



Environmental Statement Volume 1: Main Text

Land North East of Harpenden between
Lower Luton Road, Bowers Heath Lane and
Common Lane

March 2026

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Environmental Statement Volume 1: Main Text

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1 Introduction

1.1 Project Background

- 1.1.1 This Environmental Statement (ES) has been prepared by Stantec UK Limited (Stantec) on behalf of Crest Nicholson (the 'Applicant') in relation to an outline planning application for demolition of existing buildings and structures and construction of a mixed-use development comprising residential dwellings (including affordable housing), children's home, elderly care facility, local centre (flexible retail/ health/ community use), sports pitches and associated building, green infrastructure and landscaping works (to include public open space and community growing space). Primary school with early years provision, vehicular and active travel infrastructure (including pedestrian and cycle access) and diversion of Bower Heath, drainage works, and related infrastructure (hereafter referred to as the 'Proposed Development').
- 1.1.2 The Proposed Development is located on land North East of Harpenden (the 'Site'). A full description of the Proposed Development is provided in **Chapter 3**. The Site is located within the administrative boundary of St Albans City District Council (SADC).
- 1.1.3 The Site is located immediately north east of the settlement of Harpenden. It encompasses approximately 32.94 hectares (ha) of land and comprises pasture fields with further fields, hedgerows, and woodlands to the north, east and west. A Site Location Plan is provided in **Appendix 1.1** and a full description of the Site is provided in **Chapter 2**.
- 1.1.4 The Site forms part of the emerging allocation within the emerging SADC Local Plan (Policy LG1 Broad Locations and Policy B2 North East Harpenden) and represents the largest component part of this draft allocation, approximately 66% of the draft allocated site area.
- 1.1.1 This ES presents the findings of the Environmental Impact Assessment (EIA) undertaken in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (the 'EIA Regulations') and identifies the likely significant environmental effects of the Proposed Development and any measures to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and to enhance any beneficial effects over both the construction and operational phases.

1.2 Terms and Definitions

- 1.2.1 For ease of reference the following terms have been used in this ES (unless the context dictates otherwise):
- **The 'Site'** – land on which the Proposed Development is located (the extent of which is shown on the Site Location Plan in **Appendix 1.1**), and which is located on land North East of Harpenden between Lower Luton Road, Bowers Heath Lane and Common Lane;
 - **The 'Proposed Development'** – the development proposal for which outline planning application is sought as described in **Section 1.1** and in **Chapter 3**. Parameter Plans (Land Use, Storey Heights, Open Green Infrastructure, Access and Movement) are provided in **Appendix 1.2**;
 - **'SADC'** – St Albans District Council, the administrative boundary in which the Site is located.
 - **The 'Applicant'** – Crest Nicholson ('Crest'); and
 - **EIA Regulations** - the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended).



EIA Terms:

- **Primary Mitigation** – modifications to the location or design of the development made during the pre-application phase that are an inherent part of the project, and do not require additional action to be taken;
- **Secondary Mitigation** – actions that will require further activity in order to achieve the anticipated outcome. These may be imposed as part of the planning consent, or through inclusion in the ES;
- **Tertiary Mitigation** – actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects;
- **Impact** – in relation to the outcome of the project (e.g. the removal of habitat or the generation of emissions to air);
- **Effect** – the consequent implication in environment terms (e.g. the loss of a potential breeding habitat for a protected species or the reduction in local air quality);
- **Parameter Plans** – the plans that define the maximum parameters for the Proposed Development on which the EIA will be based, shown in **Appendix 1.2**;
- **Illustrative Masterplan** – an indicative view of how the Proposed Development could look;
- **Short term** effect duration – 1 to 2 years;
- **Medium term** effect duration – 2 to 5 years; and
- **Long term** effect duration – 5+ years.

1.2.2 A full glossary of terms and definitions is provided in **Chapter 18**.

1.3 The Environmental Statement and Other Documents

- 1.3.1 This ES presents the findings of an EIA undertaken in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended), referred to as the 'EIA Regulations'.
- 1.3.2 The Proposed Development is considered by the Applicant to be EIA development (as defined) because it is development that falls within paragraph 10(b) of Schedule 2 of the EIA Regulations that has the potential to give rise to significant environment effects by virtue of its size.
- 1.3.3 Running concurrently with the design process, the EIA has sought to identify the likely significant environmental effects of the Proposed Development. The EIA process then identifies appropriate design and construction measures and good practice both to mitigate likely significant adverse environmental effects and to maximise the environmental opportunities that might arise as a consequence of the construction and operation of the Proposed Development.
- 1.3.4 The EIA has also sought to determine the residual likely significant beneficial and adverse environmental effects remaining after mitigation has been incorporated.



1.4 Project Team

- 1.4.1 Regulation 18(5)(a) of the EIA Regulations requires that, to ensure the completeness and quality of environmental statements, *“the developer must ensure that the environmental statement is prepared by competent experts”*. Regulation 18(5)(b) requires an environmental statement to be accompanied by a statement from the developer outlining the relevant expertise or qualifications of such experts.
- 1.4.2 The project team working on elements supporting the ES are provided in **Table 1.1**. On behalf of the Applicant and in accordance with the EIA Regulations, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare the ES is provided in **Appendix 1.3**.

Table 1.1: EIA Team

Project Team Member	EIA Topic
Stantec	EIA Coordination; Population and Human Health; Climate Change; Waste
Bradley Murphy Design	Landscape Character and Visual Amenity
Aspect Ecology	Biodiversity
SLR Consulting	Transport and Access
Create Consulting	Noise and Vibration; Air Quality

1.5 Organisation of the EIA Report

- 1.5.1 Regulation 18 of the EIA Regulations sets out the information an ES should include. **Table 1.2** below shows where the Regulation 18 information has been provided in this ES.

Table 1.2: Location of the Information Required by Regulation 18 of the EIA Regulations

Specified Information		Location within ES
<i>Reg 18 (3) An Environmental Statement is a statement which includes at least—</i>		
(a)	a description of the proposed development comprising information on the site, design, size and other relevant features of the development;	Chapter 3
(b)	a description of the likely significant effects of the Proposed Development on the environment;	Chapters 7-14
(c)	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	Chapters 3-5
(d)	a description of the reasonable alternatives studied by the applicant or appellant, 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 significant effects of the development on the environment;	Chapter 3
(e)	a non-technical summary of the information referred to in sub-paragraphs (a) to (d);	Separate standalone NTS
(f)	any additional information specified in Schedule 4 relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected.	Chapters 7-14
<i>Reg 18 (4) An Environmental Statement must---</i>		



Specified Information		Location within ES
(a)	where a scoping opinion or direction has been issued in accordance with regulation 15 or 16, be based on the most recent scoping opinion or direction issued (so far as the Proposed Development remains materially the same as the Proposed Development which was subject to that opinion or direction);	Chapter 5
(b)	include the information reasonably required for reaching a reasoned conclusion on the significant effects of the development on the environment, taking into account current knowledge and methods of assessment;	Chapters 7-14
<i>Reg 18 (5) In order to ensure the completeness and quality of the Environmental Statement --</i>		
(a)	the developer must ensure that the environmental statement is prepared by competent experts;	A 'statement of expertise' as required by Regulation 18 (5) (b) of the EIA Regulations 2017 is provided in Appendix 1.3.
(d)	the environmental statement must be accompanied by a statement from the developer outlining the relevant expertise or qualifications of such experts.	See Appendix 1.3 'statement of expertise'.

1.6 Report Structure

1.6.1 Volume 1 of this ES comprises 10 Chapters and is supported by Figures and Technical Appendices (which are located within a separate Volume 2). A Non-Technical Summary (NTS) of the full ES is provided as a separate standalone document. The structure of the ES is set out below:

- **Volume 1 – Main Report (this report).**
 - **Chapter 2:** description of the Site and surrounding area.
 - **Chapter 3:** summarises the Proposed Development.
 - **Chapter 4:** outlines the construction methodology and phasing.
 - **Chapter 5:** provides the methodology adopted to undertake the EIA.
 - **Chapter 6:** summarises the planning and policy context.
 - **Chapters 7 – 14:** comprise the technical assessment chapters.
 - **Chapter 15:** impact interactions.
 - **Chapter 16:** schedule of mitigation and monitoring.
 - **Chapter 17:** statement of significance.
 - **Chapter 18:** glossary of abbreviations used in the ES.
 - **Chapter 19:** a list of references used in the ES.
- **Volume 2 – Figures and Technical Appendices.**
- **Non-Technical Summary.**



1.6.2 A full list of planning application documents submitted to support this Outline Application are provided in the Planning Statement and include:

- Affordable Housing Statement;
- Agricultural Land Survey;
- Air Quality Impact Assessment;
- Archaeology Assessment;
- Biodiversity Survey and Report;
- Biodiversity Net Gain Assessment and Metric;
- Design and Access Statement inc. Design Brief and Landscape Strategy;
- Flood Risk Assessment;
- Foul Water Assessment;
- Drainage Strategy;
- Utilities Assessment;
- Heritage Statement;
- Land Contamination Assessment;
- Landscape and Visual Impact Assessment;
- Green Belt Review;
- Tree Survey and Arboricultural Impact Assessment;
- Noise Impact Assessment / Acoustic Report;
- Transport Assessment inc. Framework Travel Plan (School), Framework Travel Plan (Residential), and Parking Strategy;
- Statement of Community Involvement;
- Environmental Performance and Sustainability Assessment inc. Carbon Dioxide Emissions Statement;
- Site Waste / Waste and Recycling; and
- Health Impact Assessment.

1.7 ES Availability

1.7.1 Electronic copies of the ES can be made available. Requests can be made from:

Environmental Planning Team
Stantec UK Limited
Lakeside House,
Blackbrook Business Park,
Blackbrook Park Avenue
Taunton, UK



TA1 2PX

E-mail: taunton.uk@stantec.com

Tel: 01823 218 940

- 1.7.2 The ES should be made available for public viewing. Comments on the planning application can also be made via the Council's website (<https://planningapplications.stalbans.gov.uk/planning>) or can be forwarded to the Planning Departments at the email address below:

Email: planning@stalbands.gov.uk



2 Site and Surrounding Area

2.1 Overview

- 2.1.1 This Chapter outlines the key environmental characteristics of the Site and the surrounding area which have informed the EIA being undertaken for the Proposed Development. Details of the characteristics and sensitivities of the individual receptors which have been identified within relevant Study Areas, are used to assess likely environmental effects from the Proposed Development are then provided in each chapter of the technical assessments.

2.2 The Site and Surrounding Area

- 2.2.1 The Site is located immediately north east of the settlement of Harpenden and comprises of pasture fields with further fields, hedgerows and woodlands to the north, east and west. The Site encompasses approximately 32.94 hectares (ha) of land. An unnamed track bisects the northern and southern areas of the Site. It runs along the middle of the Site from the west to east. The track links up B652 Bower Heath Road and Common Lane.
- 2.2.2 The majority of the Site is currently comprised of open fields. A small area within the western parcel of the Site is currently comprised of an equestrian centre and a telecommunication mast and electrical substation is located near the centre of the Site.
- 2.2.3 The Site is bound by the B652 Bower Heath Lane to the north west and fields directly north. Common Lane runs adjacent to the eastern boundary. To the south of the Site is Porters Hill Park and residential development. The B653 Lower Luton Road and fields are located on the western boundary. Three Public Rights of Way (PRoW) cross the Site, footpath 'Harpenden 034' runs from Bower Heath Road to Turners Close, footpath 'Harpenden 061' runs from Common Lane to Whitings Close and footpath 'Harpenden043' / 'Wheathampstead 061' runs east west from Common Lane.
- 2.2.4 The closest residential property lies within Noke Shot, immediately south of the Site. Porters Hill Park lies immediately south of the Site which also encompasses Porters Hill Playground and Porters Hill Park Allotments.
- 2.2.5 The surrounding area to the north and east of the Site is predominantly characterised by agricultural fields; residential properties; farms and associated buildings; hedgerows; and the local road network. There are various residential properties located along the B652 Bower Heath Lane and within Sauncey Wood. Additionally, there are two farms located to the north east of the Site: Hornbeam Wood Farm (approximately 100 m from the Site) and Four Oaks Farm (approximately 320 m from the Site). Hornbeam Wood Hedgehog Sanctuary & Rescue facility is located approximately 100 m north east.
- 2.2.6 The surrounding area to the south and west of the site is predominantly characterised by the hamlet of Bower Heath to the immediate south; Porters Hill Park; hedgerows; nearby residential properties; a local park; and the local road network.

2.3 Environmental Context

- 2.3.1 A summary of the environmental setting of the Site is set out in this section which has been informed by a desk study review. Detailed baseline information is presented in each of the topic chapters of this ES, as well as in the accompanying technical appendices (Volume 2 of the ES).
- 2.3.2 The desk study indicated that there are no internationally or nationally designated nature conservation sites present within or immediately adjacent to the Site including, Sites of Special Scientific Interest, Ramsar sites, Special Areas of Conservation, or Special Protection Areas. The nearest statutory designation is Batford Springs Local Nature Reserve (LNR), located



approximately 580 m to the south of the Site. The nearest non-statutory designation is Holcroft's Springs Local Wildlife Site (LWS), which is separated from the Site by Common Lane, which forms the north-eastern boundary of the Site.

- 2.3.3 The Site comprises horse stables and associated grazed pasture, supporting a range of species diversity from modified grassland to other neutral grassland. Hedgerows and trees are present at the field boundaries, whilst other habitats such as woodland, scrub and hardstanding/buildings are also present. Initial survey work has identified potential for the Site to support a number of protected and notable species including bats, Badger, birds, Great Crested Newt and reptiles.
- 2.3.4 There are no areas of ancient woodland on the Site. The closest area of ancient woodland is 'Sauncy Wood', located approximately 190m to the southeast of the Site.
- 2.3.5 A Soils and Agricultural Quality survey has been undertaken for the Site. The Agricultural Land Classification (ALC) system grades land from 1-5, with Grade 1 being defined as excellent quality agricultural land, and Grade 5 as very poor agricultural land. Grades 1, 2 and 3a comprise the 'Best and Most Versatile' (BMV) land. The survey identified that all the land within the Site is classed as Subgrade 3b, which is not BMV land.
- 2.3.6 The following Listed Buildings are located within 1 km of the Site:
- Grade II 'The Red Cow Public House' (Ref: 1102963) 100 m to the south west;
 - A cluster to the north;
 - Grade II 'Main Barn at Dane Farm' (Ref: 1103662) 960 m to the north;
 - Grade II 'Dane Farmhouse' (Ref: 1308129) 995 m to the north;
 - Grade II 'Old Raisins Farm' (Ref: 1346875) 910 m to the north east;
 - A cluster to the east;
 - Grade II 'Holly Bush Cottage' (Ref: 1346900) 910 m to the east;
 - Grade II 'Turnershall Farmhouse' (Ref: 1176000) 940 m to the east;
 - A cluster to the south east;
 - Grade II 'Well House at Mackerye End' (Ref: 1175976) 760 m to the south east;
 - Grade I 'Mackerye End' (Ref: 1175984) 775 m to the south east;
 - Grade II 'Barn South of Mackerye End' (Ref: 1175984) 775 m to the south east;
 - Grade II 'Stables, Coach House and Cottage South East of Mackerye End' (Ref: 1103673) 830 m to the south east;
 - Grade II 'North East at Mackerye End' (Ref: 1175992) 830 m to the south east;
 - Grade II 'West Barn at Mackerye End Farm' (Ref: 1103632) 800 m to the southeast;
 - Grade II 'Mackerye End Farmhouse' (Ref: 1308091) 830 m to the southeast;
 - A cluster to the south;
 - Grade II 'The Thatched Cottage (on Corner of Lower Luton Road)' (Ref: 1102990) 775 m to the south; and



- Grade II 'Marquis of Granby' (Ref: 1103001) 930 m to the south.
- 2.3.7 There are no conservation areas, or scheduled monuments on, or directly adjacent to, the Site. Mackeyre End Conservation Area is approximately 600 m to the east of the Site, and Harpenden Conservation Area is 600 m to the west. Luton Hoo Grade II* Registered Park and Garden is over 3.5 km to the north west of the Site.
- 2.3.8 The Site is not in a National Landscape but is within a locally designated Landscape Conservation Area. Trees protected under a Tree Preservation Order are located immediately north of the Site.
- 2.3.9 The Site is bound to the north by Common Lane, which wraps around the north eastern corner of the Site. It is bound to the south by Lower Luton Road which provides access towards Harpenden. The Site is in an accessible location with a number of PRoWs and cycle routes within the vicinity of the Site. Three bus services operate within close proximity to the Site, with the most local bus stops situated at the Lower Luton Road/Westfield Road junction to the west of the Site. Harpenden railway station is located approximately 2.6 km from the Site and provides frequent railway services to destinations including Luton, Bedford, and London. Lower Luton Road provides the primary access link by road and runs along the south western boundary of the Site.
- 2.3.10 The Site includes multiple potential human health receptors, including:
- Jobs;
 - Employment (specifically for residents of SADC);
 - Housing delivery;
 - Household expenditure;
 - Health and well-being of the current and future population;
 - Early years education;
 - Primary education;
 - Secondary education; and
 - GP provision.
- 2.3.11 The majority of the Site is located within Flood Zone 1 ($\leq 0.1\%$ chance of flooding from rivers or sea in any given year). A small section of the north-westernmost corner of the Site is located within Flood Zone 2 ($1\% - 0.1\%$ chance of flooding from rivers or sea in any given year). The River Lee is located to the west of Lower Luton Road which forms part of the Site's western boundary. Flooding from reservoirs and from groundwater is unlikely within the Site. There are two small sections of the Site, particularly the westernmost corner, which have a 'high' risk of surface water flooding. The high likelihood is associated with on-site ditches. The rest of the Site has a 'very low' or 'low' risk of surface water flooding.
- 2.3.12 The Site is not located within or in close proximity to an Air Quality Management Area. The closest is Luton AQMA No.3 which is located approximately 7 km north west of the Site. It was designated for annual mean nitrogen dioxide in May 2016.
- 2.3.13 As shown on the Department for Environment, Food and Rural Affairs (DEFRA) Noise Important Areas (NIA) mapping service, the Site is not located within or near to a NIA.



3 The Proposed Development

3.1 Introduction

- 3.1.1 In accordance with the EIA Regulations, this chapter sets out the description of the Proposed Development for which outline planning permission is sought.
- 3.1.2 The Applicant seeks to establish the principles of use, amount, scale of development and access. All matters, except for the main vehicular access point, are reserved for future consideration.
- 3.1.3 The description should be read in conjunction with the following plans and drawings. These plans include the Parameter Plans that set out the maximum parameters for the Proposed Development and detailed drawings, provided for information only.

Application Drawings

- Site Location Plan (**Appendix 1.1**);
- Parameter Plans (**Appendix 1.2**);
- Concept Masterplan (**Appendix 3.1**).

3.2 Description of the Proposed Development

- 3.2.1 The description of the Proposed Development is:
- 3.2.2 *“Outline Application for demolition of existing buildings and structures and construction of a mixed-use development comprising residential dwellings (including affordable housing), children’s home, elderly extra care facility, local centre (flexible retail/ health/ community use), sports pitches and associated building, green infrastructure and landscaping works (to include public open space and community growing space); primary school with early years provision, vehicular and active travel infrastructure (including pedestrian and cycle access) and diversion of Bower Heath Lane; drainage works; and related infrastructure. All matters reserved save for access from Lower Luton Road. An Environmental Statement has been submitted with the application under the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2011 (as amended).”*
- 3.2.3 The Proposed Development description should be read in conjunction with the Parameter Plans provided in **Appendix 1.2** and the Illustrative Masterplan provided in **Appendix 3.1**.

3.3 Parameter Plans

- 3.3.1 This chapter should be read in conjunction with the Parameter Plans (**Appendix 1.2**). The parameter plans define areas for land use, storey heights, open green infrastructure and access and movement, to be covered by the Proposed Development and entail the following:
- Land Use;
 - Storey Heights;
 - Open Green Infrastructure; and
 - Access and Movement.



3.4 Illustrative Masterplan and Indicative Figures

- 3.4.1 This chapter should also be read in conjunction with the Illustrative Masterplan (**Appendix 3.1**). The illustrative masterplan acts as an informed interpretation of what the Proposed Development could look like within the proposed parameters. This includes how buildings might be laid out within the overall development envelope set out in the Parameter Plans, including how the access routes and green infrastructure would be delivered. It is important to note that the Illustrative Masterplan is one iteration of how the overall development might be realised and is therefore subject to change through future Reserved Matters Applications (RMA's).
- 3.4.2 The Illustrative Masterplan has been used to provide the following indicative development figures which have been used to test the proposals against the Council's Development Plan. As per the Illustrative Masterplan, the following figures are an example of how the Site will be developed in line with the parameters. They could be subject to change through future RMAs.

Residential

Indicative Mix

- 3.4.3 The Proposed Development is envisaged to provide up to 500 homes: 196 affordable units (40%) and 294 private units (60%). **Table 3.1** and **Table 3.2** present the indicative mix for both affordable and private units. The indicative mix is based off assumptions, providing a worst-case scenario for testing, as such final figures may differ from those stated.

Table 3.1: Indicative Mix (Affordable)

House Type	Units
1 Bed Apartment	42
2 Bed Apartments	12
2 Bed Homes	62
3 Bed Homes	74
4 Bed Homes	6
Total (Affordable)	196

Table 3.2: Indicative Mix (Private)

House Type	Units
1 Bed Apartment	24
1 Bed Homes	13
2 Bed Homes	14
3 Bed Homes	111
4 Bed Homes	128
5 Bed Homes	4
Total (Private)	294

Indicative Floorspace Figures

- 3.4.4 The indicative floorspace figures are provided below in **Table 3.3**.

Table 3.3: Indicative Floorspace Figures

House Type	Sq.ft
1 Bed Apartments	540 – 675
2 Bed Apartments	675
1 Bed Homes	600
2 Bed Homes	765 – 1057
3 Bed Homes	914 – 997
4 Bed Homes	1056 – 1371
5 Bed Homes	1815



Non-Residential

- 3.4.5 Non-residential uses are proposed as part of this outline application and the indicative scheduled for these uses is set out in **Table 3.4** below. Non-residential uses will include C3, C2, E(a) to E(f) and F2(b) use classes. A primary school with early years provision is also proposed.
- 3.4.6 The local centre will indicatively comprise up to 1,200 sqm GIA of flexible Class E(a) to E(f) and F2(b). This will provide a flexible range of uses including retail, café, healthcare and community uses.

Table 3.4: Non-Residential Uses

House Type	Ha
Primary School	2.00
Elderly Care	0.61
Local Centre	0.55
Sports Pitches	1.96
Allotments, orchards and growing	0.38
Public open space	14.13

Parking Provision

- 3.4.7 Parking provision will be confirmed at the Reserved Matters stage.

Proposed Building Heights

- 3.4.8 Proposed building heights will be confirmed at the Reserved Matters stage.

Materials

- 3.4.9 The appearance of the Proposed Development will be reserved for the detailed design of each unit. However, a strong, high-quality aesthetic will be desired during the early stages of Proposed Development which will set a precedent for new designs moving forward.

Landscaping

- 3.4.10 The Proposed Development parameters have been developed in consideration of the surrounding landscape and visual context of the Site, and the Green Belt Review, particularly its topography, cross valley views and the nature / scale of existing built form in the surrounding context.
- 3.4.11 The Proposed Development will deliver over 14 ha of public open space (including outdoor space) equating to approximately 100m² of green space per person.
- 3.4.12 The Landscape Framework will:
- Create a connected multifunctional green and blue network which embraces the Site’s landscape and ecological assets;
 - Ensure habitat enhancements are concentrated throughout the meadow parkland, as part of sustainable drainage features, internally as part of the green curtains and along Site boundaries;
 - Provide improved pedestrian and cycle connectivity through the inclusion of active travel and informal routes;



- Deliver a high-quality landscape setting to support a sustainable community; and
- Provide a variety of open spaces with the opportunity for play and sport close to people's homes.

Access and movement

- 3.4.13 As shown in the Access and Movement Parameter Plan (**Appendix 1.2**) vehicular access to the Site will be via Lower Luton Road.
- 3.4.14 The Site is accessible for pedestrians and cyclists and enhancements will be made to ensure pedestrian and cycle access, both within the Site and to local facilities, have been identified.

Flood Attenuation and Drainage

- 3.4.15 The Site will contain blue infrastructure including surface water drainage comprising a sustainable drainage system incorporating conveyance and attenuation features such as ponds and basins. The run-off is proposed to be attenuated within the Site before being discharged to a local watercourse. Sustainable Drainage System (SuDS) features will be incorporated within the design where possible. If required, attenuation on-site will be implemented as a climate resilient measure.

Lighting Strategy

- 3.4.16 The lighting philosophy will be to achieve a good level of maintained illuminance across the Site, minimising dark areas and creating a safe environment whilst avoiding light pollution and light spill to surrounding areas. Where required, dark corridors will be maintained within key ecological areas. External lighting installations will be designed to meet the ILP 'Guidance Notes for the Reduction of Obtrusive Light 2021'.
- 3.4.17 The proposed lighting strategy will be confirmed at the Reserved Matters stage.

Waste Management

- 3.4.18 Schedule 4 of the EIA Regulations states that this ES should include a description of the development including:
- “an estimate, by type and quantity, of the expected residues and emissions (such as water, air soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during construction and operational phases”.*
- 3.4.19 The demolition and construction works will be undertaken in accordance with legal requirements, and it is proposed that waste will be minimised by moving waste up the waste hierarchy, avoiding waste during construction, diverting as much waste as possible from final disposal to more sustainable waste management options.
- 3.4.20 Demolition and construction waste will be recycled wherever possible on the Site. Volumes to be exported off-site are not expected to be significant and will be managed through a licensed off-site contractor.
- 3.4.21 A detailed Site Waste Management Plan (SWMP) will be prepared by the Principal Contractor prior to the commencement of construction. This will build upon the Outline SWMP submitted with the planning application. This strategy examines the relevant waste policy that needs to be considered and estimates the levels of waste to be generated, in addition to proposing waste management strategies through the construction and operational phases of the Proposed Development.



- 3.4.22 Operational waste will be subject to a SWMP, which will detail waste collection arrangements. It is anticipated that domestic waste will be collected and disposed of in-line with local policy and existing practice, and that sufficient capacity exists.

Delivery Timescale

- 3.4.23 Construction is anticipated to commence on Site in 2028, subject to gaining planning permission. The Proposed Development will be delivered in a phased manner, and full completion and occupation is anticipated by 2036.

3.5 Mitigation and Enhancement

- 3.5.1 The iterative EIA planning and design processes for the Proposed Development have been undertaken in tandem, with close dialogue maintained between the Applicant, EIA project team, project architect and other advisors. This has allowed an overarching suite of design features, mitigation measure and commitments to be incorporated into the Proposed Development from the outset.
- 3.5.2 The primary and tertiary mitigation measures relied upon when assessing the effects of the Proposed Development are identified in **Section X.6 - Primary and Tertiary Mitigation** within the technical assessments presented in **Chapters 7-14**, with secondary mitigation required to address any significant adverse effects identified through the EIA.

Primary Mitigation

- 3.5.3 Assessment within each topic have taken account of primary mitigation which is inherent in the scheme design which is in accordance with Regulation 18(3)(c) of the EIA Regulations and guidance from the Institute of Sustainability and Environmental Professionals (ISEP).
- 3.5.4 The mitigation and enhancement measures identified to avoid, prevent and/or minimise any significant adverse environmental effects, which are an inherent part of the Proposed Development include:
- Land safeguarded for the delivery of 2FE primary school incorporating early years provision.
 - Local centre with flexibility in potential uses.
 - Features of value have been used to inform the development of an extensive Landscape Strategy for the Proposed Development.
 - The Proposed Development parameters retain, where possible, existing vegetation on the Site boundaries and running internally through the Site, supplementing with additional landscape buffer planting. This includes strategic connection of existing woodlands, hedgerows and trees within the Site and to the surrounding network.
 - A new parkland area is proposed in the northern part of Site Parcels B and C, to form a new defined Green Belt edge to Harpenden and ensuring Proposed Development is set back behind a large area of green infrastructure, which provides a transition out to the wider countryside.
 - The tallest height built form is located in the least visually sensitive parts of the Site, where the combination of landform and existing vegetation provide a strong level of visual enclosure. This includes within Site Parcel A, off Lower Luton Road where the combination of low lying landform, existing boundary vegetation and the adjacent urban edge of Harpenden would assimilate the scale of development proposed. The north eastern and southern parts of Site Parcel C and Site Parcel D include the tallest height built form, set within the central parts of the plateau, away from the existing ridgeline.



