



**FD Attwood & Partners**

**Land at East Hill, North Dane Way, Chatham, Kent**

**Environmental Statement: Volume 1, Main Text**



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#### **Environmental Statement: Volume 1, Main Text**

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# 1 INTRODUCTION

1.1 FD Attwood & Partners (hereafter known as ‘the Applicant’) is seeking to obtain planning permission for a Proposed Development at Land at East Hill, North Dane Way, Chatham, Kent. The Site location is identified in Figure 1.1.

1.2 This Environmental Statement (ES) has been prepared to support an Outline Planning Application for the Site. The Planning Application seeks planning permission for the following:

- The erection of up to 800 dwellings (C3) including a mix of sizes, types and tenures including affordable housing;
- A Doctors Surgery to accommodate at least two doctors;
- Up to four shops such as local convenience shop / café;
- A two-form entry Primary School;
- Open space; and
- Road infrastructure.

1.3 The ES identifies and records the results of assessments of the construction and operational phases of the Proposed Development and considers the potentially significant environmental effects it may create. The ES suggests a range of measures to mitigate the identified effects and, where opportunities exist, to introduce improvement measures.

**Figure 1.1: Site Location**





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## LEGISLATIVE FRAMEWORK FOR THE EIA

1.4 This ES has been prepared in accordance with the requirements set out in *The Town and Country Planning (Environmental Impact Assessment) Regulations 2017* (hereafter referred to as the EIA Regulations) (**Ref. 1.1**).

1.5 The EIA Regulations require that, before consent is granted for certain types of development, an EIA must be undertaken. The EIA Regulations set out the types of development which must always be subject to an EIA (Schedule 1 development) and other developments which may require assessment if they give rise to significant environmental impacts (Schedule 2). The reporting of an EIA takes the form of an Environmental Statement (ES).

1.6 Following consultation with relevant statutory bodies and a review of potential environmental impacts, Medway Council (MC) concluded that an EIA is required for the Proposed Development.

## STRUCTURE OF THE ENVIRONMENTAL STATEMENT

1.7 The ES has been prepared on behalf of the Applicant, by a team of specialist consultants and also draws on existing studies and information where necessary.

1.8 The ES comprises three parts – the Main Text (Volume 1), the Figures and Technical Appendices (Volume 2) and the Non-Technical Summary (Volume 3). The ES forms part of a suite of reports that will support the planning application for the Proposed Development.

1.9 The ES provides:

- A description of the Site and its surroundings (Chapter 2);
- An overview of the approach and methodology of the EIA (Chapter 3);
- A description of reasonable alternatives considered in terms of design, location, size and scale (Chapter 4);
- A description of the Proposed Development (Chapter 5);
- Identification of the development programme and construction (Chapter 6);
- The results of the analysis of the potentially significant environmental effects of the Proposed Development for the following disciplines: Transport and Access; Air Quality; Noise and Vibration; Landscape and Visual Amenity; Ecology and Biodiversity; Water Quality, Hydrology and Flood Risk; Soils, Geology and



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Contaminated Land and Archaeology and Cultural Heritage (Chapters 7-14). Cumulative impacts are assessed within each of the Chapters where relevant; and

- A conclusion based on the findings of the EIA (Chapter 15).

1.10 Each of the technical sections of the ES comprises: an introduction; a methodology of assessment, review of relevant policy context, a description of the baseline (existing) conditions; an assessment of the likely environmental effects of the Proposed Development; a description of mitigation measures; a discussion on residual effects; and a summary. Technical Appendices in relation to these Chapters are provided as **Volume 2**.

1.11 In conclusion, with reference to the EIA Regulations, the ES contains those matters which must be included:

- A description of the development comprising information on the site, design, size and other relevant features of the development;
- A description of the likely significant effects of the proposed development on the environment;
- A description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- A description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;
- A non-technical summary of the above information (**Volume 3**); and
- Any additional information relevant to the specific characteristics of the development and to the environmental features likely to be significantly affected.

## **NATURE OF THE PLANNING APPLICATION**

1.12 The Proposed Development, which has been assessed by the EIA process, is the subject of an Outline planning application being made to MC comprising:

- The erection of up to 800 dwellings (C3) including a mix of sizes, types and tenures including affordable housing;
  - A Doctors Surgery to accommodate at least two doctors;
  - Up to four shops such as local convenience shop / café;
  - A two-form entry Primary School;
-



- 
- Open space; and
  - Road infrastructure.

## REFERENCES

**Ref 1.1:** Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2017.



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## 2 THE SITE AND SURROUNDINGS

2.1 The Site covers an area of approximately 49.47ha and is situated adjacent to North Dane Way on the outskirts of Chatham and is comprised of arable fields. To the west is North Dane Way and beyond that a residential area, to the north are residential properties and recreational land beyond. To the east is Capstone Farm Country Park which comprises primarily open fields and to the south is agricultural land.

2.2 The Site lies within the administrative area of Medway Council (MC).

2.3 The topography of the Site rises to the west and ranges between 40 to 100m AOD. The Site is located on part of an elevated ridge plateau and is set within a wider undulating chalk downland landscape consisting of ridge crests and extensive dip slopes that overlook steep-sided narrow valleys.

2.4 The Site is not subject to any nature conservation designations, although a number of designated sites are located within the vicinity of the Site, including the Medway Estuary and Marshes Ramsar Site, Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI) which is located approximately 3.5km to the north of the Site. There are four other SSSIs and nine local nature reserves (LNRs) within 5km of the Site.

2.5 The Site and its immediate setting are not included in any statutory landscape designation for the protection of scenic quality and is not located within Green Belt. It does lie within an area identified as an 'Area of Local Landscape Importance' within the Borough.

2.6 The Site is not located within an Air Quality Management Area (AQMA), the nearest AQMA is located approximately 500m to the northwest of the Site.

2.7 A small proportion of the Site (some 1.2% of the total Site area) which corresponds with the lowest lying portion of the Site lies within an area of overland flow and for this reason is identified within the EA mapping Flood Zones 2 and 3. The remainder of the Site lies within Flood Zone 1.





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### **3 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY**

3.1 The main objectives of the ES comprise:

- Establishing the existing baseline;
- Determine environmental conditions. This task was divided into two phases:
  - (i) collection and review of existing data relating to the Site, including a review of information held by statutory and non-statutory consultees; and
  - (ii) the enhancement of existing data, where necessary with information collected through site investigation and surveys.
- identifying, predicting and assessing the significance of the environmental impacts including beneficial, adverse, direct, indirect, long term, medium term, short term, temporary, permanent and cumulative impacts which could be expected as a result of the development proposals on those environmental issues that were considered to be potentially significant during the scoping process; and
- determining mitigation and management measures, which would be required in order to prevent, reduce or remedy any significant adverse effects along with consideration of enhancement measures which could be implemented to ensure positive benefits as a result of these proposals.

#### **CONSULTATION**

3.2 Pre-application consultation is an essential part of the EIA process and has been used to:

- identify available baseline data and the need for any further field surveys; and
- identify the main environmental issues that need to be assessed in detail.

3.3 Both statutory and non-statutory consultees have been consulted as part of the EIA. There has also been pre-application engagement with Medway Council and a presentation to Members of the Council.

3.4 As part of the planning promotion process, the Applicant has also undertaken public consultation events with the local communities, full details of which are provided in the Statement of Community Involvement which accompanies this Application.



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3.5 Throughout the pre-application process, the Applicant employed a variety of methods and approaches in accordance with best practice. The feedback received during the consultation exercises have informed and shaped the proposals for this application.

### **SCOPE OF THE EIA**

3.6 The purpose on an EIA scoping exercise is to ensure that all relevant environmental issues with respect to the Proposed Development are identified from the outset and to confirm that the EIA process would conform to the requirements of the EIA Regulations. The EIA Regulations require *'a description of the likely significant effects of the development on the environment.'*

3.7 An assessment of all environmental effects is not required, only those likely to be significant. By applying relevant guidance and professional judgement it is possible to identify those environmental areas that should be assessed.

3.8 A scoping opinion was provided by MC, this is provided in **Appendix 3.1** of this ES.

3.9 The areas potentially likely to experience a significant effect as a result of the Proposed Development were identified as follows:

- Transport and Access;
- Air Quality;
- Noise and Vibration;
- Landscape and Visual Amenity;
- Ecology and Nature Conservation;
- Water Quality, Hydrology & Flood Risk;
- Soils, Geology, Contaminated Land; and
- Archaeology and Cultural Heritage.

### **Environmental Topics Scoped out of ES**

3.10 Climate change was considered as part of the Flood Risk Assessment and Drainage Strategy which has been referred to and appended to the ES (**Appendix 12.1**). The Proposed Development has been designed to ensure that surface water run-off from the Site discharges at an appropriate rate with an additional allowance for potential climate change. Climate change has therefore been addressed in both the design of the Proposed Development and the EIA



process. It is not considered that any other climate change matters are of relevance to the Development in this instance. Any carbon emissions generated by the Development would be insignificant in the context of global climate change. Further assessment of the impact of the Proposed Development on climate change is therefore not considered further in the assessment.

## PROJECT TEAM

3.11 This ES has been completed by a team of specialist consultants as illustrated in Table 3.1 below:

**Table 3.1: Consultant Team**

Section	Consultant
Chapters 1 to 6	Entran
Chapter 7: Transport and Access	Charles & Associates
Chapter 8: Air Quality	Entran
Chapter 9: Noise and Vibration	Entran
Chapter 10: Landscape and Visual Impacts	Allen Pyke Associates
Chapter 11: Ecology	Corylus Ecology
Chapter 12: Water Quality, Hydrology and Flood Risk	Herrington Consulting
Chapter 13: Soils, Geology and Contaminated Land	Southern Testing and EAME
Chapter 14: Archaeology and Cultural Heritage	Archaeology & Planning Solutions

## ASSESSMENT CRITERIA

3.12 A number of criteria have been used to determine whether or not the potential effects of the Proposed Development are significant. Where possible, the effects have been assessed quantitatively.

3.13 The significance of effects have been assessed using one or more of the following criteria:

- international, national and local standards;



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- relationship with planning policy;
  - sensitivity of receiving environment;
  - reversibility and duration of effect;
  - inter-relationship between effects; and
  - the results of consultations.

3.14 The effects that were considered to be significant prior to mitigation have been identified within the ES. The significance of these effects reflects judgement as to the importance or sensitivity of the affected receptor(s) and the nature and magnitude of the predicted changes. For example, a large adverse impact on a feature or site of low importance will be of lesser significance than the same impact on a feature or site of high importance.

3.15 The following terms have been used to assess the significance of effects where they are predicted to occur:

- Major Beneficial or Adverse effect – where the Proposed Development would cause a significant improvement (or deterioration) to the existing environment;
- Moderate Beneficial or Adverse effect – where the Proposed Development would cause a noticeable improvement (or deterioration) to the existing environment;
- Minor Beneficial or Adverse effect – where the Proposed Development would cause a barely perceptible improvement (or deterioration) to the existing environment; and
- Neutral/ Negligible – no discernible improvement or deterioration to the existing environment.

3.16 Where individual assessment sections deviate from these terms, the alternative terminology has been explained as appropriate within the relevant Chapter.

3.17 A non-technical summary of the ES is provided as **Volume 3**.

## **CUMULATIVE EFFECTS**

3.18 Cumulative impacts from proposed or committed developments in the vicinity of the Proposed Development have been considered within each of the following technical Chapters. The proposed or committed schemes considered are identified in Table 3.2.



**Table 3.2: Proposed or Committed Developments**

<b>Site Name</b>	<b>Application No.</b>	<b>Distance from the Site</b>	<b>Location</b>	<b>Description</b>
Land East of Gleamingwood Drive Lordswood Kent	15/503359/OUT	800m	578003, 162014	Residential development (approx 89 dwellings) plus open space, biomass plant and access road (plus emergency access)
Gibraltar Farm Ham Lane Hempstead Gillingham Medway ME7 3JJ	MC 18/0556	120m	578080, 163060	The erection of up to 450 market and affordable dwellings, provision of access and estate roads and incidental open space
Land At Brickfield Darland Farm Pear Tree Lane Hempstead Gillingham ME7 3PP	MC/16/2776	30m	578213, 165607	Residential development of up to 44 dwellings with associated garaging, access, landscaping and open space



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## 4 ALTERNATIVES AND DESIGN EVOLUTION

### INTRODUCTION

4.1 This Chapter sets out the need for the Proposed Development and the reasonable alternatives considered by the developer. The EIA Regulations (**Ref 1.1**) states that an ES should include:

*“a description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment.”*

4.2 The following sections describe the reasonable alternatives considered by the developer in addition to the Proposed Development. Consideration has been given to and commentary is provided on the following:

- The 'No Development' alternative;
- Alternative Sites; and
- Alternative Designs and Layouts.

### 'NO DEVELOPMENT' ALTERNATIVE

4.3 The 'No-Development' option refers to leaving the Site in its current state, which comprises an area of undeveloped land. This alternative would not contribute positively to housing delivery in the area, which falls below the rate required to meet objectively-assessed housing need.

4.4 As the Proposed Development can contribute up to 800 dwellings to future housing supply and the Site is under the Applicant's control, the 'No Development' scenario has been dismissed.

### ALTERNATIVE SITES AND LAYOUTS

4.5 The application has been prepared because it lies within the applicants control and is available for development. MC is currently in the process of reviewing its local plan to meet its future development needs. MC is hoping to publish a Regulation 19 Stage Local Plan later this year (2019) that has been prepared taking account of an extensive evidence base platform taking account of the constraints and opportunities for growth affecting the whole administrative



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area. Higher order constraints such as the Green Belt and SSSI as well as environmental, highway capacity and sustainability of alternative spatial strategies to meet the housing requirements combined with matters of deliverability and site viability which are particularly important in Medway because of low levels of historic completions. The emerging plan when adopted will replace the adopted Medway Local Plan from 2003 and has been the subject of a number of stages of public consultation and assessment by the LPA or a range of options following an earlier 'call for sites' of opportunities and site assessment from the Strategic Housing and Land Availability Assessment. The Site is included as an allocation in three of the four development options in the emerging Medway Local Plan, which has identified the range of alternatives available itself underpinned by Sustainability Appraisal. This background demonstrates that Medway Council has reviewed a wide range of alternative options following which the Site has been identified along with other opportunities as part of a wider spatial strategy to meet the development needs of Medway in a sustainable way.

4.6 The final scheme design as described in Chapter 5 of this ES was determined following a review of the Site and surrounding area including the topography, ecology, history of the area, and surrounding road infrastructure and consideration of the likely requirements of future occupants. Further details of the issues considered in the design process are provided in the Design and Access Statement (**Appendix 4.1**).

4.7 The initial design showed a central spine road with development parcels throughout the Site and the school in a central location. Following a meeting with the Lead Drainage Authority and the Environment Agency, the outline layout was revised. Further assessment also shaped key views although it was accepted that the layout occupying a ridge line position would be visible like other residential areas nearby when MC identified the Site for housing in its development options document.

4.8 The design was then modified to move the school was moved to a more southern location and properties in the main residential area were arranged either side of a stronger pedestrian route with taller properties (3 to 4 storeys) located in the central locations and lower properties (2 to 2.5 storeys) located at the edges of the Site. Further refinements of the layout followed after additional analysis of key vantage points and following feedback from the South East Design Panel Review. Ecological and transport input from the team also strongly influenced the emerging layout proposals.

4.9 Further changes to the layout design were driven by the desire to create strong character areas and a central urban hub focused around a small number of local shops and a doctors surgery. The need for strong pedestrian/cycleway connectivity as part of a strong landscaped



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framework within which the development would be set whilst working with the level changes and woodland buffers of the Site also led the layout to be further refined.

4.10 The evolution of the Proposed Development has responded to a variety of design and environmental issues and the resultant proposals are considered to offer the most advantageous design solution to demonstrate that the Site has a realistic capacity of upto 800 dwellings. However, it should be highlighted that the proposal is in outline form and the submitted layout is illustrative since all matters(except access) are reserved for later consideration.

4.11 The final layout of the Proposed Development is identified in Chapter 5 and **Appendix 5, Volume 2**. It is relevant that although the illustrative layout material sets a strong design framework that is based on a strong evidence platform, other layout options within the red line area could be examined for their design quality at the reserved matters stage.





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## 5 THE PROPOSED DEVELOPMENT

5.1 The Proposed Development covers an area of approximately 49.47 hectares (ha).

5.2 The application is submitted in Outline with all matters other than access reserved. The Planning Application seeks planning permission for the following:

- The erection of up to 800 dwellings (C3) including a mix of sizes, types and tenures including affordable housing;
- A Doctors Surgery to accommodate at least two doctors;
- Up to four shops such as local convenience shop / café;
- A two-form entry Primary School;
- Open space; and
- Road infrastructure.

5.3 A proposed Site layout is presented in Figure 5.1. Further plans are provided in **Appendix 5, Volume 2**.

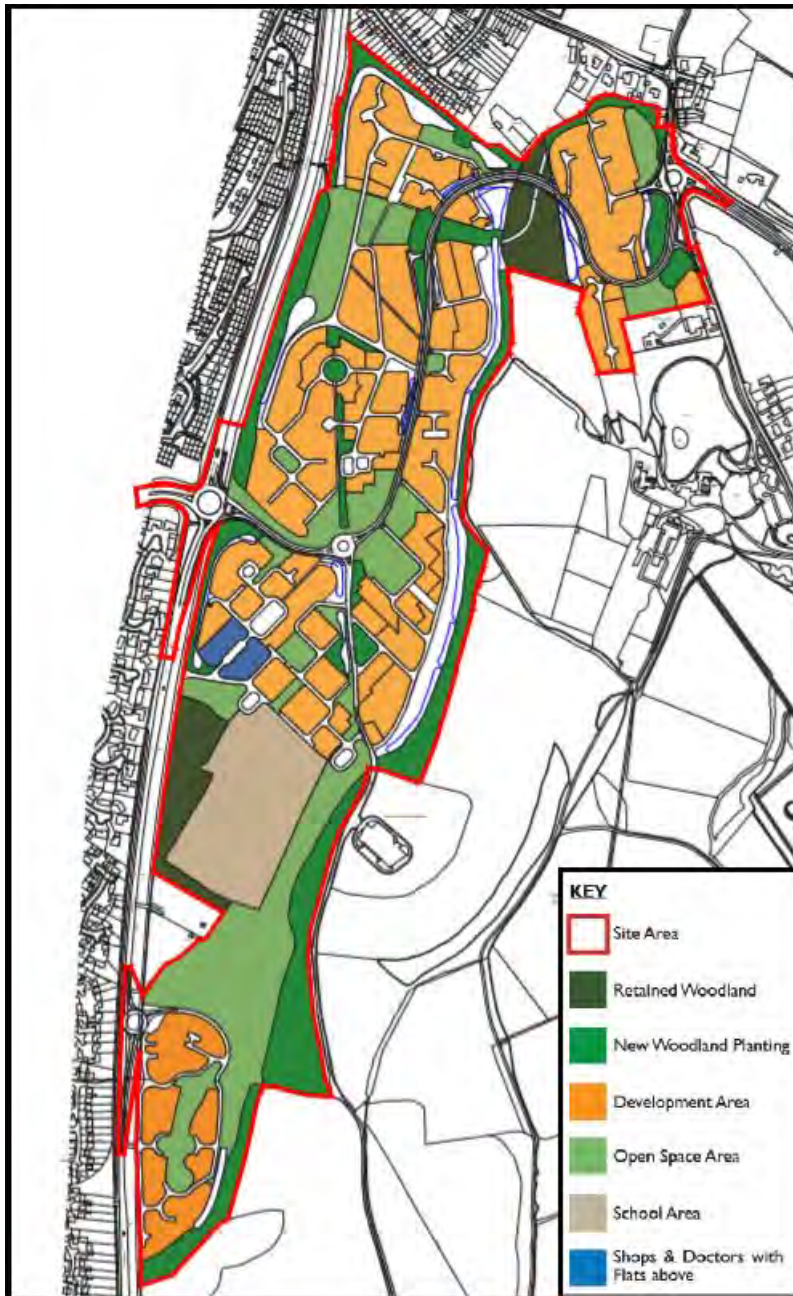
**Figure 5.1: Proposed Site Plan**



**Land Use**

5.4 The proposed land use within the Proposed Development is illustrated in Figure 5.2 below:

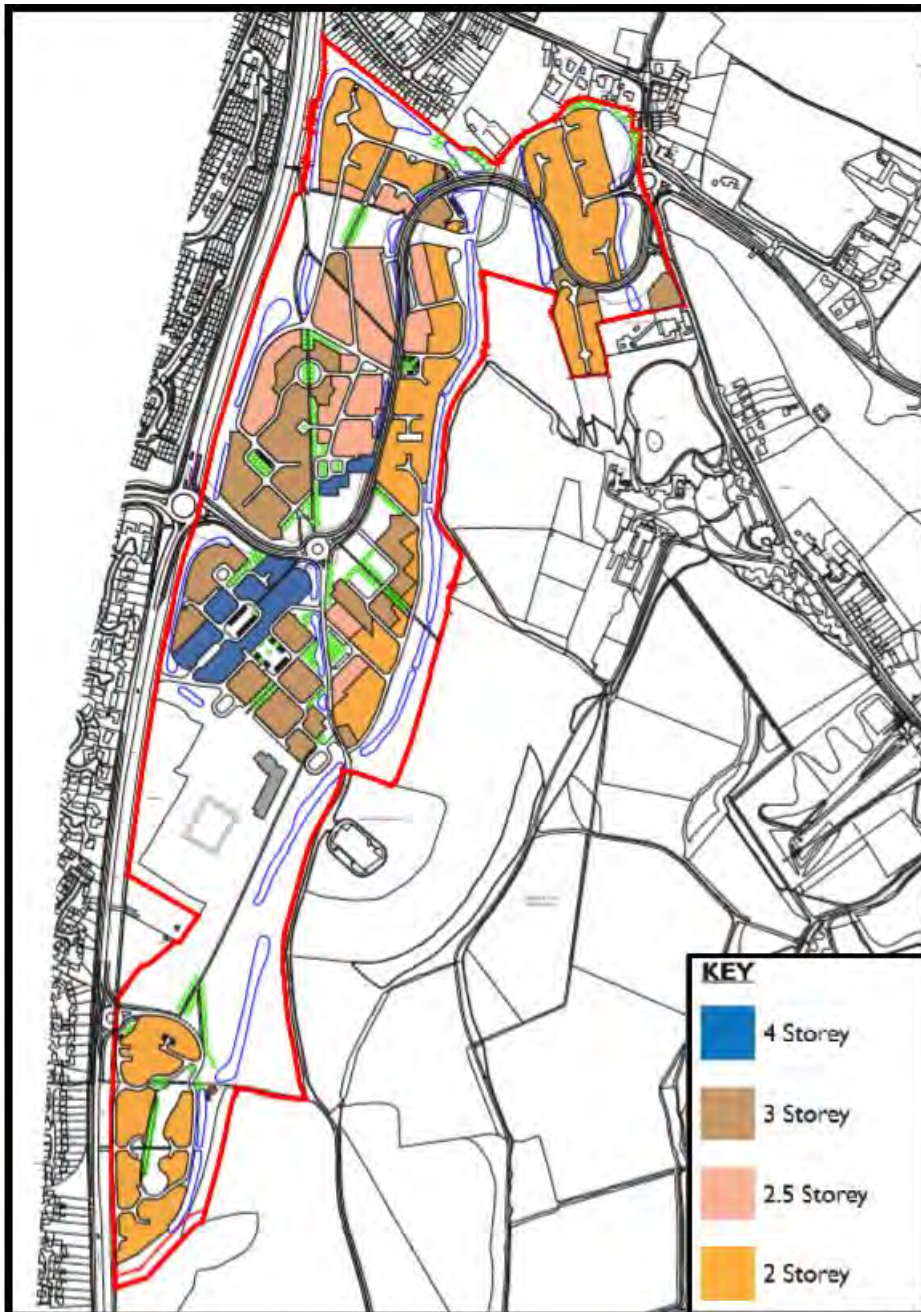
**Figure 5.2: Proposed Land Use**



### Scale and Massing

5.5 The Proposed Development is predominantly two storeys in height which is in-keeping with the surrounding districts and no building will exceed four storeys in the urban area. A small proportion of apartments will be four storeys high and up to a maximum height of 14m to the ridge. These buildings will only be located in certain key locations away from the edges of the Site, where their increased mass would benefit the overall streetscapes and give emphasis and interest to the Proposed Development.

**Figure 5.3: Building Heights**



**Density**

5.6 The residential element of the Proposed Development will have an overall density of approximately 42 dwellings per hectare, but will vary across the Site.





## Quantum of Development

5.7 Table 5.1 identifies the quantity of the land proposed for the uses to be provided by the Proposed Development.

**Table 5.1: Land Budget Summary**

	<b>Land Budget Summary</b>
Site Area	49.47 ha
Development Area	16.3 ha
Open Space / Landscaping	19.15 ha
Other (including road infrastructure)	14.02 ha
<b>Residential</b>	
Density	42 dwellings per ha
Total no of dwellings	Up to 800
<b>Public Amenities and Facilities</b>	
Shops / Cafes	150 m <sup>2</sup>
Primary School	3 ha
Doctors Surgery	300 m <sup>2</sup>
<b>Open Space / Landscaping</b>	
Retained Woodland	2.2 ha
New Woodland Planting	6.95 ha
Open Space (including LEAP, NEAP and Trim Trail)	10 ha

## Residential Uses

5.8 The residential component of the Proposed Development forms a significant part of the development proposals and will provide up to 800 new homes.

5.9 The Proposed Development will comprise a range of housing types, sizes and tenures.

## Public Amenities and Facilities

5.10 The proposed scheme will provide the following:

- up to four shops / cafes and doctors located in a central location in the Site, near the school / surgery and accessible from North Dane Way;
- a two form entry Primary School with sufficient land to accommodate a third form if required to meet future pupil demand;
- a Doctors Surgery with at least 2 doctors and flats above. It could accommodate a larger surgery with 6 to 8 doctors if necessary.

5.11 The location of the proposed public facilities is illustrated in Figure 5.4 below.

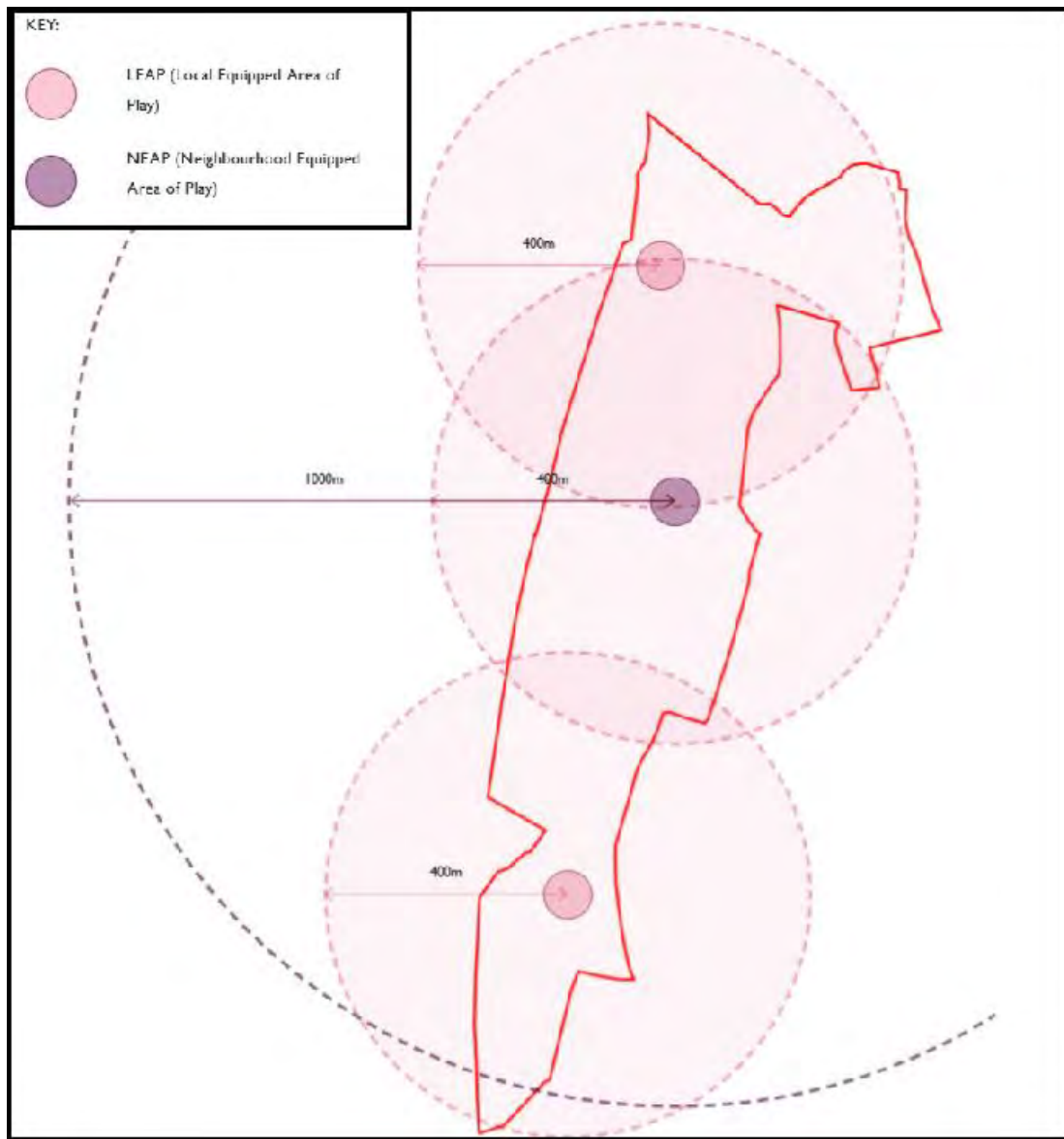
**Figure 5.4: Public Facilities**



### **Open Spaces**

5.12 The Proposed Development will include the provision of two Local Equipped Areas of Play, a Neighbourhood Equipped Area of Play, a Community allotment and Trim Trails and small play features along a central green route.

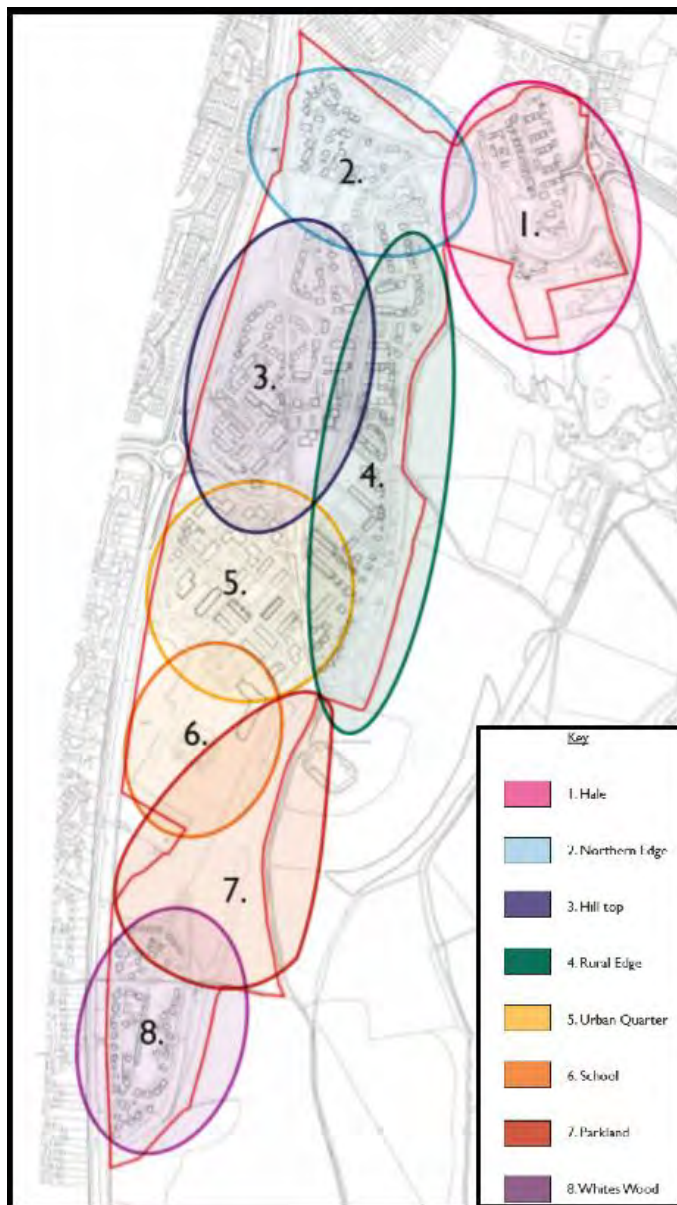
**Figure 5.5: Play Spaces**



### Character and Design

5.13 In terms of design, the Proposed Development can be considered to be divided into a series of character zones which are illustrated in Figure 5.6.

**Figure 5.6: Character Zones**



5.14 The Proposed Development will include the following areas:

- A Park – offering views to the countryside beyond which will communicate that health and wellbeing are integral to lifestyle;
- An Urban Centre – containing a local convenience store/units, a doctors' surgery, primary school and parking around an urban/community hub close to North Dane Way, making it useful for existing and new residents and encouraging integration between the existing and new communities;

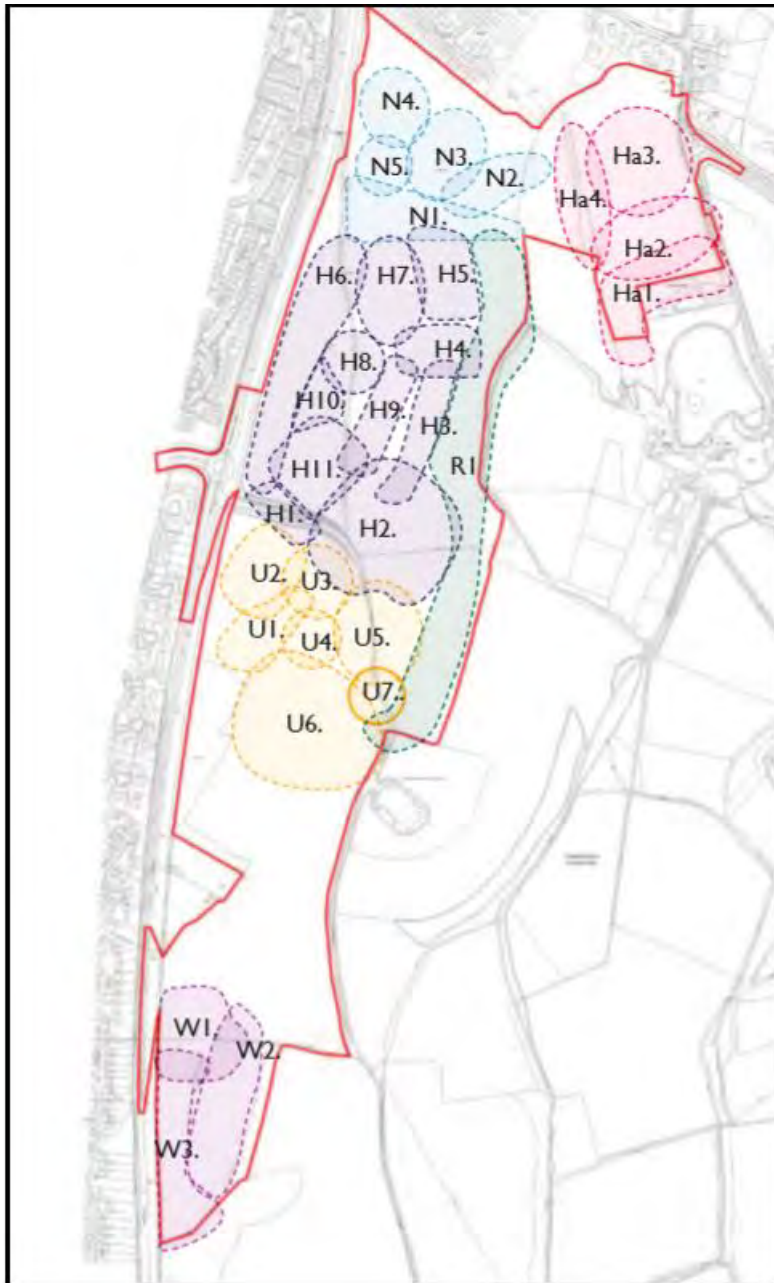




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- The Rural Edge – using unique site conditions to create exceptional places to live, this generously sized linear element establishes pedestrian priority in key areas and defines places that are very desirable for residents who want to live away from the hustle and bustle.
  - Hale – a self-contained area which establishes a new balance for the road dominated existing cluster of homes, creating new routes and leisure opportunities while defining the most desirable housing location within the development.
  - Sub-urban Areas – these locations offer a mix of tenure opportunities and house type.
  - Main Route – establishing rhythm and flexing character creates interesting variety along the main access artery through the Site.

5.15 The areas within the character zones have been further divided into smaller character areas as illustrated in Figure 5.7. A description of each area and the type of housing proposed within each area is described in Table 5.2 below.

**Figure 5.7: Character Zones**



**Table 5.2: Character Areas**

Character Area	Description	Proposed Dwellings
N1: Green Wedge	A large landscaped space that narrows to focus routes towards the rural edge.	A very high value location, an opportunity to provide some large 'Grand Design' homes with excellent views.
N2: Threshold	Landscape is still dominant. Buildings are tall.	A mixed community due to the variety in unit types.
N3: SUDS	Located in the northern part of the Site, it contains the largest SUDS	A quieter location with views over landscaped areas.



Character Area	Description	Proposed Dwellings
	feature. This makes the landscape dominant and attractive.	Buildings are clustered and set back from the road.
N4: Destination	Located in the north western part of the site.	A secluded location with a suburban character with south and west facing gardens.
N5: Road	Located towards the north of the Site on the boundary with North Dane Way.	A cluster of semi-detached and terraced homes and two high value detached properties
H1: Arrival	Steep banks on either side of the road.	A contemporary urban location with long views of townhouses and flats within parkland. This are provides a balanced community.
H2: Urban Park	Good orientation and long views both within and beyond the development. Visible from the road but not dominated by it.	A contemporary urban location with key focal apartment blocks defining the corners of the spaces and terraces of townhouses that address each other across the park.
H3: Road	Arrival in the housing area.	A tree lined street with tall houses defining its edge.
H4: Square	The first big place you arrive at along the main route through East Hill.	Terraces are smaller here but they create a place. A focal location with a strong sense of community.
H5: Avenue	A well defined part of the route where the houses make a strong edge.	The geometry of the road and the houses is intentionally different, so the road is less dominant. Houses sit at the top of the bank formed by the cutting for the road.
H6: North Dane Way Threshold	Has ecological value.	Landscaped area is large to create a buffer from North Dane Way. Most homes are semi-detached, an apartment block to the north has amazing views over the two landscaped areas.
H7: Grand Designs	A visible and prominent area either side of the main west-east pedestrian leisure route.	Design quality is showcased in this area. Homes are modern, simple and stylish.
H8: The Circus	This is one of the highest and most visible areas of the Site, the Circus will form a new landmark.	Created to define the gateway into the more urban area of the development as you walk south along the line of the existing pedestrian route. Large detached houses with visible gaps between.



Character Area	Description	Proposed Dwellings
H9: Axis	This series of spaces links the brow of the hill with the urban park to the south.	The predominant house type will be terraces.
H10: Street	Located on the western side of the Site. It links the main pedestrian route to the urban park with the Circus to the north.	Terraced and semi-detached homes are staggered to define interesting spaces along the roadway.
H11: Southern Cluster	Located immediately above the new entrance.	A dense urban area characterised by well defined spaces.
U1: Public Square	Located in the heart of the urban area, it is the focal arrival point from the slip road south of the roundabout.	Will comprise four storey apartment blocks and a landscaped square. There will be a parade of shops on the right side with three storeys of apartments above.
U2: Urban Homes	Located on the western edge of the urban area bordering North Dane Way.	Three storey contemporary townhouse facing south and east.
U3: Apartments	Located adjacent to the main public square.	Four storey apartment blocks overlooking a south facing square.
U4: Square	Located to the east of the main public square	Three storey houses and four storey flats.
U5: Transition	A landscaped space either side of the main route heading north.	Three storey townhouses varying in size.
U6: Primary School	Located at the gateway to the parkland	Houses in this area are three storey and predominantly south facing with outstanding views from upper floors.
U7: Arrival / Threshold	Marks the arrival into East Hill heading north.	Houses in this area will be terraced, semi-detached or detached.
R1: Rural Edge	Located on the eastern fringe of the Site. Leisure routes run the length of the Site on the eastern boundary.	Mainly detached housing.
W1: Arrival	Accessed from a new roundabout to the south of North Dane Way with outstanding views of the parkland.	Detached housing with kerb appeal.
W2: Secluded	Located on the eastern corner of the White Woods area.	Detached houses in clusters overlooking landscaped areas.
W3: North Dane Way	Located on the western edge and southern cluster.	A mixture of semi-detached and detached houses.
Ha1. Exclusive	Located at the top of the hill	Detached high value houses
Ha2: Arrival	Located at the entrance to the Site	Homes vary in size and orientation.
Ha3: Village Green	Located near to roundabout	Detached houses overlooking the green
Ha4: Woodside	Located at the top of the slope	A cluster of detached homes in a prime leisure location



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Character Area	Description	Proposed Dwellings
		adjacent to woodland and pedestrian routes.

## Access

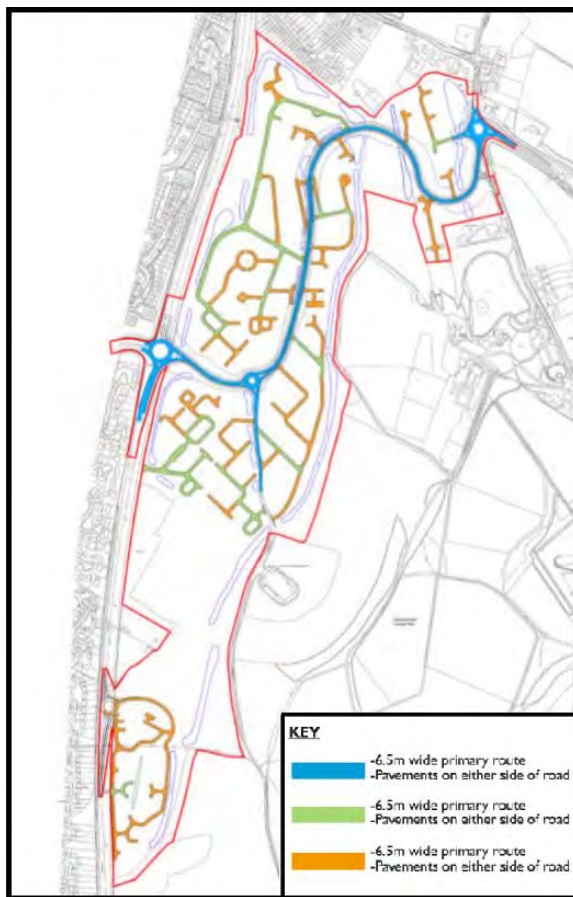
5.16 The Site lies between Luton & Wayfield and the Capstone Country Park. The development of the Site provides an opportunity to provide a strategic link for pedestrians and cyclists from the urban areas of Luton and Gillingham via the Capstone Farm Country Park to the network of paths and roads in the Kent Downs AONB.

5.17 The Proposed Development will connect to the surrounding road network via junctions on North Dane Way to the west and Capstone Road / Peartree Lane to the east. The Proposed Development will include a new link road which will provide relief to the Capstone Road around the Ash Tree Lane junction.

5.18 The link road will also facilitate a sustainable transport corridor between the east and west, linking either side the valley without reliance on the A2 or rural lanes and allowing enhanced sustainable travel modes including new bus links and footway/cycleway connections.

5.19 The proposed access points and road network are illustrated in Figures 5.8.

Figure 5.8: Proposed Road Layout





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## **6 DEVELOPMENT PROGRAMME AND CONSTRUCTION**

### **INTRODUCTION**

6.1 This chapter describes the anticipated programme of development works and the key activities that would be undertaken on the Site during the construction phase of the project. It identifies, in general terms, the potential effects associated with construction activities and outlines proposals for their mitigation. Detailed consideration of construction-related environmental effects upon the various technical topics assessed, together with their associated mitigation measures, are provided in each of the technical assessment chapters of this ES.

6.2 It is proposed that a Construction Environmental Management Plan (CEMP) would be prepared and implemented for the construction phase of the Proposed Development. This would be discussed and agreed with the relevant planning officers at MC prior to the commencement of works at the Site. An outline of the content of the CEMP is provided in this Chapter.

6.3 Planning for construction is necessarily broad at this stage and may be subject to modification. For example, specific construction activities could vary in frequency depending upon the particular stage of works. Consequently, where uncertainty exists, the assessment has assumed a 'worst-case' situation. It is considered, however, that sufficient information is available at this stage to enable the likely significant environmental effects relating to the construction works to be identified and their significance assessed.

### **PROGRAMME OF WORKS**

6.4 The construction period is anticipated to be approximately seven years to complete the Proposed Development in its entirety.

### **DESCRIPTION OF THE WORKS**

6.5 The proposed construction works can be divided into the following main stages:

- Enabling works;
- Site preparation;
- Construction of the mixed use development; and
- Removal of remaining construction elements.



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## Enabling Works

6.6 Enabling works will be undertaken prior to the start of the main construction works. The extent of these works would include:

- Establishment of site project offices and construction compound including car designated parking areas for contractors;
- Isolation or diversion of utility services impinging upon excavation areas;
- Provision of temporary electrical supplies and other required services for the duration of the construction works; and
- Erection of site hoardings including provision of a site security system.

## Site Preparation

6.7 All existing non-critical infrastructure will be removed. All works will be strictly managed to ensure that vehicle movement and dust are controlled and kept to a minimum. Further details on the management of dust are included in Chapter 8: Air Quality.

6.8 All live utilities and any live drainage would be capped off or diverted before any excavation works commence. A method statement will be produced outlining the process for identifying and disconnecting existing services at the Site.

6.9 Once the temporary works are in place, any groundworks or earthmoving would proceed. All material will be re-used on site where possible, or otherwise transported off-site where reuse is not possible.

## Construction of the Proposed Development

6.10 This phase will include the construction of the access roads within the Proposed Development.

6.11 The Site would require new mains water, gas, electricity and IT/telephone connections. Statutory services will be brought into the Site as and when the programme dictates, although the trenching works will be carried out alongside the substructure work.

6.12 The operation of construction vehicles and general construction activities may give rise to the potential for surface runoff to become contaminated with hydrocarbons, silt or other construction materials. This may in turn lead to a contamination event should site drainage be





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allowed to enter watercourses. Excavations may require dewatering (of accumulated rainfall or runoff) during construction. In such circumstances, it will be important to ensure that the quality of this water is sufficiently high to allow discharge to an appropriate point. Further details on drainage are provided in Chapter 12: Water Quality, Hydrology and Flood Risk.

#### Removal of Remaining Construction Elements

6.13 This last phase will be undertaken at the end of the main construction works or where the construction has progressed to a stage where it can be undertaken at an earlier time. The extent of these works would include:

- Removal of site project offices and construction compound;
- Decommissioning of temporary electrical supplies and other required services utilised for the construction works; and
- Removal of site hoardings and site security system.

#### **HOURS OF WORK**

6.14 It is proposed that hours of work during the construction phase would be as follows:

- 0700-1900hrs on weekdays;
- 0700-1300hrs on Saturdays; and
- No working on Sundays or bank holidays.

6.15 These proposed hours would be agreed with the Local Authority Planning department prior to commencement of the works. Special working outside these hours, such as heavy plant activities and crane and equipment assembly, would be kept to a minimum and would be subject to prior agreement with reasonable notice by the Local Authority's Environmental Health Officer (EHO).

6.16 It is anticipated that none of the works outlined above will be carried out on Sundays or Bank Holidays without special prior agreement with MC and other relevant parties.



## PLANT AND EQUIPMENT

6.17 The following plant and equipment is anticipated to be used during the construction works.

**Table 6.1: Indicative Plant used during Construction**

Plant and Equipment	Enabling works and Site Preparation	Construction	Services installation	Fit out	Landscaping
Concrete silo and ready-mix lorries		X	X		X
Concrete cutter, saws and splitters	X	X	X		X
Cranes and hoists	X	X			
Cutters, drills and small tools		X	X	X	
Excavators and breakers	X	X	X		X
Floodlights	X	X		X	
Fork lifts trucks		X	X	X	
Hydraulic benders and cutters		X	X	X	
Road Brush Vehicles		X	X	X	
Lorries/vans	X	X	X	X	X
Tarmac laying equipment		X			X
Scaffolding and access platforms		X		X	X
Temporary supports		X		X	
Tipper lorries		X			X
Wheel washers	X	X	X		X
Skips & Skip trucks	X	X		X	X



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## ENVIRONMENTAL MANAGEMENT AND MITIGATION

### Environmental Management Plan

6.18 A principal construction contractor will be responsible for all aspects of construction operations. In line with best practice, the construction contractor will subscribe to the CCS (Considerate Contractors Scheme).

6.19 A CEMP would be prepared by the Principal Contractor which would include details of all relevant environmental management controls necessary for environmental protection during the construction works. This would follow best practice guidelines and would be agreed with the Local Authority Environmental Health Department.

6.20 The CEMP would include:

- Restrictions and targets for specific work activities in order to minimise environmental effects, including disruption and disturbance to local residents (if relevant), workers and the general public;
- Details of the means by which appropriate environmental monitoring, record keeping and reporting would be managed to ensure the above targets are being met;
- Procedure(s) to deal with necessary 'abnormal' works that may result in deviation from the agreed procedures and targets; and
- Provision for a programme of regular environmental audits and reviews at key stages in the construction programme.

6.21 The CEMP would place stringent contractual and procedural performance obligations upon trade contractors. These would be maintained and reinforced by commitments detailed below and, where relevant, within Chapters 7-14 inclusive. Such obligations would be enforced through subsequent detailed agreements with and consents provided by the Local Authority. A clear management structure and description of the responsibilities and authority of a specific Project Environmental Manager (PEM) would be included.

6.22 The PEM would have primary responsibility for liaising with the Planning Authority and other statutory agencies on environmental matters. It is anticipated that regular meetings would take place to review progress and to agree necessary options. Notwithstanding this, it is recognised that positive action and reaction by site operatives at the time of any environmental incident or breach of targets are essential components for effective environmental management.



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6.23 The CEMP would address requirements in relation to environmental controls and would allow for, and include, the following:

- The appointment of an experienced PEM responsible for the preparation and implementation of the CEMP;
- Details of the phasing of the works, including information on construction works that may be carried out by trade contractors;
- Procedures for construction activities, highlighting any operations likely to result in adverse environmental effects, with an indication of the mitigation measures to be employed;
- Wheel washing and highway cleaning procedures;
- Reference to and provision of a framework for compliance with all legislation that would be relevant;
- Emergency procedures that would be implemented on the Site;
- Prohibited or restricted operations;
- Control limits of target criteria for environmental issues, where practicable;
- Requirements for monitoring and record-keeping;
- Mechanisms for third parties to register complaints and the procedures for responding to complaints;
- Provisions for reporting, public liaison and prior notification, especially where dispensations would be required;
- Details of construction operations, highlighting the operations most likely to result in disturbance and/or working outside core working hours, together with an indication of the expected duration of each activity;
- Possible departures from target criteria and details of how any adverse effects would be minimised or potential complaints addressed;
- Details of proposed routes for HGVs travelling to and from the Site;
- Provisions for auditing by the PEM, MC and other regulatory authorities, where appropriate;
- Details of plant to be used;
- Details of all construction works involving interference with a public highway, including temporary carriageway/footpath closures, realignments and diversions; and
- Housekeeping procedures and environmental management controls.



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### Contract Conditions

6.24 Individual trade contracts would incorporate appropriate requirements in respect of environmental control, based largely on the standards of 'good working practice' outlined in the EMP in addition to statutory requirements. Contractors would therefore be required to demonstrate how they would achieve the provisions of the EMP, how targets would be met and how potential adverse environmental effects would be minimised.

### Management of Construction Works

6.25 The PEM would deal with queries from the public and other complaints and enquiries. This nominated individual would be named at the Site entrance, with a contact number and would be identified to the Local Authority and community groups, prior to the start of the Site activities and whenever a change of responsibility occurs.

6.26 Any complaints would be logged and reported to the relevant individual within the Local Authority (and *vice versa*) as soon as practicable.

6.27 The CEMP would specify the roles and responsibilities of the PEM and the appropriate Officers within Local Authority in respect of any breaches or complaints from the public. The required actions would be different in each specific case, depending on the operation, equipment or location.

### Emergencies and Accidents

6.28 The building contractor would be required to maintain high safety standards on-site and to be fully compliant with current health and safety legislation.

6.29 An Emergency Incident Plan would be put in place to deal with potential spillages and/or pollution incidents. Any pollution incidents would be reported immediately to the regulatory bodies.

### Materials Storage and Handling

6.30 Environmental issues would be considered in the procurement of raw materials and manufactured building components and all such materials would be appropriately stored on the Site to minimise damage by vehicles, vandals, weather or theft. Deliveries of hazardous



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materials would be supervised and a just-in-time deliveries system would be implemented to minimise storage times and reduce the risk of spillage on-site. Tanks and drums of liquid chemicals and fuels would be stored in bunded compounds. Packaging materials would be returned, where possible.

6.31 Contractors and their sub-contractors would be expected to maintain a tidy site and, where practical, to operate a 'just-in-time' policy for the delivery and supply of materials for the works.

6.32 Where possible, pre-fabricated elements would be lifted directly into position from delivery vehicles. This would assist in reducing on-site storage and labour requirements and construction noise levels to surrounding sensitive receptors.

6.33 Mobile cranes would be used for general unloading and hoisting during the structural and envelope works. Passenger/goods materials hoists, fork lift trucks and other electric or hydraulically operated plant may be used to distribute and transport materials around the Site.

#### Waste Management and Minimisation

6.34 Waste would be generated during all stages of the construction works. Although specific materials cannot be identified at this stage of the design, potential sources of waste within the construction process are anticipated to comprise:

- Excavated material;
- Packaging – including plastics, wooden pallets, expanded foams;
- Waste materials generated from inaccurate ordering, poor usage, badly stored materials, poor handling, spillage; and
- Dirty water, for example from Site runoff containing silt.

6.35 It is the intention of the project to use all excavated material, wherever possible within the Proposed Development.

6.36 A Site Waste Management Plan (SWMP) would be developed and implemented detailing how waste created during the construction phase would be managed. This would be prepared by the Contractor in accordance with the Site Waste Management Plan Regulations 2008 and non-statutory guidance on preparation of SWMPs. All relevant Contractors would be required to investigate opportunities to minimise waste arisings at source and, where such waste generation is unavoidable, to maximise the recycling and reuse potential of construction



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materials. Recycling of materials would take place off-site, where noise and dust are less likely to result in effects to the occupants of surrounding properties. Appropriate waste management and recycling centres close to the Site would be identified prior to the construction works and contracts would be established with registered waste carriers and authorised waste disposers for construction waste.

6.37 All waste would be stored on the Site in accordance with the relevant legislation and no burning of construction waste would be undertaken at the Site.

6.38 The destination of all waste or other materials removed during construction would be notified to the relevant authority by the Contractor/Construction Manager for approval. Loads would only be deposited at authorised waste treatment and disposal sites. Deposition of waste would be in accordance with the requirements of the EA, Environmental Protection Act 1990 (EPA), the Controlled Waste Regulations 1992 as amended, the Hazardous Waste Regulations 2005 (**Ref 6.2**), the List of Wastes (England) Regulations 2005 (**Ref 6.3**) and the Waste (England and Wales) Regulations 2011.

#### Traffic and Access Management

6.39 An assessment of the potential effects of the Proposed Development on traffic and the local transportation network is presented in Chapter 7: Transport and Access.

6.40 Specific detail relating to the management of construction traffic will be presented within a dedicated construction transportation plan, which will be submitted for approval by the Local Authority post planning.

6.41 All construction traffic entering and leaving the Site would be closely controlled. Deliveries would be phased and controlled on a 'just-in-time' basis, wherever possible. This would minimise travel time and traffic congestion around the Site.

6.42 The majority of all deliveries would be made by standard HGVs, with no special access / delivery requirements.

6.43 The Traffic Management Plan would detail the management of the above measures as well as the management of car parking on the Site and the Site labour force travel to the Site. No parking on public roads would be allowed and the Contractor/Construction Manager would be responsible for enforcing this requirement. Provision would be made within the Site for



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essential on-site parking. Any local traffic management measures for Site access would be agreed with the relevant authorities.

### Air Quality and Dust

6.44 Site-specific best practice measures would be implemented by contractors to minimise the disturbance to local residents and other potentially sensitive receptors. These measures would include:

- Damping down surfaces during dry weather;
- Providing appropriate hoarding and/or fencing to reduce dust dispersion and restrict public access;
- Sheeting buildings, chutes, skips and vehicles removing wastes with the potential for dust generation;
- Appropriate handling and storage of materials, especially stockpiled materials;
- Restricting drop heights onto lorries and other equipment;
- Fitting all equipment with dust control measures such as water sprays wherever possible;
- Using a wheel wash, limiting speeds on the Site to 5 mph, avoidance of unnecessary idling of engines and routing of Site vehicles as far from sensitive properties as possible;
- Using gas powered generators rather than diesel, if possible (these are also quieter) and ensuring that all plant and vehicles are well maintained so that exhaust emissions do not breach statutory emission limits;
- Switching off all plant when not in use;
- No fires would be allowed on the Site; and
- Ensuring that a road sweeper is available to clean mud and other debris from hardstanding, roads and footpaths.

6.45 Full assessments of the potential effects of the construction works on air quality are presented in Chapter 8: Air Quality.

### Hazardous Materials and Contaminated Land

6.46 Prior to construction, the Contractor would be required to prepare a Method Statement and Risk Assessment demonstrating how the safety of construction workers and the public





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would be addressed in terms of potentially harmful substances. Protective measures would include:

- Provision of adequate facilities and procedures for personal washing and changing;
- Provision and use of personal protective equipment (PPE);
- Implementation of dust suppression methods; and
- Implementation measures to avoid surface water ponding and the collection and disposal of the Site runoff.

6.47 Such measures should be carried out in accordance with the Protection of Workers and the General Public during the Development of Contaminated Land document and CIRIA Report 132: A Guide for Safe Working on Contaminated Sites (**Ref 6.4**).

6.48 Other practical methods of limiting risks from hazardous materials and contaminated land would include:

- The storage of all potentially hazardous materials on hard surfaced areas, with bunding to the satisfaction of the Environment Agency;
- The storage of ground tank oil in accordance with the Control of Pollution (Oil Storage) (England) Regulations, 2001 (**Ref 6.5**); and
- The treatment of any excess dewatering effluent prior to discharging to the foul sewerage system and only on the achievement of an approved discharge consent from Southern Water.

#### Site Drainage and Effects on Water Resources

6.49 The assessment of the potential effects of the Development proposals on water resources is presented in Chapter 12: Water Quality, Hydrology and Flood Risk. In summary, a precautionary approach would be adopted to appropriately manage construction-derived surface water run-off. As such, particular care would be taken to prevent any release or mobilisation of pollutants, which could pose a potential risk to receptors such as surface water and groundwater.

6.50 Best practice pollution prevention measures would be put in place to isolate environmentally damaging substances and prevent their release. These measures would be agreed in consultation with the Environment Agency and Southern Water and would include:



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- Secure, careful siting and bunding of fuel storage facilities and any areas used for the storage of potentially hazardous materials;
  - Use of drip trays when filling smaller containers from tanks or drums to avoid drips and spills;
  - Works involving concrete would be carefully controlled and ready-mix concrete wagons would be washed out in a safe designated area;
  - The avoidance of stockpiling materials wherever possible to prevent spills and, where undertaken, sheeting and covering these stockpiles and haulage vehicles loads;
  - Management of the Site drainage to prevent sediment laden contaminated runoff entering the wider environment;
  - Surface drainage would pass through settlement and oil interceptor facilities where required;
  - Provision for the treatment and safe disposal of wastewaters, including water from dewatering pumping operations should these be undertaken;
  - Appropriate management and transportation of the Site waste including the establishment of dedicated waste storage areas designed to prevent pollution, regular inspections and the implementation of waste minimisation and management plans as described above; and
  - Ensuring that any water which may have come into contact with contaminated material would be disposed of in accordance with the Water Resources Act (1991) and other legislation, to the satisfaction of the Environment Agency.

6.51 Furthermore, any piling systems would be designed to minimise the risk of potential pathways for contamination to reach groundwater resources.

6.52 An Emergency Plan would be implemented, forming part of the CEMP, outlining procedures to follow in the instance of any accidents involving spillages. This would involve the provision of on-site equipment for containing spillages, such as emergency booms and chemicals to soak up spillages. Should an incident occur, the Environment Agency would be contacted immediately.

#### Protection of Ecological Resources

6.53 An assessment of the potential effects of the Development on ecological resources is presented in Chapter 11: Ecology and Nature Conservation.



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6.54 Chapter 11 details the measures that will be taken to mitigate effects from the Proposed Development can be broadly summarised as follows:

- Screening during construction;
- No trenches or excavations to be left open, though if unavoidable, exit ramps will be put in place;
- No night-time working or lighting during construction;
- Adherence to the EA's Pollution Prevention Guidance Notes;
- Careful timing of works; and
- Ecologically-informed lighting strategy for operational phase.

### **CUMULATIVE EFFECTS**

6.55 Any cumulative effects during the construction phase are identified within Chapters 7-14 where relevant.

### **SUMMARY AND CONCLUSIONS**

6.56 The construction effects of the Proposed Development would be managed through the development of a project and site-specific CEMP. The CEMP would be agreed with the Local Authority and other relevant bodies prior to the commencement of works which, as a minimum, would comply with the mitigation measures set out in this ES. The CEMP would outline methods for contractor and general public liaison, hours of work, methods to deal with complaints and outline management practices to control dust, traffic and access, waste, water pollution, ecological and archaeological effects, ensuring a high level of control throughout the construction works.

6.57 The procedures within the CEMP would ensure the delivery of a high level of environmental control throughout the construction phase, thereby minimising the potential for adverse effects. Further detail regarding specific mitigation during construction works for the Proposed Development is presented within Chapters 7 to 14 of this ES.



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## REFERENCES

**Ref 6.1:** HMSO (2011) The Waste (England and Wales) Regulations 2011

**Ref 6.2:** Office of the Deputy Prime Minister (2005) The Hazardous Waste (England and Wales) Regulations, SI 2005 No.894. HMSO, Norwich.

**Ref 6.3:** HMSO (2005) The List of Wastes (England) Regulations 2005

**Ref 6.4:** CIRIA (2002) CIRIA Report 132 Good Practice Guidance For The Management of Contaminated Land. Safe Working Practices on Contaminated Sites.

**Ref 6.5:** HMSO (2001) Control of Pollution (Oil Storage) (England) Regulations.



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## 7 TRANSPORT

### INTRODUCTION

7.1 This chapter assesses the likely significant effects of the Proposed Development in terms of transport. It is supported by **Appendix 7.1** (The Transport Assessment (TA))

7.2 The chapter describes: the assessment methodology; the baseline conditions currently existing at the Site and in the surrounding area; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; the likely residual effects after these measures have been employed; and the cumulative effects associated with the Proposed Development.

### LEGISLATION, POLICY AND GUIDANCE

7.3 The assessment has been undertaken within the context of relevant planning policies and guidance documents. There is no legislation identified as being relevant to transport.

#### Planning Policy Context

##### National Planning Policy

*The National Planning Policy Framework (NPPF) (Ref. 7.1)*

7.4 The National Planning Policy Framework (NPPF) details the national policy for Transport. At the heart of the NPPF is a presumption in favour of sustainable development which is highlighted as “*the basis for every plan, and every decision.*”

7.5 Paragraph 103 states that the “*...The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making.*”



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7.6 Paragraph 109 of the NPPF gives reference to Transport Assessments and the plans and decisions to be taken from them.

*“In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:*

- (a) appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;*
- (b) safe and suitable access to the site can be achieved for all users; and*
- (c) 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.”*

7.7 Paragraph 109 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

#### *Medway Local Transport Plan 3 (LTP3)*

7.8 Kent County Council’s Local Transport Plan provides a framework for transport policy within Kent. Its purpose is to set out the County Council’s current priorities for local transport investment for the period 2016-31.

7.9 MC’s current third Local Transport Plan (LTP3), which covers the period 2011-2026, sets out the key strategic policy for sustainable transport throughout Medway.

7.10 The LTP3 seeks to address wider social, economic and environmental challenges for the area. The ambition of the transport strategy, which is closely aligned to Medway’s Sustainable Communities Strategy, is to deliver transport interventions that contribute to five overarching priorities that focus on:

- “Supporting Medway’s regeneration, economic competitiveness and growth by securing a reliable and efficient local transport network;
- Supporting a healthier natural environment by contributing to tackling climate change and improving air quality;



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- Ensuring Medway has good quality transport connections to key markets and major conurbations in Kent and London;
  - Supporting equality of opportunity to employment, education, goods and services for all residents in Medway; and
  - Supporting a safer, healthier and more secure community in Medway by promoting active lifestyles and by reducing the risk of death, injury or ill health or being the victim of crime.”

7.11 Section 3 of the LTP3 details Medway’s framework for delivery, which includes their long-term transport objectives spanning over the period of the plan. Each of these objectives has a specific focus and seeks to deliver improvements towards the plan’s priorities, together with contributing to other agendas of Medway Council and its partner organisations.

7.12 The key transport objectives for Medway and underlying principles of each objective as set out in the plan are provided below:

- Highway maintenance – *“To undertake enhanced maintenance of the highway network in the most sustainable way practical.”*
- Improving transport infrastructure capacity – *“To respond to regeneration by efficiently and safely managing and improving Medway’s road network, including improving road freight movements through Medway.”*
- Improving public transport - *“To respond to the regeneration of Medway by encouraging travel by public transport including improving the quality, reliability, punctuality and efficiency of services.”*
- Encouraging active travel and improving health - *“To contribute to improving health by promoting and developing transport corridors that encourage personal movement and by improving air quality.”*
- Improving travel safety - *“To reduce casualties on Medway’s roads and to encourage changes to travel habits by the implementation of Safer Routes to School projects.”*

7.13 Section 5 of LTP3 sets out the actions that are planned to deliver the above objectives and how the success of the plan will be measured. LTP3 states, *“to allow funding for large one-off projects to be effectively targeted during the 15-year period of the strategy, some interventions are prioritised for short, medium and long-term delivery”*. These delivery periods are defined as:

- Short term: April 2011 to March 2016





- Medium term: April 2016 to March 2021
- Long term: April 2021 to March 2026

### *Medway Local Plan 2003*

7.14 The Medway Local plan 2003 was adopted in May 2003, replacing the Medway Towns Local Plan 1992 and Medway Local Plan Deposit Version 1999.

7.15 There are 23 policies related to transport enlisted as T1 to T23 which are contained within Chapter 8 of the Medway Local Plan 2003. The policies which are considered relevant to the site are outlined below.

7.16 Policy T1: Impact of Development; this policy states that development proposals will be permitted provided that;

- The highway network has adequate capacity to cater for the traffic generated from the development;
- The development will not significantly increase the risk of road traffic accidents;
- The development will not generate significant HGV movements on residential roads; and
- The development will not result in traffic movements at unsociable hours in residential roads.

7.17 Policy T2: Access to the Highway; this policy states that development proposals requiring formation of a new access, or an intensification in the use of an existing access will only be permitted where:

- The access is not detrimental to the safety of vehicle occupants, cyclists and pedestrians; or
- Can, alternatively, be improved to a standard acceptable to the council as Highway Authority.

7.18 Policy T3: Provision for Pedestrians; this policy states that development proposals shall provide attractive and safe pedestrian access which are accessible by people with disabilities, as well as, maintain or improve pedestrian routes related to the site.

7.19 Policy T4: Cycle Facilities; this policy states that development proposals should include cycle facilities related to the site.



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7.20 Policy T6: Provision for Public Transport; this policy states, where of sufficient scale, new developments will be expected to make provision for access by public transport.

7.21 Policy T11: Development Funded Transport Improvements; this policy states legal agreements with development would be sought to secure off-site improvements to transport infrastructure, public transport services and improved accessibility by all modes of transport.

7.22 Policy T12: Traffic Management; this policy states road layouts within new developments will need to be designed with appropriate traffic management measures to help limit vehicle speeds and improve safety for all road users.

7.23 Policy T13: Vehicle Parking Standards; this policy states that development proposals will be expected to make vehicle parking provision in accordance with the adopted standard.

7.24 Policy T22: Provision for people with disabilities; this policy states that facilities to be used by public included within the development proposals should be suitable for people with disabilities.

#### *Future Medway Local Plan*

7.25 Medway's emerging Local Plan covering the period up to 2035 is currently being prepared and once finalised, will replace the 2003 Medway Local Plan. Further consultation on spatial options, the outcome of which is dependent on a HIF bid is expected in summer 2019.

#### Guidance Documents

7.26 In producing this ES chapter, reference has been made to the following guidance documents:

- "Guidelines for the Environmental Assessment of Road Traffic" (Institute of Environmental Assessment (IEA), 1993); and
- "Assessment and Management of Environmental Effects" (Design Manual for Roads and Bridges, HA205/08 Volume 11, Section 2, Part 5, 2008)

#### **ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA**

7.27 Table 2.1 of the IEA guidelines sets out a checklist of "*environmental effects*" to be considered. Some of the items listed (namely, noise, vibration, visual impact, air pollution, dust



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and dirt, and ecological impacts) are covered in Chapters 9, 10, 8 and 11 respectively of the ES, and so will not be included in this transport chapter. The following topic areas to be considered in this chapter include:

- Severance;
- Driver delay;
- Pedestrian delay;
- Pedestrian amenity;
- Accidents and safety; and
- Hazardous loads.

7.28 It is not anticipated that the Proposed Development requires transportation of dangerous or hazardous loads. Therefore, this topic has been scoped out.

7.29 Information to inform this chapter has been taken from the TA in **Appendix 7.1** which considers:

- The Proposed Development in the context of current transport policy;
- Existing transport conditions in the vicinity of the Site;
- The form of the Proposed Development including all proposed access arrangements;
- The accessibility of the Proposed Development by sustainable modes of travel and the identification of new, and any improvements to existing, sustainable facilities and services; and
- The traffic generation and impact upon the local highway network and the identification of mitigation measures.

### Study Area

7.30 The extent of the study area reflects the scale of the Proposed Development and the occurrence of significant effects on the network. The IEA guidelines suggest that “*highway links where traffic flows will increase by more than 30%*” and “*any other specifically sensitive areas where traffic flows have increased by 10% or more*” should be included. However, as discussed below, the TA has relied upon the Medway Strategic AIMSUM model to forecast the impact of the development in the context of assumed emerging Local Plan growth and therefore the period up to 2035. In many cases, the relative impact of the development itself is well within these thresholds whilst the cumulative impact considerably exceeds these thresholds. The TA has adopted a more



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pragmatic and stringent threshold for assessment and this is also reflected in this chapter. Therefore, the study area covers the following junctions and links:

- All site access junctions;
- A2/Magpie Hall Road;
- A2/Luton Road;
- A2/Ash Tree Lane;
- A2/Courtney Road/Hoath Way/Twydall Lane;
- Luton High Street/Capstone Road/Street End Road;
- Capstone Road/North Dane Way;
- Ash Tree Lane/Beacon Road
- Ash Tree Lane/Capstone Road
- Pear Tree Lane/Hempstead Road/Hempstead Valley Drive
- Hoath Way/Ambley Road/Hempstead Road/Courtney Road/Hoath Lane;
- North Dane Way/Lords Wood Lane;
- Albermarle Road/Clandon Road;
- Lordswood Lane/Albermarle Road/Dargets Road;
- Walderslade Road/Princess Ave;
- Walderslade Road/Robin Hood Lane;
- A2045 Walderslade Woods/Boxley Road/Lords Wood Lane/Westfield Sole Road;
- A2045 Walderslade Woods/Fostington Way;
- A229 Maidstone Road/A2045 Walderslade Woods/Rochester Road;
- M2 J3
- Hoath Way/Sharsted Way/Wigmore Road;
- M2 J4

### Methodology

7.31 For details of the full methodology of the assessment, reference should be made to the TA in **Appendix 7.1**. To summarise, at the request of Medway Council Highways the TA fully adopted the Medway Strategic AIMSUM model as the framework for testing the impact of the Proposed Development and its supporting infrastructure. This approach was adopted for the following key reasons:



- The model allows for the cumulative appraisal of the emerging Local Plan growth assumptions up to 2035, without the applicant having to make assumptions on precisely what that scenario is;
- It ensures that the development forecasting assumptions remain consistent with the evidence base used to assess the impact of the Local Plan;
- As a development with a significant infrastructure component, the reassignment nature of the model allows for the full implications of the new link road to be reflected;
- Use of the strategic model allows for a wide geographic impact assessment to be undertaken in a manner consistent with the Local Plan evidence base but which avoids the need for exhaustive base survey data collection.

7.32 Due to the reliance on the Medway Strategic model, the assessment has been undertaken for the following scenarios:

- AM and PM Peak Hour, 2035 Do-Minimum;
- AM and PM Peak Hour, 2035 With-Development.

#### *Forecast Assumptions*

7.33 The future year scenario of 2035 has been adopted to maintain consistency with the Local Plan model year and allow full consideration of the cumulative implications of the development and the Local Plan preferred strategy. The transport model covers the whole of the Medway area and performs both a strategic and micro-simulation function. The specific forecast model used as the basis for this assessment is the 2035 'Do Minimum' scenario test which has been provided by MC and incorporates growth associated with a potential LP spatial strategy for Medway. No transport infrastructure intended to mitigate the LP growth is included in the Do Minimum model.

7.34 A forecast 'With Development' scenario has been developed for the purposes of the TA which is based upon the 2035 Do Minimum scenario but adds the trips associated with the Proposed Development and the proposed new link road through the Site connecting North Dane Way and Capstone Road.

7.35 For the avoidance of doubt, the Medway Council 'Do Minimum' refers to a scenario that includes the anticipated growth; presumably to be subsequently compared to a 'Do Something' scenario which includes transport interventions and strategy. This same 'Do Minimum' scenario is adopted in this chapter and the TA directly and the naming has been retained. However, in this



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case the 'Do Minimum' is to be compared to the 'Development' scenario which includes the combination of the development and its mitigating infrastructure.

### Limitations and Assumptions

7.36 The traffic flow assessment is based on the underlying assumptions which include:

- Trip generation calculations based on empirical evidence of sites in similar locations;
- The extent of the modelled area, which only allows local and not wider, strategic reassignment.

