

10. Air Quality

10.1. Introduction

10.1.1. This chapter of the ES assesses the impacts and the consequential effects on air quality as a result of the Proposed Development.

10.1.2. This chapter is supported by the following appendices and/or figures:

- **Appendix 10.1:** Construction Phase Dust Emissions Methodology;
- **Appendix 10.2:** Road Traffic Emissions Modelling Assessment Methodology
- **Appendix 10.3:** Construction Dust Mitigation Measures; and
- **Appendix 10.4:** presents **Figures A10–4 to A10–6**.

10.1.3. This Chapter, and its associated appendices, is intended to be read as part of the wider Environmental Statement (ES) with reference to the introductory chapters (Chapter 1 to Chapter 4), as well as to Transport and Access (Chapter 9).

10.1.4. The author and technical reviewer are both full members of the Institute of Air Quality Management (IAQM). The author and technical reviewer are associate and full members of the Institution of Environmental Sciences (IES) respectively and have extensive experience preparing air quality assessments of this nature and providing technical input to Environmental Statements with regard to air quality. The technical reviewer is a Chartered Environmentalist (CEnv).

10.2. Assessment Approach Scope

Scoped Out

10.2.1. Assessment of the following effects have been scoped out:

- Effects associated with emissions from construction phase Non-Road Mobile Machinery (NRMM), based on the following reasons:
 - According to the Institute of Air Quality Management (IAQM) construction guidanceⁱ, experience of assessing exhaust emissions from on-site plant (NRMM) suggests that they are unlikely to make a significant impact on local air quality;
 - The Department for Environment Food and Rural Affairs (Defra) Local Air Quality Management Technical Guidance (TG22) (LAQM.TG(22))ⁱⁱ (prepared to support local authorities in meeting their statutory obligations), states that where appropriate controls are applied, emissions generated from NRMM are unlikely to contribute to a significant impact upon local air quality. These measures will be detailed within the ES Chapter and secured through a Construction Environmental Management Plan (CEMP) which will be submitted and agreed with the LPA via a planning condition; and

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Scoped In

10.2.2. Assessment of the following effects have been scoped in:

- Effects associated with dust / particulate matter (PM₁₀) emissions generated from temporary construction activities on human and ecological receptors.
- Effects associated with road traffic emissions from operational phase vehicle movements generated by the Proposed Development on human (existing and proposed) and habitats within ecological receptors.

Study Area

Construction Dust Assessment

10.2.3. For the purposes of defining the Study Area in relation to dust and PM₁₀ generated from proposed construction activities, the IAQM construction guidance^{xxiii} has been applied. This involves the consideration of:

- Human receptors within 250m of the Site and/or within 50m of routes used by construction vehicles, up to 250m from the Site access points; and
- Ecological receptors within 50m of the Site and/or within 50m of routes used by construction vehicles, up to 250m from the Site access points.

Road Traffic Emissions Assessment

Human Receptors

10.2.4. Traffic data and the spatial extent of the study area for the road traffic emissions assessment have been informed by analysis undertaken for Chapter 9: Transport, and the Transport Assessment (TA).

10.2.5. With respect to existing sensitive human receptors, the traffic data of the TA has initially been compared to a series of established screening thresholds relating to increases in traffic movements from the Proposed Development. The outcome is used to determine the extent of the 'affected road network' requiring detailed assessment. These are outlined in the Environmental Policy Implementation Community (EPIC) and IAQM guidance^{xxi}. The study area has been informed by the relevant screening thresholds, as follows:

- For locations within or adjacent to an Air Quality Management Area (AQMA):
 - A change of >100 Annual Average Daily Traffic (AADT) for Light Duty Vehicles (LDV); and/or
 - A change of >25 AADT for Heavy Duty Vehicles (HDV).
- For locations elsewhere:
 - A change of >500 AADT for LDV; and/or
 - A change of >100 AADT for HDV.

- 10.2.6. Given the Site locale, only 'locations elsewhere' are applicable (i.e. >500 AADT as LDVs / >100 AADT as HDVs criteria). If road traffic flows are found not to exceed any of the screening criteria presented, then effects are considered 'insignificant' and can be screened out of further consideration. Where traffic flows are above the screening criteria presented, detailed assessment has been completed.
- 10.2.7. As per the DMRB LA 105^{xx}, human receptors within 200m of the 'affected road network' have been assessed. If a human receptor is located >200m from an affected road link, further consideration is not required.
- 10.2.8. With respect to proposed human receptors (i.e. those introduced by the Proposed Development), worst-case 'relevant exposure' locations across the Site have been considered in relation to modelled road links.

Ecological Receptors

- 10.2.9. Effects associated with road traffic emissions from operational phase vehicle movements generated by the Proposed Development on ecological receptors have been screened out in accordance with criteria prescribed by the IAQM^{xxii}. The study area has been informed by the relevant screening thresholds, as follows:
- Any sensitive qualifying features are located within 200m of a road link projected to experience development-generated vehicle movements; and
 - The Proposed Development ('in-isolation' for non-European / National sites; as relevant to this study), is likely to generate either >1,000 total AADT on a road link (and/or >200 HDV AADT).

Methodology

- 10.2.10. The following sections describe the methodology associated with each of the elements of the air quality chapter.

Construction Dust Assessment

- 10.2.11. The assessment of dust generated by potential construction activities on nearby sensitive human and ecological receptors (if present) considers the likely unmitigated dust emission magnitude associated with four activities:
- Demolition;
 - Earthworks;
 - Construction; and
 - Trackout (Dust resuspension by Heavy Goods Vehicles (HGVs) on public and haul roads).
- 10.2.12. The dust emission magnitude for each activity is determined based on the guidance, indicative thresholds and distances, and expert judgement.
- 10.2.13. Separately, the sensitivity of the surrounding area is characterised with reference to three discrete impacts. These include:

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- Annoyance due to dust soiling;
- The risk of health effects due to an increase in exposure to PM₁₀; and
- Harm to ecological receptors with account being taken of the sensitivity of the area that may experience these effects.

10.2.14. Once identified, the likely dust emission magnitude is considered in conjunction with the sensitivity of the surrounding area to determine the risk of impact iteratively for each activity (as activity and receptor context can vary). The maximum risk level is then used as a benchmark to inform mitigation measures.

10.2.15. The overall aim is to determine the proportionate level of mitigation necessary to prevent significant effects on receptors from construction activities. Upon successful implementation of these controls, residual effects associated with construction dust are expected to be not significant. These mitigation measures will be secured within a CEMP (classified as secondary mitigation), to ensure the certainty of the assessment outcomes in practice.

Road Traffic Emissions Assessment – Human Receptors

10.2.16. For change development trips above the applied screening criteria (see paragraph 10.2.5), and where relevant human receptors are located within 200m of the affected road network, a detailed assessment has been completed.

10.2.17. In order to appropriately assess road traffic impacts associated with the operation of the Proposed Development on human health, as well as the suitability of the Site for residential purposes, detailed dispersion modelling has been undertaken using the Cambridge Environmental Research Consultants (CERC) ADMS-Roads v5 dispersion model, focussing on concentrations of NO₂, PM₁₀ and PM_{2.5} for the following scenarios:

10.2.18. The dispersion modelling assessment has considered the following scenarios in relation to operational traffic as based on the TA:

- 2024 Base Case (2024 BC) – Base flows for the year (2024);
- 2031 Do Minimum (2031 DM) – base traffic flows projected to the year 2031, inclusive of other relevant committed developments; and
- 2031 Do Something (2031 DS) – 2031 DM traffic flows as above, plus road traffic flows associated with the Proposed Development at completion.

10.2.19. The traffic flows used in the 2031 scenarios include vehicle movements associated with relevant committed developments in the Study Area (based upon currently information). As such, the dispersion modelling exercise is inherently cumulative in nature.

10.2.20. The dispersion modelling exercise has been undertaken in accordance with Defra's LAQM.TG22 and EPIC & IAQM guidance. Further details regarding the assessment methodology and verification exercise are presented in Appendix 10.2. The modelled road network and receptors are presented in Figure A10-4 in Appendix 10.4.

Road Traffic Emissions Assessment – Ecological Receptors

- 10.2.21. In order to appropriately assess road traffic impacts associated with the operation of the Proposed Development on ecological habitats, the screening assessment procedure outlined within the IAQM Nature guidance document has been applied.
- 10.2.22. The outcomes of the above will determine whether impacts associated with the operation of the proposed development require further detailed assessment.

