



Maro Developments

Mercury 62

Proposed Employment Development

Environmental Statement Volume 2: Main Text

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Prepared for
Maro Developments

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Document Review

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1. Introduction

- 1.1 Maro (hereafter referred to as the 'Applicant') is seeking to obtain planning permission for an employment development on land off Cronton Road, Prescott known as Mercury 62 (hereafter referred to as the 'Site'). The Site is located within the administrative authority of Knowsley Metropolitan Borough Council ("KMBC"). The planning application to which this Environmental Statement ("ES") directly relates is a full planning application for a proposed employment development at the Site.
- 1.2 The planning application boundary is shown edged red on an Ordnance Survey ("OS") base map presented in **Figure 1.1**. The Site is described in detail in Chapter 3: Site Description. A detailed description of the development is provided in Chapter 5: The Proposed Development, which is supported by a series of plans and drawings.
- 1.3 Egniol, who are competent EIA experts have been commissioned by the Applicant to co-ordinate the Environmental Impact Assessment (EIA) process and produce the ES for the proposed development. As such, this ES has been coordinated by Egniol's Environmental Planning team who are members of the Institute of Environmental Management and Assessment ("IEMA").

The Site

- 1.4 The site is irregular in shape and occupies approximately 10.1 hectares ("ha") of land to the east of Junction 6 of the M62, bound by Tarbock roundabout to the west, M62 to the north, Cronton Road to the south and undeveloped land to the east which is subject to recent planning permissions for development. The site is located in KMBCs administrative area in the ward of Whiston and Cronton.
- 1.5 The site comprises undeveloped land which is vegetated with scrubby vegetation including scattered, and boundary trees. The area surrounding the site comprises a mix of agricultural land, urban areas and pockets of dense woodland vegetation.

Development Proposals

Outline of the Proposed Development

- 1.6 The planning application seeks full planning permission for a single unit employment unit. Planning permission is being sought for a development of up to 29,081sqm employment floorspace (hereafter referred to as the 'Proposed Development').

- 1.7 The Proposed Development sought for approval as part of the planning application comprises a warehouse with ancillary office floorspace (use class B8). The Development will also include for provision of associated infrastructure such as waste storage / collection facilities, highways infrastructure, drainage features and landscaping.
- 1.8 The full description of development on the planning application form is:
- "Full planning permission for the erection of a single unit (Use Classes B8) with ancillary offices, ancillary outbuildings, access, landscaping, service yard, car parking, servicing and all ancillary enabling works."*
- 1.9 Environmental constraints and potential adverse effects have been identified throughout the EIA process and, as a result, mitigation measures have been incorporated into the proposals through design (known as embedded mitigation). Where environmental mitigation measures have not been integrated into the proposals through design, it is expected that the requisite mitigation measures will be secured by appropriate planning conditions where relevant (known as further mitigation). Further detail relating to the approach to mitigation is presented in Chapter 2: Approach. Mitigation has been identified, where appropriate, in each technical chapter of this ES (Chapters 6-9) and summarised in Chapter 19: Summary of Mitigation and Residual Effects.
- 1.10 A detailed description of the Proposed Development can be found in Chapter 5: Proposed Development of this ES.

The Planning Application and Environmental Impact Assessment

EIA Context

- 1.11 EIA is a systematic process by which information about the scope and likely environmental effects of a proposed development are assessed and presented to the Local Planning Authority (LPA), relevant stakeholders and the public to inform the decision on whether the development should be granted planning permission.
- 1.12 The Proposed Development constitutes 'EIA development' under the Town and Country Planning (Environmental Impact Assessment) (England) Regulations 2017 (SI 2017/571) as amended (hereafter referred to as the 'EIA Regulations'). Criteria for establishing the need for an EIA are set out in Schedules 1 and 2 of the EIA Regulations. The Proposed Development falls under Schedule 2, Category 10 'Infrastructure Projects', Subsection (b) 'Urban Development Projects'.

- 1.13 This document is the ES which reports the findings of the EIA and supports the planning application for the proposed development. It has been prepared by Egniol with technical contributions from a range of specialist consultants experienced in EIA (see **Appendix 1.1**). This ES provides sufficient environmental information to enable KMBC to make an informed decision on whether to grant planning permission.
- 1.14 This ES relates to the planning application which is defined by the description of the development and the detailed plans for development that accompany the application.

The Planning Application Package

- 1.15 The planning application package consists of the following documents:
- Covering Letter;
 - Application form, relevant land ownership certificate (duly signed) and relevant planning application fee;
 - Full set of application drawings for approval;
 - Design and Access Statement;
 - Planning Statement;
 - Statement of Community Involvement;
 - Noise Assessment;
 - Environmental Statement; and
 - Arboriculture Impact Assessment.

The Environmental Statement

- 1.16 The ES is divided into three volumes and the contents outlined below:
- **Volume 1: Non-Technical Summary** – A document providing a synopsis of the ES without utilising technical language. The summary includes a description of the Proposed Development, the potential environmental effects associated with the Proposed Development and the measures proposed to mitigate these effects.
 - **Volume 2: Main Text** - This volume contains the main body of text of the ES, split into chapters. It provides an introduction, the approach to assessment, the assessment of alternatives, a description of the Proposed Development, a series of technical assessments relating to specific environmental topics including cumulative and combined effects and a summary of residual effects.
 - **Volume 2a: Main Text Figures** – This volume contains the figures associated with the chapters in Volume 2: Main Text.
 - **Volume 3: Appendices** – This volume contains supporting information and a collection of technical reports upon which the conclusions of the ES are based.

Environmental Statement Availability

- 1.17 The Non-Technical Summary, ES and Appendices are available for viewing at KMBC Offices and on the KMBC website. Further copies of the ES and Appendices are available on CD at a cost of £25 from Egniol. Contact details are as follows:

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2. Approach

Introduction

- 2.1 This chapter describes the methodology used to undertake the EIA in accordance with the Town and Country Planning (Environmental Impact Assessment) (England) Regulations 2017 (SI 2017/571)¹ as amended and National Planning Practice Guidance (NPPG).
- 2.2 The chapter begins with a description of the general approach to assessment and EIA regulatory compliance, including how the planning applications and EIA are linked. EIA procedure and methodology is presented, then the stakeholder consultation process is explained, and the consultees listed, before the spatial and temporal scope of the assessment is discussed.
- 2.3 Following this, the criteria used for impact prediction, assessing significance and implementing and securing mitigation measures are explained, along with any limitations and assumptions. With regard to the methodologies and assumptions for the technical assessments, each chapter has its own specific assessment methodology and assumptions, which are explained within the relevant sections.
- 2.4 A wide range of experience, resources and skills have been coordinated in order to bring together these applications and the project team, along with their professional roles, is presented at the end of this chapter.

EIA Procedure and Methodology

EIA and Regulatory Compliance

- 2.5 The EIA Regulations, supported by UK case law, provide the legal framework for the process of EIA and contents of Environmental Statements. The planning application is submitted in full and the application description of development, plans and schedule of accommodation provides sufficient detail to identify, predict and assess the significance of any potential environmental impacts.

Basis of Assessment

- 2.6 The EIA is based on the written description of the Proposed Development including construction timescales, the Site red line application boundary (**Figure 1.1**) and the quantum of development (see: Chapter 5: The

¹ HMSO. The Town and Country Planning (Environmental Impact Assessment) Regulations. 2017.

Proposed Development). These parameters, along with detailed plans and elevations submitted for approval as part of the application, allow the likely significant effects of the proposals to be fully assessed and appropriate mitigation measures secured.

- 2.7 The Design and Access Statement (DAS) (Fletcher Rae) which accompanies the planning application, presents further information about the Proposed Development.

Screening

- 2.8 Regulation 6 of the 2017 EIA Regulations makes provision for a developer to request a 'Screening Opinion' from the Local Planning Authority (LPA) to ascertain whether an EIA is required if a development is classed as a Schedule 2 development. This decision is based on the likelihood of significant environmental effects arising in relation to the development proposals.
- 2.9 It has been assumed for the purposes of the application that an EIA will be required based on the scale of the proposals and the likelihood for cumulative environmental effects; therefore the Applicant has undertaken an EIA voluntarily. It is accepted that the Proposed Developments fall within Schedule 2, Category 10 'Infrastructure Projects' Subsection (a) 'Industrial Estate Development Projects' in accordance with the EIA Regulations.

Scoping

- 2.10 Scoping is a process that, through research and consultation, identifies the environmental issues that require assessment as part of the EIA. This essentially refines the focus of the EIA on the environmental aspects which are likely to result in significant environmental impacts whilst also ensuring that no potentially significant areas are overlooked.
- 2.11 Under the EIA Regulations, submission of a scoping request to the local planning authority ("LPA") is not mandatory for an EIA development. Regulation 15 (1) of the EIA Regulations states that *"A person who is minded to make an EIA application **may ask** the relevant planning authority to state in writing their opinion as to the scope and level of detail of the information to be provided in the environmental statement (a "scoping opinion")"* [Egning emphasis in bold]. In this instance, a scoping request has not been formally made to KMBC as the likely significant effects of the project are well understood and the proposed scope of the EIA is considered to be robust.
- 2.12 Through analysis of the site constraints and establishing the proposals, it has been discussed with KMBC at pre-application meetings that an appropriate scope for the EIA comprises of the following disciplines:
- Ecology and Nature Conservation.

- Water Resources and Flood Risk.
- Transport and Access.
- Air Quality and Dust.

2.13 A number of topics were scoped out of the EIA and identified as potentially giving rise to impacts that will be not significant. This approach was agreed through pre-application meetings with KMBC on that basis that if significant effects were identified, the relevant discipline would then be included within the EIA to ensure any significant effects are robustly assessed in accordance with the EIA Regulations. A description of these topics and reasons for scoping these out of the EIA is provided in Table 2.1.

Table 2.1: Non-Significant Topics to be Scoped out of the EIA

Discipline	Commentary
Lighting	Artificial lighting is provided to encourage a safe environment for a range of activities including driving, cycling and walking. It is also used to enhance the environment by means of decorative and flood lighting of areas, features and buildings. Any new lighting proposed as part of the development at the Sites will be in accordance with British Standards, The Institution of Lighting Professionals (“ILP”) and The Chartered Institution of Building Services Engineers (“CIBSE”) which prescribes required lighting levels. The proposed lighting will be selected with reference to the following design standards and codes of practice: • BS EN 5489-1: 2003 +A2 (2008) Code of Practice for the design of road lighting: Part 1 Lighting of roads and public amenity areas; • BS EN 13201-2: 2003 Road lighting – Part 2: Performance requirements; • ILE GN01: Guidance notes for the reduction of obtrusive light; • ILE TR12: Lighting of pedestrian crossings (2007); and • ILE TR25: Lighting for traffic calming features. Lighting will be designed in conjunction with the design team and landscape consultant to ensure that lighting is appropriate in terms of the potential effects on public realm and surroundings of the Site. As this mitigation can be ‘designed-in’ to the proposals and secured through appropriate planning controls, it is considered that a detailed assessment of lighting is not required as part of the EIA.
Waste	Given the nature of the Proposed Development, materials required for the construction of the Proposed Development are unlikely to be particularly scarce or environmentally sensitive, nor is the Proposed Development likely to result in materials becoming scarce. Consideration will be given throughout the design process to the specification of suitable materials, including their sustainability and environmental implications, to support an environmentally sensitive and high-quality development. As a result, the Proposed Development is not likely to have any significant effects in relation to materials. Waste will be generated during the construction phase, as a result of the demolition of existing and construction of the new building. Waste management

Discipline	Commentary
	will be considered carefully throughout the demolition, design and construction of the Proposed Development, to ensure compliance with legislation, and to minimise costs associated with waste disposal. The volume of construction waste likely to be generated by the development would be in line with what would be expected from a development of this size and will not significantly affect the capacity of local waste infrastructure. Following the implementation of standard mitigation measures including the adoption of a Site Waste Management Plan (“SWMP”), construction waste arisings can be reduced to a minimum such that it is not significant. During the operation of the development, waste (including recyclables) generated by the development will be managed by commercial operators. It is not anticipated the end use of the building will be a major generator of waste and the wastes generated by the Proposed Development should not significantly affect the capacity of local waste infrastructure. It is considered that there will be no significant impacts with regards to waste as a result of the Proposed Development and as such this has been scoped out of the EIA.
Accidents and Disasters	The EIA Regulations 2017 require that an ES needs to include a description of the expected effects of the Proposed Development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters that are relevant to the project concerned. In this case, the nature of the Proposed Development is not considered to pose risk of major accidents and/or disasters. As such, accidents and disasters are not proposed to be included as part of this EIA.
Human Health	During the construction phase of the development, all best-practice and legislative requirements necessary to protect the environment and human health will be implemented. This will include mandatory adherence to a CEMP. It therefore follows that the health and wellbeing of construction workers, local residents, local workers and visitors to the locality is unlikely to be significantly affected by the construction works. Through the iterative EIA and design process the Applicant is committed to achieving the most practicable sustainable design including minimising the likely significant adverse environmental effects of the Development and maximising the likely significant beneficial effects of the Development. Part of this work will focus on ensuring: • The Development is suitable for its intended land-use from a ground conditions and contamination perspective. • The Development provides acceptable air quality conditions to on and off-site human receptors. • The Development provides acceptable noise and vibration conditions. In addition to the above, the Proposed Development will provide new jobs which will contribute to improved wellbeing of future employees at the Site.

Discipline	Commentary
	Whilst all of the above can contribute to promoting and encouraging healthy lifestyles and wellbeing, there is currently no widely accepted methodology for the assessment of health and wellbeing and no known robust methodology to benchmark quantify and qualify the implications of the above upon health and wellbeing. That said, it is reasonable to assume that the implications of the completed and operational Development upon health and wellbeing will be no worse than insignificant. Consequently, the ES will not provide an impact assessment of human health and wellbeing.
Archaeology & Heritage	An Archaeology and Heritage Assessment has been undertaken and is submitted in support of the planning application. There are no statutory heritage designations (Scheduled Monuments, Grade I Grade II Listed Buildings, Conservation Areas, Registered Parks and Gardens or Registered Battlefields) within the site boundary. The nearest designated heritage assets comprise: • The Paddocks and the Stables – Grade II Listed Building, c. 375m north. • Carr House Farmhouse – Grade II Listing Building, c. 375m north. • Old Halsnead – Grade II Listed Building, c. 600m northeast. All of the listed buildings are either located within an urban context or situated far enough away from the site with enough intervening development / vegetation that they would not be impacted upon by the development proposals. It is not considered there will be significant archaeological resources which will restrict the development of this site. Should any potential archaeological remains be identified, these will be dealt with by commonplace mitigation measures, such as geophysical surveys and trial trenching. As such, archaeology and heritage can be scoped out of the EIA.
Ground Conditions	A Phase 1 Geo-environmental Report has been prepared by Integra and is submitted in support of the planning application. Based on the findings of the Phase 1, it is unlikely that there will be significant levels of contamination across the site. However, there are risks associated with historical coal mining, made ground, tanks and spoil heaps within and adjacent to the site, as such the presence of Made Ground in isolated areas is likely, which could represent a potential source of contamination. It is considered that commonplace measures will be implemented following the site investigation and preparation of a remediation strategy which will be agreed with the local authority. In addition, a CEMP will be prepared to avoid any risks identified by the proposed development, and as such it is not considered the ground conditions will lead to significant environmental effects.

Discipline	Commentary
	On this basis, ground conditions has been scoped out of the EIA.
Noise & Vibration	A Noise Assessment has been undertaken by AEC and is submitted in support of the planning application. During construction, there is potential for temporary and transient changes in the existing noise environment resulting from on-site construction activities and off-site construction traffic during the construction phase of the project. Mitigation measures, including a CEMP will be implemented to control noise and vibration during construction to ensure that no significant impacts are experienced as a result of the construction phase of development. Once operational, the proposed development will introduce a commercial use which will generate noise during its operation. The nearest residential receptor is located c. 280m to the east. The results of the noise assessment confirm that the potential effects on nearby residential receptors will not be significant, and commonplace noise mitigation can be implemented. These measures will comprise appropriate noise emission limits on any fixed plant. On this basis, noise and vibration can be scoped out of the EIA.
Climate Change	The climate change impacts associated with the proposals, and the subsequent requirement for adaptation and mitigation measures to increase the resilience to climate change events are covered within the standalone reports submitted in support of the planning application such as the Transport Assessment and Travel Plan. The Travel Plan will seek to promote sustainable means of transport and deter single occupancy car journeys. This will reduce the amount of greenhouse gas emissions from the development. The drainage calculations for the proposed development have made an allowance for climate change, which is considered best practice. The development has been designed to reduce emissions and maximise its sustainability through a range of measures including appropriate lighting, ventilation and fabric design of the building. Overall, any significant climate change impacts will be sufficiently considered and assessed within the standalone reports, setting out a series of mitigation measures to minimise climate change impacts. As such, climate change has been scoped out of this EIA.
Daylight, Sunlight and Overshadowing	Development in densely urbanised locations or of a high-rise nature can cause impacts to the levels of light received by adjacent properties. The proposed development is not located in a densely urbanised location and is not of a high-rise nature. Therefore, there would be no potential for issues of overshadowing or light obstruction to adjacent properties such that an assessment would need to be

Discipline	Commentary
	undertaken to quantify the impact and propose mitigation. It is therefore proposed that this be scoped out of the EIA.
Wind Microclimate	The proposed development will not comprise buildings of sufficient size and scale to affect wind flow and dynamics such that significant environmental effects could result on nearby receptors. As such, a wind assessment is not required to be undertaken for the proposed site and it is proposed that this be scoped out of the EIA.

Consultation

- 2.14 An integral part of the EIA process is consultation with a range of statutory and non-statutory consultees. Consultation was undertaken at the scoping stage to identify, at an early stage, any initial environmental concerns associated with the Proposed Development that required examination in greater detail in the EIA. The EIA has been prepared based on pre-application discussions with KMBC, and advice from the technical experts advising the Applicant to prepare the planning application.
- 2.15 Consultation has been undertaken as part of the technical assessments as a means of establishing the environmental baseline and assessment methodologies. This includes identifying sensitive components of the environment, e.g. humans, organisms or physical characteristics, or potential effects and reaching consensus on suitable mitigation measures. Details of further consultation undertaken as part of each technical assessment will be described further within each technical chapter as relevant.

Pre-Application Discussions

- 2.16 Consultants acting on behalf of the Applicant have engaged with KMBC and relevant statutory and regulatory bodies as part of an extensive pre-application discussions exercise. Pre-application liaison between the professional team and KMBC has taken place where a range of technical and design issues have been discussed.
- 18 August 2021.
 - 1 October 2021.
 - 19 January 2022.
 - 14 April 2022.
- 2.17 Following the initial pre-application meeting the design of the proposals evolved and the location of the building has been tested in a variety of locations within the site. This design testing was a result of identifying

and responding to the site constraints, and integrating the proposals with the committed development which is being brought forward within the site's immediate vicinity.

Public Consultation

- 2.18 The proposals have been subject to a period of Public Consultation which took place in June 2022. This has been undertaken remotely, using an internet-based consultation portal. A leaflet drop was undertaken for residents and businesses within the vicinity of the site.
- 2.19 The consultation information included the plans presenting the evolution of the design approach at that stage, which had been informed and influenced by the pre-application discussions with KMBC. Consultation feedback is reported through the accompanying Statement of Community Involvement, with comments covering a range of issues and viewpoints.

EIA Methodology

- 2.20 In addition to observing the formal requirements of the EIA Regulations, further formal guidance has been drawn from National Planning Practice Guidance (NPPG). Specific technical guidance is referenced in the individual technical chapters as appropriate.

Consistency

- 2.21 To assist the reader in understanding the technical assessments a consistent approach has been adopted throughout the EIA to ensure that likely significant effects are identified and evaluated in a transparent manner. Each environmental assessment topic has adopted the following approach:
- Baseline Assessment and Identification of the Study Area;
 - Identification of Sensitive Receptors;
 - Identification of Embedded Mitigation Measures;
 - Identification of Potential Effects during Construction and Operation of the Proposed Development (including indirect, direct, adverse and beneficial);
 - Assessment of Impact Significance;
 - Identification of Impact Significance;
 - Identification of Mitigation Measures;
 - Assessment of Residual Effects; and
 - Assessment of Cumulative Effects.

Spatial and Temporal Scope of Assessment

- 2.22 The spatial extent of the EIA is described by the geographical area potentially affected by the proposed development and will need to take into account:
- The physical extent of the proposed development defined by the limits of land to be used both during construction and operation (temporary and permanent);
 - The position of sensitive receptors within or outside of the site boundaries; and
 - The nature of the baseline environment and the way in which the impacts are likely to be propagated.
- 2.23 The effects for each of the disciplines are likely to extend to different spatial extents. The spatial scope for each discipline will be described within each of the topic chapters as required.
- 2.24 The environmental baseline studies undertaken as part of the EIA consider the current conditions of the site. Therefore, each technical chapter will contain a description of the relevant study area that may be affected by the development.
- 2.25 With reference to the baseline conditions, the impact assessment will be made against existing baseline conditions. The assessment will address effects arising from the construction and operation of the proposed development as follows:
- Construction effects may arise directly from construction activities but also from the temporary use of land (e.g. construction sites) or from associated changes in traffic movements; and
 - Operational effects may arise from the permanent operational activities and ongoing use of the Proposed Development and new infrastructure, including but not limited to highways, noise, and air quality.
- 2.26 The significance of the effects that will arise in each of these phases is based on any changes compared to the baseline conditions (i.e. those conditions which would exist if the proposed development did not go ahead).

Impact Prediction

- 2.27 The 2017 EIA Regulations state that an ES should include:

“A description of the likely significant effects of the development on the environment resulting from inter alia:

The construction and existence of the development, including, where relevant, demolition works;

the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;

the emission of pollutants, noise, vibration, light, heat and radiation the creation of nuisances, and the disposal and recovery of waste;

The risk to human health, cultural heritage or environment (for example accidents and disasters);

The cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;

The impact of the project on climate (for example nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;

The technologies and substances used."

2.28 Predictions of environmental impacts are carried out using quantitative methods, or in some cases, qualitative terms using expert opinion. All assumptions used and any areas of uncertainty are defined in the relevant chapters.

2.29 The following types of effect are considered:

- Direct impacts that arise from activities that form an integral part of the proposed development (e.g. new infrastructure/land take);
- Indirect impacts that arise from activities not explicitly forming part of the proposed development (e.g. noise changes due to changes in road traffic flows on existing roads resulting from the operation of the development);
- Secondary impacts that arise as a result of an initial effect of the proposed development;
- Permanent impacts that result from an irreversible change to the baseline environment (e.g. land take) or impacts which persist for the foreseeable future (e.g. visual impact);
- Temporary impacts that persist for a limited period only, for example, due to particular construction activities (e.g. noise from construction plant);
- Beneficial impacts that have a positive influence; and
- Adverse impacts that have a negative influence.

Significance Criteria

- 2.30 The significance of effect is assessed by looking at what the changes will be against the existing or predicted baseline as a result of both the construction and operation of the development. It is a product of the sensitivity of the receptor, and the magnitude of the impact upon it. The criteria used to define the sensitivity of a receptor and magnitude of impact is provided in Table 2.2 and Table 2.3 below. These criteria are used as a guide only and the specific criteria for each technical assessment will be presented within each chapter.

Table 2.2: Description of the Sensitivity of an Environmental Receptor

Sensitivity	Typical Descriptors
Very High	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

- 2.31 Descriptions of the magnitude of impact are provided in Table 2.3 below.

Table 2.3: Description of the Magnitude of an Impact

Magnitude of Impact	Impact Type	Typical Criteria Descriptors
Very Large	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements
	Beneficial	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality
Large	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality
Medium	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring
Small	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements

Magnitude of Impact	Impact Type	Typical Criteria Descriptors
No change	N/A	No loss or alteration of characteristics, features or elements; no observable in either direction.

Identification of Significant Effects

2.32 Based on the sensitivity and magnitude criteria set out above, specific significance criteria have been used in each technical assessment and these are explained in the methodology sections within each technical chapter. Often, these are based on clearly defined criteria from published best practice guidance. However, wherever possible, the following terminology has been utilised:

- Major Beneficial;
- Moderate Beneficial;
- Minor Beneficial;
- Negligible;
- Minor Adverse;
- Moderate Adverse; and
- Major Adverse.

2.33 Each technical chapter will set out what level of effect is considered to be significant. However, generally the technical specialists advise that Major Adverse and Major to Moderate Adverse effects are considered to be significant. In certain circumstances, based on the effects in question, Moderate Adverse effects may be considered significant, and equally not significant. This conclusion is an observation based on professional judgment.

2.34 The assessment of likely significant effects has been undertaken for all potential effects to determine their relative importance. This has taken into account the following considerations:

- Magnitude (size of impact);
- Sensitivity of the surrounding environment and receptors;
- Spatial extent (size of the area affected);
- Duration (short, medium or long term);
- Nature of the effect (direct or indirect, reversible or irreversible);
- Inter-relationships and combination effects;
- International, national or local standards; and
- Relevant policy guidance.

Mitigation

- 2.35 The development of measures designed to avoid, reduce or offset significant adverse environmental effects associated with a proposal is one of the key elements of EIA. Measures to mitigate environmental effects of the Proposed Development can take two forms;
- **Embedded mitigation** – Is the consideration of mitigation embedded into the fixed development (as per the detailed drawings) with the aim where possible, of avoiding, reducing or offsetting significant adverse effects, determined during the course of the assessment; and
 - **Further mitigation** – is the mitigation that is not embedded into the proposals and which requires further action than already proposed.
- 2.36 Where environmental mitigation measures have not been integrated into the proposals through design, it is expected that all other requisite measures or ‘further mitigation’ will be secured by appropriate planning conditions or obligations. Descriptions of these mitigation measures are included in the appropriate technical chapters and summarised in Chapter 10: Summary of Mitigation and Residual Effects.

Cumulative Effects

- 2.37 In line with Schedule 4 Paragraph 5(e) of the EIA Regulations, an ES must provide a description of the likely significant effects of a project on the environment resulting from:

“...the culmination of effects with other existing and / or approved projects...”

- 2.38 Such effects are known as ‘cumulative effects’.
- 2.39 Given that existing development will be considered in the environmental baseline conditions relevant to the site and the development, and a consideration of the likelihood of significant environmental effects of the development are judged against the relevant environmental baseline conditions, the potential for cumulative effects focuses as a minimum on those developments with:
- A resolution to grant planning permission.
 - A valid planning permission and yet to start on-site.
 - A valid planning permission and under construction.
 - A planning application registered with the local authority and likely to receive planning permission.
- 2.40 These are referred hereafter as ‘committed developments’.

- 2.41 The assessment of cumulative effects is set out in two forms. The first relate to the impacts of the Proposed Development in conjunction with committed developments in the area. These committed developments should be located within a realistic geographical scope where environmental effects could combine to create a more significant effect on a particular sensitive receptor. The second type of cumulative effect is that of the combination of the various types of impacts from the Proposed Development. These are referred to as synergistic effects.
- 2.42 Committed developments for consideration in the cumulative effects assessment were initially identified through a planning application search of the KMBC planning portal and agreed through pre-application discussions. This process identified a series of projects to be included within the cumulative assessment. The list of sites considered as part of the cumulative assessment are provided in Table 2.4 below.

Table 2.4: Cumulative Sites

Ref.	Application No.	Distance & Direction	Proposal
1.	18/00283/HYB	90m north	Hybrid application comprising full application for erection of 123 no. Dwellings, construction of vehicular/pedestrian accesses, laying out of public open space and associated works; outline application for erection of up to 237 no. Dwellings, car park and associated works (access into site to be considered - all other matters reserved for future approval).
2.	20/00399/OUT	680m north	Outline application for proposed residential development of up to 277 no. Dwellings (use class c3) and an apartment development of up to 100 units for over 55's (use class c3) together with new vehicular access to lickers lane and windy arbor road, landscaping and associated works (inc. Demolition of buildings) (approval sought for access - all other matters reserved).
3.	20/00417/FUL	770m northeast	Residential development comprising of the erection of 350 no. Dwellings together with the construction of vehicular access off fox's bank lane (comprising signalised junction), suds ponds, landscaping, boundary treatments and other associated works (including demolition of existing farm buildings).
4.	20/00329/FUL	340m north	Erection of a residential development of 43 no. Dwellings comprising 14 no. Apartments and 29 no. Houses together with access, car parking and associated development (demolition of existing barn).
5.	20/00494/HYB	Adjacent north and east	Hybrid planning application comprising: full application for the development of 161,900 sq ft (15,041 sq m) (gia) of storage and distribution floorspace (use class b8), including ancillary offices (use class b1), security gatehouse, site access road, engineering earthworks to form a part country park, public car park to serve country park, and associated works; and outline application with details of point of access (details of part-access, landscaping, appearance, scale and layout are reserved) for the development of up to 838,100 sq ft (77,862 sq m) (gia) of storage and distribution floorspace (use class b8), with ancillary offices and light industrial (use class b1); engineering earthworks to form country park and drainage attenuation ponds; pedestrian/cycle/equestrian route connecting existing m62 footbridge with proposed country park; and associated works.
6.	15/00022/OUT	2.2km north	Outline application for mixed use development comprising up to 750no. Dwellings & upto 929 sq m of commercial/industrial buildings (use classes b1/b2/b8) - all matters reserved for future approval.

Ref.	Application No.	Distance & Direction	Proposal
7.	17/00301/HYB	360m west	Hybrid application comprising a full planning application for 1800 sq.m gross external area food store (use class a1), 1161 sq.m gross external area b1/b2 use (business use / general industrial use) with associated car parking, landscaping, highway works, pumping station, substation and associated works including bund and noise attenuation boundary treatment to top of bund along western boundary of the site; and outline planning application for up to 7,500 sq.m use class b1 and b2 floor space, petrol filling station (sui generis use) with up to 400 sq.m floor space associated use class a1 unit, up to 1000 sq.m use class a3 and a4 floor space (pub / restaurant), with associated car parking, servicing areas, highway works, and other associated works, with all matters reserved for future approval.
8.	16/00819/FUL	2km northwest	Erection of 62 no. Dwellings together with construction of new vehicular & pedestrian access, landscaping, public open space, drainage and associated works.
9.	18/00062/HYB	3.5km north	Detailed application for 4,180 sq.m of employment floor space (use class b1), 3,275 sq.m ancillary floor space (use classes a1/a4/c1/sui generis), 154 residential dwellings, improvements to lord derby playing fields/oak plantation and associated landscaping and infrastructure including a dedicated 500kva substation for the residential neighbourhood and a 1000kva substation for the eastern employment area and the demolition of knowsley lane farm. outline application for up to 26,350 sq.m of employment floor space (use classes b1) and associated landscaping and infrastructure.
10.	19/00651/FUL	140m north	Construction of multi-use path and associated ground works including the facilitation of rising main associated with proposed residential development on adjoining land. disused railway line extending from m62 motorway extending north through halsnead park and to rear of cronton avenue, whiston, knowsley.
11.	20/00578/FUL	Adjacent to north	Construction of a new country park comprising of the creation of sculptured landscape, habitat/wetland creation, associated works and infrastructure, engineering/earthworks including changes to site levels together with the erection of a single storey visitor centre including reception, café, education space, ranger offices and an outdoor terrace area; erection of outdoor classroom canopy; sky room; provision of colliery and mineral line multi user route, new paths including a multi user route north of the m62 bridge up to windy arbor road and provision of new car park. Vehicular access to be taken from cronton road via access road to neighbouring employment site/country park car park with new footbridge over employment site/car park access road and pedestrian/cycle access from cronton road and fox's bank lane.

Ref.	Application No.	Distance & Direction	Proposal

- 2.43 Each technical chapter sets out the potential cumulative effects associated with the proposed development in combination with those schemes identified in Table 2.5 above. The assessments are provided at the end of each technical chapter, unless stated otherwise.

Limitations and Assumptions

- 2.44 The EIA has been undertaken based on the planning application drawings and description of the development submitted with the planning applications. The technical assessments have been based on the current land uses and the existing baseline conditions at the Site. Any assumptions made or limitations relating to individual technical assessments are presented, where applicable, in the relevant technical chapters.

The Project Team

- 2.45 The ES has been compiled using a wide range of sources and with inputs from competent, technical specialists. The organisations and their roles in the project team are listed in Table 2.5 below. See **Appendix 1.1** for details of the technical team's credentials.

Table 2.5: The Project Team

Discipline	Company
Planner	Avison Young
EIA Coordination	Egniol
Architect	Fletcher Rae
Ecology	Urban Green
Water Resources and Flood Risk	Integra
Traffic and Transport	Mott MacDonald
Air Quality	Redmore Environmental

3. Site Description

- 3.1 This chapter provides a description of the Site including a description of the location, a brief site history and a description of its surrounding area and context. It also summarises the potential environmental constraints to the development of the Site.

Site Location

- 3.2 The site is irregular in shape and occupies approximately 10.1ha of undeveloped land. The site is located to the east of Junction 6 of the M62, bound by Tarbock roundabout to the west, M62 to the north, Cronton Road to the south and undeveloped land to the west.
- 3.3 Strategically, the site is located c. 6.15km northwest of Widnes, 2.3km south of Whiston and 12.6km east of Liverpool City Centre. The M62 provides strategic highways access to Liverpool in the west and Yorkshire in the east. Junction 21A of the M6 is located 17km east of the site. The M57 is located to the west of the site travelling in a broadly north-south direction and accessed via the Tarbock Island roundabout.

Site Description & Environmental Considerations

- 3.4 The site contains undeveloped land with woodland present in the western area of the site. The habitats on site principally comprise grassland with semi-natural broadleaved woodland, running water, a ditch, marshy grassland and tall ruderal vegetation. The site characteristics comprise of the following elements:
- **Air Quality** – The site is not located within an Air Quality Management Area (“AQMA”). The nearest AQMA is located c. 2.4km to the southwest associated with the blanket Liverpool City Council AQMA.
 - **Ecology** – Strettlles Bog, Tarbock is a locally designated Local Wildlife Site (“LWS”) which is located in the western extent of the site. There are a further three LWS’ located immediately to the north (The Old Wood, South), the east (Mine Waste, Cronton), and the south (Daggers Bridge Wood). The site also falls within the Impact Risk Zone for the Mersey Estuary Site of Special Scientific Interest (“SSSI”) which is located c. 6.5km south of the site.
 - **Noise** – The nearest residential receptor is located c. 280m to the east of the site.
 - **Landscape and Visual** – The site is not located within or adjacent to any area designated on account of its landscape value. There are public footpaths adjacent to the site’s northern and eastern boundary.
 - **Built Heritage** - The nearest designated heritage assets comprise:
 - The Paddocks and the Stables – Grade II Listed Building, c. 375m north.
 - Carr House Farmhouse – Grade II Listing Building, c. 375m north.

- Old Halsnead – Grade II Listed Building, c. 600m northeast.
- **Highways** – The site has excellent transport connectivity with the site access directly onto the A5080 Cronton Road to the south. To the immediate west is Tarbock Island roundabout (Junction 6 of the M62).
- **Water Resources & Flood Risk** – The principal area of the site for development is located within Flood Zone 1. However, there is a watercourse within the western extent of the site and areas of land adjacent to the watercourse is located within Flood Zones 2 and 3.
- **Ground Conditions** – There is a risk associated with historical coal mining within the site and localised contamination due to made ground, spoil heaps and tanks being present within and adjacent to the site.

Site History

- 3.5 The site was open fields until the 1920s when Ravenhurst Pits were present in the site's central section. By 1925 a mineral railway associated with Cronton Colliery is present along the north eastern boundary with a tank. By 1959 the Ravenhurst pits are no longer recorded.
- 3.6 Sometime between 1974 and 1977, the mineral railway along the north eastern boundary was demolished. By 1977, Cronton Road has been moved towards the north and now runs along the south western boundary of the site. The roundabout and the M62 slip road are present along the north western boundary and an electricity pylon is present in the eastern site section with overhead cables crossing the site towards the north west. The site has remained largely unchanged since.
- 3.7 The site has been subject to a number of planning applications. These are summarised in Table 3.1 below.

