Manston Road, Ramsgate

Air Quality Assessment

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1.0	26/09/23	E3544	AB	ND	Dr N Davey
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1 INTRODUCTION

1.1 Entran Limited has been commissioned to undertake an assessment of air quality impacts associated with a proposed residential development (hereafter referred to as 'the Proposed Development') in Thanet. The report is produced in support of a planning application. The location of the Site is shown in Figure 1.1.

1.2 The Site is approximately 3.4ha in size and is currently occupied by the Flambeau Europlast Ltd plastic manufacturing plant building which covers the majority of the Site. There is also a small area of open land.

1.3 The proposals seek to renew the lapsed 2015 outline planning permission under planning reference (OL/TH/15/0187). The proposals comprise the demolition of the existing building on site and the construction of 118 residential dwellings.

1.4 The proposed layout for the Site is provided in Figure 1.2.

1.5 Thanet District Council (TDC) has recently (25th June 2023) revoked the Air Quality Management Area (AQMA) encompassing a number of urban areas within Thanet and replaced it with a smaller AQMA known as the Ramsgate AQMA which encompasses 600 properties between High Street St Lawrence and Shah Place. The Site is located approximately 450m to the west of the Ramsgate AQMA.

1.6 This report presents the findings of an air quality assessment of the potential impacts to local air quality arising from the construction and operation of the Proposed Development. The source and significance of potential impacts are identified and the measures that should be employed to minimise these impacts are described.

1.7 A glossary of common air quality terminology is provided in **Appendix A.**

Figure 1.1: Site Location Plan

Figure 1.2: Site Layout Plan

2 LEGISLATION AND POLICY

Air Quality Strategy for England, Scotland, Wales & Northern Ireland

2.1 The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland published in July 2007[1], pursuant to the requirements of Part IV of the Environment Act 1995. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

2.2 The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems. These are benzene (C_6H_6), 1,3-butadiene (C_4H_6), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter (PM_{10}, $PM_{2.5}$), sulphur dioxide (SO_2), ozone (O_3) and polycyclic aromatic hydrocarbons (PAHs).

2.3 The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

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

2.5 For some pollutants, there is both a long-term (annual mean) standard and a short-term standard. In the case of nitrogen dioxide (NO_2), the short-term standard is for a 1-hour averaging period, whereas for fine particulates (PM_{10}) it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

2.6 The AQS objective levels relevant to this assessment are presented in **Appendix B**.

Local Air Quality Management (LAQM)

2.7 Part IV of the Environment Act 1995 (and amended in the Environment Act 2021) requires local authorities to periodically review and assess the quality of air within their administrative area. The Reviews have to consider the present and future air quality and whether any air quality objectives prescribed in Regulations are being achieved or are likely to be achieved in the future.

2.8 Where any of the prescribed air quality objectives are not likely to be achieved the authority concerned must designate that part an Air Quality Management Area (AQMA).

2.9 For each AQMA, the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality objectives. Local authorities are not statutorily obliged to meet the objectives, but they must show that they are working towards them.

2.10 The Department of Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their Review and Assessment work[2]. This guidance, referred to in this chapter as LAQM.TG(22), has been used where appropriate in the assessment.

National Planning Policy Framework

2.11 The National Planning Policy Framework (NPPF)[3] sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the NPPF with the objective of contributing to the achievement of sustainable development.

2.12 The NPPF states that the planning system has three overarching objectives in achieving sustainable development including a requirement to *'to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.'*

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[1] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland – July 2007.

[2] Department for Environment, Food and Rural Affairs (DEFRA), (2022): Part IV The Environment Act 1995 Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(22).

[3] Department for Levelling Up, Housing & Communities (Dec 23). National Planning Policy Framework.

2.13 Under Section 15: Conserving and Enhancing the Natural Environment, the NPPF (paragraph 180) requires that *'planning policies and decisions should contribute to and enhance the natural and local environment by …preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible help to improve local environmental conditions such as air and water quality.'*

2.14 In dealing specifically with air quality the NPPF (paragraph 192) states that *'planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan'.*

2.15 Paragraph 194 states that *'the focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively.''*

Thanet District Council Local Plan

2.16 The Thanet District Council Local Plan[4] was adopted in July 2020 and sets out planning policies and proposals for the future development of the borough. It contains the following policy relevant to air quality:

2.17 Policy SE05: Air Quality, which states:

'All major development schemes should promote a shift to the use of sustainable low emission transport to minimise the impact of vehicle emissions on air quality. Development will be located where it is accessible to support the use of public transport, walking and cycling.

[4] Thanet District Council. (2018). Local Plan to 2031.

New development must ensure that users are not significantly adversely affected by the air quality and include mitigation measures where appropriate.

All developments which either individually or cumulatively are likely to have a detrimental impact on air quality, will be required to submit an Air Quality and/or Emissions Mitigation Assessment, in line with the Air Quality Technical Planning 2016 and any subsequent revisions.

The Air Quality Assessment should address the cumulative effect of further emissions.

The Emission Mitigation Assessment should address any proposed mitigation measures through good design and offsetting measures that would prevent the National Air Quality Objectives being exceeded or reduce the extent of the air quality deterioration. These will be of particular importance within the urban AQMA, associated areas and areas of lower air quality.

Proposals that fail to demonstrate these will not be permitted.'

Control of Dust and Particulates associated with Construction

2.18 Section 79 of the *Environmental Protection Act (1990*) provides the following definitions of statutory nuisance relevant to dust and particles:

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

2.19 Following this, Section 80 states that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

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

EPUK & IAQM Land Use Planning and Development Control

2.21 Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) published the Land Use Planning and Development Control Air Quality guidance in January

2017[5] to provide guidance on the assessment of air quality in relation to planning proposals and ensure that air quality is adequately considered within the planning control process.

2.22 The main focus of the guidance is to ensure all developments apply good practice principles to ensure emissions and exposure are kept to a minimum. It also sets out criteria for identifying when a more detailed assessment of operational impacts is required, guidance on undertaking detailed assessments and criteria for assigning the significance of any identified impacts.