### *Traffic Data Used Throughout the Environmental Assessment*

7.37 The basis for all traffic data used in this ES, including noise and vibration assessment and air quality (Chapters 8 and 9), has been based on the same traffic data sets as the TA, albeit with appropriate factoring to the requirement parameters for the particular disciplines.

### Impact Assessment and Significance Criteria

7.38 To arrive at a judgement on the significance of effects on transport, the assessment considers the relative importance of the receptors and how these are likely to be affected as described below. The impact assessment for the Proposed Development considers a comparison between the AM and PM Peak Hour, 2035 With Development and the AM and PM Peak Hour, 2035 Do Minimum scenarios. Both scenarios include growth and cumulative development assumptions (detailed later and in the TA – **Appendix 7.1**) – accordingly all assessment considered here is cumulative in nature and there is no separate cumulative impact section.

### *Ranking of Sensitivity/Value*

7.39 The sensitivity of a receptor is based on the relative importance of the receptor or resource. The assessment has been carried out in accordance with the IEA guidance which highlights that it is useful to identify particular groups of people or locations which may be sensitive to change in traffic conditions. The guidance sets out the groups of people and special interests to be considered (described as receptors), which are included in **Table 7.1**.

### **Table 7.1: Receptor Classifications of Sensitivity**

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Value (sensitivity)	Receptors
Very High	Sensitive groups including children, elderly and disabled; sensitive locations e.g. hospitals, churches, schools and historical buildings
High	Locations where large groups of people gather such as shopping areas or tourist/visitor attraction
Medium	People walking; people cycling; sites of ecological/nature conservation value; people driving
Low	Open spaces; recreational sites; shopping areas
Negligible	No receptors

### Assessment of Impact Magnitude

7.40 The magnitude of an impact is described as major, moderate, minor, negligible or no change. Impacts are either beneficial or adverse in nature. Such terms are relative to the receptor affected by the impact (i.e. a particular impact can result in a beneficial effect on one receptor and an adverse effect on another), and the criteria associated with them are summarised in **Table 7.2**.

**Table 7.2: Magnitude of Impact and Typical Descriptors**

Magnitude of Impact	Typical Criteria Descriptors
Major	<ul style="list-style-type: none"> <li>Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).</li> <li>Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).</li> </ul>
Moderate	<ul style="list-style-type: none"> <li>Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).</li> <li>Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).</li> </ul>
Minor	<ul style="list-style-type: none"> <li>Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).</li> <li>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 (Beneficial).</li> </ul>
Negligible	<ul style="list-style-type: none"> <li>Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).</li> <li>Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).</li> </ul>
No Change	<ul style="list-style-type: none"> <li>No loss or alteration of characteristics, features or elements; no observable impact in either direction.</li> </ul>

7.41 The assessment of impact magnitude is also in accordance with the IEA guidelines and considers the following topics.

- *Severance*



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7.42 Severance is used to describe “...a complex series of factors that separate people from places and other people”. This can occur due to difficulty crossing a heavily trafficked road or relate to minor traffic flows if they impede pedestrian access to essential facilities. Factors which have been considered in the assessment include road width, traffic flow and composition, traffic speeds, availability of crossing facilities and the number of movements that are likely to cross the affected route.

7.43 In accordance with the IEA guidelines the assessment uses a range of indicators including changes in traffic flows of 30%, 60% and 90% which are regarded as “slight”, “moderate” and “substantial” changes in severance, respectively. Furthermore, consideration has been given to the local conditions such as whether crossing facilities are available and traffic signal settings.

- *Driver Delay*

7.44 Traffic delays have been determined using the individual junction models prepared to assess the local highway network in the AM and PM Peak Hour, 2035 Do-Minimum and AM and PM Peak Hour, 2035 With-Development scenarios to give an estimate of increased vehicle delays (see **Appendix 7.1** for further details).

- *Pedestrian Delay*

7.45 The assessment on pedestrian delay has been carried out using professional judgement in accordance with the IEA guidelines. The volume, composition or speed of traffic have the potential to affect the ability of people to cross roads. Increases in traffic levels are likely to lead to greater increases in delay; and the extent of the delay will be dependent on the level of pedestrian activity, visibility and general physical conditions of the Site.

- *Pedestrian Amenity*

7.46 Pedestrian amenity is defined as “the relative pleasantness of a journey” and is affected by traffic flow, traffic composition, footway width and the pedestrian separation from traffic. The assessment of the impact magnitude relating to pedestrian amenity has been carried out in accordance with the IEA guidance which states that there would be an improvement to pedestrian amenity when traffic flow (or lorry component) is halved and detrimental effect if doubled.

- *Fear and Intimidation*





7.47 Pedestrians' fear and intimidation as a result of traffic is dependent on the volumes of traffic, the HGV composition, the proximity to people or the lack of protection (such as narrow footway widths). The assessment has taken into account the IEA guideline thresholds summarised in **Table 7.3**.

**Table 7.3: Thresholds for Fear and Intimidation**

Degree of hazard	Av 18 hour traffic flow (veh/hour)	Total 18 hour HGV flow	Av speed over 18 hr day (mph)
Extreme	1800+	3000+	20+
Great	1200-1800	2000-3000	15-20
Moderate	600-1200	1000-2000	10-15

- *Accidents and Safety*

7.48 The assessment of impact magnitude relating to accidents and safety is based on consideration of the accident data acquired from Medway Council which is contained in Appendix C of **Appendix 7.1**.

*Assessment of Significance of Effect*

7.49 The relative significance of an effect is largely a product of the value and sensitivity of the identified receptor and the magnitude and duration of the impact, but the assessment is moderated by professional judgement and takes into account the considerations described above. The significance of effect matrix is provided in **Table 7.4**. It is assumed for the purposes of this assessment that any effects of moderate significance or greater will be significant in EIA terms.

**Table 7.4: Significance of Effect Matrix**

		Magnitude of Impact (Degree of Change)				
		No Change	Negligible	Minor	Moderate	Major
Value Environmental (Sensitivity)	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate



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	<b>Negligible</b>	Neutral	Neutral	Neutral Slight	or	Neutral Slight	or	Slight
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7.50 In the context of the Proposed Development, short to medium term (temporary) effects are generally considered to be those associated with the construction phase, and long term (permanent) effects are generally those associated with the operational phase.



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## BASELINE CONDITIONS

### Local Highway Network

7.51 The following section describes the local highway network which is illustrated in **Appendix 7.1**.

7.52 The following section of the report will provide details of the local highway network in relation to the proposed site access. The local highway network is also shown in **Appendix 7.1**.

#### *North Dane Way*

7.53 North Dane Way is a single carriageway road (i.e. one lane in each direction) which originates at the junction with Albermarle Road to the north western corner of the Site. It serves as a distributor road connecting Lordswood with Chatham (to the north). In the vicinity of the Site, North Dane Way is approximately 10m wide. It has grass verges on both sides.

7.54 The road is subject to the national speed limit of 60mph within the vicinity of the Site. Approximately 1km to the north, the speed limit changes to 40mph.

7.55 North Dane Way continues past the junction with Albemarle Road as a cul-de-sac running along the southern boundary of the Site. However, this section is closed to traffic at this junction. Therefore, all through traffic is required to turn right from North Dane Way into Albemarle Road (or left from Albemarle Road into North Dane Way).

#### *Capstone Road*

7.56 Capstone Road is a two-way carriageway orientated in a northwest-southeast direction between North Dane Way and Ash Tree Lane roundabout junctions. From the Ash Tree Lane junction Capstone Road continues southward to another roundabout junction with Pear Tree Lane and subsequently to meet with Ham Lane and become Lidsing Road.

7.57 Capstone Road, between North Dane Way and Pear Tree Lane junctions is a two-way carriageway approximately 7.5 to 8m in width which is lit and subject to a 30mph speed limit. There is residential frontage to the southern side, between the North Dane Way and Ash Tree Lane junctions, with some marked parking bays and a footway.



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7.58 Between the Pear Tree Lane and Ham Lane junctions Capstone Road is a two-way carriage, limited in width to less than 5m. This section of road is not lit, has no formal footway and is subject to a 30mph speed limit between the Pear Tree Lane junction and the access to the Capstone Farm Country Park. Between the country park and Ham Lane the speed limit is 40mph.

#### *Pear Tree Lane*

7.59 Pear Tree Lane is a two-way carriageway which runs northwest-southeast linking to Capstone Road to the northwest via a roundabout, and Hempstead Road/Hempstead Valley Drive via a mini roundabout to the southeast.

7.60 Pear Tree Lane is tree lined with narrow verges either side and is around 7.5m wide. It is subject to a speed limit of 50mph, reducing to 30mph as it reaches the junction with Capstone Road to the northwest and as it enters the area of Hempstead to the southeast. There is no active frontage along Pear Tree Lane until the junction with Dukes Meadow Drive from where Pear Tree Lane becomes a more residential street with individual private driveways and cul-de-sac.

#### *Shawstead Road*

7.61 Shawstead Road joins North Dane Way at a priority junction, just to the south of the Princes Avenue roundabout. Shawstead Road, at the junction with North Dane Way, is a two-way carriageway of approximately 7m in width, with no street lighting and a short section of footway on the northern side linking to a footpath. Within a short distance the road is reduced to approximately 3.5m width and no footway up to the access to the household waste site. To the south of the household waste site the road width is reduced to around 3m in places.

7.62 Shawstead Road is subject to access restrictions for heavy vehicles and buses.

#### *Hoath Way (A278)*

7.63 Hoath Way is a two-lane dual carriageway which connects the A2 to the north at Bowaters Roundabout and M2 Junction 4 to the south. This road is subject to a 50mph limit.

7.64 Hoath Way along its eastern edge has provision of shared footway and cycleway to the north starting at Sharsted Way / Hoath Way roundabout and segregated footway and cycleway north of Hoath Way roundabout leading to A2.



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### *Hempstead Road*

7.65 To the north eastern corner of the Site, Hempstead Road forms a staggered junction with Ham Lane and Lidsing Road.

7.66 Hempstead Road is approximately 6m wide and leads to Hempstead to the north. Approximately 500m north of the junction with Lidsing Road the road enters the residential area of Hempstead, providing access to a number of dwellings with private driveways, as well as a number of side roads, street lighting, and footways are present on both sides of the road.

### Strategic Highway Network

7.67 North Dane Way and Princes Avenue provide access to M2 at Junction 3. Pear Tree Lane leads, via Hempstead Road and Hempstead Valley Drive, to Hoath Way and the M2 at Junction 4. The M2 is a strategic trunk road, managed by Highways England (HE), which runs east-west to the south of the Site and across Kent connecting the A2 at either end. The M2/A2 corridor leads to London to the west, and Dover to the east.

7.68 To the north of the Site Capstone Road and Ash Tree Lane both link to the A2. This route runs roughly parallel to the M2 and provides an alternative to the motorway through the local residential areas. It links towns in Kent such as Canterbury, Faversham, Sittingbourne, Rainham, Chatham and Rochester

### Accident Analysis

7.69 An accident analysis of the study area has been undertaken, the details of which are provided in the TA in **Appendix 7.1**.

### Existing Local and Wider Accessibility

#### *Walking and Cycling*

7.70 Walking and cycling have the potential to substitute short car trips, particularly those less than 1.6km (walk) and 5km (cycle) respectively and to form a part of a longer journey on public transport. As such, facilities catering for these are crucial to encourage shorter journeys to be undertaken by sustainable modes rather than the private car.



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7.71 The Site is situated to the south of the residential settlement in Hale and to the southeast of the residential area around Luton. The majority of the existing residential roads have well established pedestrian networks with footway provision along with street lighting on both sides of the carriageway, thereby, providing useful routes for pedestrians.

7.72 The pedestrian network surrounding the Site involves mainly North Dane Way and Capstone Road and can be accessed from the eastern part of the development from the junction of Capstone Road/Pear Tree Lane and from the western part of the development from footpath access or the Site access on North Dane Way. North Dane Way provides good pedestrian connectivity throughout, as described previously.

7.73 The provision on Capstone Road is on the western side of the carriageway and is around 1/1.1m over a short section (approximately 6m) then widens slightly to 1.2/1.3m. A standard width footway is located on the eastern side of Capstone Road (N) fronting the relatively new properties to the north of the Waggon at Hale public house. The eastern footway continues through the junction of Capstone Road/Ash Tree Lane onto Capstone Road (W) which would be the pedestrian route towards Luton, Gillingham and Chatham.

7.74 There are no footways available along Pear Tree Lane, while Ash Tree Lane provides pedestrian access only for a small section in order to connect to Luton Recreation Ground.

#### *Bus Services*

7.75 The nearest bus stops to the Site are located on North Dane Way, Capstone Road and Princes Avenue. The location of these bus stops relative to the Site are shown in Figure 3.5 of **Appendix 7.1**.

7.76 Bus services B150, 166 and 716/717 can be accessed using these bus stops. The frequency of these services is summarised in **Table 7.5** below.



**Table 7.5: Existing bus services and frequency**

Route		Monday to Friday	Saturday	Sunday
166	(Chatham Rail Station) - Chatham - Luton – Princes Avenue - Lords Wood - Gleaming Wood Drive	Up to 7 per hour	Up to 5 per hour	Up to 2 per hour
169	Chatham - Luton - Heron Way- Princes Park - Walderslade - Alexandra Hospital	8 per day	8 per day	N/A
113	Chatham- Luton- Waggon at Hale- Hempstead Post Office- Hempstead Valley Shopping Centre- Wigmore	8 per day	8 per day	N/A
B150	Princes Park - Lordswood - Walderslade - Blue Bell Hill – Maidstone with school journeys to Aylesford	6 per day	6 per day	N/A
M1	Lordswood, Walderslade, Wayfield, Luton, Darland, Rainham, Wigmore, Hempstead Valley	N/A	3 services	N/A
658/9	Gillingham to Rochester schools Via Rainham, Parkwood, Hempstead Valley, Luton, Lords Wood and Walderslade	School days only	N/A	N/A
716	Darland - Luton - Lordswood - Walderslade - Bridgewood - London	3 per day	N/A	N/A
719	Hempstead Valley - Lordswood - Walderslade - Bridgewood - London	5 per day	N/A	N/A
723	London - Bean - Bridgewood - Walderslade - Lordswood - Parkwood - Rainham	1 per day	N/A	N/A

### *Rail Services*

7.77 The nearest railway station is at Gillingham located approximately 3.0 km from the Site (measured from the Capstone Road/ Pear Tree Lane), a 12 minute cycle ride. The line runs to London Victoria, Charing Cross and Cannon Street via a number of towns/villages in between such as Chatham, Rochester, and Bromley South. It takes between around 54 minutes and 1 hour 29 minutes to get to London depending on the destination station. In the opposite direction the line provides access to Kent towns including Rainham, Sittingbourne, Faversham, and Dover as well as the city of Canterbury. The services to London operate every 5 to 15 minutes in both directions on Monday - Friday, and 5 to 30 minutes at a weekend. There are two services an hour to the east (i.e. towards Rainham etc) on Monday – Saturday and hourly services on a Sunday.



7.78 There is also access to the High Speed 1 service which runs to London St Pancras via Chatham, Rochester, Strood, Ebbsfleet International and Stratford. The services run every half an hour in both directions from Monday – Sunday.

### *Local Facilities*

7.79 Planning guidance emphasises the integration of land use, transport and planning decisions. To ensure developments are sustainable, they should be accessible to local facilities, employment opportunities and public transport services.

7.80 Therefore, consideration has given to various local facilities including shops, education, employment and public transport that are available within easy walking and cycling distance from the Site. **Table 7.6** below provides a list of these facilities.

**Table 7.6: List of facilities within the vicinity of the development site**

	Facilities
Primary / Junior Schools	Kingfisher Primary School
	Maundene School
	Lordswood School
	Luton Infants School
	Luton Junior School
	Wayfield Primary School
Secondary Schools	Chatham Grammar
	The Robert Napier School
	The Victory Academy
	Walderslade Girls' School
	Greenacre Academy
	Holcombe Grammar
Health	Princes Park Medical Centre
	Hempstead Medical Centre
	Luton Medical Centre
	The Stone Cross Surgery
	Medway Medical Centre
Employment	Lordswood Industrial Estate
	Elm Court Industrial Estate
	Gillingham Business Park





	Facilities
Leisure	Lordswood Leisure Centre
	Lordswood Bowling Centre
	Lordswood Library
	Capstone Farm Country Park
	Chatham Snowsports Centre
Shopping	Luton
	Morrisons Foodstore
	Hempstead Valley Shopping Centre

7.81 In summary, as described in detail above, it is considered that the Site is within range of a wide variety of facilities within both walking and cycling distance. It is therefore conveniently located to encourage sustainable and active forms of travel; as well as providing access to public transport for longer journeys.

#### Summary of Sensitivity

7.82 The links and junctions within the study area have been considered as to which receptors may be present and if so the corresponding sensitivity. The sensitivity of the receptors are summarised in **Table 7.7**.

**Table 7.8: Summary of Receptors Sensitivity**

Resource/Receptor	Sensitivity
People walking along the adjacent carriageways and footways of North Dane Way, Capstone Road, Pear Tree Lane, Princes Avenue.	Medium
People driving on North Dane Way, Capstone Road, Pear Tree Lane, Ash Tree Lane, Princes Avenue, A2, Hoath Way, Hempstead Road, Capstone Road Luton Road.	Medium
People waiting at bus stops North Dane Way, Capstone Road and Princes Avenue.	Medium

#### Future Baseline

7.83 In the absence of the Proposed Development, the Site would continue to operate as farm land in the manner it has to date. Therefore for the core purposes of this assessment it is assumed the Site would be retained as existing and the highway network will continue to operate on a similar



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basis as the existing situation; albeit subjected to demand associated with forecast growth (in the Do Minimum scenario). The future baseline of 2035 (AM and PM Peak Hour, 2035 Do Minimum) has been used in the assessment of effects to provide a realistic assessment.

## **ASSESSMENT OF EFFECTS**

7.84 The potential impacts and the significance of the effects on transport, are characterised in the absence of mitigation measures, beyond those identified and described previously as embedded into the Proposed Development, for the construction and operational phases of the Proposed Development. The following embedded mitigation measures are considered in this chapter:

- Implementation of the Construction Environmental Management Plan (CEMP) during construction.
- The delivery of a link road, between North Dane Way and Capstone Road.

7.85 The proposed link road arises as a result of the establishment of access on to both North Dane Way and Capstone Road/Pear Tree Lane, between which a connecting road is to be established. This infrastructure, whilst embedded within the Proposed Development, derives a mitigating benefit by allowing the reassignment of baseline traffic on to the route and away from other parts of the network, including those which are congested. The delivery of this link is intrinsically linked to the Proposed Development and is therefore considered embedded.

7.86 Impacts may be direct or indirect. The effects during construction are anticipated to be short to medium term duration (temporary) while effects during operation are anticipated to be of long term duration (permanent) unless otherwise stated.

7.87 Impacts are only considered in detail when there is a reasonable likelihood of an effect on a receptor of importance.

7.88 Further details on the Proposed Development and construction activities are provided in Chapters 5 and 6 and are therefore not reproduced in detail in this chapter.

### Construction

7.89 During construction, vehicles accessing the Site will be a mixture of: specialist construction vehicles including cranes and bulldozers; HGV vehicles delivering or picking up materials to the

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Site (including excavated materials); and cars/LGVs associated with the workers at the Site. It is anticipated that the larger vehicles will be arriving/departing throughout the day and are unlikely to be during the peak hours. Traffic flows associated with the workers at the Site are likely to be concentrated at either end of the day (i.e. 08:00-18:00).

### *Severance*

7.90 There will be no change to severance experienced by pedestrians during construction as the change in traffic flow on the road network within the study area will be minimal. Whilst there will be an increase in HGVs during the construction period, the numbers will be spread throughout the day and so the change in traffic composition is likely to result in a negligible magnitude of impact resulting in a temporary neutral or slight adverse cumulative effect.

7.91 During the specific construction phase of the points of access, there will be some additional severance. However, the majority of the construction activity will take place on the eastern side of North Dane Way and western side of Capstone Road. At present, neither of these sides of these roads benefits from footway or cycleways, such that the minimum of temporary severance will take place to pedestrians and cyclists.

### *Pedestrian Delay and Pedestrian Amenity*

7.92 There will be a minimal number of extra vehicles and changes to traffic composition on the roads surrounding the Site during construction compared to the baseline. Therefore, the magnitude of impact associated with pedestrian delay and pedestrian amenity for people walking along the footways adjacent to the local roads and people waiting at bus stops will be negligible resulting in a temporary neutral or slight adverse cumulative effect.

### *Driver Delay*

7.93 Additional traffic flows associated with the construction period are likely to be minimal. However, the area suffers from congestion and so even slight increases in traffic flow could have an adverse effect on driver delay in the congested times on the road network which is when the site workers may be arriving/departing. The HGV deliveries/collections are likely to be outside of the congested periods. Therefore, the magnitude of impact will be moderate resulting in a temporary moderate adverse cumulative effect for people driving on the local roads.



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### *Fear and Intimidation*

7.94 During construction, people walking along the footways or waiting at bus stops immediately adjacent to the site access will experience a “great” hazard threshold for fear and intimidation. In addition, the people walking along the footways will experience a “great” hazard threshold for fear and intimidation. The hazard thresholds are the same as those in the AM and PM Peak Hour, 2035 Do Minimum as the change in traffic flow on the road network within the study area will be minimal.

7.95 Therefore, the magnitude of impact will be no change resulting in a temporary neutral cumulative effect.

### *Accidents and Safety*

7.96 During construction, there will be no change to accident safety risks on the external highway network as the change in traffic flow on the road network within the study area will be minimal. The magnitude of impact will be no change resulting in a temporary neutral cumulative effect.

### Operational

#### *Severance*

7.97 During operation there will be an increase in traffic flows on roads within the study area compared to the baseline “AM and PM Peak Hour, 2035 Do Minimum” scenario. On this basis, the magnitude of impact for severance experienced by pedestrians crossing these roads will be moderate resulting in a permanent moderate adverse cumulative effect.

#### *Pedestrian Delay*

7.98 Given the increase in traffic flows across the network, there would be a resulting moderate impact and therefore a permanent moderate adverse cumulative effect for pedestrians or people waiting at bus stops adjacent to these roads.



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### *Pedestrian Amenity*

7.99 The increase in traffic flows at the Site access with Capstone Road will exceed the “traffic flows doubling” threshold resulting in a detrimental effect to pedestrian amenity. This will result in an impact magnitude of moderate and therefore a permanent moderate adverse cumulative effect for people walking along the adjacent footways or waiting at bus stops on these roads. Elsewhere the increase is less than the scale necessary to impact on pedestrian amenity.

### *Driver Delay*

7.100 This relates to the increase of traffic flows during the peak period during operation of the Proposed Development. On this basis, the magnitude of impact will be moderate resulting in a permanent moderate adverse cumulative effect for people driving on these roads.

### *Fear and Intimidation*

7.101 During operation, there will be no change to the degree of hazard threshold when considering the average 18-hour traffic flow (vehicles/hour) across the network. Therefore, there will be no change to the impact magnitude experienced by people walking along the adjacent footways or waiting at bus stops on these roads resulting in a permanent neutral cumulative effect.

### *Accidents and Safety*

7.102 The accident data considered for the highway network illustrates that there is no common causation factor attributed to the crashes that occurred and no accident blackspots identified. Therefore, the magnitude of impact will be no change resulting in a permanent neutral cumulative effect.

## **MITIGATION MEASURES**

7.103 Through the mechanism of the Transport Assessment, a range of measures have been developed to mitigate the impact of the Proposed Development. These are detailed in the TA and are summarised here.



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### Mitigation of Operational Severance, Pedestrian Delay and Amenity

7.104 The Proposed Development will deliver the following mitigation measures with respect to pedestrians:

- A new pedestrian and cycle link between North Dane Way and Capstone Road, ancillary to the link road connecting the two;
- Enhanced ped/cycle facilities at the junction of North Dane Way and Princes Avenue;
- Enhanced ped/cycle facilities at the junction of Capstone Road and Pear Tree Lane;

7.105 These measures will result in the following changes to impact:

- Severance – Major Beneficial;
- Pedestrian Delay – Major Beneficial;
- Pedestrian Amenity – Moderate Beneficial.

### Mitigation of Operational Driver Delay

7.106 The Proposed Development includes the following mitigation measures directed to addressing impact on the traffic operation:

- A new signalised junction arrangement, to replace the double mini-roundabout junction at Pear Tree Lane, Hempstead Road and Hempstead Valley Drive;
- A scheme to improve the performance of the roundabout junction between Capstone Road, Street End Road and Luton High Street;
- A scheme to improve the performance of the roundabout junction between Princes Avenue and Walderslade Road;

7.107 These mitigation measures mitigate the impact of the Proposed Development and lead to a permanent, moderate beneficial impact in driver delay when compared to the Do Minimum scenario in 2035.



Residual Effects

7.108 **Table 7.9** provides a summary of the residual effects resulting from the Proposed Development after effective implementation of the embedded mitigation measures proposed above.

**Table 7.9: Residual Transport Effects**

Development Phase	Receptor Affected	Residual Effects
Construction	Severance: All links for pedestrians crossing	Neutral or Slight Adverse
	Pedestrian Delay and Amenity: All links for people walking or waiting at bus stops	Neutral or Slight Adverse
	Driver Delay: people driving on all links	Moderate Adverse
	Fear and Intimidation: All links for people walking or waiting at bus stops	Neutral
	Accidents and Safety: All links for people walking or waiting at bus stops, and people driving	Neutral
Operation	Severance: pedestrians crossing.	Major Beneficial
	Pedestrian Delay: people walking along the footways adjacent network.	Major Beneficial
	Pedestrian Amenity: people walking along the footways or waiting at bus stops.	Moderate Beneficial
	Driver Delay: people driving on network	Moderate Beneficial
	Fear and Intimidation: people walking or waiting at bus stops	Neutral
	Accidents and Safety: All links for people walking, or waiting at bus stops, and people driving	Neutral



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## SUMMARY

7.109 The Site is well connected to the local and national highway network with access onto North Dane Way, Hoath Way, Princes Avenue and thereafter on to the M2 via junctions 3 and 4.

7.110 During construction of the Proposed Development there will be a temporary moderate adverse cumulative effect relating to driver delay for all receptors on all roads while there will be neutral to slight adverse cumulative effect to severance, pedestrian delay, and pedestrian amenity for all pedestrian receptors on all roads. There will also be a neutral cumulative effect on fear and intimidation for pedestrians crossing all roads, and accidents and safety for all receptors on all roads.

7.111 During operation of the Proposed Development there will be permanent moderate adverse cumulative effects and permanent moderate beneficial cumulative effects (for pedestrians crossing relating to severance; all pedestrian receptors relating to pedestrian delay and amenity; and people driving relating to driver delay. There will also be moderate to major beneficial cumulative effects (depending on the road considered), and neutral cumulative effects for all receptors in relation to accidents and safety.

7.112 **Table 7.10** summarises the transport effects resulting from the Proposed Development.





**Table 7.10: Summary of Transport Effects**

Receptor/Affected Group	Significance (value) of Receptor	Effect	Embedded Mitigation Measures	Magnitude/Spatial Extent/Duration/ Likelihood of Occurrence	Significance of Effect	Adverse Mitigation
<b>Cumulative Effects - Construction</b>						
Severance (all links) for people crossing; pedestrian delay and pedestrian amenity (all links) for people walking or people waiting at bus stops	Medium	Minimal increase in traffic flows and negligible increase in HGVs along local road network	Implementation of the CEMP	Negligible	Neutral or Slight Adverse	No
				Local		
				Temporary		
				Definitely		
Fear and Intimidation (all links) for people walking or people waiting at bus stops	Medium	Minimal increase in traffic flows and negligible increase in HGVs along local road network	Implementation of the CEMP	Negligible	Neutral	No
				Local		
				Temporary		
				Definitely		
Accidents and Safety (all links) for people walking or people waiting at bus stops, and people driving	Medium	No change	Implementation of the CEMP	No change	Neutral	No
				Local		
				Temporary		
				Definitely		
Driver Delay: people driving on all links	Medium	Minimal increase in traffic flows	Implementation of the CEMP	Moderate	Moderate Adverse	No
				Local		
				Temporary		
				Definitely		
<b>Cumulative Effects – Operation</b>						
Severance: people crossing local roads	Medium	Increase in traffic flows	Sustainable travel strategy	Moderate	Moderate Adverse	Impe
				Local		
				Permanent		
				Likely		
Pedestrian Delay and Pedestrian Amenity: people walking or waiting at bus stops.	Medium	Increase in traffic flows	Sustainable travel strategy	Moderate	Moderate Adverse	Impe
				Local		



Receptor/Affected Group	Significance (value) of Receptor	Effect	Embedded Mitigation Measures	Magnitude/Spatial Extent/Duration/ Likelihood of Occurrence	Significance of Effect	Assessment Method
				Permanent		
				Likely		
Driver Delay: people driving on local road network.	Medium	Increase in traffic flows	Sustainable travel strategy. Access strategy	Moderate Local Permanent Likely	Moderate Adverse	Ju Im
Fear and Intimidation: people walking or waiting at bus stops	Medium	No change in 18 hour flow category range	Sustainable transport strategy	No change Local Permanent Likely	Neutral	No
Accidents and Safety: All links for people walking or waiting at bus stops, and people driving	Medium	No change	Sustainable transport strategy	No change Local Permanent Likely	Neutral	No

## REFERENCES

**Ref 7.1:** Ministry of Housing, Communities and Local Government (February 2019). National Planning Policy Framework.



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## 8 AIR QUALITY

### INTRODUCTION

8.1 This chapter presents the findings of an assessment of local air quality effects associated with the Proposed Development.

8.2 The Proposed Development may introduce the following air quality effects;

- During the construction phase, suspended and re-suspended fugitive dust emissions from demolition / construction activities and vehicular emissions from construction traffic, including re-suspended dust from HGV movements; and
- During the operational phase, vehicular emissions (primarily nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) from increased traffic movements associated with the Proposed Development.

8.3 The potential effects of the Proposed Development on local air quality during both construction and operational phases have been assessed. For both phases, the type, source and significance of potential effects are identified and the measures that should be employed to minimise these effects are described.

8.4 A glossary of common air quality terminology is provided in **Appendix 8.1**.

### ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

#### Scope of Assessment

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

- Review of air quality data for the area surrounding the Proposed Development and background pollutant maps; and
- Review of the traffic flow data, which has been used as an input to the air quality modelling assessment.



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8.6 There is the potential for impacts on local air quality during both the construction and operational phases of the Proposed Development. During the construction phase, there is the potential for impacts to occur as a result of dust and PM<sub>10</sub> emissions. Guidance provided by the Institute of Air Quality Management (IAQM) (**Ref. 8.1**) includes the following criteria for assessing the effects of construction dust:

- A sensitive 'human receptor' within 350m of the site boundary or within 50m of the route used by construction vehicles on public highways up to 500m from the site entrance; and /or
- A sensitive 'ecological receptor' within 50m of the site boundary or within 50m of the route used by construction vehicles on the public highway, up to 500m from the site entrance.

8.7 There are several residential properties surrounding the Proposed Development. An assessment of construction phase impacts of dust and particulate matter has therefore been included in this assessment. There are no sensitive ecological receptors within 50m of the site boundary or within 50m of the route used by construction vehicles up to 500m from the site entrance, an assessment of the impact of the construction phase on sensitive ecological habitats has therefore not been considered further.

8.8 During the operation of the Proposed Development there is the potential for impacts on local air quality to occur as a result of emissions from road vehicle trips generated by the operation of the Proposed Development. Based on the Department for Transport (DfT) thresholds for transport assessments as set out in Appendix 2 of the Kent and Medway Air Quality Planning Guidance (**Ref. 8.2**) the Proposed Development is classed as a 'major' development (i.e. >50 residential units). Following a review of the Proposed Development against checklist 1 and checklist 2 set out within the Guidance it is concluded that an air quality assessment is required.

8.9 Guidance provided by the IAQM & Environmental Protection UK (EPUK) (**Ref. 8.3**) provides threshold criteria for establishing when significant impacts on local air quality may occur and when a detailed assessment of potential impacts is required. At locations outside an AQMA, a change in light duty vehicles (LDV) of more than 500 per day and / or a change in heavy duty vehicles (HDV) of more than 100 per day is considered to result in potentially significant impacts on air quality. At locations within or adjacent to an AQMA, a change in LDVs of more than 100 per day and / or a change in HDVs of more than 25 per day is considered potentially significant.



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8.10 The Central Medway AQMA is located approximately 500m to the northwest of the Proposed Development. Data provided by the transport consultants indicates that the Proposed Development will result in an increase in LDVs in excess of the threshold values for locations outside an AQMA on a number of road links in the vicinity. An assessment of impacts arising from vehicle emissions using the local roads has therefore been included in the assessment. Consideration has also been given to the suitability of the Site for its proposed use.

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

## **Construction Phase Methodology**

### Introduction

8.12 To assess the potential impacts associated with dust and PM<sub>10</sub> releases during the construction phase and to determine any necessary mitigation measures, an assessment based on the latest guidance from the IAQM has been undertaken.

8.13 This approach divides construction activities into the following four categories:

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

8.14 The assessment methodology then considers 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 PM<sub>10</sub>.

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

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

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



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

#### Dust Emission Magnitude

8.18 The magnitude of the dust impacts for each source is classified as Small, Medium or Large depending on the scale of the proposed works. Table 8.1 summarises the IAQM criteria that may be used to determine the magnitude of the dust emission. These criteria are used in combination with site specific information and professional judgement.



**Table 8.1: Dust Emission Magnitude Criteria**

Source	Large	Medium	Small
<b>Demolition</b>	<ul style="list-style-type: none"> <li>Total building volume &gt;50,000m<sup>3</sup></li> <li>Potentially dusty material (e.g. concrete)</li> <li>Onsite crushing and screening</li> <li>Demolition activities &gt;20m above ground level.</li> </ul>	<ul style="list-style-type: none"> <li>Total building volume 20,000 - 50,000m<sup>3</sup></li> <li>Potentially dusty material</li> <li>Demolition activities 10 - 20m above ground level.</li> </ul>	<ul style="list-style-type: none"> <li>Total building volume &lt;20,000m<sup>3</sup></li> <li>Construction material with low potential for dust release</li> <li>Demolition activities &lt;10m above ground level</li> <li>Demolition during wetter months</li> </ul>
<b>Earthworks</b>	<ul style="list-style-type: none"> <li>Total site area &gt;10,000m<sup>2</sup></li> <li>Potentially dusty soil type (e.g. clay)</li> <li>&gt;10 heavy earth moving vehicles active at any one time</li> <li>Formation of bunds &gt;8m in height</li> <li>Total material moved &gt;100,000 tonnes</li> </ul>	<ul style="list-style-type: none"> <li>Total site area 2,500 - 10,000m<sup>2</sup></li> <li>Moderately dusty soil type (e.g. silt)</li> <li>5 - 10 heavy earth moving vehicles active at any one time</li> <li>Formation of bunds 4 - 8m in height</li> <li>Total material moved 20,000 - 100,000 tonnes</li> </ul>	<ul style="list-style-type: none"> <li>Total site area &lt;2,500m<sup>2</sup></li> <li>Soil type with large grain size (e.g. sand)</li> <li>&lt;5 heavy earth moving vehicles active at any one time</li> <li>Formation of bunds &lt;4m in height</li> <li>Total material moved &lt;20,000 tonnes</li> <li>Earthworks during wetter months</li> </ul>
<b>Construction</b>	<ul style="list-style-type: none"> <li>Total building volume &gt;100,000m<sup>3</sup></li> <li>On site concrete batching</li> <li>Sandblasting</li> </ul>	<ul style="list-style-type: none"> <li>Total building volume 25,000 - 100,000m<sup>3</sup></li> <li>Potentially dusty construction material (e.g. concrete)</li> <li>On site concrete batching</li> </ul>	<ul style="list-style-type: none"> <li>Total building volume &lt;25,000m<sup>3</sup></li> <li>Material with low potential for dust release (e.g. metal cladding or timber)</li> </ul>
<b>Trackout</b>	<ul style="list-style-type: none"> <li>&gt;50 HGV movements in any one day (a)</li> <li>Potentially dusty surface material (e.g. high clay content)</li> <li>Unpaved road length &gt;100m</li> </ul>	<ul style="list-style-type: none"> <li>10 - 50 HGV movements in any one day (a)</li> <li>Moderately dusty surface material (e.g. silt)</li> <li>Unpaved road length 50 - 100m</li> </ul>	<ul style="list-style-type: none"> <li>&lt;10 HGV movements in any one day (a)</li> <li>Surface material with low potential for dust release</li> <li>Unpaved road length &lt;50m</li> </ul>

(a) HGV movements refer to outward trips (leaving the site) by vehicles of over 3.5 tonnes.

### Receptor Sensitivity

8.19 Factors defining the sensitivity of a receptor are presented in Table 8.2.



**Table 8.2: Factors Defining the Sensitivity of a Receptor**

<b>Sensitivity</b>	<b>Human (health)</b>	<b>Human (dust soiling)</b>	<b>Ecological</b>
<b>High</b>	<ul style="list-style-type: none"> <li>• Locations where members of the public are exposed over a time period relevant to the air quality objectives for PM<sub>10</sub> (a)</li> <li>• Examples include residential dwellings, hospitals, schools and residential care homes.</li> </ul>	<ul style="list-style-type: none"> <li>• Regular exposure</li> <li>• High level of amenity expected.</li> <li>• Appearance, aesthetics or value of the property would be affected by dust soiling.</li> <li>• Examples include residential dwellings, museums, medium and long-term car parks and car showrooms.</li> </ul>	<ul style="list-style-type: none"> <li>• Nationally or Internationally designated site with dust sensitive features (b)</li> <li>• Locations with vascular species (c)</li> </ul>
<b>Medium</b>	<ul style="list-style-type: none"> <li>• Locations where workers are exposed over a time period relevant to the air quality objectives for PM<sub>10</sub> (a)</li> <li>• Examples include office and shop workers (d)</li> </ul>	<ul style="list-style-type: none"> <li>• Short-term exposure</li> <li>• Moderate level of amenity expected</li> <li>• Possible diminished appearance or aesthetics of property due to dust soiling</li> <li>• Examples include parks and places of work</li> </ul>	<ul style="list-style-type: none"> <li>• Nationally designated site with dust sensitive features (b)</li> <li>• Nationally designated site with a particularly important plant species where dust sensitivity is unknown</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>• Transient human exposure</li> <li>• Examples include public footpaths, playing fields, parks and shopping streets</li> </ul>	<ul style="list-style-type: none"> <li>• Transient exposure</li> <li>• Enjoyment of amenity not expected.</li> <li>• Appearance and aesthetics of property unaffected</li> <li>• Examples include playing fields, farmland (e), footpaths, short-term car parks and roads</li> </ul>	<ul style="list-style-type: none"> <li>• Locally designated site with dust sensitive features (b)</li> </ul>
<p>(a) In the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day.</p> <p>(b) Ecosystems that are particularly sensitive to dust deposition include lichens and acid heathland (for alkaline dust, such as concrete).</p> <p>(c) Cheffing C. M. &amp; Farrell L. (Editors) (2005), The Vascular Plant. Red Data List for Great Britain, Joint Nature Conservation Committee.</p> <p>(d) Does not include workers exposure to PM<sub>10</sub> as protection is covered by Health and Safety at Work legislation.</p> <p>(e) Except commercially sensitive horticulture.</p>			

8.20 The sensitivity of a receptor will also depend on a number of additional factors including any history of dust generating activities in the area, likely cumulative dust impacts from nearby





construction sites, any pre-existing screening such as trees or buildings and the likely duration of the impacts. In addition, the influence of the prevailing wind direction and local topography may be of relevance when determining the sensitivity of a receptor.

### Area Sensitivity

8.21 The sensitivity of the *area* to dust soiling and health impacts is dependent on the number of receptors within each sensitivity class and their distance from the source. In addition, human health impacts are dependent on the existing PM<sub>10</sub> concentrations in the area. Tables 8.3 and 8.4 summarise the criteria for determining the overall sensitivity of the area to dust soiling, health impacts and ecological impacts respectively.

**Table 8.3: Sensitivity of the Area to Dust Soiling Effects on People and Property**

Receptor Sensitivity	Number of Receptors	Distance from the source (a)			
		<20m	<50m	<100m	<350m
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

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



**Table 8.4: Sensitivity of the Area to Human Health Impacts**

Receptor Sensitivity	Annual Mean PM <sub>10</sub> (µg/m <sup>3</sup> )	Number of Receptors	Distance from the source (a)				
			<20m	<50m	<100m	<200m	<350m
High	> 32	> 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32	> 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28	> 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	< 24	> 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	>32	> 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	28-32	> 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	<28	-	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

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

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



## Risk of Dust Impacts

8.23 The risk of dust impacts prior to mitigation for each emission source is presented in Tables 8.6, 8.7 and 8.8.

**Table 8.6: Risk of Dust Impacts – Demolition**

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

**Table 8.7: Risk of Dust Impacts – Earthworks and Construction**

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

**Table 8.8: Risk of Dust Impacts - Trackout**

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

## Mitigation and Significance

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

8.25 The IAQM assessment methodology recommends that significance criteria are only assigned to the identified risk of dust impacts occurring from a construction activity following the application of appropriate mitigation measures. For almost all construction activities, the application of effective



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mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effects will normally be negligible.

### **Construction Traffic**

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

8.27 The number of vehicles associated with construction of the Proposed Development is not predicted to be significant.

### **Operational Phase Methodology**

8.28 Air quality at the Proposed Development has been predicted using the ADMS Roads dispersion model (Version 4.1.1.0, January 2018). This is a commercially available dispersion model and has been widely validated for this type of assessment and used extensively in the Air Quality Review and Assessment process.

8.29 The ADMS Roads model uses detailed information regarding traffic flows on the local road network and local meteorological conditions to predict pollution concentrations at specific locations selected by the user. Meteorological data from Gravesend for the year 2017 has been used for the assessment.

8.30 The model has been used to predict road specific concentrations of oxides of nitrogen (NO<sub>x</sub>) and Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>) at selected receptors. The predicted concentrations of NO<sub>x</sub> have been converted to NO<sub>2</sub> using the NO<sub>x</sub> to NO<sub>2</sub> calculator available on the Defra air quality website (**Ref. 8.4**).

8.31 Traffic data for road links adjacent to the Proposed Development have been provided by the Transport Consultants for the project (Charles & Associates).

8.32 A summary of the traffic data used in the assessment can be found in **Appendix 8.2**. The data includes details of annual average daily traffic flows (AADT), vehicle speeds and percentage



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Heavy Duty Vehicles (HDV) for the assessment years considered. Low traffic speeds have been assigned to appropriate road links to account for congestion and queuing vehicles.

8.33 The following scenarios have been included in the assessment:

- 2017 – baseline traffic (for verification purposes);
- 2035 – future baseline traffic, with committed developments (hereafter referred to as 'without development' scenario); and
- 2035 – future baseline traffic, with committed developments and development traffic (hereafter referred to as 'with development' scenario).

8.34 The emission factors released by Defra in November 2017, provided in the emissions factor toolkit EFT2017\_8.0.1 have been used to predict traffic related emissions in 2017 and 2035. 2030 emissions factors have been used for the future year scenarios as no emissions factors are available for 2035 (the opening year of the Proposed Development) at this time.

8.35 To predict local air quality, traffic emissions predicted by the model must be added to local background concentrations. Background concentrations of NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> have been taken from the 2015 Defra background maps (issued November 2017). The maps provide an estimate of background concentrations between 2015 and 2030. The data used for the modelling assessment are set out in Table 8.16.

8.36 Background concentrations for 2017 have been used to predict concentrations in 2035 assuming no change in future years. This is considered to represent a worst-case prediction of future concentrations.



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8.37 To determine the performance of the model at a local level, a comparison of modelled results with the results of monitoring carried out within the study area was undertaken. This process aims to minimise modelling uncertainty and systematic error by correcting the modelled results by an adjustment factor to gain greater confidence in the final results. This process was undertaken using the methodology outlined in Chapter 7, Section 4 of LAQM.TG(16).

8.38 A verification factor of 3.58 was determined which indicates that the model is under-predicting in this area. This factor was applied to the modelled road-NO<sub>x</sub> concentrations prior to conversion to annual mean NO<sub>2</sub> concentrations using the NO<sub>x</sub> to NO<sub>2</sub> calculator. Further details of the determination of the verification factor are provided in **Appendix 8.3**.

8.39 Local roadside monitoring data was not available for concentrations of PM<sub>10</sub> and PM<sub>2.5</sub>, the modelled pollutant road-contributions for PM<sub>10</sub> and PM<sub>2.5</sub> were therefore adjusted using the verification factor obtained for NO<sub>x</sub> as recommended in the guidance provided in LAQM.TG(16).

8.40 LAQM.TG(16) does not provide a method for the conversion of annual mean NO<sub>2</sub> concentrations to 1-hour mean NO<sub>2</sub> concentrations. However, research (**Ref. 8.5**) has concluded that exceedances of the 1-hour mean objective are generally unlikely to occur where annual mean concentrations do not exceed 60 µg/m<sup>3</sup>. Care has been taken to ensure that locations where the 1-hour mean objective is relevant are included in the assessment.

8.41 A quantitative assessment of air quality in the vicinity of the Proposed Development has been completed against the Air Quality Strategy objectives set out in **Appendix 8.4** for NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>.

### **Sensitive Receptors**

8.42 LAQM.TG(16) describes in detail typical locations where consideration should be given to pollutants defined in the Regulations. Generally, the guidance suggests that all locations '*where members of the public are regularly present*' should be considered. At such locations, members of the public will be exposed to pollution over the time that they are present, and the most suitable averaging period of the pollutant needs to be used for assessment purposes.

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



standards owing to the chronic health effects associated with exposure to low level pollution for longer periods of time.

8.44 To assess the impact of traffic generated by the Proposed Development pollutant concentrations have been predicted at 45 existing sensitive residential receptors close to the roads affected by traffic generated by the Proposed Development. There are no sensitive ecological habitats within the vicinity of the Proposed Development or the roads likely to be affected by the Proposed Development. The modelling assessment also predicted concentrations at two at the facades of the Proposed Development. Details of these sensitive receptors are presented in Table 8.9 and the locations are illustrated in Figure 8.1.

**Table 8.9: Location of Sensitive Receptors**

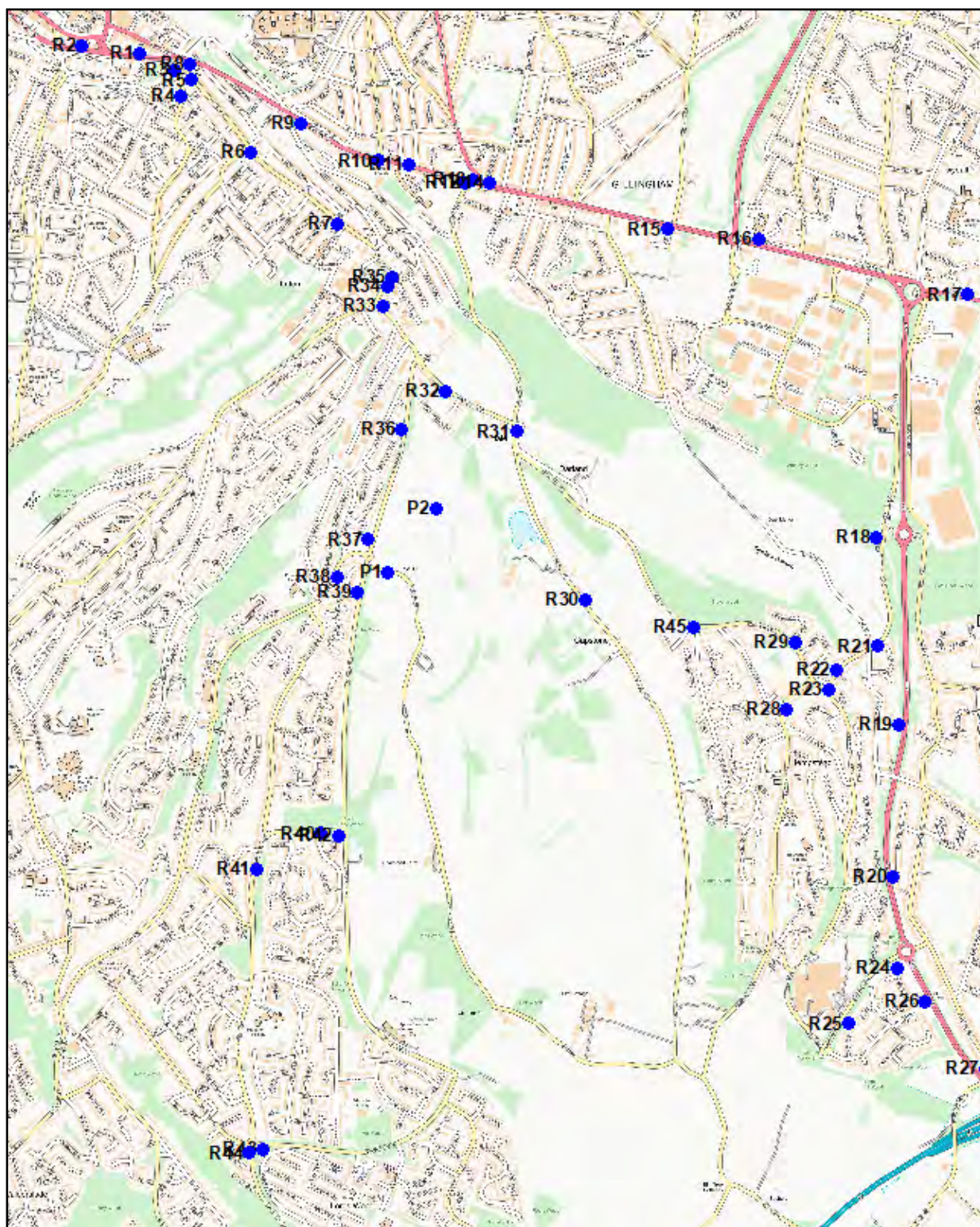
ID	Receptor	Type	Easting	Northing
R1	First Tiny Steps Pre-School	School	576315.7	167474.9
R2	137 New Road	Residential	576063.6	167509.4
R3	2 Magpie Hall Road	Residential	576469.8	167406.6
R4	All Saints C of E Primary School	School	576495.8	167289.3
R5	18 Luton Road	Residential	576543.2	167361.3
R6	154 Luton Road	Residential	576800.4	167045.5
R7	Luton Junior School	School	577178.8	166734.8
R8	6 Chatham Hill	Residential	576536.0	167431.1
R9	152 Chatham Hill	Residential	577017.9	167170.8
R10	308 Chatham Hill	Residential	577356.0	167009.2
R11	49 Rainham Road	Residential	577491.0	166994.8
R12	128 Rainham Road	Residential	577737.3	166915.2
R13	161 Rainham Road	Residential	577768.5	166925.4
R14	2 Watling Street	Residential	577843.7	166912.5
R15	Rotary Gardens	Residential	578617.9	166709.5
R16	Danecourt School	School	579014.9	166664.7
R17	50 London Road	Residential	579929.1	166424.8
R18	3 Hoath Close	Residential	579531.4	165365.6
R19	Spekes Road	Residential	579628.4	164550.8
R20	57 Norman Close	Residential	579603.3	163883.6
R21	9 Hempstead Road	Residential	579537.5	164890.8
R22	64 Hempstead Road	Residential	579356.4	164790.0
R23	55 Hempstead Road	Residential	579322.9	164703.0
R24	Blowers Wood Grove	Residential	579618.5	163488.7



R25	Sandy Dell	Residential	579408.9	163243.9
R26	Houghton Avenue	Residential	579743.9	163340.0
R27	312 Wigmore Road	Residential	580006.4	163046.8
R28	103 Hempstead Road	Residential	579137.9	164616.2
R29	34 Pear Tree Lane	Residential	579173.6	164908.2
R30	387 Capstone Road	Residential	578260.6	165090.7
R31	179 Capstone Road	Residential	577959.5	165827.0
R32	98 Capstone Road	Residential	577651.6	166003.9
R33	5 Capstone Road	Residential	577376.0	166376.9
R34	56 Luton High Street	Residential	577395.9	166458.7
R35	29 Luton High Street	Residential	577416.9	166502.5
R36	Somerset Close	Residential	577457.9	165837.5
R37	Hampshire Close	Residential	577313.1	165355.5
R38	Barleymow Close	Residential	577175.5	165191.9
R39	Barleymow Close	Residential	577266.7	165124.4
R40	170 Kingston Crescent	Residential	577107.3	164074.0
R41	447 Lordswood Lane	Residential	576826.2	163919.3
R42	Merton Close	Residential	577184.5	164065.3
R43	Phoenix Road	Residential	576853.8	162698.5
R44	Slade Close	Residential	576796.2	162679.1
R45	Pear Tree Lane	Residential	578730.5	164972.3
P1	Façade of the Proposed Development	Proposed	577400.0	165211.5
P2	Façade of the Proposed Development	Proposed	577606.8	165493.4



Figure 8.1: Location of Receptors Considered within ADMS Model



### Significance Criteria

8.45 The significance of the predicted impacts has been determined using the guidance set out within the Kent and Medway Air Quality Planning Guidance. In the first instance the change in



pollutant concentrations as a result of the development is calculated as a percentage of the relevant objective limit. The impact is then classified according to the criteria set out in Table 8.10 below.

8.46 Following classification of the impacts the guidance recommends the actions set out in Table 8.11 based on the identified impact.

**Table 8.10: Classification of impacts due to changes in pollutant concentrations**

Classification of Impact	Concentration change due to development	Or if development contribution causes
Very High	Increase >10%	Breach of air quality objective
High	Increase 5-10%	Exposure to be within 5% of Objective
Medium	Increase 1-5%	Exposure to be within 10% of Objective
Low/Imperceptible	Increase <1%	-

**Table 8.11: Recommended Planning Requirements**

Magnitude of change in air quality	Likely requirements	Likely Outcomes
Very High	Require mitigation to remove very high air quality impacts. If impact of development on air quality is still very high – strong presumption for recommendation of refusal on air quality grounds	Recommend Refusal
High	Recommend refusal unless appropriate on-site mitigation measures implemented to the satisfaction of the planning authority. Mitigations to include reducing exposure through various measures, emissions reduction technologies and/or development redesign	Refusal, unless recommended mitigation is implemented.
Medium	Seek mitigation to reduce air quality impacts. Mitigations to include reducing exposure through various measures, emissions reduction technologies and/or development redesign	Ensure on-site mitigation options are implemented.
Low/Imperceptible	Recommend the minimum mitigation for development scheme type	Recommend minimum mitigation



8.47 The EPUK & IAQM planning guidance also provides criteria for determining the significance of a development. These criteria are provided below for comparison.

8.48 The EPUK & IAQM guidance recommends that the impact at individual receptors is described by expressing the magnitude of incremental change in pollution concentration as a proportion of the relevant assessment level and examining this change in the context of the new total concentration and its relationship with the assessment criterion as summarised in Table 8.12.

**Table 8.12: Impact Descriptors for Individual Receptors.**

Long Term Average Concentration at Receptor in Assessment Year	% Change in concentration relative to AQAL (a)			
	1	2-5	5-10	>10
75% or less of AQAL	Negligible	Negligible	Slight adverse	Moderate adverse
76-94% of AQAL	Negligible	Slight adverse	Moderate adverse	Moderate adverse
95-102% of AQAL	Slight adverse	Moderate adverse	Moderate adverse	Substantial adverse
103-109% of AQAL	Moderate adverse	Moderate adverse	Substantial adverse	Substantial adverse
110% or more of AQAL	Moderate adverse	Substantial adverse	Substantial adverse	Substantial adverse
(a) A change in concentration of less than 0.5% of the AQAL is considered insignificant, however changes between 0.5% and 1% are rounded up to 1%.				

8.49 The EPUK & IAQM guidance notes that the criteria in Table 8.12 should be used to describe impacts at individual receptors and should be considered as a starting point to make a judgement on significance of effects, as other influences may need to be accounted for. The EPUK & IAQM guidance states that the assessment of overall significance should be based on professional judgement, taking into account several factors, including:

- 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.





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## LEGISLATION, PLANNING POLICY AND GUIDANCE

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

8.50 The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (AQS) published in July 2007 (**Ref. 8.6**), pursuant to the requirements of Part IV of the Environment Act 1995. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

8.51 The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems. These are benzene (C<sub>6</sub>H<sub>6</sub>), 1,3-butadiene (C<sub>4</sub>H<sub>6</sub>), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO<sub>2</sub>), particulate matter (PM<sub>10</sub>, PM<sub>2.5</sub>), sulphur dioxide (SO<sub>2</sub>), ozone (O<sub>3</sub>) and polycyclic aromatic hydrocarbons (PAHs).

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

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

8.54 For some pollutants, there is both a long-term (annual mean) standard and a short-term standard. In the case of nitrogen dioxide (NO<sub>2</sub>), the short-term standard is for a 1-hour averaging period, whereas for fine particulates (PM<sub>10</sub>) it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

8.55 The AQS also contains a framework for considering the effects of a finer group of particles known as 'PM<sub>2.5</sub>'. Local Authorities are required to work towards reducing emissions / concentrations of PM<sub>2.5</sub>, but there is currently no statutory objective incorporated into UK law at this time.



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8.56 The AQS objective levels relevant to this assessment are set presented in **Appendix 8.4**.

### **Local Air Quality Management (LAQM)**

8.57 Part IV of the Environment Act 1995 also requires local authorities to periodically Review and Assess the quality of air within their administrative area. The Reviews have to consider the present and future air quality and whether any air quality objectives prescribed in Regulations are being achieved or are likely to be achieved in the future.

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

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

8.60 The Department of Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their Review and Assessment work (**Ref. 8.7**). This guidance, referred to in this chapter as LAQM.TG(16), has been used where appropriate in the assessment.

### **National Planning Policy Framework**

8.61 The National Planning Policy Framework (NPPF) (**Ref. 8.8**) sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the NPPF with the objective of contributing to the achievement of sustainable development.

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

8.63 Under Section 15: Conserving and Enhancing the Natural Environment, the NPPF (paragraph 170) requires that *'planning policies and decisions should contribute to and enhance the natural local environment by ...preventing new and existing development from contributing to, being*



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*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.'*

8.64 In dealing specifically with air quality the NPPF (paragraph 181) states that *'planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.'*

8.65 Paragraph 183 states that *'the focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively.'*

### **Medway Local Plan**

8.66 The Medway Local Plan (**Ref. 8.9**) was adopted in May 2003. The following policy relevant to air pollution and the Proposed Development are contained within this document:

Policy BNE2 – Air Quality, which states

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

### **Control of Dust and Particulates associated with Construction**

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



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

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

8.69 In the context of the Proposed Development, the main potential for nuisance of this nature will arise during the construction phase – potential sources being the clearance, earthworks, construction and landscaping processes.

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

### **EPUK & IAQM Land Use Planning and Development Control**

8.71 The EPUK & IAQM published the Land Use Planning and Development Control Air Quality guidance in January 2017 (**Ref. 8.11**) to provide guidance on the assessment of air quality in relation to planning proposals and ensure that air quality is adequately considered within the planning control process.

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

8.73 This guidance has been used within this assessment.

### **Assessment of Dust from Demolition and Construction**

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



8.75 This guidance has been used within this assessment.

### **Kent & Medway Air Quality Partnership Planning Guidance**

8.76 The Kent & Medway Partnership Planning Guidance provides a methodology for assessing the air quality impacts of proposed developments in the Kent and Medway area. This guidance has been used within this assessment.

## **BASELINE CONDITIONS**

### **Medway Council Review and Assessment of Air Quality**

8.77 MC has carried out detailed assessments of air quality in the area and as a result has declared four AQMAs within the Medway area. All four are due to potential exceedances of the AQS objectives for annual mean NO<sub>2</sub> concentrations. The Site is not located within or near an AQMA. The closest AQMA to the Proposed Development is Central Medway AQMA which is declared for a number of roads in the Central Medway area and is located approximately 500m to the northwest of the Site.

### **Automatic Local Monitoring Data**

8.78 MC operates two automatic monitoring sites, the closest is a roadside site located approximately 840m to the north of the Proposed Development. The other automatic monitor is a rural background site located 11.6km to the northeast of the Proposed Development. Bias adjusted data obtained from both monitoring stations is presented in Tables 8.13 and 8.14.

**Table 8.13: NO<sub>2</sub> Concentrations recorded at the nearest Continuous Automatic Monitors**

<b>Monitoring Site</b>	<b>Statistic</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
Chatham	Annual Mean (µg/m <sup>3</sup> )	25.0	24.8	23.5	25.7	25.4
	Number of 1-hour means > 200 µg/m <sup>3</sup>	0	0	0	0	0
Rochester Stoke	Annual Mean (µg/m <sup>3</sup> )	14.0	14.1	13.0	13.3	14.7
	Number of 1-hour means > 200 µg/m <sup>3</sup>	0	0	0	0	0
Data obtained from MC Air Quality Annual Status Report for 2018						





8.79 Exceedences of the AQS objective for annual mean NO<sub>2</sub> concentrations have not been experienced at the Chatham monitor throughout the five-year period presented, despite being located at a roadside location within an AQMA. No exceedences were recorded at the background site.

8.80 Exceedences of the hourly objective have not been recorded during the five years of the monitoring presented, therefore the objective was met in all five monitoring years.

8.81 Based on the data recorded at these sites, NO<sub>2</sub> concentrations are expected to meet the annual mean and hourly mean objectives at the Proposed Development.

**Table 8.14: PM<sub>10</sub> Concentrations recorded at the nearest Continuous Automatic Monitors**

Monitoring Site	Statistic	2013	2014	2015	2016	2017
Chatham	Annual Mean (µg/m <sup>3</sup> )	23.0	21.4	18.5	19.1	21.6
	Number of 24-hour means > 50 µg/m <sup>3</sup>	10	15	4	3	7
Rochester Stoke	Annual Mean (µg/m <sup>3</sup> )	18.0	17.6	14.6	15.8	16.6
	Number of 24-hour means > 50 µg/m <sup>3</sup>	3	8	2	4	4
Data obtained from MC Air Quality Annual Status Report for 2018						

8.82 Annual mean PM<sub>10</sub> concentrations recorded have been consistently below the 40 µg/m<sup>3</sup> objective since 2013.

8.83 Exceedences of the 24-hour objective have been recorded at both monitoring stations during the five years of the monitoring presented, however the objective allows for 35 exceedences of the 50 µg/m<sup>3</sup> limit in any given year therefore the objective was met in all five monitoring years.

8.84 Based on the data recorded at these sites, PM<sub>10</sub> concentrations are expected to meet the annual mean and 24-hour objectives at the Proposed Development.

### Non-Automatic Monitoring

8.85 NO<sub>2</sub> diffusion tube monitoring is also carried out at 34 locations in the Medway area. The closest tubes to the Proposed Development are identified in Table 8.15.



**Table 8.15: NO<sub>2</sub> Concentrations (µg/m<sup>3</sup>) recorded at the nearest Diffusion Tube Monitors**

Monitoring Site	Type	Distance to Kerb	2013	2014	2015	2016	2017
DT05 – 27 High Street, Luton	Roadside	2	35.2	34.8	33.2	33.0	34.2
DT09 – Chatham AQ Station	Roadside	3.3	27.6	26.2	27.7	25.6	25.5
DT17 – Lamp post adjacent 159 Rainham Road, Gillingham	Roadside	1.9	43.2	43.7	45.0	43.5	45.3
DT31 – 7 Highview Drive, Chatham	Roadside	8.4	-	-	-	-	26.5

8.86 At three of the diffusion tube sites (DT05, DT09 and DT31), the AQS objective for annual mean NO<sub>2</sub> concentrations has been met over the five-year period. At the roadside location close to a busy intersection (DT17), concentrations are exceeding the objective (40 µg/m<sup>3</sup>).

8.87 Diffusion tubes cannot monitor short-term NO<sub>2</sub> concentrations, however, as previously discussed, research has concluded that exceedances of the 1-hour mean objective are generally unlikely to occur where annual mean concentrations do not exceed 60 µg/m<sup>3</sup>. Annual mean NO<sub>2</sub> concentrations were below 60 µg/m<sup>3</sup> at all monitoring sites between 2013 and 2017 therefore it is expected that the 1-hour objective is being met at these locations.

### **Defra Background Maps**

8.88 Additional information on background concentrations in the vicinity of the Proposed Development have been obtained from the Defra background pollutant maps. The average pollutant concentrations from the grid squares representing the assessment area have been extracted from the maps which include the modelled receptors and road links included in the modelling assessment.

8.89 Separate background concentrations have been obtained for the grid squares representing the monitoring sites used in the verification of the modelling.

8.90 The 2015 Defra background maps, which provide estimated background concentrations between 2015 and 2030, have been used to obtain concentrations for 2017. The data is set out in Table 8.16.



**Table 8.16: Estimated Annual Mean Background Concentrations from Defra Maps ( $\mu\text{g}/\text{m}^3$ )**

<b>Grid Square</b>	<b>Receptor</b>	<b>NO<sub>2</sub></b>	<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>
576500, 167500	DT04, R1, R2, R3, R4, R5, R6, R8	16.9	17.4	12.4
577500, 166500	DT05, DT09, R7, R11, R12, R13, R14, R32, R33, R34, R35	15.9	16.1	11.4
577500, 167500	R9, R10	16.8	16.1	11.2
578500, 166500	R15	16.3	15.2	10.5
579500, 166500	R16, R17	17.4	15.3	10.5
579500, 165500	R18	17.2	14.8	10.2
579500, 164500	R19, R21, R22, R23, R24, R28, R29	15.0	14.6	10.0
579500, 163500	R20, R25, R26	14.9	14.6	10.0
580500, 163500	R27	15.4	14.9	10.1
578500, 165500	R30	13.1	14.2	9.8
577500, 165500	R31, R36, R37, R38, R39, P1, P2	13.5	14.5	10.0
577500, 164500	R40, R42	12.7	14.3	9.8
576500, 163500	R41	14.2	14.5	9.9
576500, 162500	R43, R44	14.6	14.3	10.0
578500, 164500	R45	12.7	13.8	9.6



## IDENTIFICATION AND EVALUATION OF KEY EFFECTS

### Construction Phase

#### Area Sensitivity

8.91 The Site is currently occupied by open fields, therefore there are no buildings requiring demolition at the Site. An assessment of dust effects associated with demolition have not therefore been included within this assessment.

8.92 The assessment of dust impacts is dependent on the proximity of the most sensitive receptors to the Site boundary. A summary of the receptor and area sensitivity to health and dust soiling impacts is presented in Table 8.17.

**Table 8.17: Sensitivity of Receptors and the Local Area to Dust and PM<sub>10</sub> Impacts**

Receptor	Distance from Site Boundary (m)	Approx. Number of Receptors	Sensitivity to Health Impacts (a)		Sensitivity to Dust Soiling Impacts	
			Receptor	Area	Receptor	Area
Residential Properties	<20 m	10-100	High	Low	High	High
<b>Overall Sensitivity of the Area</b>			<b>Low</b>		<b>High</b>	
(a) Estimated background PM <sub>10</sub> concentration is 14.5 µg/m <sup>3</sup> .						

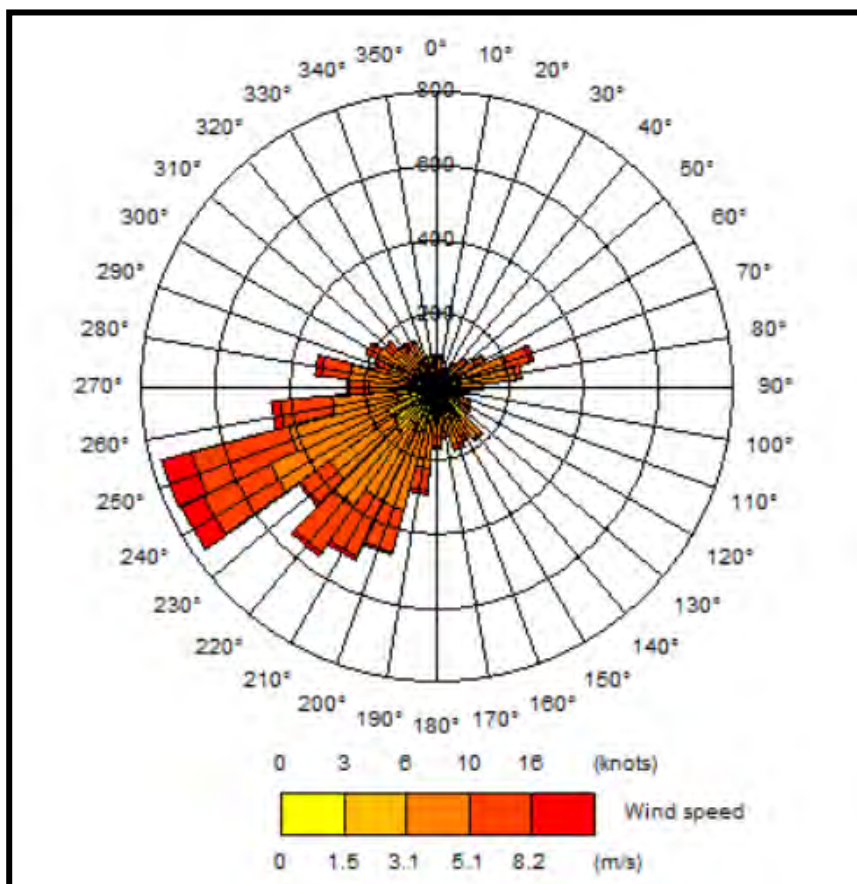
8.93 The route of the construction traffic is assumed to be North Dane Way. As the Site is large in size, the sensitivity of the area to impacts arising from track-out is considered within a distance of 500m from the Site entrance. There are several sensitive receptors along the road within this distance, therefore the sensitivity of the area to impacts from trackout is considered to be high for dust impacts and low for human health impacts.

8.94 There are no dust-sensitive habitat sites within 50m of the Proposed Development nor within 50m of the route used by construction vehicles, therefore the impact of dust and particulate matter emissions on ecologically sensitive receptors has not been considered further in this assessment.

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

8.96 A wind rose from Gravesend is provided in Figure 8.2, which shows that the prevailing wind is from the southwest, therefore receptors to the northeast of the Proposed Development are the most likely to experience dust impacts from the Proposed Development. There are several sensitive residential receptors to the northeast of the Proposed Development.

**Figure 8.2: Wind Rose for Gravesend Meteorological Station (2017)**



### Dust Emission Magnitude

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

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

8.99 Factors influencing the degree of trackout and associated magnitude of effect include vehicle size, vehicle speed, vehicle numbers, geology and duration. Construction traffic will likely access the



Proposed Development site via North Dane Way. Based on the likely movements per day, dust emission magnitude due to trackout is considered to be *large*.

### Dust Risk Effects

8.100 A summary of the potential risk of dust impacts, based on the low overall sensitivity of the area to human health impacts and high overall sensitivity to dust soiling impacts, is presented in Table 8.18.

**Table 8.18: Risk of Dust Impacts Prior to Mitigation**

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

### **Operational Phase**

#### NO<sub>2</sub> Concentrations

8.101 Annual mean NO<sub>2</sub> concentrations predicted at the selected receptor locations are set out in Table 8.19. The concentrations include the estimated 2017 background NO<sub>2</sub> concentrations as indicated in Table 8.16.

**Table 8.19: Predicted Annual Mean Nitrogen Dioxide Concentrations at Selected Receptors (µg/m<sup>3</sup>)**

Receptor Number	2035 Without Development	2035 With Development	Change as a result of Development (as % of the AQAL)	Significance of Impact
R1	27.0	26.5	-1.4	-
R2	25.2	24.7	-1.1	-
R3	20.4	20.2	-0.6	-
R4	19.3	19.1	-0.4	-
R5	21.6	21.2	-0.9	-
R6	21.4	21.0	-1.0	-
R7	18.9	18.6	-0.7	-
R8	24.4	23.9	-1.3	-
R9	22.0	21.7	-0.8	-
R10	23.9	23.5	-0.9	-



Receptor Number	2035 Without Development	2035 With Development	Change as a result of Development (as % of the AQAL)	Significance of Impact
R11	24.1	24.0	-0.3	-
R12	22.5	22.4	-0.3	-
R13	24.3	24.2	-0.4	-
R14	23.8	23.7	-0.2	-
R15	20.0	20.0	0.1	Low / Imperceptible
R16	26.9	26.8	-0.4	-
R17	24.2	24.1	0.0	Low / Imperceptible
R18	18.9	18.9	0.0	Low / Imperceptible
R19	17.1	17.0	-0.3	-
R20	19.6	19.3	-0.6	-
R21	19.5	19.6	0.2	Low / Imperceptible
R22	19.8	19.9	0.2	Low / Imperceptible
R23	18.7	18.8	0.1	Low / Imperceptible
R24	18.1	18.1	-0.2	-
R25	16.8	16.8	0.0	Low / Imperceptible
R26	20.0	19.8	-0.5	-
R27	22.2	21.9	-0.7	-
R28	17.2	17.1	-0.3	-
R29	20.6	20.9	0.5	Low / Imperceptible
R30	18.4	16.9	-3.6	-
R31	20.9	20.1	-2.1	-
R32	21.1	19.1	-5.1	-
R33	22.7	21.3	-3.3	-
R34	25.7	25.6	-0.2	-
R35	25.9	25.8	-0.1	-
R36	17.3	15.9	-3.4	-
R37	17.7	16.5	-3.1	-
R38	17.8	17.5	-0.7	-
R39	16.6	14.2	-6.1	-
R40	14.0	14.3	0.8	Low / Imperceptible
R41	16.2	17.0	2.1	Medium
R42	14.3	14.3	0.0	Low / Imperceptible
R43	16.1	16.1	-0.1	-
R44	16.6	16.4	-0.3	-
R45	15.8	16.2	0.8	Low / Imperceptible
P1	-	21.0	-	-
P2	-	23.2	-	-



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8.102 The results of the modelling indicate that in the opening year of 2035, the AQS objective level for annual mean NO<sub>2</sub> concentrations will be met at all of the receptor locations included within the assessment.

8.103 The greatest increase as a result of emissions from the traffic generated by the Proposed Development is 0.8 µg/m<sup>3</sup> which equates to 2.1% of the AQAL. According to the Kent and Medway Air Quality Partnership Air Quality Planning Guidance criteria set out in Table 8.10, the impact of the Proposed Development on local air quality with regard to annual mean NO<sub>2</sub> concentrations is considered to be *medium* at one of the selected receptors and *low / imperceptible* at 11 receptors. The remaining receptors are predicted to experience a beneficial impact as a result of the Proposed Development.

8.104 The EPUK & IAQM guidance also provides guidance for determining the significance of an impact to air quality. These are set out in Table 8.12. In accordance with the EPUK & IAQM significance criteria, the impact of the operation of the Proposed Development on annual mean NO<sub>2</sub> concentrations is *negligible*.

