Residential Receptor | 9.89 | 10.42 | 11.64 | 1.22 |
| PR3 | Proposed Residential Receptor | 9.24 | 9.75 | 10.62 | 0.87 |
| PR4 | Proposed Residential Receptor | 9.73 | 10.19 | 11.07 | 0.87 |
| PR5 | Proposed Residential Receptor | 9.13 | 9.61 | 10.37 | 0.75 |
| PR6 | Proposed Residential Receptor | 9.26 | 9.74 | 10.45 | 0.71 |
| PR7 | Proposed Residential Receptor | 9.65 | 10.09 | 10.83 | 0.74 |
| PR8 | Proposed Residential Receptor | 12.18 | 12.57 | 13.65 | 1.08 |
| PR9 | Proposed Residential Receptor | 10.64 | 11.06 | 11.88 | 0.82 |
| PR10 | Proposed Residential Receptor | 10.32 | 10.76 | 11.54 | 0.77 |
| PR11 | Proposed Residential Receptor | 9.91 | 10.38 | 11.12 | 0.74 |
| PR12 | Proposed Residential Receptor | 9.55 | 10.01 | 10.72 | 0.71 |
| PR13 | Proposed Residential Receptor | 8.74 | 10.76 | 23.68 | 12.92 |
| PR14 | Proposed Residential Receptor | 8.24 | 9.41 | 12.22 | 2.80 |
| PR16 | Proposed Residential Receptor | 8.03 | 9.34 | 10.61 | 1.27 |
| PR17 | Proposed Residential Receptor | 7.90 | 8.72 | 9.88 | 1.16 |
| PR18 | Proposed Residential Receptor | 7.93 | 8.57 | 11.68 | 3.11 |
| PR19 | Proposed Residential Receptor | 8.29 | 9.07 | 15.37 | 6.30 |
| PR20 | Proposed Residential Receptor | 8.08 | 8.70 | 14.27 | 5.57 |

| Receptor | | $NO_2$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | Baseline 2016 | No development 2021 | With development 2021 | Development Contribution |
| PR21 | Proposed Residential Receptor | 7.79 | 8.28 | 9.92 | 1.64 |
| PR22 | Proposed Residential Receptor | 6.98 | 7.48 | 8.64 | 1.16 |
| PR23 | Proposed Residential Receptor | 8.06 | 8.56 | 10.15 | 1.60 |
| PR24 | Proposed Residential Receptor | 8.16 | 8.66 | 9.85 | 1.19 |
| PR25 | Proposed Residential Receptor | 8.27 | 8.78 | 9.79 | 1.01 |
| PR26 | Proposed Residential Receptor | 8.43 | 8.91 | 9.75 | 0.83 |
| PR27 | Proposed Residential Receptor | 8.58 | 9.08 | 9.86 | 0.78 |
| PR28 | Proposed Residential Receptor | 8.40 | 8.89 | 9.76 | 0.86 |
| PR29 | Proposed Residential Receptor | 8.22 | 8.72 | 9.82 | 1.10 |
| PR30 | Proposed Residential Receptor | 8.09 | 8.59 | 11.00 | 2.41 |
| PR31 | Proposed Residential Receptor | 8.00 | 8.51 | 12.24 | 3.73 |
| PR32 | Proposed Residential Receptor | 8.32 | 8.84 | 9.91 | 1.07 |
| PR33 | Proposed Residential Receptor | 8.63 | 9.26 | 10.24 | 0.99 |
| PR34 | Proposed Residential Receptor | 8.47 | 9.12 | 10.34 | 1.22 |
| PR35 | Proposed Residential Receptor | 8.23 | 8.76 | 10.24 | 1.48 |
| PR36 | Proposed Residential Receptor | 8.79 | 9.33 | 10.11 | 0.78 |
| PR37 | Proposed Residential Receptor | 8.96 | 9.56 | 10.44 | 0.87 |
| PR38 | Proposed Residential Receptor | 8.61 | 9.17 | 10.03 | 0.86 |
| PR39 | Proposed Residential Receptor | 9.49 | 10.23 | 11.35 | 1.12 |
| PR40 | Proposed Residential Receptor | 9.27 | 10.04 | 11.18 | 1.14 |
| PR41 | Proposed Residential Receptor | 9.15 | 9.99 | 11.21 | 1.22 |
| PR42 | Proposed Residential Receptor | 9.06 | 10.18 | 11.80 | 1.62 |
| PR43 | Proposed Residential Receptor | 8.42 | 9.36 | 12.32 | 2.96 |
| PR44 | Proposed Residential Receptor | 8.62 | 9.93 | 13.30 | 3.37 |