2.23 This guidance has been used within this assessment.

Assessment of Dust from Demolition and Construction

2.24 The IAQM published guidance in 2014 on the assessment of emissions from demolition and construction activities[6]. The guidance sets out an approach to identifying the risk of impacts occurring at nearby sensitive receptors from dust generated during the construction process and sets out recommended mitigation measures based on the identified risk.

2.25 This guidance has been used to assess the likely impact of the dust and particulates arising from the construction activities on the Site.

Thanet District Council Air Quality Technical Planning Guidance[7]

2.26 Thanet District Council have prepared a guidance note to provide advice on whether a development requires an air quality assessment, to provide criteria for determining the significance of any impacts and provide advice on mitigation.

2.27 This guidance has been used within this assessment.

[5] EPUK & IAQM. Land-use Planning and Development Control: Planning for Air Quality, January 2017

[6] IAQM, Guidance on the assessment of dust from demolition and construction (version 1.1), February 2014.

[7] Thanet District Council. Air Quality Technical Planning Guidance (2016)

3 METHODOLOGY

Scope of Assessment

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

- Review of air quality data for the area surrounding the Development and background pollutant maps;
- Review of the on-site operations;

3.2 Guidance provided by the IAQM recommends that an assessment of dust impacts (during construction activities) is undertaken where there are human receptors within 350m of the site boundary or within 50m of the routes used by vehicles up to 500m from the site entrance; and where there are dust sensitive ecological receptors within 50m of the site boundary or within 50m of the routes used by construction vehicles up to 500m from the site entrance.

3.3 Human receptors sensitive to dust soiling are located within 350m of the Site, but there are no dust sensitive ecological habitats in the vicinity of the Site. An assessment of the impacts of the dust and particulates arising from the on-site activities within the Site during the construction phase on human receptors has therefore been included in the assessment. An assessment of the impacts on ecological receptors has not been considered further.

3.4 Guidance provided by the EPUK & IAQM provides threshold criteria for establishing when significant impacts on local air quality may occur and when a detailed assessment of potential impacts is required. At locations within or adjacent to an AQMA, a change in light duty vehicles (LDV) of more than 100 per day and / or a change in heavy duty vehicles (HDV) of more than 25 per day is considered to result in potentially significant impacts on air quality. At locations outside an AQMA, a change in light duty vehicles (LDV) of more than 500 per day and / or a change in heavy duty vehicles (HDV) of more than 100 per day is considered to result in potentially significant impacts on air quality.

3.5 Traffic data provided by the transport consultants indicated that the likely total number of daily trips associated with the operation of the Development would be approximately 580 vehicles. The Site is currently in use as a plastics manufacturing facility, the closure of the existing facility will lead to a reduction in the traffic along the local roads. The net change in traffic associated with the redevelopment of the Site is likely to be 180 additional daily trips and a decrease in daily HDVs of 78 per day. The distribution of vehicles associated with the Proposed Development suggests that 48% of trips are assigned to travel to the right along Manston Road towards the centre of Ramsgate and 52% to the left towards the A256. The resultant increase in traffic along the local roads is below the relevant thresholds outlined in the EPUK & IAQM guidance. Therefore, in accordance with the guidance an assessment of impacts is not required. An assessment of impacts associated with traffic generated by the Development has been scoped out of the assessment.

3.6 The proposals comprises the development of 118 residential properties, the exposure of the future residents and the suitability of the Site for residential use is included in this assessment.

3.7 Details of the assessment methodology and the specific issues considered are provided below.

Operational Dust Assessment Methodology

Introduction

3.8 To assess the potential impacts associated with dust and PM_{10} releases arising from the on-site operations and to determine any necessary mitigation measures, an assessment based on the latest guidance from the IAQM for assessing construction activities has been undertaken.

3.9 The approach outlined within the guidance divides construction activities into the following four categories:

- demolition;
- earthworks;
- construction; and
- trackout (the transport of dust and dirt from the construction site onto the public road network).

3.10 The assessment methodology considers two separate dust effects:

- annoyance due to dust soiling; and
- the risk of health effects due to a significant increase in exposure to PM_{10}.

3.11 The assessment of the risk of dust effects is determined by:

- the scale and nature of the works, which determine the risk of dust arising; and
- the proximity of sensitive receptors.

3.12 Risks are described in terms of there being a low, medium or high risk of dust effects for each of the potential activities. This assessment is based on both IAQM criteria and professional judgement.

3.13 Mitigation measures are identified where necessary and significance of dust effects determined following such mitigation. The significance of the dust effects is based on professional judgement, taking into account the sensitivity of the surrounding area and the existing air quality.

Dust Emission Magnitude

3.14 The magnitude of the dust impacts for each source is classified as Small, Medium or Large depending on the scale of the proposed works. Table 3.1 summarises the IAQM criteria that may be used to determine the magnitude of the dust emission. These criteria are used in combination with site specific information and professional judgement.

Table 3.1: Dust Emission Magnitude Criteria

Source	Large	Medium	Small
Demolition	• Total building volume >50,000m^3 • Potentially dusty material (e.g. concrete) • Onsite crushing and screening • Demolition activities >20m above ground level.	• Total building volume 20,000 - 50,000m^3 • Potentially dusty material • Demolition activities 10 - 20m above ground level.	• Total building volume <20,000m^3 • Construction material with low potential for dust release • Demolition activities <10m above ground level • Demolition during wetter months

Source	Large	Medium	Small
Earthworks	• Total site area >10,000m^2 • Potentially dusty soil type (e.g. clay) • >10 heavy earth moving vehicles active at any one time • Formation of bunds >8m in height • Total material moved >100,000 tonnes	• Total site area 2,500 - 10,000m^2 • Moderately dusty soil type (e.g. silt) • 5 - 10 heavy earth moving vehicles active at any one time • Formation of bunds 4 - 8m in height • Total material moved 20,000 - 100,000 tonnes	• Total site area <2,500m^2 • Soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • Formation of bunds <4m in height • Total material moved <20,000 tonnes • Earthworks during wetter months
Construction	• Total building volume >100,000m^3 • On site concrete batching • Sandblasting	• Total building volume 25,000 - 100,000m^3 • Potentially dusty construction material (e.g. concrete) • On site concrete batching	• Total building volume <25,000m^3 • Material with low potential for dust release (e.g. metal cladding or timber)
Trackout	• >50 HGV movements in any one day (a) • Potentially dusty surface material (e.g. high clay content) • Unpaved road length >100m	• 10 - 50 HGV movements in any one day (a) • Moderately dusty surface material (e.g. silt) • Unpaved road length 50 - 100m	• <10 HGV movements in any one day (a) • Surface material with low potential for dust release • Unpaved road length <50m
(a) HGV movements refer to outward trips (leaving the site) by vehicles of over 3.5 tonnes.			