8.105 The predicted annual mean NO<sub>2</sub> concentrations are all below 60µg/m<sup>3</sup>, therefore it is considered likely that the AQS objective level for hourly mean NO<sub>2</sub> concentrations will also be met. Therefore, the impact of the Proposed Development with regard to hourly mean NO<sub>2</sub> concentrations is also considered to be *low / imperceptible*.

8.106 Within the Site itself (receptors P1 and P2) annual mean NO<sub>2</sub> concentrations are predicted to fall well below (less than 75%) the relevant AQAL. It is also expected that the hourly mean objective level within the Site will be met. The impact with regards to new exposure is therefore also considered to be *low / imperceptible*.

#### PM<sub>10</sub> Concentrations

8.107 Predicted annual mean PM<sub>10</sub> concentrations at the selected receptors locations are presented in Table 8.20. The concentrations include the estimated 2017 background PM<sub>10</sub> concentrations as indicated in Table 8.16.





**Table 8.20: Predicted Annual Mean PM<sub>10</sub> Concentrations at Selected Receptors (µg/m<sup>3</sup>)**

Receptor Number	2035 Without Development	2035 With Development	Change as a result of Development (as % of the AQAL)	Significance of Impact
R1	22.2	21.9	-0.7	-
R2	21.3	21.0	-0.6	-
R3	19.1	19.0	-0.3	-
R4	18.6	18.5	-0.2	-
R5	19.8	19.5	-0.6	-
R6	19.6	19.4	-0.6	-
R7	17.5	17.4	-0.4	-
R8	21.1	20.8	-0.7	-
R9	18.7	18.5	-0.4	-
R10	19.4	19.2	-0.5	-
R11	20.0	19.9	-0.2	-
R12	19.1	19.1	-0.1	-
R13	20.0	19.9	-0.2	-
R14	19.8	19.7	-0.1	-
R15	17.1	17.1	0.0	Low / Imperceptible
R16	20.3	20.2	-0.2	-
R17	18.7	18.7	-0.1	Low / Imperceptible
R18	15.6	15.6	0.0	Low / Imperceptible
R19	15.6	15.6	-0.1	-
R20	16.9	16.8	-0.3	-
R21	16.8	16.8	0.1	Low / Imperceptible
R22	16.9	16.9	0.1	Low / Imperceptible
R23	16.3	16.3	0.0	Low / Imperceptible
R24	16.1	16.1	-0.1	-
R25	15.5	15.5	0.0	Low / Imperceptible
R26	17.2	17.1	-0.3	-
R27	18.5	18.3	-0.4	-
R28	15.7	15.7	-0.1	-
R29	17.3	17.5	0.4	Low / Imperceptible
R30	16.5	15.9	-1.6	-
R31	18.1	17.6	-1.1	-
R32	18.6	17.6	-2.5	-
R33	19.5	18.7	-1.9	-
R34	20.8	20.6	-0.4	-
R35	20.9	20.7	-0.3	-
R36	16.4	15.7	-1.8	-



Receptor Number	2035 Without Development	2035 With Development	Change as a result of Development (as % of the AQAL)	Significance of Impact
R37	16.6	15.9	-1.6	-
R38	16.7	16.5	-0.6	-
R39	16.0	14.8	-3.0	-
R40	14.9	15.0	0.3	Low / Imperceptible
R41	15.4	15.8	0.9	Low / Imperceptible
R42	15.1	15.0	0.0	Low / Imperceptible
R43	15.2	15.2	0.0	-
R44	15.4	15.4	-0.2	-
R45	15.3	15.4	0.4	Low / Imperceptible
P1	-	16.5	-	-
P2	-	17.6	-	-

8.108 The results of the modelling indicate that predicted annual mean PM<sub>10</sub> concentrations are well below (less than 75%) the AQS objective level of 40 µg/m<sup>3</sup> at all the selected receptors both with and without the Proposed Development operational.

8.109 Traffic associated with the Proposed Development is predicted to result in a maximum increase in the annual mean PM<sub>10</sub> concentration of 0.4 µg/m<sup>3</sup> which equates to 0.9% of the AQAL. In accordance with the Kent and Medway Air Quality Partnership Air Quality Planning Guidance criteria as set out in Table 8.10, the impact on local air quality with regards to this pollutant is considered to be *low / imperceptible* at 12 of the selected receptors. The remaining receptors are predicted to experience a beneficial impact as a result of the Proposed Development.

8.110 In accordance with the EPUK & IAQM significance criteria set out in Table 8.12, the significance of the impact of the operation of the Proposed Development on annual mean PM<sub>10</sub> concentrations is *negligible*.

8.111 LAQM.TG(16) provides a relationship between predicted annual mean concentrations and the likely number of exceedances of the short-term (24-hour mean) PM<sub>10</sub> objective of 50 µg/m<sup>3</sup> (N), where:

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

8.112 The objective allows 35 exceedances per year, which is equivalent to an annual mean of 32 µg/m<sup>3</sup>.



8.113 Based on the above approach, the maximum number of days where PM<sub>10</sub> concentrations are predicted to exceed 50µg/m<sup>3</sup> is 6 days with a change of less than one day as a result of the operation of the Proposed Development. The impact on 24 hour PM<sub>10</sub> concentrations is therefore also considered to be *low / imperceptible*.

8.114 Within the Site itself, annual mean and 24-hour mean PM<sub>10</sub> concentrations are predicted to fall well below the relevant AQALs. The effect with regards to new exposure is therefore also considered to be *low / imperceptible*.

#### PM<sub>2.5</sub> Concentrations

8.115 Predicted annual mean PM<sub>2.5</sub> concentrations at the selected receptor locations are presented in Table 8.21. The concentrations include the estimated 2017 background PM<sub>2.5</sub> concentrations as indicated in Table 8.16.

**Table 8.21: Predicted Annual Mean PM<sub>2.5</sub> Concentrations at Selected Receptors (µg/m<sup>3</sup>)**

Receptor Number	2035 Without Development	2035 With Development	Change as a result of Development (as % of the AQAL)	Significance of Impact
R1	15.0	14.8	-0.6	-
R2	14.5	14.3	-0.5	-
R3	13.3	13.2	-0.3	-
R4	13.0	13.0	-0.2	-
R5	13.7	13.5	-0.5	-
R6	13.6	13.4	-0.5	-
R7	12.1	12.1	-0.3	-
R8	14.3	14.2	-0.6	-
R9	12.6	12.5	-0.4	-
R10	13.0	12.9	-0.4	-
R11	13.5	13.4	-0.2	-
R12	13.0	13.0	-0.1	-
R13	13.5	13.4	-0.2	-
R14	13.4	13.3	-0.1	-
R15	11.5	11.5	0.0	Low / Imperceptible
R16	13.1	13.1	-0.1	-
R17	12.3	12.3	0.0	Low / Imperceptible
R18	10.7	10.7	0.0	Low / Imperceptible
R19	10.5	10.5	-0.1	-
R20	11.2	11.2	-0.2	-



Receptor Number	2035 Without Development	2035 With Development	Change as a result of Development (as % of the AQAL)	Significance of Impact
R21	11.1	11.2	0.1	Low / Imperceptible
R22	11.2	11.2	0.1	Low / Imperceptible
R23	10.9	10.9	0.0	Low / Imperceptible
R24	10.8	10.8	-0.1	-
R25	10.5	10.5	0.0	Low / Imperceptible
R26	11.4	11.4	-0.2	-
R27	12.0	12.0	-0.3	-
R28	10.6	10.5	0.0	-
R29	11.4	11.5	0.3	Low / Imperceptible
R30	11.0	10.7	-1.4	-
R31	12.0	11.7	-1.0	-
R32	12.7	12.2	-2.2	-
R33	13.2	12.8	-1.6	-
R34	13.9	13.8	-0.3	-
R35	14.0	13.9	-0.3	-
R36	11.0	10.7	-1.6	-
R37	11.1	10.8	-1.4	-
R38	11.2	11.1	-0.5	-
R39	10.8	10.2	-2.6	-
R40	10.2	10.2	0.3	Low / Imperceptible
R41	10.4	10.6	0.8	Low / Imperceptible
R42	10.2	10.2	0.0	Low / Imperceptible
R43	10.4	10.3	0.0	-
R44	10.5	10.4	-0.1	-
R45	10.4	10.5	0.3	Low / Imperceptible
P1	-	11.1	-	-
P2	-	11.7	-	-

8.116 The results of the modelling assessment indicate that predicted annual mean PM<sub>2.5</sub> concentrations are well below (less than 75%) of the AQAL as the selected receptor locations both with and without the Proposed Development.

8.117 The Proposed Development is predicted to increase PM<sub>2.5</sub> concentrations by a maximum of 0.2µm<sup>3</sup> which equates to 0.8% of the AQAL. In accordance with the Kent and Medway Air Quality Partnership Air Quality Planning Guidance criteria as set out in Table 8.10, the impact on local air quality with regards to this pollutant is considered to be *low / imperceptible* at 12 of the selected



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receptors. The remaining receptors are predicted to experience a beneficial impact as a result of the Proposed Development.

8.118 In accordance with the EPUK & IAQM significance criteria set out in Table 8.12, the significance of the impact of the operation of the Proposed Development on annual mean PM<sub>2.5</sub> concentrations is *negligible*.

8.119 Within the Site itself, annual mean PM<sub>2.5</sub> concentrations are predicted to fall well (less than 75%) below the relevant AQAL. The effect with regards to new exposure is therefore also considered to be *low / imperceptible*

### **ASSESSMENT OF CUMULATIVE EFFECTS**

8.120 Cumulative effects can potentially be experienced during both the construction and operational phases. During the construction phase, cumulative effects of dust and particulate matter generated from on-site activities may be experienced in locations in close proximity to two or more development sites and the timing of the construction phases overlap. There may also be an effect due to the increased construction traffic on local roads if construction vehicles are to use the same routes to access the sites. During the operational phase, cumulative effects may be experienced due to the additional road vehicles generated by one or more schemes if the traffic is likely to affect the same local roads.

8.121 A number of nearby committed developments have been considered cumulatively within this assessment, these are outlined in Chapter 3.

#### **Construction Phase Effects**

8.122 Guidance provided by the IAQM suggests that effects of dust and particulate matter generated from a construction site may be experienced up to 350m from the site. There are two development sites within 350m of the Site: Land East of Gleamingwood Drive (15/503359/OUT) and Gibraltar Farm.

8.123 The majority of construction phase activities for the Land East of Gleamingwood Drive are expected to occur at least 1.2km further north of the Site. Additionally, since there are relatively few sensitive receptors in the vicinity, there should be no significant cumulative effects if construction occurs at the same time.



8.124 It is currently unknown when construction will begin for Gibraltar Farm. However, with the implementation of the mitigation measures listed in **Appendix 8.5**, there should be no significant cumulative effects if construction occurs at the same time.

### Operational Phase Effects

8.125 The traffic flows used for the assessment include a contribution from the committed developments in the area. The assessment of the impact of the Proposed Development has therefore taken into account the cumulative effect of the Site and the committed development on predicted future pollutant concentrations.

### EMISSIONS MITIGATION CALCULATION

8.126 The Proposed Development is predicted to result in a medium to low/imperceptible impact on local air quality in some locations. Therefore, in accordance with the advice provided in the Kent and Medway Air Quality Partnership Air Quality Planning Guidance which is reproduced in Table 8.11, mitigation measures will be implemented to reduce operational emissions.

8.127 In order to assist in determining the value of emissions mitigation required an Emissions Mitigation Assessment was completed including an emissions mitigation calculation in accordance with the advice provided in the Kent and Medway Air Quality Planning Guidance and Defra's Damage Costs Appraisal Toolkit.

**Table 8.22: Emissions Mitigation Calculation**

	NO <sub>x</sub>	PM <sub>2.5</sub>
<b>Proposed Development Trips (as AADT)<sup>(1)</sup></b>	5,992 (0% HGV)	
<b>Average Trip Length (km)<sup>(2)</sup></b>	13.8	
<b>Emissions (kg/yr)<sup>(3)</sup></b>	3,896.61	502.03
<b>Emissions (tonnes/yr)</b>	3.90	0.50
<b>Damage Cost (per tonne)<sup>(4)</sup></b>	£16,809	£319,579
<b>Cost of 5 Year Exposure</b>	£318,126	£779,274
<b>Total</b>	<b>£1,097,400</b>	
<p>(1) Provided by Transport Consultants</p> <p>(2) Obtained from National Travel Survey 2017 (Av miles travelled per car per person in a year /av no of trips made per car per person in a year) (5104/594 = 8.6 miles (13.8km))</p> <p>(3) Value obtained from EFT spreadsheet for 2030 (assuming average speed of 48kph)</p> <p>(4) IGCB Air Quality Damage Costs per tonne (2017 prices) (Central Estimate for Transport Urban Large in 2030) 2% uplift added for each additional year.</p>		



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8.128 The Emissions Mitigation Calculation presented above suggests a damage cost of £1,097,400. A range of costs is provided, the above damage cost is based on the Central Estimate. Overall the range of costs is from £191,546 to £3,622,785.

## **ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS**

### Construction Phase

8.129 The control of dust emissions from construction site activities relies upon management provision and mitigation techniques to reduce emissions of dust and limit dispersion. Where dust emission controls have been used effectively, construction operations have been successfully undertaken without significant impacts to nearby properties.

8.130 Overall the Proposed Development is considered to be a high risk for dust impacts, and low risk to human health from particulate matter concentrations at nearby receptors during the construction phase. Appropriate mitigation measures for the Proposed Development have been identified following the IAQM guidance and based on the risk effects presented in Table 8.17. It is recommended that the 'highly recommended' measures set out in the IAQM guidance and reproduced in **Appendix 8.5** are incorporated into a Dust Management Plan (DMP) and approved by MC prior to commencement of any work on the Proposed Development site.

8.131 Following implementation of the 'highly recommended' measures outlined in the IAQM guidance and reproduced in **Appendix 8.5**, the impact of emissions during construction of the Proposed Development would be negligible.

### Operational Phase

8.132 The detailed dispersion modelling indicates that the impact of the operation of the Proposed Development on local pollutant concentrations is negligible and that the concentrations of relevant pollutants (NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>) within the Proposed Development and at nearby sensitive receptors will meet the relevant air quality objectives in the opening year.

8.133 The Kent and Medway Air Quality Partnership Air Quality Planning Guidance recommends the following mitigation measures for residential developments:



- 
- All gas fired boilers to meet a standard of <math><40\text{mgNO}\_x/\text{kWh}</math> (at £500/dwelling = £400,000);
  - 1 Electric Vehicle charging point per dwelling with dedicated parking (600 x £1,000 = £600,000) and 1 charging point per 10 spaces unallocated parking (30 x £3,000 = £90,000);
  - Travel plan (where required) including mechanisms for discouraging high emission vehicle use and encouraging the uptake of low emission fuels and technologies (£10,000);
  - A Welcome Pack available to all new residents online and as a booklet, containing information and incentives to encourage the use of sustainable transport modes from new occupiers (£3,000);
  - Improved cycle paths to link cycle network;
  - Adequate provision of secure cycle storage (1 per dwelling unit = 800 x £300 per dwelling = £240,000);
  - Using green infrastructure, in particular trees to absorb dust and other pollutants;
  - Infrastructure improvements including new road reducing pollutant concentrations at existing receptors.

8.134 The cost of implementing the above mitigation measures of the quantified items above amounts to £1,343,000 which will exceed the Damage Cost figure calculated in Table 8.22 by a significant margin even before the unquantified items that are listed are taken into account. The implementation of the above mitigation measures should further reduce the impact of emissions during operation of the Proposed Development.

## **Residual Effects**

### Construction Phase

8.135 Following implementation of the measures recommended for inclusion within the DMP the impact of emissions during construction of the Proposed Development would be *negligible*.

### Operational Phase

8.136 The Proposed Development is predicted to have a medium to low/imperceptible adverse impact on local air quality prior to the implementation of appropriate mitigation. Following the implementation of the traffic mitigation measures as described above, the impact of the operational traffic would be reduced to low / imperceptible.





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## SUMMARY

8.137 An air quality impact assessment has been carried out to assess both construction and operational impacts of the Proposed Development.

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

8.139 ADMS Roads dispersion modelling has been carried out to assess both the impact of the operation of the Proposed Development on local pollutant concentrations and the suitability of the Site for its proposed end use with regards to local air quality. The results indicate that predicted concentrations of relevant pollutants (NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>) concentrations are below the relevant objectives within the Proposed Development and at nearby sensitive receptors.

8.140 Emissions arising from traffic generated by the operation of the Proposed Development would result in a negligible impact on local pollutant concentrations, predicted concentrations remain below the objective levels at all the selected receptors. In accordance with the Kent and Medway Air Quality Partnership Air Quality Planning Guidance, the impact of the emissions arising from traffic associated with the operation of the Proposed Development is considered to be *medium to low / imperceptible*.

8.141 Beneficial air quality impacts are also predicted at a number of existing receptor locations.

8.142 It should be noted that in accordance with the EPUK & IAQM significance criteria, the impact of the operation of the Proposed Development on NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations is considered to be negligible.

8.143 Future occupants of the Proposed Development would not be exposed to pollutant concentrations above the relevant objective levels, therefore the impact of the Proposed Development with regards new exposure to air quality is considered to be negligible.

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



**Table 8.23: Air Quality Summary Table**

<b>Potential Effect</b>	<b>Nature of Effect (Permanent or Temporary)</b>	<b>Significance</b>	<b>Mitigation/ Enhancement Measures</b>	<b>Residual Effects</b>
Dust and particulate matter generated during the construction phase	Temporary	-	The adoption of best practice and measures outlined in the IAQM guidance	Negligible
Effects on Local Air Quality from emissions from construction traffic	Temporary	Negligible	None	Negligible
Effects on Local Air Quality from emissions from road traffic generated by the operation of the Proposed Development	Permanent	Medium to Low / Imperceptible	Transport related measures such as Travel Plan.	Low / Imperceptible



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## REFERENCES

**Ref 8.1:** Institute of Air Quality Management (2014); 'Guidance on the assessment of dust from demolition and construction version 1.1'

**Ref 8.2:** Kent and Medway Air Quality Partnership Air Quality Planning Guidance (Mitigation Option B)

**Ref 8.3:** EPUK & IAQM. Land-use Planning and Development Control: Planning for Air Quality, January 2017

**Ref 8.4:** <http://uk-air.defra.gov.uk>

**Ref 8.5:** D. Laxen and B Marner (2003) Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites

**Ref 8.6:** The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)

**Ref 8.7:** Department for Environment, Food and Rural Affairs (Defra), (2009): Part IV The Environment Act 1995 Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(16)

**Ref 8.8:** Ministry of Housing, Communities and Local Government: *National Planning Policy Framework* (February 2019)

**Ref 8.9:** Medway Council. (2003). Medway Local Plan.



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## 9 NOISE AND VIBRATION

### INTRODUCTION

9.1 This chapter of the Environmental Statement (ES) assesses the likely environmental significant effects, with respect to noise and vibration, at the proposed residential development at East Hill, Medway. The extant and proposed road traffic noise levels are assessed in order to demonstrate site suitability and to allow consideration of potential effects at existing noise sensitive receptors in the surrounding area.

9.2 In the context of this assessment, noise is defined as unwanted or undesirable sound derived from sources such as road traffic, or construction works that interfere with normal activities, including conversation, sleep or recreation. Vibration is defined as the transmission of energy through the medium of ground or air resulting in small movements of the transmitting medium, such as a building, which can cause discomfort or even damage to structures if the movements are large enough.

9.3 In summary, the chapter addresses:

- The potential constraints from existing sources of noise on the internal and external noise environments at the Proposed Development and where necessary, the types of measures that might be adopted to overcome these constraints;
- The impact of noise and vibration on existing sensitive receptors during the demolition and construction phase;
- The potential effect of road traffic noise from the Proposed Development on surrounding sensitive receptors following completion and habitation of the Proposed Development: and
- The effect of the existing noise and vibration climate on the Development.

9.4 A glossary of common noise terminology is provided in **Appendix 9.1**

9.5 The assessment has considered the noise and vibration effects from the development as shown on the Site Layout Plan in **Appendix 9.2**.



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## **ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA**

9.6 Planning Policy Guidance, PPG24 (**Ref 9.1**) been superseded by The National Planning Policy Framework (NPPF) (February 2019) (**Ref 9.2**). The NPPF sets out the Government's economic, environmental and social planning policies for England. It attempts to summarise in a single document all previous national planning policy advice. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

### **Construction Phase Methodology**

9.7 The impact of noise and vibration during construction of the Proposed Development requires prediction and assessment in accordance with the guidance presented in BS 5228 1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Noise' (**Ref 9.3**).

### **Changes in Road Traffic Noise**

9.8 The impact of changes in noise level resulting from changes in traffic flow and composition on existing roads as a result of the operational development requires assessment in accordance with the guidance presented in the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3 Part 7 – HD 213/11 Noise and Vibration, 2011 (**Ref 9.4**).

### **Noise at Proposed Residential Properties**

9.9 The ambient noise at residential dwellings is assessed against the guidance provided by BS 8233:2014 'Sound Insulation and Noise Reduction for Buildings' for both the day and night-time periods (**Ref 9.5**).

9.10 Night time maximum noise levels are assessed against the guideline noise level for the onset of sleep disturbance provided by the WHO Guidelines for Community Noise (**Ref 9.6**).



## ASSESSMENT CRITERIA

9.11 The measurement, prediction and assessment of noise and vibration levels associated with the Proposed Development and the significance of their potential impacts have been assessed in accordance with national guidance and recognised codes of practice. A three-stage process has been adopted. First, the sensitivity of the noise and vibration receptors is assessed. This is followed by an assessment of the magnitude of the noise and vibration impacts and finally the significance of impacts. These are discussed below and have been specifically applied to the following conceptual significance impact matrix as appropriate.

### Sensitivity

9.12 The criteria set out in Table 9.1 below have been applied to identify noise/vibration sensitive receptors either on or adjacent to the Site. The receptors are termed 'local' (within 600m of the site).

**Table 9.1 – Noise and Vibration Receptors**

Sensitivity	Description	Receptor
High	Receptors that are especially susceptible to noise/vibration	Residential dwellings, Schools, Hospitals, Care Homes
Moderate	Receptors where a reasonable degree of noise disturbance is acceptable	Offices
Low	Receptors where noise is tolerable	Retail shops, restaurants
Negligible	Receptors where noise is not likely to be a factor	Sports Grounds, commercial and industrial environments

### Effect Magnitude: Construction Phase

9.13 Noise levels generated by construction activities have the potential to impact upon nearby noise-sensitive receptors. However, the magnitude of the potential impact will depend upon a number of variables, such as:

- the noise generated by plant or equipment used on site;
- the period of time that construction plant is operational;
- the distance between the noise source and the receptor; and
- the level of likely attenuation due to ground absorption and barrier effects.



9.14 BS 5228 sets out a methodology for predicting, assessing and controlling noise levels arising from a wide variety of construction and related activities. As such, it can be used to predict noise levels arising from the operations at proposed construction sites. BS 5228 also sets out tables of sound power levels generated by a wide variety of construction plant to facilitate such predictions.

9.15 The prediction procedure essentially involves taking the source noise level of each item of plant and correcting it for (i) distance effects between source and receiver (ii) percentage operating time of the plant; (iii) barrier attenuation effects; (iv) ground absorption; and (v) facade corrections. The latter correction involves a 3dB noise increase due to the reflection effects for a receiving point location 1m in front of a building facade.

9.16 Noise levels generated by the proposed site operations and experienced at local receptors will depend upon a number of variables, for example:

- the amount of noise generated by plant and equipment being used at the development site generally expressed as a sound power level;
- the periods of operation of the plant at the development site, known as the 'on-time';
- the distance between the noise source and the receptor, known as the 'stand-off';
- the attenuation due to potential barrier effects; and
- the reflection of noise due to the presence of hard vertical faces such as walls.

9.17 BS 5228 gives several examples of acceptable limits for construction or demolition noise. The most simplistic being based upon the exceedance of fixed noise limits and states in paragraph E.2:

*“Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut.”*

*“Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed: 70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise or 75 decibels (dBA) in urban areas near main roads in heavy industrial areas. These limits are for daytime working outside living rooms and offices.”*

9.18 The construction noise impact considers the noise magnitude and adverse effect levels as provided in the Noise Policy Statement for England, 2010 (**Ref 9.7**) and the Planning Policy



Guidance (PPG) provided in March 2014 by the Department for Communities & Local Government in its on-line planning guidance to assist with interpretation of the NPPF as shown in Table 9.2.

**Table 9.2 - Construction Noise Magnitude**

Day	Time (hours)	Averaging Period T	LOAEL	SOAEL
			$L_{pAeq,T}$ (dB)	$L_{pAeq,T}$ (dB)*
Mondays to Fridays	0700 - 0800	1 hour	60	70
	0800 - 1800	10 hours	65	75
	1800 - 1900	1 hour	60	70
	1900 - 2200	1 hour	55	65
Saturdays	0700 - 0800	1 hour	60	70
	0800 - 1300	5 hours	65	75
	1300 - 1400	1 hour	60	70
	1400 - 2200	1 hour	55	65
Sundays & Public Holidays	0700 - 2200	1 hour	55	65
Any night	2200 - 0700	1 hour	45	55

\* The measured levels should be monitored in order to ensure that the levels presented in the table are not exceeded for a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months.

9.19 It is worth noting that the purpose of the target construction noise criteria is to control the impact of construction noise insofar as is reasonably practicable, whilst recognising that it is unrealistic for developments of this nature to be constructed without causing some degree of disturbance in the locality. Hence, even if the criteria adopted for this assessment is achieved, noise from construction activities is likely to be readily noticeable. It is further noted that the local authority may restrict the hours of construction and construction related traffic on the Site.

### Construction Vibration

9.20 Vibration may be impulsive, such as that due to hammer-driven piling; transient, such as that due to vehicle movements along a railway; or continuous, such as that due to vibratory driven piling. The primary cause of community concern generally relates to building damage from both construction and operational sources of vibration, although, the human body can perceive vibration at levels which are substantially lower than those required to cause building damage.

9.21 Damage to buildings associated solely with ground-borne vibration is not common and although vibration may be noticeable, there is little evidence to suggest that they produce cosmetic





damage such as a crack in plaster unless the magnitude of the vibration is excessively high. The most likely impact, where elevated levels of vibration do occur during the construction phase, is associated with perceptibility.

9.22 BS 5228 indicates that the threshold of human perception to vibration is around 0.15mm/s, although it is generally accepted that for the majority of people vibration levels in excess of between 0.15 and 0.3 mm/s peak particle velocity (PPV) are just perceptible.

9.23 There are currently no British Standards that provide a methodology to predict levels of vibration from construction activities, other than that contained within BS 5228 which relates to percussive or vibratory piling only. Therefore, it is not possible to accurately predict levels of vibration during the site preparation and construction phases of the development. As such, to control the impact of vibration during the site preparation and construction of the Proposed Development, limits relating to the perceptibility of vibration have been set.

9.24 Accordingly 1 mm/s ppv has been selected as the target criteria to control the impact of construction vibration, with the criteria for assessing the magnitude of vibration impacts according to the margin by which this target criterion is achieved or exceeded presented in Table 9.3 below. This target criterion is based on the guidance contained within BS 5228, experience from previous sites and accepted vibration policy criteria across a range of enforcing authorities elsewhere in the UK. The limits are presented in terms of peak particle velocity (PPV) as it is the simplest indicator for both perceptibility and building damage.

**Table 9.3 - Ground- vibration effect levels for permanent residential buildings**

Vibration		
Lowest Observed Adverse Effect Level	PPV mm/s	1
Significant Observed Adverse Effect Level	PPV mm/s	10

9.25 Again, it is worth noting that the purpose of the target construction vibration criteria is to control the impact of construction vibration insofar as is reasonably practicable and is entirely based on the likelihood of the vibration being perceptible, rather than causing damage to property. Hence, although vibration levels in excess of 1 mm/s ppv would be considered a Major Adverse impact in respect of the likelihood of perceptibility, they would not be considered significant in terms of the potential for building damage, which would require levels of at least 15 mm/s ppv to result in minor cosmetic damage in light / unreinforced buildings.



## Effect Magnitude: Completed Development

9.26 The aim of noise policy within the UK is to protect individuals from excessive noise levels both in the workplace and within their homes. It has been recognised that severe annoyance to individuals due to noise can lead to sleep disturbance and adverse health effects.

9.27 The NPPF does not give a set of criteria for external noise assessment and therefore guidance within contemporary British Standards and other internationally published documents has been considered.

9.28 For the purposes of this assessment, external noise levels for residential use have been applied to the residential accommodation and derived on the basis of internal noise criteria outlined in British Standard 8233 and World Health Organisation (WHO) guidance. These derived noise levels have sub-divided into four noise exposure groups (NEGs) for assessment purposes and are presented in Table 9.4. Details of the derivation of each sub-group is shown in Table 9.5.

**Table 9.4 - External Noise Levels Criteria for Assessment Purposes,  $L_{Aeq,T}$  dB (free-field)**

Noise Source		Noise Exposure Groups			
		A	B	C	D
Mixed Sources	07.00-23.00	<55	55-63	63-72	>72
	23.00-07.00	<45	45-57	57-66	>66

**Table 9.5 - Sub-class Derivation**

NEG	Derivation Source
A	WHO guidance states ' <i>general daytime outdoor noise levels of less than 55 dB(A) are desirable to prevent any significant community annoyance</i> '. Night-time levels are based upon WHO's 30 dB criterion. (see below). Noise levels in this band are unlikely to be a determining factor for planning considerations
B	Based upon a partially open window attenuation of 10-15 dB(A), a maximum figure of 45 dB(A) at the façade will meet with both WHO and the 'good' standard of BS8233 during both the day and night-time. (see below) Subject to appropriate mitigation, noise levels in this band are unlikely to be a determining factor for planning considerations



NEG	Derivation Source
C	These levels are based upon the trigger levels of Noise Insulation Regulations (NIR) during the day and WHO's 30 dB criterion at night. Subject to appropriate mitigation in the form of both external and façade treatments, noise levels in this band should be a material consideration for planning purposes
D	This band is based upon the outcome of noise survey undertaken by the Building Research Establishment on noise levels higher than that prescribed in the NIR. Residential development in this band should normally be avoided unless special mitigation measures allow suitable internal levels to be achieved

9.29 BS 8233 makes recommendations for the control of noise in and around buildings. It suggests appropriate criteria for different situations, and is primarily intended to guide the design of new or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate. The guidance provides desirable indoor ambient noise levels for dwellings which are summarised in Table 9.6 below.

**Table 9.6 - Noise Criteria for Residential Use Buildings**

Activity	Location	0700 to 2300	2300 to 0700
Resting	Living room	35 dB $L_{Aeq,16\text{ hour}}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16\text{ hour}}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16\text{ hour}}$	35 dB $L_{Aeq,8\text{ hour}}$
Note 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,f}$ depending on the character and number of events per night. Sporadic noise events could require separate values.			

9.30 BS8233:2014 states that for traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB  $L_{Aeq,T}$ , with an upper guideline value of 55 dB  $L_{Aeq,T}$  which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient



use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

9.31 The internal noise levels recommended in BS 8233 are almost identical to those presented in WHO guidelines for community noise (internal to buildings). Internally, the WHO guidance is that in order to avoid sleep disturbance the period noise level ( $L_{Aeq,T}$ ) should not exceed 30 dB and individual noise events should not exceed 45 dB  $L_{Amax}$ . Section 3.4 of the WHO Guidelines states that for good sleep, indoor noise levels should not exceed approximately 45 dB  $L_{Amax}$  more than 10-15 times a night. On the basis of the WHO's 15 dB façade insulation for windows partly open; this equates to external  $L_{Amax}$  of 60 dB that should not be exceeded more than 10-15 times per night.

9.32 Externally, the WHO guidance is now based upon thresholds of night noise exposure indicated by  $L_{night, outside}$  as defined in the Environmental Noise Directive (2002/49/EC, 2002) (**Ref 9.8**). The  $L_{night, outside}$  is the A-weighted long-term average sound level determined over all nights of the year, where the night is the 8-hour period between 2300-0700 hours.), the latest WHO guidance recommends an  $L_{night, outside}$  of 40 dB as a target for the night noise guideline (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly.

9.33 An external  $L_{night}$  value of 55 dB is recommended as an interim target for countries where the NNG cannot be achieved in the short term for various reasons, and where policy-makers choose to adopt a stepwise approach.

#### **LOAEL and SOAEL for transportation airborne noise affecting indoor residential levels.**

9.34 Incident façade levels should not be considered in isolation of the sound reduction provided by the external building fabric. The guidance within Planning Policy Guidance states that "consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations."



9.35 Based on the advice within BS:8233:2014 an indoor noise level of 35 dB  $L_{Aeq,16hr}$  during the daytime and 30 dB  $L_{Aeq,8hr}$  during the night-time may be considered as the LOAEL for transportation noise.

9.36 Similarly, an indoor noise level 50 dB  $L_{Aeq,16hr}$  and 45 dB  $L_{Aeq,8hr}$  during the night-time may be considered as the SOAEL for transportation noise.

9.37 The WHO Guidelines for Community Noise also identify 60 dB  $L_{Amax,F}$  outside as the guideline value for sleep disturbance with windows open. For this reason, a sound level of 60 dB  $L_{Amax,F}$  at the façade is considered the LOAEL.

9.38 Table 9.7 summarises LOAEL and SOAEL inside the different areas of permanent residential buildings.

**Table 9.7 - Internal and External Noise Criteria for habitable rooms due to Transportation Noise**

Level	Proposed LOAEL and SOAEL levels for transportation noise affecting new residential premises	
	Daytime (07:00 hours to 23:00 hours)	Night-time (23:00 hours to 07:00 hours)
Internal Noise Levels		
LOAEL	35 $L_{Aeq,16h}$ (dB)	30 $L_{Aeq,8h}$ (dB)
SOAEL	50 $L_{Aeq,16h}$ (dB)	45 $L_{Aeq,8h}$ (dB)
LOAEL	Not applicable	45 dB $L_{Amax,F}$ if more than 15 events
	Not applicable	50 dB $L_{Amax,F}$ if less than 15 events
SOAEL	Not applicable	65 dB $L_{Amax,F}$ if more than 15 events
	Not applicable	70 dB $L_{Amax,F}$ if less than 15 events
External Amenity Areas (free field levels)		
LOAEL	50 $L_{Aeq,16hr}$ (dB)	40 $L_{Aeq,8hr}$ (dB)
SOAEL	65 $L_{Aeq,16hr}$ (dB)	55 $L_{Aeq,8hr}$ (dB)



## Vibration

9.39 The assessment of potential vibration impacts has considered British Standard 6472:2008 (BS6472) (**Ref 9.9**), which provides guidance over the frequency range 0.5 Hz to 80 Hz.

9.40 BS 6472 describes how to determine the vibration dose value, VDV, from frequency-weighted vibration measurements. The vibration dose value is used to estimate the probability of adverse comment, which might be expected from human beings experiencing vibration in buildings.

9.41 Consideration is given to the time of day and use made of occupied space in buildings, whether residential, office or workshop. BS 6472 states that in homes, adverse comment about building vibrations is likely when the vibration levels to which occupants are exposed are only slightly above thresholds of perception.

9.42 BS 6472 contains a methodology for assessing the human response to vibration in terms of either the VDV, or in terms of the acceleration or the peak velocity of the vibration, which is also referred to as peak particle velocity.

9.43 The recommendations and guidance presented in BS 6472 have been used to derive criteria for assessing the impact of development generated vibration on nearby residential dwellings, as set out in Table 9.8.

**Table 9.8 - Residential Use Buildings, Vibration Magnitude Description**

Night-time Vibration Level VDV	Daytime Vibration Level VDV	Description
>0.51	>1.6	Major Negative
0.26 - 0.51	0.80 - 1.6	Moderate Negative
0.13 - 0.25	0.20 - 0.79	Minor Negative
<0.13	<0.20	Negligible

## Road Traffic Noise

9.44 The impact of any changes in road traffic noise levels has been considered against the principles and guidance presented within the Design Manual for Roads and Bridges (DMRB) Part



7 HD213/11 Noise and Vibration, 2011. DMRB presents an impact significance matrix for assessing the magnitude of changes in noise level for the short and long term and can be used as criteria for assessing the impact of any changes in road traffic noise levels, as shown in Tables 9.10 and 9.11.

9.45 The DMRB states that:

*'The impact of a Proposed Development at any location can be reported in terms of changes in absolute noise level. In the UK the standard index used for traffic noise is the  $L_{A10,18hr}$  level, which is quoted in decibels'*

9.46 In order to determine whether changes in traffic noise levels are likely to occur as a result of the Proposed Development, noise levels have been predicted in accordance with the methodology contained within the Calculation of Road Traffic Noise (CRTN) (Ref 9.10), based on traffic flow data for the local road network with and without the Proposed Development.

**Table 9.9 - Semantic Descriptors for Traffic Noise in the Short Term**

<b>Change in Noise Level</b> <b><math>L_{A10,18 hr}</math> dB</b>	<b>Magnitude of Impact</b>
0	No Change
0.1 to 0.9	Negligible
1 to 2.9	Minor
3 to 4.9	Moderate
5+	Major

**Table 9.10 - Semantic Descriptors for Traffic Noise in the Long Term**

<b>Change in Noise Level</b> <b><math>L_{A10,18 hr}</math> dB</b>	<b>Magnitude of Impact</b>
0	No Change
0.1 to 2.9	Negligible
3 to 4.9	Minor
5 to 9.9	Moderate
10+	Major



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## Commercial Noise

9.47 British Standard BS 4142: 2014 *Methods for Rating and Assessing Industrial and Commercial Sound* (BS 4142) (**Ref 9.11**) is intended to be used for the assessment of whether sound of industrial and/or commercial nature is likely to give rise to complaints from people residing in nearby dwellings. The Standard, which was updated in 2014, states that such sound can include:

- sound from industrial and manufacturing processes;
- sound from fixed installations which comprise mechanical and electrical plant and equipment;
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and,
- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

9.48 The procedure contained in BS 4142 for assessing the likelihood of complaints is to compare the measured or predicted sound level from the source in question, the '*specific sound level*', at the assessment position with the background sound level. Where sound contains acoustic features, such as tonality, impulsivity or other noticeable characteristics then a correction is added to the specific sound to obtain the '*rating level*' that reflects the contextual setting of the site.

9.49 To assess the likelihood of complaints, the measured background sound level is subtracted from the rating level. BS 4142 states:

*'Typically, the greater this difference, the greater the magnitude of the impact;*

- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and,*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background*





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*sound level, this is an indication of the specific sound source having a low impact, depending on the context.'*

## **LEGISLATION, PLANNING POLICY AND GUIDANCE**

### **National Policy: National Planning Policy Framework**

9.50 The National Planning Policy Framework (NPPF) (February 2019) sets out the Government's economic, environmental and social planning policies for England. It attempts to summarise in a single document all previous national planning policy advice. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

9.51 Under Section 15; Conserving and enhancing the natural environment, the following is stated in paragraph 170:

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

*preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability"*

9.52 The NPPF goes on to state in paragraph 180 that:

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

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason"*



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## Noise Policy Statement for England, 2010 (NPSE)

9.53 The NPSE seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. It also sets out the long term vision of Government noise policy:

9.54 *“To promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development”.*

9.55 The NPSE clarifies that noise should not be considered in isolation of the wider benefits of a scheme or development, and that the intention is to minimise noise and noise effects as far as is reasonably practicable having regard to the underlying principles of sustainable development.

9.56 The first two aims of the NPSE follow established concepts from toxicology that are applied to noise impacts, for example, by the World Health Organisation. They are:

- NOEL – No Observed Effect Level - the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise; and
- LOAEL – Lowest Observed Adverse Effect Level - the level above which adverse effects on health and quality of life can be detected.

9.57 The NPSE extends these to the concept of a significant observed adverse effect level.

- SOAEL – Significant Observed Adverse Effect Level - The level above which significant adverse effects on health and quality of life occur.

9.58 The NPSE notes:

*“it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times”.*



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## **Planning Practice Guidance (PPG) – Noise**

9.59 The Government's PPG on noise provides guidance on the effects of noise exposure, relating these to people's perception of noise, and linking them to the NOEL and, as exposure increases, the LOAEL and SOAEL.

9.60 As exposure increases above the LOAEL, the noise begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. As the noise exposure increases, it will then at some point cross the SOAEL boundary.

9.61 The LOAEL is described in PPG as the level above which *"noise starts to cause small changes in behaviour and / or attitude e.g. turning up the volume of the television, speaking more loudly, or, where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life."*

9.62 PPG identifies the SOAEL as the level above which *"noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area."*

### **BASELINE CONDITIONS**

9.63 The baseline conditions across the Site have been determined by environmental noise measurements and subjective observations at the Site. The survey of existing noise conditions at the Site commenced on 11 January 2019 and were completed by 15 January 2018.

9.64 The primary purpose of the noise survey was to gather acoustic information on the baseline noise levels at the Site during daytime and night-time periods. This data is used to assess the suitability of the Site for a residential development, to allow appropriate noise limits to be set for any proposed building services plant and enable an assessment of commercial noise at existing residential properties.



9.65 Site observation indicated that the dominant noise source is road traffic on the surrounding road network, predominantly on North Dane Way.

### Measurement Survey

#### Noise

9.66 The noise measurements were undertaken at 2 locations with the microphone at a height of 1.5 metres above local ground level and under free-field conditions. The microphones were fitted with protective windshields for the measurements.

9.67 All measurement equipment used during the noise surveys conformed to relevant Type 1 specifications. A full inventory of this equipment is presented in Table 9.11.

**Table 9.11 – Inventory of Acoustic Measurement Equipment**

Item	Make & Model	Serial Numbers
Sound Level Meter	Svantek 977	34815
Sound Level Meter	Svantek 957	21890
Calibrator	SV31	32530

9.68 All noise measurements were undertaken by consultants competent in environmental noise monitoring, and, in accordance with the principles of BS 7445: 2003 (**Ref 9.12**). The broadband noise parameters of  $L_{Aeq,T}$ ,  $L_{A10,T}$ ,  $L_{A90,T}$ , and  $L_{Amax,F}$  were recorded at each location.

9.69 A summary of the noise measurement at sites 1 and 2 are presented in Table 9.12. The full set of graphical results is shown in **Appendix 9.3** and 9.4. The noise measurement locations are shown in **Appendix 9.2**.



**Table 9.12 – Summary of Measured Noise Levels, January 2019**

Monitoring Position	Date	Measured Sound Pressure Level, dB re. 2x10 <sup>-5</sup> Pa.					
		Day Time (07:00 - 23:00)			Night-time (23:00 - 07:00)		
		L <sub>Amax,F</sub>	L <sub>Aeq,T</sub>	L <sub>A90,T</sub>	L <sub>Amax,F</sub>	L <sub>Aeq,T</sub>	L <sub>A90,T</sub>
S1	11/01/2019	85.4	52.2	39.7	74.2	41.1	32.0
	12/01/2019	87.1	53.8	43.9	79.7	43.3	34.5
	13/01/2019	88.4	53.5	44.5	75.3	41.6	32.3
	14/01/2019	85.6	49.5	37.4	74.3	37.0	29.0
	15/01/2019	77.6	50.3	42.3	-	-	-
S2	11/01/2019	80.8	54.5	45.2	75.8	44.7	36.2
	12/01/2019	81.1	57.5	48.7	81.2	47.5	39.0
	13/01/2019	87.4	57.0	48.1	79.9	46.4	38.0
	14/01/2019	81.8	55.9	46.4	77.9	46.1	35.8
	15/01/2019	78.8	57.3	49.7	-	-	-

9.70 The weather conditions at the start of the survey on 11 January 2019 were sunny and dry with wind speeds below 5 ms<sup>-1</sup> and a daytime temperature of 6 °C. The weather conditions on the 15<sup>th</sup> January were similar, with similar wind speeds and an average temperature of 8 °C.

#### Vibration

9.71 The vibration levels on the Site were assessed subjectively during the noise survey and no vibration was observed to be imperceptible. It is therefore considered that a vibration survey is not required for the purpose of this assessment.



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## IDENTIFICATION AND EVALUATION OF POTENTIALLY SIGNIFICANT EFFECTS

9.72 This section considers the potential effects associated with the noise egress during the construction and operation of the Proposed Development.

9.73 Potential noise impacts arising from the completed development include the consideration of access roads and building services noise. The potential noise and vibration effects on the Proposed Development from existing road and rail sources have also been considered.

### During Construction

9.74 The operation of equipment associated with site preparation and construction of the Proposed Development has the potential to result in noise effects at existing noise sensitive receptors in the vicinity.

9.75 Specific detail on the type of plant is not available at this stage, therefore construction noise levels are based on the likely plant together with generic plant detail contained within BS5228-1:2009+A1:2014. The type of piling is not yet known. As such, for the purposes of the assessment Continuous Flight Auger (CFA) piling is assumed.

9.76 Calculations were carried out in accordance with the methodology prescribed within BS 5228. Calculations representing a worst-case scenario over a one-hour period with plant operating at the closest point to the nearest Noise Sensitive Receptor and in the absence of mitigation are presented. In practice, noise levels would tend to be lower owing to greater separation distances and screening effects.

9.77 The construction noise predictions have been undertaken for the noisiest construction phases to provide assessment levels at the nearest noise sensitive receptors. The highest noise levels are from plant usually associated with earthworks, piling, concreting, road pavement and general construction site activities and the facade noise levels used for the assessment are as follows:

- Enabling works 84 dB(A) at 10m
- CFA Piling 85 dB(A) at 10m
- Sub Structure 80 dB(A) at 10m
- Road pavement 81 dB(A) at 10m
- Super Structure 85 dB(A) at 10m

9.78 With regard to barrier attenuation effects, acoustic screening would be provided by permanent structures on the intervening land between the proposed construction areas and receptor locations, in addition to the natural screening that may be afforded by the topography of the area. To provide a robust assessment however, the construction noise predictions assume no attenuation from site hoardings at receptor locations.

9.79 Construction noise levels have been predicted at the closest existing representative noise sensitive receptor locations (R1, R2 and R3) to the Proposed Development. Receptors R1 and R2 are representative of the likely highest construction noise levels at the nearby residential development, R3 is representative of the nearest residential property on the western side of the development. These locations are shown in Figure 9.1.

9.80 The calculation receptors have been chosen at the western section of the Site, as this area of the Proposed Development is closest to existing residential dwellings.

**Figure 9.1: Construction Noise Calculation Locations**



9.81 The predicted noise levels are 'worse case', assuming the closest distance between the source of construction noise and the receptor in order to calculate a worse likely noise level at the calculation location. The noise levels predicted at the closest façade of each construction assessment position during each phase and sub-phase of the works are shown in Table 9.13.



**Table 9.13 – Worst-case Façade Construction Noise Levels  $L_{Aeq,T}$  dB**

Receptor	Noise Level, dB, During Construction Phase (rounded to 0 dp)				
	Enabling Works	Piling	Sub-structure	Roads	Super-structure
R1	73	74	69	70	74
R2	73	74	69	70	74
R3	70	71	66	67	71

9.82 The comparison of the results presented in Table 9.13 above with the target noise criterion of 75 dB  $L_{Aeq,T}$  identifies that façade noise levels for the nearest existing noise sensitive locations are predicted to be below the target criteria for all construction related operations due to the intervening distances.

9.83 It should be noted that all construction activities would not occur simultaneously nor would it be operated at the closest distance to the residential areas for a long period of the time as assumed for the purposes of a worse-case scenario assessment.

9.84 Additionally, construction activity pertaining to the creation or amendment of roads would occur at distances greater than those used in this assessment.

9.85 Comparison of these results with the criteria presented in Table 9.2 identifies that for all phases, at the residential receptors, construction noise effects would be classified as below SOAEL. Due to the high sensitivity of the receptors, the significance is classed as 'Moderate' prior to mitigation.

9.86 In addition to construction plant operating on the Site, there would be movement of materials to and from the Site by road. Construction traffic would be managed to minimise the temporary and intermittent adverse effects that construction traffic can cause. Noise level changes arising from construction traffic has been undertaken using the calculation methodology detailed within the CRTN.

9.87 Mitigation measures are considered later in this chapter. These measures will be adhered to in order to ensure low likelihood of adverse impacts.





## Construction Vibration

9.88 Table 9.14 below details the distances at which certain construction activities could give rise to a just perceptible level of vibration. These figures are based on historical field measurements.

**Table 9.14 – Distances at which vibration may be just perceptible**

Construction Activity	Distance (m)
Excavation	10-15
Heavy Vehicles (e.g. dump trucks)	5-10
Hydraulic Breakers	15-20
Large Rotary Piling Rig	20-30
Driven Piling Rig (if required)	10-20

9.89 On the basis of the distances at which vibration from various construction activities is likely to be perceptible, nearby residential properties are unlikely to be affected. However, mitigation measures to control the impact of construction vibration are presented in the following section.

## Operational Phase

### Site Suitability – Existing Noise Climate

9.90 The future suitability of the Site for residential accommodation has been determined by comparing the results of the environmental noise survey with the guidance adopted for this chapter.

9.91 The measured ambient noise levels have been averaged to obtain representative day and night time noise levels. Internal ambient noise levels have been calculated using the typical façade reductions detailed in BS 8233, with a 15 dB and 33 dB reduction afforded for partially open windows and for windows closed, respectively.

9.92 The outline plan indicates the likely layout for the Proposed Development. Measurement position S1 is situated close to North Dane Way and the junction with Princes Avenue. Location S2 is situated close to the existing household waste site. Should further calculations be required, these can be undertaken following finalisation of the site layout and establishment of outline planning. The daytime and night time noise levels are presented in Table 9.15.



**Table 9.15 – External and Internal Ambient Noise Levels**

Monitoring Position	Period	Sound Pressure Level, dB re. $2 \times 10^{-5}$ Pa.		
		External	Internal (Windows Partially Open)	Internal (Windows Closed)
S1	Day	52.2	37.2	19.2
	Night	41.3	26.3	8.3
S2	Day	56.6	41.6	23.6
	Night	46.3	31.3	13.3

9.93 The ambient noise levels summarised in Table 9.15 identify that during the day and night-time the highest measured ambient noise levels are 56.6 dB  $L_{Aeq,16\text{ hr}}$  and 46.3 dB  $L_{Aeq,8\text{ hr}}$  respectively. When assessed against the derivations in Table 9.5 the noise falls within NEG B during both the daytime at night-time periods, which indicates that, subject to appropriate mitigation, the ambient noise levels are unlikely to be a determining factor for planning considerations.

9.94 In addition to the above, BS8233:2014 provides guideline values for external amenity areas and internal rooms during the day and night. Assessment of the external and internal noise levels is presented in Table 9.16.

**Table 9.16 – Assessment of Ambient Noise Levels**

Monitoring Position	BS 8233 Criteria Achieved (Y/N)			
	Outdoor Amenity (daytime)	Internal (Windows Partially Open/Windows Closed)		
		Living Rooms & Bedrooms (daytime)	Dining Areas	Bedrooms (night time)
S1	Y	N/Y	Y/Y	Y/Y
S2	N	N/Y	N/Y	N/Y

9.95 The assessment indicates that the existing ambient noise levels are below the BS 8233 threshold criteria for internal areas with windows closed.

9.96 External noise levels at S2 are 1.6 dB above the BS 8233 upper guideline value for amenity areas, with noise levels at P1 falling below the upper guideline by -2.8 dB. BS 8233 recognises that *“these guideline values are not achievable in all circumstances where development might be*



*desirable. In areas such as ... urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.”*

9.97 The noise effects on the residential area of the Proposed Development when assessed against the guidance in Table 9.7 provide between LOAEL and SOAEL and provides a minor noise effect.

9.98 The WHO Guidelines states that indoor noise levels should not exceed approximately 45 dB  $L_{Amax}$  more than 10-15 times a night to ensure there are no negative health effects related to sleep disturbance.

9.99 Considering the façade sound reduction from typical design as used in the 8233 assessment, maximum night time noise levels with windows closed and assessed over 1-minute periods, exceed the WHO criteria of 45 dB. However, the exceedances are not observed for more than 15 times per night. Maximum  $L_{Amax,F}$  noise levels are therefore considered to achieve the criteria set out in the WHO Guidelines.

9.100 The maximum noise level meets the WHO criteria with windows closed. Sufficient ventilation should be considered when relying on closed windows to achieve the criterion.

#### Road Traffic Noise

9.101 The traffic flow data provided from the Transport Assessment has been used as the basis for the road traffic noise assessment. The 24-hour Annual Average Daily Total (AADT) flows were provided for the local road network surrounding the Proposed Development for the year 2035 both with and without development. These traffic flows are shown in **Appendix 9.5**.

9.102 Traffic noise predictions have been made using the CRTN prediction methodology. The methodology has been used to predict the magnitude of any change in noise level resulting from the development proposals at the roadside of the local network.

9.103 The predicted changes in noise level on existing road links, identified with respect to the road traffic noise impact assessment criteria, are presented in Table 9.17 for the day and night-time periods.



**Table 9.17 – Change in Noise Level on Local Road Network in, 2035**

Link ID	Road Link	Change in Daily Traffic Flow Between 'Do Something' and 'Do Minimum' Scenarios, 2035	
		Increase in Flow	Noise Change, dB
1	A2 New Rd	-1,560	-0.2
2	Maggie Hall Rd	-281	-0.2
3	A2 Chatham Hill	-2,316	-0.3
4	Luton Road	-889	-0.3
5	A2 Chatham Hill E	-1,481	-0.2
6	A2 Rainham Road	-71	0.0
7	Ash Tree Lane N	-115	-0.1
8	A2	-261	-0.1
9	A2 Watling St	-85	0.0
10	A2 Sovereign Blvd W	753	0.1
11	A2 sovereign Blvd E of	-165	0.0
12	Ito Way	-864	-0.1
13	A2 Sovereign Blvd	-777	-0.1
14	A2 London Rd	-14	0.0
15	Hoath Way N	-1,866	-0.2
16	Hoath Way W	-180	-0.1
17	Hoath Way E	132	0.1
18	Hoath Way	-1,229	-0.3
19	Hempstead Rd	394	0.1
20	Sharsted Wat	373	0.1
21	Wigmore Road	-43	0.0
22	Hoath Way S	-2,463	-0.2
23	M2 EB on	-417	-0.2
24	M2 EB off	-1,203	-0.3
25	M2 WB off	301	0.1
26	M2 WB on	-838	-0.2
27	Hempstead Rd	-490	-0.4
28	Hempstead Valley Dr	-27	0.0
29	Pear Tree Lane	428	0.1
30	Capstone Road S	-3,880	-1.5
31	Capstone Road	-2,985	-0.7
32	Ash Tree Land S	-1,158	-0.3
33	Capstone Road W	-10,071	-2.6
34	Capstone Road W	-3,404	-1.1



Link ID	Road Link	Change in Daily Traffic Flow Between 'Do Something' and 'Do Minimum' Scenarios, 2035	
		Increase in Flow	Noise Change, dB
35	Street End Rd	-186	-0.1
36	Luton High St	691	0.2
37	N Dane Way	-9,425	-2.3
38	Princes Ave	-203	0.0
39	Shawstead Rd	-5,897	-41.1
40	N Dane Way	-14,399	-46.0
41	Lords Wood Ln	2,447	1.7
42	N Dane Way	1,076	0.4
43	Albermarle Rd	-344	-0.4
44	Lords Wood Ln	-811	-0.4
46	Walderslade Woods	-376	-0.1
48	Pear Tree Lane	2,178	0.5

9.104 Table 9.17 identifies that the majority of the existing noise-sensitive receptors adjacent to the road network would experience increases in noise level of less than 1 dB. DMRB states that this is likely to result in a negligible impact in both the short term and the long term.

9.105 The highest noise change on existing links is 1.7 dB, calculated at Lords Wood Lane. The maximum calculated increase on other links is 0.5 dB and the highest benefit from a reduction in noise levels is -46 dB, calculated at North Dane Way. The increase in traffic flow due to the Proposed Development is calculated to be 3.9% across the surrounding network, which equates to an average 0.2 dB increase in noise levels.

9.106 With consideration to the total change in traffic flow across the surrounding road network, and the reductions identified in Table 9.17, the 3.9% change is not likely result in a significant effect. Additionally, the increase is unlikely to significantly affect existing ambient sound levels.

#### Commercial Noise

9.107 The existing Capstone Household Waste on Shawstead Road has been identified as a possible noise source. Residential dwellings close to the household waste centre may require additional mitigation in order to provide suitable conditions.

9.108 The highest measured  $L_{Aeq,1hr}$  ambient sound level during operational hours provides a worse case possible sound level for any potentially noisy activity at the waste centre. The lowest



$L_{Aeq,1hr}$  ambient noise level has been taken to provide a worse case residual sound level in order to obtain a specific sound level from the waste site activities. Derivation of the specific source sound level is detailed in Table 9.18.

**Table 9.18 – Derivation of Specific Sound Level at Measurement Position**

Ambient Sound Level, dB $L_{Aeq,1hr}$ (highest $L_{Aeq,1hr}$ during operational hours)	Residual Sound Level, dB $L_{Aeq,1hr}$ (lowest $L_{Aeq,1hr}$ during operational hours)	Specific Level, $L_{Aeq,1hr}$ , at Measurement Location
58.8	47.2	58.5

9.109 Due to the topography of the surrounding area the ground height of the waste centre is significantly lower than the Site and the nearest proposed dwelling is approximately 140 m from the waste centre with no direct line of sight. A 10 dB reduction has been applied to the specific sound level to account for the likely minimal attenuation that would be afforded between the waste centre and the nearest proposed dwelling.

9.110 The specific level at the receptor during operational hours has been calculated by applying a distance propagation calculation  $20 \cdot \log r$ , where  $r$  is the distance between the source and receiver.

9.111 The calculation for the rating level, with consideration of the propagation over distance and the likely screening attenuation, is presented in Table 9.19.

**Table 9.19 – Derivation of Specific Level at Nearest Residential Receptor Location**

Specific Level, $L_{Aeq,1hr}$ , at Measurement Location	Measurement Distance, m	Assessment Distance, m	Approximate Minimal Likely Screening Benefit	Specific Level $L_{Ar,Tr}$ , at Receptor Location
58.5	25	140	-10	41.0

9.112 For the purpose of this assessment the lowest measured average  $L_{A90,16hr}$  has been adopted. BS 4142 requires that an acoustic feature correction is applied to the specific level, where applicable, in order to obtain a rating level  $L_{Ar,Tr}$  at the identified receptor. Any correction is applied in order to consider the effect of additional acoustic characteristics present in the source of interest.



The correction is applied based on tonality, impulsivity and intermittency that may be perceptible at the receptor location.

9.113 The specific levels at the calculation receptor are below the lowest average background and ambient sound levels and are therefore unlikely to be perceptible at the receptor location. Therefore, no additional correction has been applied to account for potential acoustic features, which are unlikely to be perceptible.

9.114 The resultant rating levels and assessment against the lowest average background sound levels are presented in Table 9.20.

**Table 9.20 – Derivation of Rating Level and BS 4142 Assessment**

Specific Level, $L_{Aeq,1hr}$	Acoustic Feature Correction	Rating Level $L_{Ar,Tr}$	Background Sound Level, $L_{A90,T}$	Excess of Rating over Background
41.0	0	41.0	45.2	-4.2

9.115 BS 4142 indicates that where the rating level does not exceed the background sound level the impact of the specific sound level is likely to be low. The BS 4142 assessment requires consideration of context and any uncertainty that may be applicable to the assessment.

9.116 With consideration to the ambient sound levels, as well as the likely infrequency of the 'noisy' periods at the waste centre and likely additional attenuation, the rating level is unlikely to cause a significant impact at the nearest residential receptors.

#### Uncertainty

9.117 The calculation of the specific level is based on the highest measured  $L_{Aeq,1hr}$  during the survey. During attendance at the Site, there was little activity observed at the waste centre. Additionally, the highest measured sound level may not be caused by activity at the waste centre. Sound levels from the waste centre are likely to be lower than calculated for this worst case assessment.

9.118 Attenuation has been applied based on the likely reduction due to line of sight and topography variations. The observed attenuation is likely to be higher than the 10 dB within this



assessment. Additionally, the Proposed Development would provide solid structures that would screen further residential dwellings from the waste centre.

9.119 The possible sources of uncertainty above are resultant of the worse-case assessment and indicate that the specific sound level would fall below the background sound level to a greater extent than calculated.

## **ASSESSMENT OF CUMULATIVE EFFECTS**

9.120 Identified nearby developments that may potentially give rise to cumulative effects include:

- Land East of Gleamingwood Drive, Lordswood Kent;
- Gibraltar Farm, Hempstead, Medway; and
- Land At Brickfield Darland Farm, Pear Tree Lane, Gillingham.

9.121 The Land East of Gleamingwood Drive site is approximately 2 km south of the Site at the closest point. The Proposed Development at Gibraltar Farm is approximately 1.6 km south of the Site. The development at Brickfield Darland Farm is situated at the north east of the Site, approximately 100 m from the Site at the closest point.

9.122 The assessment of the proposed construction and traffic movements at East Hill indicates that there are no likely significant effects from the Proposed Development. Notwithstanding this, the potential for cumulative effects has been considered based on the proximity of the developments and estimation of any cumulative noise levels.

9.123 Considering the distance and likely access routes of the nearby developments, there are unlikely to be cumulative impact from construction activities or from the increased traffic movements. The Darland Farm development is sufficiently small that the variation in traffic movements would be insignificant.

9.124 The close proximity to the Site at Darland Farm may give rise to increased noise levels during construction activities, however the likelihood of combined construction noise exceeding the threshold criteria is low. On the basis that the construction activities at Darland Farm would be similar, estimated combined construction noise levels would be no higher than 75 dB  $L_{Aeq,T}$ , and are likely to be lower following consideration of context, mitigation and best practicable means.





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9.125 With consideration to the above, the potential cumulative effects from the Proposed Development and identified nearby developments are likely to be negligible.

## **ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS**

### **Construction Phase**

9.126 To control the impact of noise during construction of the Proposed Development, contractors will ensure that works are carried out in accordance with best practicable means (BPM) as described in BS 5228 comprising of the following:

- Where possible, 'silenced' plant and equipment will be used;
- Where vehicles are standing for a significant period of time, engines will be switched off;
- Acoustic enclosures will be fitted where possible to suppress noisy equipment;
- Plant will operate at low speeds, where possible, and incorporate automatic low speed idling;
- Where possible, electrically driven equipment will be selected in preference to internal combustion powered, hydraulic power in preference to pneumatic and wheeled in lieu of tracked plant;
- All plant will be properly maintained (greased, blown silencers replaced, saws kept sharpened. Teeth set and blades flat, worn bearings replaced etc);
- Consideration will be given to temporary screening or enclosures for static noisy plant to reduce noise emissions and plant should be certified to meet any relevant EC Directives;
- All contractors will be made familiar with the guidance in BS 5228 (Parts 1 & 2) which will form a pre-requisite of their appointment; and
- Early and good public relations with the adjacent tenants and occupants of buildings will also reduce the likelihood of complaints.

9.127 These general measures to control construction noise will be incorporated within the Construction Environmental Management Plan (CEMP) and/or detailed in construction method statements. By adopting the recommended best practicable means, construction noise levels can typically be reduced by 10 dB(A).

9.128 The CEMP will present procedures to control the potential impact of noise at any proposed residential units that are occupied prior to the completion of the construction activities at the Site.



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Essentially, where construction activities associated with any phase are identified to be within the critical distances, consideration will be given to the use of quieter techniques or targeted and specific noise mitigation measures (such as reduced duration of operation, enclosure of equipment etc.) to ensure continued compliance with the criterion limit.

9.129 The existing residential properties are located at a distance greater than 30 m and therefore further mitigation measures to reduce the vibration effects are not required.

### **Residential Dwellings**

9.130 The glazing and ventilation elements are typically the weakest acoustic link in the construction of a building façade. Therefore, in order to assess the acoustic performance of the residential accommodation units of the Proposed Development, it is appropriate in the first instance to explore the level of protection that will be afforded by the performance of the glazing and ventilation elements in combination.

9.131 Using the façade reduction and assessment method detailed in BS 8233 the internal ambient noise levels are calculated to meet the criteria for all room times during both day and night-time periods with windows closed.

9.132 Sufficient ventilation is required where the construction of a façade will rely on closed windows to achieve the criteria.

9.133 Examples of façade mitigation include acoustic air bricks, trickle ventilation and mechanical ventilation. Any passive or mechanical system should allow for sufficient airflow whilst maintaining the integrity of the façade with regard to noise insulation. The specification of the glazing should be selected with consideration to the required façade reduction. Detailed façade calculations can be undertaken following confirmation of the design, should such calculations be required.

9.134 Assessment of the Proposed Development indicates that ambient  $L_{Aeq,T}$  noise levels in external amenity areas would exceed the BS 8233 upper guidelines value by up to 1.6 dB. Barriers, such as close boarded solid timber fencing can typically reduce noise levels by approximately 10 dB and may provide a reduction in measured noise levels.

9.135 Additionally, amenity areas and habitable rooms can be positioned such that they do not directly overlook any noise source.



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9.136 BS 8233 indicates that the guidelines are not always achievable and that, provided the development is designed to mitigate external noise levels as far as practicable, development should not be prohibited.

9.137 Section 3.4 of the WHO Guidelines states that for good sleep, indoor noise levels should not exceed approximately 45 dB  $L_{Amax}$  more than 10-15 times/night. With the assumed façade reduction the maximum indoor noise level during the night time would remain below 45 dB  $L_{Amax,F}$ .

9.138 When relying on closed windows to meet noise criterion, acoustically treated ventilation should be provided to habitable rooms. The windows should be openable such that the choice of meeting the internal noise levels is provided to the occupants.

9.139 It should be noted that the sound reduction performances detailed above apply to habitable rooms, such as living rooms and bedrooms, only. For non-habitable rooms, such as kitchens, bathrooms, stairways, halls, landings etc, lower acoustic performance glazing configurations are permissible.

9.140 For those façades where windows need to be closed to meet the internal noise targets, an additional means of ventilation will be necessary to ensure compliance with Approved Document F of the current Building Regulations.

## **RESIDUAL EFFECTS**

### Construction Phase

9.141 Calculated construction noise levels indicate that noise levels are likely to remain below the 75 dB  $L_{Aeq,T}$  criterion noise level. With the implementation of the mitigation measures outlined above, at least a 10dB(A) reduction in general construction noise is anticipated. On this basis, residual construction noise levels would be significantly below the specified criteria

9.142 With the appropriate mitigation measures, the residual construction noise effects at all receptors would be LOAEL, when compared with the significance criteria adopted for this assessment and provides a minor to negligible noise effect.



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## **Operational Phase**

### Site Suitability

9.143 The residential area is predicted to experience noise levels within NEG B. To ensure compliance with the adopted criterion appropriate noise mitigation measures have been provided. The residual noise effect is considered to be negligible.

### Road Traffic Noise

9.144 The assessment indicates that the Proposed Development will have no significant impact on the levels of road traffic generated noise in the area and the residual effect is negligible at the nearest existing noise sensitive receptor locations.

### Commercial Noise

9.145 The excess of the rating level over background indicates that there is low likelihood an adverse effect due to the existing waste centre on Shawstead Road. The residual noise effect is considered to be negligible.



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## SUMMARY

9.146 This chapter has considered the likely effects of the Proposed Development with respect to noise and vibration. These include the effects of existing conditions on the Proposed Development and the effects of noise and vibration generated by the Proposed Development on surrounding properties, during both construction and operational phases.

9.147 The assessment has been based on environmental noise measurements and predictions undertaken for the Site.

9.148 The impact of noise and vibration during construction of the Proposed Development has been predicted and assessed in accordance with BS 5228. Generic mitigation measures have been recommended, which when implemented are capable of ensuring that the impact of noise and vibration during the construction of the Proposed Development is adequately controlled.

9.149 An assessment has been carried out in accordance with the adopted criteria to determine the suitability of the Site for residential accommodation. Proposed units will require appropriate glazing and ventilation specification, in order to achieve the required internal noise levels.

9.150 The impact of the increase in road traffic associated with the Proposed Development has been assessed. It is predicted that significant effects from any increase in road traffic noise would be unlikely at existing receptors adjacent to the surrounding roads.

9.151 Additionally, changes in road traffic are unlikely to significantly effect the measured ambient noise levels used for assessment of the Proposed Development.

9.152 Assessment of noise from the waste centre on Shawstead Road indicate there is low likelihood of adverse effects on the proposed residential dwellings.

9.153 There are no identified commercial noise sources that would be likely to cause any significant impact at the Proposed Development.

9.154 A summary of the noise significance and residual effects for the Site are presented in Table 9.18.



**Table 9.18 - Noise Summary Table**

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Noise: Construction Impacts	Direct, Temporary  Short-Term  Local	Minor to Moderate	Implementation of Best Practicable Means to control noise emissions	Minor to Negligible
Vibration: Construction Impacts	Direct, Temporary  Short-Term  Local	Negligible	Implementation of Best Practicable Means to control vibration	Negligible
Noise: Site Suitability	Direct, Permanent  Long-Term  Local	Minor	Appropriate sound insulation	Negligible
Vibration: Site Suitability	Direct, Permanent  Long-Term  Local	Negligible	None	Negligible
Noise: Changes in road traffic noise	Direct, Permanent  Long-Term  Local	Negligible	None	Negligible
Noise: Commercial Noise	Direct, Permanent  Long-Term  Local	Negligible	None	Negligible



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## REFERENCES

- Ref 9.1:** Planning Policy Guidance PPG24 'Planning and Noise'. 1994 The Stationary Office, 1994
- Ref 9.2:** The National Planning Policy Framework, February 2019, The Stationary Office, 2012
- Ref 9.3:** British Standard 5228:-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Noise'
- Ref 9.4:** Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3 Part 7 – HD 213/11 Noise and Vibration, 2011
- Ref 9.5:** British Standard 8233: 2014 Sound Insulation and Noise Reduction for Buildings
- Ref 9.6:** World Health Organisation (WHO): 1999, 'Guidelines for Community Noise', WHO, Geneva
- Ref 9.7:** Noise Policy Statement for England, 2010 (NPSE)
- Ref 9.8:** Environmental Noise Directive, 2002/49/EC, Europa, 2002
- Ref 9.9:** British Standard 6472: 2008: Guide to evaluation of human exposure to vibration in buildings, Part 1, Vibration sources other than blasting. BSI, 2008
- Ref 9.10:** The Department for Transport, 1988, 'Calculation of Road Traffic Noise (CRTN)', The Stationary Office
- Ref 9.11:** British Standard 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound. 2014
- Ref 9.12:** British Standard 7445: 2003: Description and measurement of environmental noise. BSI, 2003



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## 10 LANDSCAPE AND VISUAL AMENITY

### INTRODUCTION

10.1 This Landscape and Visual Impact Assessment chapter has been prepared by Landscape Consultants, Allen Pyke Associates. This study provides an assessment of the potential effects on landscape character and visual amenity from the Proposed Development on the East Hill Site and its setting.

10.2 The Site is located on part of an elevated ridge plateau and is set within a wider undulating chalk downland landscape consisting of ridge crests and extensive dip slopes that overlook steep-sided narrow valleys. To the north of East Hill are the distinctive scarp and valley forms that give way to a softer rolling open plateau landscape to the south. The Site consists of a series of fields in arable agricultural use that form part of an extensive area of farmland adjacent to the Medway towns of Chatham, Gillingham and Hempstead.

### ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

#### Methodology

10.3 The methodology used in this chapter is based on best practice guidance as set out in:

- Guidelines for Landscape and Visual Impact Assessment; Third Edition, 2013 (GLVIA3) published jointly by the Landscape Institute and the Institute of Environmental Management and Assessment; and,
- Landscape Institute Technical Note 01/11: Photography and Photomontage in Landscape and Visual Assessment (2011).

10.4 Since the first edition of the GLVIA was published in 1995 the document has become the standard reference for landscape assessment work and is recognised by local authorities and the Planning Inspectorate.

10.5 GLVIA3 states that the role of a Landscape and Visual Impact Assessment (LVIA) is to “*consider the effects of development on the landscape as a resource in its own right and the effects on views and visual amenity*”. This requires a clear and separate analysis of the character of an area and the potential implications for views and surrounding visual receptors.





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10.6 The document requires professional judgements to be “*reasonable and based on clear and transparent methods*” and that “*in carrying out an LVIA the landscape professional must always take an independent stance, and fully and transparently address both the negative and positive effects of a scheme in a way that is accessible and reliable for all parties concerned*”.

10.7 GLVIA3 is not intended to be prescriptive in the adoption of a single appraisal method but does promote the use of assessments appropriate to the scale and nature of the development proposals. The methodology and definition of terms used in this chapter are set out in **Appendix 10.1**.

10.8 The assessment has been undertaken in two stages:

**Stage 1** - A baseline appraisal of the landscape and visual context to determine the sensitivity of the study area and views to and from the Site.

**Stage 2** - An assessment of the potential short and long-term effects of the changes brought about by the Proposed Development and their significance.

10.9 The baseline study combines desk-based research on landscape designations, relevant planning policies and supplementary landscape documents with site visits to assess the existing conditions, consider the landscape elements (landform, landscape features, and adjacent development), establish key views and take a photographic record of the Site and its setting.

10.10 This information provides the evidence base for the assessment of susceptibility to change and the sensitivity of the landscape, related views and intervisibility with the surrounding landscape. It should be noted, however, that access to private properties is not usually possible so an assessment based on the nearest accessible viewpoint is used. This process assists in identifying the visual envelope (Zone of Visual Influence) around the Proposed Development and locations from which the Site is visible (the Visual Receptor).

10.11 The second stage describes the mitigation measures and provides an assessment of the magnitude of change and potential effects of the scheme proposals on landscape character and collection of key visual receptors identified in the baseline survey. The results are quantified in a series of tables that seek to identify the significance of any temporary effects (during the construction period, and first year of operation/occupation) and residual effects anticipated after ‘Year 15’ when the proposed mitigation measures will have established and matured.



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10.12 The assessment assumes the development to be a single entity and does not take any account of construction in phases, the relationship between phases or the time taken to complete the whole scheme.

### **Assessment Criteria**

10.13 The assessment adopts a 'worst-case scenario' in determining each element within each stage. Where visual receptors include inaccessible private properties, assessments will be made from public vantage points and, where appropriate, assumptions will be made on the highest level of impact from upper storey windows or private gardens. The timing of the assessment has been undertaken during winter months when deciduous vegetation was not in leaf to identify the full extent of the zone of visual influence and the maximum potential effects on visual amenity.

10.14 The assessment process for character, landscape features and visual impact will provide ratings, on a high/medium/low or substantial/moderate/low/neutral scale. The results will be described with text and photographs for each area or receptor, and be combined in summary tables in both the 'baseline' and 'effects' sections.