| PR45 | Proposed Residential Receptor | 8.63 | 11.23 | 21.07 | 9.84 |
| PR46 | Proposed Residential Receptor | 8.17 | 9.09 | 11.74 | 2.65 |
| PR47 | Proposed Residential Receptor | 8.21 | 9.52 | 11.76 | 2.24 |
| PR48 | Proposed Residential Receptor | 8.01 | 9.21 | 10.49 | 1.28 |
| PR49 | Proposed Residential Receptor | 8.09 | 8.95 | 10.76 | 1.81 |
| PR50 | Proposed Residential Receptor | 7.91 | 8.64 | 9.72 | 1.08 |
| PR51 | Proposed Residential Receptor | 10.26 | 11.42 | 13.18 | 1.77 |
| PR52 | Proposed Residential Receptor | 8.52 | 9.34 | 10.34 | 1.00 |
| PR53 | Proposed Residential Receptor | 7.60 | 8.67 | 9.34 | 0.67 |
| PR54 | Proposed Residential Receptor | 7.57 | 8.36 | 8.95 | 0.59 |
| PR55 | Proposed Residential Receptor | 7.31 | 7.88 | 8.30 | 0.42 |
| PR56 | Proposed Residential Receptor | 7.25 | 7.89 | 8.30 | 0.41 |
| PR57 | Proposed Residential Receptor | 7.41 | 8.23 | 8.74 | 0.52 |
| PR58 | Proposed Residential Receptor | 7.75 | 8.42 | 9.06 | 0.64 |
| PR59 | Proposed Residential Receptor | 7.46 | 8.01 | 8.49 | 0.48 |
| PR60 | Proposed Residential Receptor | 7.25 | 7.70 | 8.06 | 0.37 |
| PR61 | Proposed Residential Receptor | 7.55 | 8.02 | 8.50 | 0.48 |
| PR62 | Proposed Residential Receptor | 8.00 | 8.55 | 9.23 | 0.68 |
| PR63 | Proposed Residential Receptor | 8.70 | 9.22 | 10.13 | 0.90 |
| PR64 | Proposed Residential Receptor | 8.62 | 9.09 | 9.90 | 0.81 |
| PR65 | Proposed Residential Receptor | 9.55 | 9.97 | 10.71 | 0.74 |
| PR66 | Proposed Residential Receptor | 8.18 | 8.56 | 9.20 | 0.64 |
| PR67 | Proposed Residential Receptor | 8.18 | 8.60 | 9.27 | 0.67 |
| PR68 | Proposed Residential Receptor | 7.59 | 7.92 | 8.36 | 0.45 |
| PR69 | Proposed Residential Receptor | 7.31 | 7.61 | 7.96 | 0.35 |

| Receptor | | $NO_2$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | Baseline 2016 | No development 2021 | With development 2021 | Development Contribution |
| PR70 | Proposed Residential Receptor | 7.09 | 7.39 | 7.66 | 0.27 |
| PR71 | Proposed Residential Receptor | 7.17 | 7.53 | 7.85 | 0.32 |
| PR72 | Proposed Residential Receptor | 7.41 | 7.80 | 8.20 | 0.41 |
| **Annual Mean AQO not to be exceeded** | | **40 µg/m$^3$** | | | |

### Table B2 2021 Theoretical Scenario $PM_{10}$ Results

| Receptor | | $PM_{10}$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | Baseline 2016 | No development 2021 | With development 2021 | Development Contribution |
| R1 | Saint Mary the Virgin Church of England VA Primary School | 15.10 | 15.31 | 15.42 | 0.12 |
| R2 | Newhouse Farm | 14.92 | 15.22 | 15.36 | 0.14 |
| R3 | 53 The Meadows | 15.39 | 15.67 | 15.83 | 0.16 |
| R4 | Shearstock Farm | 13.23 | 15.18 | 15.34 | 0.16 |
| R5 | 3 Shaftesbury Road | 16.97 | 18.07 | 18.59 | 0.52 |
| R6 | Meadow Brook Farm | 14.92 | 15.15 | 15.29 | 0.13 |
| R7 | Gillingham Primary School | 14.46 | 14.75 | 14.85 | 0.11 |
| R8 | Gilingham School | 14.72 | 14.94 | 15.02 | 0.08 |
| R9 | Jasmine Cottage | 15.20 | 16.98 | 17.21 | 0.23 |
| R10 | Primrose Farm | 15.17 | 16.08 | 16.20 | 0.12 |
| R11 | 51 Church View | 15.98 | 16.82 | 17.00 | 0.18 |