Receptor Sensitivity

3.15 Factors defining the sensitivity of a receptor are presented in Table 3.2.

Table 3.2: Factors Defining the Sensitivity of a Receptor

Sensitivity	Human (health)	Human (dust soiling)	Ecological
High	• Locations where members of the public are exposed over a time period relevant to the air quality objectives for PM_{10} (a) • Examples include residential dwellings, hospitals, schools and residential care homes.	• Regular exposure • High level of amenity expected. • Appearance, aesthetics or value of the property would be affected by dust soiling. • Examples include residential dwellings, museums, medium and long-term car parks and car showrooms.	• Nationally or Internationally designated site with dust sensitive features (b) • Locations with vascular species (c)

Sensitivity	Human (health)	Human (dust soiling)	Ecological
Medium	• Locations where workers are exposed over a time period relevant to the air quality objectives for PM_{10} (a) • Examples include office and shop workers (d)	• Short-term exposure • Moderate level of amenity expected • Possible diminished appearance or aesthetics of property due to dust soiling • Examples include parks and places of work	• Nationally designated site with dust sensitive features (b) • Nationally designated site with a particularly important plant species where dust sensitivity is unknown
Low	• Transient human exposure • Examples include public footpaths, playing fields, parks and shopping streets	• Transient exposure • Enjoyment of amenity not expected. • Appearance and aesthetics of property unaffected • Examples include playing fields, farmland (e), footpaths, short-term car parks and roads	• Locally designated site with dust sensitive features (b)

(a) 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.

(b) Ecosystems that are particularly sensitive to dust deposition include lichens and acid heathland (for alkaline dust, such as concrete).

(c) Cheffing C. M. & Farrell L. (Editors) (2005), The Vascular Plant. Red Data List for Great Britain, Joint Nature Conservation Committee.

(d) Does not include workers exposure to PM_{10} as protection is covered by Health and Safety at Work legislation.

(e) Except commercially sensitive horticulture.

3.16 The sensitivity of a receptor will also depend on a number of additional factors including any history of dust generating activities in the area, likely cumulative dust impacts from nearby construction sites, any pre-existing screening such as trees or buildings and the likely duration of the impacts. In addition, the influence of the prevailing wind direction and local topography may be of relevance when determining the sensitivity of a receptor.

Area Sensitivity

3.17 The sensitivity of the area to dust soiling and health impacts is dependent on the number of receptors within each sensitivity class and their distance from the source. In addition, human health impacts are dependent on the existing PM_{10} concentrations in the area. Tables 3.3 and 3.4 summarise the criteria for determining the overall sensitivity of the area to dust soiling and health impacts respectively.

Table 3.3: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the source (a)			
		<20m	<50m	<100m	<350m
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

(a) For trackout, the distance is measured from the side of roads used by construction traffic. Beyond 50m, the impact is negligible.

Table 3.4: Sensitivity of the Area to Human Health Impacts

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

Receptor Sensitivity	Annual Mean PM_{10} ($\mu g/m^3$)	Number of Receptors	Distance from the source (a)				
			<20m	<50m	<100m	<200m	<350m
	<28	**-**	Low	Low	Low	Low	Low
Low	**-**	**>1**	Low	Low	Low	Low	Low
(a) For trackout, the distance is measured from the side of roads used by construction traffic. Beyond 50m, the impact is negligible.							

3.18 For each dust emission source (demolition, earthworks, construction and trackout), the worst-case area sensitivity is used in combination with the dust emission magnitude to determine the risk of dust impacts.

Risk of Dust Impacts

3.19 The risk of dust impacts prior to mitigation for each emission source is presented in Tables 3.5, 3.6 and 3.7.

Table 3.5: 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

Table 3.6: Risk of Dust Impacts – Earthworks and Construction

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

Table 3.7: 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

Mitigation and Significance

3.20 The IAQM guidance provides a range of mitigation measures which are dependent on the level of dust risk attributed to the Proposed Development. Site specific mitigation measures are also included where appropriate.

3.21 The IAQM assessment methodology recommends that significance criteria are only assigned to the identified risk of dust impacts occurring from a construction activity following the application of appropriate mitigation measures. For almost all construction activities, the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effects will normally be negligible.

Construction Traffic

3.22 Construction traffic will contribute to existing traffic levels on the surrounding road network. The greatest potential for impacts on air quality from traffic associated with this phase of the Proposed Development will be in areas immediately adjacent to the principal means of access for construction traffic.

3.23 Information is not currently available regarding the numbers of vehicles associated with construction; however, based on the scale and location of the Proposed Development, the flows are not predicted to be significant in terms of total emissions or construction duration.

Operational Phase Methodology

3.24 Air quality at the Proposed Development has been predicted using the ADMS Roads dispersion model (Version 5.0.1.3, Jan 2022). This is a commercially available dispersion model and has been widely validated for this type of assessment and used extensively in the Air Quality Review and Assessment process.

3.25 The ADMS Roads model uses detailed information regarding traffic flows on the local road network and local meteorological conditions to predict pollution concentrations at specific locations selected by the user. Meteorological data from Manston for the year 2022 has been used for the assessment.

3.26 The model has been used to predict road specific concentrations of oxides of nitrogen (NO_x) and Particulate Matter (PM_{10} and $PM_{2.5}$) at selected receptors. The predicted concentrations of NO_x have been converted to NO_2 using the NO_x to NO_2 calculator available on the Defra air quality website[8].