- The Storey height parameter plan has been developed to ensure an appropriate building height transition from the valley slopes (within Site Parcel B) to the plateau landform (Site Parcel C and D), ensuring a lower scale and height of proposed development on the ridgeline.
- Retention of the habitats of elevated ecological value wherever possible, notably the areas of woodland and the hedgerows.
- Provision of substantial areas of open space within the northern part of the Site, which will be subject to habitat enhancement and creation works.
- Provision of active travel links from Site to adjoining Batford residential area to south east of the Site to allow for direct travel to facilities in Batford and to allow existing residents to access facilities included within this Site.
- Provision of additional pedestrian and cycle access points on to Lower Luton Road.
- Signalised crossing at Site access junction on Lower Luton Road.
- Dwellings to be provided with on-plot cycle parking.
- Landscaping and green infrastructure (e.g., tree planting, green walls) have been incorporated to act as natural barriers to airborne pollutants and improve local air quality.
- The Proposed Development incorporates a Sustainable Drainage System (SuDS) to reduce flood risk on the Site.
- Integration of sustainability targets and responsible sourcing principles into the design and procurement strategy.
- Site layout designed to accommodate internal/external waste storage and collection infrastructure.

Tertiary Mitigation

3.5.5 Any measures secured through legal process or separate regulations, assumed to be an inherent part of the Proposed Development, are referred to as Tertiary mitigation and include.

- Implementation of a Construction Environmental Management Plan (CEMP). See topic chapters for specific construction phase mitigation measures to be secured through the CEMP.
- Demolition of building recorded to support bat roost to be undertaken under licence from Natural England and following implementation of an appropriate mitigation strategy.
- Closure of Badger setts undertaken under licence from Natural England and following implementation of an appropriate mitigation strategy.
- Clearance of bird habitat outside of bird nesting season or following an inspection by a suitably qualified ecologist.
- Construction Traffic Management Plan (CTMP).
- All dwellings must comply with Building Regulations Part L 2021 which came into effect in June 2022.
- The Future Homes Standard, as an uplift to energy efficiency standards, will provide a pathway to highly efficient homes and non-domestic buildings which are 'zero carbon ready'. As such, it is expected that any phases of development that come forward after the



adoption of this standard will be required to comply with it. In order to meet the carbon reduction requirements of the Future Homes and Future Building Standards, it is proposed that all buildings will supply heat through air source heat pump (ASHP) systems

- Electric vehicle (EV) charging infrastructure will be provided at the Development in line with the standards of Building Regulations Part S 2021.

Secondary Mitigation

- 3.5.6 Measures which require further activity to be achieved, and do not form an inherent part of the Proposed Development, are referred to as a Secondary mitigation.
- 3.5.7 Secondary mitigation (and enhancement) measures are summarised in **Chapter 16 – Schedule of Mitigation Monitoring**. Along with the Primary and Tertiary mitigation, these measures are proposed to be secured through suitably worded planning conditions attached to any forthcoming consent.

3.6 Consideration of Alternatives

- 3.6.1 Regulation 18(3)(d) of the EIA Regulations requires an ES to include:

"a statement 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 options chosen, taking into account the effects of the development of the environment".

- 3.6.2 This is expanded at paragraph 2 of Schedule 4 of the EIA Regulations and require an ES to include:

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

- 3.6.3 This legal requirement is expressed in very general and high-level terms, requiring only the inclusion of "reasonable" alternatives and an "indication" of "main" reasons. Although a full description of alternatives and a full assessment of their likely environmental effects are not required, sufficient detail should be provided to allow for a meaningful comparison between the alternatives and the Proposed Outline Development.
- 3.6.4 The consideration of alternatives in this ES complies with that requirement and has regard to the guidance in the PPG on Environmental Impact Assessment which states (similarly to the EIA Regulations) "Where alternative approaches to development have been considered, the Environmental Statement should include a description of the reasonable alternatives studied which are relevant to the proposed development and its specific characteristics and provide an indication of the main reasons for the choice made, including a comparison of environmental effects".
- 3.6.5 Alternatives should only be considered where they are feasible, realistic, and genuine. This may depend on various factors, including planning policy, land ownership, financial viability, technical feasibility, and design quality. Options which are unlikely to be acceptable, or deliverable are not realistic alternatives and so do not need to be considered.
- 3.6.6 Whilst environmental effects are relevant when choosing between alternatives, other factors are also relevant. The main selection criteria which the Applicant has considered when choosing between the alternatives include planning policy, viability, design quality, market requirements, site constraints and opportunities and environmental effects.
- 3.6.7 The following provides an outline of the reasonable alternatives considered in relation to the Proposed Outline and Detailed Development and the main reasons for choosing the Proposed



Outline and Detailed Development in preference to them, including a comparison of the environmental effects.

3.7 No Development and Alternative Sites

- 3.7.1 There is a pressing need at both national and local level to increase the delivery of housing to meet the needs of all members of the community.
- 3.7.2 As part of the emerging SADC Local Plan (Policy LG1 Broad Locations and Policy B2 North East Harpenden), the Site forms part of an allocations and represents the largest component part of this draft allocation, approximately 66% of the draft allocated site area.
- 3.7.3 The 'do nothing' alternative refers to the option of leaving the Site in its current state, as described in **Chapter 2**, and the Proposed Development would not be progressed. In this scenario, the existing configuration of the land would remain the same in the form of agricultural fields that are predominately used for agricultural purposes. As such, the significant impacts (both adverse and beneficial) highlighted in this ES would not occur. This includes the following key benefits:
- Provision of up to 500 residential dwellings;
 - Provision of a children's home;
 - Provision of an elderly extra care facility;
 - Provision of a local centre;
 - Provision of sports pitches; public open space and community growing space; and
 - Provision of a primary school with early years provision.
- 3.7.4 As the Site has been allocated in the emerging allocation within the SADC Local Plan (Policy LG1 Broad Locations and Policy B2 North East Harpenden), no development is not considered to be a reasonable alternative, as it does not accord with policy and would not aid in meeting the housing needs for the area. For the same reason, alternative sites have not been considered in relation to the Proposed Development.



4 Construction Methodology and Phasing

4.1 Introduction

- 4.1.1 This Chapter describes the anticipated construction methodology and phasing of the Proposed Development. Consideration of likely significant effects on the environment that may arise during the demolition and construction phases and any necessary mitigation measures are provided within the respective technical chapters of this ES (**Chapters 7 – 14**).
- 4.1.2 Planning for construction is necessarily broad at this stage and may be subject to modification. This chapter is based on reasonable assumptions and experience that allows assessment of realistic 'worst case' construction phase effects.
- 4.1.3 Likely significant environmental effects associated with demolition and construction phases will be managed through a Construction Environmental Management Plan (CEMP) which will be secured through a suitably worded planning condition attached to any forthcoming consent.

4.2 Anticipated Programme

- 4.2.1 Initial infrastructure works are expected to commence in 2028, followed by commencement of residential build later that year, subject to gaining planning permission. The overall development is anticipated to take approximately 8 years to complete. It is anticipated that there would be a rate of circa 60 dwellings constructed per annum. Completion is anticipated to be in 2036.
- 4.2.2 Infrastructure will be accelerated to provide early access to the school Site.
- 4.2.3 **Figure 4.1** illustrates the broad expected direction of construction and **Table 4.1** below sets out further anticipated construction phasing information for illustrative purposes. The exact details of phasing are yet to be confirmed and will be set out in future Reserved Matters planning applications.



Figure 4.1: Illustrative Phasing Plan

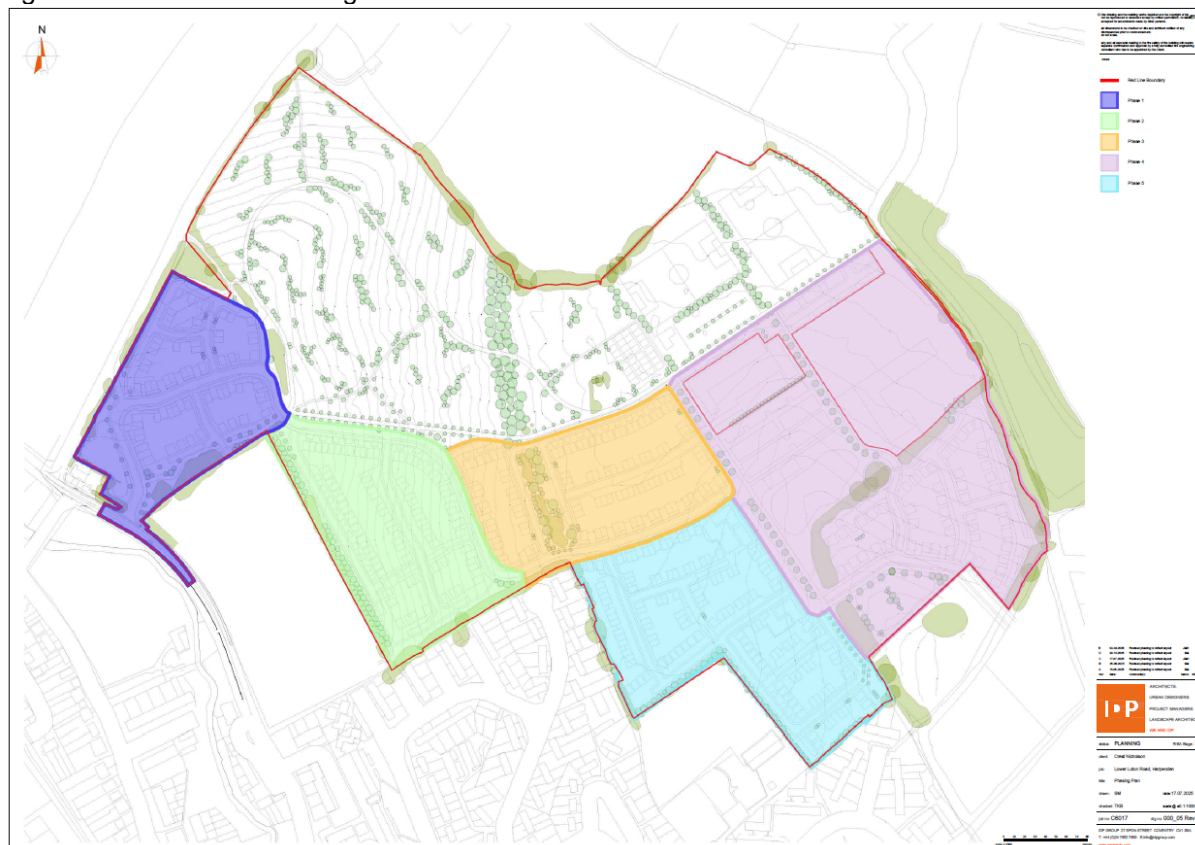


Table 4.1: Illustrative Construction Phasing

Phase	Start Date	End Date
Phase 1	2028	2030
Phase 2	2030	2032
Phase 3	2032	2034
Phase 4	2033	2035
Phase 5	2035	2036

4.3 Outline Construction Methodology

Construction Machinery

- 4.3.1 Consideration has been given to the types of plant and equipment likely to be associated with each key element of the construction process and are set out in **Table 4.2**.

Table 4.2: Typical Construction Plant

Plant	Stage		
	Enabling Works	Infrastructure and substructures	Construction & landscaping
Tracked/wheeled 360-degree excavators	✓	✓	✓
Excavator mounted hydraulic breakers	✓	X	X
Excavator mounted hydraulic crushers	✓	X	X
Dumpers	✓	✓	✓



Plant	Stage		
	Enabling Works	Infrastructure and substructures	Construction & landscaping
Concrete Crushing Plant	✓	X	X
Mobile Craneage/Tower Cranes	X	✓	✓
Eighter-wheeler trucks	✓	✓	✓
Air Compressors	✓	✓	✓
Diamond cutting tools / saws	✓	✓	✓
Handheld Tools including breakers (pneumatic and hydraulic)	✓	✓	✓
Power Tools including percussion drills, cutting disks, pipe-threaders	✓	✓	✓
Hand/power tools	✓	✓	✓
Wheel Washing Plant	✓	✓	✓
Piling Rigs	X	✓	X
Scaffold	X	X	✓
Mobile access platforms	X	X	✓
Delivery trucks	✓	✓	✓
Skips & Skip trucks	✓	✓	✓
Forklift trucks	✓	✓	✓

Site Preparation and Enabling Works

4.3.2 Site preparation will involve the establishment of on-site parking arrangements and any construction worker facilities (including site compound area with offices and welfare facilities for management and construction workers). The initial stages of the construction will likely include the new access routes into the Proposed Development. As part of the initial enabling works, a groundwork contractor will be appointed as principal contractor. This is to undertake and construct the development access, new road layout, foul and storm water drainage infrastructure, compound locations, parking and the construction of foundations and substructure works to the buildings as per the approved plans and layouts. Enabling works would take place in parallel with the access road construction and comprise:

- Preparation of Health and Safety Plans;
- Arboricultural works – including the protection of trees to be retained and removal of trees where applicable;
- Ecological works including the protection of vegetation to be retained;
- Further investigations in the form of geophysical surveys and potentially archaeological trial trenching, if required (to be secured by planning condition, as necessary);
- Installation of site hoarding and security fencing;
- Ground works including topsoil stripping and stockpiling for later use and localised re-grading within the Site; and
- Installation of temporary surface water management measures.

Infrastructure and Drainage Works

4.3.3 Appropriate infrastructure to serve the Proposed Development, such as roads, will be installed and the sustainable drainage systems (SuDS) will be constructed. All site works will be undertaken in accordance with CIRIA (2001) Control of Water Pollution from Construction



Sites which promotes environmental good practice for control of water pollution arising from construction activities.

- 4.3.4 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 with due regard to the sensitivity of the local water environment and thus the risk of accidental spillage or release will be minimised.
- 4.3.5 In accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001, any tanks 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.”* Any above ground storage tanks will be located on a designated area of hardstanding. No underground storage tanks will be used during the construction period. Storage of liquids such as degreasers, solvents, lubricants, and paints will be in segregated, bunded enclosures.
- 4.3.6 The construction drainage system will be designed and managed to comply with BS6031 *“The British Standard Code of Practice for Earthworks”*, which details methods that should be considered for the general control of drainage on construction sites. Further advice is contained within the Geotechnical Design, General Rules (BS EN 1997) which should be read in conjunction with Basis of Structural Design (BE EN 1990).
- 4.3.7 Mitigation measures associated with infrastructure and drainage during construction will be set out in a Construction Environmental Management Plan (CEMP), to be secured via planning condition and agreed with SADC prior to commencement of construction works.

Construction of Substructure

- 4.3.8 This will involve foundation excavation, the installation of below ground services and construction of new foundations. Substructure works may involve:
- Localised re-grading within the Site to create level development platforms for the structures;
 - Excavation for conventional foundations; and
 - Installation of any required piled foundations.

Construction of Superstructure

- 4.3.9 This stage will involve the construction of the main building envelope of residential dwellings and other building structures within the Proposed Development and will include the installation of timber frames, brick walls, and masonry.

Fit Out

- 4.3.10 Fit out of the Proposed Development will involve the installation of block work party walls, dry lining to internal walls, internal walls, domestic mechanical and electrical installations within fitted kitchens and bathrooms.

Landscaping

- 4.3.11 Landscaping works will involve some ground modelling works and the establishment of green spaces within the Site including soil preparation, tree, and vegetation planting, seeding, and construction of footpaths/cycle routes. The ground modelling works will be undertaken concurrently with the Site preparation and substructure works outlined above. The CEMP, to be secured via a suitably worded planning condition, would include measures such as



temporary site compounds, lighting, signage, and perimeter screen fencing, which would minimise landscape and visual effects.

- 4.3.12 Temporary protective fencing will be implemented to protect areas of importance in terms of landscape, visual amenity, or ecology from construction works.
- 4.3.13 Any clearance of nesting habitat or features required to facilitate the development should avoid the period between March and August (inclusive) when nesting birds are most likely to be present. If this is not possible, habitat will need to be checked for nesting birds by a suitably qualified ecologist prior to clearance with works only proceeding if no nesting evidence or behaviour are observed.
- 4.3.14 Advanced planting of hedgerow, woodland, scrub, wetlands, and grassland areas and new habitats would likely be planted as early as possible within the phasing to the Proposed Development to reinforce landscape character and deliver beneficial landscape effects, although this has not been relied upon when considering construction effects on the landscape. Early in the construction period, earthworks operations would implement adoptable road levels, drainage runs, attenuation ponds and achieve parcels at the correct height and gradient for construction to occur.

4.4 Site Access and Traffic Management

- 4.4.1 Traffic management will be the responsibility of the appointed Principal Contractor and on-site Supervisor to ensure that all deliveries are instructed to follow the designated route to and from the development.
- 4.4.2 Vehicular access during construction will be from Lower Luton Road.
- 4.4.3 It will be the responsibility of the Principal Contractor to have a traffic marshal at the development to assist, manage and control all deliveries and traffic on site and to bank larger Heavy Good Vehicle's (HGVs) on the Proposed Development.
- 4.4.4 Deliveries to the Site will be during site working hours 8am to 5pm. All necessary signage will be erected giving notification of the Proposed Development entrance.
- 4.4.5 To prevent soiling the existing roads and manage mud and dirt being transferred from the development onto the completed roads a jet wash and bowser/direct tap to be located at the site entrance and installed and used to remove any mud from construction vehicles when required as existing the development. Periodically a road sweeper will be employed to clean the site roads and the surrounding offsite roads, as and when required.
- 4.4.6 All operatives will be encouraged to travel sustainably and car/van share to reduce vehicular trips associated with construction workers to and from the Site.

4.5 Construction Waste

- 4.5.1 The demolition and construction process needs to be managed to accommodate the peak periods of waste generation. Where possible waste reduction strategies and practices will be formulated in advance. During demolition and construction, materials recovered from on-site works may be suitable for reuse on Site, reducing the traffic generation and pollution, costs of transportation and procurement of virgin materials. This, combined with considerate design practice, will help to minimise construction waste in line with the Waste Hierarchy (prevention, reuse, recovery, disposal).
- 4.5.2 There is no longer a statutory requirement for a Site Waste Management Plan (SWMP) to be implemented, however a SWMP will be prepared to help resource efficiency principles to be incorporated where consideration is given to designing out waste, reduce waste generated on-site as well as reuse, recycling and recovery of waste.



4.5.3 Construction waste will be managed and minimised in line with the Waste Hierarchy as outlined in **Chapter 14: Waste**. The waste management methods in order of preference are as follows;

- Waste Prevention – Through good design and procurement mechanisms.
- Preparation for Reuse – To provide design features to the Proposed Development to use materials in their current state and form, this can occur either on or off site.
- Material Recovery – By using waste materials found on site and recycling / recovering them into an alternative form that can be used for construction purposes.
- Other Recovery – Energy recovery from biodegradable or combustible materials.
- Disposal – The least preferred option where the waste stream would be subject to a final disposal route, such as landfill.

4.6 Controls to Protect the Environment

4.6.1 The preparation of a CEMP is an established method of managing environmental effects resulting from construction works.

4.6.2 The environmental controls (or mitigation measures) to eliminate, reduce or offset likely significant adverse effects on the environment during the construction phase are identified below. It is anticipated that these controls will be secured by appropriately worded planning conditions or obligations:

- Preparation of a CEMP, including measures to control construction traffic, which clearly sets out the methods of managing environmental issues for all involved with the construction works, including supply chain management;
- Requirement to comply with the CEMP included as part of the contract conditions for each element of the work. All contractors tendering for work will be required to demonstrate that their proposals can comply with the content of the CEMP and any conditions or obligations secured through the planning permission;
- In respect of necessary departures from the above, procedures for prior notification to SADC, as appropriate, and affected parties will be established;
- Establishing a dedicated point of contact and assigning responsibility to deal with construction related issues if they arise. This will be a named representative from the construction team; and
- Regular dialogue with SADC and the local community.

4.6.3 The CEMP will be submitted to SADC (and other statutory authorities) prior to the commencement of the works. Compliance with the CEMP will be secured by planning condition. The structure of the CEMP will include the following:

- A table showing the objectives, activities (mitigation/optimisation measures), and responsibilities for the implementation of those activities;
- The broad plan of the work programme including working hours and delivery times;
- Details of prohibited or restricted operations (location, hours etc.);
- Institutional arrangements for its implementation and for environmental monitoring: responsibilities, role of the environmental authorities, participation of stakeholders;



- Contact during normal working hours and emergency details outside working hours;
- Measures for the storage of materials;
- Construction noise and dust management;
- Provision for reporting, public liaison, and prior notification of particular construction related activities;
- The mechanism for the public to register complaints and the procedures for responding to such complaints; and
- The details of proposed routes for HGVs travelling to and from the Site.

Hours of Work

- 4.6.4 Working hours on the Site will be agreed with SADC through the CEMP. However, it is likely that the standard hours of work will be adhered to. These are:
- Monday to Friday, 8am to 6pm;
 - Saturday, 8am to 1pm; and
 - Sunday and Bank Holidays, no working on-site.
- 4.6.5 All work outside of these hours will be subject to prior agreement of, and/or reasonable notice to SADC as appropriate.
- 4.6.6 It is assumed that there would be no HGV access to the Site before 7am or after 7pm, Monday to Friday, or before 7am or after 1pm on Saturdays.
- 4.6.7 Night-time working will be restricted to exceptional circumstances and work internally with buildings. By arrangement, there may be some out of hours construction deliveries made to the Site.

Management of Construction Works

- 4.6.8 All contractors will be required to complete a method statement and risk assessment and obtain a works permit from the Applicant prior to commencement on Site.

Response to Complaints

- 4.6.9 Any complaints will be logged on-site and, where necessary, reported to the relevant individual within SADC, as appropriate (and vice versa) as soon as practicable.

Prior Notice

- 4.6.10 In the event of unusual activities or events, these will be notified to SADC, as appropriate, and relevant property owners, or occupiers in advance. The relevant activities will be agreed with SADC, as appropriate once the detailed programme of construction is defined. This will include:
- Necessary night-time, weekend, or evening working (outside core areas) of a type which may affect properties; and
 - Road or footpath closures/diversions and movements of wide loads.
- 4.6.11 The community will be kept informed during the construction phase as appropriate.



5 Assessment Method

5.1 Introduction

- 5.1.1 This chapter describes the process by which the EIA has been carried out. It includes a discussion of the relevant regulations, the EIA process, consultations and the over-arching assessment methods applied. Details of the technical method followed for each topic are presented in each of the chapters (7-14) as appropriate.

5.2 EIA Regulations

- 5.2.1 The Town and County Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (the EIA Regulations) implement EC Directive 85/337/EEC, as amended, into domestic legislation. The initial Directive and its three amendments have been codified by Directive 2011/92/EU. A new Directive 2014/52/EU was implemented in 2014 and the provisions and requirements were enacted in the UK on 16 May 2017 to form the EIA Regulations.
- 5.2.2 To ensure that the provisions of the EIA Regulations continue to be implemented in the same way or an equivalent way following the exit of the United Kingdom from the EU at the end of the transition period, appropriate amendments were made by The Environmental Assessments and Miscellaneous Planning (Amendment) (EU Exit) Regulations 2018. There has been no substantive change to EIA requirements as a result of the departure of the UK from the European Union.
- 5.2.3 The EIA Regulations set out the procedures for undertaking an EIA and the information which is required in an ES and such procedure has been followed in this assessment.

5.3 EIA Process

- 5.3.1 In general terms the main stages in the EIA are as follows:
- **Screening** – determining whether a proposed project falls within the remit of the EIA Regulations;
 - **Scoping** – determining the extent of issues to be considered in the assessment and reported in the ES;
 - **Establishing Baseline** – drawing together and reviewing existing available data and undertaking surveys to determine the existing and future baseline conditions;
 - **Assessment and Iteration** – assess likely significant effects of development, evaluate alternatives, provide feedback to design team on potential adverse impacts, modify development or impose parameters, incorporate mitigation, assess effects of mitigated development; and
 - **Preparation of the ES.**
- 5.3.2 It should be noted that consultation with relevant stakeholders has been undertaken at appropriate stages within the EIA process.

5.4 Screening and Scoping

- 5.4.1 The Proposed Development is considered to constitute Schedule 2 development under the EIA Regulations as an urban development project of more than 150 dwellings, and which could give rise to significant environmental effects. Therefore, the Applicant voluntarily



determined to undertake an EIA of the Proposed Development in compliance with the requirements of the EIA Regulations.

- 5.4.2 A Scoping Opinion request and associated Scoping Report was submitted to SADC on 17 September 2024 which set out information of the Site and the Proposed Development, the topics to be assessed as part of the EIA, the methodology for the assessment and those topics to be scoped out of the EIA. A copy of the EIA Scoping Report is provided in **Appendix 5.1**.
- 5.4.3 A Scoping Opinion as received from SADC on 11 November 2024 which is provided in **Appendix 5.2**. SADC requested the scope of the assessment for jobs, employment and household expenditure within Population and Human Health be extended to consider a wider spatial assessment area and that a Health Impact Assessment must be included as part of the EIA. SADC also requested the scope of the Noise and Vibration assessment be extended. In addition to the topics proposed to be included in the scope of the EIA, SADC requested that climate change and waste should also be included. As such, these assessments have been included and are presented in **Chapter 13 Climate Change** and **Chapter 14 Waste**.
- 5.4.4 SADC's Scoping Opinion has formed the basis for the scope of the EIA and this ES. Each of the topic chapters of this ES explains, as appropriate, how the studies required by SADC have been undertaken as part of the EIA process.

Table 5.1: Agreed Scope with SADC

EIA Regulations Topic	Included within the EIA?	Explanation
Population	✓	Chapter 7 Population and Human Health
Human Health	✓	Human health has also been considered (as relevant) within the following: Chapter 10 Transport and Access Chapter 11 Noise and Vibration A standalone Health Impact Assessment (HIA) has also been submitted as part of the planning application to capture wider impacts on health and wellbeing.
Biodiversity (for example Flora and Fauna)	✓	Chapter 9 Biodiversity
Land (for example land take)	✗	Ground Conditions and Land Contamination; and Agricultural Land have been scoped out of the EIA, as agreed with SADC (see Appendix 5.2).
Soil (for example organic matter, erosion, compaction, sealing)	✗	
Water (for example hydromorphological changes, quantity and quality)	✗	Water Resources and Flood Risk has been scoped out of the EIA, as agreed with SADC (see Appendix 5.2).
Air	✓	Chapter 12 Air Quality
Climate (for example greenhouse gas emissions, impacts relevant to adaptation)	✓	Chapter 13 Climate Change
Material assets	✓	Chapter 14 Waste
Cultural heritage, including architectural	✗	Cultural Heritage has been scoped out of the EIA, as agreed with SADC (see Appendix 5.2).



EIA Regulations Topic	Included within the EIA?	Explanation
and archaeological aspects		
Landscape	✓	Chapter 8 Landscape Character and Visual Amenity
The Risk of Major Accidents and/or Disasters	✗	The Risk of Major Accidents and/or Disasters has been scoped out of the EIA, as agreed with SADC (see Appendix 5.2).
The inter-relationship between the above factors	✓	Section X.11 (Cumulative Effects of Chapter 7 – 14 Chapter 15 Impact Interactions

5.5 Consultation

5.5.1 In addition to consultation to agree the scope of the EIA, consultation with relevant statutory and non-statutory bodies has been undertaken throughout the EIA and design process.

5.5.2 As part of the EIA process, the following consultees have been consulted to agree the detailed scope of the assessment, to provide information, to discuss assessment methods and findings, and/or agree mitigation measures and design responses. A summary of key consultees and the key technical areas that were consulted on is included below:

- Active Travel England;
- Affinity Water;
- St Albans Archaeological Advisor;
- St Albans Contaminated Land Officer;
- St Albans Design and Conservation Officer;
- Environment Agency;
- Hertfordshire County Council (HCC) Ecology;
- HCC Highways;
- HCC Historic Environment;
- HCC Landscape;
- HCC Lead Local Flood Authority;
- HCC Minerals and Waste;
- Hertfordshire Constabulary;
- St Albans City and District Council Housing;
- Natural England; and
- Thames Water.

5.5.3 In addition to above, community engagement with local residents has taken place in numerous stages. The Statement of Community Involvement (SCI) submitted with the planning



application provides more detail of consultation with the local community and relevant stakeholders.

- 5.5.4 The EIA has given due regard to the requirements of the consultees and their assistance is gratefully acknowledged.