| R12 | 3 Wyke Court | 16.68 | 17.72 | 18.00 | 0.28 |
| R13 | Ham Cottage | 13.71 | 16.61 | 16.91 | 0.30 |
| R14 | 25 Lockwood Terrace | 16.44 | 17.35 | 17.78 | 0.44 |
| R15 | Madjeston Farm | 15.23 | 15.41 | 15.47 | 0.06 |
| PR1 | Proposed Residential Receptor | 15.49 | 15.86 | 16.26 | 0.41 |
| PR2 | Proposed Residential Receptor | 15.20 | 15.45 | 15.66 | 0.22 |
| PR3 | Proposed Residential Receptor | 15.10 | 15.31 | 15.46 | 0.15 |
| PR4 | Proposed Residential Receptor | 15.17 | 15.39 | 15.54 | 0.15 |
| PR5 | Proposed Residential Receptor | 15.08 | 15.27 | 15.40 | 0.13 |
| PR6 | Proposed Residential Receptor | 15.10 | 15.29 | 15.41 | 0.12 |
| PR7 | Proposed Residential Receptor | 15.14 | 15.35 | 15.47 | 0.12 |
| PR8 | Proposed Residential Receptor | 15.45 | 15.76 | 15.93 | 0.17 |
| PR9 | Proposed Residential Receptor | 15.26 | 15.51 | 15.64 | 0.13 |
| PR10 | Proposed Residential Receptor | 15.22 | 15.45 | 15.57 | 0.12 |
| PR11 | Proposed Residential Receptor | 15.17 | 15.39 | 15.50 | 0.12 |
| PR12 | Proposed Residential Receptor | 15.13 | 15.33 | 15.44 | 0.11 |
| PR13 | Proposed Residential Receptor | 15.04 | 15.53 | 18.27 | 2.74 |
| PR14 | Proposed Residential Receptor | 14.97 | 15.26 | 15.80 | 0.54 |
| PR16 | Proposed Residential Receptor | 14.94 | 15.25 | 15.49 | 0.24 |
| PR17 | Proposed Residential Receptor | 14.92 | 15.13 | 15.34 | 0.21 |
| PR18 | Proposed Residential Receptor | 14.93 | 15.09 | 15.69 | 0.60 |
| PR19 | Proposed Residential Receptor | 14.98 | 15.19 | 16.44 | 1.25 |
| PR20 | Proposed Residential Receptor | 14.95 | 15.12 | 16.21 | 1.10 |
| PR21 | Proposed Residential Receptor | 14.91 | 15.04 | 15.34 | 0.30 |
| PR22 | Proposed Residential Receptor | 14.76 | 14.89 | 15.10 | 0.21 |
| PR23 | Proposed Residential Receptor | 14.94 | 15.09 | 15.38 | 0.29 |
| PR24 | Proposed Residential Receptor | 14.96 | 15.11 | 15.32 | 0.21 |
| PR25 | Proposed Residential Receptor | 14.97 | 15.13 | 15.30 | 0.18 |

| Receptor | | $PM_{10}$ (µg/m³) | | | |
|---|---|---|---|---|---|
| | | Baseline 2016 | No development 2021 | With development 2021 | Development Contribution |
| PR26 | Proposed Residential Receptor | 14.99 | 15.15 | 15.29 | 0.14 |
| PR27 | Proposed Residential Receptor | 15.01 | 15.17 | 15.30 | 0.12 |
| PR28 | Proposed Residential Receptor | 14.99 | 15.14 | 15.29 | 0.14 |
| PR29 | Proposed Residential Receptor | 14.96 | 15.11 | 15.30 | 0.19 |
| PR30 | Proposed Residential Receptor | 14.95 | 15.09 | 15.54 | 0.45 |
| PR31 | Proposed Residential Receptor | 14.94 | 15.08 | 15.79 | 0.71 |
| PR32 | Proposed Residential Receptor | 14.98 | 15.14 | 15.31 | 0.18 |
| PR33 | Proposed Residential Receptor | 15.02 | 15.21 | 15.36 | 0.15 |
| PR34 | Proposed Residential Receptor | 15.00 | 15.18 | 15.38 | 0.20 |
| PR35 | Proposed Residential Receptor | 14.97 | 15.12 | 15.38 | 0.26 |
| PR36 | Proposed Residential Receptor | 15.04 | 15.22 | 15.33 | 0.12 |
| PR37 | Proposed Residential Receptor | 15.06 | 15.26 | 15.38 | 0.12 |
| PR38 | Proposed Residential Receptor | 15.01 | 15.19 | 15.32 | 0.13 |
| PR39 | Proposed Residential Receptor | 15.13 | 15.38 | 15.52 | 0.14 |