## **LEGISLATION, PLANNING POLICY AND GUIDANCE**

### **National Policies**

10.15 The National Planning Policy Framework (NPPF) provides the national context for planning policies. It was first published in 2012 and last updated in February 2019. There is an overarching presumption in favour of achieving sustainable development in accordance with the guidance in the document but there is also recognition that this does not change the statutory status of local authority Development Plans as the starting point for decision making.

10.16 The 2019 NPPF is divided into 17 chapters covering all aspects of design, housing supply, healthy living, effective use of land, cultural and environmental issues. The following sections make particular reference to landscape and visual matters:

- **Section 8** 'Promoting healthy and safe communities' - recognises that access to a network of high-quality open spaces and opportunities for sport and physical activity is important for the health and well-being of communities (paragraph 96).



- **Section 12** 'Achieving well-designed places' - states that the creation of high-quality buildings and places is fundamental to what the planning and development process should achieve (paragraph 124). Planning decisions should ensure that developments are visually attractive as a result of good architecture, layout and appropriate and effective landscaping; and be sympathetic to local character and history, including the surrounding built environment and landscape setting (paragraph 127).
- **Section 15** 'Conserving and enhancing the natural environment' - advises that planning decisions should contribute to and enhance the natural and local environment by protecting and enhancing valued landscapes (paragraph 170). Local Plans should distinguish between a hierarchy of international, national, and locally designated or valued areas with greatest weight being given to statutory designations such as National Parks and AONBs. Plans should therefore seek to allocate land of least environmental or amenity value (paras. 171 & 172) and protect biodiversity and ecological habitats or sites (paras. 174 – 176).

## Local Policies

### Medway Local Plan

10.17 Current planning policy is set out in the Medway Local Plan 2003, adopted in May 2003. 'Saved' Policies from the Plan were confirmed by the government's Housing & Planning Directorate in September 2007. The following policies and strategic objectives having relevance to the Site and landscape aspects of the Proposed Development include:

- S1: Development Strategy
- S4: Landscape and Urban Design Guidance
- BNE1: General Principles for Built Development
- BNE2: Amenity Protection
- BNE5: Lighting
- BNE6: Landscape Design
- BNE12: Conservation Areas
- BNE18: Setting of Listed Buildings
- BNE22: Environmental Enhancement
- BNE25: Development In The Countryside
- BNE34: Areas of Local Landscape Importance
- BNE42: Hedgerow Retention
- BNE43: Trees and Development Sites
- BNE48: Agricultural Land



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- H1: New Residential Development
  - L3: Protection of Open Space
  - L9: Country Parks
  - L10: Public Rights of Way

10.18 In general terms these policies seek to protect the countryside or environmental features from inappropriate development and ensure new development is designed to the highest quality, is both distinctive and sympathetic to the setting, and protects or enhances a site's natural assets.

10.19 The planning issues associated with development of the Site and its location beyond existing defined settlement boundaries are addressed in chapters 4 and 5. Landscape policies and designations specific to East Hill and the scheme proposals are:

- **BNE34: 'Areas of Local Landscape Importance'** – the Site lies within the 'Capstone, Darland & Elm Court' ALLI, one of 16 similarly designated areas within the Borough. The policy states:

*"Within the Areas of Local Landscape Importance defined on the Proposals Map, development will only be permitted if:*

- (i) it does not materially harm the landscape character and function of the area; or*
- (ii) the economic and social benefits are so important that they outweigh the local priority to conserve the area's landscape.*

*Development within an Area of Local Landscape importance should be sited, designed and landscaped to minimise harm to the area's landscape character and function."*

- **BNE6: 'Landscape Design'** – the policy regards the provision and design of external landscaping as being integral to any major new development. The policy states:

*"Major developments should include a structural landscaping scheme to enhance the character of the locality. Detailed landscaping schemes should be submitted before development commences and should have regard to the following factors:*

- (i) provide a structured, robust, attractive, long term, easily maintainable environment including quality open spaces, vistas and views; and*
- (ii) include planting of a size, scale and form appropriate to the location and landform, taking account of underground and overground services; and*



- 
- (iii) include details of the design, materials and quality detailing of hard works elements such as gates, fences, walls, paving, signage and street furniture; and*
- (iv) retain important existing landscape features, including trees and hedgerows, and be well related to open space features in the locality; and*
- (iv) support wildlife by the creation or enhancement of semi-natural habitats and the use of indigenous plant material where appropriate; and*
- (vi) include an existing site survey, maintenance and management regimes and a timetable for implementation.”*

### Emerging Local Plan

10.20 At the time of writing, Medway Council were in the process of preparing their new Local Plan, which is due to be adopted in 2020 and cover the period up to 2035. The weight and planning balance to be given to policies in both the new and emerging plans is not a function of this chapter.

10.21 Current draft policies relevant to this assessment are:

- BE2: Sustainable Design
- BE3: Housing Design
- NE1: Sites of international importance for nature conservation
- NE2: Conservation and Enhancement of the Natural Environment
- NE4: Landscapes
- NE5: Securing strong Green Infrastructure

10.22 The 2019 version of the NPPF repeats the requirement that the planning system contributes to and enhances the natural and local environment (para. 170). The simplification of previous planning guidance brought about by the original document in 2012 included the removal of unnecessary duplication of landscape designations and policies related to the countryside, which is already protected for its own sake.

10.23 The emerging policies therefore retain the existing statutory landscape and other environmental policies along with planning policies identified in the NPPF. However, previous county and local level landscape designations such as the ALLI covering the Site have been removed.



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10.24 Medway Council still recognise the diverse range of landscapes in the Borough and their contribution in providing local character, retaining links with the historic environment and defining distinct settlements. The future emphasis will be in the provision of a robust basis for landscape planning in both rural and peri-urban fringe areas, such as East Hill, to give guidance and inform development decisions. The Council is currently updating their 'Medway Landscape Character Assessment' to provide an up-to-date evidence base. There is no date fixed for publication and until the document becomes available, the 2011 version of the LCA remains the source material for a description of landscape character and sensitivity.

10.25 While there is no certainty proposed policies will be adopted in their present form, two key landscape related policies are evolving:

- **Proposed Policy NE4: 'Landscapes'** – which seeks to:

*"...attach great importance to the distinctiveness and quality of landscape in defining Medway's character, containing urban sprawl and separation of settlements."*

And ensure:

*"Development proposals will be required to demonstrate that they protect, strengthen and connect features of local landscapes."*

- **Proposed Policy NE5: 'Securing strong Green Infrastructure'** - which is to protect the existing Borough-wide green infrastructure across rural and urban Medway as well as ensure:

*"New development should provide for green infrastructure that supports the successful integration of development into the landscape, and contributes to improved connectivity and public access, biodiversity, landscape conservation, design, management of heritage features, recreation and seeks opportunities to strengthen the resilience of the natural environment."*

*The council will expect development proposals to demonstrate that they are designed to be resilient to, and can adapt to the future impacts of climate change, in strengthening ecological networks."*



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## **BASELINE CONDITIONS**

### **Local Designations**

#### Landscape

10.26 The Site is not located within any statutory landscape designation. The nearest being the 'Kent Downs Area of Outstanding Natural Beauty' (AONB) that lies 2.7km to the south the Site beyond the M2 motorway. However, the Site is wholly located within one of Medway Council's 'Area of Local Landscape Importance' (ALLI) designation (Policy BNE34).

10.27 Adjacent to the eastern Site boundary is the Capstone Country Park (Policy L9).

#### Other Designations

10.28 Heritage Assets are assessed in Chapter 14. There are two Grade II listed buildings within 500m of the Site boundaries, Capstone Farmhouse on Capstone Road, to the east, and Pheasant House on Luton High Street, to the north. There are no building Conservation Areas within or immediately adjacent to the Site. The nearest CA is at 'Gillingham Green' to the north of Darland Banks and Kingsway, 1.5 km from Site, but is hidden from view by the intervening topography and built form. The 'Brompton Lines' CA and war memorial are prominent on the chalk ridge above Chatham but lie approximately 2.5km to the north-west of the Site and the separation means there are no significant intervisibility implications.

10.29 There are no nature conservation designations covering the Site and no statutory sites within the immediate setting. Ecology and nature conservation issues are addressed in Chapter 11.

### **Landscape Character**

#### National Level

10.30 Natural England has produced a National Character Areas Plan which divides England into 159 distinct natural areas. The area profiles were originally published in 1999 by their predecessors, the Countryside Agency, but under Natural England these profiles are now kept as a regularly updated web-based resource. The Application Site and surrounding landscape lie within National Character Area Profile No.119 – 'North Downs'.



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10.31 The North Downs forms a chain of chalk hills extending eastwards from the Hog's Back in Surrey to the White Cliffs along the sea front at Dover. The designation extends over approximately 137,447 hectares of countryside. Two Areas of Outstanding Natural Beauty fall within NCA Area 119: the Kent Downs AONB, to the east, and the Surrey Hills AONB, to the west.

10.32 The key characteristics of the North Downs are identified as follows:

- *Cretaceous Chalk forms the backbone of the North Downs. A distinctive chalk downland ridge rises up from the surrounding land, with a steep scarp slope to the south providing extensive views across Kent, Surrey and Sussex and across the Channel seascape to France.*
- *The broad dip slope gradually drops towards the Thames and the English Channel, affording extensive views across London and the Thames Estuary. The carved topography provides a series of dry valleys, ridges and plateaux.*
- *Chalk soils are predominant across the NCA but the upper part of the dip slope is capped by extensive clay-with-flint deposits. Patches of clay and sandy soils also occur with coombe deposits common in dry valleys.*
- *The North Downs end at the dramatic White Cliffs of Dover, one of the country's most distinctive and famous landmarks. Most of the coast between Kingsdown and Folkestone is unprotected, allowing for natural processes. The cliffs are home to internationally important maritime cliff-top and cliff-ledge vegetation.*
- *The area is cut by the deep valleys of the Stour, Medway, Darent, Wey and Mole. The river valleys cut through the chalk ridge, providing distinctive local landscapes which contrast with the steep scarp slope.*
- *The south-facing scarp is incised by a number of short, bowl-shaped dry valleys, cut by periglacial streams and often referred to as combes. The undulating topography of the dip slope has also been etched by streams and rivers, today forming dry valleys, some of which carry winterbournes that occasionally flow in the dip slope, depending on the level of the chalk aquifer.*
- *The footslope of the escarpment supports arable cropping, the dominant land use within the NCA. In the east, the richer, loamy soils of the lower dip slope support large tracts of mixed arable and horticultural production.*
- *Woodland is found primarily on the steeper slopes of the scarp, valley sides and areas of the dip slope capped with clay-with-flints. Well-wooded hedgerows and shaws are an important component of the field boundaries, contributing to a strongly wooded character. Much of the woodland is ancient.*





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- *Tracts of species-rich chalk grassland and patches of chalk heath are important downland habitats and of international importance.*
  - *Ancient paths, drove roads and trackways, often sunken, cross the landscape and are a distinctive feature of the dip slope. Defensive structures such as castles, hill forts and Second World War installations, and historic parks, buildings and monuments are found throughout.*
  - *Small, nucleated villages and scattered farmsteads including oasts and barns form the settlement pattern, with local flint, chalk and Wealden brick the vernacular materials.*
  - *In the western part of the area, around and to the west of Sevenoaks and into Surrey, there is increased urban development.*

### Regional Level

10.33 County-wide guidance on landscape character is provided in the 'Landscape Assessment of Kent' (Oct 2004) prepared by Kent County Council. The guidance draws together existing assessments of the County to develop strategies to ensure continued distinctiveness of the Kent countryside.

10.34 The Kent study places the Site in the 'Capstone Downs' character area (see **Appendix 10.2**). It considers the landscape to be in 'Very Poor' condition but of 'High' sensitivity. The management strategy is to restore the wooded edge to ridge tops, restore areas of species-rich chalk grassland and restore hedged boundaries to roads and other highways. Its key features are:

- *Steep ridges and valleys with open plateau to south.*
- *Woodland and pasture-scrub invasion. Remnant chalk grassland.*
- *Arable cultivation on plateau.*
- *Urban context and encroachment of urban edge.*

10.35 The landscape condition assessment references many visual detractors in the form of urban and industrial development and busy traffic routes. Built development has a high negative impact on the open view. Fragments of hedged field boundaries are very occasionally visible within the areas of intense arable cultivation. Semi natural habitats are limited to wooded areas on the hilltops, often close to urban areas. The ecological integrity of the area is therefore considered to be weak.



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10.36 The landscape sensitivity assessment confirms the presence of more recent features within the landscape including shelter belts and industrial buildings, and the erosion of historical field patterns and features. However, the wooded ridges are a strong feature and views are open within a distinct landform.

10.37 Approximately 3km to the south of the 'Capstone Downs' LCA lies the adjacent 'Chatham Outskirts: Mid Kent Downs' landscape character area. There is no physical or visual connection between the Site and this character area.

#### Local Level

#### Medway Landscape Character Assessment (March 2011)

10.38 The Site is located within two local Landscape Character Areas: 'LCA 25 East Hill' and 'LCA 27 Sharstead Farm'. The northern part of the Site includes all of the East Hill character area apart from a small portion that includes the Capstone Waste and Recycling Centre to the east of the Shawstead Road. The southern tip of the Site is located within LCA 27 Sharstead Farm, which extends further to the south along the Shawstead Road. (**Appendix 10.2**).

#### LCA 25

10.39 The characteristics of LCA 25 are identified as:

- *Large rolling arable fields with strong woodland edge to fields.*
- *Close proximity to settlement and roads means that relative tranquillity interrupted in places by urban-rural fringe intrusions.*
- *Inappropriately sited waste recycling site to south harms rural character and is strong detractor on surrounding local lanes; negative impacts include localised litter and fly-tipping.*
- *Poor accessibility especially from densely populated urban areas to west.*

10.40 LCA 25 is identified as having a variable pattern of elements with some detracting features, an interrupted visual unity and moderate functionality as agricultural land. It is also described as distinctive and historic with intermittent tree cover and a landform with a 'moderate' sensitivity. The recommended actions are to 'Conserve' and 'Create', to improve accessibility through footpaths and cycle routes from adjacent urban areas and to resist development, seeking to reinforce the rural character.



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## LCA 27

10.41 The characteristics of LCA 27 are identified as:

- *Distinctive farmed dry chalk valley; traditional irregularly shaped field pattern; diverse textures*
- *Strong sense of enclosure and rural tranquillity; wooded ridges*
- *Ancient woodland block to south; largely intact hedgerow network; shaws and shaves*
- *Distinctive traditional farm settlement to west*
- *Good footpath links*

10.42 LCA 27 is described as having a coherent pattern with few detracting features and an intact visual unity. It is of high ecological value, good cultural heritage and high functionality as arable land. It is described as very distinct and historic with a strong sense of place and in combination with the dominant landform and intermittent tree cover means the LCA is given a 'high' sensitivity rating.

10.43 The recommended action in this area is to 'Conserve' and resist proposals for any built development that harms or does not fully respect the rural character. Other actions include restoring chalk grassland where opportunities arise and, strengthening woodland and hedgerow planting.

## Other LCAs

10.44 The Site is bounded to the east by two further character areas, 'LCA 24 Darland Banks' and 'LCA 26 Capstone Farm'. LCA 29 Hempstead Fringe also lies approximately 1km east of the Site and LCA 28 Elm Court to the south east. The sensitivity of Capstone Farm LCA was judged to be 'moderate', like East Hill, whereas all the other surrounding LCAs were considered to be 'high'.

## Maidstone Landscape Character Assessment (March 2012, Amended 19 July 2013)

10.45 Additional local landscape character areas fall within the neighbouring local authority of Maidstone. LCA 1 'Bredhurst and Stockbury Downs' is located approximately 3km to the south east. There is no physical or significant association between the Site and this area.

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## Assessment of Existing Landscape and Townscape Character

10.46 A total of four landscape (LCA) and three townscape character areas have been identified to cover the Site and its setting for this assessment. These are:

### Landscape:

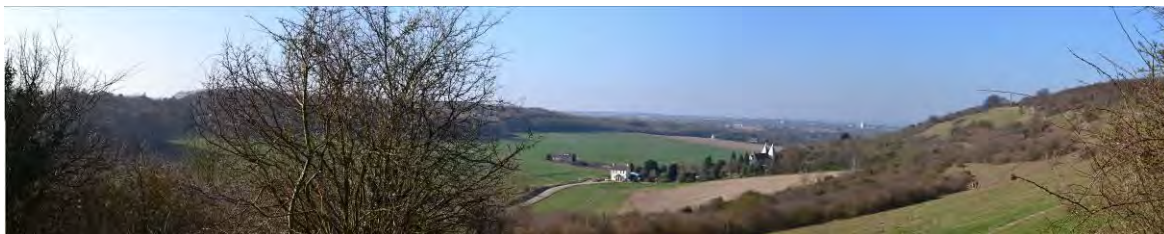
- Area 1 (LCA 24) Darland Banks
- Area 2 (LCA 25) East Hill & The Site
- Area 3 (LCA 26) Capstone Farm
- Area 4 (LCA 27) Sharstead Farm

### Urban:

- Area 5 Pre-1945 Townscape - Luton & Gillingham
- Area 6 Post-1945 Townscape – Wayfield
- Area 7 Post-1945 Townscape – Hempstead

10.47 The methodology set out in **Appendix 10.1** has been used to review and assess the Character, Condition, Value and Sensitivity of each character area. The 'Character' and 'Condition' ratings then determine the 'Susceptibility to Change'. The 'Value' and 'Susceptibility to Change' combine to determine the 'Sensitivity' of each character area. A description of each area that has the potential to be influenced by the proposals for the East Hill Site is provided below with a summary provided in Table 10.1. The definitions of terms can also be found in **Appendix 10.1**.

### **Area 1 (LCA 24): Darland Banks**



Typical view of Darland Banks

10.48 This character area is located on a north-west/south-east orientated chalk ridge and valley bottom, south of Gillingham, it abuts the northern edge of the Site at Carlton Crescent in Hale. The area has good footpath links through the open areas but is fragmented by roads and development. The strong pattern of rolling arable fields is framed by the vegetated ridge tops and mature woodland that screen the majority of the urban fringe areas. However, links with

surrounding character areas are dominated by the post-war urban expansion of the Medway towns and the tranquillity is interrupted by roads. Localised fly tipping is a noticeable problem. The published assessment concludes the sensitivity as 'High', which this assessment agrees with.

### **Area 2 (LCA 25): East Hill (The Site)**



Typical view of East Hill

10.49 The character area is located to the south of Hale and west of Capstone on the East Hill ridge with the boundary being contiguous with the perimeter of the fields in the northern part of the Site. The exception being the omission of the recycling centre off Shawstead Road. There are two east-west footpath connection across the area, but no dedicated north-south link. The area is bounded by the busy North Dane Way and urban areas to the west, which interrupt the tranquillity. The area is defined by its large rolling arable fields with strong wooded edges which help delineate the natural boundaries with adjacent character areas. Detractors from the rural character include North Dane Way, the recycling facility and issues with fly tipping. The published assessment concludes the sensitivity as 'Moderate', which this assessment agrees with.

### **Area 3 (LCA 26): Capstone Farm**



Typical view of Capstone Farm

10.50 Capstone Farm is located in the central part of the Capstone Valley between Wayfield and Hempstead, it lies due east of the Site and shares a common boundary with Shawstead Road. There is a good footpath network across the area which largely follows the boundary of the designated Country Park or connects with footpaths in the park. Activities associated with the Country Park characterise the area and include a fishing lake, car parks, visitor centre, ski centre, play areas, orchards, meadows, woodlands. The southern and western fringes consist of a farmed patchwork of rolling fields surrounded by hedgerows, shelter belts and woodland.



Framed views to the south provide a more tranquil setting. The steep topography forms a backdrop to long views down the valleys which are often covered with woodland. The adjacent recycling facility and fly tipping has a negative effect on the area. The published assessment concludes the sensitivity as 'Moderate', which this assessment agrees with.

#### **Area 4 (LCA 27): Sharstead Farm**



Typical view of Sharstead Farm

10.51 This character area encompasses part of the southern field within the Site. It is located to the east of Lordswood and west of the adjacent Elm Court open farmed plateau (LCA 28). There is a good network of footpaths and part of the area is designated for community woodland. The area is a distinctive, farmed dry chalk valley with an irregular field pattern and strong sense of enclosure and rural tranquillity created by the wooded ridges largely intact hedgerow network and shaws (thickets and small groups of trees). The published assessment concludes the sensitivity as 'High', which this assessment agrees with.

#### **Area 5: Pre 1945 Townscape: Luton & Gillingham**



Typical view of Pre 1945 Residential Townscape

10.52 This is a broad townscape character area to the north of the Site which includes a large area of settlement associated with growth along the A2 Chatham Hill and is defined by growth from the Victorian period up to the Second World War. Predominantly residential, the neighbourhood of Luton has a small commercial hub, while shops and businesses are scattered along the A2, still a busy local commuter route. The housing stock is generally in moderate condition, largely two-storey terraced and semi-detached, with larger detached properties occupying areas along ridge lines. The urban grain is generally tight with a grid of linear streets covering the level ground on ridge tops. This grid breaks within the older settlement at Luton

where the street pattern follows the contours more closely. Sporadic small trees do little to 'green' the lower valley area. Vegetation is more specifically associated with historic earthworks and areas of steep topography, public parks and private rear gardens. Overall the area is considered to have a 'Low' sensitivity.

#### **Area 6: Post 1945 Townscape: Wayfield**



Typical view of Post 1945 Residential Townscape

10.53 This area covers a large swathe of post-war development to the west of the Site from Luton in the north to Lordswood in the south, including the busy North Dane Way, which abuts the western boundary of the Site. It is defined by the ridge and valley topography from north to south and development has largely followed the contours. The urban grain changes from tight to relatively open as steeply vegetated banks and open spaces restrict development. This gives the area a strong and mature green setting. Development is variable in quality and condition with some residential areas in notably poor repair. Small pockets of industrial buildings are hidden within the townscape. Public open spaces are frequent, with many left-over incidental areas determined by the contours that become places to fly-tip rather than for amenity use. Recreation grounds are located in larger open spaces with mature vegetation that are well-used and maintained. Overall the area is considered to have a 'Low' sensitivity.

#### **Area 7: Post 1945 Townscape: Hempstead**



Typical view of Post 1945 Residential Townscape, Hempstead



10.54 This character area is located to the east of the Site and lies adjacent to LCA 24 Darland Banks, LCA 28 Elm Court and LCA 29 Hempstead Fringe. Similar to Area 5, it is predominantly residential with a large commercial complex to the north (Gillingham Business Park) and the Hempstead Valley retail park to the south. This residential area is generally in moderate repair, set within a network of woodland and small parks, which give a mature and enclosed feeling to the neighbourhood. The majority of properties are 2-storey semi-detached or detached dwellings. The busy Hoath Way at the head of the Darland Banks Valley is well screened from residential areas. Overall the area is considered to have a 'Low' sensitivity.

**Table 10.1 – Summary table of Landscape Character Area Sensitivity**

Character Area name	Character	Condition	Susceptibility to change	Value	Sensitivity
Area 1 (LCA 24): Darland Banks	High	Good	High	Moderate	High
Area 2 (LCA 25): East Hill & the Site	Moderate	Moderate	Medium	Moderate	Moderate
Area 3 (LCA 26): Capstone Farm	Moderate	Moderate	Medium	Moderate	Moderate
Area 4 (LCA 27): Sharstead Farm	High	Good	High	Moderate	High
Area 5: Pre 1945 Townscape: Luton & Gillingham	Moderate	Moderate	Medium	Low	Low
Area 6: Post 1945 Townscape: Wayfield	Moderate	Moderate	Medium	Low	Low
Area 7: Post 1945 Townscape: Hempstead	Moderate	Moderate	Medium	Low	Low

#### Comments on character

10.55 This assessment agrees in general with the sensitivity results of the Medway LCA in that the East Hill area occupied by the Site is of 'moderate' sensitivity along with the Capstone Farm LCA, while all the other adjacent character areas are considered to be of 'high' sensitivity. There are some anomalies in the LCA boundaries across the Capstone and Site landscape, like the allocation of the waste site to LCA 25, which are not explained in the 2011 study. However, it is concluded that the southern tip of the Site, currently included in LCA 27, has greater physical and visual association with LCA 25 and is of 'moderate' sensitivity. This logical boundary change could be incorporated into the forthcoming LCA update if similar areas are adopted.

10.56 No comparable assessment has been done by the Borough for the adjacent urban areas. The undulating topography and ridgeline tree cover has a significant effect on the relationship between the Site and its urban setting. However, the results show the sensitivity of each of these urban character areas to be 'low'.





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## Visual Assessment

10.57 The Site has been visited at regular intervals since the autumn of 2017 to allow an initial appraisal of a wider area that extended southwards from Darland Banks to the M2 motorway. Subsequent visits were also made in the summer of 2018 as the proposed area for development concentrated on the East Hill ridge area. Further visits have been undertaken during the winter of 2018/19 to assist the preparation of this assessment and obtain agreement on viewpoint locations.

10.58 The visual appraisal has been undertaken as a two-stage process. The first stage being to establish a maximum 'Zone of Theoretical Visibility' (ZTV) using the OS bare terrain digital model. The resultant computer-generated analysis assumed a general development height of up to 12 metres for future buildings across the East Hill Site (see **Appendix 10.3** figure 10.3). The information on the ZTV plan was then used to refine the study for on-site investigations.

10.59 The elevated East Hill ridge location and surrounding steeply undulating topography allows extensive panoramic views over many kilometres across large parts of the Medway towns and surrounding countryside. However, the chalk dip slope and valley landform obscures other urban areas closest to the Site. A further consideration in the assessment of the urban areas, particularly Luton and Hale, was the combination of topography and dense built form, which restricted public views from lower ground levels. Despite built up areas being clearly visible from Site, the reverse views from road level in these urban areas rarely allowed reverse views back to East Hill although property owners often have views from upper storey windows.

10.60 The second stage began once the ZTV was established in late 2018. Further detailed visits were undertaken in the period between December 2018 and February 2019 to establish a series of potential viewpoints, identify local landmarks and fix the area from which the Site was visible (Zone of Visual Influence – ZVI). This winter assessment occurred when deciduous trees were not in leaf and allowed the maximum ZVI to be recorded. (See **Appendix 10.3** figure 10.4).

10.61 A 'Visual Receptor Locations Report' was submitted to Medway Council in January 2019, when a total of 25 representative public viewpoints were agreed for this visual assessment. Only locations with a view of the Site were selected. These locations provide a typical range of representative viewpoints from near, middle and long distances as well as giving a good mix of countryside and urban views. The majority of the locations are taken from close to the Site boundary or on elevated viewpoints. Two further locations have been added since January and include the public footpath crossing the northern part of the Site at Hale, and a



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dwelling adjacent to the Site boundary south of Whites Wood. (See **Appendix 10.3** figure 10.5 and 10.6).

10.62 The methodology has been applied to assess the 'Type of Receptor', 'Nature of View' and 'Value of View' for each Visual Receptor (VR). The 'Type of Receptor' and 'Nature of View' determines the 'Susceptibility to Change' while the 'Value of View' and 'Susceptibility of Change' determines the 'Sensitivity' of each Visual Receptor. A summary of the results is included in table 10.2 below. The definition of the term used can be found in **Appendix 10.1**.

10.63 The 27 selected viewpoints are:

- **VR1** - Junction North Dane Way & Shawstead Road, Wayfield, Chatham,
- **VR2** - Residents at Hampshire Close, by North Dane Way, Wayfield, Chatham
- **VR3** - North Dane Way south of Shawstead Road at Whites Wood, Wayfield, Chatham
- **VR4** - Residents at (upper) Carlton Crescent, Hale, Chatham
- **VR5** - Users of Luton Recreation Ground, Hale, Chatham
- **VR6** - Capstone Road by north-eastern Field by 'Wagon at Hale' public house, Hale
- **VR7** - Users of Capstone Country Park to north-western part of site, Capstone
- **VR8** - Users of Capstone Country Park to southern part of site, Capstone
- **VR9** - Residents at Sharstead Farm Cottages, Shawstead Road, Gillingham
- **VR10** - Footpath (RC9#2) crossing Site
- **VR11** - Residents at Shanklin Close, Wayfield, Chatham
- **VR12** - Residents at Magpie Hall Road (opp. 254/256), Fort Luton, Chatham
- **VR13** - Residents at Beacon Road (west), Luton
- **VR14** - Residents at Ward View, off Ash Tree Lane, Chatham
- **VR15** - Residents along Kingsway, Gillingham
- **VR16** - Footpath (GB24) West Hoath Wood, Darland Banks
- **VR17** - Users of footpath (GB26) off Pear Tree Lane, Hempstead
- **VR18** - PRoW (KH37) off Westfield Sole Road, Lordswood
- **VR19** - Residents at Iona Close and Conifer Drive, Lordswood
- **VR20** - Users of Footpath (RCX35) Chatham Naval Memorial, Great Lines Heritage Park
- **VR21** - Users of Footpath (RS326) opposite Sans Pareil pub, Frinsbury Hill, Rochester
- **VR22** - Users of Footpath Kingsway/Hunters Way West POS Darland Banks, Chatham
- **VR23** - North Dane Way to rear of Poachers Close, Lordswood
- **VR24** - Shawstead Road / Ham Lane junction, Gillingham
- **VR25** - Residents at Mermaid close, Princes Park, Chatham

- **VR26** - Users of footpath RC32 across Site, Hale
- **VR27** - Residents south of Whites Wood

### **VR 1: Junction North Dane Way & Shawstead Road, Wayfield, Chatham**



10.64 Users along this section of North Dane Way, a busy junction on this commuter route, have partially filtered and screened views through boundary vegetation along the elevated western boundary of the Site across the carriageway. (**Appendix 10.3** figure 10.7.1).

### **VR 2: Residents at Hampshire Close, by North Dane Way, Wayfield, Chatham**



10.65 Residents' views from Hampshire Close are largely screened by the elevated highway embankment of North Dane Way and associated vegetation on both sides of the road. Views across the highway and towards the Site boundary vegetation are also possible from some first-floor windows. (**Appendix 10.3** figure 10.7.1)

### **VR 3: North Dane Way south of Shawstead Road at Whites Wood, Wayfield, Chatham**



10.66 Vegetation within the highway land and Whites Wood largely screen any views to the Site from the road. (**Appendix 10.3** figure 10.7.2)

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**VR 4: Residents at (upper) Carlton Crescent, Hale, Chatham**



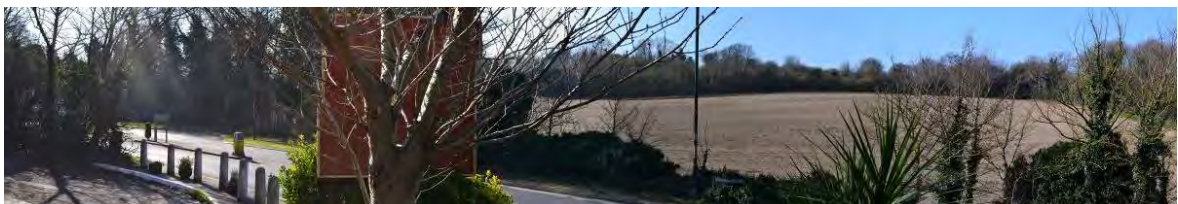
10.67 Residents on the high ground at the southern edge of Carlton Crescent have open views of the lower section of the adjacent steep northern slope within the Site. (**Appendix 10.3** figure 10.7.2)

**VR 5: Users of Luton Recreation Ground, Hale, Chatham**



10.68 Users of the Recreation Ground have glimpsed and distant views through terraced and semi-detached housing and mature garden vegetation including trees towards the northern slope of the Site. (**Appendix 10.3** figure 10.7.3).

**VR 6: Capstone Road by north-eastern Field by 'Wagon at Hale', Hale, Chatham**



10.69 Users of the Capstone Road have a partially open view through or over the mature vegetation along the field boundary in the north-eastern part of the Site. (**Appendix 10.3** figure 10.7.3)



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**VR 7: Users of Capstone Country Park to north-western part of site, Capstone**



10.70 Users along this footpath (RC6) through Capstone Farm Country Park, have a long and open view towards the mature eastern boundary vegetation along the northern part of the Site. The view is dominated by the large farm buildings within the valley bottom and the land, which rises steeply towards the Site, which is subdivided by stock fencing into small paddocks. The view is framed by belts of mature woodland. (**Appendix 10.3** figure 10.7.4)

**VR 8: Users of Capstone Country Park looking to southern part of site, Capstone**



10.71 Users within the southern part of Capstone Farm Country Park have long, panoramic and partially open view into the southern part of the Site from this elevated position at the southern end of the park. The view is dominated by the rolling meadow in the foreground, the mature woodland belts that cross the mid ground, and Whites Wood on the skyline. Woodland and tall hedgerows screen the northern parts of the Site from this location. (**Appendix 10.3** figure 10.7.4)

**VR 9: Residents at Sharstead Farm by Farm Dwellings, Shawstead Road, Gillingham**



10.72 Views north towards the Site from the dwellings at Sharstead Farm are panoramic and include the wider valley either side of the Shawstead Road. The topography of the valley,

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mature vegetation at North Dane Wood and the tall clipped vegetation along the partially sunken Shawstead Road frames a distant and narrow view of the southern part of the Site. (**Appendix 10.3** figure 10.7.5)

**VR 10: Footpath (RC9#2) crossing Site**



10.73 Footpath RC9#2 provides an open and panoramic view over the southern tip of the Site with views extending into the adjacent Capstone Country Park and the distant Darland Banks ridge. (**Appendix 10.3** figure 10.7.5)

**VR 11: Residents at Shanklin Close, Wayfield, Chatham**



10.74 From this elevated position residents have a view over the largely residential neighbourhood of Wayfield with the occasional rooftop of industrial buildings also appearing along the valley bottom. The northern field of the Site forms a narrow skyline which is occasionally broken by the mature vegetation along North Dane Way. Darland Banks can be seen to the left of the view and Whites Wood to the right. (**Appendix 10.3** figure 10.7.6)

**VR 12: Residents at Magpie Hall Road, Chatham (opp. 254/256), Fort Luton, Chatham**



10.75 Residents along Magpie Hall Road have a panoramic view between a gap in the mature vegetation on the slopes around the Barnfield Recreation Ground. The view looks over the recreation ground and residential neighbourhoods of Wayfield. The Site, on the distant central



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skyline, is barely perceptible, but can be located next to Whites Wood. The open and wooded spaces of Darland Banks and Hempstead Ridge form the horizon. (**Appendix 10.3** figure 10.7.6)

#### **VR 13: Residents at Beacon Road (west), Luton**



10.76 Residents at Beacon Road have an elevated and panoramic view of neighbouring residential and light industrial urban areas. The Site is in the distance toward the horizon where the northern fields between Carlton Crescent and Whites Wood are visible but only form a small part of the wider view. (**Appendix 10.3** figure 10.7.7)

#### **VR 14: Residents at Ward View, off Ash Tree Lane, Chatham**



10.77 Residents at Ward View have an elevated and panoramic view of neighbouring residential and light industrial urban areas to the south. North Dane Way and the northernmost fields within the Site are visible in the distance to the left. The undeveloped valley and ridge sides associated with Capstone and Wayfield surround the urban areas, which stretch to the horizon. (**Appendix 10.3** figure 10.7.7)

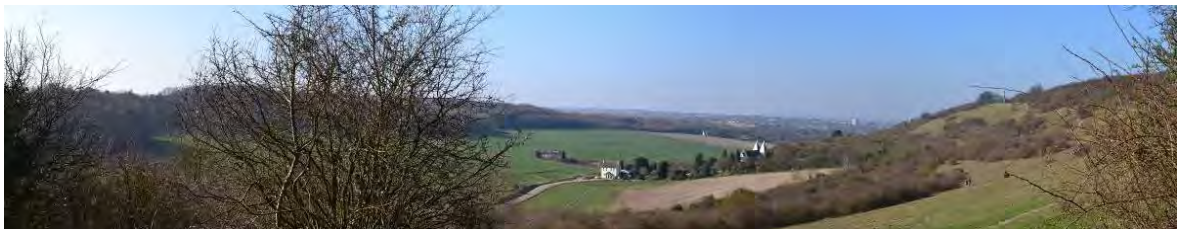
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### **VR 15: Residents along Kingsway, Gillingham**



10.78 Residents along Kingsway on the Darland Banks ridge top have a panoramic view towards the Site and the Capstone Valley through gaps in scrub vegetation. The residential neighbourhoods of Hale and Wayfield are clearly visible in this view, but it is largely of an urban/rural edge where the open and wooded spaces at the northern end of the Site and the Capstone Valley are important elements. (**Appendix 10.3** figure 10.7.8)

### **VR 16: Footpath (GB24) West Hoath Wood, Darland Banks, Gillingham**



10.79 Users of the elevated footpath (GB24) can obtain panoramic views over and along Darland Banks and the agricultural valley below, with its isolated properties and farm buildings that complement the rural character and tranquillity of the landscape. The distant developed horizon of Luton, Wayfield, and the Caulkers House tower block remain strong visual features and reference points. The northern field within the Site is partly visible in the far distance with mature vegetation in the mid and foreground along Pear Tree Lane screening the remaining parts of Site from this view. (**Appendix 10.3** figure 10.7.8)

### **VR 17: Users of footpath off Pear Tree Lane (GB26) Hempstead**





10.80 Users of footpath GB26 have a changing view as they descend the slope down to the Capstone Road. From the other end of the footpath the view is equally panoramic and dominated by the arable field off Pear Tree Lane (**Appendix 10.3** figure 10.7.9), where the roof tops of nearby properties and mature field boundaries largely screen a distant views towards the northern part of the Site and Wayfield. Whites Wood can be seen on the horizon (photo VR17 above - left), which includes the suburban areas of Chatham, and the prominent Caulkers House tower block on the ridgeline in Luton. The ski slope at the 'Snowsports' Centre in the Country Park is clearly visible on the adjacent side of the valley. Distant views towards the northern field of the Site are partially screened and filtered by boundary vegetation and the higher ground within Capstone Farm Country Park.

**VR 18: PRoW (KH37) off Westfield Sole Road/Colbeck Wood, Lordswood,**



10.81 Users of the byway KH37 have a far reaching panoramic view over the Medway towns and the Medway Estuary beyond. The arable landscape is crossed by mature hedgerows, woodland, large evergreen shelter belts and electricity pylons. The view is punctuated by the white roofs of the light industrial buildings at Elm Court and small clusters of rural residential properties. Darland Banks and the housing along the Kingsway ridgeline can be seen on the skyline. (**Appendix 10.3** figure 10.7.9)

**VR 19: Iona Close & Conifer Drive, Lordswood**



10.82 Residents in Iona Close and Conifer Drive have distant glimpsed views north between the many surrounding residential buildings in Lordswood and the mature wooded setting. These include distant views of the distinctive line of properties along Kingsway and Ward View on Darland Banks as well as some fleeting views that include parts of the East Hill Site. (**Appendix 10.3** figure 10.7.10)

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**VR 20: Users of footpath (ME206), Chatham Naval Memorial, Great Lines Heritage Park, Kings Bastion, Chatham**



10.83 From this ridge top location within the Heritage Park users of the footpath ME206 have an elevated and panoramic view over the neighbourhoods of Chatham, Luton and Wayfield. Medway Maritime Hospital is clearly visible to the left and Caulkers House tower block in Luton to the right. The distant horizon is formed of the wooded ridges at Capstone and Hempstead. The northern fields in the Site and Whites Wood are also visible on the skyline. (**Appendix 10.3** figure 10.7.10)

**VR 21: Users of footpath (RS326) opposite Sans Pareil pub, A228 Frinsbury Hill, Rochester**



10.84 Users of footpath RS326 have a panoramic view over an industrial landscape associated with the River Medway. The immediate arable setting is surrounded by the residential expansion at Wainscott and industrial estates along the river on the Frinsbury Peninsula. The historic dockyard at Chatham is located in the mid-ground (left) and is silhouetted by the vegetated ridge with the Great Lines Heritage Park. The Site lies on the skyline over and beyond the hedgerow (centre right) but is not discernable from this distance. (**Appendix 10.3** figure 10.7.11)

**VR 22: Users of footpath Kingsway/Hunters Way West POS, Darland Banks, Chatham**



10.85 Users of the footpath at Kingsway have a panoramic and open view towards the Site and the Capstone Valley through extensive gaps in scrub vegetation on the upper scarp slopes of Darland Banks. The residential neighbourhoods of Hale and Wayfield can also be seen over

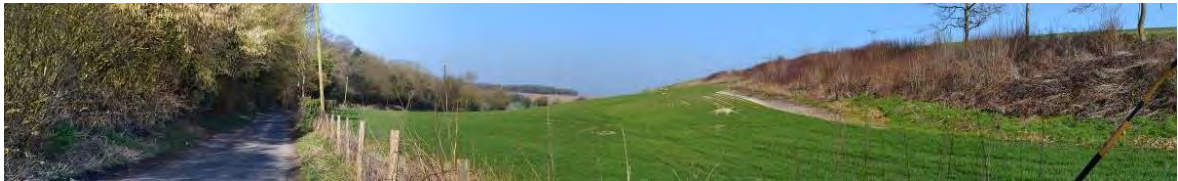
the intervening topography and vegetation. Many parts of the Site are visible in the middle distance surrounded by mature boundary vegetation. (**Appendix 10.3** figure 10.7.11)

**VR 23: North Dane Way to rear of Poachers Close, Lordswood**



10.86 Views from the highway into the southern part of the Site are glimpsed between a narrow gap in the roadside vegetation along North Dane Way. (**Appendix 10.3** figure 10.7.12)

**VR 24: Shawstead Road / Ham Lane junction, Gillingham**



10.87 Users of Shawstead Road have a narrow, glimpsed and distant view towards the southernmost field within the Site, which is framed by mature woodland on the left and rising ground to the right. The view is fleeting from the winding road because of the sunken nature of the land form and adjacent vegetation. (**Appendix 10.3** figure 10.7.12)

**VR 25: Residents at Mermaid Close, off Heron Way, Princes Park, Chatham**



10.88 This elevated and panoramic view is over a largely residential townscape. Darland Banks, the housing along Kingsway and Whites Wood are notable features on the horizon. The thin line of the northern field on Site can also just be identified on the skyline. The cluster of highway lighting columns mark the location of the North Dane Way roundabout close to the Shawstead Road junction. (**Appendix 10.3** figure 10.7.13)



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#### **VR 26: Users of footpath RC32 across Site, Hale**



10.89 Users of the public footpath crossing the north field have panoramic views over the northern portion of the Site and out towards Hale and Darland Banks. The roof tops and first floor windows of properties along Carlton Crescent can be seen along with properties along Kingsway dominating the horizon. To the west, users have views towards the residential neighbourhoods of Wayfield and Luton, and to the east towards Hoath Wood and the wooded ridge at Hempstead. (**Appendix 10.3** figure 10.7.13)

#### **VR 27: Residents south of Whites Wood, off North Dane Way**



10.90 In this view from footpath RC9#2, the dwelling in the woodland belt to the left is hidden behind the trees and tall understorey hedgerow that extend south from Whites Wood. 689/The mature boundary vegetation largely screens views from this receptor into the Site, however, filtered views are possible across the Site towards the country park, particularly in winter months. (**Appendix 10.3** figure 10.7.14)



**Table 10.2 –Summary table of Visual Receptor Sensitivity**

Ref	Name	Type of receptor	Nature of view	Susceptibility to change	Value of view	Sensitivity
VR 1	Junction North Dane Way & Shawstead Road, Wayfield	C	Moderate	Low	Low	Low
VR 2	Residents at Hampshire Close, by North Dane Way, Wayfield, Chatham	A	Poor	Medium	Low	Low
VR 3	North Dane Way south of Shawstead Road at Whites Wood, Wayfield, Chatham	C	Poor	Low	Low	Low
VR 4	Residents at (upper) Carlton Crescent, Hale, Chatham	A	Good	High	Low	Moderate
VR 5	Users of Luton Recreation Ground, Hale, Chatham	B	Poor	Low	Moderate	Low
VR 6	Capstone Road by north-eastern Field by 'Wagon at Hale', Hale, Chatham	C	Moderate	Low	Moderate	Low
VR 7	Users of Capstone Country Park to north-western part of Site, Capstone	A	Poor	Medium	Moderate	Moderate
VR 8	Users of Capstone Country Park to southern part of Site, Capstone	A	Good	High	High	High
VR 9	Residents at Sharstead Farm Cottages, Shawstead Road, Gillingham	A	Good	High	High	High
VR 10	Footpath (RC9#2) crossing Site	A	Good	High	High	High
VR 11	Residents at Shanklin Close, Wayfield, Chatham	A	Poor	Medium	Low	Low
VR 12	Residents at Magpie Hall Road, (opp. 254/256), Fort Luton, Chatham	A	Poor	Medium	Low	Low
VR 13	Residents at Beacon Road (west), Luton	A	Poor	Medium	Low	Low
VR 14	Residents at Ward View, off Ash Tree Lane, Chatham	A	Moderate	High	Low	Moderate
VR 15	Residents along Kingsway, Gillingham	A	Good	High	Moderate	High
VR 16	Footpath (GB24) West Hoath Wood, Darland Banks	A	Moderate	High	High	High
VR 17	Users of footpath (GB26) off Pear Tree Lane, Hempstead	A	Moderate	High	Moderate	High
VR 18	PRoW (KH37) off Westfield Sole Road, Lordswood, Chatham	A	Poor	Medium	Moderate	Moderate



VR 19	Residents at Iona Close & Conifer Drive, Lordswood	A	Poor	Medium	Low	Low
VR 20	Users of Footpath (RCX35) Chatham Naval Memorial, Great Lines Heritage Park	A	Moderate	High	High	High
VR 21	Users of Footpath (RS326) opp. Sans Pareil Pub, A228, Frinsbury Hill, Rochester	A	Poor	Medium	Low	Low
VR 22	Users of Footpath Kingsway/ Hunters Way West POS Darland Banks, Chatham	A	Good	High	Moderate	High
VR 23	North Dane Way to rear of Poachers Close, Lordswood	C	Poor	Low	Low	Low
VR 24	Shawstead Road / Ham Lane junction, Gillingham	B	Poor	Low	High	Moderate
VR 25	Residents at Mermaid Close, Princes Park, Chatham	A	Poor	Medium	Low	Low
VR 26	Users of footpath RC32 across Site, Hale	A	Good	High	High	High
VR 27	Residents south of Whites Wood, off North Dane Way	A	Poor	Medium	High	High

#### Comments on visual amenity

10.91 The results show that the levels of sensitivity generally related to the distance from the Site, the elevation of the viewpoint relative to the Site, and topographical features in the field of view. Higher sensitivity was usually associated with open spaces available for public amenity, such as the Capstone Farm Country Park, the Kingsway ridge crest above Darland Banks and Heritage Park at the Chatham War Memorial.

10.92 Urban areas generally have lower sensitivity because most properties are set at a lower level to those on the East Hill ridge and the topography limits views of the whole Site and the view is greatly influenced by the surrounding urban context.

10.93 The line of housing along Kingsway and Ward View on the Darland Banks ridgeline are a reoccurring focal point in most medium and long distance views across an extensive area as far south as Lordswood as well as the roads and footpaths around the M2 motorway. Key focal points in the surrounding landscape/townscape are identified on the Zone of Visual Influence Plan (**Appendix 10.3**, Figure 10.4)



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10.94 Given the elevated nature of the Site and topographical characteristics of the area the scheme layout proposals and green infrastructure must take into consideration the sensitivity of views from key locations, provide appropriate screening where most visually appropriate but still reflect and conserve the open character of the landscape.



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## IDENTIFICATION AND EVALUATION OF KEY EFFECTS

### Introduction

10.95 The second section of this assessment considers the potential effects of the changes brought about by the Proposed Development on both landscape character and visual amenity. The scheme proposals and their evolution are fully described in Chapters 4 & 5 and are illustrated on the Site Masterplan produced by architects Lee Evans Partnership in Chapter 5.

10.96 The preliminary landscape and visual baseline assessment has been used throughout the design development process to inform decisions on the layout and incorporate appropriate mitigation measures. This has been achieved by setting development in a robust and enduring green framework, influencing the location and the massing of the built form, retaining existing vegetation and ensuring the sympathetic positioning of the proposed amenity areas, new planting treatments and recreational features (**Appendix 10.3**, Figure 10.8 Landscape Strategy Parameters Plan).

10.97 Particular attention has been given to the potential effects of development and reducing the magnitude and significance of the effects of change for both the adjacent landscape character areas and surrounding visual receptors.

10.98 Effects are predicted at three stages:

- **'During construction'**,
- at **'Year 1 of operation'** when construction and ground modelling has been completed but the planting treatments are at an initial stage of establishment; and,
- at **'Year 15'** when the landscape treatments have reached or are nearing maturity, mitigation objectives are reached and the attractive design ambitions have been achieved.

10.99 The 'construction' and 'year 1' effects are temporary, while any adverse effects remaining by 'year 15', if any, are considered to be residual and long term.

10.100 'Magnitude of Change' is expressed as being either 'low', 'medium' or 'high', while the 'Significance of Effects' brought about by change is ranked as either 'Neutral', 'Minor', 'Moderate' or 'Substantial'. The direction of the terms is expressed separately as being either 'Adverse', 'Beneficial' or "Neutral". The same terms are applied to both landscape and visual effects and a full set of the definitions of these terms can be found in **Appendix 10.1**.





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## Effects on Site and Surrounding Landscape/Townscape Character

10.101 The seven landscape and townscape character areas identified in the baseline appraisal are used again to establish the significance of the potential effects over the construction and operational periods. A summary of the results is included in Table 10.3 below.

10.102 The changes and effects are most likely to be noticed across the more open and undeveloped rural areas while the urban areas are only likely to experience any change around the perimeter of each area closest to the Site rather than the whole area.

### Area 1 (LCA 24): Darland Banks

10.103 The bulk of this area is contained within a steep valley with only a small section sharing a boundary with the development area on the north-eastern corner of the Site in Hale by Pear Tree Lane. Development of the Site and associated new road layout will create a small and localised change to the setting of this character area immediately adjacent to the Site (Area 2). However, this change will be in keeping with the context of the wider character area within Hale. Construction activity will cause the most noticeable changes, but they will be localised to a narrow section along the western boundary at Hale. Once construction is complete and development operational, the Site will be progressively assimilated into the existing settlement pattern. The long term effects on the character area are considered to be neutral. (Refer to paragraph 10.49 and **Appendix 10.3** figure 10.2)

### Area 2 (LCA 25): East Hill (The Site)

10.104 The significant changes occurring to the land use across the East Hill ridge means most of the LCA in which the Site is located will be affected by the major and permanent transition from agricultural to residential use. The retention and enhancement of existing vegetation across the Site will create the basis for a new green infrastructure and framework for development. The proposed network of public open spaces and SuDS features are all positive attributes that will progressively reduce the effects of development and assist integration with the adjacent urban setting. Therefore, the long-term effects of development on the character area are considered to be substantial but positive and beneficial. (Refer to paragraph 10.50 and **Appendix 10.3** figure 10.2)



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### **Area 3 (LCA 26): Capstone Farm**

10.105 The change in character of the Site (Area 2) will only affect a small part of the eastern side of Area 3 and the Country Park because of the undulating topography and extensive vegetative cover across the park and Capstone ridges. The proposed boundary buffer treatments have been carefully located to screen the proposed residential areas. The new planting will be in keeping with the location and complement existing vegetation in the Country Park. To the south, the large field in Area 2 opposite the Country Park will be kept primarily as open amenity space and parkland with part of this area being incorporated into an outdoor sport facility for the proposed new school. The long-term effects on the character area are considered to be neutral. New footpaths will also improve connectivity for residents and visitors. (Refer to paragraph 10.51 and **Appendix 10.3** figure 10.2)

### **Area 4 (LCA 27): Sharstead Farm**

10.106 Development on the Site (Area 2) at the head of this narrow valley will have little effect on the main part of character area LCA 27. The proposed housing would be screened in the main by existing woodlands, which would be reinforced by new tree and hedgerow planting. The scheme layout will ensure the existing southernmost field in Area 2 opposite the Country Park will consist primarily of open amenity space and parkland that will preserve the green appearance of the northern end of the valley and assist the assimilation of the development into the setting. The effects over the construction period will be noticeable although access would be directed to North Dane Way. In the long term the effects of development on the character area are considered to be minor, positive and beneficial. (Refer to paragraph 10.52 and **Appendix 10.3** figure 10.2)

### **Area 5: Pre 1945 Townscape: Luton & Gillingham**

10.107 The character area covers an extensive part of both settlements but shares a small common boundary along the north edge of the Site (Area 2) along Carlton Crescent. Large parts of Luton are located well below Site levels, while Kingsway above Darland Banks is located on similar or higher levels. Development would have no significant effect on the character of this area in the short or long term. Construction activities will be noticeable but once built, the new development where visible, will be readily absorbed into the existing urban framework. The long-term effects on the character area are considered to be neutral. (Refer to paragraph 10.53 and **Appendix 10.3** figure 10.2)



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### **Area 6: Post 1945 Townscape: Wayfield**

10.108 The development of the Site (Area 2) will create a natural extension to this character area and be centred on the new roundabout on North Dane Way and Site entrance area. Existing adjacent parts of the existing residential area are on steep slopes with minimal intervisibility with the Site and will remain unaffected by the changes brought about by future construction. Although the northern part of the East Hill ridge is visible on the skyline from Area 6 it is only seen in the context of the extensive valley settlement in Wayfield and Princes Park. Construction activities will be a minor temporary feature while development is capable of being rapidly assimilated into the urban setting. The long-term effects on the character area are considered to be neutral. (Refer to paragraph 10.54 and **Appendix 10.3** figure 10.2)

### **Area 7: Post 1945 Townscape: Hempstead**

10.109 This character area covers the main settlement area of Hempstead and is separated from East Hill and the Site by the two ridges running along the Capstone valley and extensive ridge top vegetation in the country park. The long-term effects on the character area are considered to be neutral. (Refer to paragraph 10.55 and **Appendix 10.3** figure 10.2)



**Table 10.3 – Summary table of Significance of Effects on Landscape Character Area**

Character Area Name	Sensitivity	Magnitude of Change			Significance of Effects and Direction on Landscape Character		
					Temporary Effects		Residual Effects
		Constr/tion	Year 1	Year 15	Constr/tion	Year 1	Year 15
Area 1 (LCA 24): Darland Banks	High	Low	Low	Negligible	Moderate and Adverse	Moderate and Adverse	Minor and Neutral
Area 2 (LCA 25): East Hill & the Site	Moderate	High	High	High	Substantial and Adverse	Substantial and Adverse	Substantial and Beneficial
Area 3 (LCA 26): Capstone Farm	Moderate	Low	Low	Negligible	Minor and Adverse	Minor and Adverse	Neutral and Neutral
Area 4 (LCA 27): Sharstead Farm	High	High	Medium	Low	Substantial and Adverse	Moderate and Adverse	Minor and Beneficial
Area 5: Pre 1945 Townscape: Luton & Gillingham	Low	Negligible	Negligible	Negligible	Neutral and Neutral	Neutral and Neutral	Neutral and Neutral
Area 6: Post 1945 Townscape: Wayfield	Low	Low	Low	Negligible	Minor and Adverse	Minor and Neutral	Neutral and Neutral
Area 7: Post 1945 Townscape: Hempstead	Low	Negligible	Negligible	Negligible	Neutral and Neutral	Neutral and Neutral	Neutral and Neutral

Comments on the Effects on Character

10.110 The existing physical and visual relationship between the Site (Area 2) and adjacent character areas means the effects of development will be localised and limited. The character of the East Hill ridge will change completely, but the layout design and integral landscape framework will ensure the Proposed Development will be assimilated into the wider urban area while the orientation of the proposed scheme layout and positioning of boundary landscape buffers, amenity space and green infrastructure will also minimise any effects on adjacent rural character areas.

**Effects on Visual Amenity**

10.111 The twenty seven visual receptors identified in the baseline appraisal are used again to establish the significance of the effects over the construction and operational periods. A summary is included on Table 10.4 below with a definition of terms included in **Appendix 10.1**.



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10.112 The changes and effects are most likely to be noticed by visual receptors across adjacent open elevated rural and urban areas. Distance is not always a factor within the undulating landscape often hiding close views or allowing only glimpsed views of the East Hill ridge although Whites Wood is a common visual reference point on the skyline from many surrounding viewpoints. However, it is generally the case that any perception of the effects created by the changes on the Site will lessen the greater the distance of the view and increased screening effects of the extensive new planting treatments in the Proposed Development as they grow and mature. Many short and long distance views are also influenced by extensive intervening built-up areas which will absorb the Site into the surrounding settlement edge.

**VR 1: Junction North Dane Way & Shawstead Road, Wayfield, Chatham**

10.113 The view from this junction will change as construction activity associated with both the residential parcels and alterations to the junction with Shawstead Road is implemented. Once complete and operational, residential properties will be glimpsed through gaps in the retained boundary vegetation. As new boundary vegetation establishes the development will be largely screened from views. The long-term effects of development on the view are considered to be neutral. (Refer to paragraph 10.65 & **Appendix 10.3** figure 10.7.1)

**VR 2: Hampshire Close, by North Dane Way, Wayfield, Chatham**

10.114 Residents will have occasional but largely filtered views of construction activities over tree tops from first floor windows during construction and there will be glimpsed views of some roof tops until the proposed new boundary planting establishes. Planting and boundary buffer areas along North Dane Way will minimise any lasting effects on views from this urban area. The long-term effects of development on the view are considered to be neutral. (Refer to paragraph 10.66 & **Appendix 10.3** figure 10.7.1)

**VR 3: North Dane Way south of Shawstead Road at Whites Wood, Wayfield, Chatham**

10.115 The view from this location will largely remain the same. There will be some increased activity associated with highway improvements to Shawstead Road. However, once operational and development complete there will be no discernible change to the view in the short or long term. The long term effects of development on the view are considered to be neutral. (Refer to paragraph 10.67 & **Appendix 10.3** figure 10.7.2)



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#### **VR 4: Carlton Crescent, Hale, Chatham**

10.116 Residents located along the boundary with the Site will experience a comprehensive change to the view from the rear of their properties, predominantly from first floor windows, as the arable field is developed along with the associated landscape treatments. Construction activity will disrupt and dominate the view, however, once complete and operational the view will be mitigated by a wide landscape buffer stretching up the sloping ground. Views of this open amenity area will be attractive and as the scheme matures the landscape buffer will filter or obscure views of housing on the higher ground. The long-term effects of development on the view are considered to be substantial but also positive and beneficial. (Refer to paragraph 10.68 & **Appendix 10.3** figure 10.7.2)

#### **VR 5: Luton Recreation Ground, Hale, Chatham**

10.117 Users of the recreation ground may be aware of construction activity glimpsed in the distance between the properties at Carlton Crescent but these are a minor part of views obtainable from this receptor location. The roofs of the new properties nearest to the northern Site boundary will be partially visible over existing properties in Hale. However these will be seen in the context of the surrounding urban form and planted landscape buffer on the rising ground behind Carlton Crescent. Over time the Site will progressively be assimilated into the background with a mature landscape buffer filtering or obscuring views of new housing on the higher ground. The long-term effects of development on the view are considered to be neutral. (Refer to paragraph 10.69 & **Appendix 10.3** figure 10.7.3)

#### **VR 6: Capstone Road by north-eastern Field by 'Wagon at Hale', Hale, Chatham**

10.118 Construction activity on the Site and associated new road junction will dominate this area for a short period and temporarily open up the Site boundary. The new properties will be set back from Capstone Road to provide a large landscape buffer which will mature to partially screen and filter views. New landscape treatments and attractive SuDS drainage features will restore the appearance of the area and assist the progressive integration of this pocket of development and road improvements into the urban setting. The long-term effects of development on the view are considered to be minor but also positive and beneficial. (Refer to paragraph 10.70 & **Appendix 10.3** figure 10.7.3)



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#### **VR 7: View from Capstone Country Park to north-western part of site, Capstone**

10.119 Users within this part of the country park will have a partial, distant view of construction activities and the roof tops of new properties on the elevated skyline once the Proposed Development is complete and operational. The Development will be set within a boundary landscape buffer and public open space. Once this buffer matures it will enhance the appearance of the existing vegetated skyline, largely screen the development and in the long term preserve the existing qualities of the view from the steeply rising ground within the park. The long-term effects of development on the view are considered to be neutral. (Refer to paragraph 10.71 & **Appendix 10.3** figure 10.7.4)

#### **VR 8: View from Capstone Country Park to southern part of site, Capstone**

10.120 Users on the upper western facing slopes of the country park will experience a noticeable change in view across the Shawstead Road to the Site. However, the existing arable field within the line of view has been specifically designed as a large public open space similar to parts of the country park and will also include a sports field for the proposed school. A few houses may be visible from the park to the north of public footpath RC9#2 but the main part of this separate housing area on the southern tip of the Site will be screened by existing hedgerows and woodland belts. Separate access to this housing area will be provided directly off North Dane Way and will minimise the awareness of construction activities and vehicular movements by residents once operational. Planting in the public open spaces will reinforce the long-term filtering of views but the landscape mitigation measures would be designed to preserve long views across the valley. The long-term effects of development on the view are considered to be moderate but also positive and beneficial. (Refer to paragraph 10.72 & **Appendix 10.3** figure 10.7.4)

#### **VR 9: Sharstead Farm by Farm Dwellings, Shawstead Road, Gillingham**

10.121 The Proposed Development will be visible on the distant East Hill ridge around Whites Wood. North Dane Wood will largely screen the Proposed Development directly behind it, and the field currently within the Site and visible at the head of the valley will be used as open space. While it may be possible to obtain filtered views of buildings on the distant skyline, the green amenity parkland within the development will preserve the long-term appearance of the valley in views from this property. The long-term effects of development on the view are considered to be moderate but also positive and beneficial. (Refer to paragraph 10.73 & **Appendix 10.3** figure 10.7.5)



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#### **VR 10: Footpath (RC9#2) crossing Site**

10.122 Users of the public footpath will experience a change to the view when crossing the proposed housing area at the southern end of the Site. However, the path would run through a green corridor within the new area of development and then cross over the sloping ground down to Shawstead Road, which would also be part of a large area of parkland with new pedestrian links through the development to the north and wider footpath network. The character, appearance and amenity value of the footpath will increase significantly. The long-term effects of development on the view are considered to be substantial but also positive and beneficial. (Refer to paragraph 10.74 & **Appendix 10.3** figure 10.7.5)

#### **VR 11: Shanklin Close, Wayfield, Chatham**

10.123 Construction activity will be evident on the skyline from this location but will form a minor element in the overview view, which consists mainly of residential development spreading across the Wayfield valley. Once the development is complete and operational the outline of houses will alter the distant skyline. However, in the long term the existing and proposed buffer planting vegetation along the North Dane Way boundary will soften the profile or screen the new buildings and, once established, will help to assimilate the scheme into the existing urban form. The long-term effects of development on the view are considered to be neutral. (Refer to paragraph 10.75 & **Appendix 10.3** figure 10.7.6)

#### **VR 12: Magpie Hall Road, Chatham (opp. 254/256), Fort Luton, Chatham**

10.124 Construction activity will be evident on the distant skyline from this location but will form a minor element in the overall view, which consists mainly of residential development spreading across the Wayfield valley. Once the Proposed Development is complete and operational the outline of houses will alter the distant skyline. However, in the long term the existing and proposed buffer planting vegetation will soften the profile or screen the new buildings along North Dane Way and, once established, will help to assimilate the scheme into the existing urban form. The long-term effects of development on the view are considered to be neutral. (Refer to paragraph 10.76 & **Appendix 10.3** figure 10.7.6)

#### **VR 13: Beacon Road (west), Luton**

10.125 As with VR 12, construction activity will be evident on the distant skyline from this location but will form a minor element in the overall view, which consists mainly of residential





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development spreading across the Luton valley. Once the Proposed Development is complete and operational the outline of houses will alter the distant skyline. However, in the long term the existing and proposed buffer planting vegetation will soften the profile or screen the new buildings and, once established, will help to assimilate the scheme into the existing urban form. The long-term effects of development on the view are considered to be neutral. (Refer to paragraph 10.77 & **Appendix 10.3** figure 10.7.7)

**VR 14: Ward View, off Ash Tree Lane, Chatham**

10.126 As with VR 13, construction activity will be evident on the distant skyline from this location but will form a minor element in the overall view, which consists mainly of residential development spreading across the Luton valley. Once the Proposed Development is complete and operational the outline of houses will alter the distant skyline. However, in the long term the existing and proposed buffer planting vegetation will soften the profile or screen the new buildings and, once established, will help to assimilate the scheme into the existing urban form. The long-term effects of development on the view are considered to be minor but also positive and beneficial. (Refer to paragraph 10.78 & **Appendix 10.3** figure 10.7.7)

**VR 15: Kingsway/Darland Banks, Gillingham**

10.127 Darland Banks allows extensive panoramic views from higher ground across the valley to the Site, the country park in the Capstone valley and large parts of Wayfield and Chatham. Residents in the area will see a notable change with construction activity as one of a number of important elements within the view. The completed scheme will be seen in the context of the surrounding built form as well as the surrounding countryside. The proposed green infrastructure throughout the Proposed Development will soften the profile of the built form but will not attempt to screen it completely. The Proposed Development will progressively be assimilated into the surrounding urban context. The long-term effects of the Proposed Development on the view are considered to be substantial but also positive and beneficial. (Refer to paragraph 10.79 & **Appendix 10.3** figure 10.7.8)

**VR 16: Footpath (GB24) West Hoath Wood, Darland Banks, Gillingham**

10.128 Users of the footpath will see both construction activity and the completed scheme on the distant skyline, which will form one of many visual elements within the overall setting. The majority of the scheme will be obscured by existing topographical features and once landscape buffers and planting in the open spaces has matured there will be no discernible change to this



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view. The long-term effects of the Proposed Development on the view are considered to be neutral. (Refer to paragraph 10.80 & **Appendix 10.3** figure 10.7.8)

**VR 17: Footpath off Pear Tree Lane (GB26) Hempstead in Capstone Valley**

10.129 Users of the footpath off Pear Tree Lane will have filtered and distant views from both Pear Tree Lane and the Capstone valley at the other end of the public path. Views of construction activity and the completed scheme will be experienced as one of a number of visual elements within the overall panorama in the middle to long distance. Users will experience less change from the lower parts of the valley where the Proposed Development is obscured by intervening features, including the artificial ski slope in Capstone Farm Country Park. Once landscape buffers and planting to the open spaces has matured the Proposed Development will progressively be integrated in the skyline and adjacent urban areas. The long-term effects of Proposed Development on the view are considered to be moderate but also positive and beneficial. (Refer to paragraph 10.81 & **Appendix 10.3** figure 10.7.9)

**VR 18: PRoW (KH37) off Westfield Sole Road/Colbeck Wood, Lordswood**

10.130 The Site is an insignificant distant feature on the horizon but the notable element in the view are the properties along Kingsway and Ward View above Darland Banks. The short and long-term changes to this view will not be of any significance. The long-term effects of the Proposed Development on the view are considered to be neutral. (Refer to paragraph 10.82 & **Appendix 10.3** figure 10.7.9)

**VR 19: Iona Close & Conifer Drive, Lordswood**

10.131 Like VR 18, the Site is an insignificant distant feature on the horizon and it is generally difficult to find long views north from the residential area, which is set within rising woodland. The only notable element in glimpsed views north are the properties along Kingsway and Ward View above Darland Banks. The long-term effects of the Proposed Development on the view are considered to be neutral. (Refer to paragraph 10.83 & **Appendix 10.3** figure 10.7.10)

**VR 20: Footpath (ME206), Chatham Naval Memorial, Great Lines Heritage Park, Kings Bastion, Chatham**

10.132 Users of this ridge edge footpath in the park will see construction activity in the distance as one of a number of elements in the view in the Luton valley and other residential ridges and



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valleys running parallel to Wayfield. Once the Proposed Development is complete and operational it will be an insignificant element seen in the context of the surrounding built form of Chatham and will be assimilated into the view of the wider townscape. The long-term effects of the Proposed Development on the view are considered to be neutral. (Refer to paragraph 10.84 & **Appendix 10.3** figure 10.7.10)

**VR 21: Footpath (RS326) opposite Sans Pareil pub, A228 Frinsbury Hill, Rochester**

10.133 This is the most distant viewpoint from the Site. Identifying Site features over the Medway estuary and Chatham is best achieved using binoculars on a clear day. The changes to the Site will be remote and the scheme will have no discernible effects on the view. The long-term effects of development on the view are considered to be neutral. (Refer to paragraph 10.85 & **Appendix 10.3** figure 10.7.11)

**VR 22: Footpath Kingsway/Hunters Way West POS, Darland Banks, Chatham**

10.134 Darland Banks allows extensive panoramic views from higher ground across the valley to the Site, the country park in the Capstone Valley and large parts of Wayfield and Chatham. The residents in the area will see a notable change with construction activity as one of a number of important elements within the view. The completed scheme will be seen in the context of the surrounding built form as well of the surrounding countryside. The proposed green infrastructure throughout the Proposed Development will soften the profile of the built form but will not attempt to screen it completely. The Proposed Development will progressively be assimilated into the surrounding urban context and enhance perception of the view. The long-term effects of development on the view are considered to be substantial but also positive and beneficial. (Refer to paragraph 10.86 & **Appendix 10.3** figure 10.7.11)

**VR 23: North Dane Way to rear of Poachers Close, Lordswood**

10.135 The view along the road from this location will largely remain the same. There will be some increased activity associated with a new junction to the separate development in the southern part of the Site. It is likely that it will be possible in the short term to see construction activities and once operational the roof tops and glimpsed views of some properties in winter months. However, once the proposed buffer vegetation has matured, reinforcing the retained roadside vegetation, the Proposed Development will largely be screened from view. The long-term effects of the Proposed Development on the view are considered to be neutral. (Refer to paragraph 10.87 & **Appendix 10.3** figure 10.7.12)



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**VR 24: Shawstead Road / Ham Lane junction, Gillingham**

10.136 There will be a slight change to the view as construction activity will be glimpsed in the distance. Once operational the small part of the Site which is in view will predominantly be open parkland, with glimpsed views of the Proposed Development in the distant background. Once the buffer planting within the Site and the new parkland establishes the scheme will mainly be screened from view at this location and the view will remain largely unaltered. The long-term effects of the Proposed Development on the view are considered to be neutral. (Refer to paragraph 10.88 & **Appendix 10.3** figure 10.7.12)

**VR 25: Mermaid close, off Heron Way, Princes Park, Chatham**

10.137 The view from Princes Park is similar to other views across the Wayfield Valley. Construction activity will be evident on the distant skyline from this location but will form a minor element in the overall view, which consists mainly of residential development spreading across the valley towards Luton. Once the development is complete and operational the outline of houses will alter the distant skyline. However, in the long term the existing vegetation and proposed additional buffer planting along the North Dane Way boundary will soften the profile or screen the new buildings and, once established, will help to assimilate the scheme into the existing urban form. The long-term effects of development on the view are considered to be neutral. (Refer to paragraph 10.89 & **Appendix 10.3** figure 10.7.13)

**VR26 - Users of footpath RC32 across Site, Hale**

10.138 Users of this public footpath will experience a comprehensive change to the view when crossing the Site. However, the footpath will be re-routed through a green corridor alongside a new area of parkland. The character, appearance and amenity value of the footpath and corridor it runs through will increase significantly. The long-term effects of development on views are considered to be substantial but also positive and beneficial. (Refer to paragraph 10.90 & **Appendix 10.3** figure 10.7.13)

**VR27 - Residents south of Whites Wood, off North Dane Way**

10.139 There will be a significant change to the glimpsed views from this property through the existing boundary vegetation running beside the Site boundary to the south of Whites Wood. This will be experienced most during the period of construction and conversion of the arable field into an open parkland. The future view will mainly be of a green amenity area with new



blocks of tree and hedgerow planting whose effects, when mature, will be substantial but create a positive and beneficial setting for this property, as well as also be complemented by the country park backdrop to the east of the Shawstead Road. (Refer to paragraph 10.91 & **Appendix 10.3** figure 10.7.14)

**Table 10.4 – Summary table of Significance of Effects on Visual Receptors**

Visual Receptor Name	Sensitivity	Magnitude of Change			Significance of Effects and Direction on Visual Amenity		
		Constr/tion	Year 1	Year 15	Temporary Effects		Residual Effects
					Constr/tion	Year 1	Year 15
VR1: Junction North Dane Way & Shawstead Road, Wayfield	Low	High	Medium	Low	Moderate and Adverse	Minor and Neutral	Minor and Neutral
VR2: Residents at Hampshire Close, Wayfield, Chatham	Low	Low	Low	Negligible	Minor and Adverse	Minor and Neutral	Neutral and Neutral
VR3: North Dane Way south of Shawstead Road at Whites Wood Wayfield, Chatham	Low	Low	Negligible	None	Minor and Adverse	Neutral and Neutral	Neutral and Neutral
VR4: Residents at (upper) Carlton Crescent, Chatham	Moderate	High	High	High	Substantial and Adverse	Substantial and Adverse	Substantial and Beneficial
VR5: Users of Luton Recreation Ground, Hale	Low	Low	Low	Negligible	Minor and Adverse	Minor and Neutral	Neutral and Neutral
VR6: Capstone Road by north-eastern Field by 'Wagon at Hale', Hale	Low	High	High	Medium	Moderate and Adverse	Moderate and Adverse	Minor and Beneficial
VR7: Users of Capstone Country Park to north-western part of Site	Moderate	Low	Low	Negligible	Minor and Adverse	Minor and Adverse	Neutral and Neutral
VR8: Users of Capstone Country Park to southern part of Site, Capstone	High	High	Medium	Low	Substantial and Adverse	Substantial and Adverse	Moderate and Beneficial
VR9: Residents of Sharstead Farm Cottages, Shawstead Road, Gillingham	High	Medium	Low	Low	Substantial and Adverse	Moderate and Adverse	Moderate and Beneficial
VR10: Footpath (RC9#2) crossing Site	High	High	High	High	Substantial and Adverse	Substantial and Adverse	Substantial and Beneficial
VR11: Residents at Shanklin Close	Low	Medium	Medium	Low	Minor and Adverse	Minor and Adverse	Neutral and Neutral



VR12: Residents at Magpie Hall Road (opp. 254/256), Chatham	Low	Low	Negligible	Negligible	Minor and Adverse	Neutral and Neutral	Neutral and Neutral
VR13: Residents on Beacon Road (west), Luton	Low	Low	Negligible	Negligible	Minor and Adverse	Neutral and Neutral	Neutral and Neutral
VR14: Residents at Ward View, off Ash Tree Lane, Chatham	Moderate	Medium	Low	Low	Moderate and Adverse	Minor and Adverse	Minor and Beneficial
VR15: Residents along Kingsway, Gillingham	High	High	Medium	Medium	Substantial and Adverse	Substantial and Adverse	Substantial and Beneficial
VR16: Users of footpath (GB24) West Hoath Wood, Darland Banks	High	Low	Negligible	Negligible	Moderate and Adverse	Minor and Neutral	Neutral and Neutral
VR17: Users of footpath (GB26) off Pear Tree Lane, Capstone Valley	High	Medium	Medium	Low	Substantial and Adverse	Substantial and Adverse	Moderate and Beneficial
VR18: Footpath off Westfield Sole Road/Colbeck Wood, Lordwood, Chatham	Moderate	Negligible	None	None	Neutral and Neutral	Neutral and Neutral	Neutral and Neutral
VR19: Residents at Iona Close & Conifer Drive, Lordwood	Low	Negligible	None	None	Neutral and Neutral	Neutral and Neutral	Neutral and Neutral
VR20: Users of Footpath (RCX35) Chatham Naval Memorial, Great Lines Heritage Park	High	Low	Negligible	Negligible	Moderate and Adverse	Minor and Neutral	Neutral and Neutral
VR21: Users of Footpath (RS326) opp. Sans Pareil Pub, A228, Frinsbury Hill, Rochester	Low	Negligible	Negligible	Negligible	Neutral and Neutral	Neutral and Neutral	Neutral and Neutral
VR22: Users of Footpath Kingsway/Hunters Way West POS, Darland Banks, Chatham	High	High	Medium	Medium	Substantial and Adverse	Substantial and Adverse	Substantial and Beneficial
VR23: North Dane Way to rear of Poachers Close, Lordwood	Low	Medium	Low	Negligible	Minor and Adverse	Minor and Adverse	Neutral and Neutral
VR24: Shawstead Road / Ham Lane junction, Gillingham	Moderate	Low	Low	Negligible	Minor and Adverse	Minor and Adverse	Neutral and Neutral
VR25: Residents at Mermaid close, Princes Park, Chatham	Low	Low	Negligible	Negligible	Minor and Adverse	Neutral and Neutral	Neutral and Neutral
VR26 - Users of footpath RC32 across Site, Hale	High	High	High	High	Substantial and Adverse	Substantial and Adverse	Substantial and Beneficial
VR27 - Residents at south of Whites Wood	High	Medium	Medium	Medium	Substantial and Adverse	Substantial and Beneficial	Substantial and Beneficial



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### **Night time Effects on Views**

10.140 The Site lies on the edge of a densely populated urban conurbation with roads and extensive residential and commercial areas, as well as other major infrastructure facilities being lit throughout the night. Lighting in these areas contrasts sharply with the existing Site and rural parts of its setting along the Sharstead Farm and Capstone Road valleys. However, these areas also contain incongruous isolated pockets of lighting often required for security, to allow evening use of sports and amenity facilities, or to illuminate distant telecommunication masts.