5.6 Assessment Assumptions

- 5.6.1 The following assumptions have been used to ensure that the EIA provides a robust assessment of likely significant effects of the Proposed Development:
- Baseline conditions have been established through site surveys and desk based assessment of the current conditions onsite.
 - Suitable planning conditions or planning obligations will be imposed as identified in this ES to secure appropriate mitigation measures.
 - The Proposed Development will be delivered in accordance with the Parameter Plans (shown in **Appendix 1.2**). The EIA has assessed the maximum build out development parameters to provide a conservative assessment of the likely significant effects of the Proposed Development. The assessment only considers possible effects which have some potential to be significant within the context of the EIA Regulations. Other possible effects which have no potential to be significant in EIA terms have been scoped out of this EIA.
 - The Proposed Development will be constructed in accordance with the programme and construction practice documents in **Chapter 4**.
 - The assessment of likely significant cumulative effects has assumed that the committed development identified will be built out as set out in the documents supporting that application.

5.7 Uncertainty and Limitations

- 5.7.1 The prediction of future effects inevitably involves a degree of uncertainty. Where necessary, the technical chapters describe the principal factors giving rise to uncertainty in the prediction of likely environmental effects and the degree of the uncertainty.
- 5.7.2 Confidence in the predictions has been achieved by employing accepted assessment methodologies, e.g. Guidelines for Ecological Impact Assessment in the UK. Uncertainty inherent within the prediction has been described. The ES has sought to provide a robust assessment of the likely significant effects of the Proposed Development.
- 5.7.3 Further limitations in preparing this ES are noted in each of the technical chapters, as appropriate in **Section X.4** of each chapter.

5.8 Assessing Effects

Establishing Baseline Conditions

- 5.8.1 A range of Site surveys and data collection exercises have been used to identify environmental conditions at the Site and in the surrounding area to provide a basis for the subsequent assessment work. The surveys undertaken are reported in each of the technical chapters.
- 5.8.2 It should be noted however that some of the technical surveys and assessments on which the EIA is based are too detailed and lengthy for incorporation into **Volume 1** of this ES (e.g. ecology survey reports). In such instances, the technical survey and assessment reports are provided in full as an appendix to this ES (**Volume 2**), with a relevant summary and the



reference for the full survey or assessment provided in the ES. The geographical scope of these appended surveys and assessments has been based on the likelihood for significant effects.

- 5.8.3 The EIA has assessed the likely significant effects of the Proposed Development against baseline conditions in the same year (i.e. providing an assessment of ‘do something’ and ‘do nothing’). As required by the EIA Regulations, each chapter has also considered as appropriate the likely evolution of current baseline conditions without implementation of the Proposed Development as far as natural changes from the baseline scenario can be assessed, with reasonable effort on the basis of available environmental information and scientific knowledge. The EIA has therefore used these future baseline conditions within the assessment of effects.

Assessing Demolition and Construction Effects

- 5.8.4 The EIA has assessed the likely environmental effects that could occur during demolition and construction. Given that a principal contractor has not yet been appointed it is not possible to be definitive about the construction works. Therefore, the assessment of likely environmental effects during the construction phase has been based on available information and reasoned judgements based on professional experience to enable the likely environmental effects to be identified.
- 5.8.5 Demolition and construction effects will be temporary and intermittent, i.e. works will not occur in one location throughout the entire duration of the demolition and construction works. The potential duration and intermittency of effects is identified as appropriate in the ES **Chapters 7-14** based on the information provided in **Chapter 4**.
- 5.8.6 In judging the significance of construction effects, it has been assumed that the CEMP, that will be secured via a suitably worded condition, will adequately address mitigation measures in relation to construction effects identified within **Chapters 7-14**.

Assessing Operational Effects

- 5.8.7 To provide an assessment that is generally consistent between topic chapters, the EIA has focused on assessing the likely environmental effects of the overall development. This approach ensures that the full environmental effects of the outline planning application have been considered. Where worst case effects could occur during an earlier year than such an assessment has been undertaken, and this is reported in the relevant topic chapter.

5.9 Mitigation and Enhancement

- 5.9.1 The incorporation of mitigation measures, which are measures to avoid minimise or compensate for adverse effects, is an integral part of the design and EIA processes. The embedded mitigation for the Site is set out in **Section 2.6** and within each topic chapter.
- 5.9.2 The EIA Regulations require an ES to contain: *“A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment”*.
- 5.9.3 The EIA has run concurrently with the design process to identify any likely significant environmental effects and then iteratively modify the design or how it is constructed to mitigate any likely significant adverse environmental effects and to maximise the environmental opportunities which might arise as a consequence of the construction and operation of the Proposed Development.
- 5.9.4 Primary, Secondary and Tertiary mitigation is defined as follows:
- Primary mitigation is defined as the measures which are designed to be an inherent part of the Proposed Development and is set out in **Section 2.6**. and within each topic chapter.



Measures to enhance the current Site have also been included within the design of the Proposed Development such as delivering a net gain for biodiversity;

- Secondary Mitigation are the measures which require further activity to be achieved, and do not form an inherent part of the Proposed Development. Secondary mitigation measures and opportunities for environmental enhancement have also been identified through the EIA process. Such mitigation and enhancement measures are identified in this ES along with how it is proposed that they be secured; and
- Tertiary Mitigation is defined as the measures secured through legal process assumed to be an inherent part of the Proposed Development. These include actions that would occur with or without input from the EIA in the design process.

5.9.5 A hierarchy of methods for mitigating significant adverse effects will be followed; these are, in order of preference:

- **Avoidance** – designing a development in such a way that avoids effects on the environment (e.g. avoiding siting residents in areas that could be affected by flood risk);
- **Reduction** – design the Proposed Development or employ construction methodologies such that significant effects identified are reduced (e.g. employment of sustainable drainage to mitigate the effects of development on surface water run-off);
- **Compensation** – providing off-site enhancement in order to compensate for where onsite mitigation has not been possible (e.g. financial contributions towards local infrastructure).

5.9.6 Environmental effects remaining after mitigation measures have been incorporated are termed "residual effects" and these are fully described in the ES.

5.10 Assessment of Cumulative Effects

5.10.1 The EIA Regulations require the assessment to consider the likely significant effects of the Proposed Development in the context of other existing and/or approved projects, as well as the cumulative effects that may result from the Proposed Development and these other developments.

5.10.2 'Approved developments' are considered to be planning permissions that are partially built out and extant planning permissions. Planning applications that have been submitted but not yet determined have also been considered where there is a likelihood that the application may be granted planning permission before this application is determined.

5.10.3 A review of 'approved developments' was undertaken to identify major developments within 2 km of the edge of the planning application boundary of the Site that may lead to likely significant cumulative effects with the Proposed Development. It was considered that significant cumulative effects are unlikely with developments outside of these areas.

5.10.4 An initial review of approved/existing developments was undertaken, and confirmation of approval sought from SADC, during the Scoping process. The initial review identified one development to be included in the cumulative assessment and is:

Table 5.2: Cumulative Scheme

Planning Reference	Address	Description of Development	Approx. Distance from the Site	Status
5/2023/0327	Land at Cooters End Lane and Ambrose Lane	Construction of up to 550 dwellings including circa. 130 Class C2 integrated retirement homes, 40% affordable	1km	Validated: 01/03/2023 Decision: Pending



Planning Reference	Address	Description of Development	Approx. Distance from the Site	Status
	Harpenden Hertfordshire	housing, early years setting, public open space, allotments and publicly accessible recreation space.		

- 5.10.5 A plan showing the location of the cumulative development is provided in **Appendix 5.3**.

Informal Cumulative Considerations

- 5.10.6 The Site forms part of a wider allocation in the emerging SADC Local Plan (Policy LG1 Broad Locations and Policy B2 North East Harpenden) and represents the largest component part of this draft allocation, approximately circa 66% of draft allocated site area.
- 5.10.7 Whilst this application is being submitted separately, the Applicant has been working collaboratively with the promoters of the adjoining areas of land to ensure a comprehensive approach to this overall Proposed Development.
- 5.10.8 In doing so, it should be noted that the remaining areas of land will largely comprise 'residential development' and that the majority of the proposed supporting infrastructure, (i.e. the 2FE Primary School, Local Centre, Care Home, Sports Hub) are all proposed as part of the Applicant's application. The effects of such infrastructure provision (i.e. impacts and benefits) have therefore been duly assessed as part of this ES.
- 5.10.9 Whilst not forming part of this Application, the remaining areas of land cannot form part of this formal ES cumulative assessment. Nevertheless, this application has been prepared with due regard to the presence of likely future development on the adjoining areas of land and is discussed within **Chapter 3** of this ES.
- 5.10.10 Although information is currently unavailable in relation to the rest of the allocation, technical disciplines have acknowledged, where relevant, how the Site has responded to the wider context. Where relevant, this is discussed within **Chapters 7-14**.

5.11 Impact Interactions

- 5.11.1 **Chapter 15** provides the assessment of impact interactions, i.e. receptors being affected by more than one environmental effect and therefore potentially being subject to a more significant combined effect than the individual effects reported in each of the topic chapters.
- 5.11.2 The approach adopted for the assessment is in accordance with the methodology set out above, with further details provided in **Chapter 15**.

5.12 Significance Criteria

- 5.12.1 The two principal criteria for determining significance of an environmental effect are the magnitude of the effect and the sensitivity of the receptor, in addition the likelihood of the effect occurring is also considered as appropriate.
- 5.12.2 The approach to assessing and assigning significance to an environmental effect has relied upon such factors as consideration of the EIA Regulations, guidelines, standards or codes of practice, the advice and views of statutory consultees and other interested parties, and professional judgement.
- 5.12.3 The following questions are relevant in evaluating the significance of likely environmental effects:



- Is the effect direct, indirect or cumulative?
- Does the effect occur over the short, medium or long term?
- Is the effect permanent or temporary?
- Is it positive, neutral or adverse effect?
- Is the effect reversible or irreversible?
- Does the effect increase or decrease with time?
- Is the effect of local, regional, national or international importance?
- Are health standards or environmental objectives threatened?
- Are mitigating measures available and is it reasonable to require these?

5.12.4 Specific significance criteria have been prepared for each specialist topic, based on the generic criteria, for adverse and beneficial effects, set out in **Table 5.3**.

Table 5.3: Generic Significance Criteria

Significance Level	Criteria
Severe	Only adverse effects are assigned this level of significance as they represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites and features of international, national or regional importance. A change at a regional or district scale site or feature may also enter this category.
Major	These effects are likely to be important considerations at a local or district scale but, if adverse, are potential concerns to the project and may become key factors in the decision-making process.
Moderate	These effects, if adverse, while important at a local scale, are not likely to be key decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource.
Minor	These effects may be raised as local issues but are unlikely to be of importance in the decision-making process.
Not Significant	No effect or effect which is negligible or beneath the level of perception, within normal bounds of variation or within the margin of forecasting error.

5.12.5 Effects that are described as ‘severe’, ‘major’ or ‘moderate’ are determined to be *significant*, and effects that are described as ‘minor’ or ‘negligible’ are determined to be *not significant* in the context of the EIA Regulations.

5.13 Monitoring

5.13.1 The EIA Regulations introduce the requirement for the monitoring of significant adverse environmental effects where appropriate and that a schedule of proposed monitoring should be set out in an ES.

5.13.2 Each chapter of the ES therefore identifies the proposed monitoring arrangements for that topic. As stated in the EIA Regulations effort should be made to ensure that *“the type of parameters to be monitored and the duration of the monitoring are proportionate to the nature, location and size of the development and the significance of its effects on the environment.”*



- 5.13.3 A summary of mitigation and monitoring requirements identified in each topic chapter is provided in **Chapter 16**.



6 Planning Policy and Context

6.1 Introduction

- 6.1.1 This Chapter summarises the key planning policy documents that have informed and set the planning context of the EIA process with further detail on relevant policies is set out within the Planning Statement submitted with the application. Further information on planning policy is provided within the Planning Statement which has been submitted as part of this application.
- 6.1.2 Topic chapters (see **Chapters 7-14**) set out specific planning policies within these planning policy documents and how they have informed the topic assessment.

6.2 National Planning Policy Context

NPPF (December 2024)

- 6.2.1 Paragraph 11 of the NPPF states that there is a presumption in favour of sustainable development, it states:

“Plans and decisions should apply a presumption in favour of sustainable development.

For decision-taking this means:

c) approving development proposals that accord with an up-to-date development plan without delay; or

d) where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless:

i. the application of policies in this Framework that protect areas or assets of particular importance provides a strong reason for refusing the development proposed; or

ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole, having particular regard to key policies for directing development to sustainable locations, making effective use of land, securing well-designed places and providing affordable homes, individually or in combination.”

- 6.2.2 Paragraphs 231 and 225 of the NPPF state:

“The policies in this Framework are material considerations which should be taken into account in dealing with applications from the day of its publication. Plans may also need to be revised to reflect policy changes which this replacement Framework has made.

However, existing policies should not be considered out-of-date simply because they were adopted or made prior to the publication of this Framework. Due weight should be given to them, according to their degree of consistency with this Framework (the closer the policies in the plan to the policies in the Framework, the greater the weight that may be given). Where a local planning authority can demonstrate a five year supply of deliverable housing sites (with the appropriate buffer as set out in paragraph 78) and where the Housing Delivery Test indicates that the delivery of housing is more than 75% of the housing requirement over the previous three years, policies should not be regarded as out-of-date on the basis that the most up to date local housing need figure (calculated using the standard method set out in planning practice guidance) is greater than the housing requirement set out in adopted strategic policies, for a period of five years from the date of the plan’s adoption.”



Planning Policy Guidance

- 6.2.3 The Planning Policy Guidance¹ (PPG) builds on the principles within the NPPF and provides further detailed technical guidance, with reference to relevant legislation and other guidance.

National Design Guide

- 6.2.4 The National Design Guide (published 2019, Updated 2021), illustrates how well-designed places that are beautiful, enduring and successful can be achieved in practice. It forms part of the Government's collection of planning practice guidance and should be read alongside the separate planning practice guidance on design process and tools.

6.3 Local Planning Policy and Guidance

SADC's Adopted Development Plan

- 6.3.1 SADC's adopted Development Plan comprises:
- District Local Plan Review 1994 Saved and Deleted Policies Version (July 2020), and supporting Maps:
 - Harpenden Neighbourhood Plan 2018 – 2033 (2019)
 - Wheathampstead Neighbourhood Plan 2020 – 2035 (2023)

SADC's Emerging Local Plan

- 6.3.2 SADC is preparing a new emerging draft Local Plan. The Regulation 19 version of the Local Plan comprises:
- Draft Local Plan 2041 – Reg. 19 Publication (September 2024); and
 - Draft Policies Map.
- 6.3.3 The Draft Local Plan was submitted on 29th November 2024 for independent examination which commenced in December 2024. Stage 1 Hearings took place 29th April – 1st May 2025. The Examination is progressing towards Stage 2 Hearings in Autumn 2025. The Council is at an advanced stage in preparation thereby, whilst the weight to be attached to the Draft Local Plan is a matter of judgement and for the decision maker to determine, it is considered that weight can be given to the policies and proposals within the Draft Local Plan. The Plan will gain further weight as it progresses through Examination and on adoption, full weight is given to the Plan as it forms part of the Development Plan.
- 6.3.4 The Draft Local Plan designates the site as part of allocation B2 – North East Harpenden, AL5 5EG. Supplementary Planning Documents
- 6.3.5 In addition to the above, this Application has had due regard to the following guidance:
- Design Advice Leaflet No. 1 'Design and Layout of New Housing';
 - Revised Parking Policy and Standards, January 2002;
 - Affordable Housing SPG 2004.

¹ Planning practice guidance - GOV.UK (www.gov.uk)



7 Population and Human Health

7.1 Introduction

- 7.1.1 This chapter assesses the likely population and human health effects of the Proposed Development. In particular, the chapter considers the impact of the Proposed Development on the wider determinants of health and socio-economic factors including housing delivery, employment generation, household expenditure and the population's health and wellbeing. It also considers the additional demand created by the Proposed Development's new residential population for social infrastructure and therefore considers the effect of the Proposed Development on education (early years, primary and secondary phase), primary healthcare (General Practitioner (GP) provision) and open/play space.
- 7.1.2 The population and human health assessment has been prepared by Stantec UK Limited, a Registered Practice with the Landscape Institute and a corporate member of the Institute of Environmental and Sustainability Professionals (ISEP), formerly known as the Institute of Environmental Management and Assessment (IEMA).
- 7.1.3 In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in **Appendix 1.3**.
- 7.1.4 This chapter is supported by the following figures in **Appendix 7.1 Population and Human Health Figures**:
- Figure A7.1: Study Area;
 - Figure A7.2: Early Years Education;
 - Figure A7.3: Primary School Education;
 - Figure A7.4: Secondary School Education;
 - Figure A7.5: GP Provision; and
 - Figure A7.6: Open Space Provision.

7.2 Policy Context, Legislation, Guidance and Standards

National Planning Policy

National Planning Policy Framework (NPPF) (2024)

- 7.2.1 National planning policy is contained principally in the NPPF (MHCLG, 2024). At the centre of the NPPF is the principle of sustainable development, in which the planning system should *'contribute to the achievement of sustainable development, including the provision of homes, commercial development, and supporting infrastructure in a sustainable manner'* (Paragraph 7). The NPPF was last updated in December 2024, with minor amendments in February 2025.
- 7.2.2 There are three overarching objectives of sustainability: economic, social and environmental.
- 7.2.3 The social objective supports *'strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being* (paragraph 8).



- 7.2.4 The economic objective is *'to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure'* (paragraph 8).
- 7.2.5 *'Significant adverse impacts on these objectives should be avoided and wherever possible, alternative options which reduce or eliminate such impacts should be pursued. Where significant adverse impacts are unavoidable, suitable mitigation measures should be proposed or compensatory measures should be considered'* (paragraph 33).
- 7.2.6 So that sustainable development is pursued in a positive way, the NPPF states that *'plans should promote a sustainable pattern of development that seeks to: meet the development needs of their area; align growth and infrastructure; improve the environment; mitigate climate change (including by making effective use of land in urban areas) and adapt to its effects'* (paragraph 11).
- 7.2.7 The NPPF requires planning authorities to work proactively with applicants to secure developments that will improve the economic, social and environmental conditions of the area (paragraph 39). Significant weight should be placed on the need to support sustainable economic growth (paragraph 85).
- 7.2.8 Planning policies and decisions should aim to achieve healthy, inclusive and safe places that promote social interaction; are safe and accessible; and enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example, *'through the provision of safe and accessible green infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling'* (paragraph 96).
- 7.2.9 Furthermore, *'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, and can deliver wider benefits for nature and support efforts to address climate change'* (paragraph 103).
- 7.2.10 To provide the social, recreational and cultural facilities and services the community needs, planning policies and decisions should *'plan positively for the provision of shared spaces, community facilities (such as local shops, meeting places, sports venues, open space, cultural buildings, public houses and places of worship) and other local services to enhance the sustainability of communities'* and should *'ensure an integrated approach to considering the location of housing, economic uses and community facilities and services'* (paragraph 98).
- 7.2.11 In respect of education, the NPPF states that *'it is important that a sufficient choice of early years, school and post-16 places are available to meet the needs of existing and new communities. Local planning authorities should take a proactive, positive and collaborative approach to meeting this requirement'* through giving *'great weight to the need to create, expand or alter early years, schools and post-16 facilities through the preparation of plans and decisions on applications'*; and working *'with early years, school and post-16 promoters, delivery partners and statutory bodies to identify and resolve key planning issues before applications are submitted'* (paragraph 100).
- 7.2.12 The NPPF identifies key principles in relation to health that local planning authorities should consider. In particular, Chapter 8 'Promoting healthy and safe communities' states that decisions should aim to achieve the following key features to a healthy and safe community:
- a. *"Promote social interaction, including opportunities for meetings between people who might not otherwise come into contact with each other – for example through mixed-use developments, strong neighbourhood centres, street layouts that allow for easy pedestrian and cycle connections within and between neighbourhoods, and active street frontages;*
 - b. *Are safe and accessible, so that crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion – for example through the use of*



attractive, well-designed, clear, and legible pedestrian and cycle routes, and high-quality public space, which encourage the active and continual use of public areas; and

- c. *Enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling.”*

National Planning Practice Guidance

The national Planning Practice Guidance (PPG, live document) supports the NPPF health and wellbeing objectives. It states that health, wellbeing, and health infrastructure should be considered in plan making and decision making, recognising the causal relationship between health and wellbeing and the built and natural environment.

Fit for the Future: 10-Year Health Plan for England

NHS England's Fit for the Future: 10-Year Health Plan outlines a strategic shift towards preventative, place-based healthcare that supports healthier communities through integrated services and early intervention. Central to the plan is the recognition that the built environment—including housing, transport, and green infrastructure—plays a critical role in shaping health outcomes. The Plan supports healthy planning principles by promoting access to primary care, active travel, clean air, and inclusive community spaces. It also encourages collaboration between health services, local authorities, and developers to ensure that new housing developments contribute positively to physical and mental wellbeing, reduce health inequalities, and support sustainable population growth.

Local Policy

City and District of St Albans District Local Plan Review 1994 – Saved and Deleted Policies Version (SADC, July 2020)

- 7.2.13 Most of the policies in relation to the quantum of housing, employment and leisure facilities have been deleted and superseded by more up to date policy or guidance. Nonetheless the adopted Plan's objectives remain relevant and include the need to:
- Provide housing and influence the type of dwellings provided to help meet the needs of the area;
 - Provide sufficient land and floorspace to cater for full employment and provide for different kinds of employment uses whilst not encouraging substantial additional commuting into the District; and
 - Make provision for leisure uses.

Draft Local Plan 2041 Regulation 19 Publication (SADC, September 2024)

- 7.2.14 The Draft Local Plan 2041 contains all the planning policies and proposals for the future growth of the City and District of St Albans. It covers the period 1 October 2024 to 31 March 2041.
- 7.2.15 Emerging policies that are relevant to this assessment include:
- **SP1 Spatial Strategy** for St Albans District acknowledges the need to plan for the Government's Standard Method for local housing need of at least 885 new homes per annum which is equivalent to 14,603 net additional homes over the period 2024 to 2041. The draft Policy also states that most growth should be located within Tier 1 and Tier 2 settlements, with Harpenden classified as a Tier 2 settlement. North East Harpenden is identified as a broad location for a large urban extension (250 or more homes).



- **SP3 Land and the Green Belt** – growth must be supported by suitable supporting infrastructure, including; schools, healthcare and ambulance facilities, transport, parks and open space, extensive tree planting, sports and leisure facilities, and renewable and low carbon energy generation.
- **SP4 Housing** - SADC aims to deliver high-quality, inclusive housing by promoting a diverse mix of housing including affordable housing and specialist housing for older people.
- **HOU1 Housing Mix** – requires developments to provide a mix of dwelling sizes, types and tenures that reflect the latest evidence of housing need, including the Strategic Housing Market Assessment. The policy encourages a higher proportion of smaller homes (1- and 2-bedroom units) and family housing where appropriate.
- **HOU2 Affordable Housing** – requires Sites of 10 or more homes to provide 40% of homes as on-Site affordable housing.
- **HOU3 Specialist Housing** – requires a range of specialist housing to meet the needs of older people and / or people with disabilities. The draft Policy identifies a need for 809 additional homes with care (extra care housing) over the period 2024 to 2041.
- **HOU 4 Accessible and Adaptable Housing** – requires that at least 90% of new homes meet Building Regulation M4(2) standards for accessible and adaptable dwellings, and at least 10% meet M4(3) standards for wheelchair user dwellings.
- **EMP 5 Employment Skills** – requires major developments to contribute to local employment and skills development, including through construction training, apprenticeships, and local labour agreements, particularly in areas of identified skills shortages.
- **SP7 Community Infrastructure** - seeks to protect, enhance, and expand community infrastructure, ranging from healthcare and education to emergency services, leisure, and cultural facilities, ensuring new developments provide necessary capacity and resisting loss unless adequate replacement or clear redundancy is demonstrated.
- **COM1 Education** - Requires major residential developments to make appropriate provision for new schools and early years facilities, either on-Site or through contributions, setting criteria for school expansions, reserving land for new schools, and promoting shared community use of educational and sports facilities, with specific Sites identified to meet long-term needs in St Albans and Hemel Hempstead.
- **NEB12 Green Space Standards and New Green Space Provision** – requires new development to meet the standards set out in this draft Policy which align with those set out in **Table 7.1**.
- **SP13 Health and Wellbeing** - aims to enhance health and wellbeing through initiatives promoting physical activity, mental relaxation, access to green spaces, active transport, and healthy lifestyles, with a focus on reducing inequalities, supporting sustainable design, and integrating community, environmental, and heritage considerations in new developments.
- **TRA1 Transport Considerations for New Development** – requires developments to prioritise sustainable transport modes, including walking, cycling, and public transport. It also sets out requirements for travel plans, electric vehicle charging infrastructure, and mitigation of transport impacts through contributions or improvements to local networks.
- **Site Allocation B2 - North East Harpenden** set out the key development requirements for the allocated Site which the Proposed Development Site falls within.
 - 738 residential units;



- One extra care facility comprises 70-80 self-contained units (included within the indicative dwellings figure);
- A Site and appropriate contributions towards a 2FE primary school inc. early years provision;
- On-Site outdoor sports provision;
- A new local centre including a medical centre and commercial opportunities;
- Contributions / enhancements to support relevant schemes in the Local Cycling and Walking Infrastructure Plan (LCWIP) and Growth Transport Plans (GTPs) and indicated in the Transport Impact Assessment (TIA);
- Support for improvements to walking facilities along Common Lane;
- Support for links to / from and improvement of Upper Lea Valley Way into Harpenden and out of Luton;
- Support for improvements to the Public Rights of Way;
- Development proposals must take appropriate account of all trees protected by Tree Preservation Order and the small area of woodland adjacent to the Site.

Guidance and Standards

IEMA 2022a Effective Scoping of Human Health in Environmental Impact Assessment & IEMA 2022b Determining Significance for Human Health in Environmental Impact Assessment

- 7.2.16 The IEMA (2022) guidance on human health in Environmental Impact Assessment (EIA) provides a structured approach to both scoping and determining significance. Effective scoping involves identifying relevant health issues early, using a broad definition of health that includes physical, mental, and social wellbeing. It promotes a proportionate approach based on the scale and nature of the development, with emphasis on early stakeholder engagement and consideration of wider determinants of health such as socio-economic and environmental factors. The guidance also encourages integration with other EIA topics to ensure consistency. In determining significance, the guidance recommends an approach that combines contextual evidence, professional judgement and transparent reasoning to assess potential health impacts and their significance for decision-making.

The Hertfordshire Health and Wellbeing Strategy 2022-2026

This strategy sets out the vision and strategic priorities for improving health and wellbeing and reducing health inequalities in the County. The vision is: *“Working in partnership and with our communities to improve their health, wellbeing and their quality of life to reduce health inequalities and help people live longer and healthier lives”*. This strategy outlines three key overarching ambitions: Strong Communities, Healthy and Fulfilling Lives, and Effective, Joined Up Health and Care Services. The strategy also outlines six themed strategic outcomes that they are collectively aspiring to in Hertfordshire:

- Every child has the best start in life;
- Good nutrition, healthy weight and physical activity;
- Good emotional and mental wellbeing throughout life;
- Reduction in smoking and substance misuse;



- A healthy standard of living for all; and
- Healthy and sustainable places and communities.

Sustainable Hertfordshire Strategy 2022 (Revised March 2023)

- 7.2.17 This strategy was originally prepared in response to Hertfordshire County Council's (HCC) declaration of a climate emergency and was updated in 2023 to reflect changes at an international, national and local level. The strategy outlines the desire to create well-designed, healthy and safe towns and villages which enable thriving natural and human communities where people want to live, learn and work.

The Hertfordshire Public Health Strategy 2022-2027

- 7.2.18 This strategy describes how HCC's Public Health Services contributes to achieving HCC's vision – to create a cleaner, greener and healthier Hertfordshire. The vision of the strategy is *"everyone in our country is born as healthy as possible, and lives a full, healthy and happy life"*.

Hertfordshire Joint Strategic Needs Assessment

Hertfordshire's Joint Strategic Needs Assessment (JSNA) looks at the specific health and wellbeing needs of the local population and points out areas of inequality. It helps public bodies decide what type of local services to commission.

SADC Open Space Study

- 7.2.19 The SADC Open Space Study (SADC, 2014) provides quantity and accessibility standards for open space. These are summarised in **Table 7.1**.

Table 7.1: SADC Quantity and Accessibility Standards for Open Space

Open Space Type	Quantity Standard (hectares per 1,000 population)	Accessibility Standard
Parks and Gardens	0.71	9-minute walk (710m)
Natural and Semi-natural Greenspace	3.46	9-minute walk (720m)
Amenity Greenspace	1.53	6-minute walk (480m)
Provision for Children and Young People		
LAP (Local Area of Play)		1-minute walk (100m)
LEAP (Local Equipped Area of Play)	0.06	5-minute walk (400m)
NEAP (Neighbourhood Equipped Area of Play)		12.5-minute walk (1000m)
Other Provisions		9-minute walk (700m)
Allotment	0.28	n/a

7.3 Consultation

- 7.3.1 The proposed approach to the assessment of effects in relation to population and human health was set out in the submitted EIA Scoping Report (**Appendix 5.1 of the ES**). The Scoping Opinion (**Appendix 5.2**) confirmed that the SADC agreed with scoping in an assessment of Population and Human Health and did not provide any comment in respect of the proposed assessment. This chapter has therefore been prepared on the basis of the approach set out in the Scoping Report, in accordance with the requirements of the 2017 EIA Regulations, as amended.