| PR40 | Proposed Residential Receptor | 15.10 | 15.35 | 15.50 | 0.15 |
| PR41 | Proposed Residential Receptor | 15.09 | 15.34 | 15.51 | 0.16 |
| PR42 | Proposed Residential Receptor | 15.08 | 15.39 | 15.62 | 0.23 |
| PR43 | Proposed Residential Receptor | 14.99 | 15.24 | 15.77 | 0.53 |
| PR44 | Proposed Residential Receptor | 15.02 | 15.34 | 15.94 | 0.60 |
| PR45 | Proposed Residential Receptor | 13.86 | 14.47 | 16.37 | 1.90 |
| PR46 | Proposed Residential Receptor | 14.96 | 15.19 | 15.66 | 0.48 |
| PR47 | Proposed Residential Receptor | 14.96 | 15.27 | 15.65 | 0.38 |
| PR48 | Proposed Residential Receptor | 14.94 | 15.21 | 15.42 | 0.20 |
| PR49 | Proposed Residential Receptor | 14.95 | 15.16 | 15.48 | 0.31 |
| PR50 | Proposed Residential Receptor | 14.92 | 15.11 | 15.28 | 0.18 |
| PR51 | Proposed Residential Receptor | 14.08 | 14.48 | 14.66 | 0.19 |
| PR52 | Proposed Residential Receptor | 13.85 | 14.10 | 14.21 | 0.11 |
| PR53 | Proposed Residential Receptor | 13.72 | 13.98 | 14.06 | 0.08 |
| PR54 | Proposed Residential Receptor | 13.72 | 13.92 | 13.99 | 0.07 |
| PR55 | Proposed Residential Receptor | 13.69 | 13.83 | 13.88 | 0.05 |
| PR56 | Proposed Residential Receptor | 13.68 | 13.84 | 13.89 | 0.05 |
| PR57 | Proposed Residential Receptor | 13.70 | 13.90 | 13.96 | 0.06 |
| PR58 | Proposed Residential Receptor | 13.74 | 13.93 | 14.00 | 0.07 |
| PR59 | Proposed Residential Receptor | 13.71 | 13.86 | 13.91 | 0.06 |
| PR60 | Proposed Residential Receptor | 13.68 | 13.80 | 13.84 | 0.04 |
| PR61 | Proposed Residential Receptor | 13.72 | 13.86 | 13.91 | 0.06 |
| PR62 | Proposed Residential Receptor | 13.78 | 13.95 | 14.03 | 0.08 |
| PR63 | Proposed Residential Receptor | 13.87 | 14.07 | 14.17 | 0.10 |
| PR64 | Proposed Residential Receptor | 13.86 | 14.04 | 14.13 | 0.09 |
| PR65 | Proposed Residential Receptor | 14.56 | 14.74 | 14.83 | 0.09 |
| PR66 | Proposed Residential Receptor | 13.82 | 13.97 | 14.04 | 0.07 |
| PR67 | Proposed Residential Receptor | 13.80 | 13.96 | 14.03 | 0.08 |
| PR68 | Proposed Residential Receptor | 13.74 | 13.85 | 13.91 | 0.05 |
| PR69 | Proposed Residential Receptor | 13.70 | 13.80 | 13.84 | 0.04 |
| PR70 | Proposed Residential Receptor | 13.68 | 13.76 | 13.80 | 0.03 |
| PR71 | Proposed Residential Receptor | 13.69 | 13.79 | 13.83 | 0.04 |
| PR72 | Proposed Residential Receptor | 13.70 | 13.82 | 13.87 | 0.05 |
| **Annual Mean AQO not to be exceeded** | | **40 µg/m³** | | | |

### Table B3 2031 Theoretical Scenario $NO_2$ Results

| Receptor | | $NO_2$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | Baseline 2016 | No development 2031 | With development 2031 | Development Contribution |
| R1 | Saint Mary the Virgin Church of England VA Primary School | 9.25 | 9.94 | 10.96 | 1.02 |
| R2 | Newhouse Farm | 7.85 | 9.21 | 10.96 | 1.75 |
| R3 | 53 The Meadows | 11.67 | 12.15 | 13.82 | 1.68 |
| R4 | Shearstock Farm | 6.57 | 16.36 | 18.89 | 2.53 |
| R5 | 3 Shaftesbury Road | 22.61 | 24.73 | 27.48 | 2.75 |
| R6 | Meadow Brook Farm | 7.84 | 8.93 | 10.19 | 1.26 |