Sensitivity CriteriaConstruction Dust

- 10.2.23. **Appendix 10.1** details the sensitivity criteria which is defined as 'low', 'medium', or 'high' within IAQM Dust guidance

Operational Traffic Emissions Assessment

- 10.2.24. In relation to the assessment of ecological impacts, it is noted that consideration of sensitivity of ecological receptors is not a function of the applied assessment methodology and therefore no ecological sensitivity has been determined. Rather, the applied IAQM Nature Guidance method ultimately calculates impacts as a binary approach based upon numerical screening of increase in traffic / concentration change.
- 10.2.25. In relation to the assessment of human health impacts, the sensitivity of the receptor to change in annual mean NO₂, PM₁₀ and PM_{2.5} concentrations associated with operational phase road traffic emissions is presented in **Table 10.2**, based upon the EPIC & IAQM guidance.

Table 10.2: Road Traffic Emissions Sensitivity Descriptors: Human Health Impacts

Sensitivity	Concentration with the Proposed Development
Very High	110% or more of AQAL
High	103%-109% of AQAL
Medium	95%-102% of AQAL
Low	76%-94 of AQAL
Negligible	75% or less of AQAL

Magnitude of Change (Impact)Construction Dust

- 10.2.26. **Appendix 10.1** details that magnitude of change (potential for dust emission) is defined as 'small', 'medium' or 'large' within IAQM Dust guidance.

Operational Traffic Emissions Assessment

- 10.2.27. In relation to the assessment of ecological impacts, it is noted that consideration of magnitude of change on ecological receptors is not a function of the applied assessment methodology and therefore no ecological magnitude of change has been determined. Rather, the applied IAQM

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Nature Guidance method ultimately calculate impacts as a binary approach based upon numerical screening of increase in traffic / concentration change.

- 10.2.28. In relation to the assessment of human health impacts, the magnitude of change in annual mean NO₂, PM₁₀ and PM_{2.5} concentrations associated with construction phase and operational phase road traffic emissions is presented within **Table 10.2.1**, based upon the EPIC & IAQM guidance.

Table 10.2.1: Road Traffic Emissions Magnitude of Change Descriptors: Human Health Impacts

Magnitude Descriptor	Percentage Change in Air Quality Relative to AQUAL (%)
High	>10
Medium	6–10
Low	2–5
Negligible	1

Assessment of Significance

- 10.2.29. Guidance for determining operational phase effects associated with air quality is provided by the IAQM Construction Dust Guidance, EPIC & IAQM Guidance, and the IAQM Nature Guidance.

Construction Dust Assessment

- 10.2.30. Through effective application of the commensurate mitigation measures identified through the assessment of construction dust and fine particulate matter emissions, residual effects are considered to be 'not significant'.
- 10.2.31. Significance is only assigned to the effect after considering the construction activity with mitigation because, for construction activities, the aim is to prevent significant effects on receptors through the use of effective mitigation.
- 10.2.32. The IAQM Dust guidance therefore does not provide a framework to determine the significance of unmitigated effects, as is not considered appropriate nor relevant in this context. For these reasons, the significance of unmitigated effect of construction dust cannot be defined.

Road traffic Emissions Assessment – Human Receptors

Existing Receptors

- 10.2.33. The receptor sensitivity (defined in **Table 10.2**) and magnitude of change (defined in **Table 10.2.1**) combine to calculate the significance of impact descriptors presented in
- 10.2.34.
- 10.2.35.
- 10.2.36. Table 10.22, applied within this assessment, based upon the EPIC & IAQM guidance.

Table 10.22: Impact Descriptor Matrix for Receptors

		Sensitivity / Concentration with the Proposed Development				
		Very High 110% or more of AQAL	High 103-109% of AQAL	Medium 95-102% of AQAL	Low 76-94% of AQAL	Negligible 75% or less of AQAL
Magnitude Descriptor / Percentage Change in Air	High / >10%	Substantial	Substantial	Substantial	Moderate	Negligible
	Medium / 6-10%	Substantial	Substantial	Moderate	Slight	Negligible
	Low / 2-5%	Substantial	Moderate	Slight	Slight	Negligible
	Negligible / 1% ^(A)	Moderate	Negligible	Negligible	Negligible	Negligible
Note: (A) Changes <0.5% will be described as Negligible.						

10.2.37. The impact descriptors presented within

10.2.38.

10.2.39.

10.2.40. Table 10.22 can be termed adverse or beneficial, depending on whether the change in concentration is positive (i.e. a concentration increase) or negative (i.e. a concentration reduction).

10.2.41. Following derivation of impacts at all receptor locations assessed, the overall significance of the developmental 'effect' is determined based upon consideration, as necessary, of the following factors:

- The existing and future air quality in the absence of the Proposed Development;
- The extent of current and future population exposure to the impacts;
- The worst-case assumptions adopted when undertaking the prediction of impacts; and
- The extent to which the Proposed Development has adopted best practice to eliminate and minimise emissions.

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- 10.2.42. The overall significant of effect is based upon professional judgement.

New Receptors

- 10.2.43. Modelled pollutant concentrations predicted at future receptors have been compared with the relevant AQALs to determine the suitability of the Site for residential use.
- 10.2.44. As per the EPIC & IAQM guidance, “where the air quality is such that an air quality objective at the building façade is not met, the effect on residents or occupants will be judged as significant, unless provision is made to reduce their exposure by some means”.

Road traffic Emissions Assessment – Ecological Receptors

- 10.2.45. If the conditions outlined within the IAQM Nature Guidance are not met, then road traffic emissions impacts on ecological designations are likely to be imperceptible and will result in ‘no likely significant effect’.

Legislative and Policy Framework

National Policy

Clean Air Strategy

- 10.2.46. The 2019 Clean Air Strategyⁱⁱⁱ sets out the Government’s proposals aimed at delivering cleaner air in England and indicates how devolved administrations intend to make emissions reductions. It sets out the comprehensive action that is required from across all parts of government and society to deliver clean air.

Environmental Improvement Plan 2025

- 10.2.47. The Environmental Improvement Plan (EIP) 2025^{iv} is the current revision of the UK Government’s 25 Year Environment Plan, setting out the five-year delivery roadmap for improving the natural environment. Under Goal 2 (Air), the EIP strengthens and formalises the approach to air quality by detailing the strategy to achieve the statutory targets established under the Environment Act 2021. Key commitments include achieving a target annual mean PM_{2.5} concentrations of 10µg/m³ by the interim deadline of December 2030. At the same time, the EIP mandates a 30% reduction in population exposure to PM_{2.5} by December 2030 compared to 2018 levels. These goals are supported by action plans to reduce emissions from major sources, specifically domestic combustion, transport, and agriculture.

National Planning Policy Framework

- 10.2.48. The December 2024 update to the National Planning Policy Framework^v (NPPF) sets out planning policy for England. The NPPF states that the planning system should contribute to and enhance the natural and local environment, by preventing new development from contributing to or being adversely affected by unacceptable concentrations of air pollution and development should, wherever possible, help to improve local environmental conditions such as air quality.
- 10.2.49. In specific relation to air quality policy, the document states:

“Chapter 15 – Conserving and Enhancing the Natural Environment

Para 199: 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.”

- 10.2.50. The NPPF is accompanied by web based supporting Planning Practice Guidance (PPG)^{vi} which includes guiding principles on how planning can take account of the impacts of new development on air quality. In regard to air quality, the PPG states:

“The Department for Environment, Food and Rural Affairs carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with relevant limit values. It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified.”

“Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species).”

- 10.2.51. The PPG sets out the information that may be required within the context of a supporting air quality assessment, stating that *“Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific [...] Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact”*.

Local PolicyLocal Plan

- 10.2.52. The Knowsley Local Plan Core Strategy^{vii} was adopted in January 2016 and is the currently adopted strategic local plan for the district. It sets out the spatial vision through to 2028, and a range of strategy objectives and policies.
- 10.2.53. Within the Knowsley Local Plan Core Strategy, the following policies relate to air quality and the Proposed Development:

“Policy CS2: Development Principles

1) New development in Knowsley and the preparation of subsequent stages of the Local Plan will be expected to support the following development principles: [...]

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Principle 4: Recognise environmental limits, protect and enhance

For significant development, an Air Quality Impact Assessment must be submitted by the applicant which demonstrates that any resulting reduction in air quality (including from the cumulative impacts of development) can be appropriately mitigated and where possible improved."

"Policy CS7 Transport Networks

Location, Design and Management of New Development

Inclusive of measures that will mitigate carbon emissions and improve air quality where appropriate; and"

"Policy CS23 Renewable and Low Carbon Infrastructure

1) The Council will support proposals that will produce and distribute decentralised, low carbon and renewable energy, provided that they do not cause significant harm (in terms of their number, scale, siting or cumulative impacts) to:

a) Natural resources, biodiversity, geodiversity, water and air quality and, landscape character;"

- 10.2.54. Furthermore, it is noted the Phase 3 forms part of a large sustainable urban extension 'South of Whiston and Land South of M62' which is allocated for development within the Knowsley Local Plan Core Strategy (January 2016) under Policy SUE2c for approximately 1,500 dwellings, 22ha of employment and a country park. Policy SUE2c does not include any site-specific air quality requirements outside of those policies stated above.