10.141 Road lighting and the introduction of a large number of new domestic properties onto the Site will increase the level of lighting in the area. However, modern external LED lighting technology and directional lantern design minimises light spillage and glare. In most views of the Site only the perimeter lighting around the Proposed Development will be seen and then it will be viewed from existing lit roads and urban setting.

10.142 Views across the Site from adjacent rural areas already have the Medway towns as a night time backdrop. Although the Site will bring development into the rural landscape it will affect only a very limited number of rural properties and with the main rural boundary being contiguous with Capstone Farm the effects will be insignificant because the country park closes each evening at dusk.

### **ASSESSMENT OF CUMULATIVE EFFECTS**

10.143 The assessment of cumulative effects considers the combined effects of the Proposed Development at East Hill with other relevant approved developments in the surrounding area. The residential schemes that have secured planning permission as identified in Chapter 4 are:

1. Land East of Gleamingwood Drive, Lordswood
2. Gibraltar Farm, Ham Lane, Hempstead, Gillingham
3. Land at Brickfield, Darland Farm, Pear Tree Lane, Hempstead

### **Cumulative Effects on Local Landscape Character**

10.144 The effects of these three developments were compared in combination with those of the Proposed Development as identified in this chapter using the same assessment criteria.



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10.145 Schemes 1 and 2 are too distant and visually remote to create any additional combined or cumulative landscape or visual effects with the Site.

10.146 Scheme 3 is located in the Darland Banks Valley (LCA 24). The proposed residential scheme combined with the Proposed Development will represent a slight collective increase in the urbanising of Hale in the valley floor around Ash Tree Lane and Pear Tree Lane. However, this will not be sufficient to increase the overall ratings for the 'magnitude of change' and 'significance of effects' for the character areas assessed for just the East Hill proposals. This is because of the complementary wooded character of the intervening urban setting and the limited size of the Brickfield scheme, which is a low density development also set within a strong landscape framework.

### **Cumulative Visual Effects**

10.147 There will be no cumulative visual effects from schemes 1 or 2 by reason of their respective locations being too distant to view from the Site and visual receptor viewpoints identified in this chapter. However, scheme 3 and the Proposed Development are likely to be partially visible in four receptor viewpoints used for the Site and there is, therefore, the potential for some increase in the cumulative effects.

10.148 VR 15, VR 16, VR 22 have views from elevated ground on Darland Banks overlooking both the Site and scheme 3 while VR 26 is a view from Site looking towards Darland Farm. The valley floor at Hale is well wooded and gives a significant level of visual separation and screening between the two sites. While there will be some small cumulative changes noted within these views they are not considered to be of a sufficient magnitude or significance to increase the overall rating of effects already assessed solely for the Proposed Development.

### **ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS**

10.149 The green infrastructure and landscape design, as illustrated on the Landscape Parameters Plan (**Appendix 10.3** Figure 10.8), has been integral to the evolution of the development proposals for the Proposed Development. This includes the positioning of the residential parcels in an attractive and robust landscape framework that respects the character of the setting and minimises the effects on the surrounding visual receptors.

10.150 The interlinking open spaces incorporate a Sustainable urban Drainage System that reflect the Site's distinctive topography and will complement the wide range of landscape





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features incorporated into the public amenity spaces. These include footpaths, cycleways, passive amenity areas, equipped play spaces, swales, sitting & picnic areas as well as informal activity spaces to cater for residents of all ages.

10.151 The green/blue infrastructure will allow the creation of a varied range of new nature conservation habitats and planting treatments in the open spaces throughout the development to provide year-round visual interest and greatly enhance biodiversity.

10.152 The retained vegetation along with the proposed reinforcement and other substantial planting treatments in the layout design are an essential part of the mitigation measures considered in the assessments included in this chapter. The magnitude and significance assessments (summary tables 10.3 and 10.4) identify a significant number of potential substantial effects. The negative aspects of these effects have been eliminated through the layout design process and are predicted to result in the long-term residual effects being positive and beneficial for both character areas and visual receptors.

10.153 Character areas where these long-term beneficial effect can be demonstrated are at the Site (Area 2) and in Sharstead Farm LCA (Area 4). Significant parts of both these areas will change from an arable to residential land use. The establishment of a strong landscape framework as part of the Site proposals will have a beneficial long-term effect on the Site character and will limit the effects on neighbouring landscape character areas as a result.

10.154 The effects on most visual receptors is considered to be benign and neutral. However, the long term positive and beneficial effects of the scheme proposals are demonstrated at a significant number of the visual receptor locations: VR 4, VR 6, VR 8, VR 9, VR 10, VR 14, VR 15, VR 17, VR 22, VR 26 and VR 27.

10.155 Users of the proposed footpaths through the green infrastructure within the Proposed Development will benefit from the attractive route corridors and increased connectivity with the existing network of public rights of way in and around the Site.

10.156 The proposed scheme layout has been designed around a robust green infrastructure with generous landscape buffers to key boundaries helping to integrate the Site into the adjacent urban areas and softening its edge with the surrounding countryside. No further specific mitigation measures are proposed.



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## **SUMMARY**

### **Planning Policy**

10.157 A review of planning policies relating to landscape and townscape from national through to local level was undertaken and careful consideration has been given to addressing and complying with the aims of policies and designations. The scheme design has given due regard to landscape and visual factors in creating a landscape infrastructure that sets the framework for the scheme layout and responds sympathetically to the distinctive nature of the Site and its setting.

10.158 The NPPF encourages decision making to be based, amongst other things, on a comprehensive evidence base and use of Landscape Character Assessments as a tool in decision making. The proposals comply with NPPF landscape guidance.

10.159 While it is accepted that a basic premise of planning policy is to protect countryside for its own sake, it is also the case that development, where it is required beyond settlement boundaries, should use efficiently the least distinguished and non-designated landscapes – such as the Site. It is considered that the proposals comply with landscape policies in the 2003 Local Plan - with the exception that the Site is located within land designated as an Area of Local Landscape Importance. This designation does not put a blanket prohibition on development and its future status is in doubt with its exclusion from polices in the emerging Local Plan.

10.160 In other respects, the proposals are able to comply with all existing and emerging local landscape policy requirements

### **Landscape Character**

10.161 The baseline assessment identified the sensitivity of both landscape and townscape character areas and visual receptors located around the Site. The changes resulting from the Proposed Development have been assessed against the baseline findings to establish the likely significance of effects during construction, following completion at Year 1 and at Year 15.

10.162 The assessment of landscape character considered information from published landscape character assessments and information gathered from visiting the Site and surrounding areas. The baseline assessment in this chapter agrees with the findings on landscape sensitivity in the local authority's LCA study.



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10.163 Local landscapes included in the assessment in this chapter are considered to be of generally moderate to high character sensitivity with a distinct pattern, sense of place and in moderate to good condition. Character was most distinctive along Darland Banks and the lower valley slopes within the Capstone Valley. Conversely, character is generally less intact towards the ridge tops where the influence of built form detracts from these areas. The assessment also considered local townscape to generally be of moderate character but despite possessing some sense of place, they were all relatively undistinguished, not rare, could be improved and had a low sensitivity.

10.164 The assessment of the effects of the Proposed Development on landscape and townscape character concluded that the greatest effects of the Proposed Development would be limited to the Site which consists of the East Hill and Sharstead Farm LCAs. The development of the Site was shown not to harm the long-term setting of the wider landscape character or environmental assets. The scale of the Proposed Development will be in keeping with adjacent built surroundings, the height, massing, finishes and will address the relationship with the adjoining countryside, improve connections to existing urban areas and establish an enduring edge to East Hill.

10.165 Therefore, the East Hill Site is considered to be an appropriate and suitable piece of land for development in terms of its existing and proposed landscape character and ability to be assimilated into its setting.

### **Visual Amenity**

10.166 The assessment of visual amenity considered views from identified key receptors from locations agreed with the local authority. The baseline assessment concluded that the Site had a relatively enclosed visual envelope despite its elevation and size. Views are generally open and panoramic from adjacent and nearby locations of a similar or higher elevation to that of the Site from areas such as the ridge top along Darland Banks and the upper ridge slopes within Capstone Country Park.

10.167 Conversely, the pronounced ridge and valley topography means that many nearby properties have either glimpsed or no views of the Site, such as the lower ground within the Capstone Valley (including parts of the Capstone Country Park), views from North Dane Way and the adjacent residential properties in Wayfield and Princes Park. There are also areas where the view is limited by distance or the Site is a small element within the far wider panoramic view such as the receptor locations in Rochester and Lordswood.



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10.168 The assessment of the effects of the Proposed Development on all the visual receptors concluded that for the majority, there are no significant residual effects on views. Where there are shown to be potential substantial effects the scheme proposals and mitigation measures provide a positive and beneficial long-term solution to overcoming any negative outcomes. There will be some inevitable temporary adverse effects during construction that generally will only last until the proposed buffer vegetation has had time to grow and mature.

### **Connectivity & Biodiversity**

10.169 The Proposed Development will see the Site change from being arable farmland to a new residential neighbourhood. New and improved public rights of way will enhance connectivity across the Site, between existing neighbourhoods, Capstone Farm Country Park and the countryside beyond. The landscape and mitigation treatments included in the scheme proposals will create a greatly improved range of new habitats, increase biodiversity and provide new opportunities for wildlife.

10.170 The proposed scheme is capable of being readily assimilated into the adjacent urban edges of Chatham and Gillingham. Furthermore, the robust green and blue infrastructure will frame the new development as well as create an attractive, enduring and distinctive new edge to an enlarged settlement boundary.



**Table 10.6: Landscape Character and Visual Summary Table**

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Change of Site character during construction	Temporary	Substantial and Adverse	Boundary site hoardings and adoption of best practice when working on construction sites.	N/A
Change to Site character once operational	Permanent	Changing with time from Adverse to Beneficial	Creation of a robust green infrastructure in which to frame or screen development.	Substantial and Beneficial
Change of setting to adjacent character areas during construction	Temporary	Varies from Neutral to Substantial and Adverse	Boundary site hoardings and adoption of best practice when working on construction sites.	N/A
Change of setting to adjacent character areas once operational	Permanent	Remaining Neutral or changing with time from Adverse to Beneficial	Creation of a robust green infrastructure in which to frame or screen development.	Neutral or Minor and Beneficial
Potential effect on planning designations	Temporary if ALLI removed from New Local Plan	Adverse	Proposals provide a new robust green infrastructure that addresses policy considerations	Beneficial
Loss of visual amenity of footpaths crossing Site during construction	Temporary	Substantial and Adverse	Boundary site hoardings and adoption of best practice when working on construction sites.	N/A
Loss of visual amenity of footpaths crossing Site once operational	Permanent	Changing with time from Adverse to Beneficial	Creation of a robust green infrastructure in which to frame or screen development.	Substantial and Beneficial
Loss of visual amenity from limited view or distant or receptors during construction	Temporary	Varies from Neutral to Moderate and adverse	Boundary site hoardings and adoption of best practice when working on construction sites.	N/A
Loss of visual amenity from limited view or distant or receptors once operational	Permanent	Varies from Neutral to Moderate and Adverse	Creation of a robust green infrastructure in which to frame or screen development.	Neutral to Minor and Beneficial



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Loss of visual amenity from overlooking receptors near the Site during construction	Temporary	Varies from Moderate and Adverse to Substantial and Adverse	Boundary site hoardings and adoption of best practice when working on construction sites.	N/A
Loss of visual amenity from overlooking receptors near the Site once operational	Permanent	Varies from Moderate and Adverse to Substantial and Adverse	Creation of a robust green infrastructure in which to frame or screen development.	Minor and Beneficial to Substantial and Beneficial



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## 11 ECOLOGY AND BIODIVERSITY

### INTRODUCTION

11.1 This chapter assesses the likely significant ecological effects resulting from the Proposed Development.

### ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

#### Establishing Baseline Conditions

11.2 The general approach to the assessment follows the Guidelines for Ecological Impact Assessment (“EclA”) produced by the Chartered Institute of Ecology and Environmental Management (“CIEEM”) (**Ref 11.1**). These guidelines are web based and subject to review and updating. This ES is based on the guidelines available in February 2019. The guidance covers all stages of EIA, including both evaluation and impact criteria. Guidance published by the former Institute of Environmental Assessment (“IEA”) (now Institute of Environmental Management and Assessment (“IEMA”), 'Guidelines for Baseline Ecological Assessment (**Ref 11.2**) and the other publications 'Biodiversity and Environmental Impact Assessment: A Good Practice Guide for Road Schemes' (Byron, 2000) (**Ref 11.3**), Ecological Impact Assessment (Trewick, 1999) (**Ref 11.4**) have also been referred to, together with Developing Naturally (Oxford, 2000) (**Ref 11.5**) which provides specific guidance on assessing biodiversity for environmental assessment purposes.

11.3 The baseline assessment of existing conditions identifies the types and value of habitats and species found within the Site and certain information on the wider area. The baseline studies comprise:

- A desk study of relevant background ecological information, past surveys and other relevant documents within a set desk study area;
- An Extended Phase I Habitat Survey to identify key habitats and potential for protected and uncommon species within the Site; and
- Detailed surveys for targeted species and habitats within the Site.



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### Desk Study

11.4 The desk study area extended to 3km from the Site to identify any 'sensitive areas' as required by the DETR Circular for the EIA Regulations. This also enables the results of the detailed survey to be placed in context within the surrounding area.

### Site Surveys

11.5 An initial Phase I Habitat survey was undertaken by Corylus Ecology in May 2017 with additional surveys in March 2018 and additional species recorded during other species surveys. The habitats were mapped in accordance with the 'Handbook for Phase I Habitat Survey – a Technique for Environmental Audit' (Joint Nature Conservation Committee, 2001) (**Ref 11.6**). This survey identified the main habitats present and assessed their potential to support protected species.

11.6 Specific surveys have also been completed:

- Dormouse surveys;
- Bat transect and activity surveys;
- Badger Surveys;
- Wintering Bird Surveys;
- Breeding Bird surveys;
- Invertebrate Surveys; and,
- Reptile Surveys

11.7 All surveys follow standard, recognised survey techniques and have been carried out by suitably qualified professionals.

### **Significance Criteria**

11.8 The general approach to the assessment follows the Guidelines for Ecological Impact Assessment in the UK and Ireland produced by the Chartered Institute of Ecology and Environmental Management (CIEEM 2018). These guidelines are web based and subject to review and updating. The guidance covers all stages of EIA, including both evaluation and impact criteria.





11.9 The main criteria used to assess the ecological value of habitats and communities are those described by Ratcliffe (1977) and the selection criteria for SSSIs produced by the Nature Conservancy Council (1989). The primary criteria include rarity, typicalness, size, diversity, naturalness and fragility. Subsidiary criteria include ecological position, intrinsic appeal, potential value, and recorded history. In essence, the designation of SSSIs is not an all-inclusive list of sites which fall within the set criteria, rather the SSSI are designated as good examples of the better habitats within the region or nationally. Therefore, certain undesignated areas may fall within the criteria for being designated. Within Kent, the Kent Wildlife Trust have published the Criteria for Selection and Delineation of Local Wildlife Sites (2015) which sets out the criteria for sites of County Importance within the County.

11.10 Further criteria used for assessing the ecological importance of a site may be based upon their value for particular species or assemblages of species. In addition to the individual species and groups the overall species and habitat assemblage or biodiversity is evaluated.

11.11 Biodiversity has been given a number of definitions but, insofar as it relates to EIA, it is generally considered as including both structural relationships (spatial linkage, fragmentation, aspect, dispersion etc) and functional relationships (nutrient cycling rates, energy flow rates, metapopulation dynamics, etc).

**Table 11.1 Assessment of the Value of Ecological Resource**

Value	Examples of Valuation Criteria
<i>International</i>	An internationally designated site or candidate site (SPA, SAC, etc);
<i>National</i>	A nationally designated site (SSSIs, National Nature Reserves (NNRs) etc.;
<i>Regional</i>	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; Sites which exceed the County-level designations but fall short of SSSI selection guidelines where these occur;
<i>County</i>	County sites and other sites which the designating authority has determined meet the published ecological selection criteria for designation including Local Nature Reserves (LNR) selected on County criteria;
<i>Local (including District)</i>	Areas of habitat identified as being of Local Value in the relevant Natural Area profile; LNR not selected on County criteria;
<i>Parish/ Neighbourhood</i>	Areas of habitat considered to appreciably enrich the habitat resource within the context of the Parish or Neighbourhood e.g. species-rich hedgerows;
<i>Within the zone of influence or Site Importance</i>	This may be the project site or a larger area;
<i>Negligible</i>	Sites or areas which support few or no habitats, communities or species populations of nature conservation interest. Typical of such areas are most intensively managed silage fields and arable crops.



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## Assessment of Effects

11.12 Effects must be assessed in the context of the predicted baseline conditions to encompass the lifetime of a development. Where effects are predicted in the future (for example, construction several years down the line) effects must be based on the predicted baseline which will include other completed developments which may affect the zone of influence in the future, as well as other developments for which planning consent has been granted.

11.13 The following factors must be considered when assessing the effects:

- Confidence in predictions;
- Magnitude of effect;
- Extent of effect;
- Duration;
- Reversibility; and
- Timing and frequency

11.14 A level of confidence is required in assessing effects, the standard for which is given below. The requirement for the lowest confidence level, given below as “extremely unlikely”, is for those effects which, although considered as extremely unlikely to occur, would have very serious consequences and would merit contingency planning:

- Certain/near certain;
- Probable;
- Unlikely; and
- Extremely unlikely

11.15 Table 11.2 lists the broad categories used to assist in identifying the nature and types of different ecological effects. In addition to individual effects on the ecological resource being identified and evaluated, the cumulative effect of two or more effects on the resource is also evaluated using the same terminology.



**Table 11.2 Categories of Ecological Effects (based on Treweek 1999)**

Category	Example
Direct Effects	<ul style="list-style-type: none"><li>• habitat loss or destruction (for example, through construction work);</li><li>• habitat fragmentation / severance; and</li><li>• disturbance</li></ul>
Indirect Effects	<ul style="list-style-type: none"><li>• reduced population viability (for example, due to decrease in habitat area etc.); and</li><li>• habitat isolation</li></ul>
Associated Effects	<ul style="list-style-type: none"><li>• ecological effects caused by actions linked with the Proposed Development</li></ul>
Cumulative Effects	<ul style="list-style-type: none"><li>• overall reduction in habitat diversity; and</li><li>• ongoing habitat loss or fragmentation</li></ul>

11.16 The magnitude or physical extent of predicted effects upon an ecological feature is presented, wherever possible, in quantifiable terms. For example, the area of land taken, percentage of habitat lost or the number of communities, species or individuals affected. Magnitude also considers the context of the feature affected within the categories of relative importance described above. For example, if there is an internationally designated site, the significance of predicted effects are assessed within an international context with reference to the relevant legislation.

11.17 The potential effects of development schemes on nature conservation can be either beneficial or adverse. Neutral/Negligible effects are also recognised.

11.18 In the CIEEM guidance an ecologically significant effect is defined as an effect on the integrity of a defined site or ecosystem and/or conservation status of habitats or species within a given geographical area. The value of any feature that will be significantly affected is then used to identify the geographical scale at which the effect is significant. This value therefore relates directly to the consequences in terms of legislation, policy or development control at the appropriate level. Significant effects on features of ecological importance should be mitigated (or compensated for) in accordance with guidance derived from policies applied at the scale relevant to the value of the feature or resource. Any significant effects remaining after mitigation (the residual effects), together with an assessment of the likelihood of success in mitigation are the factors to be considered against legislation, policy and development control in determining the application

11.19 To relate this assessment to other technical chapters provided for other environmental topic areas within this ES, the following comparison is provided in Table 11.3



**Table 11.3: Comparison of terminology**

<b>Terminology</b>	<b>Assessment based on IEEM guidance</b>
No effect	An ecologically significant effect assessed as an effect at a local/district scale which does not trigger policy/development control and is therefore considered as being of negligible importance;
Minor – Moderate	An ecologically significant effect assessed as an effect at a district or higher level which would trigger policy/development control. This would relate to a minor to moderate level of significance if mitigation measures can address the effects.
Major - Severe	An ecologically significant effect assessed as an effect at a district or higher level which would trigger policy/development control. This would relate to moderate or major effect if mitigation measures cannot reduce the residual effect and would result in a net loss of biodiversity.

## **LEGISLATION, PLANNING POLICY AND GUIDANCE**

### **Regulatory and Policy Framework**

#### National Planning Policy

11.20 Section 15 of the NPPF (**Ref 11.7**) is considered particularly relevant to this topic chapter. This section sets out the Government’s current planning policy in relation to conserving and enhancing the natural environment. The NPPF states that:

*“Planning policies and decisions should contribute to and enhance the natural and local environment by*

- protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
- recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
- minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;



11.21 Paragraph 175 of the NPPF states that:

*“When determining planning applications, local planning authorities should apply the following principles::*

- if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest
- development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and;
- development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity...”

11.22 Para 177 states that *“The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site..”* where a habitats site refers to an SPA, SAC or Ramsar site.

#### Local Planning Policy

11.23 The Development Plan for Medway relevant to this planning application consists of the saved policies of the Medway Local Plan (adopted May 2003). This plan ran until 2006 and is therefore time expired.



11.24 The result is that the council do not have an up to date development plan and the implications of this were considered by the Secretary of State in the planning appeal when planning permission was granted by the Secretary of State for up to 450 dwellings at Gibraltar Farm which is closely located 120m to the Site. It is relevant that the Gibraltar Farm site occupied a narrower part of the undeveloped corridor between Hempstead and Lordswood than the Site which occupies one of the widest points of the gap which will be maintained by the Capstone Country Park.

11.25 The policies in the 2003 Local Plan under which the application falls to be considered and the weight to be attributed to them. Because the Local Plan was adopted in 2003 the adopted housing requirement is more than 5 year's old. Paragraph 73 of the revised 2019 Framework indicates that in these circumstances, local housing need should be applied. Using the standard method set out in guidance the Secretary of State concluded that local annual housing need in Medway was 1,310 dwellings per annum. In considering that the 20% buffer should be applied, to accord with paragraph 73 of the Framework and because of significant under delivery over the last 3 years, the Secretary of State concluded the annual requirement to be 1,572 dwellings.

#### Legal Framework

11.26 The following Acts of Parliament and Regulations set the main legal framework for the assessment:

- National Parks and Access to the Countryside Act 1949 (**Ref. 11.9**);
- Wildlife and Countryside Act 1981 (as amended) (**Ref. 11.10**);
- Natural Environment and Rural Communities Act 2006 (otherwise known as the NERC Act) (**Ref. 11.11**);
- Protection of Badgers Act 1992 (**Ref. 11.12**);
- Wild Mammals Protection Act 1996 (**Ref. 11.13**);
- Countryside and Rights of Way Act 2000 (otherwise known as the CRoW Act) (**Ref. 11.14**);
- The Conservation of Habitats and Species Regulations 2017 (**Ref. 11.15**); and
- Hedgerows Regulations (**Ref. 11.16**).

11.27 The following EC Directives and international conventions are also relevant and are implemented through the above UK Acts and Regulations as applied under English law:



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- EC Directive 79/409/EEC on the Conservation of Wild Birds as amended (also called the Birds Directive) (**Ref. 11.17**);
  - EC Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora as amended (also called the Habitats Directive) (**Ref. 11.18**);
  - Convention on the Conservation of European Wildlife and Natural Habitats (1979): also called the Bern Convention (**Ref. 11.19**); and
  - The Convention on the Conservation of Migratory Species of Wild Animals (1980): also known as the Bonn Convention (**Ref. 11.20**).



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## BASELINE CONDITIONS

### Desk Study

11.28 The full results of the Desk Study are including within the Ecological Scoping Survey (**Appendix 11.1**) a summary of the most relevant records is provided below.

### Statutory Designated Sites

11.29 Medway Estuary and Marshes Ramsar Site, Special Protection Area (SPA) Site of Special Scientific Interest (SSSI) is located 3.3km north of the nearest Site edge. The mud-flats are rich in invertebrates and, in summer, the estuary supports breeding waders and terns, whilst in winter it holds important numbers of geese, ducks, grebes and waders. The Site is also of importance during spring and autumn migration periods, especially for waders.

11.30 There are an additional four Sites of Special Scientific Interest (SSSIs) within a 5km radius of the Site. The Site falls within the Site of Special Scientific Interest (SSSI) Impact Risk Zones for these:

- Purple Hill SSSI is located approximately 2.9km to the south-east - calcareous grassland;
- Queendown Warren SSSI (also a SAC and LNR) is located 3.5km to the south-east – Broadleaved Woodland;
- Wouldham to Detling Escarpment SSSI is located approximately 4km to the south-west– Broadleaved Woodland; and
- Tower Hill to Cockham Wood SSSI is located 4km to the north-west of the Site – Broadleaved Woodland

11.31 There are nine Local Nature Reserves within a 5km radius of the Site. Three are within 1km of the Site with one, Darland Banks being within 180m to the north of the Site.

11.32 Darland Banks Local Nature Reserve is a 45ha area of chalk grassland, scrub and woodland on a steep south-west facing escarpment on the North Downs. Calcareous grassland is listed as a priority habitat under the UK's Biodiversity Action Plan. The Site is renowned for its chalk grassland plants: man orchid, lizard orchid, fragrant orchid, green-winged orchid, early-purple orchid, pyramidal orchid, field scabious and black knapweed have all been recorded here.





Numerous species of butterfly and moth have been recorded at the LNR, some of which are rare and UK BAP Priority species: chalk hill and common blue, marbled white and green hairstreak butterfly, straw belle and fox moths are examples of the species recorded.

### Ancient Woodland

11.33 There are multiple areas of ancient woodland within a 5km radius of the Site. There are two areas of ancient woodland, one within the Site itself and one adjacent to the Site. Both of these are within or adjoin Field 1 to the south. The first is 'Whites Wood' a 1.3ha section of woodland located on the western boundary of the field. The second is 'North Dane Wood' located on the southern field edge and is 3.3ha in size.

### Dormice

11.34 Hazel dormice *Muscardinus avellanarius* have been recorded within multiple areas of the Darland Banks LNR, with the nearest record being located 210m to the north of Field 3 from 2003 and the most recent record from 2006 located in woodland to the east of Pear Tree Lane approximately 580m to the east of Field 3. There are also multiple records from 'Capstone Farm' from 2011 ranging from 260m to 280m to the east of Field 1. There is also a record of dormouse approximately 680m to the south of Field 1 within 'Hook Wood' from 2009. In addition, a European Protected Species Mitigation (EPSM) Licences which allows the damage and destruction of a resting place of hazel dormouse was issued for an area within Ambley Wood, which is part of Darland Banks LNR, approximately 300m to the north of Field 3. This licence was active between 2014 and 2018.

### Bats

11.35 An EPSM licence which permitted the destruction of a resting place of common pipistrelle bat *Pipistrellus pipistrellus* and brown long-eared bat *Plecotus auritus* between 2012 and 2013 is registered approximately 4km to the south-west of the Site.

11.36 Kent Bat Group have provided over 400 records of bats from within a 3km radius of the Site. Ten species of bat have been recorded: serotine *Eptesicus serotinus*, Daubenton's *Myotis daubentonii*, whiskered *M. mystacinus*, Natterer's *M. nattereri*, Leisler's *Nyctalus leislerii*, noctule *N. noctula*, Nathusius' pipistrelle *P. nathusii*, common and soprano pipistrelle and brown long-eared bat. There are 141 records of roosting bats from within a 3km radius of the Site. The nearest of these records is of an unknown roost type within the woodland in the east of



Field 3 (or in an adjacent building on Capstone Road) in 1995. There are five records of hibernating bats from within a 3km radius of the Site. The nearest record is from approximately 60m to the south of Field 3 within Capstone Farm Country Park: eight serotines were recorded hibernating here in 1990. There are seven records of maternity roosts within a 3km radius and the closest record to the Site is located approximately 0.7km to the north-west: a maternity roost of serotines was present at an address on King's Road between 1990 and 2000, with a peak count of 29 bats in 1990 and nine bats in 2000.

#### Reptiles and amphibians

11.37 No records of GCN or palmate newt have been found within 1km of the Site. Records of four reptile species were provided. The closest records include slow worm 75m to the north in 2016 within a private residence. Adder are known to be present within Darland Banks LNR: the closest record is from approximately 500m to the north of Field 3 in 2009. The species has been recorded more recently in the wider LNR in 2012. Common lizard have also been recorded along the southern edge of Darland Banks LNR, 200m to the north-east of Field 3 in 2005. The species has been recorded more recently in the wider LNR in 2013. Grass snake have been recorded 1.8km to the north of the Site in 2006.

#### Priority Habitats

11.38 Under Section 41 of The Natural Environment and Rural Communities (NERC) Act 2006, the Secretary of State was obliged to publish a Priority Habitats Inventory which is a list of habitats and species of principal importance for the conservation of biodiversity in England. Within a 5km radius of the Site there are eight Priority Habitat Types: deciduous woodland, lowland meadow, lowland calcareous grassland, traditional orchard, coastal saltmarsh, mudflats, reedbeds and coastal and floodplain grazing marsh. There is also good quality semi-improved grassland, which is a non-priority habitat. The Site itself contains three areas of deciduous woodland and is bordered by another three. Darland Banks LNR located 200m to the north-east contains lowland meadow and lowland calcareous grassland habitats. The nearest area of traditional orchard is located 600m to the east of the Site. The areas of mudflats, coastal saltmarsh, reedbeds and coastal and floodplain grazing marsh are all located within the Medway Estuary and Marshes Ramsar Site, 3.3km to the north.



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## Phase 1 Habitat Survey and Botanical Survey

11.39 The Site consists of three large arable fields (Fields 1, 2 and 3) located within the Medway Towns area approximately 1.5km to the west of Hempstead and 2.7km to the south of Chatham. The three areas are shown on Figures 11.2 and 11.3 (**Appendix 11.10**) with further detail provided by way of specific target notes: these are denoted by the letters 'TN'.

11.40 There are two large fields that are separated by Shawstead Road and a smaller field to the east that is connected to the large northern field through an area of dense vegetation: All fields had a crop of wheat during the 2018 season.

- The southern field (Field 1) measures 20ha and is bordered by managed hedgerows and woodland along the boundaries with two separate sections of ancient woodland at the western and southern boundaries.
- The northern field (Field 2) measures 23ha bordered by managed hedgerows and dense scrub along the boundaries with an area of grassland and scrub on the western boundary.
- The smaller field (Field 3) located in the north-east corner of the Site is located to the west of Capstone Road, immediately to the north of Capstone Country Park. The area measures approximately 5ha with c.4ha being the field and a block of woodland and scrub extending to approximately 1ha to the west.

### **Field 1 – c.20ha**

11.41 Field 1 is a large field (TN1) located at the southern end of the Site. Wheat was grown during both 2017 and 2018 with oil seed rape grown over winter in 2018/2019. Where the soil is exposed, the ground is chalk with flint nodules throughout. This field is bordered by woodland, managed hedgerows and scrub. The northern and eastern boundary of the field is formed by a minor road called Shawstead Road. A large section of the western boundary and 150m section of the southern boundary of the field is formed by ancient woodland.

#### *Ancient Woodland – 'Whites Wood'– TN2*

11.42 Located within the western boundary of Field 1 there is a 1.3ha area of ancient woodland: Whites Wood. This woodland was previously part of a larger area, however in the 1980's North Dane Way and a housing development was constructed to the west reducing the woodland down to its current size. The woodland has a sparse understorey throughout with denser shrub layer where management has taken place against the edge of the arable field to



the east and north. The canopy of the woodland is dominated by sweet chestnut *Castanea sativa* and ash *Fraxinus excelsior* with several large mature pendunculate oaks *Quercus robur* and there are also occasional mature cherry *Prunus* sp. trees. The shrub layer includes elder *Sambucus nigra*, hawthorn *Crataegus monogyna*, field maple *Acer campestre*, hazel *Corylus avellana*, holly *Ilex aquifolium*, beech *Fagus sylvatica*. The ground flora is dominated by dense common ivy *Hedera helix* ssp. *helix* cover but also includes herb-Robert *Geranium robertianum*, occasional bramble *Rubus fruticosus* sp. agg, wood avens *Geum urbanum*, occasional traveller's-joy *Clematis vitalba*, cow parsley *Anthriscus sylvestris*, dog's mercury *Mercurialis* and wood anemone *Anemone nemorosa*.

#### *Ancient Woodland – 'North Dane Wood'– TN3*

11.43 Located at the southern boundary of Field 1, North Dane Wood is 3.3ha of ancient woodland. This woodland was also part of the larger area described above, divided from the rest of the woodland in the 1980's by the North Dane Way. The Site boundary runs along the edge of the woodland where a dilapidated post and wire fence is located. Access to the woodland beyond the edge was restricted due to the use of this land for shooting. The woodland has a sparse understorey throughout although the shrub layer is more developed where management has taken place against the edge of the arable field. The canopy of the woodland is dominated by mature ash but also includes beech, sycamore *Acer pseudoplatanus* and hazel. The shrub layer includes blackthorn *Prunus spinosa*, hawthorn, holly *Ilex aquifolium*, elder, dog-rose *Rosa canina* and spindle *Euonymus europaeus*. The ground flora is sparse and includes common ivy, common nettle, herb-Robert, cow parsley, traveller's-joy, wood anemone, wood avens, dog's mercury and bramble.

#### **Boundary Features and Field Margins**

##### *Dense Scrub – TN4*

11.44 The north and north-western boundary is formed by a wooden post and rail fence. The habitat beyond the fence include a narrow field margin and dense scrub on steep banks that extend down to Shawstead Road to the north and North Dane Way to the west. The dense scrub behind the fence line on the steep banks is dominated by mature silver birch *Betula pendula*, occasional cherry, alder buckthorn *Frangula alnus*, dense traveller's-joy, sycamore and common ivy, however there are also ornamental species that had have started to colonise the banks including *Berberis* sp. and several species of *Cotoneaster* sp. including *C. horizontalis*. The field margins here are narrow ranging between 0.5 to 1m in width and the assemblage is dominated by false oat-grass *Arrhenatherum elatius*, Yorkshire-fog *Holcus lanatus* and common



nettle but also includes creeping thistle *Cirsium arvense*, cock's-foot *Dactylis glomerata*, cow parsley, cleavers *Galium aparine*, mugwort *Artemisia vulgaris*, bramble and white dead-nettle *Lamium album*. There are also many plants from the Brassicaceae family with escaped oil-seed rape *Brassica napus* from the arable fields as well as charlock *Sinapis arvensis* and white mustard *Sinapis alba*. These margins also contain occasional man orchid *Orchis anthropophora*.

#### *Tall Ruderal – TN5*

11.45 The north-east boundary is formed by a low vegetated earth bund that runs along the edge of Shawstead Road, this bund is dominated by tall ruderal species. This bund and field margin is approximately 4m wide and is disturbed from fly tipping with large amounts of rubbish located throughout, towards the northern end is a single bar gate for vehicle access by the landowner. The species within the bund is dominated by common nettle and bramble but also includes large amounts of common hogweed *Heracleum sphondylium* and hemlock *Conium maculatum* along with cow parsley, cleavers, herb-Robert, false oat-grass, Yorkshire-fog and cocks-foot. These same species are also present along the adjacent narrow 0.5m field margin.

#### *Eastern Boundary – TN6*

11.46 The majority of the eastern boundary is formed by a managed hedgerow that runs on top of the bank alongside Shawstead Road. This hedge (H1) runs for c.500m, however there are two large 30m gaps located along the length. This hedge is dominated by blackthorn and dense common ivy but also includes field maple and occasional hazel, spindle and buddleia *Buddleja davidii*. The field margin along this hedgerow is very narrow with the wheat growing up to the base, however there is a narrow strip of cow parsley cleavers, false oat-grass and occasional common hogweed.

#### *South-east Boundary – TN7*

11.47 Within the south-east corner is a small 85m long section of managed hedgerow (H2) that has several gaps. The species within this hedge include field maple, blackthorn, dog rose, wild privet *Ligustrum vulgare*, alder buckthorn, spindle, common ivy, traveller's-joy and hedge bindweed *Calystegia sepium*. The number of species within this hedge make it species-rich. Here the field edge is defined by a well-worn area of bare earth from a public footpath and a c.2.5m wide area of tall ruderal. This ruderal is dominated by common nettle, common hogweed and cow parsley but also includes common ivy, cleavers, bramble and occasional hemlock water dropwort.



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### *Western Boundary – TN8*

11.48 The western boundary that extends from the southern corner to Whites Wood is c.400m long and is marked by a wooden post and rail fence line. This area is a bank that extends from the Site edge to North Dane Way; this was cleared in the 1980's when the road was built and has been colonised by dense scrub and trees since. The species within this scrub include field maple, blackthorn, hawthorn, sycamore, alder buckthorn, sycamore, dog-rose, bramble, common ivy and yew *Taxus baccata*. There is also occasional pendunculate oak, willow *Salix caprea* and beech. The field margin along this boundary is c.1m wide and is heavily shaded by the adjacent trees and scrub. The species here are dominated by dense common ivy cover but also include false oat-grass, cleavers and occasional stinking iris *Iris foetidissima*. Within the margin there is a public footpath and gate for vehicle access; here a large amount of disturbance has taken place with fly tipping and a fire taking place in October 2018 which damaged a c.30m section.

### *Tree Line – TN9*

11.49 Within the centre of the field located towards the southern end is a c.110m long tree line and scrub that has been retained within the arable field. This feature has been within the field since at least the 1940's. The dominant species are whitebeam *Sorbus* sp. and blackthorn but also include common ivy, hazel, beech, field maple and wild privet. Surrounding this isolated tree line is a c.1m wide field margin, the species here include Yorkshire-for, false oat-grass, cock's-foot, cow parsley, common ivy, common nettle, white dead-nettle, cleavers, mugwort and herb-Robert.

### **Field 2 – c.20ha**

11.50 Field 2 is a large arable field located at the northern end of the Site used to grow wheat during the 2017 and 2018 summer seasons and oil seed rape over the 2018/2019 winter. This field is bordered by dense scrub, managed hedgerows and trees. The southern boundary of the field is formed by a minor road called Shawstead Road. Running parallel to the western boundary is North Dane Way road with a steep embankment between the road and the field. The eastern boundary is the edge of the Capstone Country Park. The habitats present within the Site are shown within Figure 11.3 (**Appendix 11.10**), with further detail provided by way of specific target notes: these are denoted by the letters 'TN'.



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## Boundary Features and Field Margins

### *North-east Boundary – TN2*

11.51 The north-east boundary is a c.90m area of scattered trees set on a steep bank leading down from the field to tennis courts below. The trees here are dominated by mature oaks but also include holly, elder, hawthorn and blackthorn. The field margin here is c.2.5m wide and the species includes false oat-grass, cock's-foot, Yorkshire-fog herb-Robert, white dead nettle, common nettle, cleavers and bramble. This margin suffered fire damaged during the summer.

### *Northern Boundary and Field Margin – TN3*

11.52 The field's northern boundary is formed by multiple sections of close board fencing of private residential gardens. There is a narrow c.1m to 2m wide field margin present with a number of ornamental garden species established. The species in this margin are dominated by common ivy, hedge bindweed, cleavers, bramble, herb-Robert, common nettle, Yorkshire-fog, cock's-foot, false oat-grass, wheat and occasional common hogweed. Woody species present include snowberry *Symphoricarpos albus*, hawthorn, buddleia and leyland cypress *X Cupressocyparis leylandii*.

### *North-west and Western Boundary – TN4*

11.53 The north-west corner and extending down towards the south is formed by an area of dense scrub and trees that form the edge of the arable field; a branch of this also extends onto the steep embankment of North Dane Way road. The mature trees here consist of pendunculate oak, ash and elm and the scrub is dominated by blackthorn but also includes common ivy, hawthorn, bramble, spindle, holly, dog-rose, traveller's-joy and hazel. Closer to North Dane Way road, blackthorn, hawthorn and traveller's-joy become the dominant species. The field margin here is narrow at c.0.5m wide and heavily shaded by the tree and scrub line adjacent. The species here are dominated by common ivy and common nettle but also include cleavers, mugwort, false oat-grass and cocks'-foot.

### *Central Western Boundary – TN5*

11.54 In the western section of field 2 is an area of species-rich grassland and scattered scrub. This area is surrounded by dense scrub and has started to become colonised by scattered scrub with saplings of alder buckthorn, field maple, blackthorn, dog-rose, briar rose *Rosa rubiginosa*, bramble and travellers-joy, however grassland and herb species are also present with spear



thistle *Cirsium vulgare*, cow parsley, false oat-grass, cock's-foot, springy turf-moss *Rhytidiadelphus squarrosus*, autumn hawkbit *Leontodon autumnalis*, herb-Robert, mugwort, rosebay willowherb *Chamerion angustifolium*, dandelion *Taraxacum officinale*, oxeye daisy *Leucanthemum vulgare*, tufted vetch *Vicia cracca* and occasional hogweed. Other species of interest recorded included pyramidal orchid *Anacamptis pyramidalis*, man orchid, bladder campion *Silene vulgaris* and common poppy *Papaver somniferum*.

#### *Western and Southern Boundary – TN6*

11.55 The western section of field 2 has a scrub boundary to the west and south, formed by a wooden post and rail fence. The habitats here include a narrow field margin, fence line and dense scrub on steep banks that extend down to North Dane Way to the west. The dense scrub is dominated by mature silver birch, occasional cherry, alder buckthorn, dense traveller's-joy, sycamore and common ivy, however there are also ornamental species that had have started to colonise the banks including berberis and several species of cotoneaster. The field margins here are narrow ranging between 0.5 to 1m in width and the species present are dominated by false oat-grass, Yorkshire-fog and common nettle but also include creeping thistle, cock's-foot, cow parsley, common ivy, cleavers, mugwort, bramble and white dead-nettle.

#### *Central Southern Boundary – TN7*

11.56 The centre of the southern boundary supports an area of disturbed habitat. Here a public footpath enters the field along with a low metal gate for vehicle access, between the two is a large earth bund that is overgrown by scrub. There is fly tipping here along with a mound of chicken manure. The species here are dominated by dense bramble scrub but also include semi-mature sycamore and ash, hawthorn, dog rose, common nettle, common hogweed, cleavers, herb-Robert, cock's-foot, false oat-grass and Yorkshire-fog.

#### *South-western Boundary – TN8*

11.57 The south-west boundary is formed by a low vegetated earth bund that runs along the edge of Shawstead Road to the west; this is dominated by tall ruderal species. This bund and field margin is approximately 4m wide and is disturbed from fly tipping with rubbish located throughout and towards the northern end is a single bar gate for vehicle access by the landowner. The species are dominated by common nettle and bramble but also includes large amounts of common hogweed and hemlock along with cow parsley, cleavers, herb-Robert, false oat-grass, Yorkshire-fog and cocks-foot. These species also extend into the narrow c.0.5m wide





field margin. Within the bund there is an area of mature trees with two mature pendunculate oak trees T2 and T3.

#### *Southern and Eastern Boundary Dense Scrub – TN9*

11.58 The southern end of field 2 and majority of the eastern boundary is dominated by a dense scrub and tree line. The species within this scrub is dominated by blackthorn but also include hawthorn, hazel, field maple, elder, bramble, holly, common ivy, buddleia, travellers-joy, buddleia and occasional pendunculate oak and elm *Ulmus procera*. The field margin along these boundaries varies from c.0.5m to 1.5m wide and the species present include false oat-grass, Yorkshire-fog, cock's-foot, common nettle, creeping thistle, cock's-foot, cow parsley, common ivy, cleavers, mugwort, bramble and white dead-nettle.

#### **Field 3 – c.5ha**

11.59 Field 3 is a small arable field measuring approximately 4ha and located in the north-east corner of the Site. To the west there is an area of dense scrub and woodland which measures approximately 1ha and the northern, eastern and southern boundaries are formed of tree lines or woodland. The field was used to grow wheat during the 2017 and 2018 summer seasons, with oil seed rape grown over the 2018/2019 winter.

#### *Dense Scrub and Woodland – TN2*

11.60 The western section of Field 3 consists of an area of young woodland and dense scrub. This area was formally an area of unmanaged calcareous grassland, bordered by tree and hedge lines and has since the 1960's been left to become overgrown by dense scrub and trees. The species present here are dominated by dense blackthorn and ash but also include elm, alder buckthorn, field maple, elder, willow, hornbeam, wild privet, hawthorn, spindle, travellers-joy, bramble and occasional hazel and holly. The ground flora is predominantly dense common ivy cover with occasional cleavers.

#### *Grassland – TN3*

11.61 There is grassland where a vehicle track is kept clear to allow access between Field 3 and Field 2; here there is traveller's-joy, dog-rose, ground-ivy *Glechoma hederacea*, greater stitchwort *Stellaria holostea*, germander speedwell *Veronica chamaedry*, common vetch *Vicia sativa*, wood false-brome *Brachypodium sylvaticum*, common nettle, creeping thistle, creeping



buttercup *Ranunculus repens*, bramble, forget-me-not *Myosotis arvensis*, white dead-nettle, cow parsley, ribwort plantain *Plantago lanceolata* and red clover *Trifolium pratense*. There are also pyramidal orchids. Within this dense scrub activity from large mammals (fox/badger) was noted such as mammal runs and holes.

#### *Scrub and Trees – TN4*

11.62 To the north of the field there is a dense vegetated Site boundary dominated by scrub and trees. The western end of the boundary is dominated by sweet chestnut trees along with dense blackthorn and traveller's-joy; also located here is a large mature sweet chestnut (T1). As the boundary extends to the east the boundary becomes curtilage to residential properties located beyond with close board fencing. Here the scrub is dominated by blackthorn and traveller's joy but also includes occasional stands of hazel. The field margin along this boundary is fairly large varying between c.2m to 4m wide in places and is a mix of grassland and tall ruderal species, the species present include wood false brome, common nettle, common hogweed, cow parsley, forget-me-not, cock's-foot, bramble, cleavers, false oat-grass, creeping thistle, wood avens, common mallow *Malva sylvestris*, garlic mustard *Alliaria petiolata*, herb-Robert, rough meadow-grass *Poa trivialis*, common ivy, dog-rose and creeping buttercup.

#### *Scattered Trees – TN5*

11.63 Scattered trees and scrub form the eastern and southern boundary. The tree species include sycamore, ash, field maple, elm, blackthorn, hawthorn and elder. In the south of the field there are ash trees overhanging the field, as well as a mature sycamore tree, hazel and hornbeam *Carpinus betulus*. The western and southern field margins (c.1-2m wide) supports grassland and tall ruderal species, the species present are false brome, common nettle, hogweed, cow parsley, forget-me-not, cock's-foot, bramble, cleavers, false oat-grass, creeping thistle, wood avens, common mallow *Malva sylvestris*, garlic mustard, herb-Robert, rough meadow-grass, ivy, dog-rose and creeping buttercup.

#### Evaluation

11.64 The hedgerow on the southern boundary of Field 1 (H2) has been assessed under the wildlife and landscape criteria of the Hedgerows Regulations 1997; this hedgerow has not been assessed for its importance under the archaeology and historic criteria of the regulations as this is beyond the scope of an ecology report. Hedgerow H1 is considered to be 'Important' under



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the wildlife and landscape criteria of the Hedgerows Regulations, and it is also species rich as it contains over 7 woody species throughout the entire hedgerow.

11.65 Fragments of chalk grassland have been recorded around the margins of the arable fields and in unmanaged or infrequently managed areas. These species-rich areas of grassland also support man orchid, which is a UK BAP priority vascular plant species. Chalk grassland is a priority habitat for conservation in Kent.

11.66 Cotoneaster has been recorded within the Site and Japanese knotweed adjacent to it; these are on Schedule 9 of the Wildlife and Countryside Act, which makes it an offence to cause their spread in the wild.

### **Dormice**

11.67 During the Extended Phase I Habitat Survey the habitat was assessed for the potential for dormice. Whilst the arable fields do not support any habitats for dormice, the boundaries comprise of mature treelines, ancient woodland boundaries, species rich hedgerows and dense scrub, which provide suitable habitat for hazel dormice. The Site is adjacent to two small blocks of ancient woodland which can be highly suitable for dormice as they can contain many species of woody plants providing a range of food sources

11.68 Dormice have been confirmed with evidence of breeding also recorded. The first nest was identified during the first July check with all subsequent checks finding additional nests and dormice, with a peak count of 18 dormouse found during the November survey. The locations where dormice have been recorded are shown on Figures 11.2 and 11.3 (**Appendix 11.10**).

11.69 They have been found in all suitable habitats within the Site and within the boundary habitats of all three fields. The northern section of the western boundary of field 2 was not subject to surveys due to concerns about disturbance by people of any dormouse tubes/boxes set in the area. This area of scrub is relatively fragmented from the rest of the scrub and woodland habitat with sections of vegetation along the northern boundary having been removed and replaced with close board fencing of the adjacent house to the north.

11.70 The majority of the Site boundaries all provide high quality habitat for dormice, with two blocks of ancient woodland within Field 1. There are recent records of dormice from within 1km of the Site. Dormice have been recorded within multiple areas of the Darland Banks LNR, with the nearest record being located 210m to the north of Field 3 from 2003 and the most recent



record from 2006 located in woodland to the east of Pear Tree Lane approximately 580m to the east of Field 3. There are also multiple records from 'Capstone Farm' from 2011 ranging from 260m to 280m to the east of Field 1. There is also a record of dormouse approximately 680m to the south of Field 1 within 'Hook Wood' from 2009.

11.71 It can therefore be assumed that dormice are likely to be present in any of the Site's connected vegetated boundary features and the two areas of ancient woodland (White's Wood and adjacent North Dane Wood) both in the south of the Site as well as any connected dense scrub and tree lines.

11.72 Due to the extent of the suitable habitats within and adjoining the Site, it is considered that the dormouse population capable of being supported is likely to be relatively high. The species-rich hedgerows and scrub provide good quality foraging and nesting habitat in the summer and autumn period when soft fruits like blackberries and sloes are at their most abundant. The bases of the hedgerow and dense scrub also provide opportunities for hibernation, as they are well established and raised on banks and on slopes to prevent flooding. The two areas of ancient woodland within Field 1 also provide high quality habitat for year-round life cycles.

11.73 Adult dormice are estimated to live in densities of around ten per hectare even in the best habitats. It is difficult to estimate the dormouse population size in areas of linear habitat such as hedgerows, but it is estimated that less than 80 animals, including juveniles, would be present within the suitable habitats within the Site: the whole Site measures c.50ha, however suitable habitats are restricted to the margins of the three fields, the two blocks of ancient woodland adjacent to Field 1 and the area of dense scrub connected Fields 2 and 3 in the north of the Site amounting to c.8ha of suitable habitat across the entirety of the Site boundaries. It is considered that the dormouse population within the Site is of Local Importance.

## **Bats**

11.74 The habitat within the Site was assessed for potential for bats. The vast majority of the Site area is comprised of 'Low' quality intensively farmed arable fields with monoculture crops of wheat. However, the vegetated boundaries provide higher quality linear features for commuting and foraging and the two blocks of Ancient Woodland within and adjacent Field 1 provide larger areas of suitable bat foraging habitat. Adjacent habitats to the Site to the north and west are dense urban development and roads, and to the south and east are arable fields, woodland blocks and a country park providing links to the wider landscape. Overall, the Site



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was therefore assessed as overall as 'Low' to 'Moderate' quality habitat for commuting and foraging bats under the Bat Conservation Trust Guidelines (Collins 2016).

11.75 Due to the quality of habitats within the Site and its location within the wider landscape and the proposals to retain, protect and enhance the higher quality boundary habitats as part of the scheme, the survey methodology of three activity surveys in spring, summer and autumn and static surveys of two statics per transect was chosen as appropriate for the Site and sufficient to provide suitable information on bat activity across the Site.

### **Bats Roost Potential Assessment**

#### Trees

11.76 There are limited mature trees located within the Site and these are all confined to the Site boundaries. The trees have been assigned Low – High potential under the Bat Conservation Trust Guidelines (Collins, 2016). The trees identified as suitable have been summarised in Table 11.4.

11.77 The bat tree assessment identified two trees with suitability for bat roosts. Three emergence surveys undertaken of these two trees recorded a single common pipistrelle bat emerging from a woodpecker hole high up from tree T1 on the 4th June 2018. No bats emerged from tree T2.



**Table 11.4 - Bat Tree Schedule**

ID	Species	DBH	Features	Category	OS Grid Reference
T1	Sweet Chestnut	0.7m	Mature sweet chestnut, single stem, in poor health with crown dieback occurring. Branch extending to south has multiple woodpecker holes within at c.10m high	Moderate - High	TQ 77791 65787
T2	Pendunculate oak	0.5m	Mature oak tree on eastern bank of Shawstead Road, single stem and appears in good health. Split in limb extending to the west at 6m high	Moderate	TQ 77532 64999
T3	Pendunculate oak	0.6m	Mature oak tree on eastern bank of Shawstead Road, single stem and appears in good health, no bat roost features identified.	Low	TQ 77533 64994

*Bat Hibernation Assessment – Deneholes*

11.78 Deneholes are known to be present within the local area with four noted on OS survey plans within 1km of the Site and the closest being located 120m to the east of Field 3, adjacent to Pear Tree Lane. Three deneholes are also present within Grove Wood located 890m to the east. These features provide suitable habitat for hibernating bats as they are cool, humid and sheltered. During the surveys no Deneholes were found to be located within or adjacent to the Site. The nearest denehole located 120m to the east was found to be suitable for use by hibernating bats with access into the chambers below, however the size, layout and structure of the feature is unknown to access limitations.

*Transect activity surveys*

11.79 A total of four bat species were recorded during the three transect surveys:

- common pipistrelle,
- soprano pipistrelle
- Nathusius pipistrelle



- noctule

11.80 On any given survey only two of these species were recorded. None of the surveys recorded all four species. The dominant species recorded for all three surveys was common pipistrelle with between 90% and 100% of all passes across the surveys. The second most dominant species was soprano pipistrelle at between 6% and 10% of total passes, the other two species made up less than 1% of total passes. The diversity during the transect survey was low.

11.81 The highest levels of bat activity within the northern transect route of Fields 2 and 3 were predominantly within the area of dense scrub between the two fields as well as the northern boundary of Field 3 there was also concentration of foraging activity at the southern boundary of Field 3.

11.82 The highest levels of bat activity around Field 1 were predominantly along the woodland edges of the two blocks of ancient woodland, Whites Wood on the western side of the field and North Dane Wood at the southern end there was also a concentration of foraging activity on the northern boundary of the field.

11.83 However, activity was generally low across the Site with large sections of field boundary with either no or single bat passes, such as the western boundary of Field 1 away from the woodlands and western boundary of Field 2.

#### Static monitoring activity surveys

11.84 At least eight of the 15 species of bat recorded in Kent have been identified using the Site during the static monitoring surveys:

- soprano pipistrelle
- common pipistrelle
- Myotis genus
- long-eared bat
- noctule
- Leisler's bat
- Nathusius' pipistrelle
- Serotine



11.85 Passes by bats from the *Myotis* genus which could not be identified to species level were recorded; there is no reliable way of specifically determining which *Myotis* species are present on the Site without trapping the bats and identifying them in the hand. Given the habitats present within the Site and surrounding countryside, *Myotis* species using the Site are most likely to include Natterer's *Myotis nattereri*, whiskered *Myotis mystacinus*, Brandt's *Myotis brandtii* and/or Daubenton's *Myotis daubentonii* bats.

11.86 The earliest bat passes during May, July and September were at different static points with passes around 21 minutes after sunset, however in July at SMP2 the earliest passes were from common pipistrelle bat passes and were 2 minutes after sunset. The average emergence time for this species is 20-25 minutes after sunset, and these early passes indicate that these bats were roosting close by, perhaps in the adjacent woodland.

11.87 The highest number of bat passes was recorded at SMP2, in the eastern boundary of Field 2: 3,906 passes were recorded here over the three static monitoring sessions. This was closely followed by SMP3 in the north-west of the southern Field 1, with 3,591 passes. The higher levels of bat activity at SMP3 here correspond with the results of the transect surveys, where the bat foraging activity was concentrated along the edge of the White Wood ancient woodland. SMP1 on the western edge of Field 3 recorded a total of 1,694 passes. The lowest level of bat activity was at SMP4 in the south-east of the southern Field 1: just 874 passes were recorded here.

### **Evaluation**

11.88 Research into the habitat preferences for foraging UK bats found that habitats associated with broadleaved woodland, particularly the woodland edge, and water are more preferred for foraging, whilst arable land, moorland and improved grassland were strongly avoided (Walsh & Harris, 2006). As well as the selective preference of habitats for foraging by bats, it has also been shown that certain habitats have strong correlations with bat abundance; riverine, woodland lacustrine and vegetation corridors have a strong positive effect on bat numbers in comparison to arable land which has a strong negative relationship (Walsh & Harris, 1996). The same research highlighted that broad-leaved woodland and riparian habitats are of 'pivotal' importance to bats.

11.89 The bat activity surveys support the initial assessment that the Site provides low quality habitat but with higher quality habitat for foraging and commuting bats at the margins of fields and along with the area of dense scrub between Field 2 and 3. The two adjacent areas of





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ancient woodland, White Wood to the west of Field 1 and North Dane Wood to the south of Field 1, provide high quality roosting habitat as well as opportunities for foraging and commuting bats. The hedgerows and dense scrub and trees which surround the three fields also provide good quality foraging and linear landscape features for bats. However, the centres of the two fields provide low quality habitat: all three being used to grow wheat with narrow field margins. The open fields provide little in the way of shelter for bats and are also likely to support a lower diversity of invertebrates on which bats would forage.

11.90 The surveys show that a small number of species regularly use the Site (common and soprano pipistrelle) and that a moderately diverse number of bat species use the Site less frequently as commuting or foraging routes. The activity recorded was dominated by Pipistrellus species. A total of 9723 of all 10065 bat passes being common pipistrelle equalling 96.6% of the total assemblage the other seven bat species accounted for 1% or less of the total bat assemblage. The bat habitat and the species assemblage identified is therefore considered to be of Neighbourhood Importance.

### **Badgers**

11.91 The woodland, hedges and grassland habitat types to the south and east of the Site and at the Site boundaries are optimal for badgers, as setts tend to be located in the shelter of woodland, with badgers emerging at night or early evening to forage in fields and meadows

11.92 The objective of the badger survey was to determine the location of badger setts and field signs within the Site. The locations of badger setts have been provided and details of the badger reporting are provided in a separate confidential report to prevent locations becoming public knowledge.

11.93 Only a single outlier sett was recorded within the Site, and was confirmed as being used by badger by a trigger camera. Further holes outside the Site but within 30m were not fully investigated due to access restrictions but if used by badger are considered most likely to be another outlier or a subsidiary sett.

11.94 The territory sizes of a badger social group have been found to range from 30ha in optimal habitat to 150ha in marginal habitat (Harris et al., 1989). To put this into context, the total Site area surveyed covers approximately 50ha between all three fields, with the majority being arable fields. Within a semi-rural environment territory sizes and clan sizes are likely to be strongly influenced by available habitat and food sources, including those provided by



humans, and may therefore not easily be predicted. With regard to latrines it has been found that in some case studies, 70% of all latrines were located near or on a territorial boundary (Kruuk, 1989 in Neal and Cheeseman, 1996). However, no latrines were found within or adjacent to the Site during the 2018 surveys suggesting that there are no territorial boundaries that cross the Site.

#### *Foraging habitat*

11.95 The Site supports suitable foraging habitat and this suitable habitat extends into the wider countryside to the south and east, whilst the north and west is limited by roads and dense urban development. Badgers are omnivorous and their diet typically consists of earthworms, insects, grain and fruits. As such they the foraging habitat is likely to include most of the arable fields within the Site boundary that are used to grow wheat as well and the areas of trees, hedges and scrub at the Site boundaries. The blocks of ancient woodland to the west and south of Field 1 as well as the grassland and scrub area of Capstone Country Park to the east will also provide high quality foraging habitat.

#### *Commuting routes*

11.96 There are mammal paths that link the areas of badge activity with a path running north to south through the dense scrub between Fields 2 and 3. The other paths appears to be restricted to the vegetated Site boundaries with no well-worn or obvious paths that run through the arable fields.

11.97 It is considered that the badger population within the Site is of Neighbourhood Importance.

#### **Wintering Birds**

11.98 Wintering bird surveys were undertaken on a monthly basis between January 2018 and March 2018 inclusive. The surveys concentrated on recording species listed in the Medway SPA description and species known to use agricultural habitats for feeding and roosting such as dark-bellied brent geese, lapwing, golden plover and curlew. However, all species including farmland birds and raptors were noted to understand the winter bird assemblage. In addition to recording the number, distribution and flight direction of birds within the study area, environmental data were recorded including the crop type and height of crop.



11.99 During the surveys, a total of 24 species were recorded. Of these, two species were estuarine species: herring gull and black-headed gull. Black-headed gull was recorded during all three surveys with a peak count of five black-headed gulls during the March 2018, Herring gull were recorded on all three surveys with a peak count of three recorded during the January 2018 survey.

11.100 A single species of raptor were noted: a single sparrowhawk was recorded flying through Site during the February and March Surveys.

11.101 The farmland passerine community included chaffinch, corn bunting, goldfinch, linnet, skylark and starling. Aggregations of chaffinch, goldfinch, linnet and corn bunting were seen in the central Field 2.

### **Conservation Importance of the Bird Assemblage**

Annex 1 Species (Birds Directive) & Species of Qualifying Interest for the SPA.

11.102 The nearest SPA supports three important populations of species listed on Annex 1 on the Birds Directive: avocet and little tern during the breeding season and avocet over winter. The survey was undertaken during the winter survey period January to March and there were no avocet recorded within the Site. Separate breeding bird surveys did cover the breeding season, however these species, avocet and little tern, are not known for utilising arable habitats in summer. None of the eight species listed on Annex II of the Birds Directive for which the SPA is designated were recorded during the surveys and none were recorded within the Site.

11.103 No Schedule 1 species were recorded using the Site and no Kent RDB3 wintering bird species have been recorded. A single species herring gull which is listed on the BoCC Red List for its decline (by between 53 to 60%) during the non-breeding, wintering period was recorded within the Site. They were recorded on all three surveys with a peak count of three recorded during the January 2018 survey. Similarly, black headed gull an Amber List species due to its decline during the non-breeding winter period was recorded during all three surveys with a peak count of five black-headed gulls during the March 2018 survey within Field 2.

11.104 Other species listed on the BoCC Red List due to declines in their breeding population and/or range were recorded including corn bunting, linnet, skylark, song thrush, starling, whilst dunnock which is included within the Amber List was also recorded. All were recorded breeding during the later surveys and these are assessed below.



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## Evaluation

11.105 The Site does not support any species of bird for which the nearby SPA is designated nor does it support a significant number of waterfowl or waders; only two species have been recorded in the Site (black-headed gull and herring gull) and these have been present in low numbers.

11.106 The criteria used for the designation of Local Wildlife Sites (previously known as SINC's or County Wildlife Sites) in Kent (Kent Wildlife Trust, 2005) can be used to assess the local importance of the Site for birds. The criteria are designed to be applied to areas of habitat that are discrete and homogenous (i.e. splitting habitats such as woodland and arable rather than considering the two habitats as one site) and are as follows:

*“A site should be selected as a Wildlife Site if it can be considered as a single, identifiable unit (as explained above) in terms of its bird fauna and where:*

- a) It is occupied regularly by at least 2.5% of the county population of any one or more bird species, based on the most recent and authoritative data; or*
- b) It holds three or more Kent Red Data Book 3 (KRDB3) species at the appropriate time of year (normally this should not include a combination of breeding and wintering species); or*
- c) It holds one of the five largest colonies of colonial seabirds (with the exception of herring gull and black-headed gull), grey heron, little egret or sand martin; or*
- d) It has been recorded as being regularly used in recent years by at least 60 wintering bird species; or*
- e) It has been recorded as being regularly used in recent years by at least 100 passage bird species.”*

11.107 None of the habitat areas within the Site (arable, woodland and scrub edge) meet these criteria. The Site is therefore considered to be of negligible importance to the functionality of the SPA. The wintering bird assemblage supported is considered to be of Neighbourhood Importance.

## **Breeding Birds**

11.108 Breeding bird surveys were completed between April and July inclusive with a total of six surveys carried out. The survey followed guidelines as set out in the British Trust for



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Ornithology's (BTO) Breeding Bird Survey (BBS) and Common Bird Census (CBC) methodology.

11.109 Up to 29 species were recorded breeding or likely breeding within the Site or habitats immediately adjacent. There were no species recorded within the Site which are listed on Schedule 1 or Annex I or II. Nine species (linnet, skylark, mistle thrush, corn bunting, starling, house sparrow, dunnock, stock dove and song thrush) identified using the Site are of conservation significance and are variously listed on the Kent Red Data Book, Species of Principal Importance (under Section 41 of the NERC Act), UK BAP Priority Species and are on the BoCC 4 Red List or Amber list.

11.110 All of these nine species of conservation importance were found to be breeding or likely breeding within the survey area. The majority of these species are those which have suffered substantial recent population declines and/or a contraction in range nationally, though most remain relatively widespread through Kent and the British Isles. A single nightingale *Luscinia megarhynchos* was recorded during the invertebrate surveys in May. The species was identified calling within the dense scrub outside the Site and adjacent to the recycling centre to the south of Field 2. This species was not recorded during any of the breeding bird surveys and likely to have been moving through the Site.

11.111 Two territories of corn bunting were recorded within the Site, one in the north-west corner of the Field 2 and one in the south-west corner of Field 2. Eleven territories of skylark were recorded across Fields 1 and 2 within the arable wheat crop within the fields centre. Both are included on BoCC4 Red List and on KRDB2 and are considered to be suffering a continuing decline (29% decline in south-east England 1995 – 2012 according to BTO) whilst corn bunting are also included on the NERC/UK BAP lists for recent declines in UK populations. These two species share similar nesting requirements, favouring open ground in arable or tall grassland fields. Corn bunting prefer open farmland and in winter they may be found in stubble, root crops, fields and cattle yards. They are predominately seed eating and will also take insects. Skylark are ground nesting birds and tend to nest in pockets of open habitat or among short vegetation such as grass or growing crops in tall grassland or arable fields (Snow and Perrins 1998).

11.112 The remaining BoCC species all breed in scrub, trees or buildings and are associated with the vegetation around the perimeter of the Site, within the woodland blocks at the edges of the Site and in the scrub/woodland between fields 2 and 3.



11.113 Based on the Criteria set out in the Kent Criteria for Local Wildlife Sites, the Site does not fulfil the requirements based on Kent RDB species. The Site supports a total six breeding KRBD2 species at the appropriate time of year. The threshold of KRBD3 is three species and for KRBD2 it is 10 species. No KRDB1 species were identified.

11.114 The evaluation of the Site under the above criteria has been considered when assessed in a wider context. Of the 14 KRDB species which could be present due to the habitats found within the Site, only six were recorded: song thrush, linnet, skylark, mistle thrush, starling and house sparrow. Species such as tree sparrow, spotted flycatcher, turtle dove, common redstart, nightingale, grey partridge, could be expected to be found within the Site or the adjacent habitats, but were found to be absent during the five visits. Summer migrant populations were lower in 2018 than normal across much of the UK (BTO, 2018) possibly due to the significant cold spell (Beast from the East) which prevented many migrants from travelling as far north as the UK.

11.115 The species present and considered to be breeding are typical of the habitats present within the Site, which is dominated by a mixture of mixed use arable farmland, ancient woodland, grassland, scrub and urban fringe. Based on the range of species of conservation importance recorded it is considered that the Site should be considered as being of Local Importance for its breeding birds.

### **Terrestrial Invertebrates**

11.116 A series of seven surveys spread throughout the year were completed by specialist invertebrate surveyors. A total of 617 species were recorded overall in 2018, with 501 in the northern half of the Site (Area 1) and 331 in the southern (Area 2). The distribution of the species of significance that have been recorded is limited to the field margins of Area 1 and 2 and areas of scrub area 1b with the significant sample areas within the Site amounting to approximately 2.7ha of a total Site area of 48ha or 5.6% of the total Site area. The most diverse areas for invertebrates are found along the western boundary adjacent to the North Dane Way which supports areas of calcareous vegetation along with planted and native scrub (Area 1a).

11.117 Although not of the same diversity as the verge of North Dane Way, area 1c adjacent to the Country Park supported a reasonable fauna, including, the large bird-dropping imitating weevil *Platyrhinus resinosus*, which feeds in King Alfred's Cake fungus *Daldinia concentrica* and the fairly recently established shield bug *Tritomegas sexmaculatus*, associated with black



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horehound *Ballota nigra*. This latter species was also present in the adjacent field margin. The remains of stag beetle were found in this area having been predated upon

11.118 Area 2 is smaller than Area 1 and was found to be generally less diverse than Area 1. This was in part due to the scrubbing over of areas which would have supported a more open habitat if the scrub was subject to management. Sample Area 2a is located 290m to the south of the Site along the eastern bank of North Dane Road. This area was chosen to provide a baseline as it was considered to be the best remaining example of open, relatively flower-rich habitat that would have been present along the North Dane Way adjacent to Area 2 before it became dominated by invading scrub. This area did produce a large percentage of the records for Area 2, showing the limited habitat available within the main Site due to its arable nature. It can also be used as an example for on-site mitigation, compensation and habitat restoration showing what improvements can be made to provide a significant habitat enhancements for terrestrial invertebrates.

11.119 During the visit of 5th April 2018 the western edge of field 2 held large nesting aggregations of several *Andrena* mining bees. The southern footpath across the field had a sizeable nesting aggregation of the mining bee *Lasioglossum malachurum* and similarly a vast number of the same species was recorded along the northern footpath through this field. Research has shown that this species does not overwinter in the same location as their spring/summer nest. The fact that the footpaths are ploughed out each year and then rapidly re-established by walkers keeps the habitat suitable for nesting by this species.

11.120 Assessing the proportions of species with conservation statuses poses some difficulties as there are several systems running in parallel at present. These are explained in Appendix 2. The ratings under old and new systems (not all groups have any rating) are shown in Appendix 1. These two sets are not mutually exclusive, nor are they directly comparable.

11.121 Amongst the old Conservation Status list are a number which will no longer be considered to qualify for a strong threat status, nor a distributional one. Chief amongst these are a number of bee, wasp and ant species. A review of the statuses of this group is pending. Of the 617 species recorded, the following were of old conversation status:

- 12 Red Data Book species,
- 11 Nationally Scarce species;
- Eight Nationally Scarce a species;
- 32 Nationally Scarce b species; and



- Two UK Biodiversity Action Plan Priority Species (UK BAP).

11.122 There is one Section 41 species, the Cinnabar Moth *Tyria jacobae*, which feeds on Ragwort *Senecio jacobae*. This moth is not threatened but is included in section 41 to highlight the importance to a wide range of invertebrates of some plant species often considered to be 'weeds'.

11.123 The presence of 10 RDB3 and 32 Nationally Scarce species, focused at the western fringe of the Site which will be retained, is of significance due to their rarity and the presence of these species in their own right is of County Importance.

11.124 This along with the presence of the two UK BAP Priority Species, the Looper moth *Scotopteryx chenopodiata* and cut-worm moth *Acronicta rumicis* and the incidental record of stag beetle, the overall assemblage of species within the western edge of the Site, comprising a small proportion of the larger arable field, is considered to be of County Importance.

## **Reptiles**

11.125 A series of seven reptile presence/likely absence surveys have been undertaken in 2018. A total of 175 heat traps were placed throughout the Site in areas considered suitable for reptiles, 70 in Field 1, 53 in Field 2 and 52 in Field 3. Heat traps were set around the suitable reptile habitat within the field margins as well as within suitable areas of tussocky grassland and scrub on the western boundary of Field 2 and between Field 2 and 3. The vast majority of the Site is arable land that is not suitable for use by reptiles. Full survey information is within **Appendix 11.8**.