| R7 | Gillingham Primary School | 13.09 | 13.42 | 13.99 | 0.57 |
| R8 | Gilingham School | 10.86 | 11.21 | 12.00 | 0.79 |
| R9 | Jasmine Cottage | 7.00 | 15.69 | 17.97 | 2.29 |
| R10 | Primrose Farm | 6.74 | 11.33 | 12.55 | 1.22 |
| R11 | 51 Church View | 24.30 | 24.54 | 27.72 | 3.18 |
| R12 | 3 Wyke Court | 31.71 | 31.34 | 33.26 | 1.92 |
| R13 | Ham Cottage | 7.49 | 21.40 | 25.27 | 3.87 |
| R14 | 25 Lockwood Terrace | 18.78 | 20.99 | 23.63 | 2.64 |
| R15 | Madjeston Farm | 8.81 | 9.56 | 10.23 | 0.67 |
| PR1 | Proposed Residential Receptor | 11.87 | 12.43 | 16.99 | 4.56 |
| PR2 | Proposed Residential Receptor | 9.89 | 10.46 | 12.90 | 2.44 |
| PR3 | Proposed Residential Receptor | 9.24 | 9.79 | 11.45 | 1.67 |
| PR4 | Proposed Residential Receptor | 9.73 | 10.23 | 11.94 | 1.71 |
| PR5 | Proposed Residential Receptor | 9.13 | 9.66 | 11.01 | 1.35 |
| PR6 | Proposed Residential Receptor | 9.26 | 9.78 | 11.02 | 1.24 |
| PR7 | Proposed Residential Receptor | 9.65 | 10.14 | 11.45 | 1.31 |
| PR8 | Proposed Residential Receptor | 12.18 | 12.63 | 14.52 | 1.89 |
| PR9 | Proposed Residential Receptor | 10.64 | 11.12 | 12.55 | 1.43 |
| PR10 | Proposed Residential Receptor | 10.32 | 10.82 | 12.09 | 1.27 |
| PR11 | Proposed Residential Receptor | 9.91 | 10.44 | 11.57 | 1.13 |
| PR12 | Proposed Residential Receptor | 9.55 | 10.07 | 11.21 | 1.14 |
| PR13 | Proposed Residential Receptor | 8.74 | 10.81 | 30.92 | 20.10 |
| PR14 | Proposed Residential Receptor | 8.24 | 9.45 | 16.20 | 6.75 |
| PR16 | Proposed Residential Receptor | 8.03 | 9.38 | 12.59 | 3.21 |
| PR17 | Proposed Residential Receptor | 7.90 | 8.76 | 10.96 | 2.20 |
| PR18 | Proposed Residential Receptor | 7.93 | 8.60 | 13.63 | 5.03 |
| PR19 | Proposed Residential Receptor | 8.29 | 9.10 | 19.19 | 10.09 |
| PR20 | Proposed Residential Receptor | 8.08 | 8.74 | 17.42 | 8.68 |
| PR21 | Proposed Residential Receptor | 7.79 | 8.31 | 10.89 | 2.57 |
| PR22 | Proposed Residential Receptor | 6.98 | 7.51 | 9.33 | 1.82 |
| PR23 | Proposed Residential Receptor | 8.06 | 8.59 | 11.13 | 2.54 |
| PR24 | Proposed Residential Receptor | 8.16 | 8.70 | 10.60 | 1.90 |
| PR25 | Proposed Residential Receptor | 8.27 | 8.82 | 10.48 | 1.66 |
| PR26 | Proposed Residential Receptor | 8.43 | 8.96 | 10.27 | 1.30 |
| PR27 | Proposed Residential Receptor | 8.58 | 9.13 | 10.29 | 1.16 |
| PR28 | Proposed Residential Receptor | 8.40 | 8.94 | 10.25 | 1.31 |
| PR29 | Proposed Residential Receptor | 8.22 | 8.76 | 10.46 | 1.70 |
| PR30 | Proposed Residential Receptor | 8.09 | 8.64 | 12.32 | 3.68 |
| PR31 | Proposed Residential Receptor | 8.00 | 8.55 | 14.23 | 5.68 |
| PR32 | Proposed Residential Receptor | 8.32 | 8.89 | 10.47 | 1.58 |
| PR33 | Proposed Residential Receptor | 8.63 | 9.33 | 10.64 | 1.31 |

| Receptor | | $NO_2$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | Baseline 2016 | No development 2031 | With development 2031 | Development Contribution |
| PR34 | Proposed Residential Receptor | 8.47 | 9.18 | 10.87 | 1.70 |
| PR35 | Proposed Residential Receptor | 8.23 | 8.81 | 11.02 | 2.21 |
| PR36 | Proposed Residential Receptor | 8.79 | 9.39 | 10.46 | 1.07 |