3.27 A summary of the traffic data used in the assessment can be found in **Appendix C**. The data includes details of annual average daily traffic flows (AADT), vehicle speeds and percentage Heavy Duty Vehicles (HDV) for the assessment years considered. Low traffic speeds have been assigned to appropriate road links to account for congestion and queuing vehicles.

3.28 The following scenarios have been included in the assessment:

- 2022 – baseline traffic (for verification purposes); and
- 2028 – opening year (including contribution from Proposed Development).

3.29 The emission factors released by Defra in November 2021, provided in the emissions factor toolkit EFT2021 v11.0 have been used to predict traffic related emissions in 2022 (for verification purposes) and 2028.

3.30 To predict local air quality, traffic emissions predicted by the model must be added to local background concentrations. Background concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been taken from the 2018 Defra background maps. The maps provide an estimate of background concentrations between 2018 and 2030. The data used for the modelling assessment are set out in Table 4.3.

3.31 Background concentrations for 2022 have been used to predict concentrations in 2028 assuming no change in future years. This is considered to represent a conservative prediction of future concentrations.

[8] http://uk-air.defra.gov.uk

3.32 To determine the performance of the model at a local level, a comparison of modelled results with the results of monitoring carried out within the study area was undertaken. This process aims to minimise modelling uncertainty and systematic error by correcting the modelled results by an adjustment factor to gain greater confidence in the final results. This process was undertaken using the methodology outlined in Chapter 7, Section 4 of LAQM.TG(22).

3.33 A verification factor of 6.45 was determined which indicates that the model is under-predicting in this area. This factor was applied to the modelled road-NO_x concentrations prior to conversion to annual mean NO_2 concentrations using the NO_x to NO_2 calculator. Further details of the determination of the verification factor are provided in **Appendix D**.

3.34 Local roadside monitoring data was not available for concentrations of PM_{10} and $PM_{2.5}$, the modelled pollutant road-contributions for PM_{10} and $PM_{2.5}$ were therefore adjusted using the verification factor obtained for NO_x as recommended in the guidance provided in LAQM.TG(22).

3.35 A quantitative assessment of air quality in the vicinity of the Proposed Development has been completed against the relevant Air Quality Assessment Levels (AQALs) set out in **Appendix B** for NO_2, PM_{10} and $PM_{2.5}$.

Sensitive Receptors

3.36 LAQM.TG(22) describes in detail typical locations where consideration should be given to pollutants defined in the Regulations. Generally, the guidance suggests that all locations '*where members of the public are regularly present*' should be considered. At such locations, members of the public will be exposed to pollution over the time that they are present, and the most suitable averaging period of the pollutant needs to be used for assessment purposes.

3.37 For instance, on a footpath, where exposure will be transient (for the duration of passage along that path) comparison with short-term standard (i.e. 15-minute mean or 1-hour mean) may be relevant. For private dwellings, however; where exposure may be for longer periods, comparison with long-term (such as 24-hour mean or annual mean) standards may be most appropriate. In general terms, concentrations associated with long-term standards are lower than short-term standards owing to the chronic health effects associated with exposure to low level pollution for longer periods of time.

3.38 To assess the likely exposure of future residents to local pollutant concentrations, the modelling assessment predicted concentrations at B2050 Manston Road locations at the facades of the proposed properties closest to the A255. Details of these sensitive receptors are presented in Table 3.7 and the locations are illustrated in Figure 3.1.

Table 3.7: Location of Sensitive Receptors

ID	Receptor	Type	Easting	Northing
R1	Proposed Property	Residential	636308	165617
R2	Proposed Property	Residential	636343	165600
R3	Proposed Property	Residential	636364	165590
R4	Proposed Property	Residential	636441	165561
R5	Proposed Property	Residential	636475	165554

Figure 3.1: Location of Receptors Considered within ADMS Model

4 BASELINE CONDITIONS

Thanet District Council Review and Assessment of Air Quality

4.1 TDC has carried out detailed assessments of air quality in the area and has recently (25th June 2023) revoked an Air Quality Management Area (AQMA) encompassing a number of urban areas within Thanet and replaced it with a smaller AQMA known as the Ramsgate AQMA which encompasses 600 properties between High Street St Lawrence and Shah Place. The AQMA has been declared due to annual mean NO_2 concentrations. The Site is located approximately 450m to the west of the Ramsgate AQMA.

Automatic Local Monitoring Data

4.2 TDC currently operate two automatic monitoring sites within the borough, neither are in the vicinity of the Site. For completeness, ratified monitoring data from these two monitors are provided in Tables 4.1 and 4.2 below.

Table 4.1: NO_2 Concentrations measured at the Automatic Monitors (µg/m^3)

Monitoring Site	Statistic	Year				
		2018	2019	2020	2021	2022
Thanet Ramsgate (ZH4) (Roadside)	Annual Mean	21.3	21.4	17.1	15.9	17.4
	No of exceedances of hourly mean limit of 200µg/m^3	0	0	0	0	0
Thanet Birchington (ZH5) (Roadside)	Annual Mean	32.4	31.0	29.3	24.3	24.6
	No of exceedances of hourly mean limit of 200µg/m^3	0	0	0	0	0
Data obtained from TDC Air Quality Annual Status Report for 2023						

Table 4.2: PM_{10} Concentrations measured at the Automatic Monitors (µg/m³)

Monitoring Site	Statistic	Year				
		2018	2019	2020	2021	2022
Thanet Ramsgate (ZH4) (Roadside)	Annual Mean	24.6	22.6	24.5	22.3	25.6
	No of exceedances of 24 hour mean limit of 50µg/m³	11	3	13	0	7
Thanet Birchington (ZH5) (Roadside)	Annual Mean	25.2	23.9	23.0	21.1	18.4
	No of exceedances of 24 hour mean limit of 50µg/m³	10	14	10	1	2
Data obtained from TDC Air Quality Annual Status Report for 2023						

4.3 No exceedances of the annual mean NO_2 or PM_{10} objective level or the hourly mean NO_2 objective level have been monitored at either of the automatic roadside monitoring stations.

4.4 Exceedances of the 24 hour mean limit of 50µg/m³ have been recorded at both the monitoring stations. However, the 24 hour mean objective level includes 35 allowable exceedances of this level within a year, therefore there have been no breaches of the 24 hour mean PM_{10} objective level in the years presented at either monitoring station.