Table 3.1: Site Planning History

Ref	Proposal	Key Dates
74/03561/HIST	Plot 5 land between cronton road and m62: proposed use of land for 3 playing fields changing facilities and car parking	Refused – 10 May 1979.
00/00695/FUL	Infilling of reservoir; and culvert replacement and regrading works to fox's bank brook	Approved – 6 December 2000.
03/01148/OUT	Outline application for development of a business park to include b1/b8/c1/a3 & supporting ancillary uses, including formation of access & siting of phase 1 distribution centre with assoc.. Office building, b1 unit & multi-storey car park	Withdrawn – 8 March 2004.
16/00574/ADV	Retention of 2no freestanding non-illuminated advertising boards	Approved – 14 March 2017
20/00578/FUL	Construction of a new country park comprising of the creation of sculptured landscape, habitat/wetland creation, associated works and infrastructure, engineering/earthworks including changes to site levels	Submitted – 9 November 2020. Awaiting decision.

Ref	Proposal	Key Dates
	together with the erection of a single storey visitor centre including reception, café, education space, ranger offices and an outdoor terrace area; erection of outdoor classroom canopy; sky room; provision of colliery and mineral line multi user route, new paths including a multi user route north of the m62 bridge up to windy arbor road and provision of new car park. Vehicular access to be taken from cronton road via access road to neighbouring employment site/country park car park with new footbridge over employment site/car park access road and pedestrian/cycle access from cronton road and fox's bank lane.	

Summary

3.8 This chapter has presented a description of the Site including a description of the location, a brief site history and a description of its surrounding area. Based on the information presented in this chapter, the main environmental characteristics of the Site have been identified as follows:

- The site has excellent transport accessibility to the Strategic Road Network.
- There are ecological constraints associated with the designated LWS on-site, and the additional LWS' located within the vicinity.
- Areas of land adjacent to the watercourse on site are located in Flood Zones 2 and 3; however, the main area of the site for development is located within Flood Zone 1.
- Public footpaths form part of the northern and eastern boundaries for the site.
- There are legacy contamination risks associated with coal mining and made ground within the site.

3.9 These identified constraints have been taken into account in the development of the proposals to ensure a thorough iterative design process and through the identification of appropriate mitigation measures as presented in Chapter 5: The Proposed Development.

4. Alternatives

- 4.1 A statutory requirement for inclusion in an ES is the reporting of the consideration of alternatives which have been considered by the Applicant in the development and evolution of a proposal. Schedule 4 of the EIA Regulations states that an ES is required to provide:

“A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.”

- 4.2 This chapter describes the alternatives that were studied by the Applicant for the Proposed Development and the process of design evolution in response to the EIA process.
- 4.3 Firstly, the chapter considers the ‘no development’ option, which describes the likely conditions at the Site in the absence of implementing the Proposed Development.
- 4.4 Secondly, the constraints and opportunities identified in relation to the Site have been considered and have influenced the design of the Proposed Development. The Applicant and the design team have undertaken a continuous review process to improve the design, taking into account the views of key consultees, stakeholders and the public. This design evolution process is described in detail and the reasons for the selection of the preferred option stated.
- 4.5 No alternative sites were considered for the development. The Site is allocated within Core Strategy Policy SUE2c Sustainable Urban Extension – South of Whiston and Land South of M62.

No Development Option

- 4.6 The ‘no development option’ evaluates the likely environmental conditions at the site in the absence of implementing the proposed development. A brief description of the baseline scenario is set out in Chapter 3: Site Description and provided in detail within each technical chapter.
- 4.7 In the absence of proposed development it is not expected that there would be any significant changes to the baseline conditions. There is no indication that in the absence of development the use and therefore management of the site would alter and therefore the environmental conditions of the site would remain at its

existing level, as described in Chapter 3: Site Description. Under the 'no development' scenario therefore, the site would remain undeveloped scrub land.

Employment Land Delivery

- 4.8 The site is allocated for employment uses in the Local Plan. Therefore, the Council need this site to come forward to meet the employment land requirements to deliver the jobs and growth in the Borough during the Plan period. In the absence of the proposed development, this would restrict the Council's ability to achieve the employment land delivery targets.

Environmental Review

Landscape and Visual

- 4.9 The proposed development will result in impacts on landscape character and visual amenity. In the event that the proposed development did not progress, these impacts would not materialise and it is envisaged the site would remain in its current use.

Ecology and Nature Conservation

- 4.10 As noted in Chapter 3: Site Description, the site primarily consists of scrub vegetation with wooded areas located in the western extent of the site. Without mitigation there is the potential for the integrity of the LWS on site to be adversely affected during the construction phase.
- 4.11 The proposed development will result in the loss of habitats on site due to the removal of scrub, trees and hedgerows to accommodate the proposals. However, there will be an overall net gain in biodiversity improvements which wouldn't be realised in the absence of the proposals.

Water Resources and Flood Risk

- 4.12 During the enabling works and construction phase, the proposed development has the potential to impact surface water flow routes and water quality. In the long term, the proposed development will increase the hardstanding on the site and increase surface water runoff. In addition, there is a potential risk of contaminating surface water and groundwater. In the absence of the proposed development there is still a potential risk to water quality and impacts on surface water runoff routes as the overland runoff is currently not formally controlled. With the proposed development in place, the mitigation strategy and management with regards to surface water drainage and water quality could improve the existing situation by creating landscape, ecology and water treatment benefits through the SuDS treatment train employed on site.
- 4.13 However, in the absence of the proposed development, the existing hydrological regime would remain unchanged.

Traffic and Transport

- 4.14 It is acknowledged that during the construction phase of the proposed development there will be effects relating to noise, air quality nuisance and increases in traffic on the local road network. However, this is only temporary and these short term effects are reversible. These effects will also be controlled by best practice measures set out within a CEMP.
- 4.15 The proposed development will increase vehicles on the local highways network in the long term. Whilst the assessments confirm the impacts on the highways network are not significant, the increased vehicles on the highways network would not be realised in the absence of the proposals.

Air Quality

- 4.16 As set out above, there will be temporary impacts on local air quality during the construction phase; however, these effects are commonplace, well-understood and easily mitigated in line with best practice guidance. The increase in traffic will slightly increase PM₁₀ and NO₂ levels associated with vehicle pollution. However, whilst the effects are not anticipated to be significant, they wouldn't be realised in the absence of the proposals.

Summary

- 4.17 In the absence of the proposals, the baseline environment is not anticipated to change and would remain as scrubby, vegetated land for the foreseeable future. In addition, under the no development scenario the biodiversity benefits associated with the proposals would not be realised, nor the socioeconomic benefits. As such, the perceived negative effects of the proposed development should be weighed against the benefits of the scheme and the need to deliver high-quality employment land in a sustainable location to provide much needed jobs and support the local economy in Knowsley.

Key Design Drivers and Design Evolution

- 4.18 The Applicant did not consider alternative sites or fundamentally different alternative land uses for the site. This is due to the site being allocated for employment uses and identified in Core Strategy Policy SUE2c 'Sustainable Urban Extension – South Whiston and Land South of M62'. As such, employment uses are considered compatible with the adopted local planning policy

Design Drivers

- 4.19 The key design drivers which have informed the scheme's design evolution include:
- Locating the buildings on site within Flood Zone 1.

- Minimising the vegetation loss to limit the effects on Strettles Bog LWS.
- Retaining boundary trees where possible to assist in screening the development.
- Taking account of the committed developments located to the north and east of the site.
- Integrating the access strategy for the site with the Council's wider aspirations for highways connectivity within the Halsnead Masterplan.
- Retaining and increasing habitat provision to achieve a Biodiversity Net Gain on site.
- No impacts on trees which are subject to Tree Preservation Orders.

Design Evolution

- 4.20 The Applicant and the design team for the application have regularly liaised with KMBC during a series of pre-application meetings in order to ensure that the evolving designs meet the aspirations for the site's allocation in the Plan. The Applicant has also engaged with statutory consultees and the public as outlined in the Statement of Community Involvement ("SCI") which is submitted as part of the planning application.
- 4.21 The key points of design evolution which have been explored during the design process include:
- Locating the building on site in the optimum position to minimise visual effects on receptors to the south of the site.
 - Adjusting the site layout to retain as many Category A, B and C trees within the site.
 - Retaining a through-route to provide vehicular connectivity between Symmetry Park located to the east of the site, thus allowing for multiple access points to be delivered in the Halsnead masterplan area.
 - Adjusting the habitats on site to strike the right balance for blue and green infrastructure to deliver the ecological benefits required to offset the proposed developments impacts.
- 4.22 Overall, the site design and layout has evolved following feedback from key consultees, members of the public and the outcomes of technical assessments which have been undertaken as part of the ES.

Conclusions

- 4.23 The consideration of alternatives has included the evaluation of a "no development" option and alternative design options. The design of the scheme has evolved through consultation with KMBC, key stakeholders and the public and the findings of the series of studies that make up the EIA. A detailed description of the development proposals is presented in Chapter 5: The Proposed Development.

5. The Proposed Development

- 5.1 Schedule 4, Part 1 of the 2017 EIA Regulations outlines the information that should be provided within an ES which includes:

“(a) A description of the location of the development;

(b) A description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land use requirements during the construction and operational phases;

(c) A description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;

(d) An estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases).”

- 5.2 This chapter and the accompanying figures define each application area, the study area, the maximum quantum of development proposed, the means of access proposals and describes the proposed development in line with Schedule 4 of the EIA Regulations. A description of the broad construction methods and processes is presented towards the end of this chapter.
- 5.3 The information presented in this chapter alongside the plans submitted for approval form the basis of the EIA and provides the level of detail required to enable the assessment of environmental effects in line with the 2017 EIA Regulations.

Description of the Development

- 5.4 The planning application seeks full planning permission for the construction of an employment development comprising a single industrial unit. To confirm, the key elements of the Proposed Development sought for approval as part of the planning application is as follows:
- 29,081sqm of employment floorspace (use class B8) including ancillary office floorspace (with a max building height of c. 18.5m):

- Separate accesses for HGVs and cars / pedestrians.
- 295no. car parking spaces (including 12no. accessible bays).

- 5.5 The Proposed Development will also include the provision of associated infrastructure such as waste storage / collection facilities, highways infrastructure, drainage features, green space and landscaping.
- 5.6 Details of the proposed developments are described in the following sections. Further supporting information is provided in the accompanying Design and Access Statement (DAS).

Application Description

- 5.7 The proposed development is defined on the planning application forms as:

"Full planning permission for the erection of a single unit (Use Classes B8) with ancillary offices, ancillary outbuildings, access, landscaping, service yard, car parking, servicing and all ancillary enabling works."

Detailed Designs

- 5.8 As detailed in Chapter 2: Approach, the assessment parameters include the detailed layout plans, sections and elevations, and means of access. These plans, along with the written description of the Proposed Development, allow the likely significant effects of the proposals to be fully assessed and appropriate mitigation measures secured. The development parameters which have been used within the assessment of environmental effects are presented in the drawing schedule presented at the end of this chapter. Table 5.1 below includes the list of detailed drawings that have been prepared and are submitted for approval with the planning application and have been used within the assessment of environmental effects. A description of the proposals is presented below which should be read alongside the drawings detailed in the Table 5.1 and presented in ES Volume 2a: Main Text Figures.

Table 5.1: Detailed Plans Submitted for Approval

Plan	Author	Ref.	ES Figure Ref.
Site Location Plan	Fletcher Rae	17021-FRA-AV-XX-DR-A-0101 P1	Figure 1.1
Existing Site Plan	Fletcher Rae	17021-FRA-AV-XX-DR-A-0102 P1	Figure 3.1
Proposed Site Plan	Fletcher Rae	17021-FRA- AV-XX-DR-A-0501 P1	Figure 5.1
Proposed Gatehouse	Fletcher Rae	17021-FRA-AV-XX-DR-A-0903 P1	Figure 5.2
Proposed Ground Floor General Arrangement ("GA") Plan	Fletcher Rae	17021-FRA-V1-00-DR-A-2001 P1	Figure 5.3
Proposed Office GA Plan	Fletcher Rae	17021-FRA-V1-00-DR-A-2002 P1	Figure 5.4

Plan	Author	Ref.	ES Figure Ref.
Proposed Roof Plan	Fletcher Rae	17021-FRA-V1-R1-DR-A-2003 P1	Figure 5.5
Proposed Site Sections (1)	Fletcher Rae	17021-FRA-AV-XX-DR-A-0701 P1	Figure 5.6
Proposed Site Sections (2)	Fletcher Rae	17021-FRA-AV-XX-DR-A-0702 P1	Figure 5.7
Proposed GA Elevations	Fletcher Rae	17021-FRA-V1-XX-DR-A-2101 P1	Figure 5.8
Proposed GA Sections	Fletcher Rae	17021-FRA-V1-XX-DR-A-2201 P1	Figure 5.9
Proposed Boundary Treatments	Fletcher Rae	17021-FRA-AV-XX-DR-A-0905 P1	Figure 5.10
Landscaping Plans	ALLP	CLPD 075 P01 Rev B	Figure 5.11
Means of Access Plan #1	Mott MacDonald	392094-MMD-00XX-DR-C-0101	Figure 5.12
Cycle Shelter Details	Fletcher Rae	17021-FRA-AV-XX-DR-A-0901 P1	Figure 5.13
Proposed Waste Compound Details	Fletcher Rae	17021-FRA-AV-XX-DR-A-0902 P1	Figure 5.14

Quantum of Development

- 5.9 The planning application seeks full planning consent for the land use and amount set out in Table 5.2.

Table 5.2: Schedule of Accommodation & Uses

Use	Quantum
Employment Use (B8) and ancillary offices	29,081sqm
Car parking space (no.)	295
Cycle parking space (no.)	36
Motorcycle parking space (no.)	16
Disabled parking space (no.)	12

- 5.10 The following sections describe the detailed plans and schedule of accommodation. These have formed the basis of the assessments within this ES.

Use, Amount and Operation of the Development

- 5.11 The Proposed Development includes a single industrial unit which will provide 29,081sqm of employment uses. The building height will extend to a maximum of c. 18.5m above FFL. The gatehouse is proposed to be c. 3.3m in height. The proposed site plan and gatehouse plans are shown at **Figures 5.1** and **5.2** respectively.
- 5.12 The proposed development will operate 24 hours per day, 7 days per week and 52 weeks per year. The functional requirements of the building and the processes it provides for dictate the scale, nature, form and layout of the development. The site will also accommodate areas for habitat creation and enhancement in order to increase biodiversity.

- 5.13 The main building will be located centrally within the Site and is rectangular in shape. The floor and roof plans are illustrated at **Figures 5.3 to 5.5**. The development car park for employees will be located to the west of the building and will accommodate 295 car parking spaces. This includes 12 accessible parking spaces and 10% of the 295 comprising EV charging spaces.
- 5.14 There would be separate accesses for the development to segregate HGVs with cars and pedestrians. The eastern access point would be solely used by HGVs and monitored via the security gatehouse. Whilst the western access point would provide accessibility for all other forms of site users including pedestrians, visitors, cars and cyclists. The sections and elevations are illustrated at **Figures 5.6 to 5.8**.
- 5.15 In terms of the external appearance of the buildings, this has, by necessity, been driven by visual effects of the proposals, function and operational requirements. Materials and colour will be uniform across the application site and aim to minimise visual effects as much as possible by selecting an appropriate palette of materials and colour. It is intended that the external roof and walls would be coated profiled steel cladding.
- 5.16 The elevations of the building will be broken up by vehicle docks, windows and fire exits.

Landscaping and Green Infrastructure

- 5.17 The landscape proposals include a mix of grassed areas, shrub and tree planting and overall the planting will not only soften the appearance of the proposed development, but enhance the general character and appearance of the wider area. The intention is to utilise modified grassland and the creation of wildflower grassland areas plus native species rich hedgerow and trees to boost the biodiversity value of the landscaping scheme.
- 5.18 A boundary treatment plan has been prepared by Fletcher Rae which is shown at **Figure 5.9**, whilst the detailed landscaping plan prepared by ALLP is shown at **Figure 5.10**.

Highways and Access

Vehicular Access

- 5.19 As set out previously, the site comprises separate access points for HGVs and the remainder of the site users. To accomplish the access strategy there are two new points of access.
- 5.20 The western site junction provides access to the car parking area of the site and will be for the use of staff and visitors. It also forms the main pedestrian and cycle access to the site. It is proposed to be a signal controlled junction with a separated right turn lane into the site from Cronton Road. The junction is also equipped with pedestrian and cycle crossing facilities across the site access arm. Across the road a pedestrian crossing facility is provided to give access to a proposed new bus stop on the southern side of Cronton Road.

- 5.21 The eastern site access junction is a signal controlled junction providing access for HGVs to the docking areas of the warehouse and to trailer parking. The junction is equipped with a right turning lane into the site from Cronton Road. A left and a right turn lane are provided on the exit from the site. Pedestrian and cycle crossing facilities are provided across the site access.
- 5.22 A combined cycleway footway of 3m width is provided on the northern side of Cronton Road along the site frontage and will connect to existing facilities at Tarbock Island. In addition to the bus stop on the southern side of Cronton Road a stop will also be provided on the northern side.
- 5.23 The signalised form of the site access junctions and basic site access strategy have been agreed in scoping with KMBC.
- 5.24 The means of access plans are shown at **Figure 5.11**.

Pedestrian and Cycle Access

- 5.25 Existing footpaths bound the site on its southern boundary along Cronton Road and an improved footpath link is being provided along the northern boundary of the site, providing connection to the pedestrian walkway over the M62. These proposals form part of the Country Park planning application (ref. 20/00578/FUL) which is awaiting determination.
- 5.26 Cycle and pedestrian routes are provided from the proposed Cronton Road junctions into the development such that these roads are fully accessible to all road users.

Parking Provision

Car Parking

- 5.27 The proposals include a car parking area with 295 standard spaces, including 10% which are equipped with EV charging facilities and 12 accessible parking bays. It is envisaged that the provision of EV charge points and infrastructure would encourage staff to consider switching to EVs should they still require to rely on the private car, but wish to reduce their carbon footprint.

HGV Parking

- 5.28 Due to the nature of the development (storage and distribution uses), there is also a need for trailer bays. A total of c. 42 trailer bays are provided in the northern extent of the site, with a further docking bays on the building's northern façade.

Cycle Parking

- 5.29 There would also be cycle parking provided in the form of 36 covered Broxap Apollo cycle stands located near the buildings entrance on the western façade. The cycle shelter details are shown at **Figure 5.13**.

Drainage Strategy

Surface Water

- 5.30 The proposed site drainage will consist of a separate surface and foul water drainage system. The drainage strategy will follow the drainage hierarchy which considers the following methods of surface water discharge in order of preference:
1. *Into the ground (infiltration).*
 2. *To a surface water body.*
 3. *To a surface water sewer, highway drain or another drainage system.*
 4. *To a combined sewer.*
- 5.31 Due to the ground conditions on site, discharge via infiltration is not considered to be a viable option. It is therefore proposed to discharge attenuated surface water into Chapel Brook within the western part of the site. The new access road for HGVs in the eastern extent of the site will discharge into Fox's Brook in line with the existing highways drainage system for Cronton Road.
- 5.32 A SuDS basin is proposed within the western extent of the site. This will restrict discharge rates into Chapel Brook to greenfield runoff rates. The surface water storage will provide a volume of c. 3,500m³. A range of SuDS management measures will be employed to regularly clean and maintain the SuDS infrastructure for the lifetime of the development.
- 5.33 The proposed site levels and drainage layout plans are shown at **Figures 5.14** and **5.15** respectively.

Foul Water

- 5.34 There is no known adopted foul water sewer infrastructure in close proximity to the site. Therefore, due to the absence of foul water or combined water infrastructure in the immediate vicinity of the site, more remote connection options have been considered.
- 5.35 Detailed discussions have been undertaken with the Environment Agency regarding the foul water proposals. In principle, it has been agreed that foul water from the development can be subject to proprietary treatment on site prior to discharging treated water to Chapel Brook, until such time as foul water infrastructure is provided by the statutory undertaker in Cronton Road.

Waste Compound

- 5.36 A dedicated waste storage area is located within the northern extent of the site at the rear of the main building. The waste compound will include a number of bins and storage areas for general waste and recycling. The location, sections and elevations for the waste compound are shown at **Figure 5.14**.

Construction

- 5.37 Precise construction methodologies will only be finalised once a contractor is appointed. It is expected that the appointed contractor and its sub-contractors will at all times apply the principle of Best Practicable Means.

Construction Program and Enabling Works

- 5.38 The anticipated construction programme is as follows:

- Start on site – Q1 2023.
- Full site completion by Q4 2023.

- 5.39 Due to the size and nature of the development, there will be no phasing of construction works.

Vegetation and Tree Clearance

- 5.40 Vegetation clearance will be required to facilitate development such as some tree clearance to facilitate construction of the proposed buildings. Clearance will take place outside of the bird breeding season (March to August inclusive), where possible. Should this not be possible, pre-clearance checks will be undertaken prior to vegetation clearance. Any updated ecological surveys and any licensing procedures would also be undertaken.

Site Compounds

- 5.41 The site compounds will be carefully positioned to avoid unnecessary visual or noise nuisance to adjacent land users.
- 5.42 It is proposed to utilise the compound area to offload, store and handle materials as well as for welfare facilities where appropriate. The location of the compound will enable materials to be offloaded in one controlled area and then moved within the site to the required building area. It is envisaged that strict management of loading zones will be implemented by way of a delivery booking system, which will ensure that material movements are efficiently managed and will also facilitate a 'just in time' delivery regime. Where possible, material movements will be managed to coincide with quiet periods.

Construction Hours of Work

- 5.43 Working hours will be subject to agreement with KMBC. However, it has been assumed that standard working hours during construction would be followed. These are presented below:
- Monday to Friday: 07:00 - 19:00;
 - Saturday: 07:00 - 13:00; and
 - No working on Sundays or Bank Holidays.
- 5.44 Exceptions may arise, for example when abnormal loads are delivered or when specialist activities are conducted, when works may be required outside of these times. The applicant acknowledges that should these circumstances arise, the appropriate permissions and notifications would be sought in advance from KMBC.
- 5.45 Where works unavoidably need to take place outside the core working hours, occupiers of nearby residential properties shall be informed by the contractor in advance of the works and their likely duration.

Construction Environmental Management Plan

- 5.46 A Construction and Environmental Management Plan ("CEMP") will be prepared and submitted as a standalone document in support of the planning application. This document outlines the methods which will be employed by developers and contractors to manage and where practical minimise the impact of the development's construction activities upon the site and surrounding area. The Plan demonstrates a commitment to achieving high environmental standards and compliance with considerate contractor scheme procedures. The Plan includes best practice measures and those mitigation measures identified through the EIA process. In summary, it outlines the following:
- Construction Method Statement Incl. Machinery and Equipment.
 - Proposed Working Hours.
 - Segregation and recycling of waste (waste management).
 - Control of vibration, air, light, & noise pollution.
 - Control of air/water pollution including measures for the prevention of pollution to nearby watercourses.
 - Prevention of nuisance from temporary lighting & vibration.
 - Access to and from site & construction traffic routes including parking of site operatives and visitors' vehicles and Fencing.
 - Deliveries & unloading.
 - Provision of on-site parking facilities.
 - Safe storage of fuel/hazardous liquids on site.

- Prevention of mud/debris being deposited on the highway.
- Use of timber from sustainable/recycled sources.
- Storage of materials & heavy plant on site.
- Supplier Procurement.
- Monitoring/control of water usage.
- Monitoring/control of energy consumption.
- Signage Strategy.
- Access by Emergency Vehicles.
- Ecological Appraisal.
- Complaints/ review Procedure.

5.47 Table 5.3 sets out the procedures and mitigation measures that have been identified in the CEMP. These reflect the mitigation measures identified in the technical chapters of the ES and it is recommended reference be made to specific requirements of each.

Table 5.3: Construction Effects and Mitigation

Potential Effect	Activity and Effect	Procedures and Mitigation Measures
Visual intrusion	Construction activity, lighting, and vehicle movements	• No storage of materials will be permitted outside the site boundary. • Temporary lighting required for security purposes during hours of darkness is to be designed to illuminate into the site and not to create any nuisance to neighbouring properties or highways. • The temporary lighting will be positioned at the site entrance, to the compound, within the building as it is constructed and enclosed, and to access routes at stages throughout the programme • Whenever possible temporary lighting will be turned off when not required.
Noise and Vibration	Movement of vehicles	• Controlled vehicle movements • Adoption of site haulage road layout that seeks to reduce vehicular movements.
	Use of large equipment / machinery	• Work only within agreed working hours • Screening plant to reduce noise which cannot be reduced by increasing the distance between the source and the receiver (i.e. by installing noisy plant and equipment behind large site buildings) • Ensuring the use of quiet working methods, the most suitable plant and reasonable hours of working for noisy operations, where reasonably practicable • Locating noisy plant and equipment as far away from houses as reasonably possible, and where

Potential Effect	Activity and Effect	Procedures and Mitigation Measures
		practical, carry out loading and unloading in these areas - Shutting down any machines that work intermittently or throttling them back to a minimum - Orientating plant that is known to emit noise strongly in one direction so that the noise is directed away from houses, where possible - Closing acoustic covers to engines when they are in use or idling
	Loading / unloading of lorries	- Where possible activity must take place in designated areas away from sensitive receptors - Lowering material slowly, wherever practicable, and not dropping them
Air Emissions and Dust	Emissions from vehicles	- Vehicles must be regularly serviced - Minimise movement of construction vehicles around the site - Impose a site speed limit
	Dust	- The use of dust suppression measures during periods of prolonged dry weather to negate the generation of wind blow dust as a result of site vehicular movements and other generating activities - All cutting equipment to use water as a suppressant where possible - Locate dust generating activities away from site boundaries - Site haul roads to be hard surfaced - Vehicles to be cleaned and wheels washed before leaving site - Loads entering and leaving site to be covered - Seal stockpiles to prevent wind generating dust
Community	Disruption	- Notify community and local businesses of works through notice boards and leaflets - Designation of a community liaison officer - Work only within agreed working hours - Provision of complaint helpline
Waste	Generation of general waste (packaging, surplus material, excavation material)	Waste minimisation and re-use methods should be considered
	Removal of general waste	- Recycling of materials where possible - Non-recyclable waste to registered landfill - Sheeting to cover lorries and trucks removing waste from site
	Storage of hazardous wastes	- Storage should be in designated areas, securely contained, marked, and stored liquids banded appropriately - All contaminated waste stockpiles to be stored upon and covered with suitable chemically resistant sheeting - Storage locations to be advised to all site operatives.

Potential Effect	Activity and Effect	Procedures and Mitigation Measures
		- All stockpiles to be frequently dampen down, particularly during periods of prolong dry weather - All contaminated waste stockpiles to be located away from site boundaries on areas of hard standing.
Storage and handling of materials	Storage of general materials	Store in packaging until use to prevent damage and waste
	Storage of hazardous materials	- Storage should be in designated areas, securely contained, marked, and stored liquids banded appropriately - All contaminated waste stockpiles to be stored upon and covered with suitable chemically resistant sheeting - Storage locations to be advised to all site operatives. - All stockpiles to be frequently dampen down, particularly during periods of prolong dry weather - All contaminated waste stockpiles to be located away from site boundaries on areas of hard standing.
Discharges to water	Site runoff and seepage into groundwater	- Management of site drainage - Provision should be made for the safe disposal of wastewaters. - Spill kits and emergency response procedures to be provided and established.
Accidents and emergencies	Spillage of fuels, oils or chemicals	- Spill kits and emergency response procedures to be provided and established. - Absorbent granules to be stored on-site - All oil tank deliveries to be supervised to help avoid spillages. - Plant and wheel washing (including concrete wagons) to be carried out in a designated area min. 10m from watercourses or surface water drain.
	Accidents involving the public	Appropriate signage to be provided
Traffic	Adverse traffic conditions caused by construction traffic	- Appropriate routing of construction traffic - A manned Gatehouse will be situated at the site entrance so in coming traffic can be controlled and directed onto to site and/or to the site compound parking area and traffic leaving can be checked for cleanliness. - All vehicles will be parked within the site boundary at all times on a carpark area to be formed to the left-hand side of the proposed access road.

Summary

- 5.48 This chapter has presented a description of the proposed development which is supported by a set of detailed plans and drawings. The description development and detailed plans set out the basis for the assessments described in this ES.
- 5.49 The potential environmental impacts of the construction phase of the proposed development have been considered and all controls or measures to mitigate these effects are in line with current environmental standards and legislative requirements. Further detail of construction impacts has been presented in each technical chapter, where applicable.
- 5.50 The Applicant will implement a CEMP for the Site prior to construction, thereby ensuring that any potential environmental effects are within suitable standards or mitigated in accordance with measures identified through the EIA process, where no standards exist.

6. Ecology

Introduction

- 6.1 This chapter assesses the effects of the proposed development on ecology and nature conservation. In particular it considers effects that may arise as a result of the proposed development on ecological features.
- 6.2 The chapter describes the methods used to assess the likely significant effects, the baseline conditions currently existing at the site and surroundings, the potential direct and indirect effects of the development arising from construction and operation of the proposed development, the mitigation measures required to prevent, reduce, or offset the identified significant effects and the residual effects. It has been written by Urban Green. In summary, the objectives of this chapter are to:
- Establish a robust and accurate ecological baseline for the proposed development site;
 - Identify and evaluate the nature conservation/biodiversity interest;
 - Identify any potential effects arising from the proposed development (construction and operational stages);
 - Establish the character and significance of those identified effects;
 - Identify mitigation measures to address the significant effects;
 - Assess any residual effects and the need for any compensation; and
 - Assess cumulative effects from other surrounding developments.
- 6.3 This Chapter is supported by the following figures and appendices:
- **Appendix 6.1** - Preliminary Ecological Appraisal.
 - **Appendix 6.2** - Biodiversity Net Gain Assessment.
 - **Appendix 6.3** - Biodiversity and Ecology Management Plan.

Planning Policy Context

National Planning Policy

National Planning Policy Framework

- 6.4 The National Planning Policy Framework (2021) Chapter 15: Conserving and Enhancing the Natural Environment identifies the importance Government places on developments enhancing the natural environment by protecting and enhancing valued landscapes, geological conservation interests and soils.

National Planning Policy Guidance

Local Planning Policy

6.5 The North Merseyside Biodiversity Action Plan (BAP) is currently managed by Merseyside BioBank (<http://www.merseysidebiodiversity.org.uk> – accessed 13th June 2022). This focuses on aspects of the local ecology which are in need of protection or conservation. The habitat and species action plans of key relevance to this proposal are:

- Lowland mixed broad-leaf woodland;
- Urban green infrastructure;
- Urban grasslands;
- Bats;
- Bluebell;

Knowsley Local Plan

6.6 Strategic Objective 8 of the adopted Local Plan aims to support and strengthen the role of Knowsley's green infrastructure (in rural and urban areas), promote biodiversity, and maintain the character of rural settlements.

6.7 Principle 4 of Policy CS2 within the adopted Local Plan states that new development in Knowsley should protect and enhance environmental assets, by maintaining or enhancing the quantity and quality of biodiversity and habitats, including potential impacts on nationally and internationally important sites for biodiversity.

6.8 Policy CS8 of the adopted Local Plan states that development within Knowsley should sustain and promote biodiversity (including designated sites, priority habitats, and protected and endangered species) in accordance with importance and contribution to ecological networks.

Halsnead Garden Village Masterplan SPD

6.9 Strategic Objective 5 of the SPD aims to create a strong green space framework, with a well-connected green and blue infrastructure network. The SPD identifies the need for ecological assessments to be conducted as part of planning applications and specific ecological measures to be designed into the green space framework as part of Key Requirement 8

Baseline Survey Methodology

Desktop Study

- 6.10 A desktop study was undertaken in June 2022 which comprised the gathering of records of information pertaining to protected and notable species and habitats and designated conservation sites from the local biological record centre (Merseyside BioBank) and from free online resources including MAGIC (Multi-Agency Geographic Information for the Countryside) database. In order to gain adequate information on protected species records and local designations, information was requested from within a 1km buffer of the site boundary. This search buffer was extended up to 5km for national designated sites and 10km for international designated sites. This is based on the ecological importance of the features and the radius at which it is considered an effect on these features could potentially occur.

Limitations

- 6.11 Species records can provide a useful indication of the species present within the search area, although the absence of a given species from the dataset cannot be taken to represent actual absence.

Preliminary Ecological Appraisal

- 6.12 A Preliminary Ecological Appraisal was undertaken of the site on 6th June 2022. The methods employed were in accordance with the standard method set out in the handbook for Phase 1 Habitat Survey (JNCC, 2010), and the CIEEM Guidelines for Preliminary Ecological Appraisal. The survey included habitat assessments for protected and S41 priority species.

Limitations

- 6.13 No limitations to the Preliminary Ecological Appraisal were encountered. The survey was undertaken during the optimum survey season (mid-April to mid-October) and access was possible to all parts of the site.

Preliminary Roost Assessment

- 6.14 A preliminary roost assessment of trees within and immediately adjacent to the site was undertaken on 6th June 2022, to determine the suitability of trees to support a bat roost. This included a detailed inspection of the exterior of the trees from ground level, using high-powered binoculars, for any evidence of use by bats and any potential roost features which may provide suitable roosting habitat. Based on the Potential roost features (PRFs) identified within each tree, trees were categorised for their roost suitability in accordance with the BCT 2016 Guidance.

Limitations

- 6.15 No limitations to the ground level tree inspection surveys were encountered.

Badger Survey

- 6.16 The site was surveyed for evidence of badger setts or other badger activity such as paths, latrines, or signs of foraging. Methodologies used and any setts found were classified according to good practice guidance within Harris, Cresswell, & Jeffries (1988). Where possible and accessible to do so a 30m buffer zone around the expected zone of influence was also surveyed.

Limitations

- 6.17 The site is directly adjacent to the M62; therefore it was not possible to fully survey the motorway verge that was present within 30m of the site boundaries. A full survey of the site boundary adjacent to the motorway was surveyed for evidence of badger and any results have been considered precautionarily.

Amphibian Survey

- 6.18 No ponds are present on site. A review of the site from aerial imagery identified the M62 to the north as a significant barrier to amphibian dispersal. Therefore, discounting land past the M62, an additional four ponds were identified within 250m of the site boundary. As great crested newts' (GCN) upper dispersal limit is generally considered to be up to 250m from a waterbody (though occurrence of greater distances does exist), ponds beyond this distance were not assessed due to limited connectivity (English Nature, 2001).
- 6.19 A GCN Habitat Suitability Index (HSI) assessment was carried out on all ponds identified within 250m of the site boundary in June 2022, following good practice guidance set out in ARG UK Advice Note 5 (Oldham *et al.*, 2010). Ten habitat suitability indices were assessed and inputted into the HSI equation, which generates a score between 0 (unsuitable) and 1 (optimal) reflecting the suitability of the pond for breeding GCN.

Limitations

- 6.20 No limitations were encountered during these surveys.

Assessment Methodology

- 6.21 The EclA of the proposals upon identified ecological features will be undertaken with reference to the CIEEM EclA guidelines. The EclA will:
- Establish a robust and accurate ecological baseline for the site;
 - Identify and evaluate the nature conservation/biodiversity interest present;

- Identify any potential effects arising from the Proposed Development (construction and operational stages);
- Establish the character and significance of those identified effects;
- Identify mitigation measures to address the significant effects;
- Assess any residual effects and the need for any compensation; and
- Assess cumulative effects from other surrounding developments.