Legislation

- 10.2.55. A dual set of regulations, applicable to National and Local Government separately are currently operable within the UK.

National Obligations

- 10.2.56. The Air Quality Standards Regulations 2010^{viii} (AQSR) transpose both the EU Ambient Air Quality Directive (2008/50/EC), and the Fourth Daughter Directive (2004/107/EC) within UK legislation, in order to align and mirror European obligations. The AQSR includes Limit Values which are legally binding ambient concentration thresholds, however, must be assessed at specific locations (micro and macroscale sampling points). Carriageways or central reservations of roads and any location where the public do not have access (e.g. industrial sites) are exempt. If the sampling point does not comply with the siting locations (Schedule 1: AQSR), then strict comparison cannot be made.
- 10.2.57. Following the UK's withdrawal from the EU, the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020^{ix} was introduced to mirror revisions to supporting EU legislation. The fine particulate matter (PM_{2.5}) Limit Value is 20µg/m³ (to be met by 2020).
- 10.2.58. The responsibility of achieving the AQSR (and European equivalent Directives) is a national obligation for Central Government and Devolved Administrations who undertake assessments on an annual basis. Local Authorities have no responsibility to achieve the AQSR or the European

equivalent Directives, unless otherwise instructed to assist Central Government under Ministerial Direction.

- 10.2.59. In response to persistent exceedances, the Government published its 2017 plan^x for reducing roadside nitrogen dioxide (NO₂) concentrations in order to achieve compliance in the shortest time possible. This has resulted in the introduction of Clean Air Zones (CAZ) across England. KMBC does not have CAZ with its administrative area.

Environment Targets (Fine Particulate Matter) Regulations

- 10.2.60. The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023^{xi} introduced an annual mean concentration target of 10µg/m³ to be met across England by 2040. Central Government and Devolved Administrations is responsible for meeting this target, however not until 2040. Local Authorities have no responsibility to achieve this target.

Local Obligations

- 10.2.61. Part IV of the Environment Act 1995 (as amended) requires the Secretary of State to publish a national Air Quality Strategy (AQS) every five years and established the system of Local Air Quality Management (LAQM) for Local Authorities to regularly review and assess air quality within its area.
- 10.2.62. The Air Quality (England) Regulations 2000 (as amended) ('the Regulations') provide the statutory basis for the Air Quality Objectives Local Authorities must adhere to under LAQM in England. PM_{2.5} is not currently cited within the Regulations, however in line with the AQS and the '*PM_{2.5} Targets: Interim Planning Guidance*' issued by the Department for Environment, Food & Rural Affairs (Defra) in October 2024^{xii}, Local Authorities are required to work towards reducing PM_{2.5}.
- 10.2.63. The Air Quality Objectives apply at locations where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period (relevant exposure). **Table 04** provides an indication of those locations. Where any of the prescribed Air Quality Objectives are not likely to be achieved, the authority must designate an Air Quality Management Area (AQMA). For each AQMA, the local authority is required to prepare an Air Quality Action Plan (AQAP), which details measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the objective.
- 10.2.64. The latest AQS for England was published in 2023^{xiii}. The AQS provides the delivery framework for air quality management across England for local authorities and summarises the air quality standards and objectives operable within England for the protection of public health and the environment.
- 10.2.65. The ambient air quality standards of relevance this assessment (collectively termed Air Quality Assessment Levels (AQALs) throughout this chapter) are provided in
- 10.2.66. **Table 04.** These are primarily based upon the Air Quality Objectives Local Authorities are responsible for achieving – reflective of the Local Planning Authority's duties. The PM_{2.5} AQSR AQAL has also been included for completeness, to provide an indicative assessment (as the sampling point may not comply with the siting locations prescribed under Schedule 1: AQSR).

Table 04: Relevant Ambient AQALs

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Pollutant	AQAL ($\mu\text{g}/\text{m}^3$)	Averaging Period
NO ₂	40	Annual mean
	200	1-hour mean (not to be exceeded on more than 18 occasions per annum)
Particles (as PM ₁₀)	40	Annual mean
	50	24-hour mean (not to be exceeded on more than 35 occasions per annum)
Particles (as PM _{2.5})	20	Annual mean
Note: The PM_{2.5} AQAL is not prescribed within the Air Quality (England) Regulations 2000 / 2002 and there is no requirement for local authorities to meet it. Exceedances are only valid at specific siting locations (Schedule 1: AQSR).		

Table O5: Human Health Relevant Exposure

AQAL Averaging Period	AQALs should apply at	AQALs should not apply at
Annual Mean	Building facades of residential properties, schools, hospitals etc.	Facades of offices Hotels Gardens of residences Kerbside sites
24-hour mean	As above together with hotels and gardens of residential properties	Kerbside sites where public exposure is expected to be short term
1-hour mean	As above together with kerbside sites of regular access, car parks, bus stations etc.	Kerbside sites where public would not be expected to have regular access

Environmental Protection Act 1990

- 10.2.67. The Environmental Protection Act 1990^{xiv} sets out provisions for the regulation of statutory nuisances. Section 79 sets out this statutory nuisance as, *"any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance"*.
- 10.2.68. Section 79 requires that, where a complaint of a statutory nuisance is made to it by a person living within its area, a Local Authority must take steps as are reasonably practicable to investigate the complaint and decide whether the odour is prejudicial to health or a nuisance. Proposed developments which result in the introduction of future sensitive receptors are however subject to the Agent of Change principle to ensure potential interactions with the existing environment and operations are assessed and mitigated to minimise restrictions being placed on existing businesses.
- 10.2.69. Fractions of dust greater than 10 μm (i.e. greater than PM₁₀) in diameter typically relate to nuisance effects as opposed to potential health effects and therefore are not covered within the UK AQS. In legislation there are currently no numerical limits in terms of what level of dust deposition constitutes a nuisance.

Ecological Habitats

- 10.2.70. Ecological habitats vary in terms of their sensitivity, perceived ecological value, geographic importance, and level of protection. Within the UK, there are three types of nature conservation designations: international, national and local designations, which are all provided environmental protection from developments, including from atmospheric emissions, with a greater level of protection afforded to the former, relative to the latter.
- 10.2.71. The Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way (CROW) Act (2000))^{xv} provides protection to Sites of Special Scientific Interest (SSSI) to ensure that developments are not likely to cause damage. This Act also provides a protection to local nature conservation sites, which can be particularly important in providing 'buffers' to SSSIs and European sites.
- 10.2.72. The Environment Act 1995 and the Natural Environment and Rural Communities Act (NERC) 2006^{xvi} provides an extension to the biodiversity duty set out in the CROW Act to public bodies and statutory undertakers to ensure due regard to the conservation of biodiversity (i.e. ecological designations of local status).
- 10.2.73. Sites of ecological importance are provided environmental protection with respect to air quality, through the application of standards known as Critical Levels (CL_e) and Critical Loads (CL_o). The level of protection afforded to an internationally designated site is significantly greater than that afforded to an Ancient Woodland (AW), for example, reflecting the relative sensitivity of the sites as well as their perceived ecological value.

Assessment Guidance

- 10.2.74. This assessment has been carried out in accordance with the following principles contained within the guidance documents below.
- Defra: Local Air Quality Management Technical Guidance (LAQM.TG(22))^{xvii};
 - Defra: COVID-19: Supplementary Guidance. Local Air Quality Management Reporting in 2021^{xviii};
 - Defra: PM_{2.5} Targets: Interim Planning Guidance (the 'PM_{2.5} IPG')^{xix};
 - National Highways: Design Manual for Roads and Bridges, LA105 – Air Quality (Vertical Barriers)^{xx} (the 'DMRB LA 105' guidance);
 - Environmental Policy Implementation Community (EPIC) and the Institute of Air Quality Management (IAQM): Land-Use Planning and Development Control: Planning for Air Quality^{xxi} (hereafter referred to as the 'EPIC & IAQM guidance');
 - IAQM: A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites^{xxii} (hereafter referred to as the 'IAQM Nature Guidance');
 - IAQM: Guidance on the Assessment Dust from Demolition and Construction^{xxiii}; and
 - IAQM: Use of 2020 and 2021 Monitoring Datasets^{xxiv}.

EIA Scoping Process

- 10.2.1. As discussed in Chapter 2, a request for a Scoping Opinion was submitted on behalf of the Applicant to KMBC on 30th January 2025, which set out the proposed scope of assessment (see

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Appendix 2.1). KMBC issued their Scoping Opinion on 27th March 2025 and is summarised in Chapter 2 and included in full at **Appendix 2.2**. At that time, the intention was to submit one planning application for 2 parcels of land, referred to as Phase 2b and Phase 3. However, the planning application, which this ES supports, is now seeking planning permission in relation to Phase 3 only at this time.