| PR37 | Proposed Residential Receptor | 8.96 | 9.65 | 10.72 | 1.08 |
| PR38 | Proposed Residential Receptor | 8.61 | 9.23 | 10.42 | 1.19 |
| PR39 | Proposed Residential Receptor | 9.49 | 10.37 | 11.54 | 1.17 |
| PR40 | Proposed Residential Receptor | 9.27 | 10.16 | 11.41 | 1.25 |
| PR41 | Proposed Residential Receptor | 9.15 | 10.11 | 11.49 | 1.38 |
| PR42 | Proposed Residential Receptor | 9.06 | 10.32 | 12.31 | 1.99 |
| PR43 | Proposed Residential Receptor | 8.42 | 9.44 | 13.75 | 4.31 |
| PR44 | Proposed Residential Receptor | 8.62 | 10.03 | 14.89 | 4.86 |
| PR45 | Proposed Residential Receptor | 8.63 | 11.41 | 25.67 | 14.27 |
| PR46 | Proposed Residential Receptor | 8.17 | 9.16 | 13.04 | 3.88 |
| PR47 | Proposed Residential Receptor | 8.21 | 9.61 | 12.85 | 3.23 |
| PR48 | Proposed Residential Receptor | 8.01 | 9.28 | 11.11 | 1.83 |
| PR49 | Proposed Residential Receptor | 8.09 | 9.03 | 11.66 | 2.63 |
| PR50 | Proposed Residential Receptor | 7.91 | 8.70 | 10.25 | 1.55 |
| PR51 | Proposed Residential Receptor | 10.26 | 11.65 | 13.10 | 1.45 |
| PR52 | Proposed Residential Receptor | 8.52 | 9.48 | 10.42 | 0.95 |
| PR53 | Proposed Residential Receptor | 7.60 | 8.75 | 9.53 | 0.77 |
| PR54 | Proposed Residential Receptor | 7.57 | 8.43 | 9.08 | 0.65 |
| PR55 | Proposed Residential Receptor | 7.31 | 7.93 | 8.42 | 0.49 |
| PR56 | Proposed Residential Receptor | 7.25 | 7.93 | 8.42 | 0.49 |
| PR57 | Proposed Residential Receptor | 7.41 | 8.29 | 8.90 | 0.61 |
| PR58 | Proposed Residential Receptor | 7.75 | 8.50 | 9.17 | 0.67 |
| PR59 | Proposed Residential Receptor | 7.46 | 8.07 | 8.60 | 0.53 |
| PR60 | Proposed Residential Receptor | 7.25 | 7.75 | 8.16 | 0.42 |
| PR61 | Proposed Residential Receptor | 7.55 | 8.08 | 8.60 | 0.52 |
| PR62 | Proposed Residential Receptor | 8.00 | 8.63 | 9.31 | 0.68 |
| PR63 | Proposed Residential Receptor | 8.70 | 9.34 | 10.14 | 0.79 |
| PR64 | Proposed Residential Receptor | 8.62 | 9.20 | 9.92 | 0.72 |
| PR65 | Proposed Residential Receptor | 9.55 | 10.07 | 10.74 | 0.67 |
| PR66 | Proposed Residential Receptor | 8.18 | 8.65 | 9.25 | 0.60 |
| PR67 | Proposed Residential Receptor | 8.18 | 8.69 | 9.32 | 0.63 |
| PR68 | Proposed Residential Receptor | 7.59 | 7.98 | 8.44 | 0.47 |
| PR69 | Proposed Residential Receptor | 7.31 | 7.65 | 8.05 | 0.40 |
| PR70 | Proposed Residential Receptor | 7.09 | 7.42 | 7.74 | 0.33 |
| PR71 | Proposed Residential Receptor | 7.17 | 7.57 | 7.95 | 0.38 |
| PR72 | Proposed Residential Receptor | 7.41 | 7.85 | 8.30 | 0.45 |
| **Annual Mean AQO not to be exceeded** | | **40 µg/m$^3$** | | | |

### Table B2 2021 Theoretical Scenario $PM_{10}$ Results

| Receptor | | $PM_{10}$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | Baseline 2016 | No development 2031 | With development 2031 | Development Contribution |
| R1 | Saint Mary the Virgin Church of England VA Primary School | 15.10 | 15.33 | 15.52 | 0.19 |
| R2 | Newhouse Farm | 14.92 | 15.23 | 15.60 | 0.36 |
| R3 | 53 The Meadows | 15.39 | 15.71 | 16.00 | 0.29 |

| Receptor | | PM10 ($\mu g/m^3$) | | | |