Establishing Importance

- 6.22 The CIEEM EclA guidance confirms that detailed assessment of ecological features that are ‘widespread, unthreatened, and resilient to project impacts’ is not necessary. It is therefore necessary to determine which ecological features are sufficiently important (and potentially affected by the Scheme). Decisions on relative importance will be outlined in the assessment and consider quality, extent, rarity (including local rarity) and threats or declines of a feature. Relevant statutory and non-statutory designations, legislation, and policies will be taken into account of, although not all populations of legally protected species show the same rarity, so contextual information is vital. Importance could also be related to the supportive function of the feature (i.e. providing a buffer, connections or opportunities for expansion / climate change resilience of a neighbouring feature).
- 6.23 The importance of a feature is identified within a defined geographical context, the scales relevant to the proposed development and its ecological features are presented in Table 6.1. These criteria provide a starting point for the assessment but specific site conditions together with information on the local and wider context may result in different criteria being applied.

Table 6.1 Evaluation of Ecological Features

Geographic Context	Criteria
International	An internationally designated site or candidate site i.e., Special Area of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites and their qualifying features, some of which may depend on land outside the designation boundaries. Candidate or proposed designations are treated as of equal value to fully designated sites. Under the NPPF, land that is set aside as compensation for adverse effects of development on European Sites should also be regarded as of European value.

Geographic Context	Criteria
	Species populations or habitat areas (such as those listed in Annex I, II, or IV of the Habitats Directive or Annex I of the Birds Directive) of international importance due to relative size, rarity, or quality of the feature. Any regularly occurring population of an internationally important species, which is threatened or rare in the UK, i.e., it is a UK Red Data Book species or listed as occurring in 15 or fewer 10km squares in the UK. A regularly occurring, nationally significant populations/number of any internationally important species.
National	Designated or proposed Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Marine Nature Reserves (MNR) and their qualifying features, some of which may depend on land outside the designation boundaries. A viable area of a priority habitat identified within the UK BAP, or of smaller areas of such habitat which are essential to maintain the viability of a larger whole. Species populations or habitat areas (including legally protected or NERC Act S41 species or habitats) of national importance due to relative size, rarity, or quality of the feature.
Regional	Viable areas of key habitat identified in the Regional BAP or smaller areas of such habitat which are essential to maintain the viability of a larger whole. Viable areas of key habitat identified as being of Regional value in the appropriate Natural Area profile. Any regularly occurring, locally significant number of a regionally important species. Sites which exceed County level designations but fall short of SSSI selection guidelines.
County	Semi-natural ancient woodland greater than 0.25ha. Designated or proposed Local Wildlife Site (LWS) and their qualifying features where they occur within designation boundaries. A viable area of habitat identified in the County BAP.

Geographic Context	Criteria
	Any regularly occurring, locally significant population of a species which is listed in a County Red Data Book or BAP on account of its regional rarity or localisation. A regularly occurring, locally significant number of a County important species.
District	Ancient semi-natural woodland smaller than 0.25ha. Areas of habitat identified in a sub-County (District BAP) or in the relevant Natural Area profile. Sites / features that are scarce within the District or which appreciably enrich the District habitat resource. A population of a species that is listed in a District BAP because of its rarity in the locality or in the relevant Natural Area profile because of its regional rarity or localisation. ‘Important’ hedgerows (as described under The Hedgerows Regulations 1997) where these occur within an extensive network.
Local	Local Nature Reserves (LNR) unless also designated at a higher level, and other nature conservation designations (under local planning policies). Green infrastructure designations where these contribute to local landscape connectivity and/or buffer other ecological features valued at least this geographic scale. Species populations or habitat areas (including legally protected or NERC Act S41 species or habitats) of local importance due to relative size or quality. Features that appreciably enrich the local ecological resources, although these may themselves be common and widespread, such as long-established hedgerows, woodlands, and ponds.
Site (Within the ZOI)	Populations of common and widespread species or habitats without protection or conservation designation.

Geographic Context	Criteria
	Isolated and small fragments of NERC Act S41 habitats or species (only where better representative examples of such habitats or species are common nearby).

Characterisation of Effect

6.24 Although not necessary, it is good practice to describe potential impacts without and with mitigation. The proposals may result in multiple potential impacts on an important ecological feature, and the CIEEM approach requires that only those that are likely to occur and have significant impacts need be assessed, although a precautionary approach to scoping potential impacts is recommended. The following characteristics are used to describe impacts (not all may be relevant in all cases):

- Positive or negative;
- Extent;
- Magnitude;
- Duration;
- Timing;
- Frequency;
- Reversibility; and
- Likelihood.

Significance Criteria

6.25 Once an impact has been described it is necessary to determine if the effect is 'significant'. In the context of CIEEM EcIA guidance a significant effect is one that either 'supports or undermines biodiversity conservation objectives for 'important ecological features'. This can include impacts on the structure and function of sites and habitats or the conservation status of habitats and species (i.e., does not alter the extent, distribution, or abundance of the feature). The decision on significance is made irrespective of the geographical scale of importance of the feature; if an effect is found not to be significant at the level at which the receptor has been valued, it may be significant at a more local level. A significant adverse effect is not necessarily one that would make the proposals unacceptable.

6.26 In order to maintain consistency with other topic areas within the ES, the magnitude of the impact on the ecological receptor was summarised through a qualified description using the following scale:

- Negligible – the impact is certain not to have an adverse effect on the conservation status of a species or the integrity of a designated site or habitat. In accordance with CIEEM guidance, effects significant at less than Site level are considered not significant.

- Minor – the impact is on an ecological receptor of low (Site) value or is considered unlikely to significantly affect the conservation status or integrity of an ecological receptor of higher value (e.g., temporary hedgerow removal).
- Moderate – the impact is on an ecological receptor of medium (District, County, or Regional value) of the effect is considered unlikely to have a permanent effect on the overall conservation status or integrity of a receptor of higher ecological value (e.g., loss of 30% of dormouse habitat on a site).
- Major – any significant impact on an ecological receptor of high value (National or International); or a permanent and irreversible effect on the conservation status of an ecological receptor of medium value (e.g., loss of an area designated as a Site of Special Scientific Interest, or loss of a viable population of a NERC S41 Species of principal Importance).

6.27 The following terms have been used to define the significance of the effects identified and apply to both beneficial and adverse effects:

- Negligible – where no discernible improvement or deterioration is expected as a result of the Proposed Development on receptors, including instances where no change is confirmed;
- Minor effect – where the Proposed Development could be expected to result in a perceptible improvement or deterioration on receptors;
- Moderate effect – where the Proposed Development could be expected to have a noticeable improvement or deterioration on receptors; and
- Major effect – where the Proposed Development could be expected to have a substantial improvement or deterioration on receptors.

6.28 Effects that are classified as **Moderate or above** are considered to be **Significant**. Effects classified as **Minor or below** are considered to be **Not Significant**.

Consultation

6.29 The list of consultees during the preparation of the EclA is provided in Table 6.2.

Table 6.2: Consultation

Consultee	Date and Time	Comments	Actions
Merseyside BioBank	June 2022	Providing records of protected and notable species/habitats within 1km of the site boundary	None

Baseline Conditions

Designated Sites

6.30 Full details of the desk study conducted as part of the Preliminary Ecological Appraisal and details of international, national, and local designations are presented in **Appendix 6.1**. A summary of the sites identified is provided within Table 6.3. A search radius of 10km was used for internationally designated site and 5km for nationally designated sites. A total of five statutorily designated sites were present within the search areas described.

Table 6.3 Statutory designated sites

Site Name	Description	Location
Mersey Estuary SPA	The Mersey Estuary is a large, sheltered estuary which comprises large areas of saltmarsh, and extensive intertidal sand- and mudflats, with limited areas of brackish marsh, rocky shoreline, and boulder clay cliffs, within a rural and industrial environment. The intertidal flats and saltmarshes provide feeding and roosting sites for large populations of waterbirds. During the winter, the site is of major importance for ducks and waders. The site is also important during the spring and autumn migration periods, particularly for wader populations moving along the west coast of Britain. Qualifying species comprise non-breeding shelduck, teal, pintail, golden plover (excluded from Ramsar designation), dunlin, black-tailed godwit, and redshank. The SPA waterbird assemblage comprises great crested grebe, shelduck, wigeon, teal, pintail, ringed plover, golden plover, grey plover, lapwing, dunlin, black-tailed godwit, curlew, and redshank.	6km south
Mersey Estuary Ramsar		6km south
Childwall Woods & Fields Local Nature Reserve (LNR)		4.7km west

Site Name	Description	Location
	bluebell present in the woodland, and a wide diversity of butterfly species present.	
Clinton Wood LNR	The supports a woodland, grassland, and also has four ponds present within the site.	3.6km south
Hale Road Woodland LNR	A community woodland with grasslands and reedbeds also present.	4.2km south

6.31 Table 6.4 contains details of non-statutory designated sites present within 1km of the Site boundary. Eight non-statutory designated sites were identified from within 1km of the site boundary.

Table 6.4 Non-statutory designated sites present within 1km

Site Name	Description	Location
Strettles Bog, Tarbock Local Wildlife Site (LWS)	A small area of broadleaved woodland bisected by a minor watercourse.	Within the site
The Old Wood, South LWS	A predominantly broadleaf woodland with a ditch and marsh habitats. Bracken dominated areas can also be found. Evidence from the site visit conducted suggests this area is currently used for dirt biking.	Immediately adjacent to north of the Site
Mine Waste, Cronton LWS	A predominantly wooded site with ponds present on the north western side. A mix of dry and wet acid grasslands is present around the ponds and to the south.	Immediately adjacent to east of the Site
Daggers' Bridge Wood LWS	Broadleaf woodland dissected by two watercourses, with the confluence of these two watercourses within the woodland.	Immediately adjacent to south of the Site
The Old Wood, North	A mature broadleaf woodland set in a clough valley with rock outcrops and a former quarry. The woodland was separated from the Old Wood South by construction of the M62 motorway.	300m north
Ochre Brook, Tarbock	A minor watercourse that flows south through Merseyside, joining up with Dog Clog Brook 1.2km south of the Site.	470m north
Big Water and Big Water Wood, Halsnead	Standing water habitats which support populations of rare plant species.	500m north

Site Name	Description	Location
Ox Lane Wood, Tarbock	Section of broadleaf woodland with a ditch also present.	750m south west

Habitats

- 6.32 The habitats identified within the application site are described below and mapped as shown in **Figure 6.1**. Target notes (TNs) highlight ecological features of interest and presented in **Appendix 6.1**. the nomenclature of species found on site follows Stace (2010). Only common names are referred to in the sections below for ease of reading.

Semi Natural Broadleaved woodland

- 6.33 Semi-natural broadleaved woodland is present with the Site at the western extent, within the area that is designated as Strettles Bog, Tarbock LWS. The species present within the canopy comprised sycamore, pedunculate oak, ash, silver birch, and hawthorn. Fallen dead wood was present within this woodland, with the ground layer covered in a dense layer of leaf litter throughout. Evidence of woodland regeneration was present with some sycamore and oak saplings present within the ground layer. No evidence of management practices were observed within the woodland and some mature trees were present within the western extent of the woodland.
- 6.34 Ground flora species present within the woodland included bluebell, dog's mercury, remote sedge, creeping soft grass. Hart's tongue fern was also present in the wetter sections of the woodland in proximity to the watercourse. A dense stand of Himalayan balsam was also present within this woodland.

Mixed scrub

- 6.35 Dense scrub exists along the southern boundary of the site and is also present as a well established edge layer around the broadleaved semi-natural woodland present within the western section of the site.

Running water

- 6.36 Ochre Brook flows through the area of semi-natural broadleaved woodland present within the western section of the site. This watercourse was heavily shaded, fast flowing with minimal aquatic or marginal vegetation present. The watercourse was approximately 2m in width, with a water depth of approximately 50cm. The banks were steep to vertical in places throughout the site and reached a maximum height of 3m above the water level. The substrate of the watercourse consisted of large rocks and pebbles which were covered in a layer of silt. The water showed evidence of pollution, likely attributed to surface water runoff from the M62 motorway present adjacent to the site.

Ditch

- 6.37 Two ditches are present on site that flow from a culvert present adjacent to the northern boundary of the site into the watercourse present within the woodland. This ditch flows through a deep cutting within the northern section of the site which has been subject to previous earthworks associated with emergency flood clearance. The banks of the cutting were steep and had minimal vegetation established on the banks. Aquatic vegetation including hard rush, field horsetail, and hairy willowherb had become established within the channel. No open water was visible from the bank tops due to the density of vegetation present, however flowing water was present closer to the main watercourse.

Other neutral grassland

- 6.38 Other neutral grassland was the dominant habitat present within the site, with scattered patches of tall ruderal vegetation also present throughout. The site showed evidence of heavy machinery using the site, with deep wheel ruts evident, therefore this habitat has likely become established within the site following a period of disturbance. At the time of survey this habitat was damp, although no evidence of standing water was observed within the site. This habitat was observed to be more species rich than agricultural land, although none of the species present were notable and likely to be common within the surrounding area.
- 6.39 Yorkshire fog was present abundantly within this habitat, with common sorrel, creeping cinquefoil, creeping thistle, and marsh thistle present frequently. Field horsetail, creeping bent, hard rush, wild angelica, hogweed, common vetch, northern marsh orchid, glaucous sedge, field forget-me-not were present occasionally and square-stalked St Johns wort was present rarely.

Marshy grassland

- 6.40 Marshy grassland was present in two patches within the Site. This habitat was dominated by reed canary grass and soft rush, with occasional hairy willowherb also present.

Tall ruderal

- 6.41 A small area of tall ruderal vegetation had developed around a spoil mound that had been created within the centre of the site, likely associated with excavated material that has been deposited. Plant species that had developed within this habitat include hairy willowherb, common nettle, hogweed, and bramble, with field woundwort present rarely.

Protected and Notable Species

Vascular plants

- 6.42 88 records of bluebell (*Hyacinthoides non-scripta*) were returned in the data search. Three records of the vascular plant species grape-hyacinth and spreading hedge-parsley were returned. The closest record was

attributed to bluebell and was located onsite in 2017. Bluebell are listed under Schedule 8 of the Wildlife and Countryside Act (1981) and the North Merseyside LBAP, with both other species listed under Section 41 of the NERC act (2006).

- 6.43 Bluebell was confirmed to be present on site, within the semi-natural broadleaved woodland present in the western section of the site. Bluebell is listed on Schedule 8 of the Wildlife and Countryside Act 1981 (as amended) and on the North Merseyside BAP.

Invertebrates

- 6.44 110 records of dragonfly were returned in the data search, namely blue-tailed dragonfly, broad-bodied chaser, brown hawker, common blue damselfly, common darter, common hawker, emperor dragonfly, four-spotted chaser, migrant hawker, and southern hawker. Ten records of wall butterfly were also returned in the data search. The closest records were attributed to blue-tailed damselfly and broad-bodied chaser and were located approximately 125m southeast in 2008. All dragonfly species returned are listed under the North Merseyside LBAP, with wall butterfly listed under Section 41 of the NERC act (2006).
- 6.45 A diversity of habitats were present on Site, including broadleaved woodland with dead wood, running water, and a grassland/ruderal vegetation mosaic. These habitats will likely provide a range of habitats to support invertebrates at all life stages, although due to the location of the site on an urban/industrial fringe, the assemblage is likely to be restricted to common and widespread species.

White-clawed crayfish

- 6.46 The watercourse present within the Site within the Site which contained large rocks/pebbles that would provide sheltering habitats for white clawed crayfish. No evidence of undercutting or overhanging roots were seen along the banks.
- 6.47 The brook is culverted beneath the motorway and is likely to subject to a high degree of run off, making the brook unsuitable to support white-clawed crayfish (Peay, 2010). Additionally, no records of this species were returned from within 1km of the Site during the desk study

Amphibians

- 6.48 26 records of common toad (*Bufo bufo*) were returned in the data search, with the closest record approximately 30m east of the site from 2008. Eight records of great crested newt were returned, with the closest record approximately 780m southwest of the site from 2010. Common toad is listed on Section 41 of the NERC act (2006). Great crested newt is listed under the Wildlife and Countryside Act (1981), Section 41 of the NERC act (2006), and the North Merseyside LBAP. A MagicMap search returned no granted EPSL relating to great crested newts present within 1km of the Site.

- 6.49 No ponds were located within Site and four ponds were identified within 250m of the Site boundary. Ponds greater than 250m away were not considered as great crested newts' upper dispersal limit is generally considered to be up to 250m from a waterbody (though occurrence of greater distances does exist) (English Nature, 2001).
- 6.50 These ponds were generally of poor quality, being heavily shaded and containing low levels of water. HSI surveys conducted at the ponds in June 2022 assessed the ponds found within 250m of the Site as follows:
- Pond 1 – "Average suitability.
 - Pond 2 and Pond 3 – Below average suitability.
 - Pond 4 – Poor suitability'.
- 6.51 Previous surveys conducted in 2020 by TEP on these ponds and others within the surrounding area found no evidence of GCN, with the ponds also testing negative for GCN eDNA. The ponds identified within the surveys were subject to standard bottle trapping surveys during the optimum period for surveying in 2020, and no evidence of great crested newts was recorded. Due to these surveys having been undertaken recently and that the overall quality of the ponds and suitability towards great crested newts had not changed from when the previous surveys were undertaken, great crested newts are considered to still be absent from the ponds. The M62 present to the west and the A5080 present to the south provide a significant barrier to amphibian dispersal across the environment, and the ponds are isolated from other ponds within the local area.
- 6.52 The Site comprised a mosaic of habitats with a high abundance of soft rush, with connections to other aquatic habitats within the surrounding area which may provide suitable foraging resources and cover for common amphibians such as common toads.

Reptiles

- 6.53 No records of this species group were returned from within 1km of the Site boundary.
- 6.54 The Site was found to provide limited value for reptiles, due to the lack of open space for basking within the majority of the Site and the high level of anthropogenic disturbance present due to the proximity of nearby major roads. The woodland and scrub habitats present could provide some terrestrial cover for the species, though these are generally confined to the boundaries.

Birds

- 6.55 The Site was considered to be unsuitable to ground nesting species, however the boundary habitats and woodland habitats may provide value to species such as skylark, records of which were returned within the desk study.

- 6.56 The broadleaved woodland, aquatic habitats and boundary trees all provide suitable habitat to support nesting bird species.
- 6.57 The Site offers limited suitable habitat to support wintering birds due to the high level of anthropogenic disturbance present on Site from the adjacent motorway. Additionally the habitat present on Site is largely of poor quality and would provide limited food sources during winter months to support over wintering birds.
- 6.58 No mature trees with potential to support a barn owl were recorded on Site. The wider Site and environment provide limited foraging habitat due to the high levels of anthropogenic disturbance present.

Bats

- 6.59 No buildings were present on Site, and no trees with bat roost potential were identified within the Site. Mature trees were present within the woodland in the western section of the Site, however none with potential to support roosting bats were present.
- 6.60 The woodland and aquatic habitats on Site are anticipated to provide value for foraging bats due to providing suitable commuting route within the Site and across the wider environment, as well as providing a range of habitats to support invertebrate prey. The trees and scrub present along the Site boundaries, is likely to be of value to bats as it connects to the wider environment. The habitats within the Site were relatively common and widespread within the surrounding area.

Hedgehog

- 6.61 21 records of hedgehog were returned in the data search, with the closest record located on the southwestern border of the site in 2019. Hedgehog are listed under Section 41 of the NERC act (2006).
- 6.62 The broadleaved woodland and scrub habitats will provide suitable cover and foraging habitats for the species.

Brown hare

- 6.63 10 records of brown hare (*Lepus europaeus*) were returned in the data search, with the closest record located approximately 130m north of the site in 2012. Brown hare are listed under Section 41 of the NERC act (2006).

Water vole

- 6.64 14 records of water vole were returned in the data search, with the closest record located approximately 20m north of the site in 1989. Water vole are listed under Schedule 5 of the Wildlife and Countryside Act (1981) and Section 41 of the NERC act (2006).

- 6.65 The watercourse present within the broadleaved woodland in the western section of the Site had banks that were approximately 3m high and were steep to vertical throughout most of the Site. The banks were mostly unvegetated, with the watercourse itself being approximately 3m across with a moderate to high flow rate present.
- 6.66 Due to the lack of suitable bankside vegetation and the steepness of the banks, Ochre Brook was considered unsuitable to support water vole.
- 6.67 A ditch joined into the watercourse from the north of the Site which was approximately 0.5m across with approximately 10cm depth of water. This drainage ditch also had steep banks and no suitable bankside vegetation that could support water vole.

Otter

- 6.68 1 record of otter was returned in the data search, located approximately 630m southwest of the site in 2017. Otter are listed under Schedules 2 and 5 of the Wildlife and Countryside Act (1981) and Section 41 of the NERC act (2006).
- 6.69 The watercourse present on site and the drainage ditch which joins into this watercourse were thoroughly searched for signs of otter, including spraints, prints, and slides. No evidence of otter use was found along the watercourse, whilst the drainage ditch was considered to be too small to be of value to otter.
- 6.70 The watercourse is culverted under the adjacent motorway to the west of the Site, which will potentially reduce the value of this watercourse as a commuting or foraging route for otter. Additionally, this watercourse is further culverted to the south of the Site beneath the A5080

Badger.

- 6.71 No records of badger were returned from within 1km of the site boundary during the desk study.

Non-native invasive species

- 6.76 Himalayan balsam was noted within the Site during the field survey at TN1 and a large stand was also present within the broadleaved woodland present on Site (TN2). Target notes are shown on **Figure 6.1**. This species is listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) as an invasive non-native species.

Assumptions and Limitations

- 6.77 The assessment is made on the best available data, based on the information that has been gathered from stakeholders, other data sources and site surveys undertaken. All surveys were undertaken following good practice guidance, however the species surveyed are mobile and will move in and out of areas over time. For these reasons, a precautionary approach has been taken in the prediction of impacts.
- 6.78 It is assumed for the purposes of this EcIA that the current land uses adjacent to the site will remain as they are at the time of the ES submission, except in cases where planning permission has already been granted for development. For consented developments, it is assumed that the developments will take place. These have been considered within the cumulative assessment.

Identification of Ecological Features

- 6.79 Table 6.5 summarises the policy and legal framework relevant to the potential ecological features that could be impacted by the proposed development, the ecological value assigned to each feature and comments relating to the function of each feature within the site.
- 6.80 In line with the requirement for a proportionate approach to EcIA, only features identified as having at least Local value are taken forward for individual impact assessment.

Table 6.5 Valuation of Ecological Features.

Ecological Feature	Legislation	Summary Description	Ecological Value
Mersey Estuary SPA	The Conservation of Species and Habitats Regulations	Extensive area of saltmarsh and intertidal sand- and mud-flats supporting internationally important	International

Ecological Feature	Legislation	Summary Description	Ecological Value
		assemblage of over-wintering waterbirds.	
Mersey Estuary Ramsar	The Conservation of Species and Habitats Regulations	Extensive area of saltmarsh and intertidal sand- and mud-flats supporting internationally important assemblage of over-wintering waterbirds	International
Childwall Woods & Fields LNR	National Parks and Access to the Countryside Act 1949	Childwall Woods contains neutral grassland and semi-natural broadleaved woodland.	Local
Clinton Wood LNR	National Parks and Access to the Countryside Act 1949	The supports a woodland, grassland, and also has four ponds present within the site.	Local
Hale Road Woodland LNR	National Parks and Access to the Countryside Act 1949	A community woodland with grasslands and reedbeds also present.	Local
Strettles Bog, Tarbock LWS	The Town and Country Planning Act 1990	A small area of broadleaved woodland bisected by a minor watercourse present on site.	County
The Old Wood, South LWS	The Town and Country Planning Act 1990	Designated area of ancient woodland immediately adjacent to the north of the Site.	County
Mine Waste, Cronton LWS	The Town and Country Planning Act 1990	A predominantly wooded site with ponds present on the north western side. Immediately adjacent to east of Site	County
Daggers' Bridge Wood LWS	The Town and Country Planning Act 1990	Broadleaf woodland dissected by two watercourses. Immediately adjacent to south of Site.	County
The Old Wood, North LWS	The Town and Country Planning Act 1990	A mature broadleaf woodland set in a clough valley with rock outcrops and a former quarry. Present 300m north of the Site.	County
Ochre Brook, Tarbock LWS	The Town and Country Planning Act 1990	A minor watercourse that flows south through Merseyside. 470m south of the site.	County
Big Water and Big Water Wood, Halsnead LWS	The Town and Country Planning Act 1990	Standing water habitats which support populations of rare plant species. 500m north of the Site	County
Ox Lane Wood, Tarbock LWS	The Town and Country Planning Act 1990	Section of broadleaf woodland with a ditch also present. 750m south of the Site.	County

Ecological Feature	Legislation	Summary Description	Ecological Value
Semi-natural broadleaved woodland	S41 NERC Act 2006 North Merseyside BAP	Area of semi-natural broadleaved woodland within the area designated as Strettles Bog, Tarbock LWS.	County
Mixed scrub	N/A	Present on scattered patches within the site, comprising mostly bramble, hawthorn and blackthorn.	Site
Other neutral grassland	North Merseyside BAP – Urban Grasslands	Main habitat type present on site.	Local
Marshy grassland	North Merseyside BAP – Urban Grasslands	Present in two patches within the site, dominated by reed canary grass and hard rush.	Local
Modified grassland	North Merseyside BAP – Urban Grasslands	Present in small patches within the site, with limited species diversity.	Local
Running water	N/A	Minor watercourse present within the area designated as Strettles Bog, Tarbock LWS. Steep earth banks present with limited aquatic or marginal vegetation present.	Site
Bluebell	Wildlife and Countryside Act 1981 (as amended)	Present within the semi-natural broadleaved woodland present in the western section of the Site.	Local
Invertebrates	S41 NERC 2006	Records of notable invertebrates returned within the environment, however disturbance present on site likely only supports common assemblage.	Site
White-clawed crayfish	Wildlife and Countryside Act 1981 (as amended) S41 NERC 2006	Running water has limited suitable habitat for this species and records returned within the desk study.	N/A
Amphibians	S41 NERC 2006	No ponds present on site, but four ponds present within 250m from the Site. Great crested newt considered to be absent, suitable habitat present to support common amphibian species.	Site
Reptiles	Wildlife and Countryside Act 1981	Limited suitable habitat for reptiles present on site, with the M62 providing a significant barrier to movement. No records of these species returned within the desk study.	N/A
Birds	Wildlife and Countryside Act 1981 S41 NERC 2006	91 records of protected or notable species were returned. Habitats on site likely provide nesting opportunities for common bird species due to the level of disturbance present on site. Habitats on	Local

Ecological Feature	Legislation	Summary Description	Ecological Value
		site are unsuitable to support wintering wildfowl and waders.	
Bats	Wildlife and Countryside Act 1981 (as amended) S41 NERC 2006	Site has limited habitat to support roosting bats but likely provides some value as a commuting and foraging resource. 41 of at least 6 species	Local
Hedgehog	S41 NERC 2006	None observed but suitable habitat present and historical records of this species present.	Site
Brown hare	S41 NERC 2006	None observed but suitable habitat present and historical records of this species present.	Site
Water vole	Wildlife and Countryside Act 1981 (as amended) S41 NERC 2006	No suitable habitat for this species present on site, however historical records present within the surrounding environment.	N/A
Otter	Wildlife and Countryside Act 1981 (as amended) S41 NERC 2006	Limited suitable habitat present due to culverting of the watercourse. One record of this species present within the desk study.	Site
Badger	Protection of Badgers Act 1992		Site
Non-native Invasive species	Wildlife and Countryside Act 1981 (as amended)	Himalayan balsam is present within the woodland on site. Not of ecological concern but there is a statutory duty to avoid the spread of species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).	N/A

Baseline Projection

- 6.81 An integral part of ecological impact assessment is to consider the predicted trends of each of the ecological features if no development and mitigation were to be carried out.
- 6.82 The area of semi-natural broadleaved woodland and scrub, if left undeveloped and unmanaged, would be expected to mature and increase in structural complexity. These changes would benefit the majority of faunal groups and the ecological value would be expected to remain the same or increase.
- 6.83 The grassland areas, if left undeveloped and unmanaged would continue to become more encroached by the current scrub and tree regeneration and would eventually be lost for the site as the area would develop into woodland. While the increase in woodland cover can be beneficial, the loss of grassland habitat would be detrimental to the structural and species diversity of the site and species that these habitats support.

Embedded Mitigation

- 6.84 This section describes those mitigation measures which have been ‘embedded’ into the development through an interactive process of assessment and redesign. Embedded mitigation does not include any measures that must be secured through planning conditions/obligations, management plans, or further survey.

Construction

- 6.85 The retention of high value habitats has been taken into account where possible within the design of the development area, including the majority retention of the area of semi-natural broadleaved woodland within the western section of the site.
- 6.86 Earthworks and built development will be kept away from the northern boundary of the Strettles Bog, Tarbock LWS, ensuring that direct damage to these features will not occur during construction activities.

The Completed and Operational Development

- 6.87 The landscape design for this Site has sought to create a naturalistic planting scheme with ecological enhancement in mind in order to maximise the ecological value of the Site and contribute to Biodiversity Net Gain. The mixed scrub and marshy grassland surrounding Strettles Bog, Tarbock LWS is to be retained and enhanced. A water attenuation feature, designed to permanently hold water and be planted with emergent and marginal vegetation will be incorporated into the western section of the site, with wildflower meadow planting present along the eastern boundary of the Site.

Assessment of Likely Significant Effects

- 6.88 This section sets out the potential effects of the development on the basis of the detailed application plans and assumes the inclusion of embedded mitigation as set out in the preceding section.
- 6.89 Based on the results of the desktop study and field surveys; the distribution, function, and value of ecological features present may vary across the site. Different ecological features could be affected by different components of the proposed development in different ways, during and post-construction. The following sections identify those activities with greatest potential to give rise to biophysical changes to valued ecological features (pathways of effects). Where pathways of effects are identified, the potential impact is subject to further assessment, using impact characterisation methods in accordance with CIEEM guidelines, to determine whether a significant ecological effect may result prior to mitigation. If no pathways of effects are identified, no further assessment is made.

Construction

- 6.90 Construction activities which are likely to be required and their potential to give rise to biophysical changes, include those activities listed in Table 6.6.

Table 6.6 Potential construction activities resulting in potential changes to ecological features.

Construction Activity	Potential Ecological Change
Vegetation and other site clearance activities e.g. installation of temporary compounds	• Temporary/permanent habitat loss • Loss of species (killing/injury) • Disturbance of species (physical) • Disturbance of species (loss of or disruption to animal territories, severance, fragmentation or isolation) • Disturbance of species (loss of foraging or shelter resources) • Introduction/spread of non-native flora
Topsoil stripping, bulk earthworks, soil storage, and creation of new levels	• Temporary/permanent habitat loss • Habitat degradation / disturbance (accidental damage, compaction) • Loss of species (killing/injury) • Disturbance of species (physical) • Disturbance of species (loss of or disruption to animal territories, severance, fragmentation or isolation) • Disturbance of species (loss of foraging or shelter resources) • Disturbance of species (noise and vibration) • Introduction/spread of non-native flora
Movement and operation of plant and machinery (including piling, if required) and construction traffic	• Disturbance of species (noise and vibration) • Introduction/spread of non-native flora
Accidental spillages of fuels or chemicals	• Habitat degradation (pollution) • Possible loss of species (killing and injury)
Construction of buildings, roads, and footpaths	• Permanent / temporary habitat loss • Habitat degradation / disturbance (accidental damage, compaction) • Loss of species (killing/injury) • Disturbance of species (physical) • Disturbance of species (loss of or disruption to animal territories, severance, fragmentation or isolation) • Disturbance of species (loss of foraging or shelter resources) • Introduction/spread of non-native flora
Landscaping and planting	• Habitat creation • Habitat loss (permanent modification) • Habitat degradation / disturbance (accidental damage, compaction)

Construction Activity	Potential Ecological Change
	- Species gain (net gains in foraging and shelter habitats, as a result of met gains in woodland, scrub, and permanent grasslands. - Species gain (strengthened ecological network as result of improved connectivity. - Introduction/spread of non-native flora

Mersey Estuary SPA / Ramsar site

- 6.91 The Mersey Estuary SPA/Ramsar is located approximately 6km south of the site. There will be no direct effects on these sites during the construction phase.
- 6.92 The site does not support any birds listed as qualifying features of the SPA/Ramsar site, with the habitat found to be unsuitable to support over wintering birds due to the size of the site, with a lack of open flight lines within the site and a high level of disturbance from the adjacent M62. There will therefore be no direct effects on the qualifying features of these designated sites.
- 6.93 The designated sites are considered to be far enough away from the site that any indirect effects as a result of construction, such as airborne dust, noise, and ground water contamination will be negligible.
- 6.94 Therefore, there will be a negligible effect on the SPA and Ramsar site as a result of this development.

Statutory Designated sites

- 6.95 Three LNR's are present within 5km of the site. There will be no direct impacts on these sites due to the nature of this development and the distance from these sites.
- 6.96 The designated sites are considered to be far enough away from the site that any indirect effects as a result of construction, such as airborne dust, noise, and ground water contamination will be negligible.
- 6.97 Therefore, there will be a negligible effect on the LNR's as a result of this development.

Non-statutory designated sites

- 6.98 There are six LWSs located less than 0.5km from the Site boundary.
- 6.99 Strettles Bog, Tarbock is located within the Site and direct impacts to this Site are anticipated in the loss of approximately 0.9ha of semi-natural broadleaved woodland. There is also potential for direct damage to this site as a result of encroachment by construction machinery and indirect effects resulting from construction works such as airborne dust, noise, and ground water contamination. The development will result in a Moderate adverse effect on this LWS.

- 6.100 Five further LWSs are located outside of the site boundary but closer than 0.5km from the Site. No direct impacts to these LWSs are anticipated to occur, however there is potential for indirect effects such as airborne dust, noise, and groundwater contamination to occur. There will be Minor adverse effects on these LWSs as a result of this development.
- 6.101 There are two LWSs located further than 0.5km from the Site which will not be subject to any direct impacts during the construction phase. Indirect effects such as airborne dust or groundwater contamination are considered to be unlikely given the distances from the site and the LWSs. Therefore, there will be a negligible effect on these LWSs as a result of the proposed development.

Semi-natural broadleaved woodland

- 6.102 0.9ha of semi-natural broadleaved woodland will be lost from the Site, however the majority of this habitat will be retained within the Site.
- 6.103 There is potential for direct damage to retained semi-natural broadleaved woodland from encroachment by construction machinery and indirect effects resulting from demolition and construction works such as airborne dust, noise, and ground water contamination on retained parts of the site.
- 6.104 Overall, the construction of the proposed development will lead to a Moderate adverse effect.

Urban Grasslands assemblage

- 6.105 6.42ha of other neutral grassland will be lost as a result of this development. The landscape plans for the site will lead to the creation of 0.95ha of various types of wildflower meadow, which will take approximately 5-10 years to become a functional habitat. This is described further within the Biodiversity Net Gain assessment provided within **Appendix 6.2**. The loss of the habitat and the time taken for newly created habitat to establish will lead to a Moderate adverse effect on the urban grassland assemblage within the site.

Bluebell

- 6.106 Bluebell are present within the area of semi-natural broadleaved woodland present on site, however they are limited to the more mature sections of the woodland, with no bluebell identified within the section of woodland adjacent to A5080 Cronton road that will require removal to facilitate access to the site. The bluebell population within the Site will therefore be retained. This will therefore be a negligible effect on this feature.

Birds

- 6.107 Site clearance will lead to a loss of habitats which provide nesting opportunities for local bird species. If clearance works are undertaken during the nesting bird season, there is a risk of killing and injuring nesting birds and their young. This effect is considered to be a Minor adverse effect, significant at the Local level.

- 6.108 There is also the potential to disturb and displace birds from retained habitats as a result of the noise and movement of construction machinery. However, the site is already subject to a high degree of disturbance from the adjacent M62 and A5080, therefore local bird species are likely to be habituated to noise levels. Therefore this effect is considered to be negligible.

Bats

- 6.109 No trees with potential to support a bat roost are to be lost as a result of this scheme.
- 6.110 There is potential that bats using the retained habitats for foraging and commuting will be affected by construction lighting, if required for night time working. However, the majority of any night time working would take place during the bat hibernation period and would therefore be a negligible effect to local bat populations.