7.4 Methodology

Technical Scope

7.4.1 The following potential population and human health impacts are considered in relation to the Proposed Development:

- Construction phase and operational phase employment generation;
- Delivery of new housing, including affordable housing once operational;
- Changes in levels of household expenditure following completion;
- Change in population number and structure once the Proposed Development is operational and the demand for:
 - Early years education;
 - Primary school places;
 - Secondary school places;
 - GP places; and
 - Open/play space.
- Changes in traffic volumes, accessibility to public transport, and provision for walking and cycling, in addition to indirect effects on physical activity, road safety, and access to services.
- Environmental human health effects during construction and operational phases linked to:
 - Air Quality
 - Noise and Vibration
 - Climate Change and Adaptation

7.4.2 Assessment of the construction phase workforce impacts on housing, household expenditure, education, GPs, and open/play space have been scoped out, as it is anticipated that the construction workforce will not move to the area and therefore not place any additional demand on these services. There would either be no effect during the construction phase on these receptors or effects would be so small as to be insignificant.

Spatial Scope

7.4.3 The population and human health effects of the Proposed Development will be felt across different spatial areas depending on the receptor. For example, economic and housing effects of the Proposed Development have the potential to impact and contribute to policy targets for the SADC area, whereas effects on human health and community infrastructure (education, healthcare and open/play space) will be more localised to the Site.

7.4.4 As such, this assessment utilises a Local Study Area (LSA) which covers the Site and surrounding area. The LSA is defined as comprising of the following four electoral wards: Harpenden East, Harpenden & North & Rural, Harpenden South, and Harpenden West.

Figure A7.1 illustrates the LSA.

7.4.5 **Table 7.2** summarises the spatial assessment areas used for each population and human health receptor within this assessment. In addition to this, a focused Health Study Area (HSA)



has been applied to generate a health profile for the community surrounding the Site location. The HSA is comprised of three Middle Super Output Areas (MSOAs) including:

- E02004924: St Albans 001;
- E02004925: St Albans 002; and
- E02004927: St Albans 004.

7.4.6 District (St Albans City), regional (East England) and national (England) level data are used as comparators to contextualise HSA data.

7.4.7 A deprivation study area has also been utilised to understand the context immediately surrounding the Site, this utilises two Lower Super Output Areas (LSOAs): St Albans 002C and 004C.

Table 7.2: Spatial Assessment Areas for Population and Human Health Receptors

Receptor	Study Area	Justification
Employment	SADC area	Both the construction and operational phase of the Proposed Development will support jobs and provide employment opportunities for SADC residents.
Housing	SADC area	The homes provided by the Proposed Development will contribute towards the Local Plan housing requirement for SADC.
Household Expenditure	SADC area	The Proposed Development will create additional households who will generate expenditure through spending on day-to-day services in shops and businesses in SADC.
Early Years Education	LSA	People can register with any childcare or early years provider; however, to limit the assessment, provision within the Study Area has been considered to represent the provision most likely to be impacted upon by the Proposed Development, given they are the closest early years education facilities to the Site.
Primary Education	1 x primary planning area: Harpenden Primary.	Hertfordshire County Council (HCC) (the local education authority) group schools into planning areas for school place planning. The nearest primary schools to the Site are located in Harpenden Primary Planning Area (13 primary schools in total). The assessment considers all primary schools within this Planning Area as it represents the primary school provision which has the potential to be most likely impacted upon by the Proposed Development's new residential population, given it contains the closest primary schools to the Site.
Secondary Education	1 x secondary planning area: Harpenden Secondary.	The nearest secondary schools to the Site are located in Harpenden Secondary Planning Area (four secondary schools in total). All secondary schools within this Planning Area are included within this assessment as they represent the secondary school provision which has the potential to be most likely impacted upon by the Proposed Development's new residential population, given it contains the closest secondary schools to the Site.
GP Provision	LSA	Integrated Care Boards (ICBs) will consider the GP practices nearest to the Proposed Development when determining the impact of new development. Therefore, this assessment considers all GP provision within the LSA as the provision most likely to be impacted upon by the Proposed Development.
Open /Play space/ Recreation	Various	Considered using the accessibility standards as set out by SADC in the St Albans Open Space Study (refer to Table 7.1)
Transport & Active Travel	Site-specific and local road network	The assessment considers the immediate road network and pedestrian/cycling infrastructure surrounding the Site, as these are most likely to be affected by increased travel demand and modal shift. Please refer to Chapter 10 Transport and Access
Climate Change Adaptation	Site and wider SADC area	The assessment considers the Site's resilience to climate risks (e.g. overheating, flooding) and the contribution of the Proposed Development to local adaptation strategies.



Receptor	Study Area	Justification
Air Quality	Site and surrounding area	The assessment considers the Site and surrounding area, particularly any designated Air Quality Management Areas (AQMAs), as these are most likely to experience changes in pollutant concentrations due to increased traffic and construction activity. Please refer to Chapter 12 Air Quality .
Noise and Vibration	Site and nearest sensitive receptors	The assessment considers the Site and the nearest residential and community receptors, as these are most likely to be affected by construction and operational noise and vibration. Please refer to Chapter 11 Noise and Vibration .

Baseline Data Collection

- 7.4.8 The population and human health baseline has been established via a desk-top survey of published statistics from the following source:
- Office for National Statistics (ONS);
 - Experian;
 - Department for Education (DfE);
 - Ofsted;
 - Ordnance Survey (OS);
 - Office for Health Improvement and Disparities (OHID);
 - Public Health England (PHE);
 - NHS Digital 2025;
 - Indices of Multiple Deprivation (IMD), 2019;
 - Hertfordshire and West Essex District Profile 2024; and
 - Department of Health & Social Care: Fingertips – Public health profiles.
- 7.4.9 All data sources are referenced when reporting the baseline.

Assessment

- 7.4.10 The population and human health assessment is undertaken using quantitative and qualitative methods as detailed in **Table 7.3**.

Table 7.3: Methodology for Population and Human Health Receptors

Receptor	Methodology
Employment	The number of direct jobs generated during the demolition and construction phase is calculated using the Construction Industry Training Board (CITB), Labour Forecasting Tool (LFT). The number of direct jobs generated during the operational phase is calculated having regard to job/floorspace densities published in the Employment Density Guide (Homes & Communities Agency ('HCA'), 2015). Where the Density Guide provides a range of values, the mid-point of the range has been applied.



Receptor	Methodology
Housing	Additionality factors (leakage, displacement and multipliers) are applied to the number of direct construction and operational jobs, to calculate net additional employment to the Wider Study Area. Additionality is applied following guidance in the 'Additionality Guide' (HCA, 2014) and the 'Green Book' (HM Treasury, 2022). Effects on housing delivery are assessed quantitatively based on the contribution that the Proposed Development will make to the identified housing need (including affordable housing) for the Wider Study Area established by planning policy.
Household Expenditure	Household expenditure (convenience, comparison and leisure) is calculated using current spend per household for the Wider Study Area sourced from Experian (2025) and applied to the proposed number of households (it is assumed that one dwelling represents one household).
Population	The number of people expected to live in the Proposed Development is derived using household size for SADC according to the 2021 Census (ONS).
GP Provision	The assessment assumes that all residents of the Proposed Development will need to register with a local health practitioner. Capacities of existing GP provision are based on the Health Urban Development Unit (HUDU) standard of 1 GP for 1,800 patients (NHS, 2009).
Education	Demand for early years, primary and secondary school places arising from the Proposed Development is determined using pupil yield multipliers published by HCC with reference to HCC's Demographic Model (HCC, 2021) and assessed against forecast capacities for the relevant School Planning Areas.
Open/Play Space/Recreation	Demand for open/play space created by the Proposed Development's future residents is calculated using quantity standards as detailed in the St Albans Open Space Study (SADC, 2024).
Transport and Active Travel	Assessment is based on Chapter 10 Transport and Access and the Transport Assessment (SLR Consulting, 2025) submitted with the planning application. Key indicators include changes in traffic volumes, accessibility to public transport, and provision for walking and cycling. Health implications are considered in terms of physical activity, road safety, and access to services, in line with IEMA guidance and Public Health England's active travel frameworks.
Climate Change Adaptation	Chapter 13 Climate Change is reviewed to evaluate the Proposed Development's ability to adapt to future climate risks (e.g. heatwaves, flooding). Health impacts are considered in terms of thermal comfort, urban heat island effects, and resilience of critical infrastructure, in line with UK Climate Change Risk Assessment (CCRA) and IEMA guidance. Consideration of Climate Change is considered in Section 7.13 of this chapter.
Air Quality	Based on the Chapter 12 Air Quality , potential impacts on human health are assessed by comparing predicted pollutant concentrations (e.g. NO ₂ , PM ₁₀ , PM _{2.5}) against national air quality objectives. Sensitive receptors (e.g. schools, care homes) are identified, and cumulative effects are considered.
Noise and Vibration	Based on the Chapter 11 Noise and Vibration , potential health effects are assessed in terms of annoyance, sleep disturbance, and stress. Sensitive receptors are identified and predicted noise levels are compared against WHO and BS8233 thresholds. Construction and operational phases are both considered.

7.4.11 There is no single, standardised methodology or set of technical significance criteria for assessing population and human health effects in EIA. However, recent guidance from the Institute of Environmental Management and Assessment (IEMA, 2022) (now ISEP (Institute of Sustainability and Environmental Professionals)) including "Effective Scoping of Human Health in EIA" and "Determining Significance for Human Health in EIA" provide a structured approach to identifying health determinants and evaluating significance.

7.4.12 This assessment is therefore based on professional judgement, considering receptor sensitivity and the magnitude of change from baseline, and guided by IEMA's principles. The evaluation of 'population' effects is undertaken based on professional experience and judgement, established socio-economic guidance such as the HCA Additionality Guide (2014), Employment Density Guide (2015), and HM Treasury Green Book (2022). This supports the robust evaluation of employment, housing, and economic impacts, which are recognised as key population and human health determinants.



- 7.4.13 The sensitivity of affected receptors has been evaluated on a scale of high, medium, low and very low as detailed in **Table 7.4**.

Table 7.4: Population and Human Health Receptor Sensitivity Descriptors

Sensitivity	Descriptor
High	Economic receptors = the receptor is of significant importance to the SADC economy. Social receptors = there is currently no capacity in the community infrastructure. Human health receptors = high levels of deprivation; existing wide health inequalities; people with very poor health status.
Medium	Economic receptors = the receptor is of some importance to the SADC economy. Social receptors = there is currently limited capacity in the community infrastructure. Human health receptors = moderate levels of deprivation; widening health inequalities; people with poor health status.
Low	Economic receptors = the receptor is of low importance to the SADC economy. Social receptors = there is currently moderate available capacity in the community infrastructure. Human health receptors = low levels of deprivation; narrowing health inequalities; people with fair health status
Very Low	Economic receptors = the receptor is of no importance to the SADC economy. Social receptors = there is currently high available capacity in the community infrastructure. Human health receptors = very low levels of deprivation; narrow health inequalities; people with good health status

- 7.4.14 The magnitude of impact to a receptor has been determined by considering the estimated deviation from the baseline. The scale used for determining the magnitude of impact is detailed in **Table 7.5**.

Table 7.5: Population and Human Health Magnitude of Impact Descriptors

Magnitude	Descriptor
High	The Proposed Development would cause a large change to the existing socio-economic condition (providing a 10% increase or greater than the current baseline, or for employment 2.5% or greater). Or High exposure or scale; long term duration; continuous frequency; severity predominantly related to mortality of changes in mortality or changes in morbidity (physical or mental health) for very severe illness/ injury outcomes; majority of population affected; permanent change; substantial service quality implications.
Medium	The Proposed Development would cause a moderate change to the existing socio-economic condition (providing between a 5 to 9.9% increase from the current baseline, or for employment between 1% and 2.4%). Or Low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications



Magnitude	Descriptor
Low	The Proposed Development would cause a small change to the existing socio-economic condition (providing between a 0.1% and 4.9% increase from the current baseline, or for employment between 0.1% and 0.9%). Or Very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications
Negligible	The Proposed Development would cause no discernible change to the existing socio-economic condition (providing less than 0.1% change from the current baseline). Or Negligible exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication.

- 7.4.15 The level of effect attributed to each socio-economic receptor has been assessed based on the evaluation of the sensitivity of the affected receptor (**Table 7.4**) and the magnitude of change due to the Proposed Development (**Table 7.5**) and using the significance of effect matrix detailed in **Table 7.6**.

Table 7.6: Population and Human Health Significance of Effect Criteria

Receptor Sensitivity	Magnitude of Impact			
	High	Medium	Low	Negligible
High	Significant Beneficial / Adverse	Major Beneficial / Adverse	Moderate Beneficial / Adverse	Minor Beneficial / Adverse
Medium	Major Beneficial / Adverse	Moderate Beneficial / Adverse	Minor Beneficial / Adverse	Negligible
Low	Moderate Beneficial / Adverse	Minor Beneficial / Adverse	Negligible	Negligible
Very Low	Minor Beneficial / Adverse	Negligible	Negligible	Negligible

- 7.4.16 Those effects which are considered to have a moderate or major beneficial or adverse effect have been considered as significant and where effects have been established as significant adverse, appropriate additional mitigation measures have been identified to inform the assessment of residual effects that are not embedded within the design of the Proposed Development.

Limitations and Assumptions

- 7.4.17 The baseline conditions presented in this chapter have endeavoured to reflect the position at the time of writing, but this is not possible for all reported conditions. Each data source has methodological limitations related to data collection and surveys only represent the socio-economic context at a specific point in time. The year to which the baseline represents is clearly stated, along with any assumptions that have been applied.



- 7.4.18 An indicative size of 1,200 sqm (Gross External Area (GEA)) has been assumed for the Proposed Development's neighbourhood centre based on the indicative masterplan. There is flexibility in the Use Classes of the neighbourhood centre to allow for the most suitable use to come forward in due course.
- 7.4.19 The Proposed Development's care home is assumed to be a 60-bed care home based on the indicative masterplan.
- 7.4.20 The children's home will comprise a residential dwelling with capacity to accommodate two-children and a member of staff 24/7. Although a care home falls under Use Class C2, when assessing impacts on education, healthcare and open/play space, the children's home has been classified as a dwelling and the assessment has been based on up to 501 residential dwellings (=500 residential dwellings (Use Class C3) and one children's home (Use Class C2)).
- 7.4.21 This assessment uses HUDU GP-to-patient ratios to estimate existing primary care capacity. The HUDU ratio (typically 1 GP per 1,800 patients) provides a population-based estimate of demand but assumes uniform service delivery and staffing levels, which may not reflect local practice variation or clinical floorspace adequacy and availability.
- 7.4.22 HUDU ratios may overestimate capacity where physical space is constrained or underestimate it where surplus floorspace exists but staffing is limited.
- 7.4.23 It is recommended that further engagement is undertaken with the NHS Hertfordshire and West Essex Integrated Care Board (ICB) to understand the implications of population demand with physical feasibility in terms of a clinical floorspace capacity assessment. This engagement should also recognise that actual service capacity depend on a combination of space, staffing, and service delivery models.
- 7.4.24 Other assumptions made within the assessment are described at the relevant juncture in the chapter.

7.5 Baseline Conditions

The Site

- 7.5.1 There are no homes, supporting employment uses or areas of public open space/recreation on the Site currently.

The Surrounding Area

Population

- 7.5.2 The most recent year for which published population data is available for the LSA is mid-2022. According to the 2022 Mid-Year Population Estimates (ONS, 2024) the LSA has a population of 31,600 people, accounting for 21% of the SADC area's total population (148,500 people).
- 7.5.3 **Table 7.7** demonstrates the broad age profile of the population of the LSA and the SADC area compared to the East of England region and England averages.

Table 7.7: Age Profile by Broad Age Group (Mid-2022)

Age (years)	LSA	SADC area	East of England	England
0 to 4	5%	6%	5%	5%
5 to 11	11%	10%	8%	8%
12 to 17	10%	9%	7%	7%



Age (years)	LSA	SADC area	East of England	England
18 to 64	55%	58%	59%	61%
65+	18%	17%	20%	19%
All ages	100%	100%	100%	100%
Total population	31,600	148,500	6,401,400	57,112,500

Source: ONS. All figures have been subject to rounding and may not sum to the total

- 7.5.4 The LSA and SADC area have a younger population profile than the regional and national averages, with a smaller proportion of residents aged 65+ and a higher proportion of children (aged 0 – 17 years). The LSA and SADC area also have a smaller proportion of working age residents compared to the regional and national averages.

Ethnicity

- 7.5.5 The majority of the population in the LSA identify as White (88.9%), which is higher than in St Albans (83.6%) and England (81.0%). Within this category, most people in the LSA identify as 'White English, Welsh, Scottish, Northern Irish or British' (91.3%), followed by 'Other White' (6.8%) and 'Irish' (1.8%). The second most populous ethnic group are those identifying as Asian (4.4%), which is less than in St Albans (8.2%) and England (9.6%). The Black population makes up 1.9% of the LSA, which is smaller than St Albans (2.1%) and England (4.2%). Those of Mixed or Multiple ethnic groups make up 3.8% of the LSA population, which is lower than in St Albans (4.3%) and England (3.0%).²

Housing

- 7.5.6 The most recent data available on the housing stock and its' characteristics in the LSA, SADC area, East of England region and England, is from 2021 Census (ONS, 2023). Nonetheless, the proportions according to the 2021 Census are considered to provide an indication of the characteristics likely to exist currently.

Accommodation Type

- 7.5.7 **Table 7.8** demonstrates the accommodation type profile of homes within the LSA and SADC area compared to the regional and national averages.
- 7.5.8 Detached households represent the greatest proportion of households within the LSA (40%), whilst in the SADC area it is semi-detached (30%). Semi-detached households also represent the greatest proportion of households across the East of England region and England. The proportion of terraced accommodation is similar across the SADC area, region and England, but considerably lower in the LSA. The proportion of flatted accommodation is similar across all four areas.

Table 7.8: Household Accommodation Type (2021)

Type	LSA	SADC area	East of England	England
Detached	40%	26%	30%	23%
Semi-detached	28%	30%	31%	31%
Terraced	14%	20%	21%	23%
Flats	16%	19%	14%	17%

² Derived from: NOMIS (2022), Census 2021. TS021 – Ethnic Group.



Type	LSA	SADC area	East of England	England
Other	3%	5%	4%	6%
All Types	100%	100%	100%	100%
Total Households	12,050	58,990	2,628,782	23,436,085

Source: ONS (2023). All figures have been subject to rounding and may not sum to the total

Tenure

7.5.9 **Table 7.9** demonstrates the tenure profile of households in the LSA compared with the SADC area, East of England region and England.

7.5.10 The majority of the households in the LSA, SADC area, East of England and England own their own homes (either outright or with a mortgage). This is particularly significant in the LSA where 78% own their own homes compared to 71%, 65%, and 61% in SADC area, East of England and England respectively.

7.5.11 A smaller proportion of households privately rent their homes in the LSA (14%) and SADC area (16%) compared to the regional (18%) and national (20%) averages. Similarly, a smaller proportion of households in the LSA and SADC area socially rent their homes.

Table 7.9: Household Tenure (2021)

Tenure	LSA	SADC area	East of England	England
Owned	78%	71%	65%	61%
Shared Ownership	0%	1%	1%	1%
Social Rent	8%	12%	15%	17%
Private Rent	14%	16%	18%	20%
Living Rent Free	0%	0%	0%	0%
All Tenures	100%	100%	100%	100%

Overcrowding

7.5.12 Overcrowded households are defined as those where there are fewer rooms than required for the size of the household as defined by ONS. According to the 2021 Census, 2.7% of homes in the LSA are overcrowded which is lower than that of the SADC area (5.1%), the East of England region (5.1%) and England (6.4%).

Average Household Size

7.5.13 The average size of households across the SADC area is 2.49 people per household which is smaller than the average size in the LSA (2.61 people per household) but larger than the East of England and England average (both 2.41 people per household).

Households on the Local Authority Waiting List

7.5.14 As of 31 March 2024, there were 378 households in SADC area on the Local Authority Waiting List (MHCLG, 2025), an increase of +1% since 31 March 2023. The East region also saw an increase, albeit by a greater extent (+6%) and the national average by +3% over the same period. Data for the LSA is not published.

Housing Delivery

7.5.15 Over the period 1 April 2023 to 31 March 2024 there were 438 net housing completions in the SADC area (SADC, 2024). This is significantly below the Standard Method local housing



need for SADC of 1,600 net homes per annum which SADC are monitoring their housing completions against. Similarly, the number of completions has been consistently below the annual requirement over the last 5-years.

Household Expenditure

- 7.5.16 Household expenditure data (Experian, 2025) for the year 2023 but nonetheless has been used to provide a baseline for this assessment.
- 7.5.17 **Table 7.10** illustrates that average household expenditure in the WSA is lower than the average for the LSA, East of England and England.

Table 7.10: Average Household Expenditure per Annum (2023)

Type	LSA	SADC area	East of England	England
Comparison Spend	£13,414	£11,968	£9,841	£9,653
Convenience Spend	£8,690	£7,794	£6,947	£6,691
Leisure Spend	£15,333	£13,281	£9,541	£10,231
Total	£37,437	£33,043	£26,329	£26,576

Source: Experian

- 7.5.18 On the basis that there are 58,990 households in the SADC area (see **Table 7.8**) this would suggest a total household expenditure of £1.9 billion per annum of which 23% (£451 million per annum) is from households in the LSA.

Education

Early Years Education

- 7.5.19 **Table 7.2** explained that the LSA would be used as the assessment area for early years education. **Table 7.11** details all registered early years providers that provide year-round care in non-domestic settings in the LSA according to Ofsted, including details of the number places provided as of October 2024 (Ofsted, 2025). The number of available places is not recorded via Ofsted and therefore the current capacity position of individual facilities is not known. Those facilities included for assessment are shown on **Figure A7.2**.

Table 7.11: Early Years Provision in the LSA

No. on Figure A7.2	Name	Type	Distance from the Site (metres)	Places Provided
1	Get Set Go	Out-of-school day care	102	30
2	Noah's Ark Pre-School	Sessional day care	156	33
3	Batford Day Care	Full day care	256	63
4	Cosmos Kindergarten	Full day care	330	20
5	Noah's Ark Nursery at the Lea	Sessional day care	493	37
6	Fingertips Creative Arts Pre-School	Sessional day care	556	26
7	Timeout After School and Breakfast Club CIO	Out-of-school day care	732	30
8	Cascade Camps at Katherine Warrington School	Out-of-school day care	780	72
9	Fingertips Woodland Nursery	Full day care	795	30
10	Highfield Pre-School	Sessional day care	938	40



No. on Figure A7.2	Name	Type	Distance from the Site (metres)	Places Provided
11	Harpenden Day Nursery	Full day care	1,008	38
12	FizzBug @ Crabtree Junior School	Out-of-school day care	1,460	40
13	Bright Horizons Harpenden Luton Road Day Nursery and Preschool	Full day care	1,485	110
14	Artisans Kindergarten	Sessional day care	1,601	50
15	Bright Horizons Harpenden Central Day Nursery and Preschool	Full day care	1,613	57
16	Jousters At High Beeches	Out-of-school day care	1,667	90
17	United Reformed Church Pre-School and Nursery	Sessional day care	1,751	45
18	The Club	Out-of-school day care	1,786	32
19	Club Excel @ St Hilda's Harpenden	Out-of-school day care	1,790	92
20	Barracudas - Harpenden	Out-of-school day care	1,943	80
21	Playschool Nursery Harpenden	Full day care	1,968	55
22	Busy Bees Day Nursery at Harpenden Leyton Road	Full day care	1,983	55
23	Friends Together	Full day care	2,100	48
24	Jousters At Roundwood	Out-of-school day care	2,121	40
25	Fizzbug @ The Grove Junior School	Out-of-school day care	2,236	200
26	FizzBug @ Grove Infant School	Out-of-school day care	2,271	150
27	Fusion Childcare Services	Out-of-school day care	2,271	80
28	Jousters at Wood End	Out-of-school day care	2,417	32
29	Fusion Pre-School Southdown	Sessional day care	2,634	30
30	The Kinsbourne Common Nursery And Pre-School	Sessional day care	2,655	20
31	The Kinsbourne Common Nursery And Pre-School	Sessional day care	2,655	30
32	Busy Bees Day Nursery at Rothamsted Lodge	Full day care	2,958	70
Total				1,825

7.5.20 A total of 32 registered, non-domestic childcare and early years providers are located within the LSA. Collectively the number of places offered totals 1,825.

7.5.21 Of all the places provides within the LSA, the majority (53% = 968) are within an out of school day care setting, 30% (546 places) within a full day care setting, and 17% (311 places) within a sessional day care setting.

Primary Education



- 7.5.22 All primary schools located in the Harpenden Primary Planning Area have been included for assessment as explained in **Table 7.2**. **Table 7.12** details the number of pupils on roll and current capacity figures for each school in this planning area for the academic year 2023/24 (DfE, 2025) which is the latest available data at the time of writing. **Figure A7.3** identifies the location of the schools in relation to the Site.

Table 7.12: Existing Primary Schools and Capacities in Harpenden Primary Planning Area (2023/24)

No. on Figure A7.3	Name	Distance from the Site (metres)	School Capacity (number of places)	Pupils on Roll	Unfilled Places
1	Sauncey Wood Primary School	102	210	192	18
2	The Lea Primary School and Nursery	491	198	211	-13
3	Manland Primary School	732	210	201	9
4	Crabtree Junior School	1,391	256	257	-1
5	Crabtree Infants' School	1,445	180	180	0
6	High Beeches Primary School	1,667	420	418	2
7	Harpenden Academy	1,672	420	212	208
8	St Nicholas CofE VA Primary School	1,739	150	150	0
9	St Dominic Catholic Primary School	2,030	210	208	2
10	Roundwood Primary School	2,112	315	312	3
11	The Grove Junior School	2,236	360	361	-1
12	The Grove Infant and Nursery School	2,271	270	233	37
13	Wood End School	2,417	432	422	10
	Total		3,631	3,357	274
	Total unfilled places				289

Source: DfE

- 7.5.23 There are 13 primary schools within the Harpenden Primary Planning Area, eight of which are operating with unfilled places, collectively totalling 289 places. The closest primary school to the Site, Sauncey Wood Primary School is currently operating with 18 unfilled places.

Secondary Education

- 7.5.24 All secondary schools located within the Harpenden Secondary Planning Area have been included for assessment as explained in **Table 7.2**. **Table 7.13** details the number of pupils (school Years 7 to 11) on roll and current capacity for each school in this planning area for the academic year 2023/24 (DfE, 2025). **Table 7.14** provides the equivalent for the sixth form element of each school. **Figure A7.4** identifies the location of schools in relation to the Site.

Table 7.13: Existing Secondary Schools and Capacities in Harpenden Secondary Planning Area (2023/24) – School Years 7 to 11

No. on Figure A7.4	Name	Distance from the Site (metres)	School Capacity (number of places)	Pupils on Roll	Unfilled Places
1	Katherine Warrington School	291	1,150	923	227
2	Sir John Lawes School	775	966	1,030	-64
3	St George's School	1,063	925	962	-37
4	Roundwood Park School	2,160	1,040	1,002	38



No. on Figure A7.4	Name	Distance from the Site (metres)	School Capacity (number of places)	Pupils on Roll	Unfilled Places
	Total		4,081	3,917	164
	Total unfilled places				265

Source: DfE

Table 7.14: Existing Secondary Schools and Capacities in Harpenden Secondary Planning Area (2023/24) – School Years 12 and 13 (Sixth Form)

No. on Figure A7.4	Name	Distance from the Site (metres)	School Capacity (number of places)	Pupils on Roll	Unfilled Places
1	Katherine Warrington School	291	0	0	0
2	Sir John Lawes School	775	350	338	12
3	St George's School	1,063	400	417	-17
4	Roundwood Park School	2,160	276	366	-90
	Total		1,026	1,121	-95
	Total unfilled places				12

Source: DfE

- 7.5.25 There are four secondary schools in the Harpenden Secondary Planning Area, two of which are currently operating with unfilled places collectively totalling 265 places (school Years 7 to 11). 227 of the unfilled places are within Katherine Warrington School which is the closest secondary school to the Site.
- 7.5.26 Three of the four secondary schools provide sixth form education – the Katherine Warrington School doesn't. Only one of the three secondary schools providing sixth form education is operating with unfilled places – Sir John Lawes School with 12 unfilled places. Sir John Lawes School is the closest secondary school providing sixth form education to the Site.