|---|---|---|---|---|---|
| | | Baseline 2016 | No development 2031 | With development 2031 | Development Contribution |
| R4 | Shearstock Farm | 13.23 | 15.27 | 15.89 | 0.62 |
| R5 | 3 Shaftesbury Road | 16.97 | 18.22 | 18.78 | 0.56 |
| R6 | Meadow Brook Farm | 14.92 | 15.17 | 15.43 | 0.26 |
| R7 | Gillingham Primary School | 14.46 | 14.79 | 14.88 | 0.09 |
| R8 | Gilingham School | 14.72 | 14.97 | 15.09 | 0.13 |
| R9 | Jasmine Cottage | 15.20 | 17.06 | 17.59 | 0.53 |
| R10 | Primrose Farm | 15.17 | 16.12 | 16.39 | 0.26 |
| R11 | 51 Church View | 15.98 | 16.93 | 17.65 | 0.73 |
| R12 | 3 Wyke Court | 16.68 | 17.89 | 18.45 | 0.56 |
| R13 | Ham Cottage | 13.71 | 16.74 | 17.75 | 1.01 |
| R14 | 25 Lockwood Terrace | 16.44 | 17.47 | 18.01 | 0.54 |
| R15 | Madjeston Farm | 15.23 | 15.42 | 15.55 | 0.13 |
| PR1 | Proposed Residential Receptor | 15.49 | 15.90 | 16.78 | 0.88 |
| PR2 | Proposed Residential Receptor | 15.20 | 15.47 | 15.94 | 0.47 |
| PR3 | Proposed Residential Receptor | 15.10 | 15.33 | 15.65 | 0.32 |
| PR4 | Proposed Residential Receptor | 15.17 | 15.41 | 15.74 | 0.32 |
| PR5 | Proposed Residential Receptor | 15.08 | 15.29 | 15.55 | 0.26 |
| PR6 | Proposed Residential Receptor | 15.10 | 15.31 | 15.54 | 0.23 |
| PR7 | Proposed Residential Receptor | 15.14 | 15.37 | 15.62 | 0.24 |
| PR8 | Proposed Residential Receptor | 15.45 | 15.80 | 16.13 | 0.33 |
| PR9 | Proposed Residential Receptor | 15.26 | 15.54 | 15.79 | 0.26 |
| PR10 | Proposed Residential Receptor | 15.22 | 15.48 | 15.70 | 0.22 |
| PR11 | Proposed Residential Receptor | 15.17 | 15.41 | 15.61 | 0.20 |
| PR12 | Proposed Residential Receptor | 15.13 | 15.35 | 15.56 | 0.21 |
| PR13 | Proposed Residential Receptor | 15.04 | 15.56 | 20.67 | 5.11 |
| PR14 | Proposed Residential Receptor | 14.97 | 15.28 | 16.77 | 1.49 |
| PR16 | Proposed Residential Receptor | 14.94 | 15.27 | 15.95 | 0.68 |
| PR17 | Proposed Residential Receptor | 14.92 | 15.14 | 15.60 | 0.46 |
| PR18 | Proposed Residential Receptor | 14.93 | 15.11 | 16.21 | 1.11 |
| PR19 | Proposed Residential Receptor | 14.98 | 15.20 | 17.52 | 2.31 |
| PR20 | Proposed Residential Receptor | 14.95 | 15.13 | 17.10 | 1.97 |
| PR21 | Proposed Residential Receptor | 14.91 | 15.05 | 15.60 | 0.55 |
| PR22 | Proposed Residential Receptor | 14.76 | 14.90 | 15.28 | 0.38 |
| PR23 | Proposed Residential Receptor | 14.94 | 15.10 | 15.64 | 0.54 |
| PR24 | Proposed Residential Receptor | 14.96 | 15.12 | 15.51 | 0.40 |
| PR25 | Proposed Residential Receptor | 14.97 | 15.14 | 15.48 | 0.34 |
| PR26 | Proposed Residential Receptor | 14.99 | 15.16 | 15.43 | 0.26 |
| PR27 | Proposed Residential Receptor | 15.01 | 15.19 | 15.42 | 0.23 |
| PR28 | Proposed Residential Receptor | 14.99 | 15.16 | 15.42 | 0.26 |
| PR29 | Proposed Residential Receptor | 14.96 | 15.13 | 15.48 | 0.35 |
| PR30 | Proposed Residential Receptor | 14.95 | 15.11 | 15.90 | 0.80 |
| PR31 | Proposed Residential Receptor | 14.94 | 15.09 | 16.35 | 1.26 |
| PR32 | Proposed Residential Receptor | 14.98 | 15.15 | 15.47 | 0.32 |
| PR33 | Proposed Residential Receptor | 15.02 | 15.23 | 15.49 | 0.26 |