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- 6.111 Operational activities which are likely to occur and their potential to give rise to biophysical changes are listed in Table 6.7.

Table 6.7 Potential operational activities resulting in changes to ecological features.

Operational Effect	Potential Ecological Change
Artificial lighting (street lights, lighting of footpaths and buildings)	• Light pollution • Disruption to species (behaviour changes, changes in species abundance, reduction in foraging times of nocturnal species. • Increased predation effects in nocturnal species. • Barrier effects for light sensitive species
Traffic movements	• Noise and light pollution • Mortality of species • Disturbance of species

Mersey Estuary SPA / Ramsar site

- 6.112 The Mersey Estuary SPA and Ramsar site is located 6km south of the site. There will be no direct effects on the sites as a result of operational activities as the site will comprise an employment area, no direct impacts such as increased recreational pressure is anticipated.
- 6.113 The operation of the proposed development will lead to a negligible effect on the Mersey Estuary SPA and Ramsar site.

Statutory Designated sites

- 6.114 There are three LNRs present within 5km of the site. The proposed development will comprise an employment area, therefore it will not result in a net increase in population levels in the local area. Therefore, there will not be an increase in recreational pressure at these identified sites.
- 6.115 The operation of the proposed development will lead to a negligible effect on the statutory designated sites present within 5km of the site.

Non-statutory designated sites

- 6.116 Strettles Bog, Tarbock is present within the site. This area of the site will not be publicly accessible so there is unlikely to be continuing effects on these sites. The operation of the site will lead to a minor increase in noise and air pollution compared to the current site levels, however with the M62 present immediately adjacent to this site, this will have a negligible effect on the LWS.
- 6.117 Seven other LWSs are present with outside of the site boundary but within 1km of the site. No impacts to these sites are anticipated to occur due to the distance of the LWSs from the site and type of development proposed. These are considered unlikely to be impacted by the operation of the proposed development, and there will therefore be a negligible effect on these sites.

Semi-natural broadleaved woodland

- 6.118 There is potential for this woodland to degrade following lack of management and further spread of non-native invasive species identified to be present within this woodland. It is therefore considered that this will lead to a Moderate adverse effect as a result of the operation of this site.

Urban Grassland assemblage

- 6.119 Without appropriate ongoing management, newly created and retained habitats can degrade due to increased use from pedestrians.
- 6.120 It is considered that this could lead to a Moderate adverse effect as a result of the operation of the site.

Bluebell

- 6.121 Bluebell populations within the woodland are at risk of being lost due to competition from non-native invasive species present within the woodland, which could spread if appropriate management or eradication is not employed.
- 6.122 This represents a Moderate adverse effect on the bluebell populations as a result of the operation of this site.

Birds

- 6.123 Operation of the site will lead to an increase in vehicular movements around the site, which will lead to an increase in noise and visual disturbance for birds using retained habitats such as scrub or the woodland. This effect is only considered to be temporary as the high level of disturbance currently present on site will lead to habituation by passerine bird species present within the site and therefore not likely to significantly effect medium to long-term breeding success of these species. The effect of the operation of the development on birds is therefore considered to be negligible.

Bats

- 6.124 Loss of habitats of low value for foraging bats include scrub and grassland, which all provide edge habitat, will occur as a result of site clearance. This will lead to a loss in the availability of foraging areas within the site and will lead to a Moderate adverse effect.
- 6.125 There is potential that bats using the site for foraging or commuting could be disturbed or excluded by artificial nocturnal lighting which can therefore lead to a Moderate adverse effect due to the operation of the site.

Additional Mitigation / Enhancement Measures

- 6.126 This section describes the measures which are proposed to mitigate any significant environmental effects. It is anticipated that the delivery of these measures will be secured by way of an appropriate planning condition or obligation.
- 6.127 Mitigation or compensation is required for each ecological feature which experiences significant adverse effects, in order to reduce or offset the specific impacts of the proposed development on that feature. This section sets out the ecological mitigation measures that will be delivered as part of the application. They are additional to the embedded mitigation and any mitigation required by other disciplines and as part of the overall scheme design.
- 6.128 In considering the effectiveness of different mitigation measures, the time required for the mitigation to become effective is an important factor; works such as planting, for example, require an establishment period and a maturation period before they have the potential to replace mature and structured habitats that might be damaged or lost during the construction phase. In some instances though, mitigation measures would have an immediate effect. Time periods are considered as follows:
- Immediate – effective immediately;
 - Short term – effective within 2 years;
 - Medium term – effective within 2-5 years;

- Long term – effective within 5-10 years.

- 6.129 For legally protected species within the proposed development, any specific legal requirements for works affecting them would be met in addition to the proposed mitigation measures for the reduction of effects.
- 6.130 The mitigation hierarchy requires that adverse impacts are first avoided then where this is not possible, mitigated, and as a last resort compensated for (off-set). Mitigation measures are discussed with respect to construction and operation below.
- 6.131 This section also contains recommendations for enhancement measures that can be included within the design of the site that will provide value to local biodiversity.

Construction

Construction Environmental Management Plan

- 6.132 All mitigation measures outlined within the ES to address significant construction effects will be included with the Construction Environmental Management Plan (CEMP), which will be conditioned within the planning permission and used to inform detailed phased CEMPs. The CEMP should include an Emergency Spill Response Plan and Dust Management Plan. Those measures to be implemented prior to or during construction that are relevant to the ecological constraints identified are detailed below. This mitigation measure will be effective immediately.
- 6.133 The effects of construction will be minimised by preventing runoff and works pollution from entering watercourses. This will be achieved through the use of bunds to catch and divert runoff, drip trays to prevent any oil and fuel spillages spreading. Windblown dust will be minimised by using wheel washing and damping down, while net fencing will catch windblown debris. This mitigation measure will be effective immediately.
- 6.134 Appropriate tree and woodland protection measures will be implemented for all retained features. These measures will be in accordance with current standards (BS5837:2012). These measures will minimise incidental damage and disturbance to the retained habitats and the species they support and will be detailed in an Arboricultural Method Statement. All other retained habitats will also be appropriately protected to minimise incidental damage and disturbance. This mitigation measure will be effective immediately.
- 6.135 Any vegetation removal will take place outside of the nesting bird season (March – September, inclusive). If this timing is not achievable, vegetation removal will only be permitted upon confirmation by an ecologist that no nesting birds are present. This mitigation measure will be effective immediately.

Bluebell

- 6.136 The invasive non-native species Himalayan balsam was identified in several patches within the site, specifically within the Strettles Bog, Tarbock LWS present in the western section of the site. The removal of this plant within the woodland ground flora will allow the extent of bluebell present to expand. This woodland would be effective immediately.

Birds

- 6.137 In order to mitigate for the temporary reduction in amount of available nesting habitat for tree and scrub nesting bird species (i.e. prior to new planting establishing), bird nest boxes appropriate for such species will be affixed to retained trees within the section of semi-natural broadleaved woodland in the western section of the site. Nest boxes to be installed within the site shall include 10 boxes with an entrance hole diameter of 28-32mm suitable for blue tit, great tit, and nuthatch; and 10 open fronted nest boxes suitable for song thrush, blackbird, robin, and wren. Details of these locations shall be provided within a Bird Box Plan. This mitigation would be effective immediately.

Hedgehog

- 6.138 To mitigate for the loss of semi-natural broadleaved woodland which will provide suitable hibernating habitat for hedgehog, Therefore, hibernacula should be created within the site which will provide year round refuge for hedgehogs. These can be created out of wooden logs, twigs, moss, bark, and leaves that can be used by the hedgehog to create a hibernacula. The locations of these hibernacula should be shown on a suitably scaled plan and be located in areas away from vehicular activity as much as possible, with connections to foraging habitat available. This mitigation would be effective immediately.

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- 6.139 Much of the mitigation identified for the operational phase has been designed into the proposed scheme as embedded mitigation, during the iterative design process, in order to avoid effects wherever possible.

Biodiversity and Ecology Management Plan

- 6.140 The Biodiversity and Ecology Management Plan (BEMP) will be developed and implemented for the development, covering a period of at least 30 years post-construction. This will ensure that retained, created, and enhanced habitats are managed and maintained in good condition with reference to Biodiversity Net Gain in the long-term. This document has been included within **Appendix 6.3**.
- 6.141 This BEMP will include a section on biosecurity to reduce the risk of re-introduction/spread of invasive plant species within the site. Methods will be included within the LEMP to control/eradicate any invasive species, in the event that they are identified within the Site.

Bats

- 6.142 A Sensitive Lighting Strategy will set out the lighting proposals during both construction and operation to ensure potential adverse effects on bats are avoided. The strategy will address the following points and will be effective immediately.
- Use of unnecessary lighting will be avoided. This applies to both existing and proposed habitat features of value to bats.
 - Spatial spread of lighting – the horizontal and vertical spread of artificial light will be minimised and take into account both primary and reflected light sources. Directional lighting can be achieved by angle and orientation of beam, use of a cowl, louvre, or other light shield, or a combination of these.
 - Timing and duration of lighting – timers and bespoke dimming regimes may be used to ensure that luminaires are reduced at times of predicted low use. These can be set to change with the seasons and therefore reflect the shifting time of dusk and dawn throughout the year. Motion sensors provide further control to ensure that areas are illuminated only when required.
 - Intensity and colour of lighting – light intensity will be designed to be as low as possible whilst meeting the objectives of the intended function. The colour of lighting will need to take into account the sensitivity of the ecological features on site. Light sources selected should emit zero ultra-violet light wherever possible. Bat Conservation Trust (2016) guidance recommends that white and blue spectrum light should be avoided or where white lights are required these should be of a warm/neutral colour and have a peak wavelength above 550 nanometres. Narrow spectrum light sources will be used to lower the range of species affected by lighting.
- 6.143 There is opportunity to enhance the level of roosting opportunity available for bats within the site by providing bat boxes which can be affixed to retained trees. These boxes should be suitable for crevice dwelling species such as common pipistrelle which are known to be present within the local area. A plan to show the locations of these boxes and the specifications and maintenance schedule should be produced and implemented on site. This enhancement would be effective immediately

Residual Effects

- 6.144 This section summarises the significance of the anticipated residual environmental effects which are to remain after proposed mitigation measures are implemented.

Strettles Bog, Tarbock LWS

- 6.145 The loss of 0.9ha of semi-natural broadleaved woodland within the LWS to facilitate the access will be mitigated for by the creation of new broadleaved woodland within the site, leading to an overall increase in the number of trees present within the site. Once planted, new woodland and trees will provide functional

habitat within 20-25 years, therefore the residual effect will initially remain as moderate adverse at the county level during the construction stage, reducing to no significant residual effect in the long-term operational stage.

Semi-natural broadleaved woodland

- 6.146 Landscape plans for the Site detail the creation of 0.43ha of new woodland and 330 trees to be planted within the site. Once planted, new woodland and trees will provide functional habitat within 20-25 years, therefore the residual effect will initially remain as moderate adverse at the county level during the construction phase, reducing to no significant residual effect in the long term operational phase.

Urban grassland assemblage

- 6.147 The landscape plans for site detail the creation of 0.95ha of new wildflower meadows within the Site. Once planted the new grassland would provide functional habitat within 5-10 years, therefore the residual effect will initially remain as moderate, reducing to minor in the long-term operational phase

Bats

- 6.148 No trees on site were assessed to provide roosting potential for bats. The inclusion of bat roosting boxes within retained trees on the site therefore, will lead to a residual moderate beneficial effect at the Site level in the long-term.

Table 6.8: Residual Effects Summary

Description of Effect	Embedded Mitigation	Potential Effect (inc. Significance)	Further Mitigation	Residual Effect (inc. Significance)
Construction				
Direct and indirect impacts to Mersey Estuary SPA and Ramsar	N/A	Negligible	N/A	N/A
Direct and indirect impacts to statutory designated sites within 5km of the development	N/A	Negligible	N/A	N/A
Direct impact to Strettlles Bog, Tarbock LWS within the site.	Retention and avoidance where possible	Moderate adverse effect at County level	Implementation of a CEMP	Moderate adverse effect at county level
Five LWSs located outside the site but closer than 0.5km	N/A	Minor adverse effect at County level	Implementation of a CEMP	Negligible
Two LWSs located further than 0.5km from the site	N/A	Negligible	N/A	N/A
Loss of semi-natural broadleaved woodland	Retention and avoidance of semi-natural broadleaved woodland where possible	Moderate adverse effect at County level	Implementation of a CEMP	Moderate adverse effect at county level

Description of Effect	Embedded Mitigation	Potential Effect (inc. Significance)	Further Mitigation	Residual Effect (inc. Significance)
Damage to semi-natural broadleaved woodland	N/A	Moderate adverse effect at county level	Implementation of a CEMP	Negligible
Loss of an area of the Urban Grasslands assemblage	Retention and avoidance of grassland habitat where possible	Moderate adverse effect at County level	Implementation of a CEMP	Moderate adverse effect at Local level
Loss of individual bluebells	Retention of semi-natural broadleaved woodland where possible	Negligible	N/A	N/A
Loss of bird nesting habitat	Retention of suitable nesting habitat where possible	Minor adverse effect at Local level	Implementation of a CEMP No vegetation clearance to be undertaken during the nesting bird season	Negligible
Loss of foraging habitat for bats	Retention of habitats where possible Construction work to take place mostly outside of active bat season	Moderate adverse effect at Local level	Implementation of a CEMP	Negligible
Operation				
Direct and indirect impacts to Mersey Estuary SPA and Ramsar	N/A	Negligible	N/A	N/A
Direct and indirect impacts to statutory designated sites within 5km of the development	N/A	Negligible	N/A	N/A

Description of Effect	Embedded Mitigation	Potential Effect (inc. Significance)	Further Mitigation	Residual Effect (inc. Significance)
Strettles Bog, Tarbock LWS	Retention and avoidance where possible	Moderate adverse effect at county level	Implementation of a BEMP Woodland and tree planting within the site	Negligible
Seven other LWSs present within 1km of the site	N/A	Negligible	N/A	N/A
Degradation of semi-natural broadleaved woodland following lack of management and spread of INNS	Retention and avoidance of semi-natural broadleaved woodland where possible	Moderate adverse effect at County level	Implementation of a BEMP Woodland and tree planting within the site	Negligible
Urban grassland assemblage	Retention and avoidance of urban grassland assemblages where possible	Moderate adverse effect at County level	Implementation of a BEMP Grassland creation within the Site	Minor adverse effect at Local level
Bluebell	Retention of habitat where possible	Moderate adverse effect at Site level	Implementation of a BEMP	Negligible
Disturbance to bats through artificial nocturnal lighting	N/A	Moderate adverse effect at Local level	Implementation of a Sensitive Lighting Strategy Creation of new foraging habitat within the site Installation of new roosting boxes within the site	Minor beneficial in the long term at the Site level.

6.149 This development will lead to the following significant effects.

- Moderate adverse effect at County level of Strettlles Bog, Tarbock LWS during construction
- Moderate adverse effect at County level of the loss of semi-natural broadleaved woodland during construction.
- Moderate adverse effect at Local level during construction on Urban grassland assemblages.

Conclusions

6.150 The site was found to be moderate ecological quality, supporting a variety of habitats, however due to its size, limited potential to support protected or notable species was identified. Strettlles Bog, Tarbock LWS is present within the western section of the site.

6.151 Temporary construction and ongoing operational effects were identified, many of which are avoided through a combination of scheme design, embedded and additional mitigation.

6.152 A Biodiversity Net Gain Assessment has been undertaken to understand the loss of value to the environment as a result of this development and to understand off site mitigation and compensation requirements as a result of this development.

Assessment of Cumulative Effects

6.153 A cumulative effects scoping exercise has been undertaken to identify any potential developments within the vicinity of the site which could result in cumulative effects in combination with this application.

6.154 It is assumed that standard best practice measures have been or will be employed on each site identified below to limit the potential for cumulative effects to occur during the construction stage from sites in close proximity and/or with over lapping construction periods.

Table 6.3: Cumulative Sites

Site Ref.	Application No.	Distance and Direction	Proposal	Scoped-in / Scoped-out	Justification
1.	18/00283/HYB	90m north	Hybrid application comprising full application for erection of 123 no. Dwellings, construction of vehicular/pedestrian accesses, laying out of public open space and associated works; outline application for erection of up to 237 no. Dwellings, car park and associated works (access into site to be considered - all other matters reserved for future approval).	Scoped In	Close proximity to the scheme and site has value for ecological features
2.	20/00399/OUT	680m north	Outline application for proposed residential development of up to 277 no. Dwellings (use class c3) and an apartment development of up to 100 units for over 55's (use class c3) together with new vehicular access to lickers lane and windy arbor road, landscaping and associated works (inc. Demolition of buildings) (approval sought for access - all other matters reserved)	Scoped In	Close proximity to the scheme and site has value for ecological features
3.	20/00417/FUL	770m northeast	Residential development comprising of the erection of 350 no. Dwellings together with the construction of vehicular access off fox's bank lane (comprising signalised junction), suds ponds, landscaping, boundary treatments and other associated works (including demolition of existing farm buildings)	Scoped In	Close proximity to the scheme and site has value for ecological features
4.	20/00329/FUL	340m north	Erection of a residential development of 43 no. Dwellings comprising 14 no. Apartments and 29 no. Houses together with access, car parking and associated development (demolition of existing barn)	Scoped In	Close proximity to the scheme and site has value for ecological features
5.	20/00494/HYB	Adjacent north and east	Hybrid planning application comprising: full application for the development of 161,900 sq ft (15,041 sq m) (gia) of storage and distribution floorspace (use class b8), including ancillary offices (use class b1), security gatehouse, site access road, engineering earthworks to form a part country park, public car park to serve country park, and associated works; and outline application with details of point of access (details of part-access, landscaping,	Scoped In	Close proximity to the scheme and site has value to ecological receptors.

Site Ref.	Application No.	Distance and Direction	Proposal	Scoped-in / Scoped-out	Justification
			appearance, scale and layout are reserved) for the development of up to 838,100 sq ft (77,862 sq m) (gia) of storage and distribution floorspace (use class b8), with ancillary offices and light industrial (use class b1); engineering earthworks to form country park and drainage attenuation ponds; pedestrian/cycle/equestrian route connecting existing m62 footbridge with proposed country park; and associated works		
6.	15/00022/OUT	2.2km north	Outline application for mixed use development comprising up to 750no. Dwellings & upto 929 sq m of commercial/industrial buildings (use classes b1/b2/b8) - all matters reserved for future approval	Scoped Out	Distance from the scheme and barriers between sites mean no impacts expected the site in cumulation.
7.	17/00301/HYB	360m west	Hybrid application comprising a full planning application for 1800 sq.m gross external area food store (use class a1), 1161 sq.m gross external area b1/b2 use (business use / general industrial use) with associated car parking, landscaping, highway works, pumping station, substation and associated works including bund and noise attenuation boundary treatment to top of bund along western boundary of the site; and outline planning application for up to 7,500 sq.m use class b1 and b2 floor space, petrol filling station (sui generis use) with up to 400 sq.m floor space associated use class a1 unit, up to 1000 sq.m use class a3 and a4 floor space (pub / restaurant), with associated car parking, servicing areas, highway works, and other associated works, with all matters reserved for future approval	Scoped In	Close proximity to the scheme and ecological impacts were identified, therefore potential for cumulative effects.
8.	16/00819/FUL	2km northwest	Erection of 62 no. Dwellings together with construction of new vehicular & pedestrian access, landscaping, public open space, drainage and associated works	Scoped Out	Distance from the scheme and barriers present mean chance of cumulative effects is negligible

Site Ref.	Application No.	Distance and Direction	Proposal	Scoped-in / Scoped-out	Justification
9.	18/00062/HYB	3.5km north	Detailed application for 4,180 sq.m of employment floor space (use class b1), 3,275 sq.m ancillary floor space (use classes a1/a4/c1/sui generis), 154 residential dwellings, improvements to lord derby playing fields/oak plantation and associated landscaping and infrastructure including a dedicated 500kva substation for the residential neighbourhood and a 1000kva substation for the eastern employment area and the demolition of knowsley lane farm. outline application for up to 26,350 sq.m of employment floor space (use classes b1) and associated landscaping and infrastructure	Scoped Out	Distance from the scheme and barriers present mean chance of cumulative effects is negligible.
10.	19/00651/FUL	140m north	Construction of multi-use path and associated ground works including the facilitation of rising main associated with proposed residential development on adjoining land. disused railway line extending from m62 motorway extending north through halsnead park and to rear of cronton avenue, whiston, knowsley	Scoped In	Close proximity to the application site and the site has value to ecological features.
11.	20/00578/FUL	Adjacent to north and east	Construction of a new country park comprising of the creation of sculptured landscape, habitat/wetland creation, associated works and infrastructure, engineering/earthworks including changes to site levels together with the erection of a single storey visitor centre including reception, café, education space, ranger offices and an outdoor terrace area; erection of outdoor classroom canopy; sky room; provision of colliery and mineral line multi user route, new paths including a multi user route north of the m62 bridge up to windy arbor road and provision of new car park. Vehicular access to be taken from cronton road via access road to neighbouring employment site/country park car park with new footbridge over employment site/car park access road and pedestrian/cycle access from cronton road and fox's bank lane.	Scoped In	Close proximity to the application site and the site has value to ecological features.

Likely Residual Cumulative Effects and their Significance

Construction

- 6.155 18/00283/HYB. Development proposals indicate the loss of approximately 1.5ha of lowland meadow grassland BAP habitat in poor condition, with other BAP habitats A positive effect was identified through the eradication of invasive non-native plant species within the Site. Therefore, it is considered that the cumulative impact on Ecology at the County level associated within this development is considered to be negligible.
- 6.156 20/00399/OUT. The development proposals for this site include the loss of 0.3ha of lowland mixed broadleaf woodland. Construction work is likely to have an adverse effect on farmland birds due to loss of arable farmland, whilst the loss of grassland, woodland, and field boundary habitats will have an irreversible adverse effect. Landscape proposals are included within the design of this site which will reduce the scale of this impact, as such it is considered that no cumulative effects with respect to ecology are anticipated to occur.
- 6.157 20/00417/FUL. This development identified a significant residual effect with respect to loss of skylark nesting habitat, significant at the local level. Habitats of limited suitability to support skylark were present within the application site, therefore there are not expected to be any significant cumulative effects with respect to ecology associated with this development.
- 6.158 20/00329/FUL – The ecology report produced for this development identified mostly poor quality habitats with some areas of broadleaved woodland also present. No impacts to protected species were predicted to occur as a result of the development. The site is separated from the application site by the M62 motorway and there are no connections available between the sites. As such no cumulative impacts with respect to ecology are anticipated to occur.
- 6.159 20/00494/HYB – This scheme will result in the loss of 1.7ha of semi-natural broadleaved woodland, 9.02ha of plantation woodland, 1.069ha of swamp, and loss of 10.6ha of grassland habitats. Suitable mitigation measures are included within the design of this site, and while there is likely to be a cumulative impact on habitats, it is not considered that this will increase the significance of the impact above Local with the implementation of appropriate mitigation measures.
- 6.160 17/00301/HYB. This site comprised habitats of low ecological value, however part of the site is designated as Coppice Lane Council Depot LWS. No impacts to protected species are anticipated on protected species but the loss of LWS area will result in a moderate adverse effect at the County level. The application will result in Moderate impacts to LWS in the short term, therefore there is anticipated to be a Moderate cumulative impact to the network of LWS which is significant at the County level.

- 6.161 19/00651/FUL. The route of the proposed multi-use cycle route and associated ground works utilises a pre-existing former railway line, with low impacts predicted through loss of trees on nesting bird habitat. Impacts upon protected species are considered to be negligible if recommended mitigation is implemented, therefore no cumulative effects are expected to occur with respect to this development.
- 6.162 20/00578/FUL. This scheme will result in the loss of grassland, semi-natural broadleaved and plantation woodland. Suitable mitigation measures are included within the design of the site, and while there is likely to be a cumulative impact on habitats, it is not considered that this will increase the significance of the impact above Local with the implementation of appropriate mitigation measures.
- 6.163 Cumulative effects at the construction stage relate to the degradation of the network of LWS present within the Zone of Influence of the site, associated with other developments within the Halsnead garden Village area. However, each development has recommended that a suitable CEMP is implemented, and no two developments directly impact the same LWS, therefore there is not anticipated to be an increase in impact upon the identified LWS's, which will therefore not increase the effects of impacts previously identified for the development in isolation.

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- 6.164 18/00283/HYB. The ES chapter associated with this development identified the following significant residual effects associate with this development. Provision of attenuation ponds will have a moderate positive effect on populations of common toads present within the Site. The construction of an additional attenuation pond within the application site will likely have a Minor positive cumulative effect which is significant at the Site level
- 6.165 20/00399/OUT. This development was identified to have a significant adverse effect to Licker Lane LWS due to increased recreational pressure. The provision of a Wildlife Information Pack to all new residents will reduce the scale of this impact to be non-significant. As there is no residential development associated with this application, no cumulative effects on ecology associated with this developed are anticipated, provided all mitigation is implemented.
- 6.166 20/00417/FUL. Based on the nature of this development, assuming that all recommended mitigation is successfully implemented, no cumulative effects are anticipated to occur in combination with the application.
- 6.167 20/00329/FUL - The site is separated from the application site by the M62 motorway and there are no connections available between the sites. As such no cumulative impacts with respect to ecology are anticipated to occur.

- 6.168 20/00494/HYB – This application will result in the loss of areas of suitable habitat for protected and notable flora. However, assuming all recommended mitigation is implemented then no cumulative adverse impacts are predicted.
- 6.169 17/00301/HYB. The site contained habitats of low value to support protected and notable species, therefore the operation of this site will not lead to any significant effects in cumulation with the application site.
- 6.170 19/00651/FUL. Operational impacts associated with this proposal were limited to the provision of increased artificial nocturnal lighting. Impacts upon protected species are considered to be negligible if recommended mitigation is implemented, therefore no cumulative effects are expected to occur with respect to this development.
- 6.171 20/00578/FUL – This application will result in the loss of areas of suitable habitat for protected and notable flora. However, assumed all recommended mitigation is implemented then no cumulative adverse impacts are predicted.
- 6.172 No significant cumulative effects were identified associated with this development during the operational stage.

7. Water Resources and Flood Risk

Introduction

- 7.1 This chapter assesses the effects of the Proposed Development on water resources and flood risk. In particular, it identifies and assesses the anticipated effects of change resulting from the Proposed Development on the existing water resources, drainage and flood risk within the study area.
- 7.2 The chapter describes the methods used to assess the likely significant effects, the baseline conditions currently existing at the Site and surroundings, the potential direct and indirect effects of the Proposed Development arising from flood risk and drainage, the mitigation measures required to prevent, reduce, or offset the identified significant effects and the residual effects. This chapter has been compiled by Integra Consulting.

Planning Policy Context

National Planning Policy

National Planning Policy Framework

- 7.3 The National Planning Policy Framework (NPPF) outlines the Government's national planning policies for England and is supported by the online Planning Policy Guidance (PPG) on Flood Risk and Coastal Change. The NPPF aims to ensure that flood risk is taken into account by all relevant statutory bodies from regional to local authority planning departments to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of high risk. Where new development is exceptionally necessary in high risk areas, the policy framework aims to make it safe, ensure that it will not increase flood risk elsewhere and, where possible, reduce overall flood risk in the local area.
- 7.4 Local Authorities should only consider development in flood risk areas as appropriate where it is informed by a site-specific Flood Risk Assessment (FRA) following the Sequential Test and if required the Exception Test, that:
- Within a site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location;
 - Development is appropriately flood resilient and resistant;
 - Sustainable drainage systems are incorporated, unless there is clear evidence that this would be inappropriate;

- Any residual risk can be safely managed; and
- Safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

7.5 The FRA should identify and assess the risks of all forms of flooding to and from the development and demonstrate how flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account.

PPG on Flood Risk and Coastal Change

7.6 The PPG on Flood Risk and Coastal Change details how to take account of and address the risks associated with flooding within the planning process. It also details how planning can ensure water quality.

Environmental Protection Act 1990

7.7 The Environmental Protection Act 1990 makes provision to control pollution arising from industrial and other processes for waste management and is amended by The Environment (Amendment etc.) (EU Exit) Regulations 2019.

Water Industry Act (1991)

7.8 The Water Industry Act relates to the supply of water and the provision of sewerage services and applies to all Sewerage Undertakers.

Water Resources Act (1991 as amended)

7.9 The Water Resources Act relates to the National Rivers Authority, whose activities are now assumed by the Environment Agency and sets out the responsibilities of the Environment Agency in relation to water pollution, resource management, flood defence, fisheries, and in some areas, navigation. The Act regulates activities that may affect the water environment. Discharge to controlled waters is only permitted with the consent of the Environment Agency. An aim of the Act is to ensure that the polluter pays the cost of the consequences of their discharges.

Land Drainage Act (1991)

7.10 The Land Drainage Act outlines the constitution of Internal Drainage Boards (IDB) and the powers of the National Rivers Authority (now assumed by the Environment Agency). It also includes a definition of watercourses; all rivers / streams and all ditches, drains, culverts, dykes, sewers (other than public sewers) and passages through which water flows.

Environment Act 1995

- 7.11 The Environment Act 1995 sets standards for environmental management such as requiring national strategies for air quality and waste. It also deals with the establishment of the EA. It is amended by The Environment (Amendment etc.) (EU Exit) Regulations 2019.

The EU Water Framework Directive (2000)

- 7.12 The European Water Framework Directive (WFD) was transposed into UK law in December 2003 as the Water Environment Regulations 2003. The framework commits the UK Government (and all other European Union members) to improving the quality of all water bodies and coastal waters such that they attain at least 'Good' status for chemical and ecological criteria.
- 7.13 Any modification to a waterbody and its floodplain are now required to be WFD compliant. Assessments should be undertaken to determine the impacts on interventions within a waterbody on the designated Ecological Status of that waterbody. All water bodies have to achieve a Good Ecological Status or Good Ecological Potential (for heavily modified water bodies) by 2027. Some water bodies had targets to reach a Good Status by either 2015 or 2021.
- 7.14 The act puts a duty on local authorities to take into consideration the aims and objectives of the act and any relevant River Basin Management Plan during the completion of their duties and to ensure no adverse effect upon the environment.

Water Act (2003)

- 7.15 The Water Act is an act whose provisions are mainly to amend other legislation such as the Reservoirs Act 1975, Water Industry Act 1991 and the Water Resources Act 1991.

Flood Risk Regulations (2009)

- 7.16 The Flood Risk Regulations transpose the EC Floods Directive into domestic law and implement its provisions.

European Floods Directive (2007)

- 7.17 The aim of the European Floods Directive is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The directive sets out requirements for the UK Government (and all other European Union members) to assess and map flood risk from all major rivers. Preliminary Flood Risk Assessments (PFRA's) have been produced by all Lead Local Flood Authorities, with the flood mapping stage completed by 2013. By 2015, Flood Management Plans have needed to be produced,

focusing on flood prevention, protection and preparedness. The EU Floods Directive has been transposed into UK law in the Flood Risk Regulations (2009).

The Flood Risk Regulations 2009

- 7.18 The Flood Risk Regulations 2009 transpose the European Commission (EC) Floods Directive (Directive 2007/60/EC) into domestic law. The regulations require that PFRAs (Preliminary Flood Risk Assessments) are prepared by the Environment Agency and Unitary/County Authorities (Lead Local Flood Authorities (LLFA) that identifies areas at significant potential risk of flooding. For these "significant risk" areas, hazard maps must be produced, and flood risk management plans developed to reduce flood risk.

The Flood and Water Management Act 2010

- 7.19 The legislative framework for flood and coastal risk management is set out principally in The Flood and Water Management Act 2010. The legislation endorses the principle of an integrated approach to water and drainage management. The intentions of the Flood and Water Management Act 2010 are summarised below:
- Deliver improved security, service and sustainability for people and their communities;
 - Clarify responsibilities for managing all sources of flood risk;
 - Protect essential water supplies by enabling water companies to control more non-essential uses of water during droughts;
 - Modernise the law for managing the safety of reservoirs;
 - Encourage more sustainable forms of drainage in new developments through new arrangements for adoption and future operation of such features; and
 - Make it easier to resolve misconnections to sewers.

- 7.20 The Flood and Water Management Act gives the Environment Agency a strategic overview of the management of flood and coastal erosion risk in England. In accordance with the Government's Response to the Pitt Review, it also gives upper tier local authorities in England responsibility for preparing and putting in place strategies for managing flood risk from groundwater, surface water and ordinary watercourses in their areas.

The Environmental Permitting (England and Wales) Regulations 2016

- 7.21 The Environmental Permitting Regulations 2016 consolidate and replace the 2010 Regulations and the 15 associated amendments. The permitting regime covers a range of activities that release emissions to land, air or water or that involve waste. The regime covers facilities previously regulated under the Pollution Prevention and Control Regulations 2000 and Waste Management Licensing and exemptions schemes, some parts of the Water Resources Act 1991 and the Groundwater Regulations 2009.

- 7.22 Schedule 21 relates to water discharge activities and Schedule 25 relates to flood risk activities. Schedule 22 to the Regulations relates to groundwater activities and the regulations place a duty on regulating authorities to implement the Water Framework Directive and the Groundwater Daughter Drainage Directive and exercise their relevant function to ensure all necessary measures are taken to:

“(a) prevent the input of any hazardous substance to groundwater; and

(b) limit the input of non-hazardous pollutants to groundwater so as to ensure that such inputs do not cause pollution of groundwater” (Paragraph 6, Schedule 22).

The Water Environment (Water Framework Directive) Regulations 2017

- 7.23 The Water Environment (Water Framework Directive) Regulations 2017 revoke and replace the previous European Union directive and are designed to improve and integrate the way water from all sources is managed in the UK. Much of the implementation work is undertaken by competent authorities such as the Environment Agency and Local Authorities. The regulations establish a framework for community action in the field of water policy, the protection of groundwater against pollution and deterioration and environmental quality standards in the field of water policy.

The Environmental Permitting (England and Wales) (Amendment) (EU Exit) Regulations 2019

- 7.24 These came into force in accordance with the European Union (Withdrawal) Act 2018 on the 31st December 2020, to ensure that The Environmental Permitting Regulations 2016 for England and Wales can continue to function. The Environmental Permitting Regulations 2016 are summarised above.

The Environment (Amendment etc.) (EU Exit) Regulations 2019

- 7.25 These came into force in accordance with the European Union (Withdrawal) Act 2018 on the 31st December 2020. Part 2 amends the following legislation of relevance to the water environment:

- The Environmental Protection Act 1990 (summary provided above); and
- The Environment Act 1995 (summary provided above).

Local Planning Policy

Knowsley Local Plan Core Strategy (Jan 2016)

7.26 In relation to flood risk and climate change, the core strategy states:

“Climate change has the potential to increase flood risk by raising sea levels and leading to a greater occurrence of extreme rainfall events. The Local Plan is required to take account of these risks and set out policies for managing surface water and promoting the use of Sustainable Drainage Systems (SuDS).”

7.27 Policy CS 24 Managing Flood Risk states that:

“1. New development that may cause an unacceptable risk of flooding on the site or elsewhere will not be permitted.

2) New development should preferably be located in areas of low probability of flooding. New development in areas of medium or high flood risk will only be permitted if evidence has been submitted demonstrating that the development could not be practicably located in an area of lower flood risk and if applicable the ‘exception test’ has been complied with, in accordance with national guidance.

3) All development which is within or otherwise affects an area of flood risk or is larger than one hectare in size shall be accompanied by a site-specific Flood Risk Assessment (FRA).

4) New development shall include flood mitigation measures, where necessary, to manage flood risk associated with or caused by the development. These measures shall be derived from the Strategic Flood Risk Assessment (SFRA), relevant FRA(s) or a local strategy for flood risk management, and:

a) Be designed to contribute to the biodiversity of the borough unless it can be demonstrated that this would not be technically feasible;

b) Incorporate a Sustainable Drainage System;

c) Be fully described in the planning application; and

d) Be funded by the developer, including long term maintenance.