GP Provision

- 7.5.27 **Table 7.1** explained that the LSA would be used as the assessment area for GP provision. **Table 7.15** provides details of all GP provision in the LSA including the number of registered patients and the number of Full-Time-Equivalent (FTE) GPs (excluding any locums and trainee GPs) at each practice as of 31 May 2025 (NHS Digital, 2025). This is the latest data available at the time of writing. **Figure A7.5** shows the location of the GP provision in relation to the Site.
- 7.5.28 To determine whether existing GP provision is under or over-capacity, GP to patient ratios of the selected practices have been compared to the HUDU standard of 1 GP for every 1,800 people (NHS, 2009).

Table 7.15: Existing GP Provision and Capacities (May 2025)

No. on Fig. A7.5	Name	Distance from Site (metres)	GP (FTE)	Registered Patients	Ratio (Patients to 1 GP)	Over / Under Capacity (by no. of patients)
1	Elms Medical Practice	1,326	10.6	17,238	1,626	1,842
2	Davenport House	1,677	4.7	12,647	2,691	-4,187
3	Village Surgery	1,965	9.1	15,597	1,714	783



No. on Fig. A7.5	Name	Distance from Site (metres)	GP (FTE)	Registered Patients	Ratio (Patients to 1 GP)	Over / Under Capacity (by no. of patients)
3a	Marford Road Surgery	3,731				
	Total		24.4	45,482	1,864	-1,562
	Total (available places)					2,625

Source: NHS

7.5.29 There are three GP practices located within the LSA, one of which (Village Surgery) has a linked GP facility located outside of the LSA in Wheathampstead.

7.5.30 **Table 7.15** illustrates that two of the GP practices are operating with capacity when benchmarked against the HUDU standard with collective capacity to accommodate a further 2,625 patient registrations before the HUDU standard is reached. This includes 1,842 places within the Elms Medical Practice which is the closest GP facility to the Site.

Employment

7.5.31 **Table 7.2** explained that the SADC area would be study area for assessing employment effects of the Proposed Development. Employment characteristics of the SADC area compared to the East of England region and England are presented from a variety of sources, according to the latest available data at the time of writing.

Resident Economic Activity

7.5.32 According to the Annual Population Survey ('APS') (ONS, 2025) in the year January 2024 to December 2024 there were 79,200 residents of the SADC area aged 16 to 64 who were classified as economically active (this includes all those people in employment or available to work, for example the unemployed). This is equivalent to 85.0% of the population aged 16 to 64 years. The economic activity rate is higher in the SADC area than the average for the East of England region (80.3%) and England (78.9%). Data is not published for the LSA.

7.5.33 Of those economically active residents in the SADC area, 78,100 were in employment, representing an employment rate of 83.9%. The employment rate is higher in the SADC area than in the East of England (77.5%) and England (75.7%).

7.5.34 The remaining 1,100 economically active residents in the SADC area were unemployed which represents an unemployment rate of 1.2%. This is lower than the unemployment rate for the East of England region (3.4%) and England (4%) respectively.

7.5.35 Whilst not a measure of total unemployment, Claimant Count data (ONS, 2025) provides a count of the number of people claiming Job Seekers Allowance (JSA), National Insurance (NI) Credits or Universal Credit (UC) principally for the reason of being unemployed and therefore provides an indication of people actively seeking employment. **Table 7.16** presents the Claimant Count data as of May 2025.

Table 7.16: Claimant Count (May 2025)

	LSA	SADC area	East of England	England
Number of Claimants (aged 16+)	270	2,240	132,985	1,524,415
Claimants as a proportion of those aged 16 - 64	1.5%	2.5%	3.4%	4.2%

Source: ONS

7.5.36 As of May 2025, there 2,240 residents in the SADC area claiming unemployment related benefits, of which 270 are within the LSA. The number of claimants as a proportion of



residents aged 16 to 64 is lower in the LSA (1.5%) than the SADC area (2.5%), both of which are lower than the regional and national averages (3.4% and 4.2% respectively).

Jobs and Employment

- 7.5.37 Jobs Density data for the year 2023 (ONS, 2025) identifies that there are 76,000 jobs supported in the SADC area. The number of jobs is less than the number of residents aged 16 to 64 meaning that the SADC area is a net exporter of labour. Expressed as a proportion of residents aged 16 to 64 years, the SADC area has a job' density of 0.84 meaning there is 0.84 of a job for every resident of working age. The jobs' density for the East of England region is 0.84 and 0.87 for England. Data is not published for the LSA.
- 7.5.38 The 2023 Business Register and Employment Survey ('BRES') (ONS, 2025) provides an indication of the industrial sector of employment in the LSA, SADC area, East of England region and England as summarised in **Table 7.17**. The BRES data excludes those who are self-employed, government supported trainees and His Majesty's (HM) Forces and therefore employment reported by BRES is lower than the number of jobs reported by the Jobs' Density data.

Table 7.17: Workplace Employment by Industrial Sector (2023)

	LSA	SADC area	East of England	England
Agriculture, forestry & fishing	0%	0%	1%	1%
Mining, quarrying & utilities	0%	1%	1%	1%
Manufacturing	1%	2%	7%	7%
Construction	4%	6%	6%	5%
Motor trades	1%	2%	2%	2%
Wholesale	3%	5%	4%	4%
Retail	10%	12%	9%	8%
Transport & storage (inc postal)	0%	3%	6%	5%
Accommodation & food services	8%	8%	7%	8%
Information & communication	8%	5%	3%	5%
Financial & insurance	3%	2%	2%	3%
Property	3%	2%	2%	2%
Professional, scientific & technical	19%	15%	9%	10%
Business administration & support services	8%	8%	11%	9%
Public administration & defence	1%	2%	3%	4%
Education	14%	11%	9%	8%
Health	12%	9%	12%	13%
Arts, entertainment, recreation & other services	6%	6%	4%	5%
Total	100%	100%	100%	100%
Total Employment	11,385	65,150	2,969,000	28,246,000

Source: ONS. All figures have been rounded and may not add to 100

- 7.5.39 **Table 7.17** shows that the professional, scientific and technical sector accounts for 15% of all employment in the SADC area. This sector also accounts for the largest proportion of employment in the LSA (19%).



7.5.40 Other key sectors for employment in the SADC area are retail (12%) and education (11%), accounting for a greater proportion of employment in the SADC area compared to the regional and national averages.

7.5.41 The BRES data indicates that there is a construction workforce already working within proximity of the Site totalling 4,000 in the SADC area, accounting for 6% of total employment in the SADC area.

Commuting Patterns

7.5.42 The 2021 Census (ONS, 2023) identified that approximately 45,400 SADC residents in employment the week before the 2021 Census (21 March 2021) worked from home. This is in comparison to the 2011 Census (ONS, 2013) whereby only approximately 9,400 residents of the SADC area worked from home. The 2021 Census was undertaken during the Covid-19 Pandemic, when a large proportion of the population were working from home as instructed by the government, if they were able to do so.

7.5.43 Excluding people who work from home, the travel to work statistics from the 2021 Census reveals that 36% of jobs in the SADC area are taken up by residents of the SADC area. The remaining 64% of jobs are taken up by people who live outside of the SADC area including Luton (7%), Dacorum (7%), Welwyn Hatfield (7%) and Central Bedfordshire (6%).

Open / Play Space

7.5.44 Having regard to SADC's accessibility standards for open space (summarised in **Table 7.1**), **Figure A7.6** identifies all formal open / play space provision through reference to Ordnance Survey ('OS') Open Greenspaces (OS, 2025), and **Table 7.18** provides details of the type of space and distance from the Site.

Table 7.18: Existing Open / Play Space Provision within 1km of the Site

No. on Fig. A7.6	Name	Type	Distance from Site (metres)
1	Porters Hill Park	Playing Field	0
2	Porters Hill Basketball Court	Other Sports Facility	2
3	Coldharbour Lane Allotments	Allotments Or Community Growing Spaces	15
4	Porters Hill Play Area	Play Space	37
5	Pickford Hill Allotments	Allotments Or Community Growing Spaces	75
6	Rotl Close Green Space	Allotments Or Community Growing Spaces	280
7	Westfield Recreation Ground	Playing Field	288
8	Westfield Recreation Sports Pitch	Other Sports Facility	309
9	Batford Allotments	Allotments Or Community Growing Spaces	342
10	Westfield Road Play Area	Play Space	377
11	Westfield Allotments	Allotments Or Community Growing Spaces	400
12	Station Road Green Space	Public Park Or Garden	430
13	Westfield Road Cemetery	Cemetery	449
14	Batford Springs Local Nature Reserve	Public Park Or Garden	496
15	Riverside Allotments	Allotments Or Community Growing Spaces	502



No. on Fig. A7.6	Name	Type	Distance from Site (metres)
16	Holcroft Road Green Space	Playing Field	511
17	All Saints' Church	Religious Grounds	527
18	Highfield Playing Field	Playing Field	619
19	Highfield	Cemetery	628
20	Marquis Lane Play Area	Play Space	751
21	Marquis Lane Allotments	Allotments Or Community Growing Spaces	796

7.5.45 **Figure A7.6** and **Table 7.18** demonstrate that there are 21 areas of open/play space within 1km of the Site across a range of open space types.

7.5.46 The closest open space area to the Site is Porters Hill Park, located adjacent to the Site. This incorporates the Porters Hill Basketball Court and Porters Hill Play Area, with Pickford Hill Allotments also located alongside Porters Hill Park. All of these facilities are within 100m of the Site, along with Coldharbour Allotments.

7.5.47 Between 100m and 400m of the Site are a further five areas of open space comprising Westfield recreation ground, sports pitch and play area and two allotment Sites.

7.5.48 Between 400m and 1km of the Site are 10 areas of open space comprising Batford Springs local nature reserve, playing fields, parks/gardens, play space, religious grounds and allotments.

Transport and Active Travel

Local Highway Network

7.5.49 The proposed development Site is bordered by several key roads. To the southwest, it is bounded by Lower Luton Road, a two-way single carriageway approximately 7 metres wide with a 30mph speed limit. This road will serve as the primary access route to the Site and provides connections to Luton in the north and Wheathampstead in the south. To the north, Common Lane abuts the Site and connects to both Lower Luton Road and Bower Heath Lane. It is a narrow, rural road without streetlighting and is subject to the national speed limit; no vehicular access to the Site is proposed from this road. Westfield Road lies to the west and connects to Lower Luton Road, providing access to Harpenden town centre. It is a residential, two-way road with a 30mph speed limit, streetlighting, and pedestrian footways.

7.5.50 Traffic surveys conducted in June and July 2024 indicate that the surrounding road network experiences slight to moderate traffic volumes, with all links recording below 16,000 Annual Average Daily Traffic (AADT). The highest proportion of heavy goods vehicles (HGVs) was recorded on Laimer Lane at 3.9%.

Public Transport

7.5.51 Harpenden railway station is located approximately 2.2 kilometres south of the Site, within a reasonable walking and cycling distance. The station is well-equipped, offering 548 cycle parking spaces, 674 car parking spaces, and full step-free access. It is served by the 366 bus, which connects the Site to the station in approximately six minutes. The station provides frequent direct services to destinations including Luton, Bedford, London, Gatwick Airport, Brighton, and Rainham, with up to seven trains per hour to Luton and five to Bedford.

7.5.52 Two local bus stops serve the area. The closest is adjacent to the Site on Lower Luton Road, offering access to the 357 bus and infrequent services from the 366, 367, 612, and 807. A



second stop on Westfield Road, about 100 metres from the Site, provides more frequent access to the 366 and 367 services, with occasional services from the 45 and 807.

Walking and Cycling

- 7.5.53 Pedestrian and cycle access from the Site is primarily oriented towards Harpenden town centre, Harpenden railway station, and Katherine Warington School. Routes to the town centre and station follow Westfield Road, Sun Lane, and Carlton Road, all of which are residential roads with 30mph speed limits, streetlighting, and footways on at least one side.
- 7.5.54 However, there is currently no safe pedestrian crossing at Lower Luton Road near the Site access. This will be addressed through the installation of a signal-controlled crossing as part of the proposed development.
- 7.5.55 The route to Katherine Warington School passes through the Batford residential area and is similarly residential in nature, though it lacks dropped kerbs and tactile paving at some crossings. These deficiencies will be improved as part of the development. Additionally, the area is served by National Cycle Network Routes 6 and 57, offering connections to Luton and Hemel Hempstead via traffic-free or lightly trafficked paths.

Active Travel

- 7.5.56 The level of active travel in St Albans is generally higher than the level of active travel across the rest of the region, and England. The latest active travel data for the district (2022-2023) shows that 47.3% of the population participated in active travel within a 28-day period, which is higher than the rest of the region (61.8%) and England (62.2%). More people participate in walking (68.9% of the respondents) than cycling (22.8% of the respondents), and walking is mainly done for leisure (53.1% of respondents). Of the 22.8% of the respondents who cycle, 13.5% cycle for leisure and 10.0% cycle for travel. In recent years there has been a trend of greater active travel, likely because of the COVID-19 pandemic which has encouraged people to walk and cycle more.³

Accident Analysis

- 7.5.57 A full accident analysis has been undertaken and concludes that there are no highway safety deficiencies within the surrounding road network

Air Quality

- 7.5.58 In accordance with the Environment Act (1995), SADC has conducted a review and assessment of air quality within its jurisdiction. One AQMA has been designated due to exceedances of the annual mean NO₂ and 24-hour mean PM₁₀ Air Quality Objectives (AQOs).
- 7.5.59 This AQMA is not located near the Proposed Development Site, and there are no other AQMAs in the surrounding area.

Noise and Vibration

- 7.5.60 Baseline noise monitoring was undertaken to characterise the existing acoustic environment at the Site which is reported in **Chapter 11 Noise and Vibration**. The Site is characterised as being generally quiet, with bird song and occasional walkers being the most prominent sound sources. Distant trains and high-altitude aircraft were audible but not dominant. Long-term monitoring at two locations recorded daytime ambient sound levels of 54 dB L_{Aeq,16h} near Lower Luton Road (MP1) and 47 dB L_{Aeq,16h} near Sauncey Wood School (MP2). Night-time ambient levels averaged 47 dB L_{Aeq,8h} at MP1 and 37 dB L_{Aeq,8h} at MP2. Background sound levels were lower, with representative daytime levels of 46 dB L_{A90,1h} (MP1) and 37 dB L_{A90,1h} (MP2), and night-time levels of 30 dB L_{A90,15min} at both locations.

³ Sport England (2023). Available at: [Active Lives | Results](#)



Health Profile

Life expectancy

- 7.5.61 Average life expectancy at birth in St Albans is 82.0 years for males, which is higher than the national (80.0) average. For females, average life expectancy at birth in St Albans is 85.3 years, which is higher than the national average (83.6 years).⁴

Self-Assessed General Health

- 7.5.62 The LSA population assessed their general health to be similar to the St Albans average, and better than the national average. 88.8% rated their health as either 'good' or 'very good' (St Albans: 87.8%; England: 82.2%), while only 2.7% rated their health as 'bad' or 'very bad' (3.0%; 5.2%).⁵

Disability

- 7.5.63 In the LSA, 12.2% of the population are disabled under the Equality Act, this is lower than the district (12.9%), regional (16.6%) and national (17.3%) averages. Of those who are disabled within the LSA, 4.1% have their day-to-day activities limited a lot and 8.1% have their day-to-day activities limited a little. These figures are lower than the district (4.7%; 8.3%), regional (6.6%; 10.0%) and national (7.3%; 10.0%) averages.

Physical Health Conditions

- 7.5.64 As shown in **Table 7.19**, the LSA features an overall good level of health, with statistically similar or lower indicators than the regional and national averages.

Table 7.19: Physical Health Conditions

Indicator	Year	St Albans	East of England	England
Hip fractures in people aged 65 and over (per 100,000 population aged 65 and over)	2023/24	508	530	547
Under 75 mortality rate: all causes	2023	272.7	310.9	341.6
Under 75 mortality rate from all cardiovascular diseases (per 100,000 population aged under 75)	2023	50.5	68.6	77.4
Under 75 mortality rate from cancer (per 100,000 population aged under 75)	2023	108.3	113.4	120.8
Key				
	Better than the England average			
	Similar to the England average			
	Worse than the England average			
	Not Compared			

⁴ Office for Health Improvement and Disparities (OHID) 2021. Local Health Profiles. [Local Authority Health Profiles - Data | Fingertips | Department of Health and Social Care](#)

⁵ Derived from: NOMIS (2022), Census 2021. TS037 – General health.



Source: Office for Health Improvement and Disparities (OHID).⁶

Mental Health and Behaviour Risk Factors

7.5.65 As shown in **Table 7.20**, the LSA performs better or similar with respect to mental health and behavioural risk factors compared to its comparators. For example, it has a higher rate of physically active adults and a lower rate of overweight and obese adults, obesity in children and smoking prevalence.

Table 7.20: Mental Health and Behavioural Risk Factors

Indicator	Year	Three Rivers	East of England	England
Mental Health				
Emergency hospital admission rate for intentional self-harm (per 100,000 population)	2023/24	103.4	108.1	117.0
Suicide rate (per 100,000 population aged 10 and over)	2021-23	8.9	9.5	10.7
Estimated dementia diagnosis rate (65+ years) (%)	2024	64.7%	76.7%	78.0%
Lifestyle				
Percentage of physically active adults	2022/23	77.9%	67.7%	67.1%
Percentage of overweight or obese adults	2022/23	56.7%	64.8%	64.0%
Percentage of obesity in Year 6 children	2023/24	11.3%	20.0%	22.1%
Smoking prevalence in adults (%)	2023	3.0%	11.5%	11.6%
Hospital admission rate for alcohol-related conditions (per 100,000 population)	2021/22-23/24	481	484	504
Key				
	Better than the England average			
	Similar to the England average			
	Worse than the England average			
	Not Compared			

Source: OHID.

Deprivation Profile

⁶ Department of Health & Social Care (2025) Local Authority Health Profiles. Available at: <https://fingertips.phe.org.uk/profile/health-profiles>



7.5.66 Overall, deprivation in the LSA is significantly better than in England for reasons including the follow⁷:

- Income deprivation (4.9%) is significantly better than in England (12.9%).
- Child poverty, and income deprivation affecting children is significantly better in the LSA (5.9%) than in England (17.1%).
- 4.3% of those in the LSA live in overcrowded houses, which is significantly lower than in England (8.7%).
- Deaths from all causes considered preventable, under 75 years (Standardises Mortality Ratio) is significantly better in the LSA (53.9) than the national average (100.0).

7.5.67 The Indices of Deprivation (IoD) 2019 is published by the Ministry of Housing, Communities and Local Government (MHCLG) and provides a relative measure of deprivation for areas in England. In addition, the IoD provides a more refined picture of deprivation across England, presenting deprivation levels at Lower Super Output Area (LSOA) level. The Index of Multiple Deprivation (IMD) component of the IoD is the official measure of relative deprivation in England and is based on 39 separate indicators, organised across seven distinct domains of deprivation which are combined and weighted to calculate the IMD.

7.5.68 **Table 7.21** shows the level of deprivation in the study area (LSOAs St Albans 002C and St Albans 004C). The overall deprivation scores for the study area:

- St Albans 002C is 5, indicating the LSOA falls within the 50% least deprived neighbourhoods in the country. This indicates moderate levels of affluence and deprivation with the main challenges being linked to Barriers to Housing and Services (score of 3) which could be indicative of high housing costs, limited housing availability and poorer access to essential services. A score of 4 for the Employment domain could be indicative of slightly lower employment levels and job quality compared with more affluent areas.
- St Albans 004C is 9, indicating the LSOA falls within the 10% least deprived neighbourhoods in the country. This indicates that the LSOA has a high level of affluence and low levels of deprivation, especially linked to income, employment, education and health. The LSOA has a score of 1 for barriers to housing and services which suggests local challenges in housing affordability and access, which is common in affluent areas.

Table 7.21: Indices of Multiple Deprivation for LSOA of the Proposed Development

	English Indices of Deprivation of IMD	Income	Employment	Education, skills and training	Health and disability	Crime	Barriers to housing and services	Living environment
St Albans 002C	5	5	4	5	7	5	3	9
St Albans 004C	10	10	10	10	10	8	1	7

1	2	3	4	5	6	7	8	9	10

⁷ All judgments of significance with respect to this determinant are provided by the OHID (2021) database cited.



← More deprived

Less deprived→

Source: English indices of deprivation 2019⁸,⁹.

Baseline Evolution

Population

- 7.5.69 Population projections (ONS, 2025) which are under-pinned by assuming a continuation of past demographic trends and which do not take account of any planned housing delivery, suggest that the total population of the SADC area will increase by +5% between the current baseline (2022) and 2035 (the anticipated year of completion for the Proposed Development). This is projected to be a lower rate of growth than expected for the East of England region (+8%) and England (+9%). Projections for the LSA are not published.

Housing Market

- 7.5.70 Household projections (ONS, 2025) which are derived from the population projections referenced above (and therefore again are based on a past continuation of demographic trends and do not take account of any planned housing delivery) suggest that there will be a +5% increase in households in the SADC area between 2022 and 2035. This rate of household growth is again lower than that projected for the regional and national averages (+9% and +8% respectively).
- 7.5.71 The household projections also suggest that the average household size in the SADC area will decrease by -3% between 2022 and 2035; a comparable rate of decrease to the regional average but a slower rate of decrease than the national average (-5%).
- 7.5.72 In the absence of further information, it is assumed that other characteristics of the housing market (such as accommodation type, tenure and overcrowding) remain the same as presented in the existing baseline.

Primary and Secondary Education

- 7.5.73 The furthest year for which DfE School Place Planning Data (DfE, 2025) is available for primary education (2028/29) indicates that there will not be a need for additional primary school places across the Harpenden Primary Planning Area, with 618 unfilled primary school places.
- 7.5.74 The furthest year for which DfE School Place Planning Data (DfE, 2025) is available for secondary education (2030/31) indicates that there will be a need for additional secondary school places across the Harpenden Secondary Planning Area totalling 21 additional places by 2030/31.

Other Population and Human Health Topics

- 7.5.75 In the absence of any further information, it is assumed that the future baseline in respect of household expenditure, early years education, GP provision, economic activity, employment and open/play space, will remain the same as presented in the existing baseline.

⁸ UK Government (2019). Available at: [English indices of deprivation 2019 - GOV.UK](https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019)

⁹ UK Government (2019). Available at: [Indices of Deprivation 2015 and 2019](https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015-and-2019)



7.6 Primary and Tertiary Mitigation

Primary Mitigation

Construction

- 7.6.1 No primary mitigation measures are proposed in respect of population and human health during the construction phase.

Operation

- 7.6.2 The following elements of the Proposed Development are primary mitigation measures that are embedded within the project design and will serve to reduce the impact of the Proposed Development on population and human health receptors during the operational phase. The delivery of:

- Land safeguarded for the delivery of 2FE primary school incorporating early years provision.
- Local centre with flexibility in potential uses. This includes the potential for a new medical facility to be delivered should the ICB deem a new facility is required, and/or a creche, and/or community floorspace, and/or retail provision.
- Open space, incorporating play space.

Transport and Active Travel

- 7.6.3 The Proposed Development is located within the wider NE Harpenden allocation. The allocation is predominantly residential however will benefit from additional land uses including a primary school, local centre and medical centre. The provision of these on-Site facilities will allow residents to undertake day-to-day journeys without needing to leave the Site.
- 7.6.4 The Proposed Development will provide direct active travel links to the adjoining Batford residential area to the south east of the Site. Whilst this will allow for direct travel to facilities in Batford including Porters Hill Park, Sauncey Wood Primary School, Batford Nursery School and onwards to Katherine Warrington School, this link will also allow existing residents to access the Proposed Development and the facilities that are included.
- 7.6.5 The Proposed Development will provide additional pedestrian and cycle access points on to Lower Luton Road which in turn will allow for connection to the existing network for pedestrians and cyclists. The enhancement of the pedestrian and cycle network will provide greater permeability of movements when compared to the private car. Pedestrian access links are also provided to Bower Heath Lane to the northwest of the Proposed Development boundary and to Common Lane to the east of the Proposed Development boundary.

Air Quality

- 7.6.6 The primary mitigation measures relevant to air quality and dust during the operation phase are embedded within the project design and planning. These include:
- Landscaping and green infrastructure (e.g., tree planting, green walls) have been incorporated to act as natural barriers to airborne pollutants and improve local air quality.
 - Site access and internal circulation routes have been designed to minimise vehicle idling and congestion, reducing emissions.
 - Secure cycle storage and pedestrian-friendly pathways to promote active travel and reduce reliance on private vehicles.



Noise and Vibration

- 7.6.7 The natural layout of the Site has been considered in the assessment of noise sources to the proposed development. Additional mitigation measures are required to the southwest extent of the Site and are considered tertiary.

Tertiary Mitigation

- 7.6.8 Tertiary mitigation measures refer to actions that are implemented as standard practice or required by legislation, regardless of the findings of an Environmental Impact Assessment (EIA). These measures are typically unavoidable and form part of routine construction or operational protocols.

Construction

Transport and Active Travel

- 7.6.9 A Construction Environmental Management Plan (CEMP) will be implemented to minimise environmental impacts during the construction phase. It will include measures such as designated haulage routes, scheduled delivery times for heavy loads, and pre-determined vehicle types to ensure safe and efficient transport. Construction traffic will operate within agreed working hours where practicable, with efforts made to reduce disruption to the local road network and nearby residents, including at night. All CEMP measures will be monitored and applied in line with best practice construction management standards.

Air Quality

- 7.6.10 Institute of Air Quality Management (IAQM) guidance provides a number of potential mitigation measures to reduce air quality impacts during the construction phase. The following tertiary mitigation measures reflect standard construction practices and regulatory requirements. These will be implemented as part of good construction management and are not dependent on the EIA process and include:
- A stakeholder communications plan will be developed and implemented, including community engagement prior to commencement of works.
 - Development and implementation of a stakeholder communications plan, including community engagement prior to commencement of works.
 - Display of contact details for the person(s) responsible for air quality and dust issues on the Site boundary.
 - Preparation and implementation of a Dust Management Plan (DMP).
 - Logging and investigation of all dust and air quality complaints, with timely mitigation and documentation of actions taken.
 - Daily inspections of on-Site and off-Site conditions where receptors are nearby, with results recorded and made available to the local authority upon request.
 - Enforcement of no-idling policies for all vehicles and plant.
 - Use of mains electricity or battery-powered equipment in place of diesel or petrol generators where practicable.
 - Deployment of water-assisted dust sweepers on access and local roads to remove tracked-out material.
 - Covering of vehicles transporting loose materials to prevent escape during transit.



- Implementation of wheel washing systems and rumble grids to reduce dust and mud on public roads.
- Prohibition of bonfires and burning of waste materials.
- Re-vegetation or stabilisation of exposed surfaces and stockpiles as soon as practicable.
- Storage of sand and aggregates in bunded, moist conditions unless drying is required.
- Delivery of bulk cement and fine powders in enclosed tankers, with storage in silos fitted with emission control systems.

Noise and Vibration

- 7.6.11 To safeguard population health during construction, a Code of Construction Practice (CoCP) will be secured through planning conditions. The Best Practicable Means (BPM), as defined in the Control of Pollution Act 1974, will be adopted to minimise noise and vibration, with measures detailed in a Construction Environmental Management Plan (CEMP) and secured via a Section 106 Agreement.
- 7.6.12 Key noise mitigation measures include:
- Noise control at source: use of quieter equipment, acoustic enclosures, and restricted working hours.
 - Acoustic screening: temporary barriers and hoarding.
 - Public communication: advance notice of works and a complaints contact line.
 - Timing considerations: avoidance of sensitive periods identified through community liaison.
- 7.6.13 Construction noise will be limited to 07:00–18:00 (Mon–Fri) and 08:00–13:00 (Sat), with no noisy works on Sundays or Bank Holidays. Occasional out-of-hours deliveries may occur for logistical reasons.
- 7.6.14 Vibration mitigation includes:
- Low-vibration equipment and methods, such as continuous flight auger piling.
 - Operational adjustments near sensitive receptors, e.g. reducing roller vibration near homes.
 - Public communication and timing considerations, mirroring noise protocols.
- 7.6.15 A Traffic Management Plan will also mitigate impacts from construction traffic. While precise reductions in impact are difficult to quantify without detailed methods, these embedded measures are expected to reduce adverse effects and maintain positive community relations.