11.126 Three reptile species were recorded across the Site including slow worm, common lizard and grass snake. If all survey areas across the entire Site were considered as one continuous matrix of reptile habitat the peak count for slow worm is 15, for grass snake is one and for common lizard is 3.

11.127 However, due to the extent of the unsuitable arable habitats for reptiles it is considered that the populations across the Site are discrete particularly when considering the home-ranges of slow worm and common lizard. A 'low' population of slow worm was recorded within the scrub and field margins between Field 2 and 3, whilst a 'Good' slow worm population was found on the banks of Shawstead Road. An 'Exceptional' slow worm population was found on the western boundary of Field 2. A 'low' population of common lizards were recorded within the western





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boundary of Field 2 and the scrub and margins between Fields 2 and 3 and a 'low' population grass snake were recorded across the entire Site.

11.128 The entire Site therefore scores five points under the criteria and this along with three reptile species qualifies as a Key Reptile Site. However, when split down to the three separate habitat areas only the western boundary of Field 2 and the habitats between Field 2 and 3 had three reptile species recorded, the area consisting of either side of Shawstead road to the south only scored two points with a good population of slow worms recorded.

11.129 The suitable habitats at the Site's boundaries have mixed levels of connectivity to further suitable habitat within the wider landscape. The eastern boundary of Field 2 and southern boundary of Field 3 are adjacent to the Capstone Country Park where there are multiple large areas of tussocky grassland and scrub. However, the western boundaries of the Fields 1 and 2 are bordered by North Dane Way road and residential development and these habitats are likely to be a major barrier to any reptiles moving between on and off-site suitable habitat along this boundary. No reptiles were recorded in the margins adjacent to the two blocks of ancient woodland which provides optimal habitat for resting, foraging and hibernating slow worm. Therefore, slow worm could be favouring habitat further into the woodland as opposed to the boundary within the Site.

11.130 However, the most significant factor in whether reptiles are present within the Site appear to be the size of the field margins. The margins in areas that reptiles have been found present are between 2 to 5m wide or contain large areas of grassland leading into scrub, the margins where reptiles are absence are all narrow and around 0.5m wide with crops planted right up to the field edges.

11.131 To estimate the size of the slow worm and common lizard population which may be present, the proportion of the total population recorded during a standard presence/likely absence survey may be suggested to be in the region of 10%. On this Site, this would equate to approximately 120 slow worm and 20 common lizard within the western boundary of Field 2, 50 slow worm and 10 common lizard between Fields 2 and 3, 40 slow worm on the southern boundary of Field 2 and 20 slow worm on the eastern boundary of Field 1.

11.132 The above proportional method is not considered accurate for estimating grass snake population size as densities are limited by available resources and typical individual home ranges: grass snakes tend to live at densities of <5 per ha and the home range of grass snake has been recorded at up to 33ha (Beebee and Griffiths, 2000). The peak count of one adult



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snake in Field 3 and one snake in the western boundary of Field 2, 11 juvenile snakes were also recorded in the area between Field 2 and 3. The species is therefore breeding within or close to the Site and using the fields' marginal habitats.

11.133 The 'Low' populations of slow worm, common lizard and grass snake as well as a single 'good' population of slow worms within the banks of Shawstead Road and a single area of 'Exceptional' population on the western boundary of Field 2 are considered to be of Local Importance.

### **Amphibian Assemblage**

11.134 Within a 500m radius of the Site there is a single waterbody located 60m to the south of Field 3. Pond P1 received a low HSI score indicating 'Poor' suitability; this lake is highly unlikely to support great crested newt (GCN) due to the presence of a large stocked fish and fowl population which would predate on newts and their eggs. The wider area lacks the pond network to support amphibian Metapopulations with no further ponds located within 1km of this pond or the Site. This waterbody is understood to be artificial in nature and was constructed in 1984 when the country park was established, it was constructed as an amenity space and for fishing being stocked with large number of fish. Due to the isolated nature of this waterbody and the detrimental factors to use by amphibian species and the desk study records showing limited use of the wider area by amphibians species, it is unlikely that this pond would be used by great crested newts and no further surveys were completed.

## **IDENTIFICATION AND EVALUATION OF KEY EFFECTS**

### Sensitive Receptors

11.135 The sensitive receptors listed in Table 11.5 below have the potential to be affected by effects arising from the Proposed Development. The assessment in this Chapter has considered the effects listed in the table upon the identified sensitive receptors.



**Table 11.5 - Potentially affected sensitive receptors**

<b>Receptor</b>	<b>Importance/sensitivity/vulnerability to change</b>
Medway Estuary and Marshes Ramsar Site, Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI)	National
Darland Banks LNR	County
Botanical communities	Neighbourhood
Dormouse	Local
Bats	Neighbourhood
Badgers	Neighbourhood
Wintering Birds	Neighbourhood
Breeding Birds	Local
Invertebrates	Local
Reptiles	Local
Amphibians	Negligible

Future baseline

11.136 In the absence of the Proposed Development, the Site will remain in its current use as under active management as arable land for crop production.

### **Predicted Effects**

#### **Site Clearance and Construction Effects**

##### Designated Sites

11.137 The nearest SSSI, Purple Hill SSSI is located approximately 2.9km to the south-east. The Proposed Development is a 'residential development of up to 800 units. The standing advice for developments of this nature that fall within the IRZ of Purple Hill SSSI is for the Local Planning Authority to consult Natural England. Natural England will then provide advice on how impacts might be avoided or mitigated. The SSSI is designated for its calcareous grassland, scrub and woodland, which would be susceptible to a reduction in air quality and airborne pollutants. However, with standard measures for pollution control implemented during the



construction period and the distance of the Site from the SSSI, it is considered that there will be no indirect effect on the SSSI during the construction phase.

11.138 Darland Banks LNR is located 180m to the north of the Site. This Site would be susceptible to a reduction in air quality and airborne pollutants. However, with standard measures for pollution control implemented during the construction period and the distance of the Site from the LNR, it is considered that there will be no direct or indirect effect on the LNR during the construction phase.

#### Habitats

11.139 The proposals are for the built environment of the development c.28ha of the Site for housing with the associated roads, paths and other area of hardstanding. The remaining 22ha becoming either green open space, retained and enhanced habitat or SuDs. However, the majority of this will be within the confines of the arable field areas, impacts to the field's margins and areas of botanical interest are limited to the permanent loss of the following areas:

- 0.14ha of the wooded eastern boundary of Field 3 lost to the access road off Capstone Road;
- 0.1ha of the scrub/grassland habitat between Field 2 and 3 lost to the access road between the two areas;
- 0.14ha of the western edge of Field 2 lost to the access off the existing roundabout at North Dane Road;
- 0.13ha of habitat on the western boundary of Field 1 to connect to North Dane Road; and
- The majority of Shawstead Road including the bank habitats either side will be lost with the realigning of the road further north to enable the access road to join the roundabout at North Dane Road. This amounts to 0.81ha of habitat.

11.140 The two areas of Ancient Woodland adjacent to the Site, Whites Wood and North Dane Wood will both be retained and protected with a 15m wide planted buffer zone

11.141 Hedgerow H1 is considered to be 'Important' under the wildlife and landscape criteria of the Hedgerows Regulations, and it is also species rich and will be retained as part of the proposals.

11.142 The area of chalk grassland located on the western boundary of Field 2 will be retained and protected as part of the proposals, however the chalk grassland interspersed and



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associated with the scrub referred to above between Field 2 and 3 will be impacted with an access road here that will result in the loss of 0.1ha of this scrubby/chalk grassland habitat here.

11.143 From a botanical perspective small areas of chalk grassland which is a priority habitat of conservation within Kent as well as UK BAP vascular plant species man orchid are present in the area of scrub and grassland between Fields 2 and 3 and along North Dane Road associated with the new layout of Shawstead Road with the roundabout on North Danes Road. The effects from a botanical perspective are considered to be major adverse impact at Site level but overall significant at the Neighbourhood Level.

#### Dormice

11.144 The proposals will result in the permanent loss of dormouse habitat within the boundaries of the Site, these effects predominantly come from the creation of new vehicle access points into and within the Site. The areas to be lost include a 0.14ha of the eastern boundary of Field 3, 0.1ha of the scrub area between Field 2 and 3, 0.14ha of the western edge of Field 2 to connect the site to North Dane Road. A total of 0.13ha of habitat on the western boundary of Field 1 to connect the Site to North Dane Road, one area to north of Whites Wood and the second to the south. This will amount to approximately 0.51ha of dormouse habitat lost across the Site.

11.145 The permanent loss of the dormouse habitats which support breeding dormice without mitigation would be a permanent major adverse impact at Site level but overall significant at the Local Level.

#### Bats

11.146 The bat interest within the Site is limited with low diversity and numbers recorded. A single bat roost has been identified within Tree T1 to the north of Field 3, a single common pipistrelle bat was recorded roosting within this tree. A second tree was surveyed and no bats were recorded using it. These trees will be retained and protected as part of the proposals. The bat activity within the Site was confined to the vegetated Site boundaries with the arable fields within the centre used infrequently. These boundary features will be retained as landscape and ecology areas, however sections will be lost for the creation of new access roads. The scrubland in the central area between Field 2 and 3 of the Site was found to be an important foraging resource to bats during the transect surveys.



11.147 The effects during the construction phase are considered to be associated with the loss of foraging habitats, some fragmentation between retained habitats as the Site is cleared. Temporary construction lighting may also be required and this may have a negative impact on bats during the construction phase. The impacts are considered to be a minor adverse effect at Site level but overall significant at the Neighbourhood Level.

#### Badgers

11.148 There will be no direct effects to identified badger setts within or adjacent to the Site. No construction works will occur within 30m of any sett. Therefore, potential effects are related to the use of the wider Site by badgers for commuting and foraging. Without mitigation the impact would be a temporary minor adverse impact of Neighbourhood Significance.

#### Wintering Birds

11.149 The wider survey area is considered to be of negligible importance to the functionality of the nearby SPA, given the extent of these types of habitats in the surrounding area and the low numbers of estuarine birds recorded within the Site. The habitats within the Site are used by a total of two estuarine bird species (herring gull and black-headed gull) and a single bird of prey species (sparrowhawk) as such the proposals would have no direct effects to wintering birds. Without mitigation the effect would be a minor adverse effect of Neighbourhood Significance.

#### Breeding Birds

11.150 Habitat which was found to support a range of breeding bird species will be lost to the proposals. This includes habitat which support linnet, corn bunting and skylark. The Site is defined by two distinct habitats with the large arable crop fields being used by ground nesting species and the boundary features and field margins being used by a range of different species. The majority of the proposals are confined to the arable field areas, however there will also be loss of 1.32ha of scrub and boundary habitats where new access roads through the Site are proposed. This loss of habitat must be considered in the context of the overall site area, being c.50ha, the majority of which is in intensive arable use and of generally low value. It is relevant that the proposed development area comprises an area of 16.3 hectares within the total development site area of c.50 hectares, offering significant opportunities for habitat creation in place of the arable land, including the creation of chalk grassland. There will be a loss of habitat specifically for corn bunting (two territories) and skylark (up to 11 territories across the Site) due



to the loss of the open arable habitats. The UK population of corn bunting is c11,000 whilst for skylark it is 1,800,000. The permanent loss of breeding habitat for corn bunting and skylark would be a major adverse effect at Site level but overall significant at the Neighbourhood Level. The loss of habitats for other species and the potential risk to birds during vegetation clearance without mitigation would be considered to be a major adverse effect of Neighborhood Significance.

#### Terrestrial Invertebrates

11.151 The majority of the habitats to be lost to the proposals were not important for invertebrates. The centre of the arable fields were unimportant for invertebrates with the exception of the *Adrena* sp. nests found adjacent to the footpath through the field. The most important area for invertebrates to the west of the Site (Area 1a of Figure 11.2 (**Appendix 11.10**)) is to be retained however, without mitigation this area could become degraded. The area of scrub and grassland between fields 2 and 3 whilst being of interest for invertebrates does not support the same diversity of species as Area 1a. Some of this area (0.1ha) will be permanently lost to the proposals. 0.14ha of the western boundary of Field 2 will also be lost. Without mitigation the loss of these areas which have been found to be of high conservation value for its invertebrate assemblage is considered to be a major adverse effect at Site level but overall significant at the Country Level.

#### Reptiles

11.152 Effects to reptiles will occur in three main locations; the eastern margin of Field 3, the central area of scrub between Fields 2 and 3 and the fields margins either side and the banks of Shawstead Road between Fields 1 and 2. The eastern margin of Field 3 will result in the loss of approximately 0.14ha of reptile habitat. This area supports good population of slow worm and low population of common lizard and grass snake. The area of scrub and field margins between Field 2 and 3 will result in the loss of approximately 0.1ha of reptile habitat. This area supports good population of slow worm and low population of common lizard and grass snake. The banks of Shawstead Road between Field 1 and 2 will be completely lost to the proposals with approximately 0.81ha reptile habitat lost. This area supports good population of slow worm.

11.153 The loss of approximately 1.05ha of the reptile habitat with a good population of slow worm and a low population of common lizard and grass snake, without mitigation is considered to be a major adverse effect at Site level but overall significant at the Local Level.



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## Amphibians

11.154 No suitable ponds for great crested newts are located within 500m of the Site as such a Neutral effect is considered.

## **Completed Development and Operational Effects**

### Designated Sites

11.155 Medway Estuary SSSI and SPA, there is potential that increased recreational pressure could affect these wintering birds. Accordingly, prior to mitigation, effects are considered to be at the moderate adverse effect of National significance. A mechanism to mitigate this impact via a financial contribution for each new dwelling has been agreed with Medway Council and Natural England.

11.156 At Darland Banks LNR there is potential that increased recreational pressure could affect this Site. However, Capstone Park is in closer proximity to the Proposed Development and it is considered that this area will take a large proportion of the recreation pressure. Therefore, the effects without mitigation on Darland Banks would likely be a minor adverse effect of Local Significance.

11.157 All other statutory ecological designations are well-removed from the Site, and accordingly significant effects on any other statutory ecological designation as a result of the completed Development have been scoped out of this assessment.

### Habitats

11.158 Given that habitat losses will already have been sustained in the construction phase, effects on habitats during operation would be anticipated as degradation of natural features. New footpaths are to be provided throughout the Site, including within and adjacent to areas of proposed green space and ecology mitigation. Without mitigation these areas could suffer from degradation. The most significant effects would likely be those relating to the degradation of the adjacent ancient woodland blocks to the south of the Site as well as the area of retained chalk grassland habitat (area 1a) in the western edge of field 2. Also potentially affected would be areas assigned to be dedicated mitigation areas for protected species, through people entering the areas or through inappropriate management. Retained and newly created habitats are likely to be subject to human effects resulting from the Development, potentially including informal





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garden extensions, dumping of garden waste and damage to vegetation from recreational activities such as dog walking or vandalism. Without mitigation, habitats may also be affected by changes to the hydrological regime as a result of the creation of large areas of impermeable surfaces, increasing run-off and sediment input, and the potential risk of pollution from oil residues and sediments from vehicles, waste water from occupation of buildings within the Site, and potential use of household and garden chemicals. Such effects without mitigation would likely be a moderate adverse effect of Local Significance.

### Dormice

11.159 Dormice have been found to be present within all suitable woodland, scrub and hedgerow habitats across the Site. Effects from the completed development will relate as a result of human interference and degradation of habitat with an increase of cat predation, and long term fragmentation due to the new roads. No studies have been undertaken on the impact of lighting on dormice but given they are nocturnal it would be expected that increased lighting would have an adverse effect on dormice. There would also be indirect impacts through potential increase in cat predation in the adjacent Capstone Country Park which is also known to support dormice by bringing cats closer to the park. Without mitigation the operational effects would be a major adverse effect at Site level but overall significant at the Local Level.

### Bats

11.160 The bat interest within the Site is limited. Impacts from the completed development will relate to increased lighting within the Site and wider countryside. There are existing lighting impacts within the Site, with multiple street lights along the entire length of North Dane Road to the west of the Site and Capstone Road on the eastern boundary of the Site. There is also minor lighting spill from residential dwellings on the north boundary of the Site and the Capstone recycling centre on Shawstead Road. However, the majority of the Site including the areas of highest bat activity are dark with minimal lighting.

11.161 Without mitigation the lighting of the Site will extend over the wider countryside, the most significant areas of bat activity that will be affected are the two ancient woodland edges to the south of Site as well as the area of dense scrub and tree line boundary to the north-east of the Site and inappropriate lighting would result in habitat fragmentation. A tree with a confirmed common pipistrelle roost will be retained within the northern boundary of the Site and higher levels of lighting within the vicinity of this roost will cause a negative effect. The potential impacts



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on bats through the completed development without mitigation is a permanent minor adverse effect at Site level but overall significant at the Neighbourhood Level.

### Badgers

11.162 Potential operational effects on badger relate to permanent land-take and human interference effects. No identified setts will be lost as part of the Development and no development is proposed within 30m of any known sett. Only a single outlier sett was recorded within the vicinity of the Site, and low levels of activity were recorded within the Site boundaries. However large areas of current open land will be lost across the Site, the majority being arable fields and smaller areas of boundary habitat where access links are created. The loss of these areas would potentially result in the loss of foraging habitat utilised by badger albeit that no significant activity was recorded across the Site. Areas of habitat will be retained across the Site within greenspace areas and ecological mitigation areas will continue to provide a foraging resource to the local Badger population.

11.163 There is also potential for increased human disturbance of badgers, although it is not considered that this would be significant, since badgers have proved capable of colonising even in areas of urban development. However, there is some potential for new residents walking dogs off the lead within the areas of open space provided, thereby potentially increasing the disturbance of badgers within the Site and the on-site outlier sett.

11.164 Without mitigation there is potential for increased mortality within the local badger population through increased road traffic within and in the immediate vicinity of the Site. The potential impacts on badgers through the completed development without mitigation is minor adverse effect at Site level but overall significant at the Neighbourhood Level.

### Wintering Birds

11.165 The retained habitats and landscaped areas of open space have been designed to support wintering bird species. Without mitigation the potential effects on birds can be from increased human activity such as dog walking disturbing foraging birds, increased cat predation and increased risk of road casualties. Some bird species may also be affected by light spill from roads and areas of built development. Noise impacts have also been considered, the Site is already subject to some minor noise disturbance from the use as arable land and the adjacent North Dane Way. The potential impacts on birds through the completed development without mitigation is minor adverse effect at Site level but overall significant at the Neighbourhood Level



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### Breeding Birds

11.166 Within the design of the Proposed Development habitats and landscaped areas of open space have been designed to support species of conservation concern which were recorded during the surveys such as linnet and corn bunting. Potential adverse effects will remain on birds through disturbance from increased human recreational activities in the areas. Increased human activity including dog walking has been recorded as reducing the breeding success of birds (**Ref 11.22**). Without mitigation effects on birds can be as a result of cat predation and increased risk of road traffic accidents. Some bird species may also be affected by light spill from roads and areas of built development. Noise impacts have also been considered, the Site is already subject to some minor noise disturbance from the use as arable land and the adjacent North Dane Way. The potential impacts on birds through the completed development without mitigation is minor adverse effect at Site level but overall significant at the Local Level.

### Terrestrial invertebrates

11.167 Potential operational effects on terrestrial invertebrates relate to habitat degradation through mismanagement of the area of retained chalk grassland and increased use through dog walking resulting in nutrient enrichment. Invertebrates are also particularly sensitive to changes in light levels, which can affect circadian rhythms and subsequently mating and feeding behaviour. Without mitigation, roads, footpaths and buildings will result in light spill into adjacent habitats utilised by invertebrate species including the boundary habitats. The completed development without mitigation on the invertebrate assemblage is considered to be a major adverse effect at Site level but overall significant at the County Level.

### Reptiles

11.168 Potential effects of the operation on reptiles relate to permanent loss of habitat and the effects of human interference such as cat predation, disturbance from dog walking and human interactions with refuge and retained areas. Without mitigation this is considered to have a major adverse effect at Site level but overall significant at the Local Level.

### Amphibians

11.169 No operational effects to amphibians are predicted.



## ASSESSMENT OF CUMULATIVE EFFECTS

11.170 An assessment of the effects of the Proposed Development with other schemes that are operational / constructed, consented or for which planning permissions are currently being sought. There are considered to be few cumulative effects on the ecological interest within or immediately adjacent to the Site. There are three proposed schemes within the local area of the Site which have been considered in relation to cumulative effects, these are outlined in Table 11.6 below:

**Table 11.6 East Hill Cumulative Schemes**

Site Name	Application No.	Distance from the Site	Location	Description
Land East of Gleamingwood Drive Lordswood Kent	15/503359/OUT	800m	578003, 162014 (1)	Residential development (approx 89 dwellings) plus open space, biomass plant and access road (plus emergency access)
Gibraltar Farm Ham Lane Hempstead Gillingham Medway ME7 3JJ	N/A	120m	578080, 163060 (2)	The erection of up to 450 market and affordable dwellings, provision of access and estate roads and incidental open space
Land At Brickfield Darland Farm Pear Tree Lane Hempstead Gillingham ME7 3PP	MC/16/2776	30m	578213, 165607 (3)	Residential development of up to 44 dwellings with associated garaging, access, landscaping and open space

11.171 The proposed developments that could result in cumulative impacts are limited due to the distance from the Site and lack of shared habitats as such no direct impacts are predicted.

## ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

11.172 In ecological assessment, mitigation includes, “any deliberate action taken to alleviate adverse effects” and can take several forms including:

- Reduction/Minimisation;
- Amelioration; and
- Relocation/Translocation.



11.173 In addition, avoidance measures are those taken to avoid adverse effects (for example, redesign/relocation of the development layout and timing of works). Compensation can also be provided where mitigation is unsuitable. Compensatory measures are those that would redress but not remove residual harm within the Site. These are often off site and consist of habitat re-creation or restoration / management, to compensate for that habitat being lost.

11.174 Some consideration of mitigation is given above due to the design of the Proposed Development in minimising environmental impacts. Mitigation measures considered appropriate to reduce any identified adverse effects are set out below. Provisions for nature conservation are becoming integral to designs of new developments, as described in publications such as 'Developing Naturally' (Oxford, 2000) (**Ref. 11.5**) and Planning for Biodiversity (Royal Town and Planning Institute 1999) (**Ref 11.23**), for example, maintaining green corridors through developments to maintain links between habitats and populations of species and to avoid fragmentation. These have been taken into consideration in the Demolition and Construction Effects and Completed Development Effects section above but are considered as mitigation and are also referred to below. The enhancement and creation of wildlife corridors and other green infrastructure has strongly influenced the evolution of the design of the submitted layout.

11.175 Avoidance measures, although not strictly mitigation measures, are also identified where relevant. In addition, where benefits have been incorporated into the design these have been identified.

### **Site wide mitigation**

11.176 A large part of the proposed mitigations are formed through the areas of open space / green space which have been designed to retain connectivity through the Site for wildlife as well as protect and enhance existing ecological features of importance and to provide mitigation for specific species during both the construction and the completed development. The designs of these areas will be provided within the Landscape and Ecological Mitigation and Management Plan (LEMP) during the detailed design stage.

### **Mitigation from Construction Effects**

11.177 A Construction and Environmental Management Plan (CEMP) will be drafted prior to construction which will provide the details of the prevention measures to effects identified such as including dust deposition, damage to vegetation, and degradation of the existing habitats and



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any remediation requirements for the Site of any potential contamination to remove the risk of potential pollution to the retained habitats and areas of ecological interest. These will include:

- Tree protection fencing will be erected along retained hedgerows and around trees in accordance with BS5837:2012;
- Materials and vehicles will be stored away from the retained and created habitats to ensure that unwanted materials or chemicals do not contaminate these areas;
- Potential sources of dust will be dampened down;
- Engineering safeguards will be implemented as part of construction works to control surface water run-off and avoid contamination of the water table, and could include measures such as the use of a temporary silt trap in order to form an intercept for silt and other potential pollutants; and
- Adherence to EA Pollution Prevention Guidelines.
- Specifically designed fencing to protect the retained areas of chalk grassland to prevent dust, soils and materials from degrading the areas.

#### Habitats

11.178 Habitats within the Site where UK BAP vascular plant species man orchid have been recorded will be lost to the proposals. Mitigation will include the translocation of these orchids into the dedicated landscaping and ecology zones.

#### Dormouse

11.179 Construction effects have been identified in relation to dormice and having given due regard to the relevant legislative protection afforded to dormice, and having reviewed appropriate statutory guidance material, it is considered that a licensed approach (utilising a European Protected Species licence from Natural England) is necessary which will provide the highest legislative safeguard for the proposed activities at the Site. A discussion of relevant legislative matters ('Article 16 tests') is provided at the end of this Chapter under the heading Habitats Directive.

11.180 As part of this licence, in order to maintain the favourable conservation status of dormice within the local area and ensure that individual dormice are not injured or killed, a suite of mitigation measures will be put in place by the Developer to ensure that dormice are safeguarded during the construction period. The provision of suitable compensation and long-



term viability of dormice is discussed under the completed Development. The mitigation during the construction period is discussed below:

11.181 The level of mitigation will follow recommendations set out in English Nature's Dormouse Conservation Handbook (2006) and would likely include supervised vegetation clearance using hand tools which will likely be undertaken in winter. Details of timings are set out below.

11.182 The small areas of landscaping at the perimeter of the Site, which will be lost to provide access roads, comprises an area of 1.5 hectares. In general, the existing tree and scrub boundary planting will be maintained. Where scrub and trees will need to be removed, they would be cleared using hand tools under the supervision of the ecologist holding the licence and/or their accredited agents. Natural England tend to prefer that vegetation clearance where dormice are present is undertaken in late winter and then the area left until spring to allow animals to move from where they are hibernating on their own accord once they are awake. Where relatively small areas of vegetation are to be removed this may also be permitted in September/October prior to the hibernation period but post breeding. The vegetation would be cut down and any animals found will be relocated to a nest box in a suitable area of the existing retained boundaries nearby. Any clearance works would be designed to clear vegetation back towards retained habitats. Loose material such as leaves would be carefully swept or raked to check for any ground nests.

11.183 Additional nest tubes and boxes will be installed within the retained habitats to provide nesting places for displaced animals. Any dormice found on the ground or in any of the tubes before clearance would be relocated into a suitable retained habitat area nearest to the cleared habitat, placed away from potential wet areas or possible predators in a wooden dormouse nest box.

### Bats

11.184 No trees identified to provide potential bat roosting opportunities are to be felled under the proposals, and no further safeguards are required during the construction phase apart from those specified in respect of provision of suitable tree protection fencing, as above.

11.185 Potential for bats to be disturbed by temporary construction lighting has also been identified as a potential adverse effect of construction. To mitigate such effects on bats, temporary lighting will be minimised wherever possible. Where required for health and safety, security or other reasons, it will be positioned so as to minimise light spill on to features identified



as being of value to bats, such as the boundary features, hedgerows, ancient woodland, trees located within the Site as well as the tree T1 that has a confirmed common pipistrelle bat roost. Restrictions on working hours will mean that artificial lighting is unlikely to be utilised extensively and only in winter months when bats are less active.

11.186 Nonetheless, in order to reduce the impacts of lighting during the site preparation, earthworks and construction phases on sensitive receptors, the following best practice measures as recommended by the Institute of Lighting Professionals (ILP) and Bat Conservation Trust (BCT). 2018. Guidance Note 8: Bats and Artificial Lighting. **(Ref 11.25)**. Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following should be considered when choosing luminaires.

- All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used.
- LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (ideally <2700Kelvin) should be adopted to reduce blue light component.
- Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats (Stone, 2012).
- Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill.
- The use of specialist bollard or low-level downward directional luminaires to retain darkness above can be considered. However, this often comes at a cost of unacceptable glare, poor illumination efficiency, a high upward light component and poor facial recognition, and their use should only be as directed by the lighting professional.
- Column heights should be carefully considered to minimise light spill.
- Only luminaires with an upward light ratio of 0% and with good optical control should be used – See ILP Guidance for the Reduction of Obtrusive Light.
- Luminaires should always be mounted on the horizontal, i.e. no upward tilt.
- Any external security lighting should be set on motion-sensors and short (1 minute) timers.
- As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.





11.187 Disturbance from noise would be minimised by the adoption of good working practices, while similarly any working after dark would be minimal.

### Badgers

11.188 No active Badger setts are currently present within 30m of the construction zone, such that no setts will be disturbed during construction works. However, since there is a possibility that commuting and foraging badgers may enter the construction areas, a range of general construction site safeguards for Badger will be followed during the construction process including:

- All contractors will be briefed as to the presence of Badgers within the Site, with particular reference to the implications of legislation and licensing;
- Any trenches or deep pits within the Site that are to be left open overnight will be provided with a means of escape should a Badger (or other mammal) enter. This could simply be in the form of a roughened plank of wood placed in the trench as a ramp to the surface. This is particularly important if the trench fills with water;
- Any trenches/pits will be inspected each morning to ensure no Badgers have become trapped overnight. Should a Badger become trapped in a trench it will likely attempt to dig itself into the side of the trench, forming a temporary sett. Should a trapped Badger be encountered a suitably qualified ecologist will be contacted immediately for further advice;
- The storage of topsoil or other 'soft' building materials in the Site will be given careful consideration. Badgers will readily adopt such mounds as setts. So as to avoid the adoption of any mounds, these will be kept to a minimum and any essential mounds subject to daily inspections (or nightly patrols if 24 hour security is present at the Site) with consideration given to temporarily fencing any such mounds to exclude Badgers;
- The storage of any chemicals at the Site will be contained in such a way that they cannot be accessed or knocked over by any roaming Badgers / other mammals;
- Fires will only be lit in secure compounds away from areas of Badger activity and not allowed to remain lit during the night; and
- Food and litter will not be left within the working area overnight.



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### Wintering Birds

11.189 Wintering bird species recorded using the Site were negligible and as such no construction effects mitigation is required.

### Breeding Birds

11.190 The potential loss of active nests during the construction phase (e.g. nesting birds within vegetation to be removed) will be mitigated by undertaking clearance of potential bird nesting habitat outside the breeding season of March to July. Special attention will be given to the protected ground nesting species identified corn bunting and skylark that use the arable wheat crops within the centre of the Site. If this is not possible then any clearance within the breeding season would need to be supervised by an ecologist. In the event that an active nest is found, works would have to cease until the chicks have fledged.

### Terrestrial Invertebrates

11.191 Good working practices (in line with the CEMP) to minimise dust production, manage drainage, limit temporary lighting and protect retained vegetation will reduce any effects, which may occur on invertebrates.

### Reptiles

11.192 The majority of the Site's reptile habitat will be retained, however where habitat will be lost, a reptile relocation exercise will be required to move reptiles out of the development footprint into retained receptor areas will be required to ensure that no reptiles are killed or injured during the construction works.

11.193 The retained habitat within the western boundary of Field 2 (Receptor R1) will be significantly enhanced and increased in size and would be able to support translocation reptiles from across the Site, this area would be increased from 0.01ha to 0.46ha in size. The 0.01ha of existing habitat contains a good population of slow worms and low populations of grass snake and common lizard, this area would be the receptor for the good population of slow worms from the banks of Shawstead Road that will be lost. These habitats will have to be created in advance prior to any translocation. The habitats created would be sufficiently diverse to support slow worm, common lizard and grass snake.



11.194 The retained habitat of the field margins to the eastern boundary of Field 2 will create a second receptor (Receptor R2). This habitat will be significantly enhanced and increased in size and would be able to support translocation reptiles from across the Site, this area would be 1.6ha in size and already contains a low population of slow worms and low populations of grass snake and common lizard, this area would be the receptor for loss of reptile habitat within the area for the new access road to the Capstone Road to the east and the internal road through the centre of the scrub.

11.195 The habitat creation and enhancements will be set out in a detailed Landscape and Ecological Mitigation and Monitoring Plan (LEMMP) but will be designed specifically to create habitats suitable for both common lizard and slow worm. Common lizard often survive in loose colonies arranged along features such as road embankments, or within large areas of suitable habitats, for example, on sunny banks or hillsides. The habitat creation will be designed to provide undisturbed ground that is topographically diverse with fairly dense but short vegetation less than 0.5 metres high, open to the sun and with at least a few exposed areas or promontories that could be used for basking (Beebee & Griffiths, 2000) **(Ref 11.24)**.

11.196 The habitat creation for slow worms, will be designed to create a thick vegetation cover, combined with sunny areas to allow basking.

### **Mitigation from Completed Development Effects**

#### Designated Sites

11.197 An Appropriate Assessment (AA) will be undertaken for the Medway Estuary and Marshes Ramsar Site, Special Protection Area (SPA) Site of Special Scientific Interest (SSSI) that is located 3.3km north of the nearest Site edge by Medway Council as part of the application process. This AA will assess in detail the impacts and mitigation required for any predicted increase in visitor numbers to the designated site. An agreed financial contribution calculated per dwelling has been agreed by Medway Council and Natural England, which the applicant has agreed to meet.

11.198 The Habitats Regulation Assessment for the Local Plan also identifies the potential for increased cat predation to affect Darland Banks LNR as a result of the Proposed Development. At its closest point, the footprint of the Proposed Development will be located approximately 185m from the designation, the maximum distance is (400m) that most cats will typically travel. There are a number of busy roads separating the Site from Darland Banks. In addition,



extensive areas of open space will be provided within the Site. These areas of open space not only put distance between proposed dwellings and the designation, they also, being semi-natural in nature, provide an area for domestic cats from the householders of the Proposed Development (in part) to range. It is therefore considered that such a design is sympathetic to the concerns of cat predation on Darland Bank LNR. Darland Banks LNR due to its proximity to the Site may be affected by factors such as increased recreational pressures. To mitigate for potential increased recreational pressure on ecological designations, the Development will provide extensive areas of semi-natural open space across the Site, including areas suitable for dog walking and amenity use and so will reduce potential effects of increased recreational pressure on Darland Banks LNR and other designations.

### Habitats

11.199 Under the completed Development, the most significant habitats of ecological value will be retained, with the majority of the boundary features and field margins retained, protected and enhanced, the low quality arable field centres will be mainly lost to the development. However where new access roads are to be created to link the Proposed Development to the wider road network and internally, areas of high quality habitat will be lost. These areas represent a small proportion of the total site area and where possible the layout design has retained the existing natural framework that exists. The loss of these smaller areas of habitat to allow the roads to link across the Site will be compensated by new planting under the Development.

11.200 A long term management plan (LEMMP) will be prepared during the detailed design stage to ensure the appropriate management for the newly created habitats and the retained habitats. This will be prepared during the detailed design stage. The long term management plan will include a specific cutting regime for the areas of chalk grassland with the removal of the arisings to keep areas of bare ground available for nesting invertebrates and a good supply of flowering plants within the grassland. The grass cutting will be on a three year rotational cycle of cutting to ensure that there is a diversity of ages of plants within the grassland to ensure flowering, seed head availability and short grass for the different stages of invertebrate growth to be provided for. The retained ancient woodland 'Whites Wood' in the western section of Field 1 of the Site will also be included within the long-term management and enhancements as well as all other new and retained habitats across the Site.



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## Dormouse

11.201 Fragmentation of dormouse habitat within the Site will be mitigated for by the installation of dormouse bridges across roads that divide dormouse habitat. The 'Animex wildlife bridge' from Animexfencing.com has recently been accepted by the Highways Agency for use and would be an effective method to retain connectivity for dormouse and other small mammals across roads within the Site. Because of the connected green infrastructure framework that is proposed within the Proposed Development and the retention within the layout of the majority of existing natural landscaping, these bridges will only be required in 4 locations within this c. 50 hectare site. The key areas that these bridges will be required is on the eastern side of Field 1 (B1a and B1b), the scrub area between Fields 2 and 3 (B2), the western boundary to Field 2 (B3) and the western boundaries of Field 1 (B4 and B5) see Figure 11.5 (**Appendix 11.10**) for reference. An additional bridge (B6) will be provided to create a link between a long-standing gap near the recycling centre on Shawstead Road which doesn't exist at present.

11.202 Dormouse within the Site can be affected by artificial lighting and a lighting strategy will need to be designed with input from the project ecologist. The general measures set out for bats below follow current best practice guidance will also be taken into consideration in the preparation of the later reserved matters planning application.

## Bats

11.203 As with dormouse a sensitive lighting strategy will need to be designed with input from the project ecologist but the following general measures have been provided and these follow current best practice guidance (ILP and BCT, 2018) (**Ref 11.25**).

- Do not provide excessive lighting. Use only the minimum amount of light needed for safety.
- Do not directly illuminate bat roosts, such as any potential bat roosts in T1 – T6, T9 and T12.
- Avoid using reflective surfaces under lights.
- Minimise the spread of light, particularly along woodland edge habitats and grassland edge habitats. The spread of light should be kept near to or below the horizontal. Flat cut-off lanterns are best.
- Minimise light spill along the boundaries of the Site, particularly the south-western boundary.
- Eliminate any bare bulbs and upward pointing lighting.



- Carefully consider the mounting height of luminaries and use a lighting professional to ensure that glare and light spill is minimised.
- Use temporary close-boarded fencing until planted vegetation matures, such as any new planting that is incorporated into the landscaping design, along the landscape bunds within the Site and along the boundaries of the Site.

**Technical specifications:**

- Use narrow spectrum bulbs to lower the range of species affected by lighting. Use light sources that emit minimal ultra-violet light and avoid the white and blue wavelengths of the light spectrum to avoid attracting lots of insects. Lighting regimes that attract lots of insects result in a reduction of insects in other areas like parks and gardens that bats may be using for foraging.
- Lights should peak higher than 550nm or use glass lantern covers to filter UV light. White LED lights do not emit UV but have still been shown to disturb slow-flying bat species.

11.204 New roosting opportunities will be provided to enable an overall net increase in available roosting habitat at the Site. This will include the provision of at least 20 bat boxes, tiles and/or roosting units on new residential buildings / garages and erection of at least 30 bat boxes on trees throughout the Site. These will be located in proximity to retained boundary features, woodland and hedgerows to maximise likelihood of discovery and occupation by bats.

11.205 In addition to the location and orientation of buildings, the proposed landscape treatment and the retention and enhancement of the existing vegetation within the Site will further act as secondary mitigation to screen and soften the effects of installed artificial light sources. Where necessary, further shrub and tree planting will be provided to create screening against lighting from roads, residential areas and floodlighting.

11.206 The removal of the land from an intensive arable regime along with habitat creation and enhancement measures outlined above will be likely to provide substantial benefits to foraging and commuting bats. Notably, provision of new scrub, woodland, swales, SuDs and attenuation basins, the majority of which will be outside areas of significant light spill and adjacent to the retained boundary habitat will provide an overall net gain in foraging habitat of elevated value for bats. Similarly, new native tree and hedgerow planting, together with tree and shrub planting within the Development, should also provide additional foraging opportunities.



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## Badgers

11.207 Loss of badger foraging habitat will result in a loss of opportunities for this species, while an increase in traffic collision mortality may also occur as a result of the Proposed Development, however the retention of suitable foraging habitat away from the residential development and low speeds of traffic make this unlikely.

11.208 Implementation of enhancement measures as set out above for Habitats over the entire Site, will act to ensure that new and improved opportunities are provided for Badger under the completed Development. In particular, Badger is likely to benefit from the proposed creation of new foraging resources including new fruit bearing native planting, whilst the removal of intensive arable management from the Site will increase the quantity of invertebrates within the soil.

11.209 In order to mitigate for any potential effects of dogs disturbing the on-site outlier sett as well as potential badger activity within the boundaries of the Site and ancient woodland areas, a wooden post and wire fence will be created along this sensitive areas that will prevent both human and animal entry. This will deter dogs from exploring the habitats in the vicinity of the badger activity, whilst badgers will simply push under the fence where needed and therefore their movement will not be restricted.

## Breeding birds

11.210 The key species within the Site are the ground nesting species recorded, corn bunting and skylark as well as species that depend on seed crops such as linnets. It is not possible to recreate habitat suitable for 11 pairs of skylark within the Site given the large area of land that would be required. Mitigation has therefore concentrated on retaining suitable habitat for these species and enhancing areas of the Site with seed crops such as millet to ensure the survival of the finch species (linnet et al) and creating habitat for other bird species through planting. An area of open grassland habitat within the centre of Field 1 (R3) along with some patches of seed rich wild bird cover will be managed for the benefit of ground nesting birds but this will only be large enough to support singleton pairs of skylark, however, management of this area will be suitable for the species. The management for the benefit for breeding birds is set out below:

11.211 Skylarks can nest in grassland fields with unimproved grasslands managed without inputs often holding high densities of skylarks. These nests would only be successful if the field



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is not cut or grazed between early April and the end of May. Subsequent cuts must be at least seven weeks apart to enable success for later nests.

11.212 These farmland birds require suitable foraging habitat close to the nest areas and they are dependent on the availability of seed between April and August from species of plant such as fumitory, knotgrass, chickweed, oilseed rape and cereal grains where they feed in weedy areas where the vegetation is short and sparse. Lack of seed food is considered the major factor in limiting the breeding success of certain bird species.

11.213 Mitigation for this species will require parts of the areas of open space being kept disturbed to encourage the diversity of seed plants. For corn bunting and linnet this will involve an arable fodder crop or creation of small plots of wild bird cover to provide a seed-rich habitat in grassland areas. This will also be beneficial to other species of conservation concern such as linnet. The locations of these areas will be determined during the detailed design stage and incorporated into the LEMMP. Margins will be fenced off of up to six metres around grassland and left unfertilised, uncut and ungrazed and cut in September every two to three years.

11.214 Areas of dense scrub are of importance for species such as dunnock, blackcap and whitethroat. A management plan to maintain the functionality of the ancient woodlands and retained hedgerows and scrub for birds, would be provided within the LEMMP.

11.215 The habitat creation and enhancement measures outlined above will provide habitats for a range of bird species. In addition, it is proposed that nesting opportunities are created through the provision of nest boxes across the Site. This will include features such as sparrow terraces located towards the northern and eastern boundaries' where this species was recorded and Swift cups/bricks on at least 10 of the new residential buildings and at least 20 nest boxes erected on mature trees located within Whites Wood as well as the mature trees within the Site boundaries, these will be a mix of designs to provide a range of suitable nesting features. Such benefits will help offset any population losses as a result of increased cat predation or increased risk of traffic accidents. Mitigation outlined above in relation to bats and dormouse and lighting will also reduce adverse effects on roosting birds as a result of light spill.

#### Terrestrial Invertebrates

11.216 The habitat creation and enhancement measures outlined above will provide new opportunities for invertebrate species, particularly through the extension of the existing chalk grassland habitat to the west of the Site, the management of the scrub/chalk grassland habitat





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between fields 2 and 3, the provision of dry attenuation basins, creation of new areas of chalk wildflower and meadow grassland, new hedgerow, scrub and woodland planting, which will form a valuable habitat for a range of invertebrate species.

11.217 With the species identified using the Site, a key area of habitat creation would be to create grassland along the road sides using native grassland species. These would ideally have a south-facing aspect, but south-east and south west are also valuable. Such grasslands should be developed on the local sub-soil which has a low nutrient status, not by 'top soiling'. Grasses will outcompete the native herbaceous species if sown on rich soils. These spaces may be initiated by direct sowing of suitable herbaceous seed, using a low-vigour grass seed mix such as Emorsgate's EG1 mix as a grassland base mixture. Alternatively, where a slow rate of cover is acceptable, a green hay cut taken from the verge of the northern section of North Dane Way would provide a local seed source, or alternatively leave the exposed chalk based sub-soil to colonise naturally. In all mitigation areas absolutely no ex-arable soil can be used and a suitable early (year 1-2) mowing regime (at least twice and up to 4 mows a year if annual weed growth is severe) will be essential to control arable weed species.

11.218 Such a regime will not provide niches for those annual and biannual species such as Black Horehound and the Mustards which are important for a number of the invertebrate species recorded. These need a regime of occasional, rotational cultivation (2-3 year rotation).

11.219 Shrub and tree planting will be at lower level than is normal practice in many landscaping schemes, with shrubs being prioritised over trees and these areas of planting specific to dormouse mitigation. Native species will be used throughout. The planting of dogwood *Cornus sanguine* will be avoided as it is extremely invasive of grassland

11.220 The existing chalk grassland in the west of field 2 would be brought into more positive management. The physical removal of a large proportion of the existing Dogwood on the northern section of North Dane Way would be an important mitigation procedure in this area. There is no single management treatment which can provide all the requirements for the maintenance of a diverse invertebrate community, instead the aim is for a variety of conflicting treatments (drivers) applied over sections of a site. Applying these drivers over the same sections year on year is itself a limiting approach as each treatment area slowly diverges away from the rest. The aim will be to create a situation where different treatment types are applied over different areas on a longer than yearly scale. Cutting and removal of the arisings is a practical way of varying drivers, provided that not the whole area is cut in the same way at the same time. The management for this grassland has therefore been designed to leave areas



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uncut for up to two years to provide seed heads as over-wintering habitat. The grass cutting regime is to be rotated round the compartments.

**Year 1**

- Section 1 - mown May and September
- Section 2 - mown once only September
- Section 3 - not mown in the current year

**Year 2**

- Section 1 - not mown in the current year
- Section 2 - mown May and September
- Section 3 - mown once only September

**Year 3**

- Section 1 - mown once only September
- Section 2 - not mown in the current year
- Section 3 - mown May and September

11.221 A programme of rotational cutting of shrub areas, together with fairly hard mowing against the edges to reduce the spread of scrub into grassland areas will be part of the management detailed in the LEMMP which will benefit the management of the chalk grassland and also ensure regenerating scrub habitats for dormice.

Reptiles

11.222 As part of the Development, habitat creation and enhancement proposals will provide extensive areas of higher quality suitable reptile habitat, notably through the creation of long sward and wildflower grassland, scattered scrub and hedgerow planting within the Mitigation Areas R1 and R2. These areas will also incorporate a number of log piles and dedicated hibernacula, providing shelter for reptile species. Furthermore, multiple proposed swales and attenuation basins adjacent to these areas and across the Site which will provide new opportunities for reptiles in particular grass snake.

Enhancements

11.223 Above and beyond measures proposed as mitigation there is scope to enhance the existing biodiversity of the Site. The greatest enhancement would be through the creation and



extension of areas of chalk grassland managed for invertebrates as well as botanical diversity. Areas for this creation are proposed throughout the Site with the largest area proposed in the south of the Site to the south-east of White's Wood, other smaller areas are proposed in the north which will provide stepping stones between the areas of retained chalk grassland in the west and the enhanced area of mixed scrub and chalk grassland on the bank between field 2 and field 3. The close proximity of Darland Banks which supports important invertebrate assemblages makes this habitat creation an ideal enhancement. The layout has been prepared to provide a linked green infrastructure and enhancement to the existing tree scrub framework at the edges of the intensively cultivated arable field. The connectivity of habitats across the c.50 hectare site represents an important enhancement.

11.224 Artificial nesting boxes for birds will be provided throughout the Proposed Development, positioned within the new woodland and scrub habitat and on the retained trees. Boxes will be of varying designs, such as open fronted wren and robin boxes, to standard tit and nuthatch boxes. Specifically, open fronted nest boxes will be provided for spotted flycatcher. These would be positioned between 2 – 4m above ground level on trees with a good vantage point and preferably in an area where honeysuckle is present as they often prefer boxes within creeping plants. Colonial nest boxes for sparrows will be installed on the new buildings.

11.225 Artificial bat boxes are also proposed as set out above.

### Monitoring

11.226 A monitoring programme of the success of enhancement measures, with reference to baseline data, will be undertaken, along with contingency plans. The monitoring will cover botanical surveys of the chalk grassland habitats, terrestrial invertebrate surveys and monitoring of the dormouse and reptile populations to ensure that the receptors and newly created habitats have successfully been created.

### **Residual Effects**

11.227 Residual effects are those that are predicted to remain after implementation of the secondary mitigation measures described above.



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### Designated Sites

11.228 With the control measures during construction the residual effect of the proposals on Darland Banks LNR is considered to be negligible. The effects through the operational phase with the mitigation measures in place to provide on-site open green spaces and footpaths within the Site, the potential effects are considered to be reduced although it is likely that there will remain some increase in human activity in the LNR. The residual impacts are considered to be a long-term minor adverse effect of neighbourhood significance to the Darland Banks LNR.

### Habitats

11.229 The newly created habitats within the Site are designed to recreate habitats lost to the development for species of conservation concern or to create habitats which would have once been more extensively present (i.e chalk grassland) and which could be recreated and result in a significant increase in biodiversity as a result of its recreation. It is recognised that the Proposed Development will result in an increase in the level of human disturbance in the area, whilst the noise levels are likely to remain similar to the existing conditions.

### Dormice

11.230 With the recreated scrub habitats and provision of dormouse bridges, the residual impacts to dormice are considered to be in the short term a medium adverse effect at Site level of significance at a Neighbourhood Level. However, in the long term the increase in the scrub habitat and the positive management of the retained ancient woodland, boundary hedgerows and cyclic scrub management will result in a minor beneficial effect in the long term as a Site level which is of significance at a Local Level.

### Bats

11.231 The effects of the Proposed Development on bats were considered limited. However, with the proposed new habitat creation, retained boundary features and proposed lighting strategy the residual impacts to bats are considered to be at most a long term minor adverse effect of significance at a Site Level, if the lighting strategy can retain significant areas of dark boundary features the effects would be a long term minor benefit of significance at a Site Level.



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### Breeding Birds

11.232 The residual effects of the Proposed Development on breeding birds will be an overall loss of habitat used by 11 pairs of skylark. Whilst an area of grassland is proposed in the south of the Site to be managed to be suitable for the species it cannot be considered certain that any of the displaced pairs will use this created habitat and only singleton pairs would be able to use the field resulting in an overall loss of the numbers of pairs of skylark. The proposed habitat creation will provide increased habitat and foraging for species other than skylark and the majority of species recorded within the Site are likely to remain and potentially increase in range and number of territories. The residual impacts to breeding birds are considered to be a long term major adverse effect of significance at a Site Level for skylark and a long term minor beneficial effect of significance at a Site Level for the overall diversity of species. The residual impact based on the balance of these two is therefore a minor adverse effect significant at the Site level.

### Terrestrial Invertebrates

11.233 With the control measures in place during the construction period the residual impacts to terrestrial invertebrates are considered to be in the short term a minor adverse effect of significance at a Site level. However, in the long term given the long term commitment to recreating chalk grassland habitats, and the retention and improved management of existing areas of chalk grassland which have been found to be of significance for invertebrates these measures will result in a minor beneficial effect in the long term as a Site level which is of significance at a Local Level.

### Reptiles

11.234 The creation of new grassland habitats adjacent to existing areas will take several years to develop to support high populations of reptiles, however the existing retained habitats can be enhanced in the short term to support a relocated reptile population which can then disperse into the adjacent newly created habitats. The residual impact is therefore considered to be a short term minor adverse effect at Site level of significance at a Neighbourhood Level. However, in the long term the increase in the extent of available habitat plus the positive management of these habitats will result in a minor beneficial effect in the long term which is of significance at a Site Level.



**Table 11.7 - Significant residual effects remaining after mitigation**

Significant residual effect	Receptor sensitivity	Impact magnitude	Nature	Duration	Degree of effect	Level of certainty
Darland Banks LNR	County	Minor	Adverse	Long term	Significant at the neighbourhood level	Probable
Habitats	Neighbourhood	Moderate	Benefit	Long term	Significant at the local level	Probable
Dormouse	Local	Minor	Benefit	Long term	Significant at the local level	Certain
Bats	Neighbourhood	Minor	Benefit	Long term	Significant at the site level	Possible
Badgers	Neighbourhood	Minor	Adverse	Long term	Significant at the neighbourhood level	Certain
Breeding Birds	Local	Minor	Adverse	Long term	Significant at the site level	Certain
Invertebrates	Country	Minor	Benefit	Long term	Significant at the local level	Probable
Reptiles	Local	Minor	Benefit	Long term	Significant at the Site level	Certain

Habitats Directive

11.235 Regulation 9(5) of the Conservation of Habitats and Species Regulations 2010 places a duty on a local planning authority when determining a planning application to have regard to the requirements of the Habitats Directive. Those requirements include the prohibitions imposed by Article 12 of the Directive. In the cases of *R (Woolley) v. East Cheshire BC* [2010] Env LR 5 and *Morge v. Hampshire County Council* [2010] PTSR 1882 it was held that the duty imposed by regulation 3(4) of the Conservation (Habitats &c) Regulations 1994 (the predecessor of regulation 9(5) of the 2010 Regulations) requires a local planning authority to engage with the provisions of the Directive. In order to engage with the provisions of the Directive the local planning authority should consider whether any of the prohibitions imposed by Article 12(1) are engaged and if they are, to consider the prospects of the licensing authority deciding to grant a derogation under Article 16.

11.236 Dormice are a European protected species (“EPS”). The first issue for the local planning authority to determine is whether any of the prohibitions in Article 12(1) are engaged. The likely destruction of breeding sites or resting places of dormice would offend against the prohibition in Article 12(1)(d). The local planning authority will have to consider whether the removal of habitat amount to deliberate disturbance of the species.



11.237 Natural England during the licence process would need to consider whether there were any satisfactory alternatives, whether the action contemplated would be detrimental to the conservation status of the species concerned at favourable conservation status in their natural range, and whether there are imperative reasons of overriding public interest (“IROPI”), including those of a social or economic nature and beneficial consequences of primary importance for the environment. The proposals would not be detrimental to the conservation status of the species in their natural range. The mitigation proposals would result in beneficial consequences of primary importance for the environment.

11.238 With respect to the evaluation of satisfactory alternatives within the Site, Chapter 4 deals with all the potential options including the location of the Proposed Development. The proposals result in the loss of relatively small areas of dormouse habitat. The mitigation proposals include the creation of new habitat to supplement the retained habitats and the provision of dormouse bridges to limit fragmentation and enhance existing lines of fragmentation. It is not considered that the Proposed Development would affect the long term functionality of the dormouse population and with high quality habitat creation it is considered likely that the population would increase.

## **SUMMARY**

11.239 Ecological surveys of the Site have been undertaken, including a desk study, an extended Phase 1 Habitat survey and Phase 2 faunal studies.

11.240 Further detailed surveys for the following species were undertaken:

- Dormice
- Bats
- Badgers
- Wintering Birds
- Breeding Birds
- Terrestrial invertebrates
- Reptiles
- Amphibians

11.241 The Site is dominated by large arable fields, considered to be of low ecological value, with other habitats within and surrounding the Site considered to be of higher value in the context of the Site including all boundary vegetation with ancient woodland, hedgerows, field margins and scrub.



11.242 Surveys for protected species have found that the Site supports dormice, bats, badgers and reptiles as well as assemblages of breeding birds and terrestrial invertebrates.

11.243 The potential effects, of the Proposed Development have been assessed for designated sites and the various ecological features within the Site. A range of mitigation measures are proposed in relation to the proposed adverse effects on the habitats and ecological features, ensuring that retained habitats of high value are protected by the Development. In addition, under the Development there will be provision of enhancements in the form of semi-natural greenspace across the Site, comprising large areas of chalk grassland, new hedgerows, woodland planting and attenuation basins. These measures will provide new areas of valuable wildlife habitat, providing benefits to a wide variety of faunal species. Measures are also proposed to avoid effects relating to human influences and lighting.

11.244 The Development and mitigation scheme have been designed to achieve compliance with relevant legislation and planning policy in respect of protected faunal species. Measures are proposed to protect and avoid killing or injury of protected species such as dormice, bats, badger, reptiles and birds (protected under the Wildlife and Countryside Act 1981), and the Conservation of Habitats and Species Regulations) and opportunities for enhancements to biodiversity are also proposed, in accordance with NPPF, the NERC Act 2006 and local policy, which will ensure that opportunities for such species are maintained and enhanced under the Development. The Development also accords with BAP objectives, specifically in relation to creation of new habitats.

11.245 Following the implementation of mitigation and enhancement measures (set out within this chapter), it is considered that the Development will have moderate beneficial effects on habitats within the Site, while beneficial effects of minor to moderate significance will occur in respect of faunal species. Overall, therefore following the implementation of proposed mitigation and enhancement measures the effects on ecology will be neutral to moderate beneficial at the local level.

**Table 11.8: Ecology Summary Table**

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
<b>Construction Phase</b>				
Designations	Temporary	County	Implementation of onsite working safeguards	Avoided and therefore negligible.





Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Habitats	Permanent	Local	Erection of protective fencing for retained habitats and translocation of man orchids	Minor adverse
Dormouse	Permanent	Local	Supervised site clearance under licence	Minor adverse
Bats	Permanent	Neighbourhood	Directional lighting	Neutral
Badgers	Temporary	Neighbourhood	Safe working practices and overnight safeguards	Neutral
Wintering Birds	Permanent	Neighbourhood	Timed removal of trees and hedgerows, or removal subject to an ecological survey, management of on-site habitats	Neutral
Breeding Birds	Permanent	Local	Timed removal of trees and hedgerows, or removal subject to an ecological survey, management of on-site habitats	Minor adverse effect of Site significance.
Invertebrates	Permanent	County	Implementation of good working practices	Neutral
Reptiles	Permanent	Local	Trapping and relocation scheme	Minor adverse effect of significance at the Site level



Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
<b>Completed Development</b>				
Designations	Permanent	County	Provision of open space within the site for recreational use	Probable, minor adverse significant at the neighbourhood level
Habitats	Permanent	Local	New and extensive habitat creation	Minor to moderate, Beneficial significant at the local level
Dormouse	Permanent	Local	New and extensive habitat creation, provision of connecting bridges to prevent fragmentation and new connections	Minor, Beneficial significant at the local level
Bats	Permanent	Neighbourhood	New and extensive habitat creation, bat boxes safeguards in respect to lighting	Minor, Beneficial significant at the site level
Badgers	Permanent	Neighbourhood	Erection of a wooden fence within the vicinity of badger activity, provision of open space for foraging.	Minor, Beneficial significant at the neighbourhood level
Wintering Birds	Permanent	Neighbourhood	Habitat creation	Neutral
Breeding Birds	Permanent	Local	New and extensive habitat creation, bird boxes	Minor, adverse, significant at the site level
Invertebrates	Permanent	County	New and extensive habitat creation and management	Minor, Beneficial significant at the local level
Reptiles	Permanent	Local	New and retained habitat creation/enhancement and dedicated mitigation area and management	Minor, Beneficial significant at the site level



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**Ref 11.13:** Wild Mammals Protection Act 1996

**Ref 11.14:** Countryside and Rights of Way Act 2000 (otherwise known as the CRoW Act)

**Ref 11.15:** The Conservation of Habitats and Species Regulations 2017.

**Ref 11.16:** Hedgerows Regulations 1997

**Ref 11.17:** EC Directive 79/409/EEC on the Conservation of Wild Birds

**Ref 11.18:** EC Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora as amended (also called the Habitats Directive)

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**Ref 11.26:** Chartered Institute of Ecology and Environmental Management (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater and Coastal. [www.cieem.org.uk](http://www.cieem.org.uk)

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## 12 WATER QUALITY, HYDROLOGY & FLOOD RISK

### INTRODUCTION

12.1 This chapter considers the potential effects of the Proposed Development on flood risk and water resources. It includes consideration of effects on surface and groundwater resources, flood risk to the Site and effects on flood risk to the surrounding area.

12.2 A Flood Risk Assessment and Surface Water Management Strategy was undertaken by Herrington Consulting, and is included within **Appendix 12.1**.

### ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

#### Predicted Impacts

12.3 The scope of the assessment includes an assessment of both the construction and operational phases. The following key issues have been considered in this assessment for these phases:

- whether the Proposed Development is likely to be affected by current or future flooding from any source;
- whether the measures proposed to deal with these effects and risks are appropriate
- effects on water quality of surface water and groundwater resources;
- effects of proposed peak discharge rates on local infrastructure;
- flood risk to the Proposed Development, considering all potential sources of flooding; and
- effects on offsite flood risk associated with the surface water runoff from the Site and management of extreme rainfall events.

#### Assessing Significance

12.4 The assessment of effects refers to the change that is predicted to take place to the existing condition of the environment as a result of the Proposed Development.

12.5 The significance of an effect is generally determined as the combination of the sensitivity of the affected environment receptor and the predicted extent and/or magnitude of the effect. The



assessment of significance ultimately relies on professional judgement, although comparing the extent of the effect with criteria and standards specific to each environmental topic can guide this judgement scope. Details of criteria specific to this assessment are defined in Table 12.1 and Table 12.2.

**Table 12.1: Receptor Sensitivity for Flood Risk and Water Resources**

<b>Receptor sensitivity</b>	<b>Description</b>
<b>High</b>	Main Rivers. Highly Vulnerable Land Use as defined in NPPF ( <b>Ref. 12.1</b> ) (e.g. basement dwellings, installation requiring hazardous substances consent). Local population, including future occupants of the Proposed Development and surrounding residents. Aquifer of National Importance (e.g. Chalk Aquifer).
<b>Medium</b>	More Vulnerable Land Use as defined in NPPF (e.g. hospitals, dwellings, residential institutions, hotels, health services, nurseries and educational establishments). Site buildings and surrounding structures. Offsite abstraction from groundwater or surface water. Non-main river/ordinary watercourses. Spring/Pond/lake/standing water with outfall to a watercourse. Principal (Major) Aquifer. Infrastructure of importance at district scale.
<b>Low</b>	Less Vulnerable Land Use as defined NPPF (e.g. commercial buildings and offices). Secondary (Minor) Aquifer (River Terrace Deposits). Spring/Pond/lake/standing water with no outfall to a watercourse. Infrastructure of local level importance, public sewer network in vicinity of the Site.
<b>Very Low</b>	Water Compatible Land Use as defined in NPPF (e.g. open spaces, outdoor sports facilities). Shallow alluvium and unproductive strata. Infrastructure of importance to a street.



**Table 12.2: Magnitude of Effect**

<b>Magnitude of Effect</b>	<b>Description</b>
<b>Major</b>	Large change to existing environmental conditions. Irreversible change affecting receptor functioning (e.g. significant depletion of groundwater resource, permanent damage or insufficient capacity of drainage infrastructure). Permanent change in flood risk onsite or adjacent sites (greater annual probability than 1 in 100 year frequency).
<b>Moderate</b>	Noticeable change to existing environmental conditions. Long term irreversible change to the hydrology/water conditions. Long term or irreversible change affecting receptor capacity (e.g. partial depletion of groundwater resources, reduced capacity of drainage infrastructure). Permanent increase in flood risk onsite or adjacent sites (lower annual probability than 1 in 100 year frequency).
<b>Minor</b>	Small change to existing environmental conditions. Short term and reversible change affecting receptor capacity (e.g. temporal depletion of groundwater resources, temporarily reduced/increase to capacity of drainage infrastructure). Temporary increase/decrease in flood risk onsite or adjacent sites.
<b>Negligible</b>	No discernible change to existing environmental conditions. No discernible change in flood risk. No discernible change to receptor capacity and functionality.

12.6 The predicted significance of the effect was determined through a standard method of assessment based on professional judgement, considering both sensitivity and magnitude of change as detailed in Table 12.3 below. Major and moderate effects are considered significant in the context of the EIA Regulations.

12.7 With the significance criteria define in Table 12.3, the effects may be beneficial or adverse.



**Table 12.3: Significance Criteria Effect**

<b>Sensitivity</b>	<b>Magnitude of Change</b>			
	<b>Major</b>	<b>Moderate</b>	<b>Minor</b>	<b>Negligible</b>
<b>High</b>	Major	Major	Moderate	Minor
<b>Medium</b>	Major	Moderate	Minor	Negligible
<b>Low</b>	Moderate	Minor	Negligible	Negligible
<b>Very Low</b>	Minor	Negligible	Negligible	Negligible

### **Assessment Assumptions and Limitations**

12.8 The assessment has been based on information provided within the Flood Risk Assessment and Surface Water Drainage Strategy produced by Herrington Consulting.

12.9 The surface water drainage system has been based on site investigations carried out by Southern Testing ref J13752.

### **Design Considerations**

12.10 The following describes the measures and environmental enhancements which have been proposed to be incorporated within the design and management of the Proposed Development. These design and management measures will avoid, prevent, reduce or offset potential environmental effects.

12.11 Flood Risk Management – No significant risk of flooding has been identified for the Site. Entry thresholds to dwellings and drainage overflows will be designed to ensure the buildings are not at risk of flooding from its own drainage system (e.g. becoming overwhelmed during extreme





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event, or in the event of a blockage/failure of the system). The same measures will also protect the building from flooding by local surface water sewer during extreme events.

12.12 Sustainable Drainage –If the Site remained as current, no significant changes would be expected to water resources, the capacity of local sewers, or local flood risk.

## **LEGISLATION, PLANNING POLICY AND GUIDANCE**

12.13 The National Planning Policy Framework (NPPF) was published on the 27th March 2012 and updated in 2018 and 2019. This Framework is a key part of the Government's reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth. The NPPF sets out the Government's planning policies for England and is used in the preparation of local plans, as well as in decision making with respect to planning. The framework is executed by means of the accompanying Planning Policy Guidance Suite (March 2014) which supersedes PPS25: Development and Flood Risk Practice Guide (2009).

12.14 The Flood and Water Management Act (FWMA) (**Ref. 12.2**) was implemented in England and Wales in April 2010. The act outlines the responsibilities for managing flood risk and drought, with an increased focus on the risk of flooding from local sources.

12.15 The National Standards for the design, construction, maintenance and operation of Sustainable Drainage Systems (SuDS) (**Ref. 12.3**) came into effect from the 6th April 2015 and relate to Schedule 3, Paragraph 5 of the Flood and Water Management Act 2010. These (non-statutory) Technical SuDS Standards provide additional detail and requirements not initially covered by the NPPF, through specifying criteria to ensure sustainable drainage is included within applications classified as major development.

12.16 Medway Council is the Lead Local Flood Authority (LLFA) and has the duty to manage local flooding, which covers the risk of flooding from surface water, groundwater and ordinary watercourses. In accordance with the Flood and Water Management Act, Medway Council produced a Local Flood Risk Management Strategy (LFRMS) (**Ref. 12.4**), which was published in 2014. The strategy sets out to outline the approach to managing local flood risk within the district and how these could be implemented.

12.17 The Surface Water Management Plan (SWMP) (**Ref. 12.5**) for Medway was released in November 2016. The report provides an assessment of the risk of surface water flooding in Medway by utilising hydraulic modelling, which has been undertaken as part of the report. The



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results of the modelling have been used to recommend suitable surface water management strategies which could reduce the risk of flooding. This was primarily aimed at high risk areas within the urban confines of the Medway Towns, including the settlements of Strood, Rochester, Chatham and Gillingham.

12.18 The current Local Plan (**Ref. 12.6**) was adopted in 2003 and is currently in the process of being updated. The updated plan is due to be adopted in 2020, and will cover the period up until 2035. The Local Plan sets out policies for Medway in line with the Council's objectives for development. The SFRA forms part of the evidence base for the updated Plan, which will be used to update Local Planning Policies in relation to flood risk and surface water management, as well as informing the development allocation process.

12.19 As part of the current Local Plan, reference is made to Policies in respect to flood risk. Policy BNE45 relates to development along the undeveloped section of the coastline with respect to the existing standard of protection provided by the defences. Policy CF13 outlines requirements for development in tidal flood risk areas.

## **BASELINE CONDITIONS**

### **Existing Site**

12.20 The Site covers an area of approximately 49.47 hectares between the land at North Dane Way and Capstone Road adjacent to the Lordswood Estate. The Site is currently classified as greenfield land and is agricultural. As such, the Site is therefore considered to be permeable.

12.21 Ground levels on the Site vary between 34.9m Above Ordnance Datum Newlyn (AODN) to the north and 106.0m AODN to the south.

12.22 According to the Geotechnical Study the natural geology is made up of Lewes Nodular Chalk Formation to the north and Seaford Chalk Formation to the south.

### **Water Resources**

12.23 In relation to water resources the Geotechnical Study states the following:

- The Site is located approximately 2.9km to the south of the estuary of the River Medway.



- The Seaford Chalk Formation and the Lewes Nodular Chalk Formation are both classified as Principle Aquifers.
- The Site is situated within a Source Protection Zone (SPZ) 1 and 2. The soils are defined as having an Intermediate to High Leaching potential.
- The Site is not situated within a Nitrate Vulnerable Zone.
- The Site is located within proximity to an existing disused landfill.

### **Flood Risk**

12.24 The findings of the FRA show that the majority of the Site (some 98.8% of the 49.7 ha is Flood Zone 1. The lowest part of the Site located in the north east area, comprises of a north /south strip of land (comprising 1.2% of the total site area) is located within Flood Zone 2 and 3 (the zone of highest flood risk) on the EA Flood Map. Consequently, this portion of the Site is at Medium risk of flooding from surface water, as a consequence of local topography and the surrounding catchment.

12.25 No significant risk of flooding associated with groundwater or water infrastructure have been identified.

12.26 The occupants of the Proposed Development and the local residents are potential receptors. The sensitivity of the local population to flooding is considered to be Medium.

### **IDENTIFICATION AND EVALUATION OF KEY EFFECTS**

12.27 The identification and evaluation of key effects have been assessed based on the Proposed Development plans (**Appendix 5**) and the description of the Proposed Development detailed in Chapter 5: The Proposed Development.

#### **The 'Do Nothing' Scenario**

12.28 If the Site remained as current, no significant changes to water resources, capacity of local sewers or local flood risk would be expected.

#### **Construction Effects**

##### Predicted Construction Effects



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12.29 Construction activities and the presence of fuels, chemicals and construction materials (e.g. cement) on Site could lead to release of pollutants into the groundwater within the identified principle chalk aquifer. The sensitivity of the aquifer to pollution has been assessed to be Medium and the effect will be of Moderate magnitude. The significance will therefore be Moderate.

12.30 A temporary surface water drainage system will be provided until a permanent system comes into operation. Most site runoff will be discharged via infiltration, with the exception of the area located in proximity to the neighbouring landfill, where the discharge will need to be located further down the Site. Pollution from the Site during construction or accidental spillage could therefore enter the principle aquifer. The sensitivity of the aquifer to pollution has been assessed to be Medium and the effect will be of Moderate magnitude. The significance will therefore be Moderate.

12.31 During the construction phase there could be a potential risk of local flooding on the Site or to the local neighbourhood, due to the limited capacity of the temporary drainage system. During extreme pluvial events, or during decommissioning of the existing drainage system, the temporary system could become overwhelmed. The sensitivity of the local population to flooding is considered to be Medium and the magnitude of effect is considered to be Minor. The significance will therefore be Minor.

#### Proposed Mitigation

12.32 The measures set out in the Construction and Environmental Management Plan (CEMP) will mitigate any potential adverse effects on the water environment. In particular, the CEMP will be developed following best guidance of pollution control from construction sites and will include the following guidance (**Ref. 12.7**):

- Whenever possible, any mixing and handling of concrete done onsite, together with any washing down and cleaning of equipment used for concrete handling will be undertaken in designated contained areas.
- Appropriate storage and refill areas for oils, fuels and other potentially hazardous materials will be provided. Plant and machinery will include drip trays wherever possible.
- An emergency response plan is to be followed in the event of a pollution incident and this will be developed in consultation with the EA. The plan will include the provision of appropriate emergency response equipment onsite and staff training in emergency procedures.



- Contained wheel-washing facilities, silt traps and cut-off ditches and/or silt fences to be installed around excavations, exposed ground and stockpiles to prevent uncontrolled release of suspended solids.
- Operations will be appropriately contained to ensure that the risk of surface water flooding to neighbouring sites does not increase during construction.
- Appropriate temporary pollution control interceptors (oil traps) are to be installed upstream of any infiltration features.

### Residual Construction Effects

12.33 The development and implementation of the CEMP, (once the main contractor has been appointed), will significantly reduce the likelihood of any pollution caused by construction activities leaching into the chalk aquifer and therefore, will reduce the magnitude of effect. No waste or surface water will be discharged into the aquifer without documented authorisation obtained through a discharge consent notice, or an environmental permit. The residual adverse effects will be Minor.

12.34 The CEMP will ensure that any temporary drainage system leading into infiltration systems is approved, and appropriate mitigation methods such as temporary pollution interceptors are put into place before surface water is discharged into the aquifer. The residual adverse effects will therefore be Minor.

12.35 The development and implementation of the CEMP, (once the main contractor has been appointed), will significantly reduce the likelihood of any flooding to the neighbourhood during construction and therefore, will reduce the magnitude of effect. Due to the relatively low density of existing houses at the lowest point of the Site, the buildings can be protected by a series of cut-off drains designed to limit any adverse impact which could be caused from flooding. The residual adverse effects will be therefore be Minor.

### **Operational Effects**

#### Predicted Operational Effects

12.36 The construction of a residential development within the surface water flow paths located across the Site could have potential effects to the risk of flooding to the Proposed Development and surrounding area during higher return period events. The sensitivity of flooding has been



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assessed to be Medium and the effect will be of Moderate. The significance will therefore be Moderate.

12.37 As surface water runoff for events up to 1 in 100 year + 30% will be contained onsite, the Proposed Development will have a moderate beneficial effect on local flooding. At present the existing greenfield runoff from the Site catchment area is anticipated to contribute to surface water flooding north of the Site (e.g. on Capstone Road). The Proposed Development utilises attenuation features to store runoff and allow water to gradually allow this to soak into the underlying ground, therefore reducing the rate at which surface water is discharged off site. It can be estimated that the effect of a reduction in local flooding will be of minor magnitude. The effect will therefore be minor beneficial and not significant.

12.38 The Proposed Development will introduce roads and infrastructure to an otherwise greenfield site. This will increase the risk of pollutants arising from roads and trafficked areas, which could be infiltrated into the ground through surface water runoff. This could have an impact of the underlying principle chalk aquifer. The sensitivity of the aquifer to pollution has been assessed to be Medium and the effect will be of Moderate magnitude. The significance will therefore be Moderate.

#### Proposed Mitigation and Residual Effects

12.39 The Proposed Development has been designed to provide a green corridor through the Site, and therefore maintaining the existing surface water flow paths through the Site. The proposed buildings are located outside of the flood risk area and therefore it is concluded that the residual adverse effects will be Negligible / Neutral.

12.40 On completion of the Proposed Development, the addition of Sustainable Drainage Systems such as permeable paving, swales and drainage basins will provide additional water quality benefits to remove and treat surface water runoff in accordance with current guidance. The strategy also maximises the use of shallow infiltration and reduces areas of infiltration located within the proximity to the existing landfill. This approach therefore reduces the risk of contamination into the underlying aquifer through mitigation. The residual adverse effects are considered to be Minor.



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## **ASSESSMENT OF CUMULATIVE EFFECTS**

12.41 The cumulative impact of schemes at Darland Farm, Gibraltar Farm and Land East of Gleamingwood Drive have been considered, and whilst there is likely to be some cumulative impact in relation to Flood Risk and Surface Water, it is considered that the overall effect will be not significant due to the distances from the Site.