5) The drainage of new development shall be designed to reduce surface water run-off rates to those associated with a green-field site by treating it at its source. The chosen method of implementation

should take account of site size, ground contamination or conditions, and potential damage to adjacent buildings or sites.

6) Further guidance on these issues will be provided in a proposed Supplementary Planning Document..”

- 7.28 Knowsley Metropolitan Borough Council Local Flood Risk Management Strategy was published as the aforementioned further guidance in 2017 and refers to a number of documents that form the basis of the strategy as scheduled in the following sections.

Other Relevant Policy, Standards and Guidance

Strategic Flood Risk Assessment

- 7.29 A Strategic Flood Risk Assessment (SFRA) is a study carried out by one or more local planning authorities to assess the risk to an area from flooding from all sources, now and in the future. The Knowsley Level 1 SFRA has been produced in order to provide an assessment of the flood risk posed to the KMBC study area. A series of maps have been produced to accompany the report
- 7.30 The KMBC Level 2 SFRA comprises relevant data, guidance and recommendations for flood risk issues at a local level. It is a planning tool that enables the Local Planning Authority (LPA) to carry out Sequential and Exception Testing and to select and develop sustainable site allocations at a lower risk of flooding.
- 7.31 The Site is not shown to be located within a Critical Drainage Area (CDA) within the SFRA but is within a site that has been the subject of a site assessment. The Site Number is LDF19 in volume 2 of the level 2 SFRA.

Preliminary Flood Risk Assessment

- 7.32 A Preliminary Flood Risk Assessment (PFRA) has been prepared by KMBC and is an assessment of floods that have taken place in the past and floods that could take place in the future. It generally considers flooding from surface water runoff, groundwater, canals and ordinary watercourses, and is prepared by LLFAs.

Guidance

- 7.33 A technical guidance document Sustainable Drainage and Surface Water Management – Technical Guidance for Developers has also been published by KMBC.

Assessment Methodology and Significance Criteria

- 7.34 In order to establish the environmental impact of the Proposed Development on the hydrological regimes of the Site and its immediate environs, it was necessary to undertake the assessment in a number of stages.
- 7.35 The initial stage comprised a desk study review of available information in order to determine (where possible) Site conditions in terms of water features (both surface and ground), water quality, drainage and flood risk.

Identification of the Study Area

- 7.36 The study area used for this assessment includes both the Site and its nearby relevant hydrological features (extending to at least to 2km from the Site), including the catchments of local watercourses, surface water features and dependant habitats. It also includes hydrogeological features, including underlying geology, aquifers and nearby groundwater dependent features.

Scope

- 7.37 An FRA and Drainage Strategy has been carried out for the Proposed Development in accordance with guidance contained in the NPPF, associated PPG and included consultation with KMBC LLFA and is contained within **Appendix 7.1**. The FRA and Drainage Strategy identifies and assesses the risks of all forms of flooding to and from the Proposed Development and demonstrates how these flood risks would be managed so that the development remains safe throughout its lifetime, taking climate change into account. The FRA and Drainage Strategy includes an assessment of the existing, proposed surface water drainage of the Site and also includes a SuDS Strategy for the Proposed Development.

Data Sources

- 7.38 The sources of information used in the desktop study are listed in in Table 7.1.

Table 7.1: Data Sources

Topic	Sources of Information
Topography	• Ordnance Survey Maps • Site topographic survey
Geology	• British Geological Survey (BGS) Bedrock and Superficial Geological Map • BGS online data
Hydrogeology	• Environment Agency online data • Relevant scientific literature
Hydrology	• Metrological Office Historic Rainfall Data

Topic	Sources of Information
	• Flood Estimation Handbook (FEH) Webservice • National Soil Resource Institute • Environment Agency Flood Risk Maps • Construction Industry Research and Information Association (CIRIA) C753 – The SuDS Manual¹ • FRA

Assessment of Climate Change

- 7.39 Hydrological systems are in a state of constant flux. Two main influences on the hydrology of the Site have been identified, namely land use and climate change.
- 7.40 Climate is also variable, with observed historical and predicted future changes in global climate due to a combination of both natural and human causes. Projections of future climate change in the UK indicate more frequent, short-duration, high intensity rainfall and more frequent periods of long duration rainfall.
- 7.41 Guidance included within the NPPF recommends that the effects of climate change are incorporated into FRAs using guidance. Recommended precautionary sensitivity ranges for peak rainfall intensities and peak river flows are outlined in the Flood risk assessments: climate change allowances guidance .

Peak River Flow

- 7.42 The FRA and Drainage Strategy has assessed the effects of climate change on the flood risk posed to the Proposed Development.

Peak Rainfall

- 7.43 The SuDS Strategy includes a 30% model climate change allowance as per guidance.

Characterisation of Effect

- 7.44 The purpose of the EIA is to identify the likely 'significance' of environmental effects (beneficial or adverse) arising from a development. In broad terms, environmental effects are described as:

¹ Woods Ballard, B, Wilson, S, Udale-Clarke, H, Illman, S, Scott, T, Ashley, R, Kellagher, R (2015). The SuDS Manual, CIRIA (C697)

- **Adverse** – detrimental or negative effects to an environmental resource or receptor;
- **Beneficial** – advantageous or positive effect to an environmental resource or receptor; or
- **Negligible** – a neutral effect to an environmental resource or receptor.

7.45 Effects have been assessed in terms of:

- The magnitude of the impact – the degree of alteration (both positive and negative) from the baseline state; and
- The sensitivity of the receptor(s) subjected to the impact – this may relate to the value of a resource and the reversibility of impacts.

7.46 Any effect of moderate or major significance is considered to represent a likely significant effect for the purposes of the EIA Regulations. Significance of effects would be considered before and after mitigation.

7.47 The criteria for determining magnitude of impact is set out below in Table 7.2. Magnitude of impact, based on the change that the Proposed Development would have upon the resource / receptor, is considered within the range of high, medium, low, negligible. Consideration is given to scale, duration of impact/effect (e.g. for construction, short-term for 1-2 years, medium-term for 3-5 years, long-term for 5 years and greater, and permanent, dependent upon project timeframes) and extent of Proposed Development.

7.48 The sensitivity of the receiving environment together with the magnitude of the effect defines the significance of the effect prior to application of mitigation measures as outlined within Table 7.3.

7.49 Professional judgement is used to assess the findings in relation to each of these criteria to give an assessment of significance for each effect. This approach has been used to inform the assessment of predicted effects.

Table 7.2: Magnitude of Effects and Criteria

Magnitude of Effect	Criteria
High	Total loss or major / substantial alteration to elements / features of the baseline (pre-development) conditions such that the post development character / composition / attributes will be fundamentally changed.
Medium	Loss or alteration to one or more elements / features of the baseline conditions such that post development character / composition / attributes of the baseline will be materially changed.
Low	A minor shift away from baseline conditions. Change arising from the loss / alteration will be discernible / detectable but the underlying character / composition / attributes of the baseline condition will be similar to the pre-development.

Magnitude of Effect	Criteria
Negligible	Very little change from baseline conditions. Change not material, barely distinguishable or indistinguishable, approximating to a 'no change' situation.

Table 7.3: Degree of Sensitivity Criteria

Level of Sensitivity	Criteria
High	The receptor / resource has little ability to absorb change without fundamentally altering its present character or is of international or national importance.
Medium	The receptor / resource has moderate capacity to absorb change without significantly altering its present character or is of high and more than local (but not national or international) importance.
Low	The receptor / resource is tolerant of change without detrimental effect, is of low or local importance.
Negligible	The receptor / resource can accommodate change without material effect, is of limited importance.

- 7.50 Significance of effect is evaluated as a combination of the sensitivity of the receptor and the magnitude of change the development results in.
- 7.51 Likely effects are therefore concluded to be of major, moderate, minor or negligible. The shaded boxes in Table 7.4 represent effects considered to be significant in terms of the EIA Regulations. Although the matrix in Table 7.4 is designed to demonstrate an objective rationale to reach a conclusion about the potential significance of impact, a degree of professional judgement is a key element in the evaluation process. Table 7.5 provides details of the significance descriptors.

Table 7.4: Significance of Effect

Magnitude of Effect	Sensitivity of Receptor			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Table 7.5: Significance Descriptors

Significance	Criteria
Major	Very large or large change in environmental conditions. Effects, both adverse and beneficial, which are important considerations at a national to regional level because they

Significance	Criteria
	contribute to achieving national / regional objectives, or, likely to result in exceedance of statutory objectives and/or breaches of legislation.
Moderate	Intermediate change in environmental conditions. Effects that are likely to be important considerations at a district to local level because they contribute to achieving local objectives or may result in exceedance of local statutory objectives and/or breaches of legislation.
Minor	Small change in environmental conditions. These effects may be raised as local issues but are unlikely to be of importance in the decision-making process.
Negligible	No discernible change in environmental conditions. An effect that is likely to have a negligible or neutral influence, irrespective of other effects.

Assumptions / Limitations

- 7.52 Geological and hydrogeological data beneath the Site is limited to information which has been obtained from available phase 1 and phase 2 geo-environmental ground investigation based sources, including maps and data from boreholes surrounding the Site.
- 7.53 The Environment Agency and SFRA flood maps can change over time. However, it is not considered that the above limitations would have a significant bearing on the outcome of this assessment.

Consultation

- 7.54 Consultation including extensive correspondence and site meetings has taken place with the KMBC LLFA and EA as part of the FRA, as shown within Table 7.6.

Table 7.6: Consultation

Consultee	Date and Time	Comments	Actions
KMBC as the LLFA & the EA	2018-2019	Refer to extensive correspondence / details in FRA in Appendix 7.1 .	Comments from the LLFA and EA have been incorporated in the FRA and Drainage Strategy and the SuDS Strategy for the Proposed Development, see Appendix 7.1 .

Baseline Conditions

- 7.55 This section identifies the current hydrology, drainage and flood risk conditions of the Site and the study area.

Topography

- 7.56 The Site slopes down gently from north-east to south-west with levels adjacent to the north-eastern boundary at c. 25m Above Ordnance Datum (m AOD) falling to c. 17m AOD in the south-western section of the Site at Chapel Brook.

Hydrology/Drainage

- 7.57 Chapel Brook lies at the south-west of the Site. Fox's Bank Brook lies at the eastern end of the site. An ordinary watercourse that flows through the northwest of the site in a generally east to west direction issuing from a culvert that runs under the mineral railway which takes flows originating from Big Water on the northern side of the M62 motorway. These flows finally discharge into Chapel Brook. There are no adopted sewers present within the vicinity of the Site. The FRA in **Appendix 7.1** contains a detailed study of the local sewer network along with a viability study for discharging into it.

Rainfall

- 7.58 The Site is located within an area of moderate rainfall. The 1961-1990 Standard Average Annual Rainfall (SAAR) for the Site as recorded in the FEH web service is 858mm per annum. The UK national average is 832mm per annum.

Water Quality

- 7.59 The WFD surface water quality information for the Site is shown in Table 7.7.

Table 7.7: Surface Water Quality

Location	Name	Water Body ID	Overall Rating	Ecological Rating	Chemical Rating	Year
On Site	Prescot Brook (Logwood Mill Brook) Water Body	GB112069060710	Poor	Poor	Fail	2019

- 7.60 The WFD groundwater quality information for the Site is shown in Table 7.8.

Table 7.8: Groundwater Quality

Location	Name	Water Body ID	Overall Rating	Ecological Rating	Chemical Rating	Year
On Site	Sankey and Glaze Carboniferous Aquifers	GB41202G100100	Poor	Poor	Poor	2019

Flood Risk

- 7.61 Current Environment Agency flood data indicates the Site to mainly lie in Flood Zone 1 and therefore above any 1 in 1000 year risk but with localised areas of flood zones 2 and 3 adjacent Chapel Brook in the Tree Preservation Area Woodland. This was the outcome of the site assessment made in the KMBC level 2 SFRA. The proposed area of development lies wholly in Flood Zone 1.
- 7.62 Environment Agency / DEFRA flood mapping indicates localised, discrete areas of the Site at a low and high risk from surface water flooding.
- 7.63 It is however noted that surface water flood mapping is not highly accurate in nature as it is solely based on LIDAR data – future development of the Site will naturally address these areas through the detailed design process.
- 7.64 Environment Agency / DEFRA flood mapping indicates no areas at risk of reservoir flooding risk.
- 7.65 Groundwater flooding risk is classified as negligible.
- 7.66 A review of the KMBC Local Flood Risk Management Strategy indicates no evidence of historic flooding from any sources recorded at the Site.
- 7.67 A review of the KMBC Preliminary Flood Risk Assessment (PRFA) (specifically Figure 5.1) indicates no evidence of historic flooding incidents.
- 7.68 A review of the KMBC Level 2 SFRA indicates a negligible risk of future surface water flooding based on a 1 in 100 year rainfall event.

Geology / Hydrogeology

- 7.69 Refer to the Phase 1 geo-environmental ground investigation report in **Appendix 7.2** for full details of geology / hydrology.
- 7.70 The BGS Geological Maps indicates that the bedrock underlying the Site consists of Pennine Middle Coal Measures with the exception of the south-western boundary which is underlain by the Etruria Formation. The superficial deposits consist of glacial till with an area of alluvium in the western site section in the vicinity of Chapel Brook.

- 7.71 The bedrock deposits are designated as a Secondary A Aquifer.
- 7.72 The superficial deposits are designated as a Secondary Undifferentiated Aquifer. Assigned where it is not possible to attribute either category A or B to a rock type. In general, these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
- 7.73 The Site is not located within an Environment Agency Source Protection Zone.
- 7.74 The site lies within a surface water nitrate protection zone.

Potable Abstractions

- 7.75 There are 2 active licensed potable water abstractions within 2 km of the Site.

Surface Water Abstractions

- 7.76 There are 5 Surface Water Abstractions within 2km of the site. All are historic with the exception of a single surface water abstraction license located 680m to the south-west pertaining to the abstraction of water from Ochre and Dog Clog brook for spray irrigation by Belpool Development Ltd (License No.:2569028018).

Groundwater Abstractions

- 7.77 There are 15 No. groundwater abstraction licenses within 2km of the site. The nearest is located 1230m
- 7.78 to the south and pertains to the abstraction of groundwater from boreholes as at La Pumping
- 7.79 Station, Whiston for potable water. The remainder pertain to the abstraction of water for general use, water bottling, spray irrigation, cooking, sanitary, drinking and washing.

Licensed Discharges to Controlled Waters

- 7.80 There are 11 no. licensed discharge consents located within 500m of the site the nearest is located 10m to the south-east and pertains to the discharge of process effluent, the license was revoked in 1991. The remainder pertain to the discharge of sewage / treated effluent and surface water.

Ecological Designations

- 7.81 The designated sites located within 2km are shown in Table 7.9.

Table 7.9: Designated Sites

Location	Name	Designation
510m N	Surrounding Area	Nitrate Vulnerable Zone (NVZ)
1891m NW	Surrounding Area	Nitrate Vulnerable Zone (NVZ)
15m NE	The Old Wood South	Designated Ancient Woodland
182m NE	The Old Wood North	Designated Ancient Woodland
On site	Strettles Bog, Tarbock	Local Wildlife Site
Immediately adjacent to the east of the site	Mine Waste, Cronton	Local Wildlife Site
Immediately adjacent to the south of the site	Daggers' Bridge Wood	Local Wildlife Site
470m N	Ochre Brook, Tarbock	Minor Watercourse
500m N	Big Water and Big Water Wood, Halsnead	Standing Water Habitats
750m SW	Ox Lane Wood, Tarbock	Woodland

Sensitivity of Receptors

- 7.82 Based on the baseline conditions presented above, Table 7.10 presents the sensitive receptors which have been considered in the following assessment, along with their sensitivity to change.

Table 7.10: Identified Receptors

Source / Medium	Receptor	Sensitivity	Description
Flood Risk (all sources including river, surface water, groundwater, etc.)	Construction workers	Low	Flooding may impact upon workers during the construction phase, but their sensitivity is lowered as a result of their competency in their role as well as operating in teams and/or prescribed systems. However, the flood risk posed is low.
	Future Site users	Low	Users of site generally have little awareness of flood risk. However, the flood risk posed is low.
	Residents / users of the surrounding area	Low	Residents/users of the surrounding areas generally have little awareness of flood risk and residents' vulnerability is high given their presence overnight (via sleeping accommodation). However, the flood risk posed is low.
Increase in Impermeable Area	Construction workers	Low	Flooding may impact upon workers during the construction phase, but their sensitivity is lowered as a result of their competency in their role as well as operating in teams and/or prescribed systems.
	Future Site users	Low	Users of site generally have little awareness of flood risk. However, the flood risk posed is low.

Source / Medium	Receptor	Sensitivity	Description
	Residents / users of the surrounding area	Low	Residents/users of the surrounding areas generally have little awareness of flood risk and residents' vulnerability is high given their presence overnight (via sleeping accommodation).
Water Quality	Watercourses	Medium	Any water quality or quantity issues would only be felt over short distance of the watercourses compared to the overall length of the watercourses. Water quality issues would also be diluted rapidly within the watercourses.

Embedded Mitigation

- 7.83 This section describes the measures which have been 'embedded' into the Proposed Development.

The Completed and Operational Development

- 7.84 A SuDS Strategy is proposed as part of the Proposed Development, details of which are contained in **Appendix .17**.
- 7.85 Using the hierarchy of surface water drainage design, it is proposed that post-development surface water will be attenuated to greenfield runoff rates. The surface water runoff will be discharged to Chapel Brook to the south-west of the site.
- 7.86 Surface water runoff from the Site shall be limited to a greenfield runoff rate of 33 litres per second for all events up to and including the 1 in 100 year (+30%) event. This results in on Site storage of circa 3500m³ for the 1 in 100 year (+30%) event which is to be provided in the form of an open pond system in the northern section of the Site adjacent to the outfall to Chapel Brook.
- 7.87 In assessing the level of treatment required to ensure sufficient water quality improvement prior to discharge to watercourse via surface water sewer, reference is made to Chapter 26 of CIRIA C753 – The SuDS Manual and specifically table 26.2 which details the pollution hazard indices for different site uses. Based on the proposed commercial development, the pollution hazard level is noted as 'medium'.
- 7.88 As noted above, it is proposed to utilise an on-Site attenuation pond in order to address water quality improvements on the Site prior to conveyance of post-development attenuated surface water to Chapel Brook in the south east of the Site. In addition, it is proposed to utilise class 1 full retention and class 2 bypass oil separators to control pollution at source.

- 7.89 By inspection, the above SuDS Mitigation Indices evidently demonstrate that the proposed SuDS treatment system significantly exceeds the relevant pollution hazard indices in relation to the proposed land use. The proposed use of the on-Site attenuation pond and the use of oil interceptors is deemed to provide a suitable level of water treatment at the Site.
- 7.90 The management and maintenance of the above noted SuDS measures to serve the Proposed Development will be undertaken by a maintenance management company to be appointed for the project. The appointment of the maintenance and management company is to be confirmed at the completion of the build phase. All parts of the drainage network are to be accessible and are to be constructed from materials that are suitable and robust for the lifetime of the development.
- 7.91 The foul water treatment plant will be designed, installed and maintained to produce effluent to stringent EA permit to discharge standards.

Assessment of Likely Significant Effects

- 7.92 Potential effects that may arise during the construction phase of the Proposed Development are outlined below:
- Flood Risk - impact on construction works, future Site users, residents / uses of the surrounding areas;
 - Increase in Impermeable Area; and
 - Water Quality - suspended fine sediments / chemical spillages.

Construction

Flood Risk

- 7.93 Small areas of the Site have been identified as being at risk of flooding from surface water flooding. Any alteration of ground levels or obstructions placed within areas considered to be at risk of flooding from surface water during construction therefore has the potential to increase flood risk to the Site. This will impact on the construction works and elsewhere which will impact on residents/users of the surrounding area. Additionally, on and off-Site flood risk may increase due to increased runoff due to soil compaction on-Site.
- 7.94 The Site is currently in a greenfield state, the ground would give rise to relatively high runoff rates and volumes during rainfall events if the vegetation cover is removed and the ground is disturbed during earthworks.
- 7.95 Any flooding effects resulting from temporary construction activities are likely to be very localised within the Site itself or felt in areas immediately adjacent to the Site i.e. areas which are not overly sensitive to flooding.

The sensitivity is low and the magnitude of effect is negligible. Therefore, without mitigation the increase in flood risk during construction is considered to have a negligible effect. Any issues would only be felt over a short distance of the watercourses as opposed to the overall length of the watercourses, any issues would also only be felt in the short term and would be reversible.

Increase in Impermeable Area (temporary)

- 7.96 As the Proposed Development is being constructed, the enlarged area of impermeable surface has the potential to increase surface water runoff rates and volumes. A temporary increase in impermeable area across the Site could result in increased rates and volume of runoff that would not otherwise occur.
- 7.97 The Site is currently in a greenfield state and the existing Site would give rise to relatively low runoff rates and volumes during rainfall events however, if the vegetation cover is removed and the ground is disturbed during earthworks, runoff rates and volumes would increase during rainfall events.
- 7.98 The sensitivity is low and the magnitude of effect is low. Therefore, without mitigation measures, temporary increases in impermeable area could have a temporary, direct, minor adverse effect. Any issues would only be felt over a short distance of the watercourses as opposed to the overall length of the watercourses, any issues would also only be felt in the short term and would be reversible.

Water Quality

- 7.99 The water environment and the flora and fauna that it supports may be adversely affected by excessive levels of fine sediment contained within surface water runoff originating from construction activities associated with the Proposed Development. Furthermore, the construction activities would involve the excavation and movement of soil / ground at the Site and therefore increase the potential for leaching of pollutants into surface water receptors.
- 7.100 Runoff laden with fine sediment is principally generated by rain falling onto land that has been cleared of any vegetation and the ground potentially compacted, preventing infiltration. Other potential sources of water containing high levels of fine sediment at the Site include runoff from material stockpiles, dewatering of excavations, mud on Site and local access roads and that generated by part of the construction works themselves (e.g. vehicle washing).

- 7.101 Generally, excessive fine sediment in runoff is chemically inert and affects the water environment through smothering of riverbeds and plants, changing water quality (e.g. increased turbidity); consequently it can have physical impacts on aquatic organisms. There is also the potential for fine sediments to impact the chemical status of water bodies.
- 7.102 Without mitigation in place the watercourses would be susceptible to sediment laden water affecting water quality. Suspended fine sediment has the potential effect fisheries and causes a measurable decrease in ecological and chemical quality of the nearby watercourses although this would only be felt over a short distance of the watercourses as opposed to the overall length of the watercourses. Suspended fine sediment would also be diluted rapidly within the watercourses.
- 7.103 A number of potentially polluting materials may be used during the construction phase. These include oils, diesels, fuels, hydraulic fluids, cement / concrete, heavy metals / metalloids, bentonite, solvent / paints and flocculants etc. The accidental spillage of these may result in the contamination of surface water or groundwater.
- 7.104 Chemical spillages have a potential effect on fisheries and cause a measurable decrease in ecological and chemical quality on the nearby watercourses, although this would only be felt over short distance of the watercourses compared to the overall length of the watercourses. Chemical spillages would be diluted rapidly within the watercourses.
- 7.105 The Site is currently in a greenfield state, the ground would be susceptible to erosion if the vegetation cover is removed and the ground is disturbed during earthworks. The sensitivity is medium and the magnitude of effect is low. Therefore, without mitigation measures water quality issues could have a temporary, direct, minor adverse effect on watercourses. Any issues would only be felt over short distance of the watercourses as opposed to the overall length of the watercourses. Water quality issues would also be diluted rapidly within the watercourses in the short term and would be reversible.

The Completed and Operational Development

Flood Risk

- 7.106 Small areas of the Site have been identified as being at risk of flooding from surface water flooding. Any alteration of ground levels or obstructions placed within areas considered to be at risk of flooding from surface water during construction therefore has the potential to increase flood risk to the Site impact on future users of the Proposed Development and elsewhere which will impact on residents / users of the surrounding area. Additionally, on and off-site flood risk may increase due to increased runoff due to soil compaction on-Site.

- 7.107 The embedded mitigation measures noted above include those appropriate for climate change predictions. The SuDS Strategy provides adequate attenuation to ensure that there would be no increase in peak surface water runoff. The SuDS Strategy also makes an allowance of 30% for increase in rainfall intensity resulting from climate change throughout the lifetime of the Proposed Development.
- 7.108 Any flooding effects are likely to be very localised within the Site itself or felt in areas immediately adjacent to the Site i.e. areas which are not overly sensitive to flooding. The sensitivity is low and the magnitude of effect is negligible. Therefore, the increase in flood risk during the completed and operational development is considered to have a negligible effect.

Increase in Impermeable Area

- 7.109 Increasing the area of impermeable surface has the potential to increase surface water runoff rates and volumes. An increase in impermeable area across the Site could result in increased rates and volume of runoff that would not otherwise occur.
- 7.110 The Site is currently in a greenfield state, the existing Site would give rise to relatively low runoff rates and volumes during rainfall events however, if the vegetation cover is removed and replaced with impermeable areas during the construction of the Proposed Development runoff rates and volumes would increase during rainfall events.
- 7.111 The SuDS Strategy provides adequate attenuation to ensure that there would be no increase in peak surface water runoff. The SuDS Strategy also makes an allowance of 30% for increase in rainfall intensity resulting from climate change throughout the lifetime of the Proposed Development. As a consequence of limiting the rate of discharge from the Site, at times of heavy rainfall the volume of water leaving the Site will be significantly less than that currently draining from it.
- 7.112 The sensitivity is low and the magnitude of effect is low. On this basis the Proposed Development during the completed and operational development would have a temporary, direct, minor adverse effect.

Water Quality

- 7.113 Runoff laden with fine sediment is principally generated by rain falling onto land that has been cleared of any vegetation and replaced with impermeable surfaces, preventing infiltration and also potential increases in suspended sediment loads from runoff from roads and hardstanding areas.
- 7.114 Generally, excessive fine sediment in runoff is chemically inert and affects the water environment through smothering of riverbeds and plants, changing water quality (e.g. increased turbidity); consequently it can have

physical impacts on aquatic organisms. There is also the potential for fine sediments to impact the chemical status of water bodies.

- 7.115 Without mitigation in place the watercourses would be susceptible to sediment laden water affecting water quality. Suspended fine sediment has a potential effect on fisheries and causes a measurable decrease in ecological and chemical quality on the nearby watercourses, although this would only be felt over a short distance of the watercourses as opposed to the overall length of the watercourses. Suspended fine sediment would also be diluted rapidly within the watercourses.
- 7.116 Potential sources of pollution include oils and fuels from vehicles operating within the Site. The surface water drainage system will include petrol / oil interceptors and potentially proprietary treatment devices that would capture and retain sediment, oils and floatables from stormwater runoff.
- 7.117 Chemical spillages and suspended fine sediment have a potential effect on fisheries and cause a measurable decrease in ecological and chemical quality on the nearby watercourses, although this would only be felt over a short distance of the watercourses as opposed to the overall length of the watercourses. Chemical spillages and suspended fine sediment would be diluted rapidly within the watercourses.
- 7.118 Any issues would only be felt over a short distance of the watercourses as opposed to the overall length of the watercourses. Water quality issues would also be diluted rapidly within the watercourses in the short term and would be reversible.
- 7.119 A SuDS Strategy has been developed to not only provide flood risk benefits but also to provide water quality benefits. Sufficient treatment train components are incorporated for both the sensitivity of the receiving watercourse and the nature of the development, as well as sediment control methods. These are designed to ensure that the receiving environments are not put at risk of pollution by the Proposed Development.
- 7.120 The foul water treatment plant will be designed, installed and maintained to produce effluent to stringent EA permit to discharge standards.
- 7.121 The sensitivity is medium and the magnitude of effect is low. Therefore, the Proposed Development would have a temporary, direct, minor adverse effect on water quality and sediment loading into the receiving watercourses and therefore into the catchment as a whole.

Additional Mitigation / Enhancement Measures

Construction

Procedures

- 7.122 The design and implementation of the construction works will be undertaken in accordance with ISO 14001 and industry and regulatory procedures. As such, it is envisaged that the following documents will be prepared and, where appropriate, agreed with the regulatory bodies:
- Construction Environmental Management Plan (CEMP);
 - Site Drainage Plan;
 - Incidence Response Plan (IRP);
 - Environmental training for personnel;
 - Record keeping; and
 - The identification, mitigation and remediation of contaminated land.
- 7.123 The management of runoff during construction would be included in the CEMP. In summary, the Pollution Prevention Guidance (PPG), Environment Agency guidance and CIRIA guidance states that the following methods (see below) of surface water management should be put in place during the construction phase to ensure pollution, sediment and erosion control.
- 7.124 Mitigation measures to be included within the CEMP, Site Drainage Plan and as part of the Incident Response Plan include:
- 8m working standoff from any watercourses / ditches to be retained (excluding drainage works and the construction of the attenuation ponds);
 - Bunds will be used to prevent runoff entering watercourses;
 - Compounds will have hard surfacing to prevent infiltration;
 - Areas of localised contamination identified during the ground investigation will be remediated/ removed as appropriate;
 - A procedure will be put in place to manage previously unidentified contaminated ground that is encountered during the works; and,
 - Any surplus soil arisings from levelling or excavation works that has visual or olfactory evidence of contamination will be stored in sheeted stockpiles placed on hardstanding or sheeting pending its removal or treatment.
- 7.125 There is potential for the introduction of contaminated materials to the ground or groundwater due to incorrect storage or spillages of construction materials / fuels. Design of operational pollution prevention measures will be included in the CEMP. Impacts due to incorrect storage and spillage will be mitigated by the following:

- Design of a Drainage Plan for the Site;
- Compounds will comprise hardstanding;
- Environmental training for all personnel;
- Designated re-fuelling areas on hardstanding with interceptor drainage, bunds, plant nappies or similar;
- Spill kits will be readily available;
- Storage areas for materials will be identified; and
- Deliveries will be planned in advance.

Excavated and Exposed Ground

- 7.126 To limit the volume of runoff reaching the exposed ground, runoff diversion or interception devices can be placed upstream. To help prevent pollution from entering a watercourse, silt fences, hay bales or stilling ponds can be placed downstream.
- 7.127 The extent of all excavations would be minimised as far as is reasonably practicable. During construction activities, surface water flows would be captured through a series of cut-off drains to prevent water entering excavations or eroding exposed surfaces. If dewatering of excavations is required, pumped discharges would be passed through a washout area, settlement / attenuation ponds and silt fences to capture sediments before release to a watercourse / drain.

Stockpiles

- 7.128 Stockpiles will be located away from a watercourse or Site drainage system to prevent leaching of contaminants. Protective coverings will help prevent runoff stripping a stockpile. Concrete should also be stored to prevent release into drains.
- 7.129 Topsoil / subsoil would be stored away from watercourses and on flat lying land (minimum 20m on flat land). Where this is not possible and it is to be stockpiled for longer than a two week period, the material would, as soon as possible either be covered with geotextile mats, seeded to promote vegetation growth, or drainage provided to a suitable settlement area.

Plant and Wheel Washing

- 7.130 Plant wheel washing will take place in designated locations. The area will be tanked and will not be allowed to discharge into a watercourse or infiltrate to groundwater. Some proprietary vehicle washing systems offer a recycling facility, which filter and settle solids, with effluent being pumped back into the system. The solid waste materials from this process need to be treated as contaminated waste due to the high hydrocarbon content.

- 7.131 Mud deposits would be controlled at entry and exits to the Site using wheel washing facilities and / or road sweepers operating during earthworks or other times as considered necessary.
- 7.132 Tools and plant would be washed out and cleaned in designated areas within the Site compound where runoff can be isolated for treatment before discharge to surface water drainage under appropriate consent and / or agreement with the Environment Agency and / or the LLFA, or otherwise removed from Site for appropriate disposal at a licenced waste management facility.

Haul Roads

- 7.133 Haul roads will be designed so that the length is kept to a minimum, but still serve their purpose. The gradient will be shallow to prevent increasing runoff velocity and, if possible, bunds and / or discrete ditches constructed to intercept the runoff. Haul roads will be sprayed regularly to keep down dust. If any section of a haul road is hard surfaced, then it will be swept on a regular basis to prevent accumulation of dust and mud. Gullies will be covered when not in use before the final bituminous running surface is laid.
- 7.134 The movement of construction traffic (to / from and between main construction areas) would be controlled via defined tracks and hardstanding areas.

Oils and Hydrocarbons

- 7.135 Simple measures can be taken to prevent oil and hydrocarbons becoming pollutants, such as:
- Maintenance of machinery and plant;
 - Drip trays;
 - Regular checking of machinery and plant for oil leaks;
 - Correct storage facilities;
 - Check for signs of wear and tear on tanks;
 - Care with specific procedures when refuelling;
 - Designated areas for refuelling;
 - Emergency spill kit located near refuelling area;
 - Regular emptying of bunds; or
 - Tanks located in secure areas to stop vandalism.
- 7.136 In accordance with the Environment Agency PPG's, all fuel tanks on-Site will have a bunded containment of a minimum of 110% fuel tank capacity. There would be no drainage point from the bunded catchment area and tamperproof taps / valves would be installed. All empty fuel containers or drums would be stored within a

catchment area prior to their removal from the Site. Oil traps would be incorporated in pertinent drainage systems to prevent accidental spillage being discharged into the surface runoff. Furthermore, spill kits would be stored at refuelling areas in the event of accidental spillage.

- 7.137 Best practice measures would be undertaken when refuelling plant and machinery. Where fuelling of large machinery is required, drip trays and absorbent mats or pellets would be utilised. General maintenance would also be undertaken in a designated area and similar contamination prevention measures would be adopted.
- 7.138 All runoff from the Site would be intercepted and treated to remove sediment, oils and other substances prior to discharge. As construction of the Proposed Development progresses the drainage system would be progressively implemented and would also include pollution prevention control systems.

Watercourses / Drainage Channels

- 7.139 The gradient of any constructed drainage channels needs to be carefully considered. If the gradient is made too flat, then the channel is likely to silt up and reduce the flow capacity of the channel and prevent sediment travelling downstream. Alternatively, if the gradient is made too steep, this can increase erosion of the ditch banks which would result in an increase in the quantity of sediments which migrate downstream.

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- 7.140 Storage and handling of fuels and oils at the Site would comply with the Environment Agency PPG's, Environment Agency guidance and CIRIA guidance. Standard pollution prevention procedures to mitigate the risks to surface water quality would be implemented throughout operation of the Proposed Development.
- 7.141 In accordance with the Environment Agency PPG's, all fuel tanks on-Site shall have a bunded containment of a minimum of 110% fuel tank capacity. There would be no drainage point from the bunded catchment area and tamperproof taps / valves would be installed. All empty fuel containers or drums would be stored within a catchment area prior to their removal from the Site. Oil traps would be incorporated in pertinent drainage systems to prevent accidental spillage being discharged into the surface runoff.

Likely Residual Effects of the Development and their Significance

- 7.142 This section summarises the significance of the anticipated residual environmental effects, which are those that remain after all proposed mitigation measures are implemented. Table 7.11 details the residual effects.

Construction Phase**Flood Risk**

- 7.143 The implementation of the mitigation measures will result in a negligible effect which is not significant .

Increase in Impermeable Areas (temporary)

- 7.144 The implementation of the mitigation measures will result in a negligible effect which is not significant.

Water Quality

- 7.145 The implementation of the mitigation measures will result in a negligible effect which is not significant.

Operational Phase**Flood Risk**

- 7.146 The implementation of the mitigation measures will result in a negligible effect which is not significant.

Increase in Impermeable Areas

- 7.147 The implementation of the mitigation measures will result in a negligible effect which is not significant.

Water Quality

- 7.148 The implementation of the mitigation measures will result in negligible effect which is not significant.