- 10.2.2. It is considered that the Scoping Opinion provides relevant information to ensure a robust assessment in relation to the Phase 3 site, and has therefore been used to guide the scope of this chapter and ES as a whole.
- 10.2.3. With regards to Air Quality matters, relevant responses were received from the consultees including KMBC and Natural England and comments^{xxv} have been addressed accordingly, as follows in **Table 06** below.
- 10.2.4. Whilst primarily agreeing with the recommended scope for work within the Air Quality Scoping Report^{xxvi}, KMBC have provided two key comments on Air Quality matters as listed in **Table 06**.
- 10.2.5. On review of the scoping response from Natural England. No specific advice on assessment of ecological impacts has been provided.

Table 06: Relevant EIA Scoping Consultation Comments

Consultee	Summary of Comment	Response or location within the ES where comments are addressed
Knowsley Metropolitan Borough Council	KMBC have provided comment on <i>Cronton Road/Whitefield Lane junction</i> due to historical exceedances of the annual mean NO ₂ AQAL in this location.	Paragraph 10.4.22 Provides a numerical screening assessment for the <i>Cronton Road/Whitefield Lane junction</i> . Impacts are considered to be Negligible and therefore give rise to a Negligible level of effect.
Knowsley Metropolitan Borough Council	It is considered that committed developments/newly consented sites within the vicinity are considered within the air quality chapter.	Section 10.4 outlines the operational phase impacts. Future year 'Do Minimum' and 'Do something' scenarios are inclusive of all committed development trips in line with the 'Cumulative Sites Plan' ^{xxvii}

Limitations to the Assessment

- 10.2.6. No limitations have been identified in the production of this Chapter.

10.3. Baseline Conditions

Site Description and Context

- 10.3.1. The Site is centered at the approximate National Grid Reference (NGR) x347330, y389861 and is bound to the north by Halsnead Caravan Park, beyond lies a field and the under-construction Land south of Lickers Lane residential scheme (under planning application reference 20/OO399/OUT). To the east, the Site is bound by the consented and under construction Fox's Lane residential scheme under planning application reference 20/OO417/FUL, beyond which lies Fox's Bank Lane and Blundell's Hill Golf Club. The M62 Motorway bounds the south of the Site, beyond which lies Symmetry Park (inclusive of Cumulative Site 5 as listed within the Cumulative Sites Plan^{xxvii}). To the west, the Site is bound by an area of woodland (with an associated pond known as 'Big Water'), beyond which lies the consented and under construction land north of M62 motorway residential scheme under planning application reference 18/OO283/HYB, with Windy Arbor Road and the M57 Motorway further west.
- 10.3.2. The Site is proposed to be accessed via Taylor Wimpey's Phase 2a scheme which is approved and currently under construction (planning application reference 20/OO417/FUL).
- 10.3.3. All of the completed or under construction schemes set out in the above paragraph form part of the wider South of Whiston and Land South of M62 SUE2c Allocation.
- 10.3.4. The wider area beyond the Site is predominantly residential in nature, further characterised by pockets of woodland, industrial development, the local and strategic road network, and open fields.

Baseline Air Quality

- 10.3.5. Existing publicly available datasets have been used to characterise the receiving environment in terms of air quality.
- 10.3.6. In respect of local monitoring data, pollutant concentrations monitored during 2020 and 2021 (i.e. affected by the COVID-19 pandemic) are expected to be atypical and have not been considered for the determination of baseline conditions, although have been presented for completeness.

Air Quality Management Areas

- 10.3.7. KMBC has conducted an on-going exercise to review and assess air quality within their administrative area. The latest publicly available LAQM report at the time of writing is the 2025 Air Quality Annual Status Report (ASR)^{xxviii}.
- 10.3.8. KMBC presently has no AQMA's declared within its administrative area. The closest AQMA to the Site is the Liverpool City AQMA declared exceedences of the annual mean NO₂ AQAL in areas of relevant exposure. The Liverpool City AQMA is located approximately 2.5km west of the Site and has therefore been screened out based on proximity.

Review of Air Quality Monitoring

Automatic Air Quality Monitoring

- 10.3.9. KMBC did not undertake automatic air quality monitoring in the district in 2024 and there are no automatic monitors located in proximity of the Site.

Passive Diffusion Tube Monitoring

Air Quality

- 10.3.10. KMBC undertakes passive NO₂ diffusion tube monitoring at numerous locations including those within the Site locale.
- 10.3.11. The details and results of the monitoring locations of relevance to the Site are presented in **Table 10.37** and **Table 10.38** respectively. All monitoring data presented has been ratified by KMBC.

Table 10.37: Passive Diffusion Tube Monitoring Sites: Details

Site ID	Site Type	NGR (m)		Approx. Distance and Direction from Site (km)
		X	Y	
H12a, H12b	Roadside ^(a)	346425	389669	0.6, west
H11a, H11b	Suburban ^(c)	346329	389782	0.7, west
P7Aa, P7Ab	Roadside ^(a)	346799	391419	1.5, north
P8Aa, P8Ab	Roadside ^(a)	346792	391617	1.7, north
H8Aa, H8Ab	Roadside ^(a)	345577	389394	1.4, southwest
H5Aa, H5Ab	Roadside ^(a)	345563	389397	1.4, southwest
H3a, H3b	Kerbside ^(b)	345563	389399	1.4, southwest
H9Aa, H9Ab	Roadside ^(a)	345555	389392	1.4, southwest
H6Aa, H6Ab	Kerbside ^(b)	345543	389390	1.5, southwest
H1a, H1b	Roadside ^(a)	345552	389413	1.5, southwest
H2a, H2b	Roadside ^(a)	345537	389407	1.5, southwest
H7Aa, H7Ab	Roadside ^(a)	345503	389429	1.6, southwest
H4a, H4b	Roadside ^(a)	345517	389329	1.5, southwest
H10a, H10b	Suburban ^(c)	345424	389325	1.6, southwest
Note: (a) Roadside site classification defined by LAQM.TG(22) as: "a site sampling typically within one to five metres of the kerb of a busy road". (b) Kerbside site classification defined by LAQM.TG(22) as: "An area where industrial sources make an important contribution to the total pollution burden". (c) Suburban site classification defined by LAQM.TG(22) as: "A location type situated in a residential area on the outskirts of a town or city"				

Table 10.38: Passive Diffusion Tube Monitoring Sites: Results

Site ID	Annual Mean NO ₂ Concentration (µg/m ³)				
	2020	2021	2022	2023	2024
H12a, H12b	23.3	21.9	21.6	22.4	21.3
H11a, H11b	27.2	35.9	28.7	26.3	24.6
P7Aa, P7Ab	-	-	17.9	16.2	17.1
P8Aa, P8Ab	-	-	17.9	16.0	16.0
H8Aa, H8Ab	-	46.9	34.4	30.1	29.6
H5Aa, H5Ab	-	38.1	31.4	28.1	26.0
H3a, H3b	42.2	46.7	39.3	33.6	31.7
H9Aa, H9Ab	-	36.5	30.3	26.7	27.0
H6Aa, H6Ab	-	45.4	36.7	32.4	31.4
H1a, H1b	29.5	34.4	28.4	24.9	24.4

H2a, H2b	35.1	38.2	30.1	29.0	26.8
H7Aa, H7Ab	-	33.1	25.7	24.0	24.5
H4a, H4b	25.3	30.1	25.0	21.5	20.4

- 10.3.12. As shown in **Table 10.38**, none of the considered monitoring locations exceeded the annual mean NO₂ AQAL (i.e. 40µg/m³) between 2022 – 2024. In 2024, the greatest annual mean NO₂ concentration was 31.7µg/m³, representing 79.3% of the AQAL (diffusion tube monitoring location 'H3a, H3b'). Monitoring location 'H3a, Hb3' is located at the kerbside, approximately 1.5km west of the Site at the Cronton Road/Whitefield Lane junction.
- 10.3.13. The closest monitoring location to the Site, of 'roadside' classification (diffusion tube monitoring location 'H12a, H12b'), recorded a 2024 annual mean NO₂ concentration of 21.3µg/m³, representing 53.3% % of the AQAL (i.e. 'well-below' (<75% of the AQAL)). Monitoring location 'H12a, H12b' is located approximately 560m west of the Site on Windy Arbor Road.
- 10.3.14. All of the considered monitoring locations display a general downward trend in monitored concentrations between 2020 and 2024, with some slight year-on-year fluctuations.
- 10.3.15. The empirical relationship given in LAQM.TG(22) states that exceedences of the 1-hour mean NO₂ AQAL are unlikely to occur where annual mean concentrations are <60µg/m³. This indicates that an exceedence of the 1-hour mean AQAL was unlikely to have occurred at the above locations between 2020 and 2024.