| PR34 | Proposed Residential Receptor | 15.00 | 15.20 | 15.55 | 0.35 |
| PR35 | Proposed Residential Receptor | 14.97 | 15.14 | 15.60 | 0.47 |
| PR36 | Proposed Residential Receptor | 15.04 | 15.24 | 15.44 | 0.21 |
| PR37 | Proposed Residential Receptor | 15.06 | 15.28 | 15.49 | 0.21 |
| PR38 | Proposed Residential Receptor | 15.01 | 15.21 | 15.45 | 0.24 |

| Receptor | | $PM_{10}$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | Baseline 2016 | No development 2031 | With development 2031 | Development Contribution |
| PR39 | Proposed Residential Receptor | 15.13 | 15.41 | 15.63 | 0.22 |
| PR40 | Proposed Residential Receptor | 15.10 | 15.38 | 15.62 | 0.24 |
| PR41 | Proposed Residential Receptor | 15.09 | 15.37 | 15.65 | 0.28 |
| PR42 | Proposed Residential Receptor | 15.08 | 15.41 | 15.82 | 0.41 |
| PR43 | Proposed Residential Receptor | 14.99 | 15.25 | 16.20 | 0.94 |
| PR44 | Proposed Residential Receptor | 15.02 | 15.37 | 16.44 | 1.07 |
| PR45 | Proposed Residential Receptor | 13.86 | 14.51 | 17.86 | 3.34 |
| PR46 | Proposed Residential Receptor | 14.96 | 15.21 | 16.05 | 0.85 |
| PR47 | Proposed Residential Receptor | 14.96 | 15.29 | 15.99 | 0.70 |
| PR48 | Proposed Residential Receptor | 14.94 | 15.23 | 15.62 | 0.38 |
| PR49 | Proposed Residential Receptor | 14.95 | 15.18 | 15.74 | 0.56 |
| PR50 | Proposed Residential Receptor | 14.92 | 15.12 | 15.45 | 0.33 |
| PR51 | Proposed Residential Receptor | 14.08 | 14.52 | 14.80 | 0.28 |
| PR52 | Proposed Residential Receptor | 13.85 | 14.12 | 14.30 | 0.18 |
| PR53 | Proposed Residential Receptor | 13.72 | 14.00 | 14.15 | 0.15 |
| PR54 | Proposed Residential Receptor | 13.72 | 13.94 | 14.06 | 0.13 |
| PR55 | Proposed Residential Receptor | 13.69 | 13.85 | 13.94 | 0.09 |
| PR56 | Proposed Residential Receptor | 13.68 | 13.85 | 13.94 | 0.09 |
| PR57 | Proposed Residential Receptor | 13.70 | 13.91 | 14.03 | 0.12 |
| PR58 | Proposed Residential Receptor | 13.74 | 13.95 | 14.07 | 0.13 |
| PR59 | Proposed Residential Receptor | 13.71 | 13.87 | 13.97 | 0.10 |
| PR60 | Proposed Residential Receptor | 13.68 | 13.81 | 13.89 | 0.08 |
| PR61 | Proposed Residential Receptor | 13.72 | 13.87 | 13.97 | 0.10 |
| PR62 | Proposed Residential Receptor | 13.78 | 13.97 | 14.09 | 0.13 |
| PR63 | Proposed Residential Receptor | 13.87 | 14.09 | 14.24 | 0.14 |
| PR64 | Proposed Residential Receptor | 13.86 | 14.06 | 14.19 | 0.13 |
| PR65 | Proposed Residential Receptor | 14.56 | 14.76 | 14.88 | 0.12 |
| PR66 | Proposed Residential Receptor | 13.82 | 13.98 | 14.09 | 0.11 |
| PR67 | Proposed Residential Receptor | 13.80 | 13.97 | 14.09 | 0.11 |
| PR68 | Proposed Residential Receptor | 13.74 | 13.87 | 13.95 | 0.08 |
| PR69 | Proposed Residential Receptor | 13.70 | 13.81 | 13.88 | 0.07 |
| PR70 | Proposed Residential Receptor | 13.68 | 13.77 | 13.83 | 0.06 |
| PR71 | Proposed Residential Receptor | 13.69 | 13.80 | 13.87 | 0.07 |
| PR72 | Proposed Residential Receptor | 13.70 | 13.83 | 13.91 | 0.08 |
| **Annual Mean AQO not to be exceeded** | | **40 µg/m$^3$** | | | |

End of Report