Table 7.11: Residual Effects Summary

Description of Effect	Embedded Mitigation	Potential Effect (inc. Significance)	Further Mitigation	Residual Effect
Construction				
Flood Risk (all sources including river, surface water, groundwater, etc.)	None proposed	Flood risk posed to construction workers and residents / users of the surrounding area. Negligible	Industry Standard Procedures, CEMP, Site Drainage Plan	Negligible (not significant)
Increase in Impermeable Areas (temporary)		Increased flood risk posed to construction workers and residents / users of the surrounding area due to increase runoff rates and volumes. Minor adverse	Industry Standard Procedures, CEMP, Site Drainage Plan	Negligible (not significant)
Water Quality		Water quality issues due to increases in sediment laden runoff and chemical spillages causing pollution of watercourses. Moderate adverse	Industry Standard Procedures, CEMP, Site Drainage Plan	Negligible (not significant)
Operation				
Flood Risk (all sources including river, surface water, groundwater, etc.)	SuDS Basin	Flood risk posed to site users and residents / users of the surrounding area. Negligible	Industry Standard Procedures	Negligible (not significant)
Increase in Impermeable Areas		Increased flood risk posed to site users and residents / users of the surrounding area due to increase runoff rates and volumes.	Industry Standard Procedures	Negligible (not significant)

Description of Effect	Embedded Mitigation	Potential Effect (inc. Significance)	Further Mitigation	Residual Effect
		Minor adverse		
Water Quality		Water quality issues due to increases in sediment laden runoff and chemical spillages causing pollution of watercourses. Incorporation of licenced and fully maintained foul water treatment plant. Moderate adverse	Industry Standard Procedures	Negligible (not significant)

Conclusions

- 7.149 This impact assessment has considered the potential adverse impacts on the flood risk and drainage at or near the Site from the Proposed Development.
- 7.150 The principal risks during construction are considered to be the potential for excess fine sediment, hydrocarbons, chemicals polluting waterbodies and increase in surface water runoff rates and volumes. This could be exacerbated by the extensive earthworks that would be required at the Site.
- 7.151 The principal risk during the operation of the Site are increases in the impermeable area due to the Proposed Development resulting in an increase in surface water runoff rates and volumes.
- 7.152 An FRA and Drainage Strategy (**Appendix 7.1**) has been prepared to inform this Chapter of the ES which includes a SuDS Strategy.
- 7.153 The SuDS Strategy ensures that a sustainable drainage solution can be achieved, which reduces the peak discharge rate to manage and reduce the flood risk posed by the surface water runoff from the Site as well as providing water quality benefits.
- 7.154 Using the hierarchy of surface water drainage design, it is proposed that post-development surface water will be attenuated to greenfield runoff rates. The surface water runoff will be discharged into Chapel Brook from a SuDS stormwater attenuation pond. Discharge of surface water direct to the ground in the form of infiltration measures is not feasible based on the assessment of the Devensian Till superficial drift underlying the site.
- 7.155 Surface water runoff from the Site shall be limited to a greenfield runoff rate of 33 litres per second for all events up to and including the 1 in 100 year (+30%) event. This results in on Site storage of circa 3500m³ for the 1 in 100 year (+30%) event which is to be provided in the form of an open pond system in the northern section of the Site adjacent to Chapel Brook.
- 7.156 The proposed use of the on-Site attenuation pond and the use of oil interceptors to vehicle parking areas is deemed to provide a suitable level of water treatment at the Site.
- 7.157 A range of pollution prevention and mitigation measures have been described that would adequately manage the flood risk and water quality/quantity during the construction phase. The assessment concludes that the mitigation measures described would reduce the magnitude of impacts to a negligible level and would prevent significant adverse effects arising.

- 7.158 The assessment concludes that the mitigation measures described would reduce the magnitude of impacts to a negligible level and would prevent significant adverse effects arising. The findings of this assessment have demonstrated that the Proposed Development would not result in any significant residual adverse impacts on drainage or flood risk.

Assessment of Cumulative Effects and their Significance

Approach

- 7.159 An assessment of the cumulative effects on flood risk and drainage has been undertaken and involves the identification of any incremental changes likely to result from the construction and operation of the Proposed Development together with other Cumulative Sites.
- 7.160 Table 7.12 provides a list of the developments which have been included within the Cumulative Sites assessment.

Likely Residual Cumulative Effects and their Significance

Construction

- 7.161 There is the potential for some degree of cumulative effect on flood risk and drainage during construction. However, on the basis that the Cumulative Sites shown in Table 7.12, similar to the Proposed Development, would have to employ forms of flood risk and drainage mitigation during the construction phase, it is considered unlikely that the cumulative effects of these developments, when considered at a catchment scale, would give rise to significant effects. Cumulative effects would therefore be negligible.

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- 7.162 There is the potential for some degree of cumulative effect on flood risk and drainage, in particular in a scenario where an extreme weather event occurs which exceeds the capacity of the designed surface water management schemes.
- 7.163 The Proposed Development includes mitigation measures as described above and if an extreme weather event occurs which exceeds the capacity of the SuDS Strategy, there is additional capacity with the system to accommodate this (i.e. within the manholes, pipes etc.). Consequently, the impact of an exceedance event is not considered to represent any significant flood hazard.
- 7.164 On the basis of the above, and that the Cumulative Sites shown in Table 7.12, similar to the Proposed Development, would have to employ forms of flood risk and drainage mitigation during the completed and

operation development, it is considered unlikely that the cumulative effects of these developments, when considered at a catchment scale, would give rise to significant effects. Cumulative effects would therefore be negligible.

Table 7.12: Cumulative Sites

Site Ref.	Application No.	Distance and Direction	Proposal	Justification
1.	18/00283/HYB	90m north	Hybrid application comprising full application for erection of 123 no. Dwellings, construction of vehicular/pedestrian accesses, laying out of public open space and associated works; outline application for erection of up to 237 no. Dwellings, car park and associated works (access into site to be considered - all other matters reserved for future approval).	Proposals include measures to ensure that the development does not give rise to unacceptable effects on flood risk and drainage.
2.	20/00399/OUT	680m north	Outline application for proposed residential development of up to 277 no. Dwellings (use class c3) and an apartment development of up to 100 units for over 55's (use class c3) together with new vehicular access to lickers lane and windy arbor road, landscaping and associated works (inc. Demolition of buildings) (approval sought for access - all other matters reserved)	Proposals include measures to ensure that the development does not give rise to unacceptable effects on flood risk and drainage.
3.	20/00417/FUL	770m northeast	Residential development comprising of the erection of 350 no. Dwellings together with the construction of vehicular access off fox's bank lane (comprising signalised junction), suds ponds, landscaping, boundary treatments and other associated works (including demolition of existing farm buildings)	Proposals include measures to ensure that the development does not give rise to unacceptable effects on flood risk and drainage.
4.	20/00329/FUL	340m north	Erection of a residential development of 43 no. Dwellings comprising 14 no. Apartments and 29 no. Houses together with access, car parking and associated development (demolition of existing barn)	Proposals include measures to ensure that the development does not give rise to unacceptable effects on flood risk and drainage.
5.	20/00494/HYB	Adjacent north and east	Hybrid planning application comprising: full application for the development of 161,900 sq ft (15,041 sq m) (gia) of storage and distribution floorspace (use class b8), including ancillary offices (use class b1), security gatehouse, site access road, engineering earthworks to form a part country park, public car park to serve country park, and associated works; and outline application with	Proposals include measures to ensure that the development does not give rise to unacceptable effects on flood risk and drainage.

Site Ref.	Application No.	Distance and Direction	Proposal	Justification
			details of point of access (details of part-access, landscaping, appearance, scale and layout are reserved) for the development of up to 838,100 sq ft (77,862 sq m) (gia) of storage and distribution floorspace (use class b8), with ancillary offices and light industrial (use class b1); engineering earthworks to form country park and drainage attenuation ponds; pedestrian/cycle/equestrian route connecting existing m62 footbridge with proposed country park; and associated works	
6.	15/00022/OUT	2.2km north	Outline application for mixed use development comprising up to 750no. Dwellings & upto 929 sq m of commercial/industrial buildings (use classes b1/b2/b8) - all matters reserved for future approval	Proposals will have to include measures to ensure that the development does not give rise to unacceptable effects on flood risk and drainage.
7.	17/00301/HYB	360m west	Hybrid application comprising a full planning application for 1800 sq.m gross external area food store (use class a1), 1161 sq.m gross external area b1/b2 use (business use / general industrial use) with associated car parking, landscaping, highway works, pumping station, substation and associated works including bund and noise attenuation boundary treatment to top of bund along western boundary of the site; and outline planning application for up to 7,500 sq.m use class b1 and b2 floor space, petrol filling station (sui generis use) with up to 400 sq.m floor space associated use class a1 unit, up to 1000 sq.m use class a3 and a4 floor space (pub / restaurant), with associated car parking, servicing areas, highway works, and other associated works, with all matters reserved for future approval	Proposals will have to include measures to ensure that the development does not give rise to unacceptable effects on flood risk and drainage.

Site Ref.	Application No.	Distance and Direction	Proposal	Justification
8.	16/00819/FUL	2km northwest	Erection of 62 no. Dwellings together with construction of new vehicular & pedestrian access, landscaping, public open space, drainage and associated works	Proposals will have to include measures to ensure that the development does not give rise to unacceptable effects on flood risk and drainage.
9.	18/00062/HYB	3.5km north	Detailed application for 4,180 sq.m of employment floor space (use class b1), 3,275 sq.m ancillary floor space (use classes a1/a4/c1/sui generis), 154 residential dwellings, improvements to lord derby playing fields/oak plantation and associated landscaping and infrastructure including a dedicated 500kva substation for the residential neighbourhood and a 1000kva substation for the eastern employment area and the demolition of knowsley lane farm. outline application for up to 26,350 sq.m of employment floor space (use classes b1) and associated landscaping and infrastructure	Proposals include measures to ensure that the development does not give rise to unacceptable effects on flood risk and drainage.
10.	19/00651/FUL	140m north	Construction of multi-use path and associated ground works including the facilitation of rising main associated with proposed residential development on adjoining land. disused railway line extending from m62 motorway extending north through halsnead park and to rear of cronton avenue, whiston, knowsley	Proposals include measures to ensure that the development does not give rise to unacceptable effects on flood risk and drainage.
11.	20/00578/FUL	Adjacent to north and east	Construction of a new country park comprising of the creation of sculptured landscape, habitat/wetland creation, associated works and infrastructure, engineering/earthworks including changes to site levels together with the erection of a single storey visitor centre including reception, café, education space, ranger offices and an outdoor terrace area; erection of outdoor classroom canopy; sky room; provision of colliery and mineral line multi user route, new paths including a multi user route north of the m62 bridge up to windy arbor road and provision of new car park. Vehicular access to be taken from cronton road via access road to neighbouring	Proposals include measures to ensure that the development does not give rise to unacceptable effects on flood risk and drainage.

Site Ref.	Application No.	Distance and Direction	Proposal	Justification
			employment site/country park car park with new footbridge over employment site/car park access road and pedestrian/cycle access from cronton road and fox's bank lane.	

List of Abbreviations

- British Geological Survey (BGS)
- Building Research Establishment (BRE)
- Construction Environmental Management Plan (CEMP)
- Construction Industry Research and Information Association (CIRIA)
- Critical Drainage Area (CDA)
- European Commission (EC)
- European Water Framework Directive (WFD)
- Flood Estimation Handbook (FEH)
- Knowsley Metropolitan Borough Council (KMBC)
- Incidence Response Plan (IRP)
- Internal Drainage Boards (IDB)
- Lead Local Flood Authorities (LLFA)
- Local Nature Reserves (LNR)
- Local Planning Authority (LPA)
- National Planning Policy Framework (NPPF)
- Nitrate Vulnerable Zone (NVZ)
- Planning Policy Guidance (PPG)
- Pollution Prevention Guidance (PPG)
- Preliminary Flood Risk Assessment (PFRA)
- Sites of Special Scientific Interest (SSSI)
- Special Protection Areas (SPA)
- Source Protection Zone (SPZ)
- Standard Average Annual Rainfall (SAAR)
- Strategic Flood Risk Assessment (SFRA)

8. Transport and Access

Introduction

- 8.1 This chapter assesses the effects of the proposed development on transport and access. In particular, it considers the anticipated effects of the proposed development and the resulting change in traffic conditions in the local area.
- 8.2 The chapter describes the methods used to assess the likely significant effects, the baseline conditions currently existing at the site and surroundings, the potential direct and indirect effects of the development arising from road traffic, the mitigation measures required to prevent, reduce, or offset the identified significant effects and the residual effects. It has been written by Mott MacDonald. As requested during scoping discussions with KMBC a cumulative assessment is provided.

Planning Policy Context

National Planning Policy

National Planning Policy Framework

- 8.3 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and details how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so. It provides a framework within which local people and their councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.
- 8.4 The NPPF sets out the following guidelines regarding transport:
- 8.5 *"Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:*
- *the potential impacts of development on transport networks can be addressed;*

- *opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;*
- *opportunities to promote walking, cycling and public transport use are identified and pursued;*
- *the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and*
- *patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places”.*

8.6 NPPF states that all developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed.

8.7 In assessing sites that may be allocated for development in plans, or specific applications for development, NPPF recommends it should be ensured that:

- *“appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;*
- *safe and suitable access to the site can be achieved for all users;*
- *the design of streets, parking areas, other transport elements and the content of associated standards reflects current national guidance, including the National Design Guide and the National Model Design Code 46; and*
- *any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree”.*

8.8 NPPF states that ‘Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.’

Local Planning Policy

Knowsley Local Plan Core Strategy

8.9 Knowsley Local plan sets out the vision, objectives and policies which will guide development within Knowsley up to the year 2028. Specifically in terms of transport, Objective 6 strives to ensure that:

“new development in Knowsley encourages a reduction in the overall need to travel, and prioritises sustainable transport such as walking, cycling and public transport.”

- 8.10 Policy CS7 concerns Transport Networks and outlines the overall transport strategy, with a focus upon supporting a sustainable transport system. It also describes how new development will be required to be located and designed to prioritise accessibility and sustainable modes of travel.

Replacement Unitary Development Plan

- 8.11 The Knowsley Replacement UDP was adopted in June 2006 but much of it has been replaced by the Local Plan Core Strategy. There are 3 UDP Policies that continue to be saved relevant to transport, these are:
- Policy T5 - Location of Major Traffic Generating New Developments: Provides guidance on the location of new developments at sustainable locations.
 - Policy T7 - New Development and Walking and Cycling Routes stipulates that new development should have good access to and contribute to the walking and cycling network.
 - Policy T8 - Transport Assessments: stipulates that these must be provided to support developments which generate significant volumes of traffic.

Halsnead Garden Village Masterplan SPD

- 8.12 This document was adopted by KMBC to guide the development of Halsnead Garden Village as a Sustainable Urban Extension (SUE) in accordance with Knowsley's Local Plan Policy. The site lies within the SPD area and Local Plan allocation. The document sets out the broad development parameters and movement framework within which new developments within the area must accord with.

Assessment Methodology and Significance Criteria

- 8.13 The assessment methodology is based upon the general approach detailed in the 'Guidelines for the Environmental Assessment of Road Traffic' (1993) – Institute of Environmental Assessment - now the Institute of Environmental Management and Assessment (IEMA).

- 8.14 The study area extent has been determined in scoping with KMBC and National Highways for Transport Assessment purposes and consists of Cronton Road from the proposed new eastern site access junction to the east and Tarbock Island (M62 Junction 6) to the west.
- 8.15 The IEMA guidelines provides useful screening 'rules' to determine the scale and extent of the environmental assessment of road traffic:
- Rule 1: Include highway links where traffic flows will increase by more than 30% - or the number of HGVs will increase by more than 30%.
 - Rule 2: Include any other specifically sensitive areas where traffic flows are expected to increase by 10% or more.
- 8.16 In accordance with the IEMA guidelines Mott MacDonald has undertaken a review of the level of traffic increase within the study area attributable to the proposed development, taking into account committed development agreed with KMBC in scoping.
- 8.17 The potential impact that may occur on account of changes in road traffic flows are described in the IEMA guidelines, they include: noise, vibration, visual impact, **severance, driver delay, pedestrian amenity, accidents and safety**, hazardous loads, air pollution, dust and dirt, ecological impact and heritage and conservation areas.
- 8.18 The environmental implications arising from noise, vibration, visual impact, air quality, ecology and heritage matters are dealt with in other chapters of this ES. The analysis presented in this section considers the implications of the factors highlighted in bold during the operational and construction phases of development. Hazardous loads, whilst listed within the IEMA Guidelines, have not been assessed as they will not be required during the construction or operational phase of the development.
- 8.19 Traffic data for the surrounding highway network has been obtained from traffic surveys undertaken in 2019 and have been agreed as appropriate for use by KMBC. Site visits have been undertaken to review existing transport conditions. Future year baseline traffic assessments for the opening year of 2024 and 2032 future year have been prepared using Temprow. Traffic from committed development sites as identified by KMBC has been accounted for by reviewing the Transport Assessments which accompanied those planning applications. Development traffic has been accounted for by using the TRICS database. These parameters have been agreed in scoping with KMBC. This process is discussed

in more detail in the Transport Assessment as included in **Appendix 8.1**. In this way the following scenarios are considered as part of this assessment:

- 2019 Baseline.
- 2022 Baseline (including background traffic growth and committed development traffic).
- 2022 Baseline + Development.
- 2032 Baseline (including background traffic growth and committed development traffic).
- 2032 Baseline + Development.

Cumulative schemes (committed development)

8.20 Through the scoping process the cumulative schemes to be included in this assessment are set out in Table 8.1 below.

Table 8.1: Cumulative Sites

Site Ref.	Application No.	Distance and Direction	Proposal	Scoped-in / Scoped-out	Justification
1.	18/00283/HYB	90m north	Hybrid application comprising full application for erection of 123 no. Dwellings, construction of vehicular/pedestrian accesses, laying out of public open space and associated works; outline application for erection of up to 237 no. Dwellings, car park and associated works (access into site to be considered - all other matters reserved for future approval).	In	Development traffic will route on Tarbock Island and potentially Cronton Road(Refer to Transport Assessment Section 5 in Appendix 8.1).
2.	20/00399/OUT	680m north	Outline application for proposed residential development of up to 277 no. Dwellings (use class c3) and an apartment development of up to 100 units for over 55's (use class c3) together with new vehicular access to lickers lane and windy Arbor road, landscaping and associated works (inc. Demolition of buildings) (approval sought for access - all other matters reserved)	In	Development traffic will route on Tarbock Island and potentially Cronton Road(Refer to Transport Assessment Section 5 in Appendix 8.1).
3.	20/00417/FUL	770m northeast	Residential development comprising of the erection of 350 no. Dwellings together with the construction of vehicular access off fox's bank lane (comprising signalised junction), suds ponds, landscaping, boundary treatments and other associated works (including demolition of existing farm buildings)	In	Development traffic will route on Tarbock Island and potentially Cronton Road(Refer to Transport Assessment Section 5 in Appendix 8.1).
4.	20/00329/FUL	340m north	Erection of a residential development of 43 no. Dwellings comprising 14 no. Apartments and 29 no. Houses together with access, car parking and associated development (demolition of existing barn)	In	Development traffic will route on Tarbock Island and potentially Cronton Road(Refer to Transport Assessment Section 5 in Appendix 8.1).

Site Ref.	Application No.	Distance and Direction	Proposal	Scoped-in / Scoped-out	Justification
5.	20/00494/HYB	Adjacent north and east	Hybrid planning application comprising: full application for the development of 161,900 sq. ft (15,041 sq. m) (gia) of storage and distribution floorspace (use class b8), including ancillary offices (use class b1), security gatehouse, site access road, engineering earthworks to form a part country park, public car park to serve country park, and associated works; and outline application with details of point of access (details of part-access, landscaping, appearance, scale and layout are reserved) for the development of up to 838,100 sq ft (77,862 sq m) (gia) of storage and distribution floorspace (use class b8), with ancillary offices and light industrial (use class b1); engineering earthworks to form country park and drainage attenuation ponds; pedestrian/cycle/equestrian route connecting existing m62 footbridge with proposed country park; and associated works	In	Development traffic will route on Tarbock Island and Cronton Road (Refer to Transport Assessment Section 5 in Appendix 8.1).
6.	15/00022/OUT	2.2km north	Outline application for mixed use development comprising up to 750no. Dwellings & up to 929 sq. m of commercial/industrial buildings (use classes b1/b2/b8) - all matters reserved for future approval	Out	Development traffic unlikely to route on Tarbock Island and Cronton Road (Refer to Transport Assessment Section 5 in Appendix 8.1). Traffic flow from this development is included in background Temprow growth.
7.	17/00301/HYB	360m west	Hybrid application comprising a full planning application for 1800 sq. gross external area food store (use class a1), 1161 sq. m gross external area b1/b2 use (business use / general industrial use) with associated car parking, landscaping, highway works, pumping station, substation and associated works including bund and noise attenuation boundary treatment to top of bund along western boundary of the site; and outline planning application for up to 7,500 sq. use class b1 and b2 floor space, petrol filling station (sui generis use) with up to 400 sq. m floor space associated use class a1 unit, up to 1000 sq. m	In	Development traffic will route on Tarbock Island and potentially Cronton Road(Refer to Transport Assessment Section 5 in Appendix 8.1).

Site Ref.	Application No.	Distance and Direction	Proposal	Scoped-in / Scoped-out	Justification
			use class a3 and a4 floor space (pub / restaurant), with associated car parking, servicing areas, highway works, and other associated works, with all matters reserved for future approval		
8.	16/00819/FUL	2km northwest	Erection of 62 no. Dwellings together with construction of new vehicular & pedestrian access, landscaping, public open space, drainage and associated works	Out	Development traffic unlikely to route on Tarbock Island and Cronton Road (Refer to Transport Assessment Section 5 in Appendix 8.1). Traffic flow from this development is included in background Temprow growth.
9.	18/00062/HYB	3.5km north	Detailed application for 4,180 sq. m of employment floor space (use class b1), 3,275 sq. m ancillary floor space (use classes a1/a4/c1/sui generis), 154 residential dwellings, improvements to lord derby playing fields/oak plantation and associated landscaping and infrastructure including a dedicated 500kva substation for the residential neighbourhood and a 1000kva substation for the eastern employment area and the demolition of Knowsley lane farm. outline application for up to 26,350 sq. m of employment floor space (use classes b1) and associated landscaping and infrastructure	Out	Development traffic unlikely to route on Tarbock Island and Cronton Road (Refer to Transport Assessment Section 5 in Appendix 8.1). Traffic flow from this development is included in background Temprow growth.
10.	19/00651/FUL	140m north	Construction of multi-use path and associated ground works including the facilitation of rising main associated with proposed residential development on adjoining land. disused railway line extending from m62 motorway extending north through Halsnead park and to rear of Cronton avenue, Whiston, Knowsley	In	No change to traffic flow expected from this development
11.	20/00578/FUL	Adjacent to north and east	Construction of a new country park comprising of the creation of sculptured landscape, habitat/wetland creation, associated works and infrastructure, engineering/earthworks including changes to site levels together with the erection of a single storey visitor centre including reception, café, education space, ranger offices and an outdoor terrace area;	In	Traffic flow from this development included as 20/00494/HYB

Site Ref.	Application No.	Distance and Direction	Proposal	Scoped-in / Scoped-out	Justification
			erection of outdoor classroom canopy; sky room; provision of colliery and mineral line multi user route, new paths including a multi user route north of the m62 bridge up to windy Arbor road and provision of new car park. Vehicular access to be taken from Cronton road via access road to neighbouring employment site/country park car park with new footbridge over employment site/car park access road and pedestrian/cycle access from Cronton road and fox's bank lane.		

Local Highway Network

- 8.21 Traffic data has been sourced from 2019 traffic surveys, approved for use by KMBC. The general operation of the highway network and existing infrastructure has been observed in site visits.

Highway Safety

- 8.22 Injury accident records for the study area has been provided by KMBC.

Walking Links

- 8.23 Walking connections have been appraised by reviewing online mapping and undertaking site visits. Mapping of walking distances to local amenities has been undertaken.

Cycle Links

- 8.24 Cycle connections have been appraised by reviewing online mapping and undertaking site visits. Mapping of cycling distances to local amenities has been undertaken.

Public Transport Links

- 8.25 Public transport accessibility has been reviewed by appraising bus and train frequency at local bus stops and train stations.

Significance Criteria

- 8.26 In this report, the significance of the environmental effect is derived from measures of the magnitude of the change and the sensitivity of the receptors affected. Categories of sensitivity and magnitude are defined and assessed to determine the significance of the effect.
- 8.27 Table 8.2 below provides the receptor sensitivity criteria to be used based on IEMA guidelines:

Table 8.2: Receptor Sensitivity

Receptor Sensitivity	Receptor Type
High	Receptors of greatest sensitivity to traffic changes: educational facilities, playgrounds, accident black spots, retirement homes, roads without footways that are used by pedestrians.
Medium	Congested junctions, doctors' surgeries, hospitals, shopping area with roadside frontage, roads with narrow footways, recreation facilities.
Low	Receptors with some sensitivity to traffic flow: places of worship, public open space, listed buildings, tourist attractions and residential areas with adequate footway provision.
Negligible	Those people and places located away from the affected highway link

- 8.28 In light of the receptor sensitivity criteria above, the following receptors are identified within the study area:

Table 8.3: Receptors and their sensitivity within the study area

Receptor	Comment	Sensitivity
Pedestrians and cyclists on Cronton Road	At present there are very few pedestrians and cyclists observed on Cronton Road. Pedestrians and cyclists will access the site using the proposed new combined footway / cycleway.	Low
Drivers and Passengers on Cronton Road and Tarbock Island	Cronton Road is uncongested. Tarbock Island experiences congestion during peak times of the day	Low
Public transport users on Cronton Road	Cronton Road is an existing bus route.	Low

- 8.29 Table 8.4 shows how the magnitude of impact will be established in this report based on IEMA guidelines and professional judgement.

Table 8.4: Impact Magnitude

	Impact Magnitude			
Impact	Negligible	Minor	Moderate	Major
Severance	Change in traffic or HGV flow of 30% or less	Change in traffic or HGV flow of 31% - 60%	Change in traffic or HGV flow of 61% - 90%	Change in traffic or HGV flow of 90% or more
Driver Delay	Change in Journey time of less than 30 seconds	Change in Journey time of 30 seconds to 1 minute	Change in journey time of 1 – 2 minutes	Change in journey time of more than 2 minutes
Pedestrian Amenity	Change in traffic or HGV flow of 30% or less	Change in traffic or HGV flow of 31% - 60%	Change in traffic or HGV flow of 61% - 90%	Change in traffic or HGV flow of 90% or more
Accidents & Safety	Change in traffic or HGV flow of 30% or less	Change in traffic or HGV flow of 31% - 60%	Change in traffic or HGV flow of 61% - 90%	Change in traffic or HGV flow of 90% or more

- 8.30 Where the development leads to an increase in traffic over the baseline the impact magnitude will be adverse. Where the change in traffic, as a result of the development is negative, the impact magnitude will be beneficial.
- 8.31 Table 8.5 shows how the significance of effects will be established in this report based on IEMA guidelines and professional judgement with reference to the receptor sensitivity and impact magnitude.

Table 8.5: Impact significance matrix

	Impact Magnitude			
Receptor Sensitivity	Negligible	Minor	Moderate	Major
Negligible	Negligible	Negligible	Negligible	Minor
Low	Negligible	Negligible	Minor	Moderate
Medium	Negligible	Minor	Moderate	Major
High	Minor	Moderate	Major	Major

- 8.32 Based on the IEMA guidelines, impacts with a minor or negligible significance, are not considered to be significant in terms of EIA guidance. Impacts of moderate and major significance are considered to be significant in terms of EIA guidance.
- 8.33 Impacts are also assessed in terms of whether they are short term / long term, permanent / temporary and beneficial / adverse.

Assumptions/Limitations

- 8.34 In undertaking the assessment of the application site and wider study area, there are several assumptions and limitations that have been made.
- 8.35 The assessment is limited to the accuracy of the forecast tools used for calculation of future background traffic flows and the estimation of trips that would be generated by the proposed development, including the mode of travel and their distribution onto the transport networks that provide access to the application site. Notwithstanding these limits, these tools are widely accepted industry standards and the methodology has been agreed with KMBC.
- 8.36 The assessment will rely on available data, and best endeavours have been made to ensure that the data are accurate and up to date. It is assumed that information supplied by third parties is accurate.

Consultation

- 8.37 The consultation process which has been followed in the pre-application stages is indicated below

Table 8.6: Consultation

Consultee	Date and Time	Comments	Actions
KMBC	12 th May 2022	Scoping meeting	General scoping discussion
KMBC	19 th May 2022	Scoping note issued	Scoping note issued to KMBC for agreement
KMBC	10 th June 2022	Scoping response received	Comments on proposed scope received
National Highways	19 th May 2022	Scoping Note issued	Scoping note issued to National Highways for agreement
National Highways	7 th June 2022	Scoping response received	Comments on proposed scope received

Consultee	Date and Time	Comments	Actions
KMBC	10 th June	Scoping response received	Comments on proposed scope received
KMBC & National Highways	17 th June	Trip Generation Note issued to KMBC and National Highways	Note sets out potential traffic change at Tarbock Island
KMBC & National Highways	7 th July	Meeting with KMBC & National Highways	Discussion on VISSIM Modelling
KMBC & National Highways	20 th July	VISSIM modelling scoping note issued to KMBC and National Highways	Note sets out the scope of VISSIM modelling to be undertaken
KMBC & National Highways	18 th August	Meeting with KMBC & National Highways	Meeting to commission VISSIM modelling

Baseline Conditions

- 8.38 This section describes the baseline conditions at the site and study area. These conditions are described in greater detail in Sections 3 & 4 in the Transport Assessment included as **Appendix 8.1**.

Local Highway Network

- 8.39 The highway network within the study area consists of A5080 Cronton Road and the nearby grade separated junction Tarbock Island (M62 Junction 6).
- 8.40 Cronton Road is a single carriageway road with a 60mph speed limit in the vicinity of the site. It is lit and is equipped with a footway on its northern side. It bounds the proposed development site to the south and leads to Tarbock Island some 300m to the west of the site and to the east connects towards the village of Cronton some 2km away.
- 8.41 KMBC has informed Mott MacDonald that it is proposed in the near future to change the speed limit on Cronton Road to 40mph in the vicinity of the site. Mott MacDonald understands that the Traffic Regulation Orders for this are currently being processed by KMBC.
- 8.42 Tarbock Island is a strategically important junction linking the M62 to the west towards Liverpool Docks and Liverpool City Centre, and the M62 to the east towards Warrington and Manchester. The A5300 connects southwards towards John Lennon Airport and Jaguar Land Rover Halewood. To the northwest the M57 facilitates access to the eastern suburbs of Liverpool and the M58.

- 8.43 In terms of junction layout the M62 runs in an east-west direction in an underpass. The M57 / A5300 Knowsley Expressway traverses the junction in a north-south direction on an overpass. Linking these two routes at an intermediate level is the roundabout junction. There are direct slip roads linking the M62 westbound with the M57 northbound and the M57 southbound with the M62 eastbound.
- 8.44 As well as these strategic connections Tarbock Island also provides more local connections. Cronton Road also forms a western arm to the junction connecting to Huyton. Windy Arbor Road forms an arm at the northeast of the junction. This road provides access towards Whiston. The junction is partially signalised with five of the seven entries under signal control, the unsignalized entries being the Windy Arbour Road and the Cronton Road eastern entry being unsignalized.
- 8.45 Traffic surveys undertaken in 2019 and used for the purpose of the Transport Assessment confirmed the following:
- On an average weekday Cronton Road is trafficked by around 8,850 vehicles per day.
 - Morning Peak flows occur on Cronton Road between 07:00 and 09:00 with flows of around 650 vehicles per hour.
 - Evening peak flows on Cronton Road take place between 16:00 – 18:00 with flows of around 750 vehicles per hour.
 - Tarbock Island accommodates around 6,000 vehicles per hour in the morning and evening peak hours.

Highway Safety

- 8.46 A detailed review of highway safety is provided in Section 4 of the Transport Assessment in **Appendix 8.1**. Over the last 5 year period:
- A total of 3 collisions have occurred in proximity to the site on Cronton Road. Two of the collisions on Cronton Road occurred at the junction with Dacres Bridge Lane, both of which were serious. The other collision on Cronton Road did not occur at a junction and was serious in severity.
 - At Tarbock Island a total of 32 accidents occurred in the same period. One of these was fatal, 2 were serious and 29 were slight in severity.

Walking and Cycling Links

- 8.47 Due to the location of the site being in a currently undeveloped area, walking and cycling destinations are somewhat remote despite the reasonable standard of existing footways and cycleways in the vicinity of the site.

- 8.48 Current provision for walking and cycling around the site comprises a footway along Cronton Road on the northern side of the carriageway and a shared use pedestrian/cycleway which runs to the north-east of the site and across the M62.
- 8.49 In recent years pedestrian crossing facilities have been installed on uncontrolled and signal-controlled arms of Tarbock Island. This has enhanced the connectivity of the site through the junction towards Huyton and Whiston.
- 8.50 The Huyton and Knowsley Mineral Greenway is located to the north of the site which currently runs from Whiston to Stadt Moers Park and forms part of the National Cycle Route 56 running from Chester to Wallasey. The site therefore benefits from close proximity to the national cycle network which can be better connected to the site once wider development proposals come forward.

Public Transport Links

- 8.51 A detailed review of public transport accessibility is provided in the Transport Assessment Section 3 which is included in **Appendix 8.1**.
- 8.52 There are a number of bus stops in proximity to the site to serve future employees which offer connectivity to Liverpool City Centre and surrounding areas. The closest bus stops to the development are located on Cronton Road around 7 minutes walking distance from the proposed entrance to the site. Bus stops are located on either side of Cronton Road to allow bus travel in both directions from the site. Additional public transport connectivity is provided along Windy Arbor Road which can be reached in around 10-15 minutes on foot.
- 8.53 Although the services on Cronton Road are currently infrequent, the development of the Halsnead Masterplan should see enhancements to bus routing and frequency as the population of the area will be increasing making bus a more viable mode of transport for future employees of the site.
- 8.54 The site is located around a 30-minute walk (1.5 miles) away from the nearest rail station at Whiston. Prescott, and Huyton train stations are also located within approximately 4km of the site. However, these stations are considered to be too remote for passengers to walk to the site, though cycling to the station may be attractive to some.

Embedded Mitigation

The Completed and Operational Development

- 8.55 As part of development two new bus stops will be provided outside the development site to encourage public transport use for future staff and visitors. Furthermore the design incorporates a new shared use pedestrian and cycle path along its northern frontage. This facility will connect to existing cycle and pedestrian provision at Tarbock Island. The two new signalised junctions will be equipped with pedestrian crossing facilities.
- 8.56 It is expected that these embedded mitigation measures will encourage public transport and active travel to the site and potentially reduce car travel.
- 8.57 A wide range of transport infrastructure improvements are committed by KMBC to be implemented in the coming months as part of the Halsnead Garden Village Masterplan. This includes capacity improvements at Tarbock Island and the nearby Cronton Road / Prescott Road / Fox's Bank Lane junction improvements which were completed last year.
- 8.58 The speed limit on Cronton Road itself will soon be reduced to 40mph from the current 60mph limit. This should be to the benefit of road safety in the local area. KMBC has informed Mott MacDonald that the TROs for this speed reduction are currently being processed.

Assessment of Likely Significant Effects

- 8.59 The change in traffic flow on account of development is critical to the assessment of development impact. Table 8.6 below shows the future year traffic flows and analyses the change in traffic that will come about on account of development.
- 8.60 It is not expected that construction traffic flow will exceed that of the operational traffic in terms of AADT, accordingly this assessment concentrates on the operational traffic expected to be generated. A Construction Environmental Management Plan (CEMP) will be implemented over the duration of the construction works. This will address the specific mitigation measures that will be implemented by the eventual contractor(s) to mitigate effects of construction traffic.

8.61 Table 8.7 below sets out the 2024 base and base plus development traffic flows including cumulative traffic. Table 8.8 compares the 2032 base and base plus development traffic flows including cumulative traffic.