Operation

Transport and Active Travel

- 7.6.16 A Travel Plan will be developed separately for both the residential and primary school elements of the Proposed Development, in line with Hertfordshire County Council's Local Transport Plan 4 objectives. These plans will follow the latest county guidance and aim to promote sustainable travel choices among future residents, students, and school staff.



- 7.6.17 By encouraging alternatives to private car use, the Travel Plans are intended to reduce traffic impacts associated with the development. Their effectiveness will be monitored through a management strategy outlined within each respective plan.

Noise and Vibration

- 7.6.18 **Chapter 11 Noise and Vibration**, outlines that there are no tertiary mitigation measures considered relevant to the Proposed Development.

Air Quality

- 7.6.19 Chapter 12 Air Quality outlines that electric vehicle charging facilities will be provided at the Site in line with Building Regulations. A minimum of 10% of total car parking spaces will be allocated electric vehicle

7.7 Assessment of Significant Likely Effects

Construction Phase

Effects on Employment

- 7.7.1 The construction phase of the Proposed Development will generate jobs across all construction disciplines, from ground workers to construction management. The number of direct jobs generated during the construction phase has been calculated using the Construction Industry Training Board ('CITB'), Labour Forecasting Tool ('LFT') (CITB, 2025). Build cost data (£ per sqm by type of floorspace) from Costmodelling (2025) has been applied to the Proposed Development's floorspace to calculate an indicative construction cost for the Proposed Development. The LFT has been populated with the indicative build cost and run over an indicative 8-year construction period.
- 7.7.2 The LFT calculates that the Proposed Development will support an average of 129 FTE direct jobs, over an 8-year construction period.
- 7.7.3 Guidance from the Additionality Guide (HCA, 2014) and more recently, the Green Book (HM Treasury, 2022), establishes that direct jobs generated by the Proposed Development would most likely be subject to a degree of 'displacement' (the level of employment likely to be lost, moved or adversely affected by the employment created as a result of the Proposed Development); 'leakage' (referring to the number of jobs likely to be taken up by people outside the SADC area), and; 'multiplier effects' (the additional economic benefit that will be derived as a direct result of the income earned by the new employment as an indirect result of the supply chain linkages).
- 7.7.4 These factors are collectively known as 'additionality' factors. They enable quantification of the employment effect specifically to the SADC area.
- 7.7.5 In this instance, no displacement is applied to the direct construction jobs because construction workers are transient and will move from one construction job to another.
- 7.7.6 A leakage factor of 64% has been applied based on the proportion of jobs in the SADC area that are filled by residents who live outside of the SADC area according to the 2021 Census travel to work statistics as detailed in the baseline conditions for employment.
- 7.7.7 In addition to those jobs created as a direct effect of the construction and management of the Proposed Development, further indirect employment will be supported during the construction phase as a result of the spin-off and multiplier effects in the supply-chain.
- 7.7.8 The Green Book (HM Treasury, 2022) classifies employment sectors as either tradable (outputs delivered mainly outside the SADC area) and non-tradeable (outputs delivered mainly inside the SADC area). Employment multipliers are only applied to tradeable uses. The



construction operations are considered tradeable and to represent a worst-case scenario (that is to represent the lowest level of 'spin-off' employment in the supply chain) the Green Book's 'low' employment multipliers are applied (= x0.1 to derive non-tradeable multiplier effect and x0.3 to derive tradeable multiplier effect).

- 7.7.9 **Table 7.22** illustrates the result of applying the additionality factors to 129 direct FTE construction jobs.

Table 7.22: Net Additional Construction Employment Supported by the Proposed Development

	Jobs (FTE)
Gross Job Creation	129
Displaced jobs from elsewhere in the SADC area (0%)	0
Net jobs in the SADC area (gross jobs minus displaced jobs)	129
Jobs filled by people who live outside of the SADC area (64%)	83
Jobs (net direct) filled by residents of the SADC area	46
Indirect supply chain jobs (multiplier effects x 0.4)	19
Net additional employment to the SADC area	65

- 7.7.10 Of the 129 direct FTE jobs supported during the construction of the Proposed Development, 46 of these are estimated to provide employment for residents of the SADC area, along with a further 19 indirect FTE jobs. Therefore, the net employment effect to the SADC area over the construction phase is 65 FTE jobs.
- 7.7.11 These are not expected to be new jobs, rather safeguarded jobs. For the contractors involved, this is likely one of several projects that they will be involved in during the course of a year or number of years. Construction activity will take place temporarily and then move on to other projects, which might be local, elsewhere in the region or further afield.
- 7.7.12 The sensitivity of construction employment in the SADC area is considered to be **medium**, noting that there are 4,000 construction jobs within the SADC area as identified in the existing baseline, representing 6% of employment in the SADC area.
- 7.7.13 The 129 direct construction jobs represent 3.2% of construction employment in the SADC area and therefore the magnitude of change is considered to be **high**.
- 7.7.14 On this basis, the Proposed Development will have a temporary, **major beneficial** effect on employment in the SADC area during the construction phase, which is **significant**.

Transport and Active Travel

- 7.7.15 The following human health receptors have been identified: construction workers; existing residents in LSA; cyclists and pedestrians; future occupants of the Proposed Development Site; people with pre-existing health conditions; Children and young people. The receptor sensitivity is considered to be **medium**.
- 7.7.16 A detailed assessment of transport effects during conclusion is provided in **Chapter 10 Transport and Access**. The assessment concludes that construction traffic volumes are expected to be significantly lower than those generated during the operational phase of the development, making the operational traffic assessment a worst-case scenario.
- 7.7.17 The construction programme will be phased over several years, potentially beginning in 2025 and completing by 2036, with traffic volumes influenced by build-out rates and economic conditions. Based on comparable data from the Cambourne New Settlement, a robust estimate of 175 two-way vehicle movements per day has been assumed for a build rate of 100 dwellings per year. This would result in less than a 10% increase in traffic on Lower Luton Road, representing a **negligible** impact.



- 7.7.18 As such, no further assessment of construction traffic impacts on population and human health is considered necessary in accordance with **Chapter 10 Transport and Access**.

Air Quality

- 7.7.19 Construction activities such as excavation, groundworks, cutting, material handling, and on-Site storage may generate fugitive dust emissions throughout the construction phase. In addition, vehicle movements, both within the Site and on surrounding roads, can contribute to the re-suspension of dust from haul routes and road surfaces, potentially affecting local air quality and human health.
- 7.7.20 **Chapter 12 Air Quality** indicates that, prior to mitigation, the risk of dust-related impacts from construction activities, including earthworks, building works, and vehicle trackout, was assessed as high for dust soiling and low for human health. These risk levels were determined based on worst-case assumptions, with activities occurring at the Site boundary nearest to sensitive receptors. In practice, actual risks are expected to be lower for much of the construction period.
- 7.7.21 Human health receptors include: construction workers, existing residents in LSA; people with pre-existing health conditions (e.g., asthma, COPD, heart disease); children and pregnant women.
- 7.7.22 An assessment of air quality effects during the construction phase of the proposed development has been undertaken and reported in **Chapter 12 Air Quality**, which focuses on potential dust emissions and vehicle trackout. Sensitive receptors were identified within 250 m of the Site boundary and 50 m of likely access routes. Residential properties to the east and south of the Site are considered high sensitivity receptors due to the expectation of a high level of amenity, while nearby industrial and commercial premises are classified as medium sensitivity.
- 7.7.23 The magnitude of change is considered medium to high, based on the number and proximity of sensitive receptors to dust-generating activities. For example, more than 100 high sensitivity receptors are located within 100 m of the Site boundary and trackout routes. When receptor sensitivity is combined with the predicted magnitude of dust emissions, the unmitigated risk of dust soiling is classified as high, while the risk to human health is low (see **Chapter 12 Air Quality**). With the implementation of appropriate primary and tertiary mitigation measures, such as those outlined above, it is anticipated that dust generating activities during construction will result in a **minor adverse**, temporary effect which is **Not Significant**.

Noise and Vibration

- 7.7.24 The following receptors have been identified: construction workers; existing residents in LSA; People with pre-existing health conditions (e.g., mental health conditions; sensory disabilities); children and pregnant women. Receptor sensitivity is deemed to be **high**.
- 7.7.25 Exact details of construction methods and plant are still to be determined; however, the Noise and Vibration assessment considered the following factors:
- Demolition Activities;
 - Site Noise;
 - Site Vibration; and
 - Traffic Noise and Vibration.



Demolition Activities

- 7.7.26 The assessment indicates that, without mitigation, demolition of the Equestrian Facility would exceed the ABC threshold by 18 dB at the nearest sensitive receptor (NSR 5). Given the high sensitivity of the receptor and the **high** magnitude of impact, this would result in a **major adverse** effect, as defined by the assessment criteria.
- 7.7.27 The demolition of the Radio Tower is predicted to be 2 dB below the ABC threshold at the closest receptor (NSR 1). However, as noise levels are expected to exceed existing baseline conditions, the impact is classified as **low** magnitude, resulting in a **minor adverse** effect on this high sensitivity receptor.

Site Noise

- 7.7.28 An assessment of construction noise at each receptor has been undertaken based on typical plant noise level data (see **Chapter 11 Noise and Vibration**). Without mitigation, the assessment shows that category ABC threshold¹⁰ levels in accordance with BS5228 are likely to be exceeded at several locations by more than 5dB, with the worst assessment location shown to produce 13 dB above the threshold levels. It is therefore considered that this would constitute a **high** magnitude of change without mitigation. **Tables 11.14-11.17** in **Chapter 11 Noise and Vibration** provide a detailed assessment of noise levels taking mitigation measures into account in accordance with BS 5228-1:2009 + A1:2014.
- 7.7.29 With the proposed mitigation the assessment shows the category ABC threshold levels are unlikely to be exceeded at all locations. However, as construction noise levels are still likely to be above the baseline sound levels the magnitude of impact is considered to be **minor**, taking tertiary mitigation measures into account.
- 7.7.30 It is therefore judged that Site noise effects during construction are likely to result in a **minor adverse**, temporary effect which is **not significant**.

Site Vibration

- 7.7.31 Vibration is not considered a significant risk for this project with the exception of pilling activities. Where pilling is found to be required it is proposed that CFA pilling methods will be used, reducing the risks of vibration (see **Chapter 11 Noise and Vibration**).
- 7.7.32 Ensuring low vibration construction methods and identifying and mitigating any potential sources of vibration will result in a **minor** or **negligible** magnitude of change. This is deemed to result in a **minor adverse** and **negligible** effects, that are temporary in duration and **not significant**.
- 7.7.33 Construction noise is unlikely to be continuous in one fixed place for the whole duration of construction. In practice, there will be large periods where works are occurring at greater distances (i.e., not immediately adjacent to this receptor) where the impact magnitude is likely to be lower and consequently result in an effect of lower significance.

Traffic Noise and Vibration

- 7.7.34 Construction activities involving noisy or vibratory works will be restricted to 07:00–18:00 Monday to Friday and 08:00–13:00 on Saturdays, with no such works permitted on Sundays or Bank Holidays. Site access by construction vehicles will primarily occur within these hours. However, occasional deliveries outside of these times may be necessary for logistical reasons, such as the transport of large equipment. These working hours will be formalised in the Construction Environmental Management Plan (CEMP), secured by a planning condition.

¹⁰ The ABC method in BS 5228-1 is a technique for assessing the noise impact of construction activities. It involves comparing predicted or measured noise levels against baseline noise levels (before construction started) and determining whether mitigation is required.



- 7.7.35 To minimise disturbance from construction traffic, best practicable means (BPM) will be implemented in line with BS 5228. Measures may include reducing engine idling, staggering engine start times, and scheduling vehicle arrivals to avoid queuing on public roads. Additional mitigation will be provided through a Traffic Management Plan, also referenced in the CEMP. With these controls in place, the magnitude of change from construction traffic are expected to be **negligible to minor**, resulting in a minor adverse / negligible temporary effects which are **not significant**.

Operational Phase

Effects on the Housing Market

- 7.7.36 The Proposed Development will provide up to 500 new homes (Use Class C3) across a range of bedroom sizes, accommodation types and tenures, to be determined in due course via a Reserved Matters application.
- 7.7.37 In addition to the up to 500 homes (Use Class C3), the Proposed Development is also providing a 60-bed extra care facility (Use Class C2 / C3) and a children's home (Use Class C2).
- 7.7.38 The Proposed Development will therefore deliver a mix of housing that will provide homes for different groups of the community as required by local planning policy.
- 7.7.39 Draft Policy SP1 in SADC's Draft Local Plan 2041 (SADC, 2024) identifies a need for 14,603 net additional homes in the SADC area over the period 2024 to 2041. The Proposed Development's delivery of up to 500 new homes will contribute 3.4% of the total Draft Local Plan requirement.
- 7.7.40 Draft Policy HOU3 identifies a need for 809 additional homes with care (extra care housing). The Proposed Development's delivery of a 60-bed extra care facility will contribute 7.4% of the Draft Local Plan requirement.
- 7.7.41 Furthermore, Site Allocation B2 (North East Harpenden) of the Draft Local Plan 2041 sets out a requirement for 738 residential units and 70-80 self-contained extra care units. The Proposed Development would deliver up to 68% of the strategic allocation.
- 7.7.42 In light of the above, it is considered that Proposed Development will have a **high** magnitude of change on the housing market of the SADC area.
- 7.7.43 The sensitivity of the housing market in the SADC area is considered to be **medium**, noting that whilst housing delivery over the last five-years has been below the annual requirement according to the Government's standard method for local housing need, overcrowding in the SADC area is comparable to the regional average and the number of households on the housing waiting list has increased at a lower rate than the regional and national averages.
- 7.7.44 On this basis, the Proposed Development will have a permanent **major beneficial** effect on the housing market in the SADC area during the operational phase, which is considered **significant**.

Effects on Household Expenditure

- 7.7.45 The Proposed Development will deliver up to 500 additional households (indicative) into the SADC area, assuming each new home will represent one household. These new households will inject additional consumer spending into the area by purchasing everyday goods and services from local providers.
- 7.7.46 Utilising the average household spending figures for the SADC area as presented in **Table 7.10**, the Proposed Development could generate additional household expenditure of £16.5m. per annum as illustrated in **Table 7.23**. Further expenditure would be created by the Proposed Development's care home population.



Table 7.23: Annual Household Expenditure Generated by the Proposed Development

Type	Per Household Expenditure (SADC area)	Household Expenditure created by the Proposed Development
Comparison Spend	£11,968	£6.0m
Convenience Spend	£7,794	£3.9m
Leisure Spend	£13,281	£6.6m
Total	£33,043	£16.5m

- 7.7.47 The sensitivity of household expenditure in the SADC area is considered to be **low**, noting that average annual household expenditure in the SADC area is higher than both the regional and national averages, across all types of expenditure.
- 7.7.48 The magnitude of change is considered to be **low** in the context of the Proposed Development increasing household expenditure in the SADC area by 0.8% from the existing baseline.
- 7.7.49 On this basis, the Proposed Development will have a permanent, **negligible** effect on household expenditure in the SADC area during the operational phase, which is considered **not significant**.

Effects on Education

- 7.7.50 **Table 7.3** explained that HCC's demographic model would be used to calculate the child yield from the Proposed Development. Where a development mix is now known, HCC apply the yield ratios detailed in **Table 7.24**. Pupil yield is not calculated from the Proposed Development's 60 extra care housing units as these are not anticipated to be occupied by families with children, rather they are units designed typically for the population aged 55+ years.

Table 7.24: HCC Pupil Yield Rates

Education Phase	Yield per 100 dwellings
Early Years	25.9
Primary	21.5
Secondary (11 to 15 years)	9.8
Post-16	3.1

- 7.7.51 **Table 7.25** identifies the resulting pupil yield through application of HCC's pupil yield rates (**Table 7.24**) to the Proposed Development's up to 501 homes. As explained in the 'Limitations and Assumption' section of this chapter, the Proposed Development's children's home has been treated as a dwelling for the purpose of considering impacts on education.

Table 7.25: Pupil Yield from the Proposed Development

Education Phase	Number of Children
Early Years	130
Primary School	108
Secondary (11 to 15 years)	49
Post-16	16



Early Years Education

- 7.7.52 **Table 7.25** identifies that the Proposed Development will yield 130 children aged 0-4 years. Not all of these children will require a place at a registered, non-domestic early years provider as the demand for early years education/childcare can be met via both formal and informal provision in a variety of setting types.
- 7.7.53 The sensitivity of early years education in the LSA is considered to be **low**, noting that there are 32 registered, non-domestic childcare and early years' providers in the LSA collectively providing 1,825 places which is significantly in excess of the number of places required by the Proposed Development.
- 7.7.54 The Proposed Development incorporates the delivery of a new early years' provision within the 2FE primary school. 30 early years' places are usually sought for each 1FE of primary school provision, so the Proposed Development will deliver 60 early years' places. Furthermore, there is also the potential within the flexible uses of the Proposed Development's neighbourhood centre to deliver a standalone nursery/creche if demand necessitates.
- 7.7.55 In light of the new early year's provision being provided by the Proposed Development and the existing early years provision in the LSA, the magnitude of change is considered to be **negligible**.
- 7.7.56 On this basis, the Proposed Development will have a permanent, **negligible effect** on early years education in the LSA during the operational phase, which is considered **not significant**.

Primary Education

- 7.7.57 **Table 7.25** identifies that the Proposed Development will yield 108 children aged 5 to 10 years, all of whom are considered to require a place in a local primary school to the Site.
- 7.7.58 The sensitivity of primary education in the Harpenden Primary Planning Area is considered to be **low**, noting that there are currently 289 unfilled primary school places across the Harpenden Primary Planning Area, with DfE forecasts presented in the future baseline indicating that by 2027/28 there is expected to be 618 unfilled primary school places in this planning area.
- 7.7.59 Furthermore, the Proposed Development incorporates safeguarded land for the delivery of a new 2FE primary school which will provide a further 420 primary school places (on the basis of 1FE of primary education being equivalent to 210 places = 2 x 210), sufficient to accommodate all of the demand for primary school places created by the Proposed Development, with 312 remaining places available to support the wider area. The remaining 312 places represent 8.6% of primary school places currently provided in the Harpenden Primary Planning Area and for this reason, the magnitude of change is considered **medium**.
- 7.7.60 On this basis, the Proposed Development will have a permanent, **minor beneficial effect** on primary education in the Harpenden Primary Planning Area during the operational phase, which is considered **not significant**.

Secondary Education

- 7.7.61 **Table 7.25** identifies that the Proposed Development will yield 49 children aged 11 to 16 years, all of whom are considered to require a place in a secondary school in the Harpenden Secondary Planning Area, and 16 children aged 17 to 19 years.
- 7.7.62 The sensitivity of secondary education in the Harpenden Secondary Planning Area is considered to be **medium**, noting that whilst there are currently unfilled secondary school places, the future baseline identified a shortfall in secondary places in the Harpenden Secondary Planning Area (need for an additional 21 secondary school places by 2029/30).



7.7.63 The 65 additional secondary school places required by the Proposed Development represents 1.3% of the current number of secondary school places (Years 7 to 13) in the Harpenden Secondary Planning Area and therefore the magnitude of change is considered **low**.

7.7.64 On this basis, the Proposed Development would have a permanent, **minor adverse effect** on secondary education in the Harpenden Secondary Planning Area during the operational phase, which is considered **not significant**.

Effects on GP Provision

7.7.65 Applying the average household size for the SADC area of 2.49 persons per household as identified in the 'Baseline Conditions', to the Proposed Development's up to 501 homes, it is estimated that the homes will support a resident population of approximately 1,248 people. In addition, it is considered that the 60-bed extra care facility will provide homes for a further 60 residents. The Proposed Development is therefore anticipated to have a total resident population of 1,308 people. Whilst some of the future residents may already be registered with a GP in the LSA, the worst-case scenario for assessment is to assume that all future residents of the Proposed Development will need to register with a local GP.

7.7.66 The magnitude of change is considered to be **low** on the basis that the demand for 1,308 GP places created by the Proposed Development represents 2.8% of the total number of registered patients in the LSA currently.

7.7.67 The sensitivity of GP provision in the LSA is considered to be medium. Based on the HUDU benchmark of 1 GP per 1,800 patients, there is an estimated surplus of 2,625 patient places across The Elms Practice and The Village Surgery (including its branch, Marford Road Surgery, located just outside the LSA). However, when the capacity of Davenport House Surgery—identified as the second closest practice to the proposed development—is included in the assessment, a cumulative deficit of approximately 1,562 patient places emerges. This suggests that while some practices within the LSA have available capacity, overall provision may be constrained when considering nearby facilities likely to serve the development.

7.7.68 On this basis, the Proposed Development will have a **minor adverse effect** on GP provision in the LSA during the operational phase, which is considered **not significant**.

7.7.69 Nonetheless, the Proposed Development's neighbourhood centre has the potential to incorporate a new medical facility should the ICB deem a new facility is required locally. It is also recommended that engagement is undertaken with the NHS ICB to determine any developer contributions that may be required to support primary care service provision for the future population.

Effects on Employment

7.7.70 The Proposed Development will deliver a neighbourhood centre providing up to 1,200 sqm (GEA) of non-residential floorspace comprising flexible E class uses, which will support employment. The amount of employment that could be supported will be dependent on which uses come forward in the neighbourhood centre.

7.7.71 There is the potential that the entire neighbourhood centre could be delivered as a new medical facility. Staffing profiles of GP facilities of a similar size to that with the potential to be delivered by the Proposed Development (through reference to Primary Health Properties (2025) and GP Workforce Statistics (NHS Digital, 2025) identify that the Proposed Development's healthcare facility has the potential to support 22 FTE jobs.

7.7.72 Greater levels of employment could be supported should retail and / or restaurants / cafes and / or professional services uses be delivered. However, it is not anticipated that the whole of the neighbourhood centre would be delivered as retail / restaurant / professional services. For this reason, a realistic scenario is to assume that 50% of the neighbourhood centre (600 sqm) is delivered as a retail, restaurant or professional services, with the remaining 600 sqm as community floorspace, such as a community hall.



- 7.7.73 The Density Guide (HCA, 2015) provides a range of densities for retail uses including 15 to 20 sqm (Net Internal Area (NIA)) per FTE job for high street stores and food stores. Similarly, the employment density for restaurants and cafes is also 15 to 20 sqm (NIA) per FTE job. The employment density for professional services is 16 sqm (NIA) per FTE job. The reasonable worst-case employment scenario for this indicative use is arrived at by applying the lowest published density of 20 sqm (NIA) of floorspace per FTE job.
- 7.7.74 The indicative floorspace areas are GEA which have been converted into NIA by first converting the GEA into Gross Internal Area (GIA) assuming 95% of the GEA and then calculating by NIA by assuming 85% of the GIA area, following conversion guidance provided in the Density Guide (HCA, 2015). On this basis 600sqm GEA is equivalent to 485 sqm NIA. Applying the employment density of 20 sqm (NIA) per FTE job to this, suggests that 25 jobs could be supported by the Proposed Development's indicative retail / restaurant / professional services.
- 7.7.75 The provision of community floorspace will provide limited operational employment opportunities, anticipated to total two FTE jobs maximum, associated with maintenance and day-to-day operational management of the space.
- 7.7.76 It is therefore anticipated that Proposed Development's neighbourhood centre could support between 22 and 27 FTE jobs depending on which uses are delivered.
- 7.7.77 Further employment would be supported by the 2FE primary school once that is delivered on land being safeguarded by the Proposed Development. Applying the average pupil to adult ratio of 10.4 children per adult for primary schools in Hertfordshire in 2024/2025 (DfE, 2025)¹¹ to the anticipated 420 children, it is estimated that the 2FE primary school could support employment for 40 people.
- 7.7.78 The Proposed Development's children home will have a member of staff in the home 24/7. On this basis, the children's home is anticipated to support one FTE job.
- 7.7.79 In total therefore, the Proposed Development could support in the region of between 63 to 68 FTE jobs. The worst-case assessment is to assume 63 FTE jobs.
- 7.7.80 As explained when reporting the effects on construction employment, it is necessary to apply additionality factors (displacement, leakage and multipliers) to the 63 direct FTE jobs, to establish the employment effect to the SADC area.
- 7.7.81 No displacement factor is applied during the operational phase because it is considered that the Proposed Development's non-residential floorspace is additional floorspace to support the needs of the Proposed Development and will not result in any employment activities being displaced from elsewhere.
- 7.7.82 The same leakage factor applied in the assessment of construction employment (64%) is also applied for operational employment.
- 7.7.83 None of the Proposed Development's proposed non-residential floorspace is considered tradable (outputs delivered mainly outside the SADC area) and therefore no employment multipliers are applied.
- 7.7.84 **Table 7.26** illustrates the effect of applying the described additionality factors to the 63 FTE jobs supported on-Site by the Proposed Development to establish the Proposed Development's operational employment effect to the SADC area.

¹¹ School Workforce in England. Reporting year 2024. Available at: [Step 6: Explore data - Create your own tables](#)



Table 7.26: Net Additional Operational Employment Effect of the Proposed Development

	Jobs (FTE)
Gross Job Creation	63
Displaced jobs from elsewhere in the SADC area (0%)	0
Net jobs in the SADC area (gross jobs minus displaced jobs)	63
Jobs filled by people who live outside of the SADC area (64%)	40
Jobs (net direct) filled by residents of the SADC area	23
Indirect supply chain jobs (multiplier effects x 0.4)	0
Net additional employment to the SADC area	23

- 7.7.85 The Proposed Development's net additional employment effect to the SADC area is 23 FTE jobs.
- 7.7.86 The sensitivity of employment in the SADC area is considered to be **low**, noting that the employment rate is higher and the Claimant Count is lower than the regional and national averages.
- 7.7.87 The magnitude of change is considered to be **negligible** given that the 63 direct FTE jobs created by the Proposed Development, will increase jobs in the SADC area by 0.08% and the net additional employment effect to the SADC area of 23 FTE jobs will increase resident employment by 0.03%.
- 7.7.88 On this basis, the Proposed Development will have a permanent, **negligible effect** on employment in the SADC area which is considered **not significant**.

Effects on Open / Play Space

- 7.7.89 **Table 7.27** details the Proposed Development's requirement for open / play space based on application of SADC's quantity standards (refer to **Table 7.1**) to the Proposed Development's anticipated population of 1,308 people. This is set alongside the on-Site provision that the Proposed Development will be delivering.

Table 7.27: The Proposed Development's Open / Play Space Requirement

Open Space Type	Quantity Standard (hectares per 1,000 population)	Proposed Development's Requirement (hectares)	Proposed Development's Provision (hectares)
Parks and Gardens	0.71	0.93	1.02
Natural and Semi-natural Greenspace	3.46	4.53	8.35
Amenity Greenspace	1.53	2.00	2.10
Provision for Children and Young People			
LAP			
LEAP	0.06	0.08	0.09
NEAP			
Other Provisions			
Allotment	0.28	0.37	0.54

- 7.7.90 In total the Proposed Development will be delivering 12.1 hectares of open space across a range of open space typologies. **Table 7.27** illustrates that the Proposed Development will be delivering in excess of the requirement across all types of open / play space. In addition to the



provision outline in **Table 7.27**, the Proposed Development will also be facilitating the delivery of two adult senior sports pitches (= 2.6 hectares).

- 7.7.91 The sensitivity of open / play space in the local area to the Site is considered **medium**, noting that there is a range of open /play space within 1km of the Site as identified in the 'Baseline Conditions' section of this chapter, but noting that the Proposed Development will increase the demand for open / play space.
- 7.7.92 The magnitude of change is considered **high** in the context of the Proposed Development delivering approximately 50% more open space (equivalent to approximately 4 hectares) than the requirement.
- 7.7.93 On this basis, the Proposed Development will have a permanent, **major beneficial** effect on open / play space within the local area to the Site which is considered **significant**.