Defra Mapped Background Concentration Datasets (2024)

- 10.3.16. Defra maintains a nationwide model of existing and future background air quality concentrations at a 1km grid square resolution which is routinely used to support LAQM requirements and air quality assessments. The data sets include annual average concentration estimates for NO₂, PM₁₀ and PM_{2.5} using a base year of 2021 (the year in which comparisons between modelled and monitoring are made).
- 10.3.17. The Defra mapped background concentrations for the base year (2024) is presented in **Table 10.39**.
- 10.3.18. All of the mapped background concentrations presented are "well-below" the respective annual mean AQALs.

Table 10.39: Defra Mapped Background Pollutant Concentrations (2024)

Grid Square (X, Y) (m)	Year	Annual Mean Concentration (µg/m³)			
		NO _x	NO ₂	PM ₁₀	PM _{2.5}
347500, 389500	2024	16.5	12.4	15.0	7.3
347500, 390500		15.8	11.9	13.0	7.4
AQAL		–	40	40	20

Future Baseline or the 'Do Nothing Scenario'

- 10.3.19. Air quality conditions are expected to improve over time due to the transition to cleaner fuels and technologies, alongside the implementation of strengthened regulatory and policy measures. This includes the Clean Air Strategy 2019 ⁱⁱⁱ and the Environmental Improvement Plan 2025 ^{iv}. This anticipated improvement is reflected in Defra's background pollutant concentration projections for the modelled area between 2024 and 2031. Local NO₂ monitoring data supports this trend (as discussed above), indicating measurable historic improvements in air quality.

Air Quality

- 10.3.20. In parallel, both central and local governments are required to implement targeted interventions where pollutant concentrations persistently exceed the relevant AQALs. Key measures include:
- The Government published its 2017 plan ^{xxix} aimed at reducing roadside NO₂ concentrations to achieve compliance in the shortest time possible. This has resulted in the introduction of Clean Air Zones across England; and
 - Implementation of local authority AQAPs within AQMAs. These plans outline the measures that local authorities intend to introduce to deliver improvements in local air quality and achieve compliance. As mentioned above, KMBC do not have any declared AQMAs.
- 10.3.21. Further improvements are expected as a result of tightening air quality legislation. For example:
- The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 reduced the PM_{2.5} Limit Value from 25µg/m³ to 20µg/m³ (to be met by 2020); and
 - The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023, made under the Environment Act 2021, introduced a legally binding target of 10µg/m³ for annual mean PM_{2.5} to be achieved by 2040 across England.
- 10.3.22. Taken together, national projections, local monitoring data, and progressive regulatory changes point to a sustained downward trend in pollutant concentrations.

Defra Mapped Background Concentration Datasets (2031)

- 10.3.23. The Defra mapped background concentrations for the future year corresponding to the anticipated opening year of the development (2031) are presented in **Table 10.310**.
- 10.3.24. All of the mapped background concentrations presented are “well-below” the respective annual mean AQALs.

Table 10.310: Defra Mapped Background Pollutant Concentrations (2031)

Grid Square (X, Y)	Year	Annual Mean Concentration (µg/m ³)			
		NO _x	NO ₂	PM ₁₀	PM _{2.5}
347500, 389500	2031	11.8	9.1	14.6	6.9
347500, 390500		11.7	9.0	12.6	7.0
AQAL		-	40	40	20

Baseline Survey Information

- 10.3.25. No baseline air quality surveys were undertaken as part of the assessment as existing KMBC air quality monitoring surveys were utilised in the preparation of this air quality assessment / Chapter. This was agreed with KMBC during consultation.

10.4. Assessment of Likely Significant Effects

- 10.4.1. The Proposed Development has the potential to impact on air quality during both the construction and operational phases due to localised increases in dust and pollutant concentrations associated with construction activities and road vehicle movements.

Construction

- 10.4.2. This section presents the potential air quality impacts and effects associated with the construction of the Proposed Development.

Construction Dust Assessment

Assessment Screening

- 10.4.3. There are human receptors within 250m of the Site and therefore an assessment of construction dust on human receptors is required. In terms of ecological receptors, there are Local Wildlife Sites (LWS) / Ancient Woodlands (AW) located adjacent to the Site on the western / northern / eastern extent, within the 50m screening distance of the Site.

- 10.4.4. Therefore, assessment of construction dust on human receptors and ecological receptors is required.

Potential Dust Emission Magnitude

Demolition

- 10.4.5. The Site currently comprises open land / green space, therefore, no demolition or removal of existing structures is required. Dust emissions for demolition is therefore screened out.

Earthworks

- 10.4.6. The total Site area is between 18,000m² – 110,000m² and given the size of the Site, it is considered that 5 – 10 heavy earth moving vehicles may be active at any one time. On review of Magic maps, the primary soil type at the Site is '*Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils*', considered to have moderate dust potential when dry. The dust emission magnitude for earthworks is therefore considered to be 'medium'.

Construction

- 10.4.7. The total building volume requiring construction is between 12,000m³ – 75,000m³. It is likely that construction materials and techniques may be potentially dusty. The dust emission magnitude for construction is therefore considered to be 'medium'.

Trackout

- 10.4.8. The maximum number of outward HDV movements in any one day may be 20 – 50 during the construction phase. Unpaved road lengths are likely to be between 50m – 100m. The dust emission magnitude for trackout is therefore considered to be 'medium'.

Summary

- 10.4.9. A summary of the dust emission magnitude for the activities is detailed in **Table 10.411**.

Table 10.411: Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	N/A
Earthworks	Medium

Air Quality

Construction	Medium
Trackout	Medium

Sensitivity of the Study AreaDust Soiling Impacts

- 10.4.10. There are between 10 – 100 high sensitivity receptors within 20m of the Site boundary and within 20m of trackout routes. The sensitivity of the area in relation to earthworks, construction and trackout is therefore considered to be 'high'.
- 10.4.11. It should be noted that the 'high' trackout classification is under the assumption that the site immediately to the east (Taylor Wimpey's Phase 2a scheme) is built out and occupied prior to the construction phase of Phase 3 and will therefore represent an area of high sensitivity (i.e. new residential dwellings) to potential dust soiling.

Human Health Impacts

- 10.4.12. The maximum 2024 mapped background PM₁₀ concentration (2021 reference year) for the 1km² grid squares which cover the Site is estimated to be 15.0µg/m³ (i.e. falls into the <24µg/m³ class). As discussed, no local background PM₁₀ monitoring exists in the Site locale.
- 10.4.13. Given the above information regarding the number of receptors within 20m of the Site boundary and trackout routes, the sensitivity of the area in relation to demolition, earthworks, construction and trackout is therefore considered to be 'low'.

Ecological impacts

- 10.4.14. The Old Wood LWS/AW, and the Halsnead Park 1 AW are located within 20m west the Site boundary. Additionally, the Fox Clump AW is located to the east of the Site within 50m of trackout route(s). The Old Wood, Halsnead Park 1 and Fox Clump designations are of 'low' sensitivity to dust soiling impacts. The sensitivity of the area in relation to earthworks and construction is therefore considered to be 'low' in relation to ecological impacts.

Context

- 10.4.15. A summary of the sensitivity of the Study Area is detailed in **Table 10.41212**. Whilst the spatial density of nearby receptors is provided in Figure A10-6 in **Appendix 10.4**.

Table 10.412 Sensitivity of the Area:

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

Risk of Impacts (Unmitigated)

- 10.4.16. The outcome of the assessment of the potential 'magnitude of dust emissions', and the 'sensitivity of the Study Area' are combined in **Table 10.411** below to determine the risk of impact (unmitigated) which is used to inform the selection of appropriate mitigation.

Table 10.411: Risk of Dust Impacts (Unmitigated)

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	High Risk	High Risk	Medium Risk
Human Health	N/A	Low Risk	Low Risk	Low Risk
Ecological	N/A	Low Risk	Low Risk	N/A

Summary

- 10.4.17. Following the construction dust assessment (**Table 10.411**), the Proposed Development is found to be at worst:
- High Risk in relation to dust soiling effects on people and property;
 - Low Risk in relation to human health impacts; and
 - Low Risk in relation to ecological impacts.
- 10.4.18. However, potential dust effects during the construction phase are not considered to be permanent in nature and may only arise at particular times (i.e. certain activities and/or meteorological conditions and/or locations of the Site).
- 10.4.19. Despite the identified dust risk, best practice mitigation measures are required to minimise or eliminate potential impacts. Provided effective measures (as outlined in **Appendix 10.3**) are implemented, residual effects are Negligible and result in a 'not significant' effect.