Non-Automatic Monitoring

4.5 TDC operate a network of NO_2 diffusion tube monitoring sites, in 2022 monitoring was undertaken at 50 sites. There are no background monitoring sites in the vicinity of the Site, that are representative of the likely concentrations at the Site. However, data from the background diffusion tubes and the closest roadside monitoring sites to the Site are presented in Table 4.3 below.

Table 4.3: NO_2 Concentrations recorded at the nearest Diffusion Tube Monitors (µg/m³)

Monitoring Site	Type	Distance to Kerb	2018	2019	2020	2021	2022
TH90	Roadside	2.0	-	-	-	13.9	18.6
TH37	Suburban	NA	14.4	16.3	14.5	12.3	14.2
TH31	Urban Background	NA	12.2	12.2	11.3	11.6	12.3
TH87	Roadside	1.0	-	-	-	13.9	13.9
TH81	Roadside	7.8	21.2	19.1	17.9	17.0	18.9
TH86	Roadside	1.5	36.7	23.4	20.9	21.0	21.9
TH54/TH64/TH65	Roadside	1.0	32.7	33.7	28.9	27.8	31.7
TH70/TH71/TH72	Roadside	1.0	38.6	37.6	30.7	30.8	35.2
TH66	Roadside	3.0	24.7	24.0	21.3	19.6	23.0
Data obtained from TDC Air Quality Annual Status Report 2022							

4.6 At the diffusion tube sites, NO_2 concentrations were well below the annual mean objective in the years of monitoring presented.

4.7 Diffusion tubes cannot monitor short-term NO_2 concentrations, however, research has concluded[9] that exceedances of the 1-hour mean objective are generally unlikely to occur where annual mean concentrations do not exceed 60 µg/m^3. Annual mean NO_2 concentrations were below 60 µg/m^3 at the monitoring sites therefore it is expected that the 1-hour objective is being met at these locations.

4.8 Based on the data recorded at these sites, NO_2 concentrations are expected to meet the annual mean and 1-hour mean objectives at the Site.

Defra Background Maps

4.9 Additional information on background concentrations in the vicinity of the Site has been obtained from the Defra background pollutant maps. The maximum concentration for each pollutant determined for the grid squares surrounding the Site, are provided below in Table 4.4.

4.10 The 2018 Defra background maps, which provide estimated background concentrations between 2018 and 2030, have been used to obtain concentrations for 2022.

Table 4.4: Estimated Annual Mean Background Concentrations from Defra Maps (µg/m^3)

Pollutant	2022 Background Concentrations at Proposed Development	Air Quality Assessment Levels
NO_2	10.0	40
PM_{10}	14.7	40
$PM_{2.5}$	9.9	20

4.11 The data presented in Table 4.4 shows background concentrations of all three pollutants to be well below the relevant annual mean air quality assessment levels.

[9] D. Laxen and B Marner (2003) Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites.

5 ASSESSMENT OF IMPACT

Construction Phase

Area Sensitivity

5.1 The assessment of dust impacts is dependent on the proximity of the most sensitive receptors to the Site boundary. A summary of the receptor and area sensitivity to health and dust soiling impacts is presented in Table 5.1.

Table 5.1: Sensitivity of Receptors and the Local Area to Dust and PM_{10} Impacts

Receptor	Distance from Site Boundary (m)	Approx. Number of Receptors	Sensitivity to Health Impacts (a)		Sensitivity to Dust Soiling Impacts	
			Receptor	Area	Receptor	Area
Residential Properties	<20 m	0	High	-	High	-
	<50 m	Approx. 20	High	Low	High	Medium
	<100 m	>100	High	Low	High	Medium
Overall Sensitivity of the Area			**Low**		**Medium**	
(a) Estimated background PM_{10} concentration is 15.3 µg/m^3.						

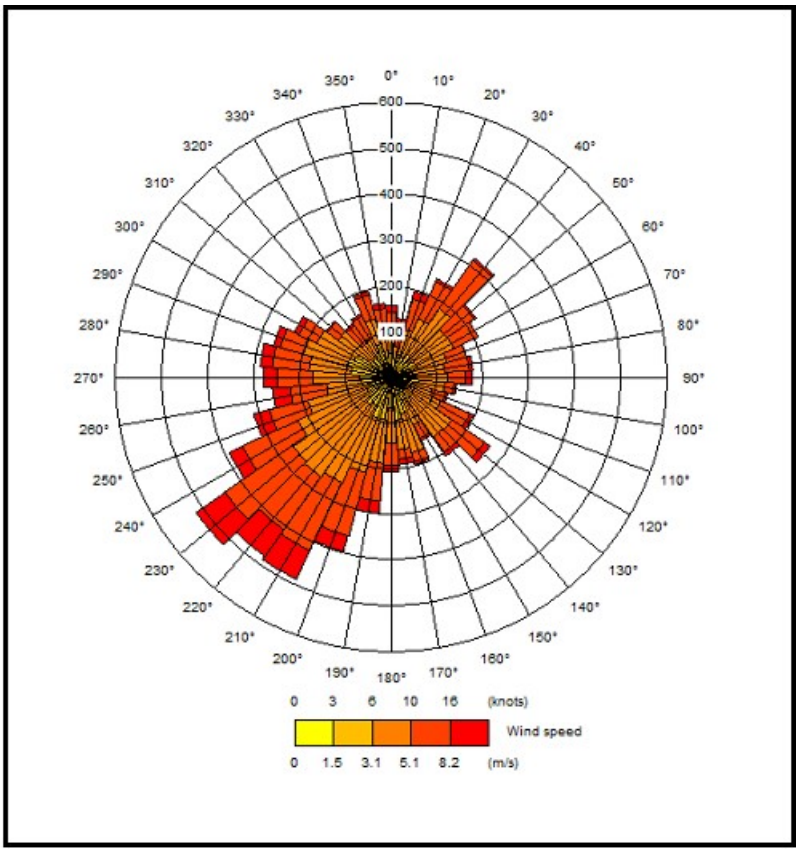
5.2 The route of the traffic is assumed to be mainly via the primary entrance to the Site which is along Manston Road. The Site is large in size, the sensitivity of the area to impacts arising from track-out is considered within a distance of 500m from the site entrance. There are more than 10 sensitive receptors within 20m of the roadside within this distance from the site entrance. The sensitivity of the area of impacts from track out is therefore considered to be high for dust impacts and low for human health impacts.