Transport and Active Travel

- 7.7.94 The following human health receptors have been identified: existing residents in LSA; cyclists and pedestrians; future occupants of the Proposed Development Site; People with pre-existing health conditions; Children and young people. Receptor sensitivity is considered to be **medium**.
- 7.7.95 **Chapter 10 Transport and Access** indicates that the Proposed Development will result in modest increases in traffic across the local network. The most notable impacts occur on Lower Luton Road and Westfield Road, where traffic increases by up to 16.1% and 24.3% respectively. These increases are attributed to the Site's proximity to these routes and are classified as slight adverse impacts under IEMA guidance. However, both roads are considered low sensitivity receptors, and the magnitude of change is therefore deemed negligible.
- 7.7.96 To mitigate potential impacts, the development will deliver several improvements. On Lower Luton Road, two new signal-controlled pedestrian crossings will be installed, one east of the Site access and another west of Porters Hill, enhancing pedestrian safety and connectivity. Gateway features will also be introduced to reduce vehicle speeds. On Westfield Road, a parallel pedestrian and cycle crossing is proposed at the existing road narrowing, along with the installation of dropped kerbs and tactile paving at key locations.
- 7.7.97 Junction modelling confirms that all key junctions, including those at Lower Luton Road, Westfield Road, Bower Heath Lane, and Station Road, will operate within capacity post-development, with no significant impact on driver delay. Given the limited change in flows at sensitive receptors, no further assessment of impacts on Harpenden town centre is required.
- 7.7.98 The Proposed Development encompasses a number of sustainable travel measures that reduce the need to travel from the outset. This includes prioritisation of sustainable modes of transports through the provision of active travel infrastructure and nearby access to public transport options.
- 7.7.99 The Transport Assessment (SLR Consulting, 2025) states that the Site is situated in an accessible location with a range of sustainable transport opportunities including access to public transport within the immediate vicinity. This includes two local bus stops which benefit from differing bus services. The nearest railway station to the Site is Harpenden railway station, located approximately 2.2km to the south of the Site. This is considered to be within an acceptable cycling distance and for many this would be within an acceptable walking distance.
- 7.7.100 Additionally, the Site is in close proximity to a range of existing and consented facilities including shops, cafes and schools.
- 7.7.101 The Site will contain cycle links throughout which will improve the connectivity and permeability of the Site to residents and the surrounding community, such as the proposed



connections to the Batford estate. In terms of layout and design within the Site, a network of high-quality cycle routes will offer direct, safe, and convenient access around and through the Site by cycling.

- 7.7.102 To facilitate active travel and to enable residents and visitors to make direct journeys to the Site, a number of active travel connections are proposed as part of the Proposed Development. The proposed vehicle access will be provided with pedestrian and cycle provisions on either side of the carriageway, connecting to the existing network on Lower Luton Road, including a new signal-controlled crossing on Lower Luton Road.
- 7.7.103 Additional non-vehicular access points will be provided to the neighbouring Batford estate. This includes connections at Turners Close (at the point of the existing PRow), Dane Close, through Porters Hill Park and from Whittings Close (at the point of the existing PRow). Additional walking route connections are provided to Common Lane and Bower Heath Lane.
- 7.7.104 The Proposed Development includes a street design that encourages active travel and walking. Connected active travel paths will be created that invite and encourage interaction and promote health and wellbeing through the provision of shading, green walkways, and safe routes with the absence of car traffic. Street trees, and green walkways will reduce the temperature on hot days, improve air quality, and provide shelter in rain, creating connected healthy walk and cycle ways around the Site.
- 7.7.105 Taking into account primary and tertiary mitigation, it is concluded that the Proposed Development would have a **medium** magnitude of change in respect of operational transport and active travel measures. This would result in a **moderate beneficial**, long term effect which is **significant**.

Air Quality

- 7.7.106 Human health receptors include: existing residents in LSA; future residents of Proposed Development people with pre-existing health conditions (e.g., asthma, COPD, heart disease); children and pregnant women. Receptor sensitivity is considered to be **high**.
- 7.7.107 As reported in **Chapter 12 Air Quality**, an assessment was undertaken to evaluate operational impacts of the proposed development in 2036, focusing on annual concentrations of nitrogen dioxide (NO₂), PM₁₀, and PM_{2.5}. Dispersion modelling compared scenarios with and without the development, assessing impacts at human receptors and Batford Springs Local Nature Reserve.
- 7.7.108 Predicted annual mean NO₂ concentrations at all receptors remain well below the Air Quality Objective (AQO), with changes due to the development considered negligible. The percentage change in NO₂ levels relative to the AQO is minimal, and all impacts are classified as negligible in accordance with EPUK-IAQM guidance. As annual mean NO₂ levels are below 60 µg/m³, exceedance of the 1-hour AQO is not expected.
- 7.7.109 Background NO₂ levels are also expected to be lower at upper building levels due to increased distance from emission sources. Therefore, the Site is considered suitable for its proposed use without requiring mitigation to protect future users or existing receptors from elevated NO₂ concentrations.
- 7.7.110 An operational air quality assessment for the year 2036 found that predicted concentrations of NO₂, PM₁₀, and PM_{2.5} at all sensitive receptors, including residential locations and Batford Springs Local Nature Reserve, remain well below relevant Air Quality Objectives (AQOs). The development would result in only negligible changes in pollutant levels, with no exceedances expected. As annual mean NO₂ concentrations are significantly below 60 µg/m³, short-term (1-hour) AQOs are also unlikely to be breached. Given the low predicted concentrations and minimal impact, no mitigation is required to protect future Site users or existing receptors.
- 7.7.111 An assessment of annual PM_{2.5} concentrations for the Proposed Development in 2036 was undertaken against the government's interim (12 µg/m³ by 2028) and legally binding (10 µg/m³



by 2040) targets. Predicted concentrations at all sensitive receptors remain below the interim target. Slight exceedances of the 2040 target were identified at a small number of receptors (R9–R11 and E1–E2), though the changes in concentration due to the development are negligible and within acceptable limits under EPUK-IAQM guidance.

7.7.112 Background PM_{2.5} levels are expected to be lower at upper floors due to distance from road sources. Although some exceedances of the 2040 target occur in both baseline and development scenarios, pollutant levels are declining due to improved vehicle technologies and post-pandemic traffic trends.

7.7.113 The Site selection and layout have considered proximity to sensitive receptors, such as Sauncey Wood Primary School, and include mitigation features such as green buffers, tree planting, and a pond to reduce exposure. Best practice construction measures will also be implemented to minimise dust emissions. Overall, the development is not expected to result in significant PM_{2.5} impacts on human health.

7.7.114 The overall effect of road traffic emissions associated with the operational phase of the Proposed Development on NO₂, PM₁₀ and PM_{2.5} concentrations have therefore been considered to have a **negligible** magnitude of change resulting in **negligible** and not **significant** impact on human health receptors. While further mitigation is not required, best practice measures recommended by IAQM should be considered at the reserved matters stage to further reduce operational emissions. These are outlined in **Section 7.8**.

Noise and Vibration

7.7.115 The primary source of environmental noise affecting the Site is the surrounding road network. Although aircraft movements were noted during the baseline survey, the Site lies well beyond the lowest airport noise contours and aircraft noise was not found to significantly influence overall sound levels. The following receptors have been identified: construction workers; existing residents in LSA; People with pre-existing health conditions (e.g. mental health conditions, sensory impairments); children and elderly people. Receptor sensitivity is deemed to be **high** during operation and occupation of the Site.

7.7.116 Across most of the Site, ambient noise levels are relatively low, allowing for the use of openable windows to support the baseline ventilation strategy without exceeding internal noise guideline thresholds. As a result, the majority of the Site is expected to experience minor or negligible impacts in accordance with the assessment criteria.

7.7.117 However, elevated noise levels were identified in the northwest portion of the Site, particularly in areas close to the road (see **Chapter 11 Noise and Vibration**). In these locations, the significance of impact ranges from moderate to major, necessitating mitigation. Proposed measures include acoustically rated glazing (minimum 36 dB Rw) and ventilator elements designed to achieve appropriate sound insulation performance. With these measures in place, internal noise levels across all dwellings are expected to comply with relevant guidance.

7.7.118 To address external noise in amenity areas, imperforate fencing with a minimum mass per unit area of 10 kg/m² has been recommended in affected zones. This is typically achieved using 20 mm solid timber fencing. Following implementation of these measures, external noise levels are predicted to fall below upper guideline limits and marginally above lower limits, ensuring acceptable conditions for outdoor use.

7.7.119 Overall, the magnitude of change for noise impacts during operation is considered to be **negligible** with no perceptible change expected at several receptor locations (see **Chapter 11 Noise and Vibration**). This would result in an overall **negligible** and **not significant** effect.



7.8 Secondary Mitigation and Enhancement

Construction

- 7.8.1 No significant adverse effects have been identified during the Proposed Development's construction phase and therefore no secondary mitigation or enhancement measures are required.
- 7.8.2 However, the following secondary mitigation and enhancement measures are proposed in respect of Air Quality effects during construction in line with IAQM recommendations to further reduce any impacts and deliver additional environmental and community benefits:
- Use of real-time dust monitoring to trigger responsive mitigation actions (e.g., increased water suppression during dry, windy conditions).
 - Scheduling of high-dust activities during periods of low sensitivity (e.g., outside peak traffic or school hours).
 - Engagement with local schools or community groups to raise awareness of air quality and promote environmental stewardship.
 - Use of ultra-low emission vehicles (ULEVs) for Site logistics where feasible.
 - Installation of temporary green screening (e.g., living walls) along sensitive boundaries to enhance visual and air quality buffering.
- 7.8.3 **Chapter 11 Noise and Vibration** outlines that although predicted construction noise levels are expected to comply with BS 5228 Category A ambient noise thresholds, Best Practicable Means should nonetheless be implemented to minimise disturbance. Maintaining clear communication with nearby residents is also key to fostering positive relations.
- 7.8.4 Noise mitigation should prioritise control at source, including:
- Switching off equipment when not in use;
 - Setting noise emission limits for Site machinery;
 - Retrofitting equipment with silencers or mufflers;
 - Installing nearfield acoustic screening around noisy activities;
 - Selecting quieter working methods and equipment where feasible.
 - Additional general measures include:
 - Locating plant away from shared walls, ceilings, and floors where possible;
 - Keeping residents informed of potentially disruptive works;
 - Adhering strictly to agreed working hours;
 - Consistently applying Best Practicable Means.
- 7.8.5 To reduce noise from Site access, the following practices should be adopted:
- Minimising engine revving and switching off engines during loading/unloading;
 - Restricting haulage vehicle movements to between 08:00 and 18:00;



- Using nearfield screening along access routes where practicable.

7.8.6 At the time of assessment, no piling methodology was available. Should piling be required, CFA piling is recommended due to its lower noise and vibration impacts. Once a methodology is confirmed, a detailed noise and vibration assessment should be undertaken to identify potential impacts and appropriate mitigation.

Operation

7.8.7 No significant adverse effects have been identified during the operational phase and therefore no secondary mitigation measures or enhancement measures are required.

Transport and Active Travel

7.8.8 No secondary mitigation is deemed necessary for the Proposed Development, as its impacts are not considered significant. However, a range of measures will be implemented to further reduce potential effects. These include residential and school Travel Plans aimed at promoting sustainable travel among residents, pupils, and staff, which may help reduce private vehicle use.

7.8.9 The Site layout will also accommodate bus services, with potential routing options agreed with Hertfordshire County Council. This includes a turning loop and through-route via Common Lane, ensuring that public transport is easily accessible to residents and encouraging its uptake.

Air Quality

7.8.10 While no significant effects have been identified for operational air quality effects, it is recommended that best practice measures from the IAQM are considered at the reserved matters stage to further reduce operational emissions. These include:

- Promotion of green travel plans for staff and visitors, including incentives for public transport, cycling, and car-sharing.
- Installation of additional EV charging points based on future demand.
- Periodic air quality audits to identify opportunities for further improvement.
- Integration of air quality data into public-facing dashboards or community information boards.
- Enhancement of green infrastructure (e.g., additional tree planting or biodiversity corridors) to improve local microclimate and pollutant dispersion.

7.9 Residual Effects

Construction

7.9.1 The residual effect on employment during the construction phase is **major beneficial (significant)** in the SADC area.

7.9.2 The residual effect for Transport and Active Travel during construction remains negligible (not significant) in relation to the Site area and local road network. The residual effect for Air Quality remains as **minor adverse (not significant)** in relation to the Site and surrounding area. Taking mitigation into consideration, the residual effects for Noise and Vibration are considered to be **moderate adverse** in the most impacted locations for demolition activities (see Chapter 11 Noise and Vibration) for the remainder of the Site, **minor adverse / negligible (not significant)** effects have been determined with mitigation.



Operation

- 7.9.3 The residual effect on housing delivery remains **major beneficial (significant)** in the SADC area; household expenditure remains **negligible (not significant)** in the SADC area; early years education remains **negligible (not significant)** in the LSA; primary education remains **minor beneficial (not significant)** in the Harpenden Primary Planning Area; secondary education remains **minor adverse (not significant)** in the Harpenden Secondary Planning Area; GP provision remains **minor adverse (not significant)** in the LSA; employment remains **negligible (not significant)** in the SADC area; and open / play space remains **major beneficial (significant)** in the local area.
- 7.9.4 The residual effect on Transport and Active Travel remains as **moderate beneficial (significant)** in relation to the Site area and the local road network.
- 7.9.5 The residual effect on Air Quality remains **negligible (not significant)** in the Site and surrounding area.
- 7.9.6 Residual Noise and Vibration impacts on all identified receptors are expected to remain **negligible (not significant)** at the Site level and location of nearest sensitive receptors.
- 7.9.7 The anticipated increase in road traffic associated with the development is predicted to result in a **negligible impact (not significant)** on noise levels across the surrounding road network.
- 7.9.8 Provided that the recommended noise limits are adhered to, the impact of mechanical plant operations on nearby noise-sensitive receptors is expected to range from **minor adverse to negligible (not significant)** at the Site level and location of nearest sensitive receptors.

7.10 Cumulative Effects

- 7.10.1 Consideration has been given to the committed developments described within **Chapter 5 Assessment Method**, for the potential to have likely significant cumulative effects on socio-economic receptors when combined with the Proposed Development. Only one committed development has been identified – Land at Cooters End Lane and Ambrose Lane, Harpenden (Ref: 5/2023/0327).

Construction Phase

Cumulative Effects on Employment

- 7.10.2 Construction of the committed development will generate employment across all construction disciplines from ground workers to construction management. However, construction workers are transient and will move from one construction job to another and therefore it is not anticipated that the cumulative development will create any new construction employment, rather safeguard the existing construction jobs in the SADC area.
- 7.10.3 If construction phases of the committed development do not overlap with the Proposed Development, there is the potential for the same construction workforce to work on the Proposed Development and each of the committed developments, thereby providing the same level of effect as assessed for the Proposed Development. However, if the construction phases do overlap, there is the potential for a greater significance of effect to be realised, as a greater number of construction workers will be required simultaneously.
- 7.10.4 The reasonable worst-case scenario for cumulative assessment is therefore to assume the same level of effect as assessed for the Proposed Development – a temporary, **major beneficial** cumulative effect on construction employment in the SADC area, which is considered **significant**.



Cumulative Effect on Transport and Active Travel

- 7.10.5 The construction impact of the wider allocation would be as per that identified for the Proposed Development.

Operational Phase

Cumulative Effects on the Housing Market

- 7.10.6 The committed development will deliver up to 550 new homes, including 130 retirement homes. The Proposed Development is delivering up to 500 new homes, a 60-bed extra care facility and a children's home. Cumulatively, the Proposed Development and committed development will deliver 920 new homes, 130 retirement homes, a 60-bed extra care facility and children's home.
- 7.10.7 The sensitivity of the housing market in the SADC has been identified as **medium**. The magnitude of change is considered to be **major** in the context of the Proposed Development and committed development combined, contributing a significant number of homes towards the SADC's housing requirement as set out in Draft Local Plan (SADC, 2024).
- 7.10.8 On this basis, there is likely to be a permanent, **major beneficial** cumulative effect on the housing market in the SADC area during the operational phase, which is considered **significant**.

Cumulative Effects on Household Expenditure

- 7.10.9 Applying the average household expenditure figures for the SADC area presented in **Table 7.10**, it is calculated that the 920 new households created by the committed development and Proposed Development, could cumulatively generate additional household expenditure of £30.4m per annum. Further expenditure will be created by the population of the retirement homes and extra care facility.
- 7.10.10 The sensitivity of household expenditure in the SADC area has been identified as **low**. The magnitude of change is considered to be **low** in the context of the Proposed Development and committed developments combined, increasing household expenditure in the SADC area 1.6%.
- 7.10.11 On this basis, there is likely to be a permanent, **negligible** beneficial cumulative effect on household expenditure in the SADC area during the operational phase, which is considered **not significant**.

Cumulative Effects on Education

- 7.10.12 Demand for early years, primary and secondary school places will be created by the committed development's up to 420 new homes. No education demand will arise from the 130 retirement homes.
- 7.10.13 HCC's pupil yield rates (refer to **Table 7.24**) have been applied to the committed development's up to 420 new homes. **Table 7.28** presents the resulting pupil yield alongside the yield from the Proposed Development.

Table 7.28: Cumulative Pupil Yield

Education Phase	Pupil Yield Rate per 100 dwellings	Pupil Yield from the Committed Development	Pupil Yield from the Proposed Development	Cumulative Pupil Yield
Early Years	25.9	109	130	239
Primary	21.5	90	108	198



Education Phase	Pupil Yield Rate per 100 dwellings	Pupil Yield from the Committed Development	Pupil Yield from the Proposed Development	Cumulative Pupil Yield
Secondary (11 to 15 years)	9.8	41	49	90
Post-16	3.1	13	16	29

Cumulative Effect on Early Years Education

7.10.14 Combined the Proposed Development and committed development will create demand for 239 early years places.

7.10.15 The sensitivity of early years education in the LSA has been identified as **low**, noting the number of existing registered, non-domestic childcare and early years' providers in the LSA. Furthermore, both the Proposed Development and committed development incorporate the delivery of new early years provision. On this basis, the cumulative magnitude of change is considered to be **negligible**.

7.10.16 The cumulative effect on early years education in the LSA during the operational phase is therefore considered to be **negligible**, which is **not significant**.

Cumulative Effect on Primary Education

7.10.17 Combined the Proposed Development and committed development will create demand for 198 primary school places.

7.10.18 The sensitivity of primary education in the Harpenden Primary Planning Area has been identified as **low**, noting that there are currently unfilled primary school places which are forecast to increase in the coming years. Furthermore, the Proposed Development incorporates land for the delivery of an additional 2FE primary. The existing and new primary school provision will be able to accommodate the cumulative demand for primary school places and therefore the cumulative magnitude of change is considered to be **negligible**.

7.10.19 On this basis, there is likely to be a **negligible cumulative effect** on primary education in the Harpenden Primary Planning Area during the operational phase, which is **not significant**.

Cumulative Effect on Secondary Education

7.10.20 Combined the Proposed Development and committed development will create demand for 90 secondary school places (Years 7 to 11) and 29 post-16 places.

7.10.21 The sensitivity of secondary education in the Harpenden Secondary Planning Area has been identified as **medium**, noting that despite unfilled places currently, additional secondary school places will be required in the Planning Area in future years.

7.10.22 The cumulative demand 119 additional secondary and post-16 places represents 2.3% of the current number of secondary school places (Years 7 to 13) in the Harpenden Secondary Planning Area and therefore the cumulative magnitude of change is considered **low**.

7.10.23 On this basis, there is likely to be a **minor adverse cumulative effect** on secondary education in the Harpenden Secondary Planning Area during the operational phase, which is **not significant**.

Cumulative Effect on GP Provision

7.10.24 Applying the average household size for the SADC area of 2.49 persons per household, to the committed development's up to 550 homes, it is estimated that the homes will support a resident population of approximately 1,370 people. The Proposed Development is estimated



to have a resident population of 1,308 people. Collectively therefore, the Proposed Development and committed development combined will have a total resident population of 2,678 people, all of whom are assumed will need to register with a local GP.

7.10.25 The sensitivity of GP provision in the LSA has been identified as **medium**, as there is currently capacity in the GP provision totalling 2,625 places when assessed against the HUDU GP to patient ratio.

7.10.26 Whilst the number of GP places available in the LSA is not sufficient to accommodate the cumulative demand, the shortfall is minor (equivalent to 53 places) which represents 0.1% of the total number of registered patients in the LSA currently. The cumulative magnitude of change is therefore **low**.

7.10.27 On this basis, there is likely to be a **minor adverse cumulative** effect on GP provision in the LSA during the operational phase, which is **not significant**.

7.10.28 A worst-case scenario is assumed in which all residents from cumulative developments will require new registrations with local GP practices. It is further acknowledged that any resulting registration patterns and potential capacity pressures on specific GP practices will need to be discussed with the LPA and NHS ICB following submission.

7.10.29 The Proposed Development's neighbourhood centre has the potential to incorporate a new medical facility should the ICB deem a new facility is required locally.

Cumulative Effect on Employment

7.10.30 Employment will be supported by the committed development's early years provision, although the number of jobs supported will not be extensive. The Proposed Development will support approximately 63 jobs.

7.10.31 The sensitivity of employment in the SADC area was identified as **low** and the cumulative magnitude of change is considered to be **negligible** (the same as was assessed for the Proposed Development).

7.10.32 On this basis, there is likely to be a **negligible cumulative effect** on employment in the SADC area during the operation phase, which is **not significant**.

Cumulative Effect on Open / Play Space

7.10.33 The committed development is delivering public open space, incorporating allotments and recreational space. The Proposed Development is also delivering 12.1 hectares of open space across a range of types, in excess of the policy requirement. The cumulative magnitude of change is therefore considered to be **high**. The sensitivity of open / play space in the local area to the Site has been identified as **medium**.

7.10.34 On this basis, there is likely to be a **major beneficial cumulative effect** on open / play space in the local area during the operational phase, which is **significant**.

Cumulative Effect on Transport and Active Travel

7.10.35 The assessment in **Chapter 10 Transport and Access** considers cumulative effects by comparing the 2036 Reference Case with the 2036 Reference + Full Allocation scenario, which includes the wider Site allocation. Construction impacts are expected to be consistent with those already identified for the Proposed Development. Operationally, most road links experience less than a 10% increase in traffic, with the exception of Lower Luton Road, Westfield Road, and Station Road.

7.10.36 Station Road (south of Lower Luton Road) shows an 11% increase in AADT, just above the threshold for further consideration. This is attributed to its role as a key route to Harpenden and St Albans. Despite the increase, Station Road is considered a low sensitivity receptor,



and the magnitude of change is negligible. Junction modelling confirms that the Lower Luton Road/Station Road junction will remain within capacity, and no significant adverse impacts or mitigation measures are required. Impacts on Harpenden town centre remain minimal and do not warrant further assessment. Full modelling results are presented in the Transport Assessment (SLR Consulting, 2025).

Air Quality

- 7.10.37 Cumulative effects are defined as those that occur as a result of combined baseline and future activities that may impact in combination over time. The assessment has considered the planning application (Ref: 5/2023/0327). This committed development has been considered in the assessment, and the cumulative impacts during the construction and/or operational phase are considered **not significant**.

Consideration Against the Wider Allocated Site

- 7.10.38 The Site forms part of a wider allocation in the Draft SADC Local Plan (Site Allocation B2).
- 7.10.39 From a population and human health perspective, we note that the Proposed Development's delivery of social infrastructure including a 2FE primary school, extra care facility, neighbourhood centre with the potential to incorporate a new medical facility and / or commercial opportunities, and open / play / recreation space, all serve to benefit and meet the needs of the wider allocation.
- 7.10.40 The Proposed Development therefore does not compromise the future development (or formal assessment) of the remaining areas of land in the wider allocation.

7.11 Monitoring

- 7.11.1 No significant residual adverse population and human health effects have been identified and therefore no monitoring is required.

7.12 Consideration of Climate Change

- 7.12.1 Human health receptors relevant to the Proposed Development include both existing residents within the Local Study Area (LSA) and future occupants of the development. These receptors are considered to have a high sensitivity to climate-related impacts.
- 7.12.2 Over the operational lifetime of the Proposed Development, it is anticipated that the site will be subject to several climatic changes. These include increases in average and maximum annual temperatures—particularly during summer months—alongside warmer winters, increased winter rainfall, and reduced summer rainfall. These changes are expected to give rise to climate hazards such as heatwaves, droughts, heavy rainfall and flooding, and long-term shifts in climate norms.
- 7.12.3 During the construction phase, climate hazards may pose risks to worker safety and disrupt construction activities. For example, heatwaves or periods of intense rainfall could delay works or damage equipment. However, these risks are expected to be effectively managed through standard health and safety procedures and the Construction Environmental Management Plan (CEMP). Consequently, the effect of climate change during construction is considered negligible and not significant.
- 7.12.4 In the operational phase, rising temperatures may increase the risk of overheating in homes and public spaces, potentially leading to heat stress, particularly among elderly and vulnerable residents. The Proposed Development incorporates open spaces to support evaporative cooling and will comply with Part O of the Building Regulations, which addresses overheating in residential buildings. These measures are expected to maintain thermal comfort during extreme heat events.



- 7.12.5 Surface water flooding presents another risk, with potential to disrupt access, damage buildings, and contribute to mental health issues and respiratory conditions. The Surface Water Drainage Strategy is designed to accommodate up to the 1-in-100-year flood event plus a 40% climate change allowance, thereby mitigating these risks.
- 7.12.6 Periods of low rainfall and drought may affect public water supply. Each new dwelling will be designed to limit water usage to 110 litres per person per day, in line with national standards. Water companies also have statutory obligations to maintain supply during drought conditions through Water Resources Management Plans (WRMPs).
- 7.12.7 Infrastructure such as roads and underground utilities may be affected by extremes in temperature and soil moisture deficits. These risks will be addressed during the detailed design phase, using nationally accepted standards and guidance. Similarly, ecological features and landscaping may be impacted by changing climate norms, heatwaves, and droughts. A Landscape and Ecological Management Plan (LEMP) will be prepared and secured via planning condition. This plan will incorporate climate-resilient planting schemes and maintenance strategies, informed by guidance from Natural England, the RSPB, and the British Ecological Society.
- 7.12.8 Residual effects on human health are considered minor adverse and not significant, with further mitigation dependent on external factors such as healthcare system resilience. For ecological receptors, moderate adverse effects are anticipated due to droughts and heatwaves, but these will be reduced to minor adverse and not significant through implementation of the LEMP and climate-adaptive planting regimes. Overall, the Proposed Development is considered to be resilient to climate change impacts, even under a worst-case emissions scenario. Taking into account the embedded and further mitigation measures, the magnitude of change is judged to be negligible. Given the high sensitivity of receptors, the resulting long-term effect is minor adverse and not significant.

7.13 Conclusions

- 7.13.1 The population and human health assessment considers the impact of the Proposed Development on the local community in the context of the Site, the area immediately surrounding the Site (the Local Study Area) and the wider SADC area during both the construction phase and once the Proposed Development is complete and occupied. In particular, the assessment considers the impact of the Proposed Development on the housing market, household expenditure, education (early years, primary and secondary), GP provision, employment, open / play space, transport and active travel, air quality, noise and vibration and climate change.
- 7.13.2 The age profile of the population living in the SADC area is younger compared to the regional and national averages, with a smaller proportion of residents aged 65 and over and a higher proportion of working age residents.
- 7.13.3 There are 32 registered, non-domestic early years and childcare providers, 13 primary schools and four secondary schools within proximity of the Site. The primary schools are operating with unfilled places in both the existing and future baseline. However, whilst there is existing capacity in the secondary schools, additional secondary school places have been identified as being required in future years.
- 7.13.4 There are three GP facilities in the LSA, which are collectively operating with indicative available capacity.
- 7.13.5 There are 21 areas of open / play space within 1km of the Site, comprising play space, nature reserves, parks, playing fields, outdoor sports facilities and allotments.
- 7.13.6 Employment rates in the SADC area are higher than the regional and national averages and unemployment rates are lower.



- 7.13.7 The health and environmental baseline for the Local Study Area (LSA) and wider St Albans District presents a generally positive picture. Active travel levels are high, with 47.3% of residents engaging in walking or cycling within a 28-day period—above regional and national averages. Walking is more common than cycling and is primarily undertaken for leisure. Accident analysis indicates no significant highway safety issues in the surrounding road network.
- 7.13.8 Air quality is generally good, with only one AQMA in the district, located away from the proposed development Site. Noise monitoring shows the Site is characterised by a quiet acoustic environment, with ambient sound levels within acceptable thresholds for both day and night.
- 7.13.9 The health profile of the population performs well compared to regional and national comparators. Life expectancy exceeds national averages, and self-rated health is high, with fewer residents reporting poor health or disability compared to regional and national figures. Rates of physical health conditions such as hip fractures and premature mortality are lower than average, and mental health and behavioural indicators, including physical activity, obesity, smoking, and alcohol-related admissions, are all more favourable than national benchmarks.
- 7.13.10 Finally, the deprivation profile shows that the LSA is significantly less deprived than the national average, with low levels of income deprivation, child poverty, overcrowding, and preventable deaths. The two LSOAs covering the Site fall within the 50% and 10% least deprived areas in England, respectively.

Construction Effects

- 7.13.11 It is anticipated that the Proposed Development will take approximately 8-years to complete and will support an average of 129 direct jobs during the construction phase, representing 3.2% of construction employment in the SADC area currently. 46 of the direct jobs supported during the construction phase are anticipated to provide employment for residents of the SADC area, along with a further 19 indirect jobs in the supply chain. The construction phase will provide a **temporary, major beneficial (significant)** effect on employment in the SADC area over the construction period.