Operation

- 10.4.20. The operational phase assessment has considered the Proposed Development as fully operational within the future assessment year of 2031. Impacts have been predicted at relevant receptor locations, including those within Site on the assumption that the Proposed Development is occupied.

Operational Traffic Emissions Assessment

Human Receptors

- 10.4.21. The results from the operational phase road traffic emissions assessment are summarised in the following sections. The full results tables are presented in **Table 10.412 – Table 10.414**.

Air Quality

- 10.4.22. The Proposed Development trips fall below the EPIC and IAQM indicative criteria at the Croton Road / Whitefield Road Junction (i.e. <500 LDVs / 100 HDVs a 24-hour AADT). On this basis, these links have been screened out and change in development trips concluded to result in an 'insignificant' effect on air quality at human receptors. This includes locations at the Cronton Road / Whitefield Lane junction, which had been highlighted by the EHO within the Scoping Opinion.

NO₂ Modelling Results

- 10.4.23. **Table 10.412** presents the annual mean NO₂ concentrations predicted at all assessed receptor locations for the 2024 BC, 2031 DM and 2031 DS scenarios.

Table 10.412: Annual Mean NO₂ Concentrations

Receptor	Predicted Annual Mean NO ₂ Concentration (µg/m ³)			% Change of AQAL	% of 2031 DS Relative to AQAL	EPIC & IAQM Impact Descriptor
	2024 BC	2031 DM	2031 DS			
HR1	16.3	13.7	14.2	+1.3	35.5	Negligible
HR2	16.5	14.1	14.6	+1.4	36.5	Negligible
HR3	16.8	14.5	15.1	+1.4	37.8	Negligible
HR4	14.5	11.7	12.0	+0.8	30.0	Negligible
HR5	14.3	11.8	12.2	+0.9	30.5	Negligible
HR6	14.9	12.4	12.8	+1.1	32.0	Negligible
HR7	14.2	11.4	11.7	+0.7	29.3	Negligible
HR8	13.2	10.8	11.1	+0.6	27.8	Negligible
HR9	13.8	10.7	10.9	+0.4	27.3	Negligible
HR10	13.8	10.9	11.1	+0.5	27.8	Negligible
HR11	12.9	10.6	10.7	+0.4	26.8	Negligible
HR12	12.9	10.3	10.5	+0.4	26.3	Negligible
HR13	16.2	13.3	13.6	+0.8	34.0	Negligible
HR14	12.8	10.2	10.3	+0.2	25.8	Negligible
HR15	12.6	10.1	10.3	+0.3	25.8	Negligible
New Receptors						
PR1	-	-	13.9	-	34.8	-
PR2	-	-	17.6	-	44.0	-
PR3	-	-	15.7	-	39.3	-
PR4	-	-	15.2	-	38.0	-
PR5	-	-	13.7	-	34.3	-
PR6	-	-	13.8	-	34.5	-
PR7	-	-	14.0	-	35.0	-
Note: PR2, PR3 and PR4 represent footpaths / cycleways and are therefore not applicable to annual mean impacts.						

- 10.4.24. Based on the results presented above, the NO₂ modelling results are summarised as follows:

- Existing receptors:

- Maximum concentration in the 2031 DS scenario: $15.1\mu\text{g}/\text{m}^3$ at Receptor HR3, representing 38.0% of the AQAL.
- Maximum change due to the Proposed Development (2031 DS vs. 2031 DM) relative to the AQAL: 1.4% at Receptor HR2 and HR3.
- The predicted percentage change of annual mean NO_2 concentration ranges from +1.4% of the AQAL (i.e. a 'low' magnitude of impact) to +<0.5% of the AQAL (i.e. a 'negligible' magnitude of impact). Concentrations with the Proposed Development in the '2031 DS' scenario are predicted to be <75% of the AQAL at all existing receptors (i.e. all receptors are of 'negligible' sensitivity). An unmitigated '**negligible**' impact is therefore predicted at all receptor locations in accordance with the assessment methodology.
- The empirical relationship given in LAQM.TG(22) states that exceedences of the 1-hour mean NO_2 AQAL are unlikely to occur where annual mean concentrations are $<60\mu\text{g}/\text{m}^3$. Annual mean NO_2 concentrations predicted at all receptor locations are well below this limit. Therefore, it is unlikely that an exceedence of the 1 hour mean AQAL will occur as a result of absolute and incremental concentrations associated with the Proposed Development.
- New receptors:
 - As indicated in **Table 10.412**, there are no predicted exceedences of the annual mean NO_2 AQAL at any considered proposed receptor location in the '2031 DS' scenario. The maximum predicted annual mean NO_2 concentration in locations of relevant exposure (i.e. residential dwellings) is $14.0\mu\text{g}/\text{m}^3$ at proposed receptor PR7; this represents 35% of the AQAL.
 - It is unlikely that an exceedence of the 1-hour mean NO_2 AQAL will occur at the assessed receptors, in reference to the empirical relationship given in LAQM.TG(22) and the maximum predicted absolute annual mean NO_2 concentration.

PM₁₀ Modelling Results

10.4.25. **Table 10.413** presents the annual mean PM_{10} concentrations predicted at all assessed receptor locations for the 2024 BC, 2031 DM and 2031 DS scenarios.

Table 10.413: Annual Mean PM_{10} Concentrations

Receptor	Predicted Annual Mean PM ₁₀ Concentration (µg/m³)			% Change of AQAL	% of 2031 DS Relative to AQAL	EPIC & IAQM Impact Descriptor
	2024 BC	2031 DM	2031 DS			
Existing Receptors						
HR1	16.4	16.4	16.7	+0.7	41.8	Negligible
HR2	16.4	16.6	16.9	+0.8	42.3	Negligible
HR3	16.5	16.8	17.1	+0.8	42.8	Negligible
HR4	15.7	15.7	15.8	+0.4	39.5	Negligible
HR5	15.6	15.9	16.1	+0.6	40.3	Negligible
HR6	15.8	16.1	16.3	+0.7	40.8	Negligible
HR7	15.6	15.6	15.7	+0.4	39.3	Negligible

Air Quality

HR8	13.4	13.4	13.6	+0.4	34.0	Negligible
HR9	15.5	15.3	15.3	+0.2	38.3	Negligible
HR10	15.5	15.4	15.5	+0.3	38.8	Negligible
HR11	13.3	13.1	13.2	+0.2	33.0	Negligible
HR12	13.3	13.1	13.2	+0.2	33.0	Negligible
HR13	16.4	16.3	16.4	+0.4	41.0	Negligible
HR14	13.3	13.0	13.0	+0.1	32.5	Negligible
HR15	13.2	13.0	13.0	+0.1	32.5	Negligible
New Receptors						
PR1	-	-	16.4	-	41.0	-
PR2	-	-	17.6	-	44.0	-
PR3	-	-	16.9	-	42.3	-
PR4	-	-	16.7	-	41.8	-
PR5	-	-	16.2	-	40.5	-
PR6	-	-	16.3	-	40.8	-
PR7	-	-	16.4	-	41.0	-
Note: PR2, PR3 and PR4 represent footpaths / cycleways and are therefore not applicable to annual mean impacts.						

10.4.26. Based on the results presented above, the PM₁₀ modelling results are summarised as follows:

- Existing receptors:
 - Maximum concentration in the 2031 DS scenario: 17.1µg/m³ at Receptor HR3, representing 42.8% of the AQAL.
 - Maximum change due to the Proposed Development (2031 DS vs. 2031 DM) relative to the AQAL: 0.8% at Receptor HR3.
 - The predicted percentage change of annual mean PM₁₀ concentration ranges from +0.8% of the AQAL (i.e. a 'low' magnitude of impact) to +<0.5% of the AQAL (i.e. a 'negligible' magnitude of impact). Concentrations with the Proposed Development in the '2031 DS' scenario are predicted to be <75% of the AQAL at all existing receptors (i.e. all receptors are of 'negligible' sensitivity). An unmitigated '**negligible**' impact is therefore predicted at all receptor locations in accordance with the assessment methodology.
 - Based upon the maximum predicted annual mean PM₁₀ concentration of 17.1µg/m³, this equates to <1 day where 24-hour mean PM₁₀ concentrations are predicted to be greater than 50µg/m³. This is well below the 35 permitted number of 24-hour mean concentrations in excess of 50µg/m³, and therefore the number of maximum exceedences is in compliance with the 24-hour mean AQAL.
- New receptors:
 - As indicated in **Table 10.413**, there are no predicted exceedences of the annual mean PM₁₀ AQAL at any considered proposed receptor location in the '2031 DS' scenario. The maximum predicted annual mean PM₁₀ concentration in locations of

relevant exposure (i.e. residential dwellings) is $16.4\mu\text{g}/\text{m}^3$ at proposed receptor PR1 and PR7; this represents 41% of the AQUAL.