Table 8.7: 2024 Traffic Flows: Annual Average Daily Traffic

Link	2024 Base			2024 Base + Development			Difference	
	All Veh	HGV	HGV%	All Veh	HGV	HGV%	Diff All Veh%	Diff HGV%
Cronton Road (East of site)	12722	1157	9%	12860	1157	9%	1%	0%
Cronton Road (West of site)	12722	1157	9%	13832	1680	12%	9%	45%
A5300 SB On-Slip	12402	1103	9%	12483	1156	9%	1%	5%
A5300 Knowsley Expressway	60552	6303	10%	60715	6403	11%	0%	2%
A5300 NB Off-Slip	15409	640	4%	15491	686	4%	1%	7%
M62 WB On-Slip	18356	796	4%	18447	823	4%	0%	3%
M62 W	81761	3380	4%	81955	3432	4%	0%	2%
M62 EB Off-Slip	12592	309	2%	12695	334	3%	1%	8%
Cronton Road (East of Whitefield Lane)	18730	359	2%	18794	359	2%	0%	0%
M57 NB On-Slip	14188	632	4%	14370	732	5%	1%	16%
M57	78699	11051	14%	79072	11239	14%	0%	2%
M57 SB Off-Slip	11829	646	5%	12021	734	6%	2%	14%
Windy Arbor Road	16242	265	2%	16316	265	2%	0%	0%
M62 EB On-Slip	13535	1330	10%	13658	1427	10%	1%	7%
M62 E	107484	11007	10%	107724	11190	10%	0%	2%
M62 WB Off-Slip	12086	1176	10%	12203	1262	10%	1%	7%

Table 8.8: 2032 Traffic Flows: Annual Average Daily Traffic

Link	2032 Base			2032 Base + Development			Difference	
	All Veh	HGV	HGV%	All Veh	HGV	HGV%	Diff All Veh%	Diff HGV%
Cronton Road (East of site)	13422	1164	9%	13561	1164	9%	1%	0%
Cronton Road (West of site)	13422	1164	9%	14532	1686	12%	8%	45%
A5300 SB On-Slip	13379	1164	9%	13460	1217	9%	1%	5%
A5300 Knowsley Expressway	64692	6690	10%	64855	6789	10%	0%	1%
A5300 NB Off-Slip	16443	669	4%	16525	716	4%	0%	7%
M62 WB On-Slip	19904	840	4%	19995	868	4%	0%	3%
M62 W	87488	3589	4%	87682	3641	4%	0%	1%
M62 EB Off-Slip	13466	325	2%	13569	350	3%	1%	8%
Cronton Road (East of Whitefield Lane)	20094	382	2%	20158	382	2%	0%	0%
M57 NB On-Slip	15127	668	4%	15310	768	5%	1%	15%
M57	83857	11759	14%	84230	11948	14%	0%	2%
M57 SB Off-Slip	12622	683	5%	12813	771	6%	2%	13%
Windy Arbor Road	18471	282	2%	18545	282	2%	0%	0%
M62 EB On-Slip	14620	1404	10%	14743	1502	10%	1%	7%
M62 E	114644	11699	10%	114885	11882	10%	0%	2%
M62 WB Off-Slip	12866	1253	10%	12983	1339	10%	1%	7%

8.62 Based on the predicted change in traffic flow only one road link is predicted to experience an increase in traffic flow or HGV flow of 30% or more. Therefore based on the IEMA guidelines the assessment of environmental impact should concentrate on the following links:

- Cronton Road West of the site access: experiences an increase in HGV traffic of 45% in the 2024 and 2032 assessment years.

- 8.63 It should be noted that whilst the HGV traffic will increase by 45% in 2024 and 2032 on Cronton Road on account of development, the actual increase in traffic volume is modest – being only 9% in 2024 and 8% in 2032.

Severance Effects

- 8.64 The increase in HGV flow of 45% on Cronton Road on account of development results in a minor adverse impact magnitude. The significance of effect on pedestrians and cyclists on Cronton Road west of the development site is negligible adverse. This is a long term, permanent effect at a local level. This impact is not significant in terms of EIA guidance.

Driver Delay Effects

- 8.65 A scheme of highway works are committed by Knowsley Council to improve the capacity of Tarbock Island to mitigate the impact of developments at Halsnead Garden Village including the Mercury 62 Site. It is envisaged the works will commence in 2022. During the design process for the highway works traffic modelling was undertaken by Knowsley Council to assess impact of Halsnead and the Cronton site was included in this modelling. It is considered therefore that any traffic impact at Tarbock resulting from development will be minimal. The increase in HGV flow of 45% on Cronton Road on account of development results in a minor adverse impact magnitude. The significance of effect on driver delay on Cronton Road west of the development site is negligible adverse. This is a long term, permanent effect at a local level. This impact is not significant in terms of EIA guidance.

Pedestrian Amenity Effects

- 8.66 The increase in HGV flow of 45% on Cronton road on account of development results in a minor adverse impact magnitude. This means that the significance of effect on pedestrian amenity on Cronton Road west of the development site is negligible adverse. This is a long term, permanent effect at a local level. This impact is not significant in terms of EIA guidance.

Accidents and Safety Effects

- 8.67 The accident record on Cronton Road in the vicinity of the site is 3 injury accidents in the last 3 year period. The predicted increase in HGV flow of 32% on account of development on Cronton Road will result in a minor adverse impact magnitude. This means that the significance of effect on accidents and safety on Cronton Road west of the development site is negligible adverse. This is a long term, permanent effect at a local level. This impact is not significant in terms of EIA guidance.

Additional Mitigation / Enhancement Measures

- 8.68 A Construction Management Plan will be implemented for the duration of the construction works. This will include mitigation measures to reduce wherever practical the potential environmental impacts of construction.
- 8.69 A Travel Plan will be in operation at the site when operational. Although no significant traffic impacts have been identified this will help reduce further the traffic generation of the site.

Residual Effects

- 8.70 Taking into account the mitigation measures the residual effects of the development are summarised in Table 8.9.

Table 8.9: Residual Effects Summary

Description of Effect	Embedded Mitigation	Potential Effect (inc. Significance)	Further Mitigation	Residual Effect (inc. Significance)
Construction				
General impact of Construction Traffic	-	Negligible adverse in the long term at a local level. Not significant.	Construction Management Plan	Negligible adverse in the long term at a local level.
Operation				
Severance	Active travel improvements, new bus stops, Halsnead Garden Village masterplan improvements.	Negligible adverse in the long term at a local level. Not significant.	Travel Plan	Negligible adverse in the long term at a local level. Not significant.
Driver Delay	Active travel improvements, new bus stops, Halsnead Garden Village masterplan improvements.	Negligible adverse in the long term at a local level. Not significant.	Travel Plan	Negligible adverse in the long term at a local level. Not significant.
Pedestrian Amenity	Active travel improvements, new bus stops, Halsnead Garden Village masterplan improvements.	Negligible adverse in the long term at a local level. Not significant.	Travel Plan	Negligible adverse in the long term at a local level. Not significant.
Accidents & Safety	Active travel improvements, new bus stops, Halsnead	Negligible adverse in the long term at a	Travel Plan	Negligible adverse in the long term at a local level. Not significant.

Description of Effect	Embedded Mitigation	Potential Effect (inc. Significance)	Further Mitigation	Residual Effect (inc. Significance)
	Garden Village masterplan improvements.	local level. Not significant.		

- 8.71 Based on the assessment criteria none of the effects identified are significant in terms of EIA guidance.

Conclusions

- 8.72 This chapter of the ES builds upon assessment work undertaken for the Transport Assessment and Framework Travel Plan in **Appendix 8.1 and 8.2** respectively. Changes in traffic flow as a result of development have been assessed and assigned to the network. Committed developments in the local area have been agreed with KMBC and are included in the cumulative assessment.
- 8.73 The general approach to the assessment is informed by the Guidelines for the Environmental Assessment of Road Traffic' (1993 - Institute of Environmental Assessment (IEA, now the Institute of Environmental Management and Assessment (IEMA).
- 8.74 Based on these guidelines the impact of the development has been assessed in terms of severance, driver delay, pedestrian amenity and accidents & safety.
- 8.75 The assessment demonstrates that the development will not result in a significant environmental impact on any of the environmental criteria assessed.

9. Air Quality

Introduction

- 9.1 This chapter assesses the likely significant effects of the proposed development on local air quality. In particular it considers the potential effects of construction phase dust and operational phase road traffic emissions on air quality at identified existing receptor locations.
- 9.2 The chapter describes the methods used to assess the likely significant effects, the baseline conditions currently existing at the Site and surroundings, the potential direct and indirect effects of the proposed development arising from fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the Site during operation, the mitigation measures required to prevent, reduce, or offset the identified significant effects and the residual effects. It has been written by Redmore Environmental Ltd.
- 9.3 This Chapter is supported by the following figures and appendices:
- **Figure 9.1:** Monitoring Locations
 - **Figure 9.2:** Wind Rose of Liverpool Airport Meteorological Data
 - **Figure 9.3:** Road Vehicle Exhaust Emissions Sensitive Receptor Locations
 - **Figure 9.4:** Predicted Annual Mean Nitrogen dioxide (NO₂) Concentrations (µg/m³) Do-Minimum
 - **Figure 9.5:** Predicted Annual Mean NO₂ Concentrations (µg/m³) Do-Something
 - **Figure 9.6:** Predicted Annual Mean Particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀) Concentrations (µg/m³) Do-Minimum
 - **Figure 9.7:** Predicted Annual Mean PM₁₀ Concentrations (µg/m³) Do-Something
 - **Figure 9.8:** Predicted Annual Mean Particulate matter with an aerodynamic diameter of less than 2.5µm (PM_{2.5}) Concentrations (µg/m³) Do-Minimum
 - **Figure 9.9:** Predicted Annual Mean PM_{2.5} Concentrations (µg/m³) Do-Something
 - **Figure 9.10:** ADMS-Roads Inputs

 - **Appendix 9.1:** Assessment Input Data
 - **Appendix 9.2:** Figures
 - **Appendix 9.3:** Abbreviations and Glossary

Planning Policy Context

Legislation

- 9.4 The Air Quality Standards Regulations¹ and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:
- NO₂;
 - Sulphur dioxide;
 - Lead;
 - PM₁₀;
 - PM_{2.5};
 - Benzene; and,
 - Carbon monoxide.
- 9.5 Air Quality Target Values have also been provided for several additional pollutants. It should be noted that the AQLV for PM_{2.5} stated in the Air Quality Standards Regulations² was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations³.
- 9.6 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007⁴. The document contains standards, objectives and measures for improving ambient air quality, including a number of Air Quality Objectives (AQOs). These are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.
- 9.7 Table 9.1 presents the AQOs and AQLV for pollutants considered within this assessment.

Table 9.1: Air Quality Objectives/Air Quality Limit Value

Pollutant	Air Quality Objectives/Air Quality Limit Value	
	Concentration (µg/m ³)	Averaging Period
NO ₂	40	Annual mean

¹ UK Government, 2010. The Air Quality Standards Regulations 2010.

² UK Government, 2010. The Air Quality Standards Regulations 2010.

³ UK Government, 2020. The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020.

⁴ DEFRA, 2007. Air Quality Strategy for England, Scotland, Wales and Northern Ireland.

Pollutant	Air Quality Objectives/Air Quality Limit Value	
	Concentration ($\mu\text{g}/\text{m}^3$)	Averaging Period
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM ₁₀	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
PM _{2.5}	20	Annual mean

9.8 The Environment Act⁵ was published 9th November 2021 and makes provision for the setting of lower PM_{2.5} targets. The final criteria will be included in legislation to be put before parliament by 31st October 2022. Prior to this time the AQLV outlined in Table 9.1 remains the adopted air quality standard within the UK.

9.9 Table 9.2 summarises the advice provided in DEFRA guidance⁶ on where the AQOs for pollutants considered within this report apply.

Table 9.2: Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets)	Kerbside sites where the public would not be expected to have regular access

⁵ UK Government, 2021. The Environment Act.

⁶ DEFRA, 2022. Local Air Quality Management (TG22).

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
	Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	

Local Air Quality Management

- 9.10 Local Authorities (LA) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 9.2, are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

Dust

- 9.11 The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016)⁷ and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990)⁸. The Act defines nuisance as:

"Any dust, stream, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."

- 9.12 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990)⁹. The only defence is to show that the process

⁷ UK Government, 2016. Environmental Permitting (England and Wales) Regulations (2016).

⁸ UK Government, 1990. Environmental Protection Act (1990).

⁹ UK Government, 1990. Environmental Protection Act (1990).

to which the nuisance has been attributed and its operation are being controlled according to best practicable means.

National Planning Policy

National Planning Policy Framework

9.13 The revised National Planning Policy Framework¹⁰ (NPPF) was published in July 2021 and sets out the Government's planning policies for England and how these are expected to be applied.

9.14 The purpose of the planning system is to contribute to the achievement of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives, including the following of relevance to air quality:

"c) An environmental objective - 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."

9.15 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

[...]

e) 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 [...]"

9.16 The NPPF specifically recognises air quality as part of delivering sustainable development and 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

¹⁰ Ministry of Housing, Communities & Local Government (2021). NPPF.

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."

9.17 The implications of the NPPF have been considered throughout this assessment.

National Planning Practice Guidance

9.18 The National Planning Practice Guidance¹¹ (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 and updated on 1st November 2019 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

9.19 These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

Local Planning Policy

Local Plan

9.20 Review of the Knowsley Local Plan Core Strategy¹² indicated the following policy of relevance to air quality:

"Policy CS2

Development Principles

¹¹ Ministry of Housing, Communities & Local Government, UK Government (2019). NPPG.

¹² Knowsley Borough Council (KBC), 2013. Knowsley Local Plan, Core Strategy.

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

[...]

Principle 4: Recognise environmental limits, protect and enhance environmental assets, enhance local character and promote quality of place by:

[...]

e) Mitigating potential negative impacts of traffic growth and road traffic on highway safety, air quality, noise and health.

[...]

j) Minimising negative impact upon flood risk, air quality, water quality, land quality, soil quality, and noise or vibration levels and ensuring any negative impacts are appropriately mitigated.

Development that will have an unacceptable impact upon any of the above will only be permitted where the benefits of the proposal clearly outweigh the harm.

[...]"

9.21 The Knowsley Replacement Unitary Development Plan¹³ (UDP) was adopted in June 2006. Under the transitional arrangement for moving to the Local Plan system, 39 UDP policies have been saved, these include the following in relation to air quality:

'Policy Env1: Control of Pollution in New Development

Development will not be permitted which is likely to cause significant harm to amenity as a result of impact on any of the following:

Air quality; [...]'

9.22 The above policies have been taken into consideration throughout the undertaking of the Chapter.

¹³ KBC, 2006. Knowsley Replacement Unitary Development Plan.

Site Specific Policies

- 9.23 The Halsnead Garden Village Masterplan Supplementary Planning Document¹⁴ (SPD) provides the following in respect to air quality:

*"Air Quality**

There are no Air Quality Management Areas identified within the vicinity of the site. Nevertheless, proximity of the land to the M62 and M57 are an indication that concentrations of nitrogen dioxide (NO₂) and fine particulate matter (such as PM₁₀ and PM_{2.5}) are potentially key pollutants;

Based on the monitoring data available it is likely that annual mean NO₂ concentrations at the site have the potential to be close to or above the annual mean objectives at locations close to the M62 and M57. [...]

Due to the size of the site, there is potential for elevated PM₁₀ and dust emissions during the construction phase. This will need to be managed through a Construction Environmental Management Plan."

- 9.24 The above was considered as necessary during the undertaking of this Chapter.

Other Relevant Policy, Standards and Guidance

- 9.25 The following air quality related guidance was utilised through the assessment:

- Guidance on the Assessment of Dust from Demolition and Construction Version 1.1, Institute of Air Quality Management (IAQM)¹⁵;
- Guidance of Land-Use Planning & Development Control: Planning for Air Quality, IAQM¹⁶;
- Local Air Quality Management Technical Guidance (TG22), DEFRA¹⁷;
- Design Manual for Roads and Bridges (DMRB) LA105: Air Quality, Highways England¹⁸;
- Mitigation of Development Air Quality Impacts V1.1, IAQM¹⁹; and,
- Town and Country Planning (Environmental Impact Assessment) EIA Regulations, UK Government²⁰.

¹⁴ KBC, 2017. Halsnead Garden Village Masterplan SPD.

¹⁵ IAQM, 2016. Guidance on the Assessment of Dust from Demolition and Construction.

¹⁶ IAQM, 2017. Land-Use Planning & Development Control: Planning for Air Quality.

¹⁷ DEFRA, 2022. Local Air Quality Management (TG22).

¹⁸ Highways Agency, 2019. Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, LA 105.

¹⁹ IAQM, 2018. Mitigation of Development Air Quality Impacts V1.1.

²⁰ UK Government, 2017. Town and Country Planning (EIA) Regulations.

Assessment Methodology and Significance Criteria

- 9.26 The proposed development has the potential to cause impacts during the construction and operational phases. These have been assessed in accordance with the following methodology.

Construction Phase

- 9.27 There is the potential for fugitive dust emissions to occur as a result of the construction phase activities. These have been assessed in accordance with the methodology outlined within the IAQM document 'Guidance on the Assessment of Dust from Demolition and Construction V1.1'²¹.
- 9.28 Activities on the Site during the construction period have been divided into three types to reflect their different potential impacts. These are:
- Earthworks;
 - Construction; and,
 - Trackout.
- 9.29 The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects.
- Annoyance due to dust soiling;
 - Harm to ecological receptors; and
 - The risk of health effects due to a significant increase in exposure to PM₁₀.
- 9.30 The first stage screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the boundary or 50m from the construction vehicle route up to 500m from the Site entrance, then the assessment proceeds to the next stage. Additionally, should ecological receptors be identified within 50m of the Site, or the construction vehicle route up to 500m from the Site entrance, then the assessment also proceeds to the next stage.
- 9.31 The second stage of the assessment screens the risk of potential dust impacts. It should be noted that the standard IAQM terminology of risk has been replaced with significance criteria to allow continuity throughout the Environmental Statement (ES) and comparison of various effects.
- 9.32 A site is initially allocated an effect significance (risk) category based on the following two factors:

²¹ IAQM, 2016. Guidance on the Assessment of Dust from Demolition and Construction.

- The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity; and,
- The scale and nature of the works, which determines the magnitude of dust arising as small, medium or large.

9.33 The two factors are combined in order to determine the potential effect significance without the mitigation applied.

9.34 The influencing factors that define the sensitivity of the area around a development to potential impacts as shown in Table 9.3.

Table 9.3: Construction Dust - Examples of Factors Defining Sensitivity of an Area

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	Users expect high levels of amenity High aesthetic or value property People expected to be present continuously for extended periods of time Locations where members of the public are exposed over a time period relevant to the AQO for PM ₁₀ . e.g. residential properties, hospitals, schools and residential care homes	Internationally or nationally designated site e.g. Special Area of Conservation
Medium	Users would expect to enjoy a reasonable level of amenity Aesthetics or value of their property could be diminished by soiling People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work	Nationally designated site e.g. Sites of Special Scientific Interest
Low	Enjoyment of amenity would not reasonably be expected Property would not be expected to be diminished in appearance Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields,	Locally designated site e.g. Local Nature Reserve

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
	shopping streets, farmland, short term car parks and roads	

9.35 The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the areal and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;
- During of the potential impact, as a receptor may become more sensitive over time; and,
- Any know specific receptor sensitivities which go beyond the classifications given in the document.

9.36 These factors were considered in the undertaking of this assessment.

9.37 The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 9.4.

Table 9.4: Construction Dust - Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 350
High	More than 100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

9.38 Table 9.5 outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 9.5: Construction Dust - Sensitivity of the Area the Human Health Impacts

Receptor Sensitivity	Background Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)			
			Less than 20	Less than 50	Less than 100	Less than 350
High	Greater than 32µg/m ³	More than 100	High	High	High	Medium
		10 - 100	High	High	Medium	Low
		1 - 10	High	Medium	Low	Low
	28 - 32µg/m ³	More than 100	High	High	Medium	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low
	24 - 28µg/m ³	More than 100	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	Less than 24µg/m ³	More than 100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Medium	Greater than 32µg/m ³	More than 10	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	28 - 32µg/m ³	More than 10	Medium	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	24 - 28µg/m ³	More than 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	Less than 24µg/m ³	More than 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	-	More than 1	Low	Low	Low	Low

9.39 Table 9.6 outlines the criteria for determining the sensitivity of an area to ecological impacts.

Table 9.6: Construction Dust - Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	Less than 20	Less than 50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

- 9.40 The scale and nature of the constructions works determine the magnitude of dust impacts arising from each activity. The relevant criteria are summarised in Table 9.7.

Table 9.7: Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Earthworks	Total site area greater than 10,000m ² Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) More than 10 heavy earth moving vehicles active at any one time Formation of bunds greater than 8m in height More than 100,000 tonnes of material moved
	Construction	Total building volume greater than 100,000m ³ On-site concrete batching Sandblasting
	Trackout	More than 50 Heavy Duty Vehicle (HDV) trips per day Potentially dusty surface material (e.g. high clay content) Unpaved road length greater than 100m
Medium	Earthworks	Total site area 2,500m ² to 10,000m ² Moderately dusty soil type (e.g. silt) 5 to 10 heavy earth moving vehicles active at any one time Formation of bunds 4m to 8m in height Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	Total building volume 25,000m ³ to 100,000m ³ Potentially dusty construction material (e.g. concrete) On site concrete batching
	Trackout	10 to 50 HDV trips per day Moderately dusty surface material (e.g. high clay content) Unpaved road length 50m to 100m
Low	Earthworks	Total site area less than 2,500m ² Soil type with large grain size (e.g. sand) Less than 5 heavy earth moving vehicles active at any one time Formation of bunds less than 4m in height Total material moved less than 20,000 tonnes Earthworks during wetter months
	Construction	Total building volume less than 25,000m ³ Construction material with low potential for dust release (e.g. metal cladding or timber)

Magnitude	Activity	Criteria
	Trackout	Less than 10 HDV trips per day Surface material with low potential for dust release Unpaved road length less than 50m

- 9.41 The dust emission magnitude and the sensitivity of the area were combined to determine the significance of unmitigated impacts. This process is described in the Significance Criteria section below.

The Completed and Operational Development Phase

- 9.42 There is the potential for road traffic exhaust emissions associated with vehicles travelling to and from the Site during the operational phase to impact on exiting air quality at sensitive receptor locations. Potential impacts were defined by predicting NO₂, PM₁₀ and PM_{2.5} concentrations at sensitive locations using dispersion modelling for the following scenarios:
- 2019 - Verification;
 - Opening year Do-Minimum (DM) (predicted traffic flows in 2024 should the proposed development not proceed); and,
 - Opening year Do-Something (DS) (predicted traffic flows in 2024 should the Proposed Development be completed).
- 9.43 The DM scenario (i.e. without the proposed development) included baseline traffic data, inclusive of anticipated growth and committed developments for the relevant assessment year. The DS scenario (i.e. with the proposed development) included baseline traffic data, inclusive of anticipated growth and committed developments for the relevant assessment year, in addition to predicted traffic associated with the operation of the proposed development.
- 9.44 For the purpose of the assessment, traffic data for 2024 was utilised as the proposed development opening year. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emission factors for 2019 were utilised within the dispersion model. The use of 2024 traffic data and 2019 emission factors is considered to provide a worst-case scenario and therefore the predicted pollution concentrations are likely to overestimate actual levels during the operation of the proposed development.
- 9.45 Reference should be made to **Appendix 9.1** for assessment input data and details of the verification process.

- 9.46 Locations sensitive to potential changes in off-site pollutant concentrations were identified within 200m of the highway network in accordance with the guidance provided within the DMRB²² on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance²³ on where the AQOs apply, as summarised in Table 9.2, was utilised to determine worst-case receptor positions in the vicinity of links likely to be affected by changes in traffic flows as a result of the proposed development.
- 9.47 The sensitivity of receptors to potential changes in pollutant concentrations as a result of road vehicle exhaust emissions is outlined in Table 9.8. It should be noted that these are based on the values provided within the IAQM guidance²⁴ with additional descriptors in ensure consistency throughout the ES.

Table 9.8: Operational Phase - Receptor Sensitivity

Receptor Sensitivity	Pollutant Concentration at Receptor in Assessment Year
Very High	110% or more of AQO or AQLV
High	103 - 109% of AQO or AQLV
Medium	95 - 102% of AQO or AQLV
Low	76 - 94% of AQO or AQLV
Very Low	75% or less of AQO or AQLV

- 9.48 The magnitude of predicted air quality impacts was calculated based on the predicted concentration change between DM and DS scenarios as a proportion of the AQO or AQLV. This is outlined in Table 9.9.

Table 9.9: Operational Phase - Magnitude of Impact

Predicted Concentration Change as a Proportion of AQO (%)	Magnitude of Impact
0	Negligible
1	Very Minor
2 - 5	Minor
6 - 10	Moderate
More than 10	Major

- 9.49 It should be noted that the categories in Table 9.9 are intended to be used by rounding the change in percentage pollutant concentration to whole numbers.

²² Highways Agency, 2019. Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, LA 105.

²³ DEFRA, 2022. Local Air Quality Management (TG22).

²⁴ IAQM, 2017. Land-Use Planning & Development Control: Planning for Air Quality.

- 9.50 The magnitude of impact and receptor sensitivity were combined to determine the significance of unmitigated impacts. This process is described in the Significance Criteria section below.

Significance Criteria

- 9.51 The significance of potential effects was determined by integrating the assessments of sensitivity and impact magnitude in a reasoned way. This is described separately for the construction and operational phase impacts in the following sections.

Construction Phase

- 9.52 The dust emission magnitude and the sensitivity of the area were combined to determine the significance of the unmitigated impacts. Table 9.10 outlines the dust risk category from earthworks and construction activities.

Table 9.10: Construction Dust - Dust Risk Category from Earthworks and Construction Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Medium
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

- 9.53 Table 9.11 outlines the risk category from trackout activities.

Table 9.11: Construction Dust - Dust Risk Category from Trackout Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

- 9.54 It should be noted that predicted air quality impacts from construction phase activities are considered to be adverse but temporary in nature.
- 9.55 Site specific mitigation measures were identified from the IAQM guidance²⁵ to reduce potential dust impacts based upon the predicted effect significance. For sites with negligible effects, mitigation measures beyond

²⁵ IAQM, 2016. Guidance on the Assessment of Dust from Demolition and Construction.

those required by legislation are not required. However, additional controls may be applied as part of good practice.

- 9.56 The significance of residential impacts was determined based on professional judgement. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible, hence the residual effect will normally be negligible. This is regarded as not significant with respect to the EIA Regulations²⁶.

The Completed and Operational Development Phase

- 9.57 For operational phase road vehicle exhaust emission impacts, the interaction between the magnitude of impact and sensitivity of the receptor was utilised to define the significance of the effect, as outlined in Table 9.12.

Table 9.12: Operational Phase Road Vehicle Exhaust Emissions - Effect Significance

Receptor Sensitivity	Magnitude of Impact			
	Very High	High	Medium	Low
Major	Major	Major	Major	Moderate
Moderate	Major	Major	Moderate	Moderate
Minor	Major	Moderate	Moderate	Minor
Very Minor	Moderate	Moderate	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

- 9.58 It should be noted that predicted air quality impacts from operational phase activities are considered to be adverse and permanent in nature.
- 9.59 Following the prediction of impacts at discrete receptor locations, the IAQM document²⁷ provides guidance on determining the overall air quality impact significance of the operation of a development. The following factors are identified for consideration by the assessor:
- The existing and future air quality in the absence of the proposed development;
 - The extent of current and future population exposure to the impacts; and,
 - The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

²⁶ UK Government, 2017. Town and Country Planning (EIA) Regulations.

²⁷ IAQM, 2017. Land-Use Planning & Development Control: Planning for Air Quality.

- 9.60 The IAQM guidance²⁸ states that an assessment must reach a conclusion on the likely significance of the predicted impact. Where the overall effect is moderate or substantial, the effect is likely to be considered significant in regards the EIA Regulations²⁹, whilst if the impact is slight or negligible, the impact is likely to be considered not significant in regards to the EIA Regulations³⁰.

Assumptions and Limitations

- 9.61 A number of air quality factors are likely to change in future years and therefore act as potential limitations to the assessment, these include:
- Background pollutant concentrations are predicted to decrease in future years as a result of Government policies and legislation to reduce pollutant emissions. However, there is current uncertainty over the level of likely decrease. As such, a worst-case assumption that air quality conditions do not improve in the future was adopted to ensure robust results; and,
 - Road traffic exhaust emissions are predicted to decrease in future years with changes to the UK's vehicle fleet in line with Government legislation. However, similarly to background concentrations, there is current uncertainty over the level of likely decrease. As such, a worst-case assumption that emission factors do not reduce in the future was adopted to ensure robust results.
- 9.62 A number of assumptions have been made in the undertaking of the assessment. These include the following:
- The meteorological data used for the assessment is representative of the conditions at the Site. Site specific meteorological data was obtained for use in the model, as outlined in **Appendix 9.1**. This ensured a more accurate representation of meteorology at the Site.
 - The background concentrations used for the assessment are representative of baseline annual mean pollutant concentrations at the Site. These values were obtained from the DEFRA background mapping study, an industry standard database produced on behalf of the UK Government. This ensured the most accurate representation of background pollutant concentrations at the Site;
 - The traffic data obtained for the purpose of the assessment is accurate. Information was provided by the Transport Consultants for the project. This ensured a more accurate representation of vehicle flows in the local are; and,
 - The monitoring data used in the assessment was accurate. Relevant pollutant concentrations were obtained from KBC for 2019 in order to provide an accurate representation of conditions.

²⁸ IAQM, 2017. Land-Use Planning & Development Control: Planning for Air Quality.

²⁹ UK Government, 2017. Town and Country Planning (EIA) Regulations.

³⁰ UK Government, 2017. Town and Country Planning (EIA) Regulations.

- 9.63 The above assumptions are similar to those required for any project of this nature and the adoption of worst-case parameters, where necessary, has ensured the assessment results can be considered sufficiently robust.

Consultation

- 9.64 A formal scoping opinion was not prepared due to time constraints associated with the project. However, consultation was undertaken with Helen Bradshawe, Environmental Protection Officer at KBC, in order to agree the specific assessment methodology. This is summarised in Table 9.13.

Table 9.13: Summary of Consultation Responses

Consultee	Date	Comments	Actions
Helen Bradshawe, Environmental Protection Office at KBC	31 st May 2022	The proposed methodology for the Air Quality Assessment is acceptable	Undertook assessment in accordance with agreed methodology

Baseline Conditions

- 9.65 Existing air quality conditions in the vicinity of the Site were identified in order to provide a baseline for the assessment. These are detailed in the following sections.

Local Air Quality Management

- 9.66 As required by the Environment Act³¹, KBC has undertaken a Review and Assessment of air quality within their area of jurisdiction. This process has indicated that concentrations of all pollutants considered within the AQS are currently below the relevant AQOs. As such, no AQMAs have been designated within the borough.

Background Concentrations

- 9.67 Predictions of background concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire UK to assist Las in their Review and Assessment of air quality. The proposed development is located in grid square National Grid Reference (NGR): 346500, 389500. Data for this located was downloaded from the DEFRA website³² for the purpose of the assessment and is summarised in Table 9.14.

³¹ UK Government, 2021. The Environment Act.

³² <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>

Table 9.14: Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration ($\mu\text{g}/\text{m}^3$)		
	2019	2022	2024
NO ₂	23.73	20.35	18.48
PM ₁₀	14.89	14.41	14.19
PM _{2.5}	9.29	8.92	8.74

- 9.68 As shown in Table 9.14, predicted background NO₂, PM₁₀ and PM_{2.5} concentrations are below the relevant AQOs and AQLV at the Site.

Local Air Quality Monitoring Data

- 9.69 Monitoring of pollutant concentrations is undertaken by KBC throughout their area of jurisdiction. Recent results from the closest survey positions to the Site are shown in Table 9.15.

Table 9.15: Monitoring Results - NO₂

Monitoring Site		Monitored NO ₂ Concentrations ($\mu\text{g}/\text{m}^3$)		
		2018	2019	2020
Huyton	Cronton Road, Huyton	37.4	37.6	29.5
H1a, H1b	Huyton station co-location	37.5	37.4	29.5
H2a, H2b	Outside 2 Whitefield Lane	41.0	40.8	35.1
H3a, H3b	Outside 1 Whitefield Lane	49.3	48.0	42.2
H4a, H4b	Opposite Smithford Walk	29.8	31.4	25.3
H5a, H5b	Sevenoak Grove	26.8	27.4	21.4
H6a, H6b	Wilson Road Junction	30.0	21.1	28.6
H7a, H7b	Tarbock Island	36.8	37.2	33.9
H8a, H8b	Natruscot	26.6	29.3	22.7
H9a, H9b	Outside 29 Southford Walk	25.0	26.4	20.6
H10a, H10b	Outside 9 Ribchester Way	23.3	23.9	19.1
H11a, H11b	Outside 12 Windy Arbor Brow	26.4	28.9	23.3
H12a, H12b	Halsnead Development	33.5	32.8	27.2

- 9.70 As shown in Table 9.15, annual mean NO₂ concentrations were above the relevant AQO of 40 $\mu\text{g}/\text{m}^3$ at the H2a, H2b and H3a, H3b monitors in recent years. Annual mean NO₂ concentrations were below the relevant AQO at the remaining locations.

- 9.71 Pollutant concentrations during 2020 were lower than previous years due to a reduction in traffic and associated emissions caused by the COVID-19 pandemic. The results should therefore be viewed with caution.
- 9.72 Recent annual mean PM₁₀ results recorded in the vicinity of the Site are shown in Table 9.16.

Table 9.16: Monitoring Results - PM₁₀

Monitoring Site		Monitored PM ₁₀ Concentrations (µg/m ³)		
		2018	2019	2020
Huyton	Cronton Road, Huyton	21.8	22.9	-(a)

Note: -(a) monitoring data not available

- 9.73 As shown in Table 9.16, the annual mean AQO for PM₁₀ was achieved at the Huyton monitor in recent years.
- 9.74 Recent annual mean PM_{2.5} results recorded in the vicinity of the Site are shown in Table 9.17.

Table 9.17: Monitoring Results - PM_{2.5}

Monitoring Site		Monitored PM _{2.5} Concentrations (µg/m ³)		
		2018	2019	2020
Huyton	Cronton Road, Huyton	9.1	10.8	-(a)

Note: -(a) monitoring data not available

- 9.75 As shown in Table 9.17, the annual mean AQLV for PM_{2.5} was achieved at the Huyton monitor in recent years.
- 9.76 Reference should be made to **Figure 9.1** for a map of the survey positions.

Air Quality Receptors

- 9.77 A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. These have been defined for construction dust and road vehicle exhaust emission impacts in the following sections.

Construction Phase Sensitive Receptors

- 9.78 Receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 350m from the Site boundary. These are summarised in Table 9.18.

Table 9.18: Construction Dust - Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	1 - 10	0
Up to 50	1 - 10	0
Up to 100	10 - 100	-
Up to 350	10 - 100	-

- 9.79 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the Site access. These are summarised in Table 9.19.

Table 9.19: Construction Dust - Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	1 - 10	0
Up to 50	1 - 10	0

- 9.80 There are no ecological receptors within 50m of the development boundary or the access route within 500m of the Site entrance. As such, ecological impacts have not been assessed further within this report.
- 9.81 A number of additional factors have been considered when determining the sensitivity of the surrounding area to potential dust impacts. These are summarised in Table 9.20.