5.3 There are no sensitive ecological habitats within 50m of the Site or 50m of the construction traffic route, therefore an assessment of effects on ecological habitats has not been considered further.

5.4 The precise behaviour of the dust, its residence time in the atmosphere, and the distance it may travel before being deposited will depend upon a number of factors. These include wind direction and strength, local topography and the presence of intervening structures (buildings, etc.) that may intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall.

5.5 A wind rose from Manston is provided in Figure 5.1, which shows that the prevailing wind is from the southwest, therefore receptors to the northeast of the Development are the most likely to experience dust impacts from the Development. Manston Road runs along the northeast site boundary, beyond that is a schools playing fields.

Figure 5.1: Wind Rose for Manston Meteorological Station (2022)



Dust Emission Magnitude

5.6 The current manufacturing building on site will require demolition prior to the development of the Site. Dust emissions from the demolition will arise from dismantling activities, on-site crushing and sorting. The size of the structures to be demolished is more than 50,000m^3 and demolition activities will be undertaken at less than 10m above ground. To ensure a worst-case assessment, the dust emission magnitude from demolition activities is considered to be *large*.

5.7 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. This may also involve levelling of the Site and landscaping. Based on the size of the Site, the magnitude of the dust emission for the earthworks phase is considered to be *large*.

5.8 Dust emissions during construction will depend on the scale of the works, method of construction, construction materials and duration of the build. Based on the overall size of the Development, the dust magnitude is considered to be *medium*.

5.9 Factors influencing the degree of trackout and associated magnitude of effect include vehicle size, vehicle speed, vehicle numbers, geology and duration. Construction traffic will access the Site via Manston Road. The number of HGV movements (leaving the Site) is likely to be less than 50 per day, therefore dust emission magnitude due to trackout is considered to be *medium*.

Dust Risk Effects

5.10 A summary of the potential risk of dust impacts is presented in Table 5.2.

Table 5.2: Risk of Dust Impacts Prior to Mitigation

Source	Impact Magnitude	Human Health Risk	Dust Soiling Risk
Demolition	Large	Medium	High
Earthworks	Large	Low	Medium
Construction	Medium	Low	Medium
Trackout	Medium	Low	Medium

Operational Phase

NO_2 Concentrations

5.11 Annual mean NO_2 concentrations predicted at the selected receptor locations are set out in Table 5.3. The Predicted Environmental Concentrations (PEC) include the estimated background NO_2 concentration indicated in Table 4.4. The PECs are also presented as a percentage of the relevant Air Quality Assessment Level.

Table 5.3: Annual Mean Nitrogen Dioxide Concentrations

Receptor Number	2028 Opening Year	
	PEC ($\mu g/m^3$)	PEC as % AQAL
R1	14.8	37.0
R2	13.7	34.3
R3	13.2	33.1
R4	12.7	31.8
R5	13.0	32.4

5.12 The predicted annual mean NO_2 concentrations within the Site are well below (less than 75% of) the relevant AQAL which is the Air Quality Strategy objective level of 40 µg/m^3. Therefore, the impact of the Proposed Development with regards to new exposure is considered to be *negligible* with respect to annual average NO_2 concentrations.

5.13 As the predicted annual mean NO_2 concentrations are all below 60 µg/m^3, it is considered unlikely that the 1-hour objective will be exceeded within the Site. The impact of the Proposed Development with regards to exposure is therefore also considered to be *negligible* with respect to hourly mean NO_2 concentrations.

PM_{10} Concentrations

5.14 Predicted annual mean PM_{10} concentrations at the selected receptor locations are presented in Table 5.4. The PECs include the estimated background PM_{10} concentration indicated in Table 4.4. The PECs are also presented as a percentage of the relevant Air Quality Assessment Level.

Table 5.4: Annual Mean PM_{10} Concentrations

Receptor Number	2028 Opening Year	
	PEC (µg/m^3)	PEC as % AQAL
R1	17.2	43.0
R2	16.7	41.6
R3	16.4	41.0
R4	16.1	40.4
R5	16.3	40.7

5.15 The predicted annual mean PM_{10} concentrations within the Site are well below (less than 75% of) the relevant AQAL which is the Air Quality Strategy objective level of 40µg/m^3. Therefore, the impact of the Proposed Development with regards to new exposure is considered to be *negligible* with respect to annual mean PM_{10} concentrations.

5.16 LAQM.TG(22) provides a relationship between predicted annual mean concentrations and the likely number of exceedances of the short-term (24-hour mean) PM_{10} objective of 50µg/m^3 (N), where:

$$N = -18.5 + 0.00145 \times annual\ mean^3 + (206/annual\ mean).$$

5.17 The objective allows 35 exceedances per year, which is equivalent to an annual mean of 32µg/m^3.

5.18 The number of predicted days where the 50µg/m^3 level is predicted to be exceeded within the Site is 1 day. The impact of the Proposed Development with regards to new exposure is therefore considered to be *negligible* with respect to 24-hour PM_{10} concentrations.

$PM_{2.5}$ Concentrations

5.19 Predicted annual mean $PM_{2.5}$ concentrations at the selected receptor locations are presented in Table 5.5. The PECs include the estimated background $PM_{2.5}$ concentration indicated in Table 4.4. The PECs are also presented as a percentage of the relevant Air Quality Assessment Level.

Table 5.5: Predicted Annual Mean $PM_{2.5}$ Concentrations

Receptor Number	2028 Opening Year	
	PEC (µg/m^3)	PEC as % AQAL
R1	11.3	56.4
R2	11.0	54.8
R3	10.8	54.1
R4	10.7	53.4
R5	10.8	53.8

5.20 The predicted annual mean $PM_{2.5}$ concentrations within the Site are well below (less than 75% of) the relevant AQAL which is a concentration of 20µg/m^3.