- Based upon the maximum predicted annual mean PM_{10} concentration with the Proposed Development in place (in areas of relevant exposure) i.e. $17.6\mu\text{g}/\text{m}^3$ at Receptor PR2 in the 2031 DS scenario, this equates to less than 1 days where 24-hour mean PM_{10} concentrations are predicted to be greater than $50\mu\text{g}/\text{m}^3$. This is therefore in compliance with the 24-hour mean AQUAL.

PM_{2.5} Modelling Results

10.4.27. **Table 10.414** presents the annual mean $\text{PM}_{2.5}$ concentrations predicted at all assessed receptor locations for the 2024 BC, 2031 DM and 2031 DS scenarios.

Table 10.414: Annual Mean $\text{PM}_{2.5}$ Concentrations

Receptor	Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)			% Change of AQAL	% of 2031 DS Relative to AQAL	EPIC & IAQM Impact Descriptor
	2024 BC	2031 DM	2031 DS			
Existing Receptors						
HR1	8.1	8.0	8.1	+0.8	40.5	Negligible
HR2	8.2	8.1	8.3	+0.8	41.5	Negligible
HR3	8.2	8.2	8.4	+0.9	42.0	Negligible
HR4	7.7	7.5	7.6	+0.5	38.0	Negligible
HR5	7.7	7.6	7.8	+0.7	39.0	Negligible
HR6	7.8	7.8	7.9	+0.7	39.5	Negligible
HR7	7.7	7.5	7.6	+0.4	38.0	Negligible
HR8	7.6	7.4	7.5	+0.4	37.5	Negligible
HR9	7.6	7.3	7.4	+0.2	37.0	Negligible
HR10	7.6	7.4	7.4	+0.3	37.0	Negligible
HR11	7.6	7.3	7.3	+0.2	36.5	Negligible
HR12	7.6	7.3	7.3	+0.2	36.5	Negligible
HR13	8.2	7.9	8.0	+0.5	40.0	Negligible
HR14	7.6	7.2	7.2	+0.1	36.0	Negligible
HR15	7.5	7.2	7.2	+0.1	36.0	Negligible
New Receptors						
PR1	-	-	8.0	-	40.0	-
PR2	-	-	8.7	-	43.5	-
PR3	-	-	8.3	-	41.5	-
PR4	-	-	8.2	-	41.0	-
PR5	-	-	7.9	-	39.5	-
PR6	-	-	7.9	-	39.5	-
PR7	-	-	8.0	-	40.0	-
Note: PR2, PR3 and PR4 represent footpaths / cycleways and are therefore not applicable to annual mean impacts.						

10.4.28. Based on the results presented above, the $\text{PM}_{2.5}$ modelling results are summarised as follows:

Air Quality

- Existing receptors:
 - Maximum concentration in the 2031 DS scenario: $8.4\mu\text{g}/\text{m}^3$ at Receptor HR3, representing 42% of the AQAL.
 - Maximum change due to the Proposed Development (2031 DS vs. 2031 DM) relative to the AQAL: 0.9% at Receptor HR3.
 - The predicted percentage change of annual mean $\text{PM}_{2.5}$ concentrations ranges from between 0.9% of the AQAL (i.e. a 'low' magnitude of change impact) to <0.5% of the AQAL (i.e. a 'negligible' magnitude of change impact). Concentrations with the Proposed Development in the '2031 DS' scenario are predicted to be <75% of the AQAL at all receptors (i.e. all receptors are of 'negligible' sensitivity). An unmitigated **negligible impact** is therefore predicted at all existing receptor locations in accordance with the assessment methodology.
- New receptors:
 - As indicated in **Table 10.414**, there are no predicted exceedences of the annual mean $\text{PM}_{2.5}$ AQAL at any considered proposed receptor location in the '2031 DS' scenario. The maximum predicted annual mean $\text{PM}_{2.5}$ concentration in locations of relevant exposure (i.e. residential dwellings) is $8.0\mu\text{g}/\text{m}^3$ at proposed receptor PR1 and PR7; this represents 41% of the AQAL.

Ecological Receptors

- 10.4.29. In accordance with the methodology outlined in Paragraph 10.2.21 and using the available distributed development trip data provided by Eddisons, a review of designated ecological sites has been undertaken to determine whether the Proposed Development's operational phase trips are predicted to occur on any roads within 200m, in order to establish the appropriate level of assessment required.
- 10.4.30. This process has identified the following ecological receptors and designations:
- 'Old Wood' LWS and AW, located approximately 20m and 75m west of the Site and associated internal road, respectively;
 - Halsnead Park 1 AW, located approximately <10m and 90m north of the Site and associated internal road, respectively; and
 - Fox Clump, located approximately 170m to the east of the Site and <10m north of the 'affected road' network.
- 10.4.31. Given the designation status (i.e. LWS and AW) assessment of 'project alone' trip generation, only, is required.
- 10.4.32. The Site is proposed to generate a maximum of +801 AADT total vehicles and +7 AADT as HDVs. The project alone development trips are therefore below the 1,000 AADT total vehicles / 200 AADT as HDVs screening criterion defined within the IAQM Nature Guidance ^{xxiii}. Therefore, the resultant impacts can be classed as having 'no likely significant effect' (i.e. 'not significant' effect) at habitats within the identified ecological receptor of local importance. As such, no further detailed assessment is required.

Summary

- 10.4.33. In relation to existing receptors, predicted NO₂, PM₁₀ and PM_{2.5} concentrations are below the AQALs, and the level of effect is concluded to be **'not significant'**.
- 10.4.34. In relation to new receptors introduced by the Proposed Development, all modelled concentrations are well-below the AQALs. The level of effect is concluded to be **'not significant'**.
- 10.4.35. In relation to impacts of ecological receptors, project alone trip generation is concluded to result in **'no likely significant effect'** (i.e. **'not significant'**) at habitats within identified designations.

10.5. Mitigation, Enhancement and Residual Effects**Mitigation by Design**

- 10.5.1. The proposals include carefully considered design and mitigation measures to minimise the level of any adverse effects on air quality.
- 10.5.2. A summary is provided in **Table 10.51.17** below.

Table 10.51.17: Embedded Mitigation Measures

Type	Mitigation Measure / Detail
Primary Mitigation	In relation to air quality, the following embedded mitigation is relevant: • Electric Vehicle (EV) charging stations – to incentivise the use of lower emission vehicles including EVs. • Cycleways and footpaths – to encourage the use of active travel through appropriate provisions. • Travel Plan^{xxx} – which includes a series of measures/actions to encourage the use of sustainable and active modes of travel and decrease reliance on private vehicle trips.
Secondary Mitigation	Construction activities would be undertaken in accordance with best practice techniques. Part of the mechanism for this would be the implementation of a CEMP. This will secure the application of the construction dust mitigation measures identified by the outcomes of the construction dust assessment.

Additional Mitigation.

- 10.5.3. Based on the assessment outcomes, no additional mitigation and monitoring measures are required for the construction and operational phases.

Enhancements.

- 10.5.4. Based on the assessment outcomes, no enhancements are required for the construction and operational phases.

Residual Effects

Air Quality

- 10.5.5. Effects are '**not significant**', taking into account the embedded mitigation detailed in **Table 10.5117**. No additional mitigation is required; and therefore, investigation of residual effects is not necessary.

10.6. Cumulative and In-Combination Effects

Construction Dust Assessment

- 10.6.1. Cumulative dust effects arising from construction activities could be experienced where construction activities from more than one scheme overlap at an affected receptor, dependent on the impact (e.g. dust soiling, human health and ecological).
- 10.6.2. However, all schemes which are considered to pose a risk of cumulative effects will have had to undertake a construction dust assessment separately relating to their own site activities and associated risks, with the recommendation of best practice mitigation to remedy residual effects as not significant.
- 10.6.3. These measures would be integrated into a CEMP, to be adhered to during construction, as part of each scheme's environmental responsibilities and commitments. The CEMP will be secured and agreed with the LPA as part of a planning condition.
- 10.6.4. IAQM construction guidance states that, with the implementation of the recommended mitigation, effects will be '**not significant**'. As such, it is not anticipated that there would be significant cumulative effects associated with construction phase dust emissions. No further assessment in relation to cumulative effects is therefore required.

Road Traffic Emissions Assessment

Human Receptors

- 10.6.5. Additional traffic flows from nearby consented developments (as listed within the Cumulative Sites Plan^{xxvii}) have been included within the traffic data used within the 2031 future year dispersion modelling scenarios. This includes trip rates associated with relevant committed developments. Reference should be made to **Chapter 9: Traffic & Transport** for further details. As such, the 2031 DS dispersion modelling scenario included as part of this chapter in the assessment of road traffic emissions associated with the Proposed Development account for associated trip generation with other committed developments. Resultant impacts are described as 'negligible' at all assessed human receptor locations, and remain 'not significant'.