Table 9.20: Additional Area Sensitivity Factors to Potential Dust Impacts

Guidance	Comment
Where there is any history of dust generating activities in the area	Cronton Clay Pit is located approximately 175m south-east of the proposed development. This operates as an extraction site covering an area of approximately 6 hectares. As such, it is likely that there has been a history of dust generation in the area
The likelihood of concurrent dust generating activity on nearby sites	A review of the planning portal indicated the following planning applications have recently been submitted within 700m of the Site: Former Site of Cronton Colliery - Construction of a new country park

Guidance	Comment
	(reference: 22/00162/REM), adjacent to the eastern boundary of the Site; ▪ Former Site of Cronton Colliery - 15,273m² of storage and distribution floorspace and outline consent for a further 77,629m² of storage and distribution floorspace (reference: 22/00162/REM), adjacent to the eastern boundary of the Site; ▪ Land North of M62 Motorway off Windy Arbor Road - Construction of circa 360 residential units and associated infrastructure (reference:18/00283/HYB), approximately 120m north of the Site; and, ▪ Land Between Cronton Road and M62 Motorway - Full planning application for a foodstore with associated pumping station and sub-station car parking. Outline planning for up to 6,500m² of Use Class B1/B2 and B8 floorspace, up to 400m² of Use Class A1 floorspace, a petrol filling station and up to 1,000m² of Use Class A3 and A4 floorspace with associated car parking (reference:17/00301/HYB), approximately 340m north-west of the Site; ▪ Fleet Factors, Stretton Way, Huyton - Erection of extension to existing industrial unit (reference: 21/00732/FUL), approximately 615m north of the Site. It is therefore possible that these may result in concurrent dust generation should the construction phases overlap with that of the proposed development
Pre-existing screening between the source and the receptors	Trees and shrubs are located along the Site boundary. These may act as a barrier between emission sources and receptors should they be

Guidance	Comment
	retained during the construction phase of the proposed development
Conclusions drawn from analysing local meteorological data which accurately represents the area and if relevant the season during which the works will take place	As shown in Figure 9.2 , the predominant wind bearing at the Site is from the south-south-east, with significant frequencies from the north-west. As such, receptors to the north-north-west and south-east of the Site are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Development construction is estimated to take approximately 12 months. It is considered unlikely that receptor sensitivity would change significantly over this time period
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment

9.82 Dust sensitive receptors within 350m of the Site include green fields, places of work and residential dwellings. These are considered to be of low, medium and high sensitivity, respectively. It should be noted that only receptors of low sensitivity are present within 100m of the boundary.

9.83 The sensitivity of the receiving environment to specific dust impacts, based on the criteria outlined in the Assessment Methodology section above, is shown in Table 9.21.

Table 9.21: Construction Dust - Sensitivity of the Surrounding Area to Specific Dust Impacts

Potential Impact	Sensitivity of the Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	Low	Low	Low
Human Health	Low	Low	Low

The Completed and Operational Development Sensitive Receptors

- 9.84 Receptors sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk top study and are summarised in Table 9.22.

Table 9.22: Operational Phase - Road Vehicle Exhaust Emissions Sensitive Receptor Locations

Receptor		NGR (m)	
		X	Y
R1	Residential - Fox's Bank Cottages	347517.3	388894.6
R2	Residential - Cronton Road	347198.9	389048.0
R3	Residential - Windy Arbor Road	346431.5	389794.9
R4	Residential - Windy Arbor Road	346488.9	389943.8
R5	Residential - Coppice Lane	345795.1	389205.0
R6	Residential - Sevenoak Grove	345688.6	389364.9
R7	Residential - Whitefield Lane	345563.5	389392.3
R8	Residential - Whitefield Lane	345537.3	389394.0
R9	Residential - Cronton Road	345516.7	389431.4
R10	Residential - Whitefield Lane	345510.5	389329.0
R11	Residential - Whitefield Lane	345507.1	389188.4

- 9.85 Reference should be made to **Figure 9.3** for a graphical representation of operational phase road vehicle exhaust emission sensitive receptor locations.

Embedded Mitigation

Construction Phase

- 9.86 There is no proposed embedded mitigation included within the development for the construction phase of the Site.

The Completed and Operational Development

- 9.87 There is no proposed embedded mitigation included within the development for the operational phase of the Site.

Assessment of Likely Significant Effects

- 9.88 This section describes the potential impacts and likely effects on the baseline described above that could arise in the absence of mitigation during the construction and operation of the proposed development. This will set the scene for the mitigation developed for the Site in the following section.

Construction Phase

- 9.89 The undertaking of activities such as excavation, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicles movements both on-Site and on the local road network also have the potential to result in the re-suspension of dust from haul roads and highway surfaces.
- 9.90 The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.
- 9.91 The desk study undertaken to inform the baseline identified a number of sensitive receptors within 350m of the Site boundary. As such, a detailed assessment of potential dust impacts has been undertaken.
- 9.92 It should be noted that predicted air quality impacts from construction phase activities are considered to be adverse but temporary in nature.

Earthworks

- 9.93 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as Site levelling and landscaping. The Site covers an area greater than 100,000m². In accordance with the criteria outlined in Table 9.7, the magnitude of potential dust emissions from earthworks is therefore large.
- 9.94 Table 9.21 indicates the sensitivity of the area to dust soiling effects on people and property is low. In accordance with the criteria outlined in Table 9.10, the significance of unmitigated dust soiling effects as a result of earthworks is predicted to be low.
- 9.95 Table 9.21 indicates the sensitivity of the area to human health impacts is low. In accordance with the criteria outlined in Table 9.10, the significance of unmitigated effects at human health receptors as a result of earthworks is predicted to be low.

Construction

- 9.96 Based on the Site layout, the new building is anticipated to have a total volume of more than 100,000m³. In accordance with the criteria outlined in Table 9.7, the magnitude of potential dust emissions from construction is therefore large.
- 9.97 Table 9.21 indicates the sensitivity of the area to dust soiling effects on people and property is low. In accordance with the criteria outlined in Table 9.10, the significance of unmitigated dust soiling effects as a result of construction activities is predicted to be low.
- 9.98 Table 9.21 indicates the sensitivity of the area to human health impacts is low. In accordance with the criteria outlined in Table 9.10, the significance of unmitigated effects at human health receptors as a result of construction is predicted to be low.

Trackout

- 9.99 Based on the Site area, it is anticipated that the unpaved road length may be greater than 100m during certain stages of construction. In accordance with the criteria outlined in Table 9.7, the magnitude of potential dust emissions from trackout is therefore large.
- 9.100 Table 9.21 indicates the sensitivity of the area to dust soiling effects on people and property is low. In accordance with the criteria outlined in Table 9.11, the significance of unmitigated dust soiling effects as a result of trackout activities is predicted to be low.
- 9.101 Table 9.21 indicates the sensitivity of the area to human health impacts is low. In accordance with the criteria outlined in Table 9.11, the significance of unmitigated effects at human health receptors as a result of earthworks is predicted to be low.

Summary Of Dust Effects

- 9.102 A summary of the construction phase effect significance from each dust generating activity is provided in Table 9.23.

Table 9.23: Construction Phase - Summary of Potential Unmitigated Effect Significance

Potential Impact	Potential Unmitigated Effect Significance		
	Earthworks	Construction	Trackout
Dust Soiling	Low	Low	Low
Human Health	Low	Low	Low

The Completed and Operational Development

- 9.103 Vehicle movements associated with the operation of the proposed development will generate exhaust emissions on the local and regional road networks. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutants concentrations at sensitive locations in the vicinity of the Site.
- 9.104 For the purpose of the assessment, traffic data for 2024 was utilised as the opening year of the proposed development. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emission factors and background concentrations for 2019 were utilised within the dispersion model. The use of 2024 traffic data and 2019 emission factors is considered to provide a worst-case scenario and therefore predicted pollution concentrations are likely to overestimate actual levels during the operational of the proposed development. Reference should be made to **Appendix 9.1** for assessment inputs.
- 9.105 It should be noted that predicted air quality impacts from operational phase activities are considered to be adverse and permanent in nature.

Predicted Concentrations

- 9.106 Annual mean NO₂ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. The results are summarised in Table 9.24.

Table 9.24: Predicted Annual Mean NO₂ Concentrations

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Fox's Bank Cottages	30.51	30.57	0.06
R2	Residential - Cronton Road	27.30	27.34	0.04
R3	Residential - Windy Arbor Road	31.23	31.29	0.06
R4	Residential - Windy Arbor Road	31.55	31.59	0.04
R5	Residential - Coppice Lane	36.16	36.21	0.05
R6	Residential - Sevenoak Grove	31.22	31.25	0.03
R7	Residential - Whitefield Lane	39.58	39.62	0.04
R8	Residential - Whitefield Lane	37.99	38.02	0.03
R9	Residential - Cronton Road	37.68	37.72	0.04
R10	Residential - Whitefield Lane	32.57	32.59	0.02
R11	Residential - Whitefield Lane	36.26	36.29	0.03

- 9.107 As shown in Table 9.24, predicted annual mean NO₂ concentrations were below the relevant AQO at all sensitive receptors in both the DM and DS scenarios.
- 9.108 Reference should be made to **Figure 9.4** and **Figure 9.5** for graphical representations of annual mean NO₂ concentrations across the assessment area for the DM and DS scenarios.
- 9.109 Annual mean PM₁₀ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. The results are summarised in Table 9.25.

Table 9.25: Predicted Annual Mean PM₁₀ Concentrations

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Fox's Bank Cottages	21.83	21.84	0.01
R2	Residential - Cronton Road	21.15	21.15	0.01
R3	Residential - Windy Arbor Road	21.67	21.69	0.01
R4	Residential - Windy Arbor Road	21.77	21.78	0.01
R5	Residential - Coppice Lane	21.86	21.87	0.01
R6	Residential - Sevenoak Grove	21.58	21.59	0.01
R7	Residential - Whitefield Lane	22.55	22.55	0.01
R8	Residential - Whitefield Lane	22.34	22.34	0.01
R9	Residential - Cronton Road	22.31	22.32	0.01
R10	Residential - Whitefield Lane	21.79	21.80	0.00
R11	Residential - Whitefield Lane	21.95	21.96	0.01

- 9.110 As shown in Table 9.25, predicted annual mean PM₁₀ concentrations were below the relevant AQO at all sensitive receptors in both the DM and DS scenarios.
- 9.111 Reference should be made to **Figure 9.6** and **Figure 9.7** for graphical representations of annual mean PM₁₀ concentrations across the assessment area for the DM and DS scenarios.
- 9.112 Annual mean PM_{2.5} concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. The results are summarised in Table 9.26.

Table 9.26: Predicted Annual Mean PM_{2.5} Concentrations

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Fox's Bank Cottages	10.28	10.28	0.00
R2	Residential - Cronton Road	9.98	9.99	0.00
R3	Residential - Windy Arbor Road	10.23	10.24	0.00
R4	Residential - Windy Arbor Road	10.27	10.27	0.00
R5	Residential - Coppice Lane	10.37	10.37	0.00
R6	Residential - Sevenoak Grove	10.19	10.19	0.00
R7	Residential - Whitefield Lane	10.64	10.64	0.00
R8	Residential - Whitefield Lane	10.54	10.55	0.00
R9	Residential - Cronton Road	10.53	10.53	0.00
R10	Residential - Whitefield Lane	10.29	10.29	0.00
R11	Residential - Whitefield Lane	10.40	10.40	0.00

9.113 As shown in Table 9.26, predicted annual mean PM_{2.5} concentrations were below the relevant AQLV at all sensitive receptors in both the DM and DS scenarios.

9.114 Reference should be made to **Figure 9.8** and **Figure 9.9** for graphical representations of annual mean PM_{2.5} concentrations across the assessment area for the DM and DS scenarios.

Effect Significance

9.115 Predicted effects on annual mean NO₂ concentrations at sensitive receptor locations are summarised in Table 9.27.

Table 9.27: Predicted Operational Phase Road Vehicle Exhaust Emission Effect Significance - NO₂

Receptor		Sensitivity of Receptor	Magnitude of Impact	Effect Significance
R1	Residential - Fox's Bank Cottages	Low	Negligible	Negligible
R2	Residential - Cronton Road	Very Low	Negligible	Negligible
R3	Residential - Windy Arbor Road	Low	Negligible	Negligible
R4	Residential - Windy Arbor Road	Low	Negligible	Negligible
R5	Residential - Coppice Lane	Low	Negligible	Negligible
R6	Residential - Sevenoak Grove	Low	Negligible	Negligible
R7	Residential - Whitefield Lane	Medium	Negligible	Negligible

Receptor		Sensitivity of Receptor	Magnitude of Impact	Effect Significance
R8	Residential - Whitefield Lane	Medium	Negligible	Negligible
R9	Residential - Cronton Road	Medium	Negligible	Negligible
R10	Residential - Whitefield Lane	Low	Negligible	Negligible
R11	Residential - Whitefield Lane	Low	Negligible	Negligible

9.116 As shown in Table 9.27, impacts on annual mean NO₂ concentrations as a result of the proposed development were predicted to be negligible at all receptors.

9.117 Predicted effects on annual mean PM₁₀ concentrations at sensitive receptor locations are summarised in Table 9.28.

Table 9.28: Predicted Operational Phase Road Vehicle Exhaust Emission Effect Significance - PM₁₀

Receptor		Sensitivity of Receptor	Magnitude of Impact	Effect Significance
R1	Residential - Fox's Bank Cottages	Very Low	Negligible	Negligible
R2	Residential - Cronton Road	Very Low	Negligible	Negligible
R3	Residential - Windy Arbor Road	Very Low	Negligible	Negligible
R4	Residential - Windy Arbor Road	Very Low	Negligible	Negligible
R5	Residential - Coppice Lane	Very Low	Negligible	Negligible
R6	Residential - Sevenoak Grove	Very Low	Negligible	Negligible
R7	Residential - Whitefield Lane	Very Low	Negligible	Negligible
R8	Residential - Whitefield Lane	Very Low	Negligible	Negligible
R9	Residential - Cronton Road	Very Low	Negligible	Negligible
R10	Residential - Whitefield Lane	Very Low	Negligible	Negligible
R11	Residential - Whitefield Lane	Very Low	Negligible	Negligible

9.118 As shown in Table 9.28, impacts on annual mean PM₁₀ concentrations as a result of the proposed development were predicted to be negligible at all receptors.

9.119 Predicted effects on annual mean PM_{2.5} concentrations at sensitive receptor locations are summarised in Table 9.29.

Table 9.29: Predicted Operational Phase Road Vehicle Exhaust Emission Effect Significance - PM_{2.5}

Receptor		Sensitivity of Receptor	Magnitude of Impact	Effect Significance
R1	Residential - Fox's Bank Cottages	Very Low	Negligible	Negligible
R2	Residential - Cronton Road	Very Low	Negligible	Negligible
R3	Residential - Windy Arbor Road	Very Low	Negligible	Negligible
R4	Residential - Windy Arbor Road	Very Low	Negligible	Negligible
R5	Residential - Coppice Lane	Very Low	Negligible	Negligible
R6	Residential - Sevenoak Grove	Very Low	Negligible	Negligible
R7	Residential - Whitefield Lane	Very Low	Negligible	Negligible
R8	Residential - Whitefield Lane	Very Low	Negligible	Negligible
R9	Residential - Cronton Road	Very Low	Negligible	Negligible
R10	Residential - Whitefield Lane	Very Low	Negligible	Negligible
R11	Residential - Whitefield Lane	Very Low	Negligible	Negligible

9.120 As shown in Table 9.29, impacts on annual mean PM_{2.5} concentrations as a result of the proposed development were predicted to be negligible at all receptors.

Overall Impact Significance

9.121 The overall impact of operational phase road traffic emission impacts was determined as negligible. This was based on the worst-case predicted impact at any discrete receptor location and the considerations outlined previously. Further justification is provided in Table 9.30.

Table 9.30: Operational Phase Road Vehicle Exhaust Emissions - Overall Effect Significance

Guidance	Comment
The existing and future air quality in the absence of the proposed development	Predicted annual mean NO ₂ , PM ₁₀ and PM _{2.5} concentrations were below the relevant AQOs and AQLV at all receptor locations in the DM scenario The predicted concentrations are considered unlikely to change significantly in the absence of the proposals given the established nature of the area
The extent of current and future population exposure to the impacts	The proposed development is not predicted to affect the population exposed to exceedences of the AQOs

Guidance	Comment
The influence and validity of any assumptions adopted when undertaking the prediction of impacts	The assessment assumed that vehicle exhaust emission rates and background pollutant levels will not reduce in future years. This provides worst-case results when compared with DEFRA and National Highways methodologies Due to the adopted assumptions it is considered the presented results are sufficiently robust for an assessment of this nature

Additional Mitigation / Enhancement Measures

Construction Phase

- 9.122 Due to the size and nature of the proposed development a Construction Environmental Management Plan (CEMP) will be produced to control potential impacts during the construction phase. This can be secured through attachment of a suitably worded planning condition to any forthcoming consent. The mitigation measures outlined in Table 9.31 will be included within the CEMP to mitigate fugitive dust emissions during construction. These are based on the advice provided within IAQM guidance³³ and are therefore considered suitable for the Site.

Table 9.31: Fugitive Construction Dust Emissions Mitigation Measures

Guidance	Comment
Communications	Develop a Dust Management Plan (DMP) which may be part of an overarching CEMP Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust issues on the Site boundary Display the head or regional office contact information
Site Management	Record and respond to all dust and air quality pollutant emissions complaints Make the complaints log available to the LA upon request Record any exceptional incidents, either on or off the Site, and the action taken to resolve the situation is recorded in the log book
Monitoring	Undertake daily on-Site and off-Site inspection, where receptors are nearby, to monitor dust, record inspection results, and make the log available to the LA when asked

³³ IAQM, 2016. Guidance on the Assessment of Dust from Demolition and Construction.

Guidance	Comment
	Carry out regular Site inspections, record inspection results, and make an inspection log available to the LA upon request Increase the frequency of Site inspections when activities with a high potential to produce dust and emissions and dust are being carried out, and during prolonged dry or windy conditions
Site Preparation	Plan Site layout: machinery and dust causing activities should be located away from receptors Fully enclose Site specific operations where there is a high potential for dust production and the Site is active for an extensive period Erect solid screens or barriers around dust activities or the Site boundary that are, at least, as high as any stockpiles on Site Avoid Site runoff of water or mud; Keep Site fencing, barriers and scaffolding clean using wet methods Remove materials from Site as soon as possible Cover, seed or fence stockpiles to prevent wind whipping
Operating Vehicle/Machinery and Sustainable Travel	Ensure all Non-Road Mobile Machinery comply with the relevant standards 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
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques; Ensure an adequate water supply on the Site for effective dust/particulate matter mitigation (using recycled water where possible) Use enclosed chutes and conveyors and covered skips Minimise drop heights and use fine water sprays wherever appropriate
Waste Management	Avoid bonfires and burning of waste materials
Construction	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
Trackout	Use water-assisted dust sweeper on access and local roads, if required Avoid dry sweeping of large areas Ensure vehicles entering and leaving Site are covered to prevent escape of materials Record all inspections of haul routes and any subsequent action in a Site log book Implement a wheel washing system, if required

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- 9.123 The IAQM have released a position statement 'Mitigation of Development Air Quality Impacts'³⁴ which provides guidance on determining appropriate mitigation measures for new development. This states:

The IAQM position is that the appropriate mitigation solution for the operational air quality impact of any given general development scheme should be principle-led rather than specified by detailed prescription.

- 9.124 The following hierarchy of principles is provided for use when determining an appropriate level of mitigation:

- Prevent or avoid;
- Reduction and minimisation; and,
- Off-setting.

- 9.125 The Air Quality Assessment has shown that the overall significance of operational phase road traffic emission impacts was determined as negligible, which is considered to be not significant. As such, mitigation to further reduce potential impacts is not considered necessary.

Residual Effects

- 9.126 Residual impacts are summarised in Table 9.32.

³⁴ IAQM, 2018. Mitigation of Development Air Quality Impacts V1.1.

Table 9.32: Residual Effects Summary

Description of Effect	Embedded Mitigation	Potential Effect (inc. Significance)	Further Mitigation	Residual Effect (inc. Significance)
Construction				
Fugitive dust emissions associated with earthworks, construction and trackout activities	There is no proposed embedded mitigation included within the development for the construction phase	Low in the short term at local level	Suitable mitigation measures would be detailed in the CEMP to control effects to an acceptable level	Not Significant
Operation				
Road traffic vehicle exhaust emissions associated with vehicles travelling to and from the Site	There is no proposed embedded mitigation included within the development for the operational phase	Negligible in the long term at local level	Further mitigation to reduce potential impacts is not considered necessary	Not Significant

Conclusions

- 9.127 The proposed development has the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the Site during operation. As such, an assessment was undertaken in order to determine baseline conditions and assess potential effects as a result of the proposed development.
- 9.128 During the construction phase of the proposed development there is the potential for air quality impacts as a result of fugitive dust emissions from the Site. These were assessed in accordance with the IAQM methodology³⁵. Assuming good practice dust control measures are implemented, the residual effect of potential air quality effects from dust generated by earthworks, construction and trackout activities was predicted to be negligible, which is considered to be not significant.
- 9.129 Potential impacts during the operational phase of the proposed development may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the Site. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the local highway network both with and without the proposed development in place. Results were subsequently verified using local monitoring data.
- 9.130 Review of the dispersion modelling results indicated that effects on annual mean NO₂, PM₁₀ and PM_{2.5} concentrations as a result of traffic generated by the proposed development were classified as negligible at all receptor locations.
- 9.131 Based on the worst case predicted impact, the overall significance of potential operational phase road vehicle exhaust emissions effects was classified as negligible, which is considered to be not significant.

Assessment of Cumulative Effects

Approach

- 9.132 There is the potential for cumulative effects to occur as a result of development associated with the sites identified in Table 9.33. As such, the potential for cumulative impacts has been considered for both the construction and operational phases.

Construction Phase

³⁵ IAQM, 2016. Guidance on the Assessment of Dust from Demolition and Construction.

- 9.133 Should permission be granted for other developments within 700m of the boundary it is possible that cumulative dust impacts may occur. A review of the planning portal indicated a number of planning applications have recently been submitted or granted planning permission within the vicinity of the Site. These are shown in Table 9.33. Any cumulative developments within 700m of the Site were therefore reviewed to ensure consideration of cumulative impacts from developments within the local area.

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- 9.134 There is the potential for cumulative operational phase road vehicle exhaust emission impacts should other developments generate traffic which utilise the same routes as movements generated by the proposals. Several planning applications have been submitted within the vicinity of the proposed Site. These are shown in Table 9.33. Traffic generation associated with the relevant schemes was therefore included within the data sets provided by Mott MacDonald Limited, the Transport Consultants for the proposed development, in order to ensure consideration of cumulative impacts from developments within the local area.

Table 9.33: Cumulative Sites

Site Ref.	Application No.	Distance and Direction	Proposal	Scoped-in / Scoped-out	Justification
1.	18/00283/HYB	90m north	Hybrid application comprising full application for erection of 123 no. Dwellings, construction of vehicular/pedestrian accesses, laying out of public open space and associated works; outline application for erection of up to 237 no. Dwellings, car park and associated works (access into site to be considered - all other matters reserved for future approval)	Scoped-in	Due to the proximity of this application to the proposed development, it is possible this application will result in cumulative impacts
2.	20/00399/OUT	680m north	Outline application for proposed residential development of up to 277 no. Dwellings (use class c3) and an apartment development of up to 100 units for over 55's (use class c3) together with new vehicular access to lickers lane and windy arbor road, landscaping and associated works (inc. Demolition of buildings) (approval sought for access - all other matters reserved)	Scoped-in	Due to the scale and nature of the proposals, it is possible this application will result in cumulative impacts within the vicinity of the proposed development
3.	20/00417/FUL	770m northeast	Residential development comprising of the erection of 350 no. Dwellings together with the construction of vehicular access off fox's bank lane (comprising signalised junction), suds ponds, landscaping, boundary treatments and other associated works (including demolition of existing farm buildings)	Scoped-in	Due to the scale and nature of the proposals, it is possible this application will result in cumulative impacts within the vicinity of the proposed development

Site Ref.	Application No.	Distance and Direction	Proposal	Scoped-in / Scoped-out	Justification
4.	20/00329/FUL	340m north	Erection of a residential development of 43 no. Dwellings comprising 14 no. Apartments and 29 no. Houses together with access, car parking and associated development (demolition of existing barn)	Scoped-in	Due to the scale and nature of the proposals, it is possible this application will result in cumulative impacts within the vicinity of the proposed development
5.	20/00494/HYB	Adjacent north and east	Hybrid planning application comprising: full application for the development of 161,900 sq ft (15,041 sq m) (gia) of storage and distribution floorspace (use class b8), including ancillary offices (use class b1), security gatehouse, site access road, engineering earthworks to form a part country park, public car park to serve country park, and associated works; and outline application with details of point of access (details of part-access, landscaping, appearance, scale and layout are reserved) for the development of up to 838,100 sq ft (77,862 sq m) (gia) of storage and distribution floorspace (use class b8), with ancillary offices and light industrial (use class b1); engineering earthworks to form country park and drainage attenuation ponds; pedestrian/cycle/equestrian route connecting existing m62 footbridge with proposed country park; and associated works	Scoped-in	Due to the scale and nature of the proposals, it is possible this application will result in cumulative impacts within the vicinity of the proposed development
6.	15/00022/OUT	2.2km north	Outline application for mixed use development comprising up to 750no. Dwellings & up to 929 sq m of	Scoped-in	Due to the scale and nature of the proposals, it is possible this application will result in

Site Ref.	Application No.	Distance and Direction	Proposal	Scoped-in / Scoped-out	Justification
			commercial/industrial buildings (use classes b1/b2/b8) - all matters reserved for future approval		cumulative impacts within the vicinity of the proposed development
7.	17/00301/HYB	360m west	Hybrid application comprising a full planning application for 1800 sq.m gross external area food store (use class a1), 1161 sq.m gross external area b1/b2 use (business use / general industrial use) with associated car parking, landscaping, highway works, pumping station, substation and associated works including bund and noise attenuation boundary treatment to top of bund along western boundary of the site; and outline planning application for up to 7,500 sq.m use class b1 and b2 floor space, petrol filling station (sui generis use) with up to 400 sq.m floor space associated use class a1 unit, up to 1000 sq.m use class a3 and a4 floor space (pub / restaurant), with associated car parking, servicing areas, highway works, and other associated works, with all matters reserved for future approval	Scoped-in	Due to the scale and nature of the proposals, it is possible this application will result in cumulative impacts within the vicinity of the proposed development
8.	16/00819/FUL	2km northwest	Erection of 62 no. Dwellings together with construction of new vehicular & pedestrian access, landscaping, public open space, drainage and associated works	Scoped-in	Due to the scale and nature of the proposals, it is possible this application will result in cumulative impacts within the vicinity of the proposed development
9.	18/00062/HYB	3.5km north	Detailed application for 4,180 sq.m of employment floor space (use class b1), 3,275 sq.m ancillary floor space	Scoped-in	Due to the scale and nature of the proposals, it is possible this application will result in

Site Ref.	Application No.	Distance and Direction	Proposal	Scoped-in / Scoped-out	Justification
			(use classes a1/a4/c1/sui generis), 154 residential dwellings, improvements to lord derby playing fields/oak plantation and associated landscaping and infrastructure including a dedicated 500kva substation for the residential neighbourhood and a 1000kva substation for the eastern employment area and the demolition of knowsley lane farm. outline application for up to 26,350 sq.m of employment floor space (use classes b1) and associated landscaping and infrastructure		cumulative impacts within the vicinity of the proposed development
10.	19/00651/FUL	140m north	Construction of multi-use path and associated ground works including the facilitation of rising main associated with proposed residential development on adjoining land. disused railway line extending from m62 motorway extending north through halsnead park and to rear of cronton avenue, whiston, knowsley	Scoped-out	Consultation with Mott Macdonald, the Transport Consultants for the Site, indicated that KBC considered that this development would not result in a material change to traffic
11.	20/00578/FUL	Adjacent to north and east	Construction of a new country park comprising of the creation of sculptured landscape, habitat/wetland creation, associated works and infrastructure, engineering/earthworks including changes to site levels together with the erection of a single storey visitor centre including reception, café, education space, ranger offices and an outdoor terrace area; erection of	Scoped-out	Consultation with Mott Macdonald, the Transport Consultants for the Site, indicated that KBC considered that this development would not result in a material change to traffic

Site Ref.	Application No.	Distance and Direction	Proposal	Scoped-in / Scoped-out	Justification
			outdoor classroom canopy; sky room; provision of colliery and mineral line multi user route, new paths including a multi user route north of the m62 bridge up to windy arbor road and provision of new car park. Vehicular access to be taken from cronton road via access road to neighbouring employment site/country park car park with new footbridge over employment site/car park access road and pedestrian/cycle access from cronton road and fox's bank lane.		

Likely Residual Cumulative Effects and their Significance

Construction

- 9.135 Should construction phase activities of developments highlighted in Table 9.33 take place within 700m of the boundary it is possible that cumulative dust impacts may occur. However, as previously outlined, any fugitive dust emissions generated by the proposals will be controlled through the outlined mitigation measures. Therefore, cumulative impacts are predicted to be not significant in accordance with the EIA Regulations³⁶ and no further mitigation measures are required.

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- 9.136 Cumulative vehicle exhaust emissions effects may occur as a result of additional traffic growth on the local road network associated with committed developments in the vicinity of the Site. Consultation with Mott MacDonald Limited, the Transport Consultants for the proposed development, indicated that the traffic data provided for use in this assessment included consideration of potential cumulative traffic flows as outlined in Table 9.33. The traffic data also included predicted growth up to 2024. This is considered to provide a reasonable representation of potential increases in traffic flows as a result of other local committed developments, as well as schemes throughout the wider area. As such, the presented results are anticipated to consider cumulative impacts from road vehicle exhaust emissions. Residual cumulative impacts are therefore predicted to be not significant in accordance with the EIA Regulations³⁷.

³⁶ UK Government, 2017. Town and Country Planning (EIA) Regulations.

³⁷ UK Government, 2017. Town and Country Planning (EIA) Regulations.

10. Summary of Mitigation and Residual Effects

Introduction

- 10.1 Both the EIA and the design evolution have been an iterative process. Therefore, many measures to mitigate potential adverse environmental effects have been incorporated into the design of the Proposed Development in order to avoid, reduce or offset negative changes. These measures are 'embedded mitigation' and are presented in Chapter 5: The Proposed Development. They have been accounted for in each of the technical assessments, where relevant (see Chapters 6 - 9).
- 10.2 The residual effects of the Proposed Development have been assessed as part of the EIA and can be described as the effects which remain after the implementation of the embedded and any additional proposed mitigation measures. The residual effects have been identified for each category in the preceding technical chapters (Chapters 6 - 9) and are summarised in Table 10.1. It is expected that the appropriate mitigation measures will be secured through appropriately worded planning conditions. Reference should be made to each technical chapter for the definition of the significance of the effect stated.
- 10.3 Following Table 10.1 is a discussion of the residual effects and a conclusion.

Table 10.1: Summary of Mitigation and Residual Effects

Category	Stage of Development	Description of Potential Effect inc. Significance	Mitigation Measures	Residual Effects
Ecology	Construction	Direct and indirect impacts to Mersey Estuary SPA and Ramsar – negligible.	N/A	N/A
		Direct and indirect impacts to statutory designated sites within 5km of the development – negligible	N/A	N/A
		Strettlles Bog, Tarbock LWS – Moderate Adverse effect at County level.	Implementation of a CEMP	Moderate adverse effect at county level
		Five LWSs located outside the site but closer than 0.5km - Minor adverse effect at County level.	Implementation of a CEMP	Negligible
		Two LWSs located further than 0.5km from the site – negligible.	N/A	N/A
		Loss of semi-natural broadleaved woodland – Moderate Adverse effect at County level.	Implementation of a CEMP	Moderate adverse effect at county level
		Damage to semi-natural broadleaved woodland – Moderate Adverse effect at County level.	Implementation of a CEMP	Negligible
		Loss of an area of the Urban Grasslands assemblage	Implementation of a CEMP	Moderate adverse effect at Local level
		Damage to retained areas of urban grassland – Moderate Adverse effect at County level.	Implementation of a CEMP	N/A
		Loss of individual bluebells – Negligible.	N/A	Negligible
		Loss of bird nesting habitat – Minor Adverse effect at Local level.	Implementation of a CEMP No vegetation clearance to be undertaken during the nesting bird season	Negligible

Category	Stage of Development	Description of Potential Effect inc. Significance	Mitigation Measures	Residual Effects
		Loss of foraging habitat for bats – Moderate Adverse effect at Local level.	Implementation of a CEMP	N/A
	Operation	Direct and indirect impacts to Mersey Estuary SPA and Ramsar – Negligible.	N/A	N/A
		Direct and indirect impacts to statutory designated sites within 5km of the development – Negligible.	N/A	N/A
		Strettlles Bog, Tarbock LWS – Moderate Adverse effect at County level.	Implementation of a LEMP Woodland and tree planting within the site	Negligible
		Seven other LWSs present within 1km of the site – Negligible.	N/A	N/A
		Degradation of semi-natural broadleaved woodland following lack of management and spread of INNS – Moderate Adverse effect at County level.	Implementation of a LEMP Woodland and tree planting within the site	Negligible
		Urban grassland assemblage – Moderate Adverse effect at County level.	Implementation of a LEMP Grassland creation within the Site	Minor adverse effect at Local level
		Bluebell – Moderate Adverse effect at Site level.	Implementation of a LEMP	Negligible
		Disturbance to bats through artificial nocturnal lighting – Moderate Adverse effect at Local level.	Implementation of a Sensitive Lighting Strategy Creation of new foraging habitat within the site Installation of new roosting boxes within the site	Minor beneficial in the long term at the Site level.

Category	Stage of Development	Description of Potential Effect inc. Significance	Mitigation Measures	Residual Effects
Water Resources and Flood Risk	Construction	Flood Risk (all sources including river, surface water, groundwater, etc.) – negligible.	Industry Standard Procedures, CEMP, Site Drainage Plan.	Negligible
		Increase in Impermeable Areas (temporary) – minor adverse.		Negligible
		Water Quality – moderate adverse.		Negligible
	Operation	Flood Risk (all sources including river, surface water, groundwater, etc.) – negligible.	Industry Standard Procedures – SUDS scheme.	Negligible
		Increase in Impermeable Areas (temporary) – minor adverse.		Negligible
		Water Quality – moderate adverse.		Negligible
Traffic and Transport	Construction	General impact of Construction Traffic – Negligible Adverse.	CEMP	Negligible Adverse
	Operation	Severance – Negligible Adverse.	Travel Plan	Negligible Adverse
		Driver Delay – Negligible Adverse.		Negligible Adverse
		Pedestrian Amenity – Negligible Adverse.		Negligible Adverse
		Accidents & Safety – Negligible Adverse.		Negligible Adverse
Air Quality	Construction	Fugitive dust emissions associated with earthworks, construction and trackout activities – Low.	CEMP	Not Significant
	Operation	Road traffic vehicle exhaust emissions associated with vehicles travelling to and from the Site – Negligible.	Travel Plan	Not Significant

Summary and Conclusions

- 10.4 A comprehensive assessment of the potential effects of the construction and operational phases of the proposed development has been undertaken as part of this EIA to establish the environmental changes associated with the development.
- 10.5 The proposed development has been designed in accordance with the findings and recommendations of the EIA. Any adverse effects identified through the assessment have been minimised as far as possible through the design process or the application of appropriate mitigation measures. Those effects associated with the construction activities will be controlled by a CEMP.
- 10.6 Effects during demolition and construction period are considered to be short term negligible for the majority of impacts which are not significant. Some moderate adverse effects are anticipated with regards to the potential effects on ecological receptors in the short term. However, the majority of construction phase effects are negligible or minor adverse, following the implementation of mitigation.
- 10.7 Potential environmental impacts of the completed development are predominantly negligible which are not significant. There are some minor beneficial impacts identified at completed development stage relating to ecology which would not be realised in the absence of the proposed development.
- 10.8 The proposed development constitutes a sustainable, high quality development which accords with national and local planning policy. It will create jobs for local residents on an allocated employment site. The completed development will bring about a sympathetically designed development that contributes to the economic, social and environmental aspirations of the Council.