5.21 An Interim Target for $PM_{2.5}$ concentrations of 12µg/m^3 has been set within the Environmental Improvement Plan 2023 to be achieved by the year 2028. It should be noted that the PECs presented above include the current background $PM_{2.5}$ concentrations with no reduction for improvements in the background $PM_{2.5}$ concentrations in future years. The presented concentrations and can therefore be considered to be worst-case predictions. As outlined in Table 5.5, the PECs within the Site for the year 2028 are predicted to be below the Interim Target Level of 12µg/m^3 even with no future reduction in background $PM_{2.5}$ concentrations.

5.22 Therefore, the impact of the Proposed Development with regards to new exposure is considered to be *negligible* with respect to annual mean $PM_{2.5}$ concentrations.

6 MITIGATION MEASURES

Construction Phase

6.1 The control of dust emissions from activities such as crushing and sorting relies upon management provision and mitigation techniques to reduce emissions of dust and limit dispersion.

6.2 Overall the Site is considered to be a high risk of dust impacts and a medium risk to human health from particulate matter concentrations at nearby receptors from the construction of the Development. Appropriate mitigation measures for the Site have been identified following the IAQM guidance and the risk effects presented in Table 5.2. It is recommended that the 'highly recommended' measures set out in the IAQM guidance and reproduced below are incorporated into a Dust Management Plan (DMP) and approved by TDC prior to commencement of any work on the Site.

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- display the name and contact details of the person accountable for air quality and dust issues on the site boundary (i.e. the environment manager/engineer or site manager);
- display the head or regional office contact information on the site boundary;
- record all dust and air quality complaints, identify cause, take appropriate measures to reduce emissions in a timely manner and record the measures taken;
- make the complaints log available to the local authority when asked;
- record any exceptional incidents that cause dust and/or air emissions, either on- or off- site and the action taken to resolve the situation in the log book;
- hold regular liaison meetings with other high risk construction sites within 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 inspections, 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 windows sills withing 100m of the site boundary, with cleaning to be provided if necessary;
- carry out regular site inspections to monitor compliance with the DMP, record inspection results and make inspection log available to TDC when asked;
- increase frequency of site inspection by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged periods of dry or windy conditions;

- 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.
- 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 as necessary that are at least as high as any stockpiles;
- fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- avoid site runoff of water or mud;
- keep site fencing, barriers and scaffolding clean using wet methods;
- remove materials that have a potential to produce dust from site as soon as possible unless being re-used on site.
- cover, seed or fence stockpiles to prevent wind whipping;
- ensure all vehicles switch off engines when stationary - no idling vehicles;
- avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable;
- impose and signpost a maximum-speed limit of 15mph on surfaced and 10mpa on unsurfaced haul roads and work areas;
- 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 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;
- 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 spays 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 using appropriate manual or mechanical alternatives.
- 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;
- avoid scabbing (roughening of concrete surfaces) if possible;
- ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery;
- 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;

The guidance also details one further measure which is considered to be 'desirable'. It is recommended that these measures should also be considered for inclusion within the DMP:

- for smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust;

Operational Phase

6.3 The detailed dispersion modelling indicates that the concentrations of relevant pollutants (NO_2, PM_{10} and $PM_{2.5}$) across the Site will meet the relevant AQALs. No mitigation during the operation of the Site is therefore considered necessary.

6.4 The Thanet District Council Air Quality Planning Guidance requires the following standard mitigation measures for residential developments, these will be incorporated into the Proposed Development.

- All gas fired boilers to meet a minimum standard of <40mgNOx/kWh;
- 1 electric vehicle charging point (best technology available at the time of planning approval) per dwelling with dedicated parking or 1 charging point per 10 spaces (unallocated parking).

7 CONCLUSIONS

7.1 An air quality assessment has been carried out to assess the impact of the construction of the Proposed Development and the potential for exposure of future occupants and suitability of the Site for its proposed end use.

7.2 An assessment of the potential impacts during the construction phase has been carried out in accordance with the latest Institute of Air Quality Management Guidance. This has shown that for the Proposed Development, limited releases of dust and particulate matter are likely to be generated from on-site activities. However, through good site practice and the implementation of suitable mitigation measures, the impact of dust and particulate matter releases may be effectively mitigated and the resultant impacts are considered to be *negligible*.

7.3 Detailed dispersion modelling has been undertaken to predict the pollutant concentrations within the Site. Predicted pollutant concentrations remain below the relevant standards at all the selected receptors.

7.4 Future occupants of the Proposed Development would not be exposed to pollutant concentrations above the relevant standards, therefore impact of the Proposed Development with regards to new exposure is also considered to be *negligible*.

7.5 Mitigation measures have been suggested in line with the current guidance.

7.6 It is concluded that air quality does not pose a constraint to the Proposed Development, either during construction or once operational.

APPENDIX A - AIR QUALITY TERMINOLOGY

Term	Definition
Accuracy	A measure of how well a set of data fits the true value.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between 2 years, which is useful for pollutants that have higher concentrations during the winter months.
AQMA	Air Quality Management Area.
DEFRA	Department for Environment, Food and Rural Affairs.
Exceedance	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
Fugitive emissions	Emissions arising from the passage of vehicles that do not arise from the exhaust system.
LAQM	Local Air Quality Management.
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO_2	Nitrogen dioxide.
NO_x	Nitrogen oxides.
O_3	Ozone.
Percentile	The percentage of results below a given value.
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
ppb parts per billion	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppb means that for every billion (10^9) units of air, there is one unit of pollutant present.
ppm parts per million	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppm means that for every billion (10^6) units of air, there is one unit of pollutant present.
Ratification (Monitoring)	Involves a critical review of all information relating to a data set, in order to amend or reject the data. When the data have been ratified they represent the final data to be used (see also validation).
µg/m^3 micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of 1ug/m3 means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
UKAS	United Kingdom Accreditation Service.
Uncertainty	A measure, associated with the result of a measurement, which characterizes the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the closely related parameter 'accuracy', and has replaced it on recent European legislation.
USA	Updating and Screening Assessment.
Validation (modelling)	Refers to the general comparison of modelled results against monitoring data carried out by model developers.
Validation (monitoring)	Screening monitoring data by visual examination to check for spurious and unusual measurements (see also ratification).
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.