12.42 The relationships between the environmental effects of the construction and operation of the Proposed Development and the anticipated effect of committed developments elsewhere has been considered and is classified as negligible, or negligible to minor adverse. Therefore, the cumulative effects are not considered to be significant.

### **SUMMARY**

12.43 All significant effects on the water environment, local water infrastructure and flood risk during the construction period will be mitigated by the development and implementation of appropriate construction methods, and implementation of a CEMP. These effects will be controlled by discharge consents which will regulate construction drainage discharges. The effects have therefore been assessed as neutral.

12.44 The Proposed Development will result in a reduction to the peak rate at which surface water is discharged from the Site when compared to the current greenfield runoff rates. The Proposed Development has also been designed to manage surface water runoff for events up to and including the 1 in 100 year return period, including a 30% increase to account for climate change. The additional water will be contained onsite, and therefore the Proposed Development will have a beneficial effect on local flooding.



**Table 12.4: Summary of Construction Effects**

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Pollution into groundwater from construction on site	Temporary	Moderate	CEMP and certification	Minor
Pollution into groundwater from temporary drainage systems	Temporary	Moderate	CEMP and certification	Minor
Flooding during extreme events and during decommissioning of temporary drainage	Temporary	Minor	CEMP	Minor

**Table 12.5: Summary of Operational Effects**

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Existing surface water flow paths	Permanent	Moderate	Development design outside of flow path	Negligible / Neutral
Surface water runoff from the Proposed Development	Permanent	Minor Beneficial	SuDS systems	Beneficial / Negligible
Pollution into groundwater from infrastructure	Temporary	Moderate	SuDS systems	Minor





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## REFERENCES

**Ref 12.1:** Department for Communities and Local Government, 2012 (and 2019 update). National Planning Policy Framework

**Ref 12.2:** Flood and Water Management Act 2010

**Ref 12.3:** Defra (2015) The National Standards for the design, construction, maintenance and operation of Sustainable Drainage Systems (SuDS)

**Ref 12.4:** Medway Council (2014) Local Flood Risk Management Strategy

**Ref 12.5:** Medway Council (2016) Surface Water Management Plan

**Ref 12.6:** Medway Council (2003) Local Plan

**Ref 12.7:** Environmental Protection, England and Wales (2010) The Environmental Permitting (England and Wales) Regulations



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## 13 SOILS, GEOLOGY AND CONTAMINATED LAND

### INTRODUCTION

13.1 This chapter discusses the historical and current use of the Site with respect to contaminated land and the underlying geology and hydrogeology. It details the objectives, methodology and findings of a desk-based environmental review and preliminary site investigation and considers the potential impacts of disturbance of the soils on the Site associated with the Proposed Development.

13.2 The information presented within this chapter has been sourced from the following technical assessments:

- ST Consult (2018). Desk Study & Preliminary Site Investigation Report, Site: Land off Shawstead Road, Hale, Kent, ME5, Client: KD Attwood & Partners, Date: October 2018, Project Ref. J13752. Provided in **Appendix 13.1**.
- ST Consult (2018). Land Gas Monitoring Report. Provided in **Appendix 13.2**.

### ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

13.3 The assessment of contaminated soils in the UK follows a risk-based approach and is structured in a tiered manner. As well as having a systematic approach to collecting the data it is also necessary to adopt recognised techniques and standards in assessing them and particularly with regard to environmental risk assessment.

13.4 An assessment of baseline conditions has been undertaken by ST Consult (**Appendix 13.1**) based on the findings of a desk-based study and preliminary site investigation. The methodology employed in completing the desk-based review of the Site and surroundings involved the following:

- a site walkover by an experienced environmental consultant to provide an assessment of current site activities and the Site's environmental setting;
- a review of available historic maps to determine the land-use history in the context of potentially contaminative activities;
- a review of environmental data relating to the Site and its surroundings using a proprietary third-party environmental database (Groundsure);



- 
- desk-based assessment of site geology, hydrogeology and hydrology from published mapping and web-based sources to determine the Site's environmental setting and sensitivity;
  - a web-based search of freely available sources of information to identify any potential issues relating to the Site;
  - consultation of the Indicative Atlas of Radon in England and Wales (HPA-RPD-033), published by Public Health England (November 2007) (**Ref. 13.1**) and Radon: guidance on protective measures for new dwellings, published by the BRE & Department of the Environment, Transport and the Regions (1999) (**Ref. 13.2**); and
  - provision of a qualitative contaminated land risk assessment based on Source-Pathway-Receptor as per current best practice contained in CLR11 (**Ref. 13.3**).

13.5 Information from these data sources enabled the identification of potential pollution sources and pathways for pollutants to migrate from the source areas to potential receptors (*i.e.* humans, ecosystems, buildings, *etc.*). Based on this information a Conceptual Site Model (CSM) has been formed for the Site and its proposed end use. The CSM is based on the risk assessment principles of source, pathway and receptor.

13.6 The overall significance of effect is defined using a combination of the magnitude and sensitivity together with professional judgement. It considers:

- duration (*i.e.* short, medium, long term);
- reversibility (*i.e.* temporary or permanent);
- whether the effect is positive/negative, indirect/direct;
- performance against environmental standards; and
- compatibility with environmental policies as appropriate.

13.7 The potential effects have been classified, prior to mitigation, as “Minor”, “Moderate” or “Major” (either “Adverse”, “Neutral/Negligible” or “Beneficial”). Where the predicted effects are “Significant” (substantial), mitigation measures have been incorporated to eliminate or reduce the effects to an acceptable level.



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## LEGISLATION, PLANNING POLICY AND GUIDANCE

### European Policy and Legislation

13.8 The EU Common Forum on Contaminated Land was initiated in 1994 and provides a discussion forum for experts from all EU Member States and Accession Countries. Main topics are the development of strategies for the treatment of contaminated sites and for land recycling. Key EU legislation includes the Groundwater Directive (2006/118/EC) and the Environmental Liability Directive (2004/35/EC).

13.9 The Environmental Liability Directive (ELD) has regard for the prevention and remedying of environmental damage through a framework based on the polluter pays principle to prevent and remedy environmental damage. The polluter pays-principle is set out in the Treaty on the Functioning of the European Union (Article 191(2) TFEU). As the ELD deals with the pure ecological damage, it is based on the powers and duties of public authorities. The Directive defines "environmental damage" as damage to protected species and natural habitats, damage to water and damage to soil.

### National Policy and Legislation

13.10 The National Planning Policy Framework (**Ref. 13.4**) (February 2019) sets out the Government's planning policies for England and how these are expected to be applied. The National Planning Policy Framework (NPPF) constitutes guidance for local planning authorities and decision-takers both in drawing up plans and as a material consideration in determining applications. Fundamental to the NPPF is a presumption in favour of sustainable development.

13.11 The NPPF states that plans, and policies should prevent 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. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.

13.12 Planning policies and decisions should also ensure that:

- a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any



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proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);

- after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the *Environmental Protection Act 1990*; and
- adequate site investigation information, prepared by a competent person, is available to inform these assessments.

13.13 The minimum information that should be provided by an applicant is the report of a desk study and site reconnaissance although this should be supplemented by further site-specific studies as determined necessary.

13.14 The NPPF stresses that land contamination, or the possibility of land contamination, is a material planning consideration in taking decisions on individual planning applications.

13.15 The planning process can influence how contaminated sites are managed through planning policy and development control. In terms of the latter, planning conditions often require detailed site assessment or, in some cases, the restoration of a site to render it suitable for its proposed new use.

## **UK Legislation**

13.16 Part 2A of the *Environmental Protection Act 1990* (“Part 2A”) provides the legislative framework for the contaminated land regime in England, Wales and Scotland. It provides for contaminated land to be identified and dealt with in a risk-based manner. *The Contaminated Land (England) Regulations 2006* (SI 2006/1380) set out provisions for procedural matters under Part 2A. The 2006 regulations have been modified with the introduction of *The Contaminated Land (England) (Amendment) Regulations 2012*, which came into force on 6<sup>th</sup> April 2012. This includes an amendment to Regulation 3(c) to take account of the updated definition of “controlled waters” in Section 78A(9) of the *Environmental Protection Act 1990*.

13.17 Section 78A(2) of Part 2A of the EPA 1990 defines contaminated land as “*land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:*

- *significant harm is being caused or there is a significant possibility of such harm being caused; or*



- *pollution of controlled waters is being or is likely to be caused*".

13.18 The implementation of Section 86 of *The Water Act 2003* on 6<sup>th</sup> April 2012 by *The Water Act 2003 (Commencement No. 11) Order 2012* (SI 2012/264) modifies the definition of contaminated land to also include land where there is "*significant possibility of significant pollution of controlled waters*".

13.19 Contaminated land statutory guidance published in April 2012 (**Ref. 13.5**) provides for a four-category test which is intended to clarify when land does or does not need to be remediated, where Category 1 is deemed as being high risk and Category 4 as being low risk.

13.20 "Significant harm" is defined in the guidance on risk-based criteria and must be the result of a significant "pollutant linkage". The presence of a pollutant linkage relies on the Source-Pathway-Receptor concept, where all three factors must be present and potentially or actually linked for a potential risk to exist. An initial assessment of pollutant linkage can be made qualitatively (*i.e.* through identifying these factors) and may be assessed using qualitative risk assessment models.

13.21 Contaminated Land Report 11 (CLR 11), Model Procedures for the Management of Land Contamination (**Ref. 13.3**) identifies the risk management framework to be followed when dealing with land affected by contamination.

13.22 Further guidance documents relevant to the assessment of contaminated land are provided by various statutory and non statutory bodies and are referenced where applicable. The following list details the main legislation and guidance that has been used in preparation of this impact assessment:

- Part IIA Environmental Protection Act 1990 (as inserted by Section 57 of the Environment Act 1995).
- Contaminated Land (England) Regulations 2006.
- Contaminated Land (England) (Amendment) Regulations 2012.
- Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance, DEFRA, April 2012 (**Ref. 13.5**).
- Environment Agency (2004): The Model Procedures for the Management of Land Contamination, CLR 11 (**Ref. 13.3**).



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## Regional Policy

13.23 The *Localism Act 2011* legislated to provide powers to abolish the regional planning strategies. The abolition of regional strategies reinforced the importance of councils' local plans produced with the involvement of local communities, as the keystone of the planning system.

## Local Policy

13.24 To ensure that decisions about the granting of planning permission are seen to be fair, open and reasonable, local authorities are required to prepare publicly available plans containing policies and proposals to guide the shape and nature of development in their areas. These plans are collectively given the name "the Development Plan". The Development Plan is usually composed of four different types of plans: structure plans; local plans; minerals plans and waste plans.

13.25 The structure plan provides a framework for more detailed policies and proposals at a local level. Local policies are set out in local plans. Local plans identify specific sites for different forms of development and indicate how local issues are to be addressed over the life of the plan.

13.26 The Medway Local Plan 2003 (**Ref. 13.6**) was adopted and launched on 14 May 2003, replacing the Medway Towns Local Plan 1992 and the Medway Local Plan Deposit Version 1999. Medway Council are currently working on the new Local Plan, Future Medway, which will replace the 2003 Medway Local Plan and cover the period up to 2035.

13.27 The Medway Local Plan 2003 states:

- **POLICY BNE23: CONTAMINATED LAND** – Development on land known or likely to be contaminated or affected by adjacent or related contamination must be accompanied by the findings of a detailed site examination to identify contaminants and the risks that these might present to human health and the wider environment. Appropriate measures to reduce, or eliminate, risk to building structures, services and occupiers of the site and of adjoining sites must be agreed. Such remedial measures must be satisfactorily implemented before the development is occupied



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## **Brownfield Registers and Contaminated Land Strategy**

13.28 Brownfield Registers include up-to-date and consistent information on previously developed sites that are appropriate for residential development, under the criteria set out in *The Town and Country Planning (Brownfield Land Register) Regulations 2017*.

13.29 The Government has set out its commitment to introduce a statutory brownfield register and ensure that 90% of suitable brownfield sites have planning permission for housing by 2020. This is part of the aim to boost the supply of housing land and to deliver plans for increased house building.

13.30 The Site has not been designated within the current Brownfield Register (last updated January 2019) according to the Medway Map Service ([www.maps.medway.gov.uk](http://www.maps.medway.gov.uk)).

13.31 Part 2A of the *Environmental Protection Act 1990* outlined the statutory framework for the management of potentially contaminated land and required that local authorities adopt a Contaminated Land Strategy. This is not currently available from the Medway Council website.



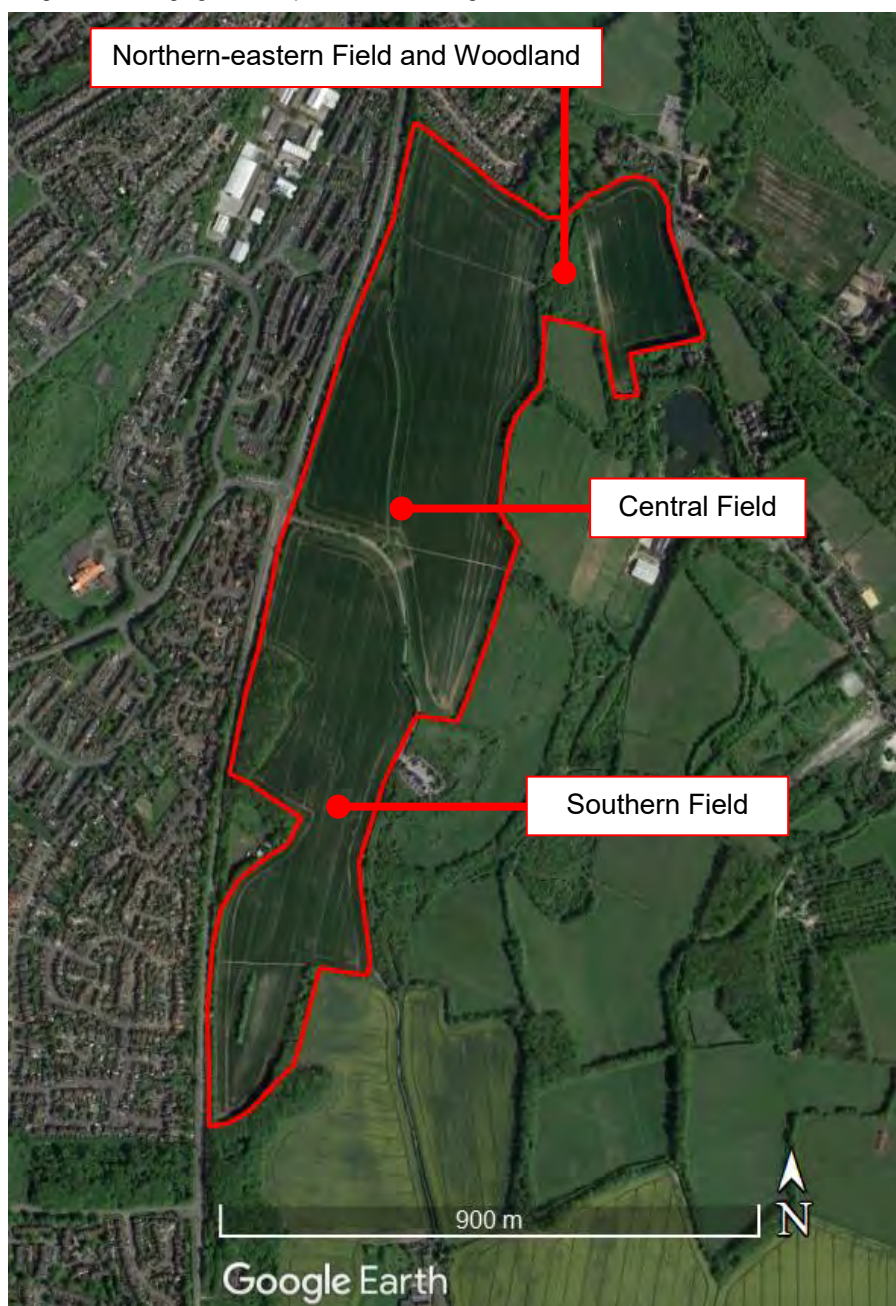
## BASELINE CONDITIONS

### Current Activities On-site

13.32 The Site is irregular in shape, occupies an area of 49.47 ha and predominantly comprises of three distinct areas (a) southern field, (b) central field and (c) northern eastern fields and woodland (Figure 13.1).

#### Figure 13.1: Location of current on-site activities

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13.33 The Site comprises a large area of land to the east of North Dane Way and to the south of Capstone Road. The Site is currently used as arable farmland with some areas of deciduous woodland.

13.34 In general, the Site is bounded by residential housing to the north, isolated housing, commercial units, Capstone Farm Country Park and Capstone household waste recycling centre to the east, open agricultural land and woodland to the south and North Dane Way to the west, beyond which is residential housing.

13.35 There are various public rights of way across or around the Site.

13.36 A Site visit was undertaken by ST Consult on 11<sup>th</sup> September 2018. The main observations made by ST Consult were:

- The Site is situated at the crest and across the western slope of a large dry valley, as well as partially across the eastern slope of an adjacent valley to the west. The Site is solely composed of ploughed agricultural land or parcels of woodland composed of Silver Birch (*Betula pendula*), Oak (*Quercus robur*) and Beech (*Fagus sylvatica*).
- No evidence of above ground or below ground tanks (current or historic), Intermediate Bulk Containers (IBCs), drummed materials, Asbestos Containing Materials (ACMs) or evidence of uncontrolled releases to ground was reported during the Site inspection.
- Minor evidence of fly-tipping was observed along the edges of Shawstead Road towards the centre of the Site.
- No buildings are currently on the Site. Historic evidence of the well associated with Maunders House was located within the central area of the Site. ST Consult found the well to be capped and infilled (with brick rubble) to a depth of 1.6 m below ground level (bgl).
- Within the central area a heavily overgrown single-track road (old route of Shawstead Road) was observed. The replacement road exits from North Dane Way and provides access to the Capstone household waste recycling centre.

13.37 Based on the observations reported by ST Consult no significant sources of potential contamination were identified. Full details are provided in **Appendix 13.1**.



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## Historical Activities On-site

13.38 A selection of historical maps was examined by ST Consult as part of their desk-based review. A summary of the key historical developments (on-site) is provided below:

- Earliest map dated 1865 shows the Site to be open land (presumably farmland) with some areas of woodland. The Site is divided into multiple irregular fields by fence line boundaries, with a road bisecting the Site in a southeast to northwest orientation (*i.e.* the old Shawstead Road). Shawstead Road appears to have been diverted/re-routed by 1979.
- On the 1907 map a shallow earthwork is shown on the southern half of the Site.
- A single detached house (Maunder's House) is shown on the maps until 1955.
- A single house is also shown within the north-eastern corner of the Site until 1964.

13.39 The key off-site historical developments are:

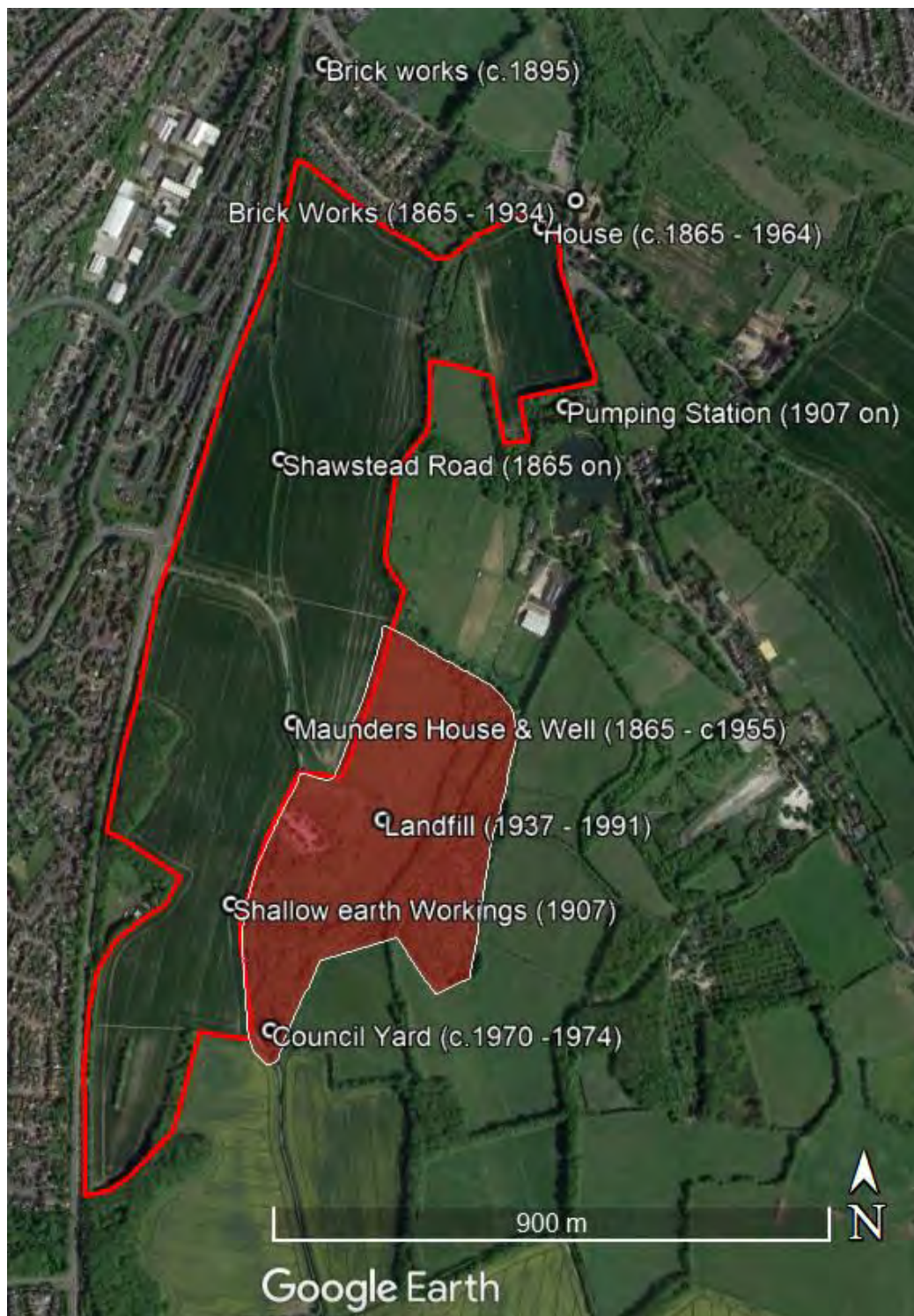
- Earliest map dated 1865 show the surrounding area to be mainly open farmland. Darland brick field/brick works is located northeast of the Site. By 1896 the brick works had expanded to include the north of the Site's north-western corner.
- By 1907 a pumping station was located adjacent to the north eastern Site boundary with a quarry and tramway 100 metres east from the north eastern corner of the Site. A large brick works is located 500 metres north west of the Site.
- By 1931 housing had been developed on land immediately north of the Site, formerly occupied by a brick works.
- By 1955 the quarry to the north of the Site was disused.
- By 1964 a council yard is located adjacent to the south eastern corner of the Site. A refuse tip is located to the east of the Site. The refuse tip (landfill) appears to have been completed (finished tipping) by 1991, however, it remained annotated until 2010.

13.40 The location of the identified potential sources is outlined in Figure 13.2.



**Figure 13.2: On-site and Off-site Potential Sources**

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13.41 A full description of the on-site and off-site historical developments and all available maps are reproduced in **Appendix 13.1**.

## Environmental Database

13.42 A commercial database search (provided by Groundsure) was obtained by ST Consult for the desk-based study to provide further information regarding the site and the surroundings (Order ref: HMD-137-5366555). Key relevant information and records are summarised below:

- **Current Landfills** – According to the environmental database, there are no current operational landfill sites located on-site or within a 250-metre search radius.
- **Historical Landfills** – There is one historical landfill site within 250 metres of the Site *i.e.* within the 250-metre planning consultation zone (Figure 13.3). EA records show that the Site was operated by Kent County Council (Ref. EAHLD19435) with waste (inert and household) first deposited in 1931 and the first licence issued in 1974. Waste was last deposited in 1991.

### Figure 13.3: Landfills in the vicinity of the Site (within 250 metres)

Source: EA (<https://data.gov.uk/dataset/17edf94f-6de3-4034-b66b-004ebd0dd010/historic-landfill-sites>)



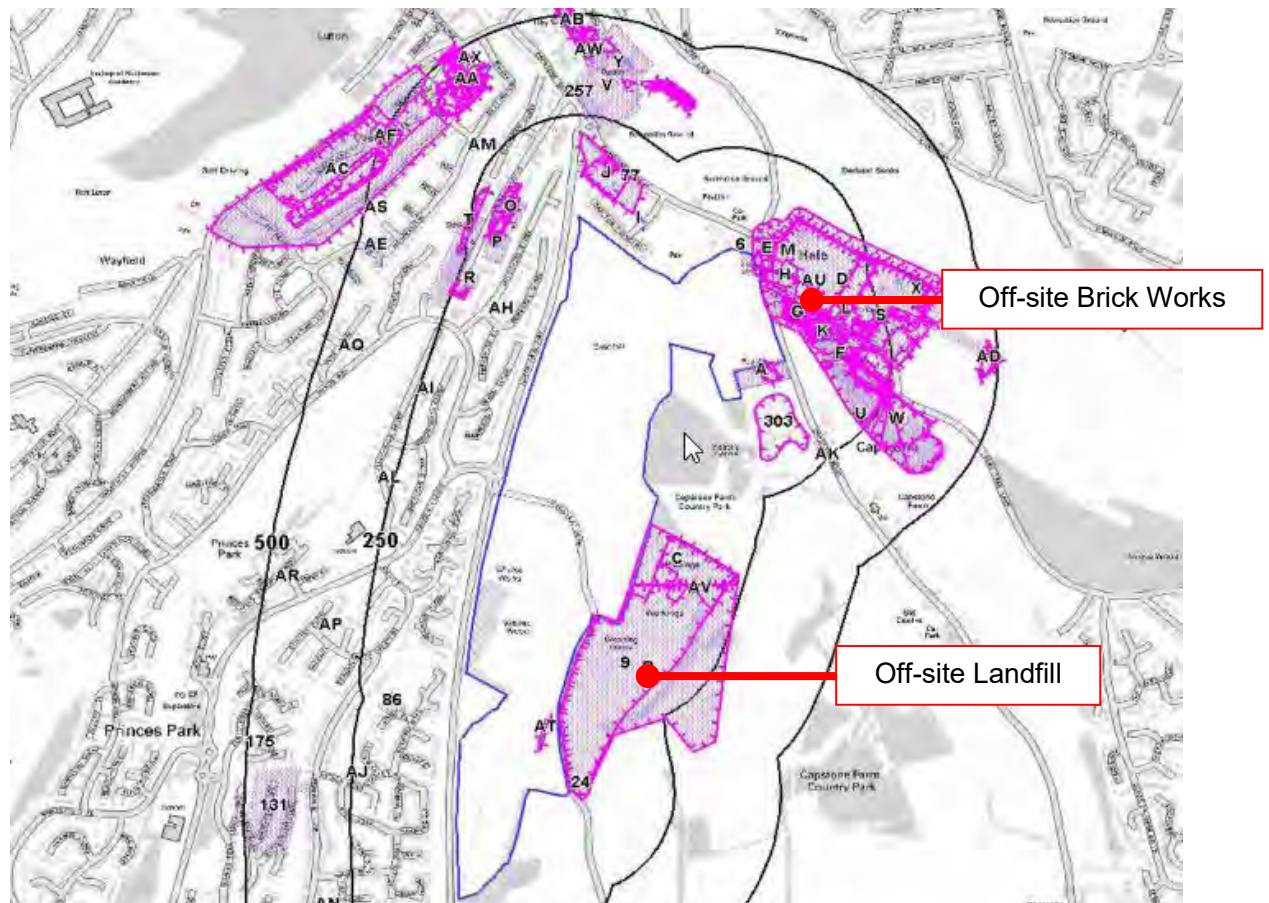
- **Contaminated land** – No sites determined as contaminated land under Part IIA of the EPA 1990 identified within 500 metres of the study Site.



- **Historical land use** – Various potentially contaminative uses have been identified from the available 1:10,000 scale mapping (Figure 13.4).

**Figure 13.4: Historical land uses (within 250 metres)**

Source: Groundsure Order ref: HMD-137-5366555



13.43 The full results of the environmental database search are reported in **Appendix 13.1**.

### Contamination Potential

13.44 The Site has a history of agricultural use and is located within a semi-rural area, with urban areas to the north and west. Several potentially contaminative uses have been identified both on-site and off-site (within 250 metres). This includes:

- **Agricultural activities (on-site)** – Historical use as agricultural farmland is likely to have involved the use of pesticides and herbicides. Therefore, there is a risk (although low) from these chemicals remaining within the upper soil profile.



- **Former buildings (on-site)** – Two houses were identified on the historical maps. These have been since demolished in-turn leading to localised areas of Made Ground.
- **Unspecified ground workings (on-site)** – A small area of ground workings, within the southern field, was identified within the environmental database. No visual evidence of this feature was identified by ST Consult during their site walk-over. ST Consult concluded that it may represent some degree of slope reprofiling rather than excavation (cut and fill).
- **Landfill site (off-site)** – Land immediately to the east of the southern site was used as an inert/household landfill between the early 1930s until completion in 1991. ST Consult noted that the landfill was a land raise and did not involve any infilling. The landfill represents a significant (potential) source of contamination in the form of landfill gas.

### **Unexploded Ordnance**

13.45 ST Consult undertook a preliminary search of regional unexploded ordnance records held by Zetica (**Appendix 13.1**). The assessment identified a high density of bombing during WWII around Chatham and Gillingham both located north of the Site. In addition, three bombing decoys were identified in the surrounding area (0.8 km south of the Site). The preliminary risk assessment recommends that a detailed UXO risk assessment be carried out prior to groundworks being undertaken at the Site.

### **Invasive Species**

13.46 ST Consult did not report common invasive non-native plants within the Phase I desk study. Common invasive non-native plants include Giant Hogweed (*Heracleum mantegazzianum*), Himalayan Balsam (*Impatiens glandulifera*) and Japanese Knotweed (*Fallopia japonica*).

13.47 The National Biodiversity Network (NBN) mapping (**Ref. 13.7**) was inspected for any details regarding the presence of these species on-site or in the near vicinity, Giant Hogweed, Himalayan Balsam and Japanese Knotweed was not indicated within the 2 km grid square within which the Site is located.

13.48 A full Scoping Survey (Phase 1 Habitat Survey) has been prepared by Corylus Ecology. This is presented in **Chapter 11** and **Appendix 11**.



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## Underground Pipelines and Transmission Assets

13.49 A search of the Linesearch (**Ref. 13.8**) database was undertaken on 25<sup>th</sup> March 2019. This database lists pipelines owned and/or operated by the following pipeline and transmission operators: BOC Limited (A Member of the Linde Group), BP Exploration Purbeck Southampton Pipeline, BPA, Centrica Energy, ConocoPhillips (UK) Ltd, ConocoPhillips Ltd Humber Refinery, Coryton Energy Co Ltd (Gas Pipeline), E-on UK Plc (Gas Pipelines Only), ESSAR, Esso Petroleum Company Limited, FibreSpeed Limited, Geo Networks Limited, Government Pipelines & Storage System, HV Cables, INEOS Manufacturing (Scotland and TSEP), Ineos Enterprises Limited, Mainline Pipelines Limited, Manchester Jetline Limited, Marchwood Power Ltd (Gas Pipeline), NPower CHP Pipelines, National Grid Gas and Electricity Transmission, Oikos Storage Limited, Premier Transmission Ltd (SNIP), RWEpower (Little Barford and South Haven), SABIC UK Petrochemicals, Scottish Power Generation, Star Energy, Total UK (Finaline, Colnbrook & Colwick Pipelines), Wingas Storage UK Ltd.

13.50 According to the database, there are SGN and UK Power Network assets in the zone of interest.

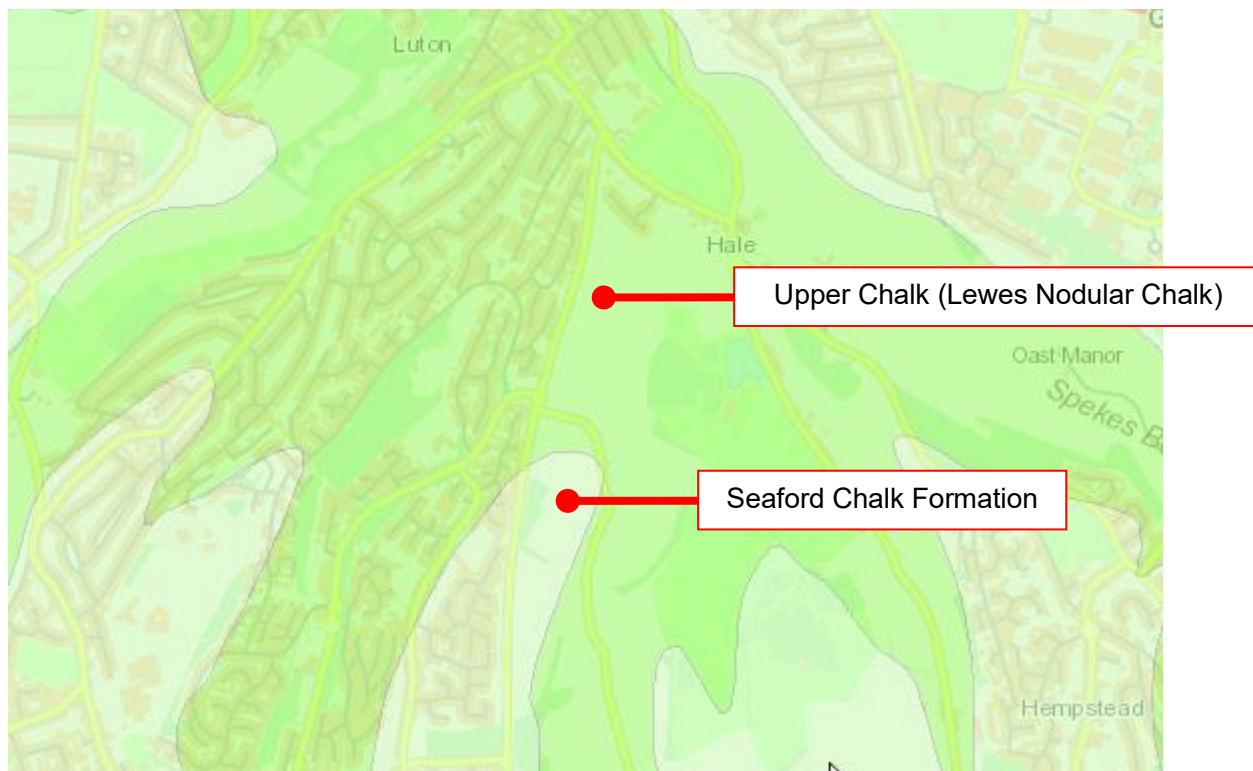
## Geology

13.51 According to the British Geological Society (BGS) Geoindex Onshore (**Ref. 13.9**), the northern portion of the Site is underlain by Upper Chalk (Lewes Nodular Chalk Formation) whilst the southern portion is underlain by Seaford Chalk Formation (Figure 13.5). Superficial deposits of Clay with flints (clay, silt, sand and gravel) over the Chalk bedrock is located south of Shawstead Road (Figure 13.6).



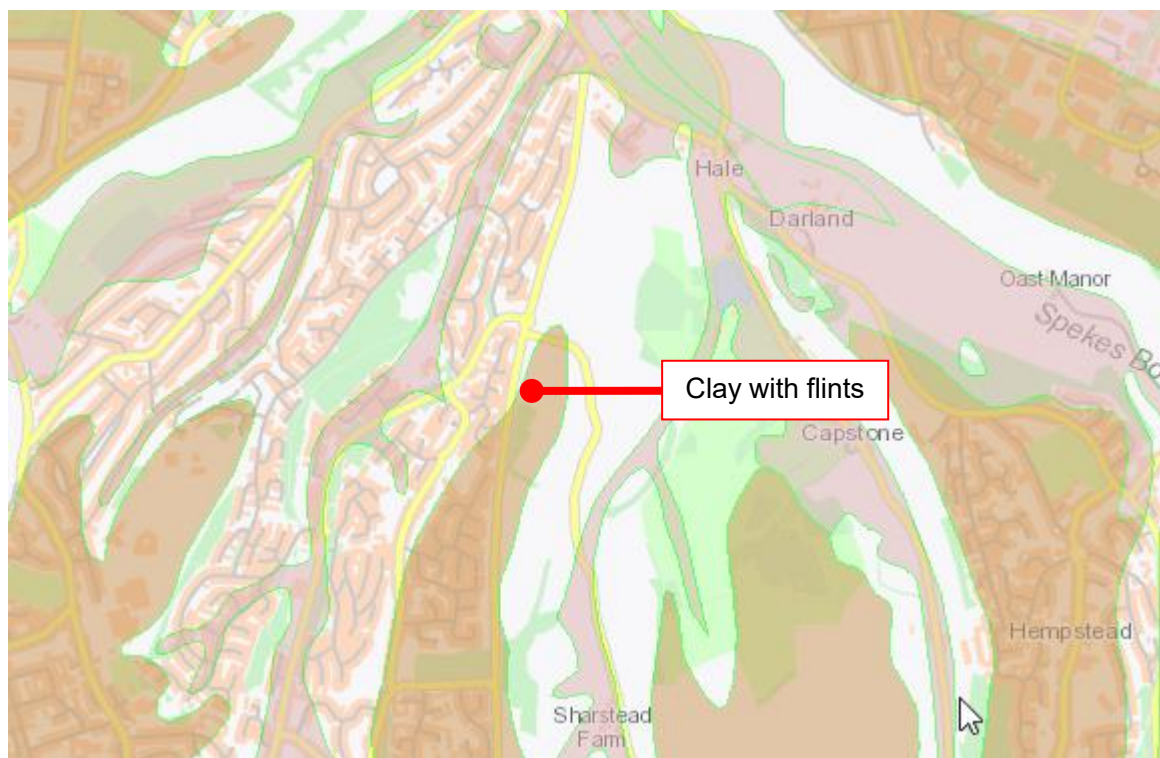
**Figure 13.5: Bedrock geology 1:50,000 scale**

Source: <http://mapapps2.bgs.ac.uk/geoindex/home.html>



**Figure 13.6: Superficial geology 1:50,000 scale**

Source: <http://mapapps2.bgs.ac.uk/geoindex/home.html>





13.52 According to the on-line BGS Borehole Record Viewer (**Ref. 13.10**) the closest borehole record (Ref. TQ76NE52) is associated with the previous 'Maunders House'. The borehole relates to a former well which was dug to 289 ft (88 m) bgl. The well is recorded as having been infilled (prior to 1958).

13.53 According to data issued by the Public Health England (**Ref. 13.1**), the land is in an area where less than 1-3% of residential properties are above the action level for Radon. No radon protection measures are considered necessary by the BGS.

### Hydrogeology

13.54 The aquifer classification system was updated on 1<sup>st</sup> April 2010 which provided new aquifer designations to replace the old system of aquifer classifications, such as Major, Minor and Non-Aquifer. This new system is in line with the Environment Agency's (EA's) Groundwater Protection Policy (GP3) and the Water Framework Directive (WFD) and is based on British Geological Survey mapping. From a review of the MAGIC website (**Ref. 13.11**) the Site is underlain by the following:

- **Unproductive** – The Clay with flints superficial deposits are classified as unproductive strata. These are deposits with low permeability that have negligible significance for water supply or river base flow.
- **Principal Aquifer** – The underlying Chalk has been assigned as a Principal Aquifer. Principal Aquifers are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

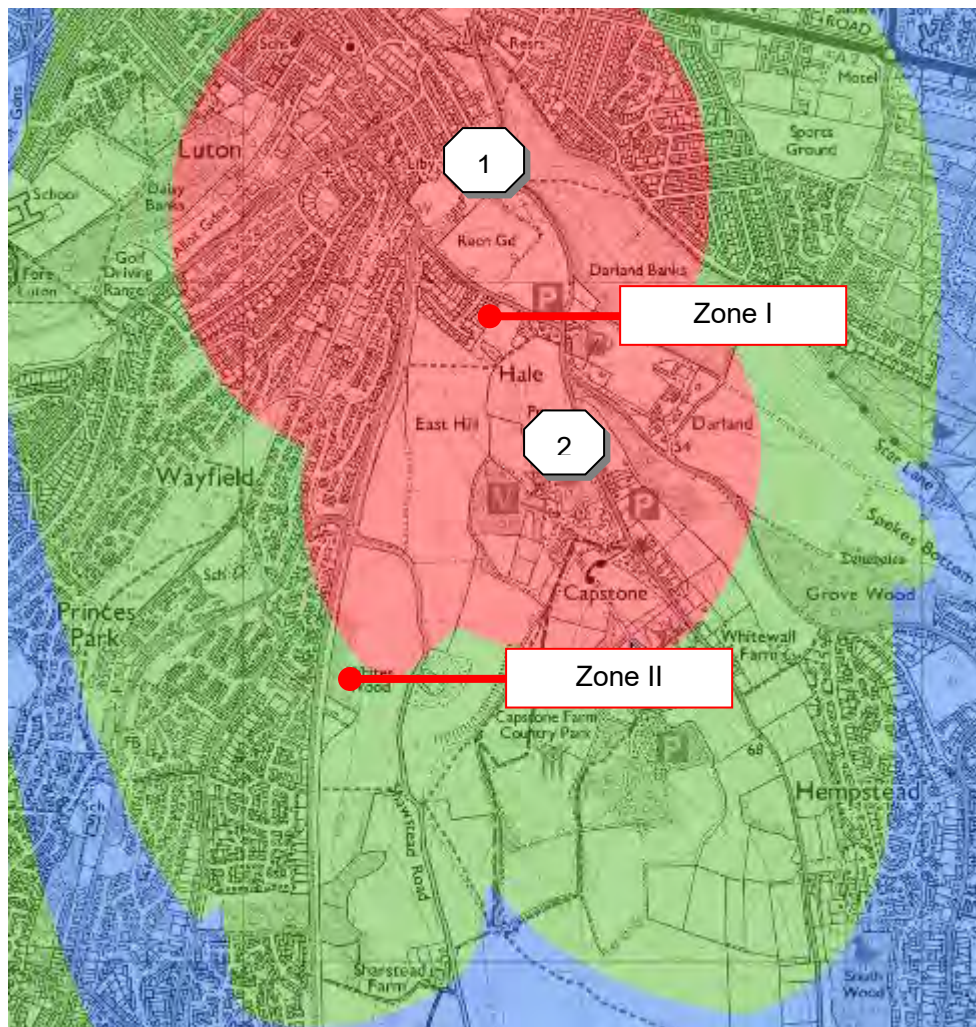
13.55 The EA have defined Groundwater Source Protection Zones (SPZs) for 2000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area, the closer the activity, the greater the risk. The maps show three main zones (*i.e.* an inner, an outer and the total catchment) and a fourth zone of special interest, which the EA occasionally apply, to a groundwater source. The MAGIC website indicates that the Site is in an SPZ.

13.56 The northern portion of the Site is in Zone I (Inner Protection Zone) which is defined as the 50-day travel time from any point below the water table to the source. This zone has a

minimum radius of 50 metres. The southern portion is in Zone II (Outer Protection Zone which is defined by a 400-day travel time from a point below the water table and has a minimum radius of 250 or 500 metres around the source, depending on the size of the abstraction (Figure 13.7).

**Figure 13.7: Source Protection Zones and Abstraction Points**

Source: <https://magic.defra.gov.uk/MagicMap.aspx>



13.57 According to the ST Consult report there is a licence (Ref. 9/40/02/0236/G) for a potable groundwater abstraction [2] held by Southern Water Services Ltd in relation to Capstone Pumping Station (adjacent to the north eastern Corner of the Site) and for the Luton Pumping Station (Ref. 9/40/02/0236/G), operated by Southern Water Services Ltd (30 metre north of the Site) [1].

13.58 The EA has determined groundwater vulnerability as Major (High) *i.e.* areas able to easily transmit pollution to groundwater. They are characterised by high leaching soils and the absence of low permeability superficial deposits. The remaining areas of the Site are classified





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as Major (Intermediate) *i.e.* soils that have some ability to prevent pollutants entering groundwater.

## Hydrology

13.59 For each River Basin District, the Water Framework Directive (WFD) requires a River Basin Management Plan to be published. These are plans that set out the environmental objectives for all the water bodies within the River Basin District and how they will be achieved. The plans are based upon a detailed analysis of the pressures on the water bodies and an assessment of their impacts. The plans must be reviewed and updated every six years. The ecological status of surface water bodies is based on the following quality elements: biological quality, general chemical and physico-chemical quality, water quality with respect to specific pollutants (synthetic and non-synthetic), and hydromorphological quality. There are five classes of ecological status (*i.e.* high, good, moderate, poor or bad). Ecological status and chemical status together define the overall surface water status of a watercourse.

13.60 No on-site water features were observed during the ST Consult Site inspection. The nearest surface water feature is a man-made lake within Capstone Country Park (100 metres east). There are no mainline Rivers within at least 2.5 km of the Site.

13.61 There are no surface water abstractions within 2 km of the Site.

13.62 The flood risk, according to the GOV.UK website, is:

- Flood risk from rivers or the sea – No risk identified.
- Flood risk from surface water – The eastern edges of the Site are at potential risk of surface water flooding. It is important to note that flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.
- Flood risk from reservoirs – No risk identified.

13.63 A flood risk assessment (FRA) for the Site is presented in **Chapter 12** and **Appendix 12.1**.

## Sensitive Land Uses

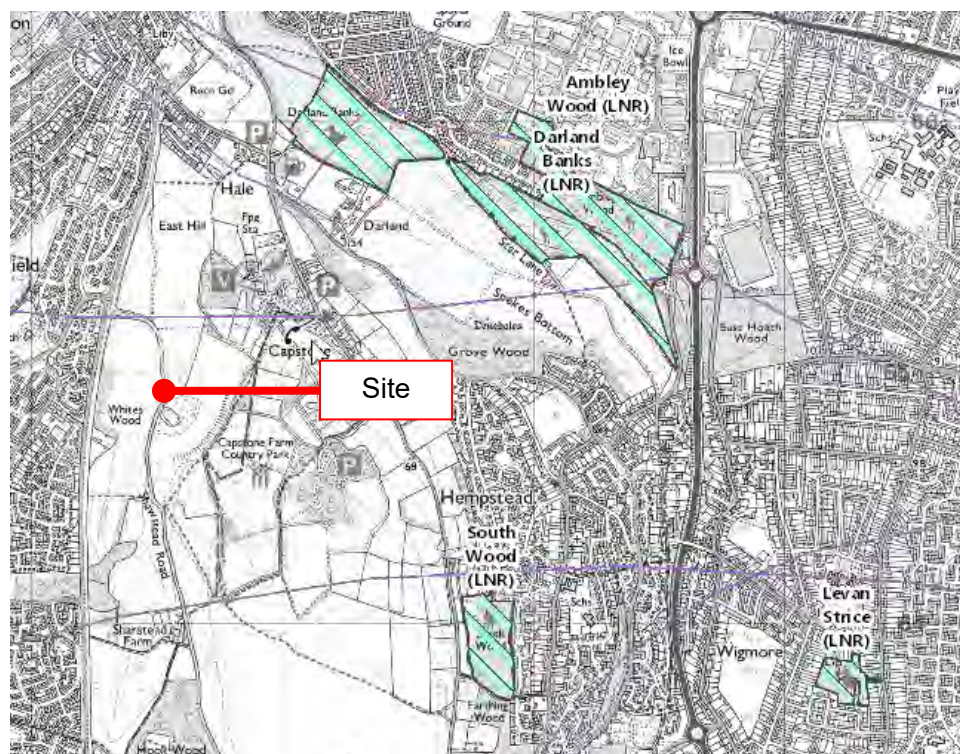
13.64 The MAGIC website (**Ref. 13.11**), which is managed by the Department for Environment, Food and Rural Affairs (Defra), was queried to locate ecological receptors such as Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar Sites, National Nature Reserves (NNR), Areas of Outstanding Natural Beauty (AONB) and National Parks. None of these designations were identified within 2 km of the Site.

13.65 Three Local Nature Reserves (LNRs) are located within 1 km of the Site the closest being Darland Banks (143 metres northeast).

13.66 There are no Listed Buildings on-site. The closest designated building is Capstone Farmhouse (Grade II, Ref. 1368251) located 490 metres from the Site.

### Figure 13.8: Statutory land and ecological designations

Source: <https://magic.defra.gov.uk/MagicMap.aspx> (2019)



13.67 Nitrate Vulnerable Zones (NVZs) cover some 62% of England and indicate all land draining to waters that are affected by nitrate pollution. NVZs were implemented by the *Nitrate*

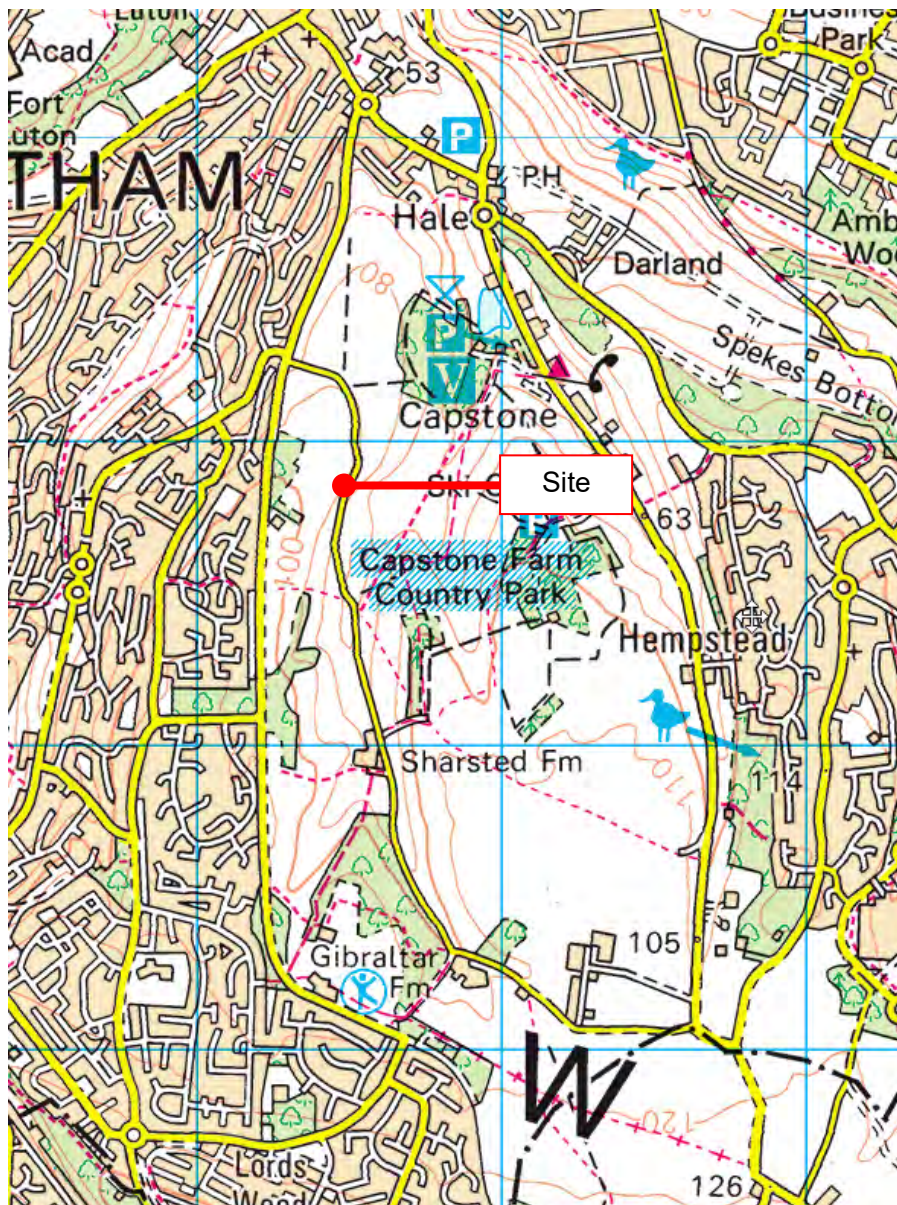


*Pollution Prevention Regulations 2008*, which came into force on 1<sup>st</sup> January 2009. According to the database, the Site is not located in an NVZ.

13.68 The nearest residential properties are located adjacent to the western and southern boundaries of the Site (*Figure 13.9*).

**Figure 13.9: Adjacent land uses surrounding site**

Source: Based upon the Ordnance Survey mapping with the permission of The Controller of Her Majesty's Stationery Office, Crown Copyright, Earth & Marine Environmental Consultants Ltd, Licence No. 100050755





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## Significance of the Environmental Setting

13.69 The significance of the environmental setting is as follows:

- **Groundwater [HIGH SENSITIVITY]** – The underlying Chalk has been assigned as a Principal Aquifer. The northern portion of the Site is in Zone I Source Protection Zone (SPZ) (Inner Protection Zone) whilst the southern portion is in Zone II SPZ (Outer Protection Zone).
- **Surface Water [LOW SENSITIVITY]** – There are no on-site water features or mainline rivers close to the Site. The nearest surface water feature is a man-made lake within Capstone Country Park (100 metres east).
- **Flood Risk [LOW SENSITIVITY]** – The Site is not located in area at risk of flooding due to Rivers. Parts of the Site (eastern edges) are predicted to be at risk of surface water flooding.
- **Ecological Sensitive Areas [LOW SENSITIVITY]** – Three Local Nature Reserves (LNRs) are located within 1 km of the Site the closest being Darland Banks (143 metres northeast).
- **Protected Buildings and Structures [LOW SENSITIVITY]** – There are no Listed Buildings on-site. The closest designated building is Capstone Farmhouse (Grade II, Ref. 1368251) located 490 metres from the Site
- **Residential Areas [HIGH SENSITIVITY]** – With respect to residential properties the Site is in a highly sensitive area (*i.e.* residential receptors are currently located adjacent to the western and northern boundaries).

## Environmental Assessment Works

13.70 ST Consult undertook a preliminary (limited scope) environmental site investigation, as part of a more geotechnical assessment, between 10/09/18 and 15/09/18. The works included:

- the drilling of 5 boreholes to a maximum depth of 20 metres bgl (cable percussion);
- the drilling of 5 boreholes to a maximum depth of 5 metres bgl (windowless sampler);
- the excavation of 7 trial pits to a maximum depth of 2.1 m bgl (tracked excavator); and
- the collection of 7 soil samples (6 topsoil, 1 natural) for analysis in-line with STL key contaminant suite (general inorganics, total phenols, speciated Polycyclic

aromatic hydrocarbons (PAHs), heavy metals, asbestos) of which two of these soil samples were analysed for the STL Pesticide suite.

13.71 The full results of the preliminary site investigation are presented in **Appendix 13.1**. The key findings are outlined below.

13.72 The location of the environmental soil sampling points is outlined within Figure 13.10.

**Figure 13.10: Environmental Sampling (STL Investigation, 2018)**

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13.73 The results of the soil analysis have been compared (by ST Consult) against published Tier 1 screening values (residential with homegrown produce) in accordance with the contaminated land exposure assessment (CLEA) methodology.





13.74 Except for Benzo[a]pyrene (BaP) there were no exceedences of stated Tier 1 screening values for any of the stated determinands that were analysed. The BaP exceedences (in-line with the ST Consult selected Tier 1 Screening values) were:

- BH3 (0.1 m) – BaP 4.4 mg/kg – The borehole log describes a firm mottled white silty clay with occasional crushed fine chalk gravel with coarse sand sized red brick (topsoil).
- WLS1 (0.15 m) – BaP 4.9 mg/kg – The borehole log describes a crop stubble over dark brown gravelly clay. Gravels are fine to medium angular to subangular flint with rare fine brick and clinker fragments.
- TP1 (0.1 m) – BaP 2.5 mg/kg – The borehole log describes a dark brown gravelly sandy clay. Gravel is fine to coarse surrounded flint, fine chalk and slate, with coarse sand sized brick.

13.75 The exceedences of the BaP Tier 1 screening level coincide with areas of shallow Made Ground (*i.e.* brick and clinker fragments). Given that the investigation was preliminary and limited in scope it is unclear the likely density with which Made Ground will exist across the wider 49.47 ha Site. As a result, a more detailed assessment will be required.

13.76 Two samples from TP4 (0.2 m) and TP6 (0.2 m) were screened for pesticides and herbicides. Both samples were below detection limits (in-house non-accredited test).

13.77 Although ST Consult well installations were installed to 20 metres bgl no groundwater was encountered during the investigation.

13.78 The ST Consult investigation recorded pH values in the range 7.7 to 8.6 and a soluble sulphate concentration in the range 8 mg/l to 96 mg/l. The Design Sulphate Class is DS-1. Groundwater was assumed by ST Consult to be immobile based on anticipated depth to groundwater (not encountered during the 2018 investigation). The Aggressive Chemical Environment for Concrete (ACEC) site classification is AC-1s.

### **Land Gas Assessment**

13.79 A formal land gas assessment was not included within the original scope of work conducted by ST Consult. ST Consult concluded, based on CIRIA C665 guidance, that the sensitivity of the Proposed Development was Moderate and, therefore, twelve gas readings should be carried out over a period of six months (**Ref. 13.12**).

13.80 A separate land gas monitoring programmes was started in December 2018 during which two rounds of monitoring were undertaken by ST Consult (04/12/18 and 14/12/18) using five installed windowless sample locations alongside the off-site historic landfill (Figure 13.11). The results of the land gas assessment are provided in **Appendix 13.2**. The results are discussed below.

**Figure 13.11: Land gas monitoring points (STL Consult, 2018)**

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13.81 Land gas is produced because of the decomposition of organic materials such as paper, vegetation, wood, *etc.* but it may also originate from natural sources, such as coal seams and organic rich soils. The principal components of ground gas are methane and carbon dioxide although trace gases such as hydrogen sulphide and carbon monoxide can also be present. Ground gases can present a hazard to site workers during construction activities (*e.g.* carbon dioxide is heavier than air and may accumulate in voids and methane is flammable), and can enter buildings, thus presenting a hazard to occupants in terms of asphyxiation or explosion.



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Methane is explosive at concentrations of between 5 and 15%, with 5% being the lower explosive limit (LEL).

13.82 Several guidance documents have been produced for new developments on gassing sites. The framework includes CIRIA's Report 149 (**Ref. 13.13**), which provides further guidance and an initial attempt at characterising gassing sites in terms of volume of gas rather than just concentrations. This was further developed by Wilson and Card's paper in 1999, which provided an approach considering the distribution of gas concentrations and flow rates. For this assessment, reference has been made to the recent CIRIA 665 (**Ref. 13.12**) document, assessing risks posed by hazardous ground gases to building, 2007, which provides the most up to date and comprehensive reference criteria for assessing land gas, by providing advice relevant to existing or planned development and a step-wise approach to risk assessment. The CIRIA guidance has been supplemented using BS 8485:2015 *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings* (**Ref. 13.14**).

13.83 The CIRIA C665 document uses both gas concentrations and borehole flow rates to define a characteristic situation for a site based on the limiting borehole gas volume flow for methane and carbon dioxide. This provides a Gas Screening Value (GSV), based on the maximum gas concentrations (methane or carbon dioxide) and flow rates recorded at the Site.

- $\text{GSV (litres of gas per hour)} = \text{max borehole flow rate (l/hr)} \times \text{max gas conc. (\%)}$

13.84 This then enables an appropriate Characteristic Situation to be determined (Table 13.1). The GSV should only be considered as a guideline value and not as an absolute threshold.



**Table 13.1: Modified Wilson and Card Classification (adapted from CIRIA Report 665)**

Characteristic Situation (CIRIA R149 & BS 8485:2015)	Risk Classification	Gas Screening Value (CH <sub>4</sub> or CO <sub>2</sub> (l/hr))	Additional Factors
CS1	Very low risk	<0.07 l/hr	Typical methane $\leq 1\%$ v/v and/or carbon dioxide $\leq 5\%$ v/v. Otherwise increase to Situation 2.
CS2	Low risk	<0.7 l/hr	Borehole air flow rate not to exceed 70l/hr. Otherwise consider increase to Situation 3.
CS3	Moderate risk	<3.5 l/hr	-
CS4	Moderate to high risk	<15 l/hr	Quantitative risk assessment required to evaluate scope of protective measures
CS5	High risk	<70 l/hr	-
CS6	Very high risk	<70 l/hr	-
<b>Note:</b> Gas Screening Value (GSV): litres of gas/hour is calculated by multiplying the gas concentration (%) by the measured borehole flow rate (l/hr).			

13.85 The characteristic situation defined above can be used to define the general scope of gas protective measures required. The philosophy behind this is that as the risks posed by the presence of methane and carbon dioxide in the ground increase the degree of redundancy within the type of protective system proposed is also increased, so if one method or element of the protection fails for any reason the building is not exposed to unacceptable risk. CIRIA C665 and BS 8485:2015 differ slightly in the presentation and scope of required protection measures versus the site-specific characteristic situation. In-line with current guidance BS 8485:2015 has been utilised (where required).



**Table 13.2: Gas Protection Score (BS 8454:2015)**

Characteristic Situation	Minimum Gas Protection Score (Points)			
	High Risk Type A Building	High Risk Type B Building	Medium Risk Type C Building	Low Risk Type D Building
CS1	0	0	0	0
CS2	3.5	3.5	2.5	1.5
CS3	4.5	4	3	2.5
CS4	6.5A	5.5A	4.5	3.5
CS5	_B	6.5A	5.5	4.5
CS6	_B	_B	7.5	6.5

Notes:

A Residential buildings should not be built on CS4 or higher sites unless the type of construction or site circumstances allow additional levels of protection to be incorporated e.g. high-performance ventilation or pathway intervention measures, and an associated sustainable system of management of maintenance of the gas control system, e.g. in institutional and/or fully serviced contractual situations.

B The gas hazard is too high for this empirical method to be used to define the gas protection measures.

Under BS8485:2015 the building type proposed would be Type B.

13.86 When the minimum gas protection score has been determined for the building, or for each part of the building, then a combination of two or more of the following three types of protection measures should be used to achieve that score *i.e.* structural barrier of the floor slab or basement slab and walls; ventilation measures and a gas resistant membrane.

13.87 The results of the two rounds of ST Consult gas monitoring is summarised below:

- Gas flow – All gas flows from the five monitored locations were either zero or negative during both rounds of monitoring. Where flow rates were recorded as zero or negative, the flow resolution of the GFM4000 has been used as the maximum flow rate (*i.e.* 0.1 l/hr). 0.1 l/hr has been utilised within GSV calculation.
- Maximum Carbon dioxide – The CO<sub>2</sub> levels ranged from 0.0 – 2.7 % v/v. 2.7 % v/v has been utilised within the GSV calculation.
- Maximum Methane – Methane was not recorded (above GFM4000 detection limits) during either of the two visits.
- Maximum Hydrogen sulphide – Hydrogen sulphide was not recorded (above GFM4000 detection limits) during either of the two visits.



- Carbon monoxide – Carbon monoxide was not recorded (above GFM4000 detection limits) during either of the two visits.

13.88 The Calculated GSV (carbon dioxide) is 0.0027 l/hr *i.e.* meets the requirements for CS1. As the methane concentrations were  $\leq 1\%$  v/v and/or carbon dioxide  $\leq 5\%$  v/v there is no need to increase to CS2.

13.89 The BS 8485:2015 Minimum Gas Protection Score for CS1 (High Risk – Type B Building) is zero *i.e.* no protection measures are deemed necessary. It is important to note that this assessment is based on two visits. Further visits will be required in order to provide a full and complete assessment.

## IDENTIFICATION AND EVALUATION OF KEY EFFECTS

13.90 This section considers the potential effects of the Proposed Development, both during the construction and operational phases of the development.

13.91 The regime for contaminated land was set out in Part 2A (ss.78A-78YC) of the *Environmental Protection Act 1990* (EPA), as inserted by S.57 of *The Environment Act 1995* and came into effect in England on the 1<sup>st</sup> April 2000 as '*The Contaminated Land (England) Regulations 2000* (SI 2000/227)'. These regulations were subsequently revoked with the provision of '*The Contaminated Land (England) Regulations 2006* (SI 2006/1380)', which came into force in England on 4th August 2006, and consolidated the previous regulations and amendments. The 2006 regulations have recently been modified with the introduction of *The Contaminated Land (England) (Amendment) Regulations 2012*, which came into force on 6<sup>th</sup> April 2012. Under Part 2A of the EPA Section 78A(2), "contaminated land" is defined as "land which appears... to be in such a condition, by reason of substances in, on or under the land, that –

- significant harm is being caused or there is a significant possibility of such harm being caused; or
- pollution of controlled waters (including streams, lakes and groundwater) is being, or is likely to be caused.

13.92 Based on the above factors, a qualitative assessment of the presence of potential pollutant linkages can be undertaken.



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## Conceptual Site Model

13.93 The soil and groundwater conditions on the Site, as identified through the ST Consult desk study and preliminary site investigation, have been summarised into a Conceptual Site Model (CSM), which defines the key sources, pathways and receptors that have been identified as being relevant to this Site. The CSM considers the situation and potential pollutant linkages before the planned redevelopment of the area and afterwards and considers the following factors:

- SOURCES – the identification of contaminants within the soils and groundwater that represent potential pollution sources;
- PATHWAYS – the identification of the potential exposure mechanisms and migration pathways from the potential sources; and
- RECEPTORS – the identification of the potential receptors that could be sensitive to harm if exposed to these pollution sources.

13.94 Collectively each of these scenarios would be considered a potential pollutant linkage that may require action.

13.95 It has been assumed for the purposes of this assessment that the Site use will change from its current use (mainly agricultural) into a mixed-use development consisting of up to 800 dwellings. This will include a 2 person GP surgery, a small row of 4 shops (e.g. hairdressers and local convenience shop *etc.*) and a 2-form entry primary school. The initial parameter plans show building heights of between 2 storey and 4 storeys. Construction will involve ground disturbance (e.g. excavation, landscaping, waste disposal *etc.*).

13.96 A conceptual model is presented below (*Table 13.2*) in accordance with the guidance outlined within Contaminated Land Report 11 (CLR11) Model Procedures for the Management of Land Contamination, Environment Agency (September 2004) (**Ref. 13.3**).

## Identification of Potential Sources

13.97 Based on the information from the ST Consult desk study, historical maps, published information and results of the preliminary ground investigation, a summary of potential contaminant sources is provided below.





13.98 The Site has a history of agricultural use and is located within a semi-rural area, with urban areas to the north and west. Several potentially contaminative uses have been identified both on-site and off-site (within 250 metres). This includes:

- **Agricultural activities (Category Historic/Current - On-site/Off-site)** – Historical use as agricultural farmland is likely to have involved the use of pesticides and herbicides. Therefore, there is a risk (although low) from these chemicals remaining within the upper soil profile.
- **Former buildings (Category: Historic - On-site)** – Two houses were identified on the historical maps. These have been since demolished in-turn leading to localised areas of Made Ground. The Made Ground is likely to consist of localised demolition rubble but could include heavy metals and Polycyclic Aromatic Hydrocarbons (PAHs) (e.g. ash and cinder) and asbestos containing matters (e.g. building materials).
- **Landfill site (Category: Historic - Off-site)** – Land immediately to the east of the southern site was used as an inert/household landfill between the early 1930s until completion in 1991. ST Consult noted that the landfill was a land raise and did not involve any infilling. The landfill is still considered to constitute a (potential) significant source of contamination in the form of landfill gas.

13.99 From the available information it appears that there have been limited (potentially) contaminative activities undertaken on-site as most of the Site has remained in agricultural use.

### **Identification of Potential Exposure Pathways**

13.100 Exposure pathways are the potential routes and mechanisms by which potential on-site sources could be linked to the identified potential receptors and thereby expose them to potential harm. Only plausible pathways need be considered, however.

13.101 The following potential exposure pathway has been identified at the Site:

- inhalation of contaminated ground (soils and dust);
- dermal contact with contaminated ground (soils and dust);
- direct ingestion of contaminated ground (soils and dust);
- inhalation of vapours and/or gases;
- uptake into edible produce (fruits and vegetables);
- migration of contaminants through the soil;





- migration of contaminants via groundwater;
- migration of contaminants via run-off or surface water bodies via through direct flow or via transmission along conduits, for example drains or the gravel pack surrounding a drain;
- contact of building materials and services with contaminated ground; and
- fire and explosion due to presence of vapours and/or gases.

### **Potential Receptors**

13.102 Based on the Site's environmental setting and the proposed future end use of the area following redevelopment, the following potential receptors have been identified:

- current site users (*i.e.* edible produce/plant uptake, agricultural workers, trespassers and members of the public)
- groundworkers (*i.e.* construction workers, maintenance workers or other personnel who may be directly exposed in the course of their activities).
- future site users (*i.e.* users and residents of the Site post redevelopment including edible produce/plant uptake within residential gardens and communal areas).
- groundwater (*i.e.* controlled waters associated with the Chalk Principal Aquifer);
- infrastructure and services (*i.e.* on-site structures post redevelopment); and
- third-party land (*i.e.* the possibility of contamination migrating off-site onto third party land via contaminated groundwater, surface water run-off *etc.*)

13.103 Although groundwater may be in hydraulic continuity with surface water, the lack of surface water features immediately surrounding the Site means this is not considered a realistic (significant) receptor for site-derived contamination (if indeed it is present).

13.104 If the Site was redeveloped, any associated activities may bring workers and construction workers into contact with potentially contaminative materials, however, it is considered that the risks to workers will be short term and controlled by safe working procedures.

13.105 It is recognised that there may also be dust emissions during any future planned construction work however, even without mitigation measures it is unlikely that emissions of dust would cause a nuisance issue to the closest off-site human receptors. Notwithstanding this mitigation measures would need to be included as part of the Construction Environmental



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Management Plan (CEMP) which would reduce the level of impact and ensure protocols are in place to minimise the potential for exposure.

### **Potential Pollutant Linkages**

13.106 In order for there to be a plausible pollutant linkage there must be a source, receptor and pathway and a feasible linkage between them (a so called pollutant linkage). Consequently, even where a contaminant is identified, if there is no pathway for the contamination to reach a receptor, or no receptor then there can be no significant risk and remedial actions are not required. Furthermore, even if there is a complete pollutant linkage, it is possible that the contaminant concentration that can pass along the linkage does not represent a significant risk to human health or the environment. Central to this risk assessment process is the development of a 'conceptual model'. This is a descriptive and/or pictorial representation of the area of potential contamination, the surrounding environment and the processes acting on the contaminants by which they can move and come into contact with receptors (e.g. by leaching and migration into groundwater).

13.107 Production of a conceptual model requires an assessment of risk to be made. Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, in order to assess risk both the likelihood and the consequences of an event must be taken into account. This report adopts the methodology for risk evaluation presented in CIRIA report C552 'Contaminated Land Risk Assessment – A Guide to Good Practice', 2001 (**Ref. 13.15**).

13.108 The method is qualitative and involves the classification of the following:

- the magnitude of the potential severity or consequence of the risk occurring (*Table 13.3*);
- the magnitude of the likelihood or probability of the risk occurring (*Table 13.4*); and
- once the likelihood of an event occurring and its severity have been classified, a risk category can be assigned using *Table 13.5*.



**Table 13.3 – Classification of consequence**

Consequence	Definition
Severe	<p>Short term (acute) risk to human health likely to result in 'significant harm' as defined by the <i>Environment Protection Act 1990</i>, Part IIA.</p> <p>Short term risk of (significant) pollution of sensitive water resource.</p> <p>Catastrophic damage to building/property.</p> <p>A short term risk to a particular ecosystem, or organism forming part of such ecosystem.</p>
Medium	<p>Chronic damage to human health (significant harm).</p> <p>Pollution of sensitive water resources.</p> <p>A significant change in a particular ecosystem, or an organism forming part of such an ecosystem.</p>
Mild	<p>Pollution of non-sensitive water resources.</p> <p>Significant damage to crops, buildings, structures and services.</p> <p>Damage to sensitive buildings/structures/services or the environment.</p>
Minor	<p>Harm, although not necessarily significant harm, which may results in a financial loss, or expenditure to resolve.</p> <p>Non-permanent health effects to human health (easily prevented by means such as personal protective clothing <i>etc.</i>).</p> <p>Easily repairable effects of damage to buildings, structures and services.</p>

**Table 13.4 – Classification of probability**

Likelihood	Definition
High	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution.
Likely	There is a pollutant linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period that such an event would take place and is even less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.



**Table 13.5: Risk Assessment Matrix**

		Consequence			
		Severe	Medium	Mild	Minor
Likelihood of Occurrence	High	Very High	High	Moderate	Moderate/Low
	Likely	High	Moderate	Moderate/Low	Low
	Low	Moderate	Moderate/Low	Low	Very Low
	Unlikely	Moderate/Low	Low	Very Low	Very Low

13.109 The description of the classified risks and likely actions required, in accordance with CIRIA C552, are:

- **VERY HIGH RISK** – There is a high probability that severe harm could arise to a designated receptor from an identified hazard OR, there is evidence that severe harm to a designated receptor is currently happening. This risk (if realised) is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
- **HIGH RISK** – Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term.
- **MODERATE RISK** – It is possible that harm could arise to a designated receptor from an identified hazard. However, if it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
- **LOW RISK** – It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
- **VERY LOW RISK** – There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.



13.110 A conceptual model has been derived based on the information obtained through the desk-based study and based on the current and future usage of the Site. This is detailed in *Table 13.6*.

13.111 Consideration has also been given to the potential effects associated with the construction phase of the Site's redevelopment in addition to the operational phase of the Site following its development.