Ecological Receptors

- 10.6.6. In line with the IAQM Nature Guidance, in-combination assessment is not required for sites that are designated at a local level only, such as AW and LWS (i.e. The 'Old Wood', Halsnead Park 1, and Fox Clump).

10.7. Summary

- 10.7.1. This assessment has considered the potential air quality effects on sensitive receptors associated with the Proposed Development. Consideration has been given to potential worst-case effects arising from construction and operational activities based upon available information. The assessment has adopted a series of conservative assumptions to exaggerate potential impacts and increase confidence in the assessment outcomes.

Baseline Conditions

- 10.7.2. KMBC presently has no AQMA declared within its administrative area. The closest AQMA to the Site is the Liverpool City AQMA declared exceedences of the annual mean NO₂, located approximately 2.5km west of the Site and has therefore been screened out based on proximity.
- 10.7.3. KMBC NO₂ monitoring data has been used at locations in proximity to the Site, the monitoring locations display a general downward trend in concentrations between 2020–2024.
- 10.7.4. Defra background air quality concentration maps for the baseline (2024) and the completed development (2031) show all of the mapped background concentrations presented are well-below the respective annual mean Air Quality Assessment Levels (AQAL).

Likely Significant Effects

- 10.7.5. An industry standard qualitative construction assessment has been undertaken in accordance with IAQM guidance to inform the extent of dust control measures, proportionate to localised risks. These measures are detailed in **Appendix 10.3**. Providing these measures are effectively implemented, construction dust effects are considered to be ‘not significant’. These measures will be included within a CEMP, which forms an embedded mitigation measure and secures their implementation.
- 10.7.6. A quantitative assessment of road traffic emissions has been undertaken to identify operational impacts on existing and proposed human receptors associated with the Proposed Development. This has comprised the use of ADMS-Roads v5.1 dispersion model.
- 10.7.7. In accordance with the EPIC & IAQM guidance methodology applied, effects at all receptors as a result of road traffic emissions generated by the Proposed Development are found to be ‘**not significant**’.
- 10.7.8. In accordance with the IAQM Nature guidance methodology applied, change in development trips and potential impacts on habitats at the Old Wood AW, Halsnead Park 1 AW, and Fox Clump AW are classed as having ‘**no likely significant effect**’ (i.e. a ‘not significant’ effect). As such, no further detailed assessment is required.

Mitigation and Enhancement

- 10.7.9. Mitigation measures embedded within the design of the Proposed Development include:
- Electric Vehicle (EV) charging stations – to incentivise the use of lower emission vehicles including EVs.
 - Cycleways and footpaths – to encourage the use of active travel through appropriate provisions.
 - Travel Plan – which includes a series of measures/actions to encourage the use of sustainable and active modes of travel and decrease reliance on private vehicle trips.
- 10.7.10. During construction activities would be undertaken in accordance with best practices techniques and measures will be implemented to control dust. These measures would be implemented through the CEMP,

Conclusion

Air Quality

- 10.7.11. No significant effects are anticipated on air quality as a result of the Proposed Development.
- 10.7.12. **Table 10.7** provides a summary of effects, mitigation and residual effects.

Table 10.718: Summary of Effects, Mitigation and Residual Effects

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
Construction								
Surrounding Environment: Dust soiling effects on people and property. Human health effects from PM ₁₀ exposure. Dust soiling effects on ecological receptors	Dust / PM ₁₀ generated from temporary construction activities. High risk of dust impact, temporary, direct, short-term.	Temporary / direct	Not Applicable	Not Applicable	Local	Negligible	Embedded mitigation includes the implementation of a CEMP and construction best practice throughout the construction phase.	Negligible
Operation								
Existing Human Receptors.	Public health impacts associated with a change in pollutant levels from operational traffic generated by the Proposed Development.	Permanent / direct	Low	Negligible	Local	Negligible	Primary Mitigation – mobility hubs, EV charging infrastructure, cycleways and a Travel Plan.	Negligible
New Human Receptors	The exposure of new receptor locations introduced by the	Permanent / direct	Not Applicable	Not Applicable	Local	Negligible	Primary Mitigation – mobility hubs,	Negligible

Air Quality

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
	Proposed Development.						EV charging infrastructure, cycleways and a Travel Plan.	
Ecological Receptors	Impacts associated with a change in pollutant levels from operational traffic generated by the Proposed Development.	Permanent / direct	Not Applicable	Not Applicable	Local	Negligible	Primary Mitigation – mobility hubs, EV charging infrastructure, cycleways and a Travel Plan.	Negligible
Cumulative and In-Combination								
Surrounding Environment: Dust soiling effects on people and property Human health effects from PM ₁₀ exposure Dust soiling effects on ecological receptors	Cumulative dust / PM ₁₀ generated from temporary construction activities.	Temporary / Direct	Not Applicable	Not Applicable	Local	Negligible	Embedded mitigation includes the implementation of a CEMP and construction best practice throughout the construction phase. Other cumulative schemes are expected to implement similar.	Negligible

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
Existing Human Receptors	Public health impacts associated with a change in pollutant levels from cumulative traffic.	Permanent / direct	Low	Negligible	Local	Negligible	Primary Mitigation – mobility hubs, EV charging infrastructure, cycleways and a Travel Plan.	Negligible
New Human Receptors	The exposure of new receptor locations introduced by the Proposed Development.	Permanent / direct	Not Applicable	Not Applicable	Local	Negligible	Primary Mitigation – mobility hubs, EV charging infrastructure, cycleways and a Travel Plan.	Negligible

ⁱ Guidance on the assessment of dust from demolition and construction (version 2.2), IAQM, January 2024

ⁱⁱ Local Air Quality Management Technical Guidance (TG22), Defra, May 2025.

ⁱⁱⁱ The Clean Air Strategy, Defra. January 2019.

^{iv} Environmental Improvement Plan 2025, Defra. December 2025.

^v Ministry of Housing, Communities & Local Government, National Planning Policy Framework, (2024).

^{vi} Ministry of Housing, Communities & Local Government, Planning Practice Guidance: Air Quality, (2019).

^{vii} Knowsley Local Plan Core Strategy, January 2016.

^{viii} The Air Quality Standards Regulations (England) 2010, Statutory Instrument No 1001, The Stationary Office Limited.

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- ix The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020, Statutory Instrument No. 1313, The Stationary Office Limited.
- x UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations, 2017.
- xi The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023. UK Statutory Instruments 2023 No. 96.
- xii Defra, PM_{2.5} Targets: Interim Planning Guidance, (2024).
- xiii Air Quality Strategy: Framework for Local Authority Delivery, Department for Environment Food and Rural Affairs, April 2023.
- xiv The Environmental Protection Act 1990. Available at <http://www.legislation.gov.uk/ukpga/1990/43/contents>.
- xv UK Government, Wildlife and Countryside Act, (1981).
- xvi UK Government, Natural Environment and Rural Communities Act, (2006).
- xvii Local Air Quality Management Technical Guidance (22), Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland. May 2025.
- xviii Defra and the Greater London Authority, COVID-19: Supplementary Guidance. Local Air Quality Management Reporting in 2021. April 2021.
- xix <https://uk-air.defra.gov.uk/pm25targets/planning>. Accessed February 2026.
- xx National Highways, DMRB, LA 105 – Air Quality (Vertical Barriers), 2024.
- xxi EPIC and IAQM, Land-Use Planning and Development Control: Planning for Air Quality, v1.2 2017.
- xxii IAQM, A guide to the assessment of air quality impacts on designated nature conservation sites, v1.1, 2020.
- xxiii IAQM, Guidance on the Assessment Dust from Demolition and Construction, v2.2, January 2024.
- xxiv IAQM, Use of 2020 and 2021 Monitoring Datasets, v1.1, December 2023.
- xxv KMBC Scoping Response reference: 25/00063/SO. Natural England Scoping Response Reference: 25/00063/SO.
- xxvi Environmental Impact Assessment Scoping Report. Land at Halsnead Garden Village, Phase 2b and Phase 3. Pegasus Ref: P24-1099.
- xxvii Cumulative Sites Plan. Drawing Reference: P24-1099_EN_06.
- xxviii 2025 Air Quality Annual Status Report (ASR), Knowsley Metropolitan District Council, June 2025.
- xxix UK plan for tackling roadside nitrogen dioxide concentrations – Detailed plan, Defra and Department for Transport, July 2017.
- xxx Framework Travel Plan. Proposed Residential Development Land at Halsnead Garden Village, Phase 3. January 2026.