APPENDIX B - AIR QUALITY ASSESSMENT LEVELS

Table B1: Air Quality Assessment Levels

Pollutant	Standard ($\mu g/m^3$)	Averaging Period	No. of Permitted Exceedances	Notes
NO_2	200 (a)	1-Hour	18 per annum (99.8th percentile)	
	40 (a)	Annual	-	
PM_{10}	200 (a)	24-Hour	35 per annum (90.4th percentile)	
	50 (a)	Annual	-	
$PM_{2.5}$	20 (a)	Annual	-	
	12 (b)	Annual	-	Interim Target to be achieved by end January 2028
	10 (c)	Annual	-	Target Level to be achieved by end December 2040

(a) Air Quality Standards Regulations (2010) and amendments
(b) Environmental Improvement Plan 2023
(c) The Environmental Targets (Fine Particulate Matter) (England Regulations 2023

APPENDIX C - SUMMARY OF TRAFFIC DATA

Table C1: Traffic Data

Description	Average Speed (mph)	2022 Verification		2028 Opening Year	
		AADT Traffic Flows	HDV (%)	AADT Traffic Flows	HDV (%)
Manston Road east of site entrance	33.5	8545	8.4	8946	7.9
Manston Road west of site entrance	33.5 / 15 / 25 / 60	8545	8.4	8953	7.8
A254 Margate Road (a)	25 / 30	12692	1.7	-	-
(a) Sourced from DfT traffic counts https://roadtraffic.dft.gov.uk/manualcountpoints/6822/57883/55645					

APPENDIX D – VERIFICATION AND ADJUSTMENT OF MODELLED CONCENTRATIONS

Nitrogen Dioxide (NO_2)

Most nitrogen dioxide (NO_2) is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions. Verification of concentrations predicted by the ADMS model has followed the methodology presented in LAQM.TG(22).

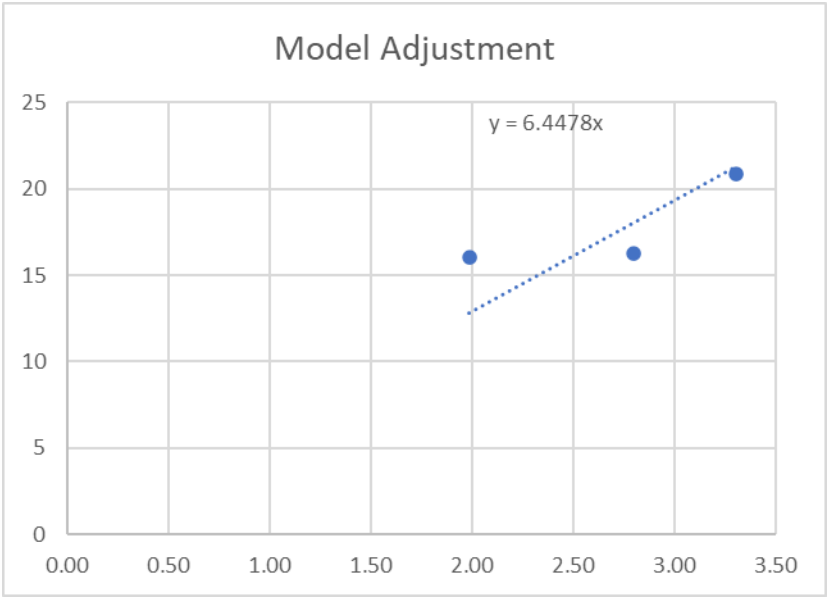
The model has been run to predict annual mean road-NO_x concentrations at diffusion tube sites located close to the Site.

The model output of road-NOx (i.e. the component of total NO_x coming from road traffic) has been compared to the 'measured' road-NO_x (Table D1). The 'measured' road NO_x has been calculated from the measured NO_2 concentrations by using the Defra NO_x from NO_2 calculator available on the UK-AIR website.

Table D1: Comparison of Modelled and Monitored NOx concentrations

Monitoring Location	Total Monitored NO_2	Background NO_2	Monitored Road NOx	Modelled Road NOx	Ratio
TH90	18.6	10.0	16.1	1.99	8.09
TH81	18.9	10.2	16.3	2.80	5.81
TH86	21.9	10.9	20.9	3.30	6.31

Figure D1: Comparison of Modelled and Monitored Road NOx concentrations



The results in Table D1 and Figure D1 shows that the ADMS model under-predicted the road NO_x concentrations at the selected monitoring sites within this area. An adjustment factor was therefore determined as the ratio between the measured road-NO_x contribution and the modelled road-NO_x contribution (6.45). This factor has then been applied to the modelled road-NO_x concentration for each receptor to provide an adjusted modelled road-NO_x concentration.

Particulate Matter (PM_{10} and $PM_{2.5}$)

There was insufficient roadside monitoring data available against which the modelling could be verified. Consequently, the verification factor determined above for adjusting the road-NO_x contribution has been applied to the predicted road-PM_{10} and road-$PM_{2.5}$ contributions, consistent with guidance provided in LAQM.TG(22).

Model Uncertainty

An evaluation of model performance has been undertaken to establish confidence in model results. LAQM.TG(22) identifies a number of statistical procedures that are appropriate to evaluate model performance and assess the uncertainty. These include root mean square error (RMSE); fractional bias (FB) and correlation coefficient (CC). These parameters estimate how the model results agree or diverge from the observations. The simplest parameter to calculate and to interpret is the RMSE, which has therefore been used in this assessment to understand the model uncertainty.

The RMSE values calculated after verification was 1.1. Guidance provided in LAQM.TG(22) indicates that for RMSE values higher than 25% of the objective level, that the model should be revisited. For annual mean NO_2, which has an objective level of 40µg/m^3, this equates to 10µg/m^3. The guidance also states that ideally the calculated RMSE value should be within 10% of the objective level which equates to 4µg/m^3. As the RMSE value calculated for this assessment is below 4, the final predictions can be considered to be robust.