**Table 13.6: Conceptual Site Model**

Pathway	Receptor	Potential Pollutant Linkage and Significance
Ingestion, inhalation and/or dermal contact	<b>HHR01 Human Health</b> Current Site users	Likelihood x Consequence = RISK LOW x MINOR = VERY LOW
<p>The property is currently used for agricultural purposes (arable production). There are various public rights of way across or around the Site. The rural nature of the Site means it is currently easily accessible to trespassers.</p> <p>ST Consult undertook a preliminary site investigation in 2018 during which 7 soil samples (6 topsoil, 1 natural) were obtained and analysed for STL key contaminant suite (<i>i.e.</i> general inorganics, total phenols, speciated PAHs, heavy metals, asbestos). Two of these soil samples were analysed for the STL Pesticide suite. No groundwater was encountered during the site investigation works.</p> <p>The results of the soil analysis have been compared (by ST Consult) against published Tier 1 screening values (residential with homegrown produce) in accordance with the CLEA methodology. Except for BaP, there were no exceedences of stated Tier 1 screening values for any of the stated determinands that were analysed.</p> <p>Although the Site is easily accessible the preliminary investigation has not identified any significant risks.</p>		



Pathway	Receptor	Potential Pollutant Linkage and Significance
Ingestion, inhalation and/or dermal contact	<b>HHR02 Human Health</b> Construction Workers	Likelihood x Consequence = RISK LOW x MINOR = VERY LOW
<p>The Site will be subject to clearance/turn-over including the areas where previous buildings were located.</p> <p>The site investigation did not identify any significant shallow on-site (in ground) sources of contamination beyond that identified in HHR01.</p> <p>The redevelopment of the Site will involve ground disturbance and removal of some shallow Made Ground. Any localised Made Ground encountered during the redevelopment works should be assessed and removed as required.</p> <p>Construction mitigations measures would need to include a formal CEMP to minimise potential Environmental impacts. It can be stated that where construction activities involve ground disturbance, appropriate legislative requirements and industry –standard procedures and protocols will be applied such as damping down of soils, cleaning and wetting of roadways, managing stockpiles, dust monitoring, wheel washes, PPE, RPE and hygiene facilities.</p> <p>Normal operational hygiene requirements and procedures will be applied. These would be sufficient to break any potential pollution linkages with the below ground materials (if indeed they are present).</p>		

Pathway	Receptor	Potential Pollutant Linkage and Significance
Ingestion, inhalation and/or dermal contact	<b>HHR03 Human Health</b> Future Site Users	Likelihood x Consequence = RISK LOW x MINOR = VERY LOW
<p>ST Consult undertook a preliminary site investigation in 2018 during which 7 soil samples (6 topsoil, 1 natural) were obtained and analysed for STL key contaminant suite (<i>i.e.</i> general inorganics, total phenols, speciated PAHs, heavy metals, asbestos). Two of these soil samples were analysed for the STL Pesticide suite. No groundwater was encountered during the site investigation works.</p> <p>The results of the soil analysis have been compared (by ST Consult) against published Tier 1 screening values (residential with homegrown produce) in accordance with the CLEA methodology. Except for BaP there were no exceedences of stated Tier 1 screening values for any of the stated determinands that were analysed.</p> <p>The Site will be subject to clearance/turn-over including the areas where previous buildings were located. Any localised Made Ground encountered during the redevelopment works should be assessed and removed as required. Where required, localised replacement of existing topsoil should be undertaken in areas of proposed private gardens and communal landscaping.</p> <p>Removal and/or replacement of impacted soils would be enough to break the pollutant linkage.</p>		



Pathway	Receptor	Potential Pollutant Linkage and Significance
Migration from impacted soils to groundwater	<b>CWR01 Controlled Waters</b> Future Site Users	Likelihood x Consequence = RISK LOW x MINOR = VERY LOW
<p>The Clay with flints superficial deposits are classified as unproductive strata whilst the underlying Chalk has been assigned as a Principal Aquifer.</p> <p>ST Consult undertook a preliminary site investigation in 2018 during which 7 soil samples (6 topsoil, 1 natural) were obtained and analysed for STL key contaminant suite (<i>i.e.</i> general inorganics, total phenols, speciated PAHs, heavy metals, asbestos). Two of these soil samples were analysed for the STL Pesticide suite.</p> <p>Although 5 boreholes were progressed to 20 m bgl, no groundwater was encountered during the site investigation works.</p> <p>The results of the soil analysis have been compared (by ST Consult) against published Tier 1 screening values (residential with homegrown produce) in accordance with the CLEA methodology. Except for BaP there were no exceedences of stated Tier 1 screening values for any of the stated determinands that were analysed.</p> <p>The Site will be subject to clearance/turn-over including the areas where previous buildings were located. Any localised Made Ground encountered during the redevelopment works should be assessed and removed as required. Where required, localised replacement of existing topsoil should be undertaken in areas of proposed private gardens and communal landscaping.</p> <p>There is no evidence of significantly impacted soils hence the risk to the Principal Aquifer is minimal, both currently and post redevelopment.</p>		

Pathway	Receptor	Potential Pollutant Linkage and Significance
Direct contact	<b>BER01 Built Environment</b> Future on-site buildings, services and structures	Likelihood x Consequence = RISK LOW x MINOR = VERY LOW
<p>ST Consult undertook a preliminary site investigation in 2018 during which 7 soil samples (6 topsoil, 1 natural) were obtained and analysed for STL key contaminant suite (<i>i.e.</i> general inorganics, total phenols, speciated PAHs, heavy metals, asbestos). Two of these soil samples were analysed for the STL Pesticide suite.</p> <p>The results of the soil analysis have been compared (by ST Consult) against published Tier 1 screening values (residential with homegrown produce) in accordance with the CLEA methodology. Except for BaP there were no exceedences of stated Tier 1 screening values for any of the stated determinands that were analysed.</p> <p>As the ST Consult works were a preliminary investigation further works will be required in the areas where suspected shallow Made Ground will be present (<i>i.e.</i> previously demolished residential buildings).</p> <p>The ST Consult investigation recorded pH values in the range 7.7 to 8.6 and a soluble sulphate concentration in the range 8 mg/l to 96 mg/l. The Design Sulphate Class is DS-1. Groundwater was assumed by ST Consult to be immobile based on anticipated depth to groundwater (not encountered during the 2018 investigation). The Aggressive Chemical Environment for Concrete (ACEC) site classification is AC-1s.</p>		



Any service pipes should be installed to comply with <i>Water Supply (Water Fittings) Regulations 1999</i> and <i>Water Supply (Water Quality) Regulations 2000</i> . All materials to be Water Regulations Advisory Scheme (WRAS) approved for use on potable water supplies.		
Pathway	Receptor	Potential Pollutant Linkage and Significance
Migration of land gas through soils	<b>BER02 Built Environment</b> Future on-site buildings, services and structures	Likelihood x Consequence = RISK LOW x MILD = LOW
<p>No evidence of any significant on-site in-ground materials was noted by ST Consult.</p> <p>There is one historical landfill site within 250 metres of the Site <i>i.e.</i> within the 250-metre planning consultation zone. EA records show that the site was operated by Kent County Council (Ref. EAHLD19435) with waste (inert and household) first deposited in 1931 and the first licence issued in 1974. Waste was last deposited in 1991.</p> <p>A land gas monitoring programmes was started in December 2018 during which two rounds of monitoring were undertaken by ST Consult (04/12/18 and 14/12/18) using five installed windowless sample locations alongside the off-site historic landfill.</p> <p>The Calculated GSV (carbon dioxide) is 0.0027 l/hr <i>i.e.</i> meets the requirements for Characteristic Situation 1 (CS1). As the methane concentrations were <math>\leq 1\%</math> v/v and/or carbon dioxide <math>\leq 5\%</math> v/v there is no need to increase to Characteristic Situation 2 (CS2).</p> <p>The BS 8485:2015 Minimum Gas Protection Score for CS1 (High Risk – Type B Building) is zero <i>i.e.</i> no protection measures are deemed necessary. It is important to note that this assessment is based on two visits.</p> <p>Further visits will be required in order to provide a full and complete assessment but based on the current results the risk is low.</p>		

## Site Preparation, Clearance and Construction

### Disposal of Contaminated Spoil

13.112 A certain volume of material would be required to be excavated for the laying of building foundations and services. Sustainable solutions will be implemented to enable (as far as practical) the re-use of waste materials and avoidance of landfill disposal.

13.113 A Site Waste Management Plan (SWMP) will also be produced for the Proposed Development. Although this is no longer a statutory requirement it is still considered best practice. The main objectives of the SWMP will be; to ensure that building materials are managed efficiently, that waste is disposed of legally, and that material recycling, reuse and recovery is maximised. The completed SWMP will provide a description of the wastes removed from the Site; identify the companies who removed the wastes and their waste carrier registration number; detail the disposal/ treatment sites that the wastes were taken to; and provide the environmental permits or exemptions held by the disposal/treatment sites used.





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13.114 Opportunities for reusing material from excavations on site are likely to be minimal as no significant ground raising is proposed and the majority would therefore be used for landscaping (where appropriate) or require removal from Site for off-site disposal (*i.e.* any unsuitable materials). Overall, there is potential for the construction phase to result in a minor positive effect on the soils and surrounding habitats due to the removal of unsuitable Made Ground materials.

13.115 Due to the previous use of the Site some material excavated from the Site may require off-site disposal and could be classified as hazardous waste. All waste material would be disposed of at a licensed landfill site with prior consent from the EA. The material would require transporting and disposal in accordance with *Waste (England and Wales) Regulations 2011*. The excavated material should be analysed to determine its classification and to identify an appropriate disposal facility.

13.116 In order to determine whether the excavation waste is hazardous or not, the potential contaminants would be identified based on the history of the waste, with sufficient representative samples of the waste being subjected to appropriate laboratory chemical analysis. The data would be assessed in accordance with EA guidance.

13.117 Chemical testing would be required to confirm the disposal classification prior to disposal. Any Made Ground would likely be classified as either 'hazardous' or 'non-hazardous'. The natural soils would be expected to be classified as inert.

13.118 Following the classification of excavation wastes, the options available for the waste would be considered in the context of the waste hierarchy:

- On-site reuse (with or without prior treatment);
- Off-site reuse (with or without prior treatment), *e.g.* use of waste in construction at a site exempt from the requirement to hold an environmental permit; and
- Off-site disposal (with or without prior treatment), *i.e.* landfill.

13.119 All waste transfer documentation shall be maintained by the Principal Contractor for the required statutory period (*i.e.* two years for general waste and three years for hazardous waste).

13.120 The potential effect of waste disposal activities would be a temporary, short-term, local effect of negligible significance



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### Risks to Groundworkers and Public Safety

13.121 During the construction phase, earthworks could disturb potentially contaminated material (*i.e.* historic demolition materials from the two previous houses), to which construction workers may be exposed. These activities could create plausible pollutant linkages. In the absence of appropriate mitigation and the use of PPE, any contamination present in the soil would present a risk to construction workers. However, worker safety would be the subject of the mandatory requirements of the *Control of Substances Hazardous to Health Regulations 2003* (COSHH) and the *Construction (Design and Management) Regulations 2015* (CDM). These regulations set out the extensive requirements for the protection of the workforce and stress the importance of appropriate procedures in the event of the workforce encountering pockets of unknown contamination.

13.122 Adherence to the legislative requirements described above would significantly reduce the health and safety risk posed to site workers during the construction phase. The potential effect of demolition and construction works on-site workers would therefore be negligible.

13.123 In respect of public safety, the Site would be surrounded by hoarding and would always be secured. The risk to individual members of the public during construction would therefore be negligible. Dust control measures would reduce dust emissions to an acceptably low level. The potential effect of site clearance and construction works on public safety would be a temporary, short-term, local effect of negligible significance.

### Risk to Water Resources

13.124 All site works will be undertaken in accordance with the EA's current pollution prevention guidance hosted on the [www.gov.uk](http://www.gov.uk) website. Pollution prevention guidance (PPGs) which advised industry and the public about their legal responsibilities was formerly withdrawn on 17 December 2015. The EA no longer provides 'good practice' guidance.

13.125 Construction vehicles will be properly maintained to reduce the risk of hydrocarbon contamination and will only be active when required. Construction materials will be stored, handled and managed to reduce the risk of accidental spillage or release. Construction contractors will also take full account of the requirements of the EA's current pollution prevention guidance.



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13.126 No underground storage tanks will be used during the construction phase. Any liquids such as degreasers, concrete release agents, oils or diesel required as part of the construction works will be stored in above ground tanks, drums or IBCs and located on designated areas of hardstanding. In accordance with the *Control of Pollution (Oil Storage) (England) Regulations 2001*, any vessel storing more than 200 litres of oil will have secondary bunding. Bunding will be specified having a minimum capacity of 'not less than 110% of the container's storage capacity or, if there is more than one container within the system, of not less than 110% of the largest container's storage capacity or 25% of their aggregate storage capacity, whichever is the greater'.

13.127 During construction, dewatering of groundwater from excavations is possible but is considered unlikely given that the ST Consult investigation did not encounter any perched waters. Should dewatering be necessary, care will be taken to ensure the quality of this water is sufficiently high to allow discharge into the municipal sewer. Prior to the construction phase, discussions will be held with the local water company to ascertain if such disposal would be possible. Alternatively, if the quality of the groundwater is unsuitable for discharge to sewer, collection and off-site disposal to a suitably licensed waste facility will be undertaken.

13.128 During the construction process, surface water runoff and groundwater removed from the excavations through dewatering operations could contain new sources of contaminants such as sediment. If this was to be discharged to the storm water system leading to the local watercourse, a temporary, short-term, local effect of minor adverse significance could arise in terms of water quality adjacent to the outflow on this reach of the watercourse.

#### Contamination of Ground during Construction

13.129 During the construction works potential new sources of potential contamination would be introduced and stored on the Site in the form of, for example, diesel fuel, oils, chemicals and construction materials. As a result, there would be a risk related to material or fuel leakages or spillages directly or indirectly to the soil. In the absence of the adoption of mitigation methods, the risk of soil contamination occurring as a direct result of construction would be a temporary, short-term, local effect of negligible significance.

### **Completed Development**

#### Risks to Future Site Users



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13.130 ST Consult undertook a preliminary site investigation in 2018 during which 7 soil samples (6 topsoil, 1 natural) were obtained and analysed for STL key contaminant suite (*i.e.* general inorganics, total phenols, speciated PAHs, heavy metals, asbestos). Two of these soil samples were analysed for the STL Pesticide suite. As the ST Consult works were a preliminary investigation further works will be required in the areas where suspected shallow Made Ground will be present (*i.e.* previously demolished residential buildings).

13.131 The Site will be subject to clearance/turn-over including the areas where previous buildings were located. Any localised Made Ground encountered during the redevelopment works shall be assessed and removed as required. Where required, localised replacement of existing topsoil shall be undertaken in areas of proposed private gardens and communal landscaping. Removal and/or replacement of impacted soils would be enough to break the pollutant linkage.

13.132 On that basis, the Proposed Development would give rise to a long-term, local effect of negligible significance to future site users.

## **ASSESSMENT OF CUMULATIVE EFFECTS**

13.133 Development schemes which have been identified in the consideration of cumulative effects are included in Chapter 3. There are no cumulative effects from these schemes with respect to soil or groundwater contamination and the Proposed Development on this Site.

## **MITIGATION**

### Environmental Ground Investigation

13.134 ST Consult undertook a preliminary search of regional unexploded ordnance records held by Zetica. The assessment identified a high density of bombing during WWII around Chatham and Gillingham both located north of the Site. The preliminary risk assessment recommends that a detailed UXO risk assessment be carried out prior to groundworks being undertaken at the Site.

13.135 With respect to the land gas assessment further visits will be required in order to provide a full and complete assessment in-line with CIRIA 665 recommendations (but based on the current results the risk is low).



13.136 A preliminary (limited scope) environmental site investigation, as part of a geotechnical assessment, was undertaken by ST Consult between 10/09/18 and 15/09/18. Given that the investigation was preliminary and limited in scope it is unclear the likely density with which made ground will exist across the wider 49.47 ha Site. As a result, a more detailed assessment will be required.

13.137 The information available from the desk study indicates that there is a low potential for soil contamination at the Site as limited potentially contaminative activities have been undertaken on-site. However, it is recommended that a watching brief is undertaken during the earthworks especially in the vicinity of the demolished residential properties. If any potentially contaminative material is found, the earthworks will be temporarily suspended until further investigatory works are undertaken.

#### Protection of Site Workers and Public

13.138 During site preparation and construction phases, precautions would be taken to minimise the exposure of workers and the general public to potentially harmful substances. Attention would be paid to restricting possible off site nuisances, such as those arising from any dust and odour emissions. Such precautions would be included within the CEMP and include:

- Personal hygiene, washing and changing procedures;
- PPE and respiratory protective equipment (RPE), including disposable overalls, gloves and particulate filter masks to be worn;
- Adoption of dust suppression methods, e.g. water spraying, wheel washing facility for vehicles leaving the Site;
- Covering of stockpiled material on the Site;
- Enclosure of vehicles used to transport materials;
- Measures to avoid surface water ponding and positive collection and disposal of all on-Site runoff; and
- Regular cleaning of all site roads, access roads and the public highway.

13.139 The above measures would be carried out in accordance with the Health and Safety Executive (HSE) publication HS(G)66 'Protection of workers and the general public during the development of contaminated land' (**Ref. 13.17**) and CIRIA Report 132, 'A guide for safe working on contaminated sites' (**Ref. 13.16**). The contractor would (prior to construction) provide method statements which would show how the safety of the work force and the public would be ensured.



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13.140 Where required, appropriate plans would be developed as required by the *Control of Substances Hazardous to Health Regulations 2003* (COSHH) and the *Construction (Design and Management) Regulations 2015* (CDM).

#### Piling and Risks to Water Resources

13.141 The current parameter plans show most buildings between 2 and 3 storeys with some reaching a maximum of 4 storeys. The ST Consult report (2018) states that *'based on the soils encountered during this investigation, an allowable bearing capacity of 120 kPa is available for normal strip or trench fill foundations set upon the firm to stiff clays or medium dense chalk strata. Where foundations are set within the clay soils, foundations will require deepening in accordance with NHBC Chapter 4.2 [Chapter 4.2, NHBC, 2019] for Medium VCP soils'*. NHBC (Ref. 13.18) states a minimum depth of 0.9 m for medium VCP soils.

13.142 Although piling is unlikely the (EA guidance document on piling on Contaminated Land (Ref. 13.19) describes various methods and scenarios for piling through contaminated land. The report recommends that a Foundation Works Risk Assessment report (FWRA) is prepared in such cases, in order to assess foundation works to prevent migratory pathways for contamination migration. It is considered that with the application of an appropriate piling methodology, the risks to the deep chalk aquifer from piling works penetrating through potentially contaminated land would be low. This is not seen as a significant issue for the Proposed Development due to the lack of defined contamination sources. However, the EA guidance should be considered as best practice if unsuitable materials are located and piling is required.

#### Contamination of Ground during Construction

13.143 Several mitigation measures will be used to reduce the risks of potential contamination of the Site during construction. The measures to be employed will be detailed in a CEMP for the Site and include measures to store and handle hazardous substances safely and procedures to manage spills.

### **RESIDUAL EFFECTS**

#### Disposal of Contaminated Spoil

13.144 During the excavation works the majority of contaminated arisings (if present) would be removed from Site. The disposal of contaminated spoil would be subject to legislative and



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regulatory control. As such, the likely residual effects would remain the same as the identified potential effects, that is, negligible.

#### Risks to Site Workers and Public Safety

13.145 As above, the legislative and regulatory framework set out to protect construction site workers and the public would be implemented as part of the Proposed Development. The likely residual effect of the Proposed Development on soils and ground conditions from the demolition and construction phase would therefore be negligible.

#### Risk to Water Resources

13.146 Although piling is considered unlikely, a FWRA would be undertaken prior to construction. This would be based on the results of the geotechnical ground investigation to be undertaken following the grant of any planning permission. The likely residual effect of the site clearance and construction phase of the Proposed Development on water resources would therefore remain negligible.

#### Contamination of Ground during Construction

13.147 The implementation of protective measures would reduce the potential for contamination of the ground during construction. However, owing to unforeseen accidental spillages, some risk would still remain. The likely residual effect of contamination from accidental spillages would be negligible.

#### Risk to Future Site Users

13.148 The overall effect of the completed Development on ground contamination and its effects on future users and occupants would be negligible with the mitigation measures in place.

13.149 Residual contamination risks to human health, following mitigation, would therefore be reduced to a negligible level. Therefore, the likely residual effect of any ground contamination on human health during the occupational use of the completed Development would be negligible.



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## SUMMARY

13.150 The Site has a history of agricultural use and is located within a semi-rural area, with urban areas to the north and west. Several potentially contaminative uses have been identified both on-site and off-site (within 250 metres). The Sites use as agricultural farmland is likely to have involved the use of pesticides and herbicides. Therefore, there is a risk (although low) from these chemicals remaining within the upper soil profile. Two historic (now demolished) houses were identified which in-turn will have led to localised areas of Made Ground.

13.151 Land immediately to the east of the southern site was used as an inert/household landfill between the early 1930s until completion in 1991. ST Consult noted that the landfill was a land raise and did not involve any infilling. The landfill is still considered to constitute a significant source of contamination in the form of landfill gas.

13.152 With regards to the environmental setting, the underlying Chalk has been assigned as a Principal Aquifer. The northern portion of the Site is in Zone I Source Protection Zone (SPZ) (Inner Protection Zone) whilst the southern portion is in Zone II SPZ (Outer Protection Zone).

13.153 A preliminary (limited scope) environmental site investigation, as part of a geotechnical assessment, was undertaken by ST Consult between 10/09/18 and 15/09/18. The results of the soil analysis have been compared (by ST Consult) against published Tier 1 screening values (residential with homegrown produce) in accordance with the CLEA methodology. Except for BaP there were no exceedences of stated Tier 1 screening values for any of the stated determinands that were analysed. The exceedences of the BaP Tier 1 screening level coincide with areas of shallow made ground (*i.e.* brick and clinker fragments). Given that the investigation was preliminary and limited in scope it is unclear the likely density with which made ground will exist across the wider 49.47 ha Site. As a result, a more detailed assessment will be required.

13.154 ST Consult undertook a preliminary search of regional unexploded ordnance records held by Zetica. The assessment identified a high density of bombing during WWII around Chatham and Gillingham both located north of the Site. The preliminary risk assessment recommends that a detailed UXO risk assessment be carried out prior to groundworks being undertaken at the Site.

13.155 A separate land gas monitoring programme was started in December 2018 during which two rounds of monitoring were undertaken by ST Consult (04/12/18 and 14/12/18) using five installed windowless sample locations alongside the off-site historic landfill. The Calculated





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GSV (carbon dioxide) is 0.0027 l/hr *i.e.* meets the requirements for CS1. The BS 8485:2015 Minimum Gas Protection Score for CS1 (High Risk – Type B Building) is zero *i.e.* no protection measures are deemed necessary. It is important to note that this assessment is based on two visits. Further visits will be required in order to provide a full and complete assessment prior to development.

13.156 Although ST Consult well installations were installed to 20 metres bgl no groundwater was encountered during the investigation.

13.157 It is recommended that a watching brief is undertaken during all earthworks especially in the areas surrounding the previous demolished residential properties. If any potentially contaminative material is found, the earthworks will be temporarily suspended until further investigatory works are undertaken. In the unlikely event that contaminated land is identified a remediation strategy and verification programme will be agreed with the statutory consultees.

13.158 There is a slight potential for ground contamination to arise during the construction period but with appropriate control measures this can be mitigated against through the application of appropriate design and operational controls.



**Table 13.6: Soils, Geology and Land Contamination Summary Table**

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
<p><b>Construction</b></p> <p>Potential to disturb contaminated soils and shallow groundwater during the earthworks during the construction phase.</p> <p>Potential to mobilise contaminants.</p>	<p>Temporary</p> <p>Short-term</p> <p>Local</p>	Minor Adverse	<p>A watching brief to be undertaken during to the earthworks. If any contaminated material is found, work will be suspended until further investigation is undertaken.</p> <p>Any contamination encountered during the construction would be removed and treated in an appropriate manner.</p>	Minor Positive
<p><b>Construction</b></p> <p>Leaks and spillages of fuel and oils from construction plant, equipment and refuelling areas resulting in localised contamination/run-off.</p>	<p>Temporary</p> <p>Short-term</p> <p>Local</p>	Minor Adverse	<p>Appropriate storage, containment and handling of oils and fuel to reduce the risk of accidental spillages. Mitigation measures to be incorporated into a Construction Environmental Management Plan (CEMP).</p>	Negligible
<p><b>Construction</b></p> <p>Contamination risks to water resources posed by piling activities.</p>	<p>Temporary</p> <p>Short/Medium term</p> <p>Local</p>	Minor Adverse	<p>Piling is unlikely to be required due to the type of buildings proposed.</p> <p>If required, implementation of a pile design together with preparation of a FWRA in consultation with the EA.</p>	Negligible
<p><b>Completed Development</b></p> <p>Contamination risk and exposure of future users of the Proposed Development.</p>	<p>Permanent</p> <p>Long term</p> <p>Local</p>	Minor Adverse	<p>Minor contamination risks identified on-site.</p> <p>Any contamination encountered during the construction would be removed and treated in an appropriate manner.</p>	Minor Positive



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## GLOSSARY OF TERMS

ACEC	Aggressive Chemical Environment for Concrete
ACM	Asbestos Containing Material
AONB	Areas of Outstanding Natural Beauty
AST	Above-ground Storage Tank
BaP	Benzo[a]pyrene
BGS	British Geological Society
BRE	Building Research Establishment
CDM	Construction Design and Management
CEMP	Construction Environmental Management Plan
CIRIA	Construction Industry Research and Information Association
CLEA	Contaminated Land Exposure Assessment
CLR	Contaminated Land Report
COMAH	Control of Major Accident Hazards
COSHH	Control of Substances Hazardous to Health
CSM	Conceptual Site Model
DEFRA	Department for the Environment, Food and Rural Affairs
EA	Environment Agency
EIA	Environmental Impact Assessment
EPR	Environmental Permitting Regulations
ELD	Environmental Liability Directive
EPA	Environmental Protection Act



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FWRA	Foundation Works Risk Assessment
FRA	Flood Risk Assessment
GSV	Gas Screening Value
HSE	Health and Safety Executive
IBC	Intermediate Bulk Container
IPPC	Integrated Pollution Prevention and Control
LEL	Lower Explosive Limit
LNR	Local Nature Reserve
NBN	National Biodiversity Network
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NVZ	Nitrate Vulnerable Zone
PAH	Polycyclic Aromatic Hydrocarbons
PPC	Pollution Prevention and Control
PPE	Personal Protective Equipment
PPG	Pollution Prevention Guidance
PPS	Planning Policy Statement
RPE	Respiratory Protective Equipment
SAC	Special Areas of Conservation
SNCI	Site of Nature Conservation Importance
SPA	Special Protection Areas
SPZ	Source Protection Zone



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SSSI	Sites of Special Scientific Interest
SWMP	Site Waste Management Plan
UST	Underground Storage Tank
UXO	Unexploded Ordnance
VCP	Volume Change Potential
WAC	Waste Acceptance Criteria
WFD	Water Framework Directive
WML	Waste Management Licence
WRAS	Water Regulations Advisory Scheme



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## REFERENCES

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- Ref. 13.2:** BRE & Department of the Environment, Transport and the Regions (1999), Radon: guidance on protective measures for new dwellings, Third Edition, 1999.
- Ref. 13.3:** Environment Agency (2004), Model Procedures for the Management of Land Contamination, CLR 11, September 2004.
- Ref. 13.4:** Department for Communities and Local Government (2019), National Planning Policy Framework (NPPF), February 2019.
- Ref. 13.5:** Department for Environment, Food and Rural Affairs (DEFRA) (2012), Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance, April 2012.
- Ref. 13.6:** Medway Council (2003), Medway Local Plan, May 2003.
- Ref. 13.7:** <https://data.nbn.org.uk/>
- Ref. 13.8:** <http://linesearch.org/>
- Ref. 13.9:** <http://mapapps2.bgs.ac.uk/geoindex/home.html>
- Ref. 13.10:** <http://www.bgs.ac.uk/data/boreholescans/home.html>
- Ref. 13.11:** <https://magic.defra.gov.uk/>
- Ref. 13.12:** CIRIA (2007). Assessing risks proposed by hazardous ground gases to buildings, CIRIA C665, updated 2007.
- Ref. 13.13:** CIRIA (1995). Report 149 - Protecting Development from Methane, January 1995, ISBN: 0860174107.
- Ref.13.14:** British Standards (2015). BS 8485:2015 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.
- Ref. 13.15:** Construction Industry Research and Information Association (CIRIA) (2001), CIRIA report C552, Contaminated Land Risk Assessment – A Guide to Good Practice.
- Ref. 13.16:** Construction Industry Research and Information Association (CIRIA) (1996), CIRIA report C132, A Guide for Safe Working on Contaminated Sites.
- Ref. 13.17:** Health and Safety Executive (HSE) (1991), HS(G)66 Protection of Workers and the General Public during Development of Contaminated Land.



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**Ref. 13.18:** NHBC (2019). NHBC Standards 2019.

**Ref. 13.19:** Environment Agency (2001), Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention National Groundwater & Contaminated Land Centre report NC/99/73, F J Westcott, C M B Lean & M L Cunningham, May 2001.



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## 14 ARCHAEOLOGY AND CULTURAL HERITAGE

### INTRODUCTION

14.1 This chapter assesses the effects of the Proposed Development on the significance of heritage assets.

14.2 A heritage asset is defined in the National Planning Policy Framework (Annex 2) as ‘a building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions because of its heritage interest. It includes designated heritage assets and assets identified by the local planning authority (including local listing)’.

14.3 Designated heritage assets include world heritage sites, scheduled monuments, listed buildings, protected wreck sites, registered parks and gardens, registered battlefields and conservation areas. Non-designated heritage assets include sites held on the county Historic Environment Record, elements of the historic landscape and sites where there is the potential to encounter unrecorded archaeological remains.

14.4 Significance is defined in the NPPF (Annex 2) as ‘the value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset’s physical presence, but also from its setting.’

### ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

#### Assessment Methodology

14.5 This section describes the methodology used to produce this chapter, which follows guidance provided by the Chartered Institute for Archaeologists and Historic England.

14.6 The chapter has been produced in accordance with guidelines in the *Standard and guidance for historic environment desk-based assessment* issued by the Chartered Institute for Archaeologists (**Ref 14.1**). These guidelines provide national standards for the completion of desk-based assessments. In this regard the assessment comprised consultation of readily available information from documentary, cartographic and aerial photographic sources utilised in the production of a Heritage Assessment produced in February 2019 and which is included as **Appendix 14.1**. This document was produced in accordance with a screening opinion response





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from Medway Council dated 18<sup>th</sup> October 2018 stating that a Desktop Archaeological Assessment was required in order to inform the planning application. The major repositories of information consulted in the production of the Heritage Assessment were:

- the on-line National Heritage List for England database maintained by Historic England for details of designated heritage assets close to the Site;
- the Kent Historic Environment Record for details of recorded archaeological sites within an approximate distance of 1km of the Site;
- Kent Archives for historic maps;
- the Historic England Archive Service for aerial photographic records;
- examination of Lidar data available on-line;
- the results of a geotechnical investigation; and
- the results of a walkover of the Site and its environs.

14.7 In addition, Historic England have produced guidance on how the effects of development on the significance of heritage assets should be identified and assessed. These guidelines include *Conservation Principles Policies and Guidance for the Sustainable Management of the Historic Environment (Ref. 14.2)* which describes the criteria for defining the significance of a heritage asset. Historic England define the significance of a heritage asset as a collective term for the sum of all the heritage values attached to a place, be it a building, an archaeological site or a larger historic area such as a village or landscape. The value that can be placed on historic assets can be grouped into four categories as follows:

*Evidential value:* the potential of a heritage asset to yield evidence about past human activity including through archaeological remains or built fabric.

*Historical value:* this derives from particular aspects of past ways of life, or an association with notable families, persons, events or movements which can be seen to connect the past with the present.

*Aesthetic value:* this derives from the sensory and intellectual stimulation people draw from a historic asset. It may include its physical form, and how it lies within its setting and may be the result of design or be unplanned.



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*Communal value:* this derives from the meanings that a historic asset has for the people who relate to it, or for whom it figures in their collective experience or memory. It may be commemorative or symbolic.

14.8 Historic England have also produced guidelines for assessing changes to the settings of heritage assets in *The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning Note 3, Second Edition (Ref. 14.3)*.

14.9 This Good Practice Advice Note provides guidance on how to assess the effects that a development may have on the setting and significance of heritage assets. This best practice guidance re-iterates the NPPF definition of the setting of a heritage asset as *‘the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate the significance or may be neutral.’*

14.10 On a practical level Historic England identify a staged approach to establishing the effects on the setting and significance of heritage assets as follows:

- Step 1 identifies which heritage assets and their settings are affected.
- Step 2 assesses the degree to which these settings make a contribution to the significance of the heritage asset(s) or allow significance to be appreciated.
- Step 3 assesses the effect of the proposed development, whether beneficial or harmful, on that significance or on the ability to appreciate it.
- Step 4 explores ways to maximise enhancement and avoid or minimise harm.
- Step 5 makes and documents the decision and monitors the outcomes.

### **Significance Criteria**

14.11 Annex 2 of the National Planning Policy Framework (NPPF) defines heritage significance as *‘the value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset’s physical presence, but also from its setting’*. The combined evidential, historical, aesthetic and communal values assessed for each heritage asset, or category of assets, results in an overall heritage significance rating as demonstrated in **Table 14.1**.



**Table 14.1: Significance Ratings**

Scale	Description
High	A feature, space or theme which is significant at a national or international level. These will tend to have a high cultural value and form an important element of a building or site.
Medium	A feature, space or theme which is significant at a regional level. These will tend to have cultural merit and form a significant part of the building or site.
Low	A feature, space or theme which is of local significance.
Neutral	A feature, space or theme which has no cultural significance but which is not intrusive to heritage value

14.12 In order to assess the effect of the Proposed Development on the significance of known and potential heritage assets, the following assessment provides a comparable analysis of the heritage significance against the magnitude of change. This is based on the criteria set out by the Design Manual for Roads and Bridges (**Ref. 14.4**) and is a clear way of understanding the magnitude of change, and how levels of effect vary according to the significance of the heritage asset. The magnitude of change is assessed based on the criteria set out in **Table 14.2**.

**Table 14.2: Magnitude of Change**

Scale	Description
<b>Major Beneficial</b>	The proposed changes would significantly improve the overall setting and character of heritage assets, revealing and/or enhancing important characteristics which were previously unknown or inaccessible. There would be a substantial improvement to important elements of the asset.
<b>Moderate Beneficial</b>	The proposed changes would considerably improve the setting or overall character of the heritage asset. There may be an improvement in key uses and beneficial change (e.g. the creation of coherency) to the characteristics of the asset.
<b>Minor Beneficial</b>	The proposed changes may cause a minor improvement to the setting or overall character of a heritage asset.
<b>Neutral</b>	The proposed changes would have no impact on the heritage asset.



Scale	Description
<b>Minor Adverse</b>	The proposed changes would have a negative minor impact on the setting or overall character of a heritage asset.
<b>Moderate Adverse</b>	The proposed changes would negatively alter the setting or overall character of the heritage asset. They would be likely to disturb key features and detract from overall heritage significance.
<b>Major Adverse</b>	The proposed changes would significantly damage the overall setting and/or character of heritage assets. They would cause a notable disruption to, or in some cases, complete destruction of, important features.

14.13 There are two potential effects on the significance of heritage receptors which can be caused by the Proposed Development as follows:

- construction of the Site could have direct physical effects on buried archaeology through the excavation of building foundations, roads, services and landscaping groundworks. Such effects are permanent and irreversible; and
- the operation of the Site could have an effect on the historic landscape and the settings of designated heritage assets. Although such effects can be beneficial, they are usually neutral (i.e. no effect) or negative (i.e. they will have a detrimental effect on the historic landscape and/or the settings and significance of designated heritage assets). Such effects are permanent.

14.14 The significance of the effect of the Proposed Development on the heritage significance of any given asset is a function of the significance of that asset and the magnitude of change that would be caused. This is summarised in **Table 14.3**.



**Table 14.3: Significant Effects Matrix**

Magnitude of Change	Heritage Significance			
	Neutral	Low	Medium	High
<b>Major Beneficial</b>	Insignificant effect	Beneficial effect of minor significance	Beneficial effect of moderate significance	Beneficial effect of major significance
<b>Moderate Beneficial</b>	Insignificant effect	Beneficial effect of minor significance	Beneficial effect of minor to moderate significance	Beneficial effect of moderate to major significance
<b>Minor Beneficial</b>	Insignificant effect	Beneficial effect of insignificant to minor significance	Beneficial effect of minor significance	Beneficial effect of minor to moderate significance
<b>Neutral</b>	Insignificant effect	Insignificant effect	Insignificant effect	Insignificant effect
<b>Minor Adverse</b>	Insignificant effect	Adverse effect of insignificant to minor significance	Adverse effect of minor significance	Adverse effect of minor to moderate significance
<b>Moderate Adverse</b>	Insignificant effect	Adverse effect of minor significance	Adverse effect of minor to moderate significance	Adverse effect of moderate to major significance
<b>Major Adverse</b>	Insignificant effect	Adverse effect of minor significance	Adverse effect of moderate significance	Adverse effect of major significance

## LEGISLATION, PLANNING POLICY AND GUIDANCE

14.15 All planning decisions relating to the Site must address the statutory considerations of the Planning (Listed Buildings and Conservation Areas) Act 1990 and relevant policies within the National Planning Policy Framework and the Medway Local Plan.



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## Planning (Listed Buildings and Conservation Areas) Act 1990

14.16 Section 66 (1) of the Planning (Listed Buildings and Conservation Areas) Act 1990 states that *'in considering whether to grant planning permission for development which affects a listed building or its setting, the Local Planning Authority or Secretary of State should pay special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses'*.

## National Planning Policy Framework

14.17 Government policy in relation to the historic environment is outlined in section 16 of the National Planning Policy Framework (NPPF) entitled *Conserving and enhancing the historic environment (Ref 14.5)*. Paragraphs 184-202 provide guidance for planning authorities, property owners, developers and others regarding the treatment of heritage assets in the planning process and paragraph 184 states that heritage assets are *'an irreplaceable resource, and should be conserved in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of existing and future generations.'* Specific paragraphs which are relevant to this assessment are summarised below.

### General

14.18 Paragraph 189 addresses planning applications stating that: *'in determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes, or has the potential to include, heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation.'*

14.19 Paragraph 190 states that *'local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this into account when considering the impact of a*



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*proposal on a heritage asset, to avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposal.'*

14.20 Paragraph 192 goes on to state that *'in determining applications, local planning authorities should take account of:*

- a) the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation;*
- b) the positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality; and*
- c) the desirability of new development making a positive contribution to local character and distinctiveness.'*

14.21 The above paragraphs make it clear that the effects that proposed developments have on the significance of heritage assets should be assessed within planning applications.

#### Designated heritage assets

14.22 Designated heritage assets are specifically covered in paragraphs 193-196. Paragraph 193 states that *'when considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation (and the more important the asset, the greater the weight should be). This is irrespective of whether any potential harm amounts to substantial harm, total loss or less than substantial harm to its significance.'*

14.23 Paragraph 194 states that *'any harm to, or loss of, the significance of a designated heritage asset (from its alteration or destruction, or from development within its setting), should require clear and convincing justification. Substantial harm to or loss of:*

- a) grade II listed buildings, or grade II registered parks or gardens, should be exceptional;*
- b) assets of the highest significance, notably scheduled monuments, protected wreck sites, registered battlefields, grade I and II\* listed buildings, grade I and II\* registered parks and gardens, and World Heritage Sites, should be wholly exceptional.'*

14.24 Paragraph 195 states that *'where a proposed development will lead to substantial harm to (or total loss of significance of) a designated heritage asset, local planning authorities should*



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*refuse consent, unless it can be demonstrated that the substantial harm or total loss is necessary to achieve substantial public benefits that outweigh that harm or loss, or all of the following apply:*

- a) the nature of the heritage asset prevents all reasonable uses of the site; and*
- b) no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and*
- c) conservation by grant-funding or some form of not for profit, charitable or public ownership is demonstrably not possible; and*
- d) the harm or loss is outweighed by the benefit of bringing the site back into use.'*

14.25 Paragraph 196 states that *'where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal including, where appropriate, securing its optimum viable use.'* Paragraph 20 of the accompanying Planning Practice Guidance (**Ref: 14.6**) outlines what is meant by public benefits namely: *'public benefits may follow from many developments and could be anything that delivers economic, social or environmental progress as described in the National Planning Policy Framework (Paragraph 8). Public benefits should flow from the proposed development. They should be of a nature or scale to be of benefit to the public at large and should not just be a private benefit. However, benefits do not always have to be visible or accessible to the public in order to be genuine public benefits.'*

14.26 The key test in NPPF paragraphs 194-196 is whether a proposed development will result in substantial harm or less than substantial harm. Substantial harm is not defined in the NPPF although paragraph 17 of the accompanying Planning Practice Guidance provides guidance and states *'what matters in assessing if a proposal causes substantial harm is the impact on the significance of the heritage asset. As the National Planning Policy Framework makes clear, significance derives not only from a heritage asset's physical presence, but also from its setting. Whether a proposal causes substantial harm will be a judgment for the decision taker, having regard to the circumstances of the case and the policy in the National Planning Policy Framework. In general terms, substantial harm is a high test, so it may not arise in many cases. For example, in determining whether works to a listed building constitute substantial harm, an important consideration would be whether the adverse impact seriously affects a key element of its special architectural or historic interest. It is the degree of harm to the asset's significance rather than the scale of the development that is to be assessed. The harm may arise from works to the asset or from development within its setting.'*

#### Non-designated heritage assets





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14.27 Paragraph 197 states that *'the effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that directly or indirectly affect non-designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset.'*

### **Medway Council planning guidance**

14.28 Until the emerging Medway Local Plan 2012 to 2035 comes into force development in Medway is guided by the 2003 Medway Local Plan which contains policies relating to conservation areas (BNE12-15), listed buildings (BNE16-19) and archaeology (BNE20-21). Specific policies which are of relevance to this assessment are as below:

14.29 Policy BNE18: Setting of Listed Buildings states that:

*'Development which would adversely affect the setting of a listed building will not be permitted'.*

14.30 Policy BNE21: Archaeological Sites states that:

*'Development affecting potentially important archaeological sites will not be permitted, unless:*

- i) the developer, after consultation with the archaeological officer, has arranged for an archaeological field evaluation to be carried out by an approved archaeological body before any decision on the planning application is made; and*
- ii) it would not lead to the damage or destruction of important archaeological remains. There will be a preference for the preservation of important archaeological remains in situ.*
- iii) where development would be damaging to archaeological remains, sufficient time and resources are made available for an appropriate archaeological investigation undertaken by an approved archaeological body. Such investigations should be in advance of development and in accordance with a specification and programme of work approved by the council. Resources should also be made available for the publication of the results of the investigation.'*



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## BASELINE CONDITIONS

14.31 The baseline heritage conditions within and around the Site are described in **Appendix 14.1**. In summary, based on consulted desk-based sources and a walkover of the Site, the following has been established:

- the Site lies in proximity to two grade II listed buildings, namely Capstone Farmhouse which has mid-15<sup>th</sup> century origins approximately 350m to the south and east and Pheasant House, a 17<sup>th</sup> century building, approximately 525m to the north;
- the Site is located 1.2km to the east of the scheduled monument of Fort Luton, an artillery fort completed around 1892;
- Palaeolithic flint tools have been found in the area, notably a Palaeolithic working floor, indicated by numerous flint implements, found in the face of a brickearth pit approximately 400m to the north of the Site. In addition, several Lower or Middle Palaeolithic flints have been found to the east;
- Neolithic and Bronze Age artefacts have been found in the area, notably Neolithic flint tools approximately 650m to the east and a Late Bronze Age copper alloy axehead which has been found close to the southern boundary of the Site although its exact findspot location is unknown. A possible Bronze Age barrow, now destroyed, has also been identified approximately 500m to the south;
- Romano-British burials have been found near the site of Hale Farm approximately 100m to the north of the Site. A burial or burials were also found in 1901 along with pottery vessels approximately 150m to the east. A probable cemetery, identified through the discovery of artefacts in the 19<sup>th</sup> century thought to relate to the presence of a burial site, has also been found approximately 800m to the north and Roman buildings have been found approximately 600m to the west;
- Maunder's House, a dwelling which was in existence by 1839 and which had been demolished by 1992, is located within the Site. A well within its grounds survives under a concrete cap; and
- a north-south aligned trackway in the northern portion of the Site survives and is a remnant of a routeway present in 1839.



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## IDENTIFICATION AND EVALUATION OF KEY EFFECTS

### Introduction

14.32 This section assesses the potential impact of the Proposed Development on the significance of heritage assets. Specifically, it assesses the effects that construction phase groundworks could have on archaeological remains and the operational effects that the completed development could have on designated heritage assets due to any change in their setting.

### Archaeology

14.33 Construction groundworks for the Proposed Development have the potential to damage and destroy archaeological remains. The full extent of any surviving archaeological remains is presently unknown although, should any exist, they are likely to be concentrated on the flatter higher ground within the Site, rather than on the valley slopes. This area of higher archaeological potential is shown in **Appendix 14.1, Figure 25**.

#### Palaeolithic and Mesolithic archaeology

14.34 Research priorities for the study of the Palaeolithic archaeology of the south-east of England have been summarised in the South East Research Framework where it has been noted that Palaeolithic artefacts are more common in the lower rather than the upper Medway valley (**Ref: 14.7**). A more detailed analysis of Lower and Middle Palaeolithic periods in the Medway has also recently been produced although the Site lies outside of its study area (**Ref: 14.8**).

14.35 Palaeolithic artefacts have been found around the Site with a Palaeolithic working floor, indicated by numerous flint implements found in the face of a brickearth pit, approximately 400m to the north. In addition, several Lower or Middle Palaeolithic flints have been found to the east although their exact findspot location is uncertain.

14.36 It is therefore possible that further evidence of Palaeolithic activity, through the presence of artefactual material, could be present within the Site although the presence or absence of such material is difficult to predict. If present, any remains of Palaeolithic date, in accordance with Table 14.1 would be of medium (regional) significance. However, in view of the overall general lack of Palaeolithic material within the 1km study area, it is considered that there is only a low potential for such archaeology to exist within the Site. Based on evidence from desk-based sources it is therefore concluded that, in accordance with Table 14.2, construction groundworks for the



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Proposed Development will cause a neutral magnitude of change. In accordance with Table 14.3 the Proposed Development could therefore have an insignificant effect on Palaeolithic archaeology.

14.37 No recorded sites or artefacts of Mesolithic date have been identified within 1km of the Site. If present, any remains of Mesolithic date, in accordance with Table 14.1, could be of medium (regional) significance. However, in view of the absence of Mesolithic material within the 1km study area, it is considered that there is only a low potential for such archaeology to exist within the Site. Based on evidence from desk-based sources it is therefore concluded that, in accordance with Table 14.2, construction groundworks for the Proposed Development will result in a neutral magnitude of change. In accordance with Table 14.3 the Proposed Development could therefore have an insignificant effect on Mesolithic archaeology.

#### Neolithic, Bronze Age & Iron Age archaeology

14.38 Research priorities for study of the Neolithic and Bronze Age archaeology of the south-east of England have been summarised in the South East Research Framework where late Bronze Age settlement was characterised by medium-density development in the Medway valley (**Ref: 14.9**). Neolithic and Bronze Age sites have been found around the Site with Neolithic flint tools having been found approximately 650m to the east and a possible Bronze Age barrow, now destroyed, sited approximately 500m to the south. A Late Bronze Age copper alloy axehead has also been found close to the southern boundary of the Site although its exact findspot location is unknown.

14.39 It is therefore possible that further evidence of Neolithic and Bronze Age activity, could be present within the Site although the presence or absence of such material is difficult to predict without archaeological fieldwork. If present, any remains of Neolithic and Bronze Age date, in accordance with Table 14.1, could be of medium (regional) significance. However, in view of the overall general lack of Neolithic and Bronze Age material within the 1km study area, it is considered that there is only a low potential for such archaeology to exist within the Site. Based on evidence from desk-based sources it is therefore concluded that, in accordance with Table 14.2, construction groundworks for the Proposed Development will result in a neutral magnitude of change. In accordance with Table 14.3 the Proposed Development could therefore have an insignificant effect on Neolithic and Bronze Age archaeology.

14.40 No recorded sites or artefacts of Iron Age date have been identified within 1km of the Site. If present, any remains of Iron Age date, in accordance with Table 14.1, could be of medium



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(regional) significance. However, in view of the absence of Iron Age material within the 1km study area, it is considered that there is only a low potential for such archaeology to exist within the Site. Based on evidence from desk-based sources it is therefore concluded that, in accordance with Table 14.2, construction groundworks for the Proposed Development will result in a neutral magnitude of change. In accordance with Table 14.3 the Proposed Development could therefore have an insignificant effect on Iron Age archaeology.

#### Roman archaeology

14.41 Research priorities for study of the Roman archaeology of the south-east of England have been summarised in the South East Research Framework where the presence of a concentration of Roman villas along the Medway valley has been identified (**Ref: 14.10**). Romano-British burials have been found near the site of Hale Farm approximately 100m to the north; a burial or burials were also found in 1901 along with pottery vessels approximately 150m to the east; a probable cemetery, identified through the discovery of artefacts in the 19<sup>th</sup> century thought to relate to the presence of a burial site, has also been found approximately 800m to the north; and Roman buildings have also been found approximately 600m to the west. All of these archaeological sites are located to the south of the Watling Street Roman road.

14.42 The recorded presence of Roman sites around the Site suggests that it is possible that evidence of Roman activity, notably any settlement remains associated with the cemetery to the north, could be present within the Site although the presence or absence of such material is difficult to predict without archaeological fieldwork. If present, any remains of Roman date, in accordance with Table 14.1 and depending on their nature, could be of medium (regional) significance. Given the proximity of recorded Roman remains around the Site it is concluded that there is a moderate to high potential for such archaeology to exist within the Site. Any such archaeological remains are likely to be destroyed by construction groundworks. Based on evidence from desk-based sources it is therefore concluded that, in accordance with Table 14.2, construction groundworks for the Proposed Development could result in a minor to moderate magnitude of change. In accordance with Table 14.3 the Proposed Development could result in a minor or moderate adverse effect on Roman archaeology.

#### Early Medieval & Medieval archaeology

14.43 No recorded sites or artefacts of Early Medieval or Medieval date have been identified within 1km of the Site. If present, any remains of these dates would, in accordance with Table 14.1, be of low (local) or medium (regional) significance. It is likely that, during the later medieval



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period, the Site was under woodland and/or agricultural use on land to the west of Capstone Farmhouse which has mid-15<sup>th</sup> century origins. In view of the absence of Early Medieval and Medieval material within the 1km study area, it is considered that there is only a low potential for such archaeology to exist within the Site. Based on evidence from desk-based sources it is therefore concluded that, in accordance with Table 14.2, construction groundworks for the Proposed Development could result in a neutral magnitude of change. In accordance with Table 14.3 the Proposed Development could therefore have an insignificant effect on Early Medieval and Medieval archaeology.

#### Post Medieval & modern archaeology

14.44 Research priorities for study of the Post Medieval and 20<sup>th</sup> century archaeology of the south-east of England have been summarised in the South East Research Framework where it is noted that many of the parishes in the lower Medway valley were sparsely populated in the early 19<sup>th</sup> century and that population growth increased markedly when brick and cement works began to appear on the banks of the Medway resulting in a dramatic effect on many of the small villages in the valley (**Ref: 14.11**). However, although brickearth extraction was taking place by 1869 between Hale and Darland for the Darland Brick Works, the Site and surrounding villages retained a rural feel into the 20<sup>th</sup> century as demonstrated on historic mapping and the number of existing and former farms and outfarms in the area.

14.45 It is likely that, during the Post Medieval period, the Site was under woodland and/or agricultural use on land to the west of Capstone Farmhouse. However, the Site could also contain archaeological evidence for Maunder's House which was in existence by 1839 and which had been demolished by 1992. A well within the house grounds certainly still exists (**Ref. 14.12**). The Site may also contain evidence for a trackway visible on the 1769 map, which led west across the Site from the settlement of Capstone, although this may well have been ploughed out. If present, any remains of these dates could, in accordance with Table 14.1, be of low (local) significance. However, apart from the possible archaeological remains of Maunder's House and relict field boundaries, it is concluded that there is only a low potential for Post Medieval archaeology to be encountered within the Site. Based on evidence from desk-based sources it is therefore concluded that, in accordance with Table 14.2, construction groundworks for the Proposed Development could result in a minor adverse magnitude of change. In accordance with Table 14.3 the Proposed Development could therefore have a minor adverse effect on Post Medieval and Modern archaeology.



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### **Grade II listed Capstone Farmhouse**

14.46 The grade II listed Capstone Farmhouse, which has mid-15<sup>th</sup> century origins, is located approximately 350m to the south and east of the Site (**Appendix 14.1, Figure 2, no. 1**). It is located on the eastern frontage of Capstone Road, faces west onto the entrance into Capstone Farm Country Park and is well screened from the Site by trees. The significance of the building is largely derived from its architectural importance and its predominantly rural setting and by virtue of its Grade II listing can, in accordance with Table 14.1, be regarded as a heritage asset of medium (regional) significance.

14.47 However, its original rural setting to the west has been changed through the creation of car parking and associated woodland planting for the Capstone Country Park. It is therefore concluded that the Proposed Development when built will result, in accordance with Table 14.2, in a neutral magnitude of change to the existing setting of the listed building. In accordance with Table 14.3 the Proposed Development will have an insignificant effect on the heritage significance of the listed building.

### **Grade II listed Pheasant House**

14.48 The grade II listed Pheasant House with its attached front garden walls is located approximately 525m to the north of the Site (**Appendix 14.1, Figure 2, no. 2**). The significance of the building is largely derived from its architectural importance and its immediate built-up setting and by virtue of its Grade II listing can, in accordance with Table 14.1, be regarded as a heritage asset of medium (regional) significance.

14.49 The house has a setting confined to the roadside and its immediate built-up surroundings. It is therefore concluded that the Proposed Development when built will result, in accordance with Table 14.2, in a neutral magnitude of change to the existing setting of the listed building. In accordance with Table 14.3 the Proposed Development will have an insignificant effect on the heritage significance of the listed building.

### **Scheduled monument of Fort Luton**

14.50 The scheduled monument of Fort Luton is located approximately 1.2km to the west of the Site (**Appendix 14.1, Figure 3**). This and other fortresses, including Fort Horsted approximately 2km to the west of the Site, are scheduled due to their importance as the last major work of



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traditional fortifications in the country and, by virtue of its scheduled status can, in accordance with Table 14.1, be regarded as a heritage asset of high (national) significance.

14.51 When built these forts would have had a very wide setting to include their field of fire. However, extensive residential development has since been built between the fort and the Site. It is therefore concluded that the Proposed Development when built will result, in accordance with Table 14.2, in a neutral magnitude of change to the existing setting of the scheduled monument. In accordance with Table 14.3 the Proposed Development will have an insignificant effect on the heritage significance of the scheduled monument.

### **ASSESSMENT OF CUMULATIVE EFFECTS**

14.52 It is reasonably assumed that the determination of planning approval for neighbouring developments will have been made in accordance with national, regional and local planning policy and guidance, within which archaeological assets would be a material consideration. This would have included the provision of appropriate archaeological mitigation measures, including the requirement for an appropriate programme of investigation and recording. Therefore, there would be no cumulative effects on below ground archaeology once the relevant schemes are completed and operational as all effects on sub-surface heritage assets would have been mitigated ahead of or during the construction phase.

### **ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS**

14.53 Because of the potential presence of Roman archaeology, and possibly archaeology of other periods, within the Site it is proposed that a programme of archaeological fieldwork be carried out in order to establish the nature, date, and extent of any surviving archaeology. Should significant archaeology be identified further archaeological works may be required. All archaeological work will be carried out in accordance with a scope of works approved by the archaeological advisors to Medway Council.

### **SUMMARY**

14.54 The Proposed Development may result in the loss of archaeological remains, notably any associated with Romano-British burials found near the site of Hale Farm approximately 100m to the north of the Site and a further burial or burials found approximately 150m to the east. Roman buildings have also been found approximately 600m to the west of the Site. The recorded presence of Roman sites around the Site suggests that it is possible that evidence of Roman





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activity, notably any settlement remains associated with the cemetery to the north, could be present although the presence or absence of such material is difficult to predict without archaeological fieldwork. However, given the proximity of recorded Roman remains around the Site, it is concluded that there is a moderate to high potential for such archaeology to exist within it and that any such archaeological remains are likely to be destroyed by construction groundworks.

14.55 It is possible that evidence of prehistoric date may also survive within the Site. However, given the general absence of prehistoric activity within a 1km study area, it is considered that there is only a low potential for such archaeology to be affected by construction groundworks. Similarly, In view of the absence of Early Medieval and Medieval material within a 1km study area, it is considered that there is only a low potential for archaeology of these periods to exist within the Site.

14.56 During the later medieval and post medieval periods, the Site was under woodland and/or agricultural use on land to the west of the grade II listed Capstone Farmhouse which has mid-15<sup>th</sup> century origins. However, the Site could contain archaeological evidence for Maunder's House which was in existence by 1839 and which had been demolished by 1992. It may also contain evidence for a trackway visible on a 1769 map, which led west from the settlement of Capstone, although this may well have been ploughed out.

14.57 The grade II listed Capstone Farmhouse is located approximately 350m to the south and east of the Site. However, its original rural setting to the west has been changed through the creation of car parking and associated woodland planting for the Capstone Country Park. It is concluded that the Proposed Development when built, will have no appreciable effect on the existing setting of the listed building and therefore no effect on its significance as a heritage asset. Similarly, no other designated heritage assets will have their significance affected by the Proposed Development.



**Table 14.4: Heritage Summary Table**

<b>Potential Effect</b>	<b>Nature of Effect (Permanent or Temporary)</b>	<b>Significance</b>	<b>Mitigation/ Enhancement Measures</b>	<b>Residual Effects</b>
Changes to the settings of designated heritage assets	Permanent	Neutral	None	Neutral
Damage during construction groundworks to archaeological remains	Permanent	Minor or moderate Adverse	Programme of archaeological fieldwork	Minor Adverse



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## REFERENCES

**Ref 14.1:** Standard and guidance for historic environment desk-based assessment. Chartered Institute for Archaeologists, 2017.

**Ref. 14.2:** Conservation Principles Policies and Guidance for the Sustainable Management of the Historic Environment. English Heritage, 2008.

**Ref. 14.3:** Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets. Historic England, 2017.

**Ref. 14.4:** Design Manual for Roads and Bridges. Highways Agency.

**Ref 14.5:** National Planning Policy Framework. Department for Communities and Local Government, February 2019.

**Ref 14.6:** Planning Practice Guidance. Department for Communities and Local Government, 2018.

**Ref 14.7:** Bridgland D, 2007. River terrace sequences of the Thames, Kent and Sussex. In Notes from the South-East Research Framework Public Seminar on the Lower and Middle Palaeolithic. <https://www.kent.gov.uk/leisure-and-community/history-and-heritage/south-east-research-framework>

**Ref 14.8:** Wenban-Smith FF, Bates MR & Marshall G 2007 Medway Valley Palaeolithic Project Final Report: The Palaeolithic Resource in the Medway Gravels (Kent). English Heritage.

**Ref 14.9:** Champion, T 2007 The evolution of later prehistoric settlement in Kent and Surrey. In Notes from the South-East Research Framework Public Seminar on the middle Bronze Age and Iron Age. <https://www.kent.gov.uk/leisure-and-community/history-and-heritage/south-east-research-framework>

**Ref. 14.10:** Houlistan M, 2007 The Urban Evidence. In Notes on the South-East Research Framework Public Seminar on the Roman period. <https://www.kent.gov.uk/leisure-and-community/history-and-heritage/south-east-research-framework>

**Ref: 14.11:** Hann, A 2007 Experiencing the urban in a rural setting: the lower Medway valley of Kent 1750-1900. In Notes on the South-East Research Framework Public Seminar on the Post-medieval and modern periods. <https://www.kent.gov.uk/leisure-and-community/history-and-heritage/south-east-research-framework>

**Ref: 14.12:** Desk Study & Preliminary Site Investigation Report. Land off Shawstead Road, Hale, Kent ME5. Southern Testing, 2018.



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## 15 CONCLUSIONS

15.1 This chapter contains the conclusions of the Environmental Statement (ES). The ES has examined the potential impacts associated with the Proposed Development during both the construction and operational phases.

15.2 The conclusions from each topic assessed in the ES are provided below.

### **Development Programme and Construction**

15.3 This chapter identifies that the construction period would be approximately seven years and the effects of the Proposed Development would be managed through the development of a project and site-specific Construction Environmental Management Plan (CEMP). The CEMP would outline methods for contractor and general public liaison, hours of work, methods to deal with complaints, and outline management practices to control dust, traffic and access, waste, water resources, ecological and archaeological effects, ensuring a high level of control throughout the construction works.

15.4 The procedures within the CEMP would ensure the delivery of a high level of environmental control throughout the construction phase, thereby minimising the potential for adverse effects.

### **Transport and Access**

15.5 The Site is well connected to the local and national highway network with access onto North Dane Way, Hoath Way, Princes Avenue and thereafter on to the M2 via junctions 3 and 4.

15.6 During construction of the Proposed Development there will be a temporary moderate adverse cumulative effect relating to driver delay for all receptors on all roads while there will be neutral to slight adverse cumulative effect to severance, pedestrian delay, and pedestrian amenity for all pedestrian receptors on all roads. There will also be a neutral cumulative effect on fear and intimidation for pedestrians crossing all roads, and accidents and safety for all receptors on all roads.

15.7 During operation of the Proposed Development there will be permanent moderate adverse cumulative effects and permanent moderate beneficial cumulative effects (for pedestrians crossing relating to severance; all pedestrian receptors relating to pedestrian delay and amenity; and people driving relating to driver delay. There will also be moderate to major beneficial cumulative effects



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(depending on the road considered), and neutral cumulative effects for all receptors in relation to accidents and safety.

### **Air Quality**

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

15.9 ADMS Roads dispersion modelling has been carried out to assess both the impact of the operation of the Proposed Development on local pollutant concentrations and the suitability of the Site for its proposed end use with regards to local air quality. The results indicate that predicted concentrations of relevant pollutants (NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>) concentrations are below the relevant objectives within the Proposed Development and at nearby sensitive receptors.

15.10 Emissions arising from traffic generated by the operation of the Proposed Development would result in a negligible impact on local pollutant concentrations, predicted concentrations remain below the objective levels at all the selected receptors. In accordance with the Kent and Medway Air Quality Partnership Air Quality Planning Guidance, the impact of the emissions arising from traffic associated with the operation of the Proposed Development is considered to be medium to low / imperceptible. Beneficial air quality impacts are also predicted at a number of existing receptor locations.

15.11 It should be noted that in accordance with the EPUK & IAQM significance criteria, the impact of the operation of the Proposed Development on NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations is considered to be negligible.

15.12 Future occupants of the Proposed Development would not be exposed to pollutant concentrations above the relevant objective levels, therefore the impact of the Proposed Development with regards new exposure to air quality is considered to be negligible.

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



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## **Noise and Vibration**

15.14 The impact of noise and vibration during construction of the Proposed Development has been predicted and assessed in accordance with BS 5228. Generic mitigation measures have been recommended, which when implemented are capable of ensuring that the impact of noise and vibration during the construction of the Proposed Development is adequately controlled.

15.15 An assessment has been carried out in accordance with the adopted criteria to determine the suitability of the Site for residential accommodation. Proposed units will require appropriate glazing and ventilation specification, in order to achieve the required internal noise levels.

15.16 The impact of the increase in road traffic associated with the Proposed Development has been assessed. It is predicted that significant effects from any increase in road traffic noise would be unlikely at existing receptors adjacent to the surrounding roads.

15.17 Additionally, changes in road traffic are unlikely to significantly effect the measured ambient noise levels used for assessment of the Proposed Development.

15.18 Assessment of noise from the waste centre on Shawstead Road indicate there is low likelihood of adverse effects on the proposed residential dwellings.

15.19 There are no identified commercial noise sources that would be likely to cause any significant impact at the Proposed Development.

## **Landscape and Visual Amenity**

### Planning Policy

15.20 A review of planning policies relating to landscape and townscape from national through to local level was undertaken and careful consideration has been given to addressing and complying with the aims of policies and designations. The scheme design has given due regard to landscape and visual factors in creating a landscape infrastructure that sets the framework for the scheme layout and responds sympathetically to the distinctive nature of the Site and its setting.

15.21 The NPPF encourages decision making to be based, amongst other things, on a comprehensive evidence base and use of Landscape Character Assessments as a tool in decision making. The proposals comply with NPPF landscape guidance.



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15.22 While it is accepted that a basic premise of planning policy is to protect countryside for its own sake, it is also the case that development, where it is required beyond settlement boundaries, should use efficiently the least distinguished and non-designated landscapes – such as the Site. It is considered that the proposals comply with landscape policies in the 2003 Local Plan - with the exception that the Site is located within land designated as an Area of Local Landscape Importance. This designation does not put a blanket prohibition on development and its future status is in doubt with its exclusion from polices in the emerging Local Plan.

15.23 In other respects, the proposals are able to comply with all existing and emerging local landscape policy requirements

#### Landscape Character

15.24 The baseline assessment identified the sensitivity of both landscape and townscape character areas and visual receptors located around the Site. The changes resulting from the Proposed Development have been assessed against the baseline findings to establish the likely significance of effects during construction, following completion at Year 1 and at Year 15.

15.25 The assessment of landscape character considered information from published landscape character assessments and information gathered from visiting the Site and surrounding areas. The baseline assessment in this chapter agrees with the findings on landscape sensitivity in the local authority's LCA study.

15.26 Local landscapes included in the assessment in this chapter are considered to be of generally moderate to high character sensitivity with a distinct pattern, sense of place and in moderate to good condition. Character was most distinctive along Darland Banks and the lower valley slopes within the Capstone Valley. Conversely, character is generally less intact towards the ridge tops where the influence of built form detracts from these areas. The assessment also considered local townscape to generally be of moderate character but despite possessing some sense of place, they were all relatively undistinguished, not rare, could be improved and had a low sensitivity.

15.27 The assessment of the effects of the Proposed Development on landscape and townscape character concluded that the greatest effects of the Proposed Development would be limited to the Site which consists of the East Hill and Sharstead Farm LCAs. The development of the Site was shown not to harm the long-term setting of the wider landscape character or environmental assets. The scale of the Proposed Development will be in keeping with adjacent built surroundings, the



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height, massing, finishes and will address the relationship with the adjoining countryside, improve connections to existing urban areas and establish an enduring edge to East Hill.

15.28 Therefore, the Site is considered to be an appropriate and suitable piece of land for development in terms of its existing and proposed landscape character and ability to be assimilated into its setting.

#### Visual Amenity

15.29 The assessment of visual amenity considered views from identified key receptors from locations agreed with the local authority. The baseline assessment concluded that the Site had a relatively enclosed visual envelope despite its elevation and size. Views are generally open and panoramic from adjacent and nearby locations of a similar or higher elevation to that of the Site from areas such as the ridge top along Darland Banks and the upper ridge slopes within Capstone Country Park.

15.30 Conversely, the pronounced ridge and valley topography means that many nearby properties have either glimpsed or no views of the Site, such as the lower ground within the Capstone Valley (including parts of the Capstone Country Park), views from North Dane Way and the adjacent residential properties in Wayfield and Princes Park. There are also areas where the view is limited by distance or the Site is a small element within the far wider panoramic view such as the receptor locations in Rochester and Lordswood.

15.31 The assessment of the effects of the Proposed Development on all the visual receptors concluded that for the majority, there are no significant residual effects on views. Where there are shown to be potential substantial effects the scheme proposals and mitigation measures provide a positive and beneficial long-term solution to overcoming any negative outcomes. There will be some inevitable temporary adverse effects during construction that generally will only last until the proposed buffer vegetation has had time to grow and mature.

#### Connectivity & Biodiversity

15.32 The Proposed Development will see the Site change from being arable farmland to a new residential neighbourhood. New and improved public rights of way will enhance connectivity across the Site, between existing neighbourhoods, Capstone Farm Country Park and the countryside beyond. The landscape and mitigation treatments included in the scheme proposals





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will create a greatly improved range of new habitats, increase biodiversity and provide new opportunities for wildlife.

15.33 The proposed scheme is capable of being readily assimilated into the adjacent urban edges of Chatham and Gillingham. Furthermore, the robust green and blue infrastructure will frame the new development as well as create an attractive, enduring and distinctive new edge to an enlarged settlement boundary.

### **Ecology and Biodiversity**

15.34 Ecological surveys of the Site have been undertaken, including a desk study, an extended Phase 1 Habitat survey and Phase 2 faunal studies.

15.35 Further detailed surveys for the following species were undertaken:

- Dormice
- Bats
- Badgers
- Wintering Birds
- Breeding Birds
- Terrestrial invertebrates
- Reptiles
- Amphibians

15.36 The Site is dominated by large arable fields, considered to be of low ecological value, with other habitats within and surrounding the Site considered to be of higher value in the context of the Site including all boundary vegetation with ancient woodland, hedgerows, field margins and scrub.

15.37 Surveys for protected species have found that the Site supports dormice, bats, badgers and reptiles as well as assemblages of breeding birds and terrestrial invertebrates.

15.38 The potential effects, of the Proposed Development have been assessed for designated sites and the various ecological features within the Site. A range of mitigation measures are proposed in relation to the proposed adverse effects on the habitats and ecological features, ensuring that retained habitats of high value are protected by the Development. In addition, under the Development there will be provision of enhancements in the form of semi-natural greenspace



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across the Site, comprising large areas of chalk grassland, new hedgerows, woodland planting and attenuation basins. These measures will provide new areas of valuable wildlife habitat, providing benefits to a wide variety of faunal species. Measures are also proposed to avoid effects relating to human influences and lighting.

15.39 The Development and mitigation scheme have been designed to achieve compliance with relevant legislation and planning policy in respect of protected faunal species. Measures are proposed to protect and avoid killing or injury of protected species such as dormice, bats, badger, reptiles and birds (protected under the Wildlife and Countryside Act 1981), and the Conservation of Habitats and Species Regulations) and opportunities for enhancements to biodiversity are also proposed, in accordance with NPPF, the NERC Act 2006 and local policy, which will ensure that opportunities for such species are maintained and enhanced under the Development. The Development also accords with BAP objectives, specifically in relation to creation of new habitats.

15.40 Following the implementation of mitigation and enhancement measures (set out within this chapter), it is considered that the Development will have moderate beneficial effects on habitats within the Site, while beneficial effects of minor to moderate significance will occur in respect of faunal species. Overall, therefore following the implementation of proposed mitigation and enhancement measures the effects on ecology will be neutral to moderate beneficial at the local level.

### **Water Quality, Hydrology and Flood Risk**

15.41 All significant effects on the water environment, local water infrastructure and flood risk during the construction period will be mitigated by the development and implementation of appropriate construction methods, and implementation of a CEMP. These effects will be controlled by discharge consents which will regulate construction drainage discharges. The effects have therefore been assessed as neutral.

15.42 The Proposed Development will result in a reduction to the peak rate at which surface water is discharged from the Site when compared to the current greenfield runoff rates. The Proposed Development has also been designed to manage surface water runoff for events up to and including the 1 in 100 year return period, including a 30% increase to account for climate change. The additional water will be contained onsite, and therefore the Proposed Development will have a beneficial effect on local flooding.



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## Soils, Geology and Contaminated Land

15.43 The Site has a history of agricultural use and is located within a semi-rural area, with urban areas to the north and west. Several potentially contaminative uses have been identified both on-site and off-site (within 250 metres). The Sites use as agricultural farmland is likely to have involved the use of pesticides and herbicides. Therefore, there is a risk (although low) from these chemicals remaining within the upper soil profile. Two historic (now demolished) houses were identified which in-turn will have led to localised areas of Made Ground.

15.44 Land immediately to the east of the southern site was used as an inert/household landfill between the early 1930s until completion in 1991. ST Consult noted that the landfill was a land raise and did not involve any infilling. The landfill is still considered to constitute a significant source of contamination in the form of landfill gas.

15.45 With regards to the environmental setting, the underlying Chalk has been assigned as a Principal Aquifer. The northern portion of the Site is in Zone I Source Protection Zone (SPZ) (Inner Protection Zone) whilst the southern portion is in Zone II SPZ (Outer Protection Zone).

15.46 A preliminary (limited scope) environmental site investigation, as part of a geotechnical assessment, was undertaken by ST Consult between 10/09/18 and 15/09/18. The results of the soil analysis have been compared (by ST Consult) against published Tier 1 screening values (residential with homegrown produce) in accordance with the CLEA methodology. Except for BaP there were no exceedences of stated Tier 1 screening values for any of the stated determinands that were analysed. The exceedences of the BaP Tier 1 screening level coincide with areas of shallow made ground (i.e. brick and clinker fragments). Given that the investigation was preliminary and limited in scope it is unclear the likely density with which made ground will exist across the wider 49.47 ha Site. As a result, a more detailed assessment will be required.

15.47 ST Consult undertook a preliminary search of regional unexploded ordnance records held by Zetica. The assessment identified a high density of bombing during WWII around Chatham and Gillingham both located north of the Site. The preliminary risk assessment recommends that a detailed UXO risk assessment be carried out prior to groundworks being undertaken at the Site.

15.48 A separate land gas monitoring programme was started in December 2018 during which two rounds of monitoring were undertaken by ST Consult (04/12/18 and 14/12/18) using five installed windowless sample locations alongside the off-site historic landfill. The Calculated GSV (carbon dioxide) is 0.0027 l/hr i.e. meets the requirements for CS1. The BS 8485:2015 Minimum



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Gas Protection Score for CS1 (High Risk – Type B Building) is zero i.e. no protection measures are deemed necessary. It is important to note that this assessment is based on two visits. Further visits will be required in order to provide a full and complete assessment prior to development.

15.49 Although ST Consult well installations were installed to 20 metres bgl no groundwater was encountered during the investigation

15.50 It is recommended that a watching brief is undertaken during all earthworks especially in the areas surrounding the previous demolished residential properties. If any potentially contaminative material is found, the earthworks will be temporarily suspended until further investigatory works are undertaken. In the unlikely event that contaminated land is identified a remediation strategy and verification programme will be agreed with the statutory consultees.

15.51 There is a slight potential for ground contamination to arise during the construction period but with appropriate control measures this can be mitigated against through the application of appropriate design and operational controls.

### **Archaeology and Cultural Heritage**

15.52 The construction of the Proposed Development may result in the loss of archaeological remains. The assessment has shown that it is possible that archaeological remains of Romano-British date associated with known burial sites to the north, could survive within the Site. Study of desk-based sources indicate that it is unlikely, although not impossible, that significant archaeology of other periods is present within the Site, although the foundations of a building known as Maunder's House which was present within the Site by 1839 may well survive. The effect of the Proposed Development on archaeology is predicted to be minor to moderate adverse.

15.53 There will be no operational effects as the settings of listed buildings located within 1km and the scheduled monument of Fort Luton approximately 1.2km to the west will be unaffected by the Proposed Development.

15.54 Because of the potential presence of Romano-British archaeology, and possibly archaeology of other periods, within the Site it is proposed that a programme of archaeological fieldwork be carried out in order to establish the nature, date and extent of any surviving archaeology.



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15.55 The overall effect of the Proposed Development on heritage assets is predicted to be minor adverse due to the potential permanent loss of archaeological remains.