Operation Effects

- 7.13.12 Once the Proposed Development is complete and operational, the up to 500 new homes and one children's home will accommodate in the region of 1,248 residents. A further 60 people are anticipated to be residing in the Proposed Development's extra care facility. In total therefore, the Proposed Development is anticipated to have a resident population of 1,308 people. The increase in population will impact upon the availability of education, healthcare and open / play space, within the local area surrounding the Site.
- 7.13.13 It is assumed that all 1,308 residents will need to register with a local GP. Sufficient capacity has been identified within the existing GP provision in the LSA to accommodate the demand created, thereby a **minor adverse effect** on existing GP provision is identified. Nonetheless, the Proposed Development's neighbourhood centre has the potential to incorporate a new medical facility should the ICB deem a new facility is required locally.
- 7.13.14 The Proposed Development incorporates the delivery of a new 2FE primary school incorporating co-located early years provision. A **negligible effect** on early years provision is anticipated and a **minor beneficial effect** on primary education, as a result of the Proposed Development's 2FE primary school providing more school places than required by the Proposed Development. A **minor adverse effect** on secondary education has been identified because there is not sufficient capacity in future years to accommodate the demand for secondary school places created. Nonetheless, the adverse effect is **not significant**.
- 7.13.15 The up to 500 new homes will deliver 68% of wider strategic allocation for North East Harpenden and will provide homes across a range of tenures, types and sizes, along with



providing a 60-bed extra care facility and children's home. The Proposed Development will therefore have a **significant beneficial effect** on the housing market in the SADC area.

7.13.16 The new households created by the Proposed Development will provide an increase in consumer spending, as future residents will use shops and services to meet their day-to-day needs providing a **negligible (not significant)** effect to the SADC area.

7.13.17 The Proposed Development will provide 12.1 hectares of open space provision, plus sports pitch provision, which is considerably in excess of the policy requirement. As such, the Proposed Development will therefore provide a **major beneficial effect (significant)** on open / play space in the local area to the Site.

7.13.18 Employment will be supported by the Proposed Development's delivery of a neighbourhood centre and 2FE primary school. It is anticipated that a minimum of 63 FTE jobs could be supported on-Site by such uses, with the total net additional employment effect to the SADC area estimated to be 23 jobs. As such, the Proposed Development will provide a **negligible effect (not significant)** on employment in the SADC area.

7.13.19 Modelled concentrations of NO₂, PM₁₀, and PM_{2.5} across the proposed development and at all identified human receptor locations are predicted to remain below relevant Air Quality Objectives (AQOs) in the operational year (2036). The development is expected to have a **negligible** impact on air quality at all receptor locations, in accordance with EPUK-IAQM guidance. While no specific measures are required to protect human health, it is recommended that best practice measures recommended by IAQM may be considered at the reserved matters stage to further reduce operational emissions.

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8 Landscape and Visual Impact

8.1 Introduction

- 8.1.1 This chapter of the ES has been prepared by Bradley Murphy Design (BMD) and identifies and describes the nature and significance of the effects likely to arise as a result of the Proposed Development on the existing landscape (including physical landscape resources) and the visual amenity of people, identified through a Landscape and Visual Impact Assessment (LVIA).
- 8.1.2 This Landscape and Visual Impact Assessment (LVIA) chapter was carried out by Joanne John CMLI and reviewed by Richard Waddell CMLI, both chartered landscape architects from Bradley Murphy Design.
- 8.1.3 The LVIA ES chapter is supported by the following appendices, which are referenced as required throughout this chapter:
- Appendix 8.1: Glossary of Terms
 - Appendix 8.2: LVIA Methodology
 - Appendix 8.3: Planning Policy and Guidance
 - Appendix 8.4: Supporting Figures
 - Appendix 8.5: Viewpoint Photographs - Winter
 - Appendix 8.6: Viewpoint Photographs – Summer
 - Appendix 8.7: AVR Viewpoint Photographs
 - Appendix 8.8: Schedule of Likely Landscape Effects
 - Appendix 8.9: Schedule of Likely Visual Effects
 - Appendix 8.10: LVIA Discounted Viewpoints
 - Appendix 8.11: LVIA Landscape Framework Plan
- 8.1.4 The landscape and visual effects have been considered in relation to the proposed land uses and the parameters that are defined by the submitted Parameter Plans (refer to **Chapter 3 The Proposed Development** of the ES and the parameter plans at **Appendix 1.2**) and the Illustrative Masterplan and Landscape Strategy plan (refer to Design and Access Statement which has been submitted as a separate document as part of the planning application). The description of the Proposed Development is set out in **Chapter 3: The Proposed Development**.
- 8.1.5 The chapter provides a description of the methods used in the assessment, followed by a description of the relevant baseline conditions of the Site and surrounding area. An assessment is then presented of the likely effects of the Proposed Development during demolition / construction works and once the Proposed Development is completed and operational. Mitigation measures are identified, where appropriate, to avoid, reduce, or offset any adverse effects, together with an assessment of the significance of any likely residual effects.
- 8.1.6 To aid the reader, a glossary of terms is provided at **Appendix 8.1**, a detailed LVIA methodology is provided at **Appendix 8.2** and a detailed review of planning policy of



relevance to the consideration of landscape and visual value and suitable mitigation is provided in **Appendix 8.3**.

8.2 Policy Context, Legislation, Guidance and Standards

- 8.2.1 The overarching planning policy framework applicable to this EIA for the Proposed Development is outlined in **Chapter 6 – Planning and Policy Context**. This section considers planning policy and guidance relevant to this landscape and visual assessment. A detailed review of all planning policy has been undertaken and those of greatest relevance to the Site, the Proposed Development and the LVIA are included at **Appendix 8.3** and illustrated on **Figure 8.6** at **Appendix 8.4**.

National Planning Policy

National Planning Policy Framework 2025

- 8.2.2 The National Planning Policy Framework (NPPF) (updated February 2025) sets out the Government's planning policies for England and provides a framework within which the appropriate local council can produce local and neighbourhood plans - the NPPF is material consideration in making planning decisions.
- 8.2.3 The NPPF sets out three dimensions to achieve sustainable development that are economic, social and environmental considerations. High quality design and local character are repeating themes through the core planning principles. The NPPF also notes the importance that design 'evolves' in response to local issues and to the view of local communities and also sets out principles in relation to conservation and enhancement of the natural environment. The following paragraphs of the NPPF are relevant to the assessment of the LVIA, a detailed description is provided in **Appendix 8.3**:
- Chapter 2 Achieving sustainable development - paragraph 7
 - Chapter 3 Plan-making Strategic policies - paragraph 20
 - Chapter 8 Promoting healthy and safe communities - paragraph 96
 - Chapter 11 Making Effective Use of Land - paragraph 124
 - Chapter 12 Achieving well-designed and beautiful places - paragraph 131, 135 and 137
 - Chapter 14 Meeting the challenge of climate change, flooding and coastal change – paragraph 164
 - Chapter 15 Conserving and enhancing the natural environment – paragraph 187, 188 and 198
 - Chapter 16 Conserving and enhancing the historic environment – paragraph 203 and 210

Local Planning Policy

The District Local Plan Review 1994 Saved and Deleted Policies Version (SACDC, 2020)

- 8.2.4 The Site is located within St Albans City and District Council (SACDC). The current Local Plan for the area is The District Local Plan Review 1994 Saved and Deleted Policies Version (SACDC, 2020). The following planning policies are relevant to the assessment of the LVIA, a description is provided in **Appendix 8.3**:
- Policy 1 Metropolitan Green Belt
 - Policy 69 General Design and Layout



- Policy 70 Design and Layout of New Housing
- Policy 74 Landscaping and Tree Preservation
- Policy 75 Green Space within Settlement
- Policy 104 Landscape Conservation

Harpenden Neighbourhood Plan 2018-2033 (2019)

8.2.5 Harpenden Neighbourhood Plan forms part of the Development Plan for SACDC. The following policies are of relevance to the Site and Proposed Development, a description is provided in **Appendix 8.3:**

- Policy ESD1 Design Strategy
- Policy ESD2 Local Character and Heritage
- Policy ESD8 Green and Open Space and Areas of Ecological and Landscape Value
- Policy ESD9 Key Views
- Policy ESD10 Views in New Developments
- Policy ESD11 Access to the Natural Environment
- Policy ESD13 Biodiversity
- Policy ESD14 Trees and Hedges

Wheathampstead Neighbourhood Plan 2020 - 2025 (2023)

8.2.6 Wheathampstead Neighbourhood Plan forms part of the Development Plan for SACDC. The northeastern part of the Site is located with the Wheathampstead Neighbourhood Plan boundary. The following policies are of relevance to the Site and Proposed Development, a description is provided in **Appendix 8.3:**

- Policy W3: Minimising the Environmental Impact of Development
- Policy W7: Locally Significant Views

Emerging Local Planning Policies

Draft Local Plan 2041 Regulation 19 Publication (SACDC September 2024)

8.2.7 St Albans City & District Council (SACDC) is currently in the process of producing the new Local Plan. The latest version is the Draft Local Plan Regulation 19 Publication, published in September 2024.

8.2.8 The Site is part of a wider allocation in the emerging Local Plan, designated a Broad Location (Policy LG1), referred to as North East Harpenden, for a sustainable extension of around 732 homes, mixed use, 2 FE primary school site, green infrastructure, transport infrastructure, a childcare facility and other community infrastructure.

8.2.9 The following policies are of relevance to the Site and Proposed Development, a description is provided in **Appendix 8.3:**

- Policy LG1 – Broad Locations



- Policy LG5 – Green Belt
- Strategic Policy SP10 - Natural Environment, Biodiversity and Green and Blue Infrastructure
- Policy NEB1 - Woodland, Trees and Landscape Features
- Policy NEB 10 - Landscape and Design

Supplementary Planning Documents (SPD)

Design and Layout of New Housing: Design Leaflet No.1

- 8.2.10 This Supplementary Planning Guidance set outs additional information to support Saved Policy 70 within the adopted SACDC Local Plan 1994. It provides guidance regarding the design and layout of residential areas to promote the high design standards that respect the setting and character of its surroundings. Section (v) covers the advice on landscape, a description is provided in **Appendix 8.3**.

Any other relevant policy, legislation or guidance

St Albans District Green Infrastructure Plan (2011)

- 8.2.11 The Site straddles a Woodland Enhancement Zone and Chalk Valleys Conservation Zone, along with the southwest boundary adjoining the River Valleys Project. The Woodland Enhancement Zone focuses on creating small scale woodland to link woodland habitat and restoration, rather than mass woodland planting. The Chalk Valleys Conservation Zone conserves key green infrastructure assets as part of the movement, habitat and physical landscape network.

Natural England's Green Infrastructure Framework (2023)

- 8.2.12 Natural England, the Government's adviser for the natural environment, released in January 2023 the final version of its Green Infrastructure Framework, which serves to support the Government's 25 Year Environment Plan.
- 8.2.13 The Green Infrastructure Framework is a voluntary framework that supports the NPPF, which stipulates that the planning system should contribute to and enhance the natural and local environment by minimising the impact on biodiversity and providing net gains in biodiversity where possible.
- 8.2.14 The Green Infrastructure Framework will complement mandatory mechanisms such as Biodiversity Net Gain (BNG) and Local Nature Recovery Strategies (LNRS), which form part of the requirements of the Environment Act (2021).

8.3 Consultation

- 8.3.1 An EIA Scoping Report was submitted to SACDC in September 2024, including an outline of the proposed scope, methodology and viewpoint locations for the LVIA. Comments were received on the 7th of November 2024, which are summarised in **Table 8.1** below, including how they have been dealt with in the LVIA chapter.



Table 8.1: Summary of Consultation

Consultation (Who and Date)	Summary of issues raised during consultation	How it has been dealt within this Chapter	Where it has been addressed within the chapter (if applicable)
Scoping Opinion Consultation Response from Hertfordshire County Council (HCC) Adam Rumble Landscape Officer 07.10.2024 Email from Hertfordshire County Council (HCC) Adam Rumble Landscape Officer 03.06.2025	Request for winter LVIA viewpoints	Winter LVIA viewpoints were completed in January 2025	Appendix 8.5: LVIA Viewpoint Photographs - Winter
	No objection to the LVIA viewpoint locations and receptors. Clarification to what height the ZTV (Zone of Theoretical Visibility) is assessed at. Bare Earth ZTV (worst case scenario that does not take into account any mitigation features other than Topography)	Viewer eye height set at 1.6m above landform. The winter baseline ZTV is the worst case scenario (that only takes account of existing settlements following landform) Existing Settlements are set at 9m high following landform and set as visually impermeable. Existing Woodland blocks are set at 12m high following landform and set as visually impermeable (for the summer ZTV, excluded for the winter ZTV).	The process used to determine the ZTV and visual envelope for the Proposed Development is described in the LVIA Methodology at Appendix 8.2. (Section 8.3 Scope of Assessment) Appendix 8.4: Supporting Figures (Figures 8.2 and 8.3)
	The full LVIA should also build upon and have influence on the Building Heights for the site, optioneering should highlight the best location for the taller built form. A clear narrative should be included that shows how the Visual Assessment has influenced the layout.	The visual amenity in Section 8.5 Baseline Conditions identifies those visual receptors that currently share intervisibility with the Site and are of the greatest visual sensitivity to the type of development proposed. Section 8.6 – Primary and Tertiary Mitigation provides a narrative to how the Visual Assessment has influenced the layout.	Appendix 8.7: AVR Viewpoint Photographs – have been used to test building height parameters. The Landscape Section of the Design and Access Statement provides an approach and narrative in terms of the landscape and visual design considerations and how they have informed the Proposed Development.
	Request for Accurate Visual Representation (AVR) wirelines (Level 1) for a selected number of viewpoints (3C, 7, 8 & 9)	AVR Wirelines were surveyed (June 2025) and modelled (July 2025) based on the Parameter Plans	Appendix 8.7: AVR Viewpoint Photographs



8.4 Methodology

Scope

- 8.4.1 The LVIA considers the potential landscape and visual effects as a result of the Proposed Development upon:
- Landscape character, including physical landscape resources; and
 - Views and visual amenity experienced by people.
- 8.4.2 To define the spatial scope of the assessment, Zones of Theoretical Visibility (ZTV) have been modelled digitally to identify those areas of the landscape that theoretically would be visually connected to the Proposed Development.
- 8.4.3 **Figures 8.2 and 8.3 at Appendix 8.4** illustrate potential areas of visibility, taking account of the effect that settlements and woodland blocks / belts would have on views toward the Proposed Development. The ZTVs (**Figures 8.2 and 8.3**) represent the maximum Proposed Built Form within the Site that would theoretically be visible, based on the maximum building heights identified on the **Parameters Plans at Appendix 1.2**.

Study Area

- 8.4.4 A study area of 2km from the Site boundary has been determined and agreed with SACDC through the EIA scoping process, to conduct baseline studies and assessment work. It is considered that any direct or indirect landscape or visual impacts arising as a result of the Proposed Development at a distance greater than this radius would be negligible at worst and therefore are not considered further as part of this assessment.

Baseline Data Collection

- 8.4.5 In order to capture a comprehensive description of the baseline position for landscape and visual receptors, information has been collated using desk study and field survey. The desk study identified potential sensitive / designated landscape resources by reference to national Geographic Information System (GIS) databases, OS maps, existing published landscape character studies, relevant planning policies / guidance and / or designated or protected views.
- 8.4.6 This stage has also enabled the identification of potential visual receptors such as Public Rights of Way (PRoW), residential properties on settlement edges or designated areas.
- 8.4.7 Sources of baseline data (planning policy documents already listed under policy context) referred to during this LVIA process are provided in **Appendix 8.2**.

Assessment Approach

- 8.4.8 The assessment was undertaken in accordance with the principles of good practice set out in the following published guidance, produced by the relevant professional organisations concerned with landscape and visual impact assessment:
- Guidelines for Landscape and Visual Impact Assessment, Third Edition (2013), (GLVIA3), Landscape Institute and the Institute of Environmental Management & Assessment;
 - GLVIA3 Statements of Clarification (2013 - 2015), Landscape Institute;
 - An Approach to Landscape Sensitivity Assessment (Natural England, 2019);
 - Natural England's 'An Approach to Landscape Character Assessment' (2014);



- Landscape Institute Technical Guidance Note 08/24: Notes and Clarifications on Aspects of Guidelines for Landscape and Visual Impact Assessment, Third edition (GLVIA3), (LI, 2024);
- Landscape Institute (2019), Technical Guidance Note 06/19, Visual Representation of Development Proposals; and
- Landscape Institute Technical Guidance Note 02/21: Assessing Landscape Value Outside National Designations (LI, 2021).

8.4.9 Full details of the LVIA methodology are included at **Appendix 8.2**. The approach used to identify and assess landscape and visual effects is summarised as follows:

- Determine the **scope** of the assessment;
- Collate baseline information for landscape and visual receptors, including completing desk study research, undertaking field survey work, identifying appropriate receptors and establishing their **value**;
- Review the type of development proposed and determine the **susceptibility** of the landscape and visual receptors to the type of change proposed;
- Combine value with susceptibility to determine the **sensitivity** of landscape and visual receptors to the nature of the development proposed;
- Describe the nature and magnitude of change (**impact**) likely to be experienced by landscape and visual receptors as a result of the Proposed Development;
- Judge the combination of sensitivity and impact to assess the scale of **effects** for landscape and visual receptors without mitigation measures;
- Describe any measures (**mitigation**) to avoid or reduce the magnitude of any adverse impact;
- Assess the **significance of effects** for landscape and visual receptors in relation to the Proposed Development, through a clear description of judgements on sensitivity and magnitude of impact; and
- Identify those effects that are considered significant and therefore relevant to decision making.

Significance Criteria

8.4.10 Following the LVIA methodology summarised above, the following steps are applied to derive the significance of any landscape or visual effects.

Sensitivity

8.4.11 The sensitivity of a landscape resource or visual receptor is derived by determining its value (defined by qualities including whether it is a protected landscape or view, its level of tranquillity, cultural associations, condition etc.) and combining this with its susceptibility to the nature of development proposed (ability of the landscape or view to accommodate the change proposed). **Tables 1.1** and **1.2** at **Appendix 8.2** define the criteria for determining the value of landscape and visual receptors, whilst **Tables 1.3** and **1.6** define the criteria for determining the susceptibility of landscape and visual receptors. **Table 8.2** below defines how these criteria are combined to derive the sensitivity of landscape or visual receptors.



Table 8.2: Matrix for determining sensitivity of landscape and visual receptors

Susceptibility	Value				
	Very Low	Low	Medium	High	Very High
Very Low	Negligible	Low	Low	Medium	Medium
Low	Low	Low	Medium	Medium	High
Medium	Medium	Medium	Medium	High	High
High	Medium	Medium	High	High	Very High
Very High	High	High	High	Very High	Very High

Magnitude of Impact

8.4.12 The magnitude of impact for landscape or visual change is influenced by a number of factors, including the extent to which landscape features are lost and / or altered, the introduction of new features into the landscape and the resulting change in the physical and / or perceptual characteristics of the landscape or view. It is determined by, but not limited to:

- the size and scale of the impact;
- the extent of the geographical area over which the change is likely to be felt;
- the duration of the impact and its potential reversibility; and
- the proximity of the receptor to the change and the nature of the effect.

8.4.13 **Tables 1.5 and 1.8 at Appendix 8.2** define the criteria for determining the magnitude of impact on landscape and visual receptors. As an example, **Table 8.3** below provides the criteria for determining the magnitude of impact for landscape change.

Table 8.3: Criteria for determining magnitude of impact for landscape change

Magnitude	Criteria
Very Large	The size and scale of change is considered to be very high due to the total loss of or alteration to existing landscape character or highly distinctive / important features and elements, and / or the addition of uncharacteristic conspicuous features and elements, resulting in a complete change to key aesthetic or perceptual qualities. The geographical extent of change would influence the landscape at a national level. Impacts would be considered long term and would either be irreversible or very difficult to reverse in practical terms.
Large	The size and scale of change is considered to be high due to the notable loss of or alteration to existing landscape character or distinctive / important features and elements, and / or the addition of uncharacteristic noticeable features and elements, degrading the integrity of key aesthetic or perceptual qualities. The geographical extent of change would influence the landscape at a regional level. Impacts would be considered long term and would either be irreversible or very difficult to reverse in practical terms.
Medium	The size and scale of change is considered to be medium due to the partial loss of or alteration to existing landscape character or features and elements, and / or the addition of uncharacteristic features and elements, resulting in key aesthetic or perceptual qualities out of scale or at odds with the local pattern and landform. The geographical extent of change would influence the landscape at a local level.



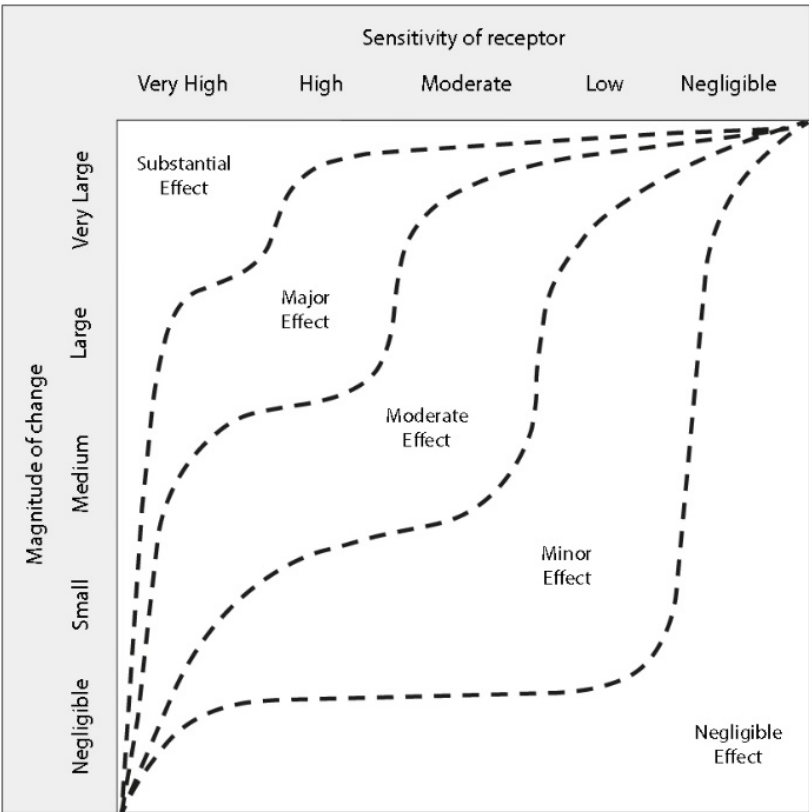
Magnitude	Criteria
	Impacts would be considered medium term and / or potentially reversible, although it may not be practical to do so.
Small	The size and scale of change is considered to be low due to minor loss or alteration of existing landscape features and elements, resulting in a discernible negative effect to key aesthetic or perceptual qualities. The geographical extent of change would influence the immediate setting of the proposed development. Impacts would be considered short term and / or potentially reversible and in practical terms would easily be achievable.
Negligible	The size and scale of change to existing landscape features and elements is considered to be barely discernible. The geographical extent of change would influence the site only. Impacts would be considered short term / temporary and / or easily reversible and in practical terms would very easily be achievable.

Significance Evaluation

- 8.4.14 The final conclusion for both landscape and visual effects are based on a combination of sensitivity and magnitude of change (impact). The overall judgement on the nature and level of these effects, referred to as significance, is based on the sequential combination of each criteria, leading to a balanced justification as described by the criteria provided in the **Tables 1.10 and 1.11** at **Appendix 8.2**, with professional judgement applied to inform this determination. The matrix in **Table 8.4** below provides an indication of how significance is determined by this combination of sensitivity and magnitude but it is not applied without due consideration of the specific details of the Site and development under consideration.
- 8.4.15 Describing effects likely to arise as a result of the Proposed Development and determining their significance requires the application of professional judgement to weigh the findings of the sensitivity of receptors against the predicted magnitude of change (impact), which can be beneficial, adverse or neutral.
- 8.4.16 For the purpose of this assessment, effects are described in relation to their relevance to decision making and have been defined as follows.
- **Substantial** – Considerable effect (by extent, duration or magnitude of impact) of more than local importance or in breach of recognised acceptability, legislation, policy and / or standards. Considered to be very important and material to decision making and significant in EIA terms.
 - **Major** – Obvious effect (by extent, duration or magnitude of impact) considered to be important and material to the decision making process and significant in EIA terms.
 - **Moderate** – Potential to be material to decision making and potentially significant in EIA terms.
 - **Minor** – Slight, very short or highly localised effect, not important for decision making and not considered significant in EIA terms.
 - **Negligible or Neutral** – No important effect, not relevant to decision making and not considered significant in EIA terms.



Table 8.4: Matrix for determining significance of effect



8.4.17 As described in the LVIA methodology, Major and Substantial effects are considered to be material to decision making and considered significant in EIA terms, with Moderate effects having potential to be material to decision making and considered potentially significant in EIA terms. Minor, Negligible and Neutral effects are considered not significant in EIA terms.

Limitations

8.4.18 Landscape results from the interplay between the natural, physical and cultural components of the environment and as such the assessment of landscape and visual effects is a process closely linked with other topics, notably ecology and the historic environment. The LVIA considers the contribution heritage and ecological features make to the character and value of the landscape and visual receptors, along with an assessment of the likely effect of the Proposed Development on the landscape character and views associated with heritage features. The LVIA has been carried out in landscape and visual terms only, as an assessment of effects on heritage assets and their wider cultural setting (e.g. impacts on cultural and historic associations) are considered to be beyond the remit of this LVIA. The LVIA does not assess direct or any other indirect effects on heritage or ecological resources, which have been assessed within **Chapter 9: Ecology** and a stand alone **Heritage Statement**, supporting the Outline Planning Application.

8.4.19 The LVIA is based on views from publicly accessible locations. Where an impact on residential and other private views (e.g. commercial properties) is noted this has, necessarily, been estimated. The viewpoints identified in the LVIA are illustrative of the worst-case potential impact from a representative range of receptors including residences, rights of way, public open spaces, private open space, commercial operations, the road and rail network. This LVIA does not necessarily identify all locations from where the Proposed Development would potentially be visible.

8.4.20 In the absence of a detailed design and layout the effects of lighting cannot be accurately determined, however, an assessment is provided on: the likely effects of temporary lighting



resulting from construction; the change to the baseline sky glow; and, the change to the landscape and views as a result of the introduction of lighting as part of the Proposed Development.

- 8.4.21 The construction work for the Proposed Development is anticipated to commence in 2028, with the initial infrastructure works followed by commencement of residential build later that year, over an 8 year period (2028-2036). However, for assessment purposes, to avoid over-complication in interpretation of the LVIA, it is assumed that all construction work would commence and be completed at the same time. As a result, the post-completion (Year 0) and post mitigation establishment (Year 15) stages are assumed as being achieved concurrently around the Site.

8.5 Baseline Conditions

The Site and Context

- 8.5.1 As illustrated on **Figure 8.1 Site Location and Study Area** at **Appendix 8.4**, the Site is located immediately northeast of the settlement of Harpenden and comprises pasture fields with hedgerows and woodlands. To the northwest, it is bordered by the B652 Bower Heath Lane; to the west by the B653 Lower Luton Road; and to the south by residential properties and gardens along Nokeshot, Saxon Close, Dane Close, and Turner Close in Batford. Common Lane forms the eastern boundary, while a central unnamed track bisects the northern and southern sections of the Site, connecting Bower Heath Lane in the west with Common Lane in the east.
- 8.5.2 The Site comprises four land parcels, characterised by topography and land use, referred to as follows (as illustrated at **Appendix 8.4** on **Figure 8.1: Site Location and Study Area**):
- Site Parcel A: Land associated with Greenacres Equestrian Centre stables & outbuildings;
 - Site Parcel B: Land between Bower Heath Lane and Batford on Lea valley slopes;
 - Site Parcel C: Land west of Common Lane on Blackmore End Plateau; and
 - Site Parcel D: Land west of Common Lane & north of Whitings Close.
- 8.5.3 Due to the scale of the Site (approximately 32.9370 hectares) and distribution of parcels, as noted above, these references are used through this LVIA chapter to refer to specific areas.

Physical Landscape Resource

Land Use

- 8.5.4 The majority of the Site (c. 90%) consists of several medium sized pastoral fields primarily used for grazing, as part of Greenacres Equestrian Centre. These fields are partly enclosed or divided by mature hedgerow with trees, while others are separated by traditional agricultural fencing. The remainder of the Site, located on the western edge, adjacent to B653 Lower Luton Road and B652 Bower Heath Lane, contains a collection of agricultural buildings, stables, menage, small paddocks and a few residential properties, all associated with Greenacres Equestrian Centre.

Topography and Landform

- 8.5.5 The Site's topography and landform, as illustrated at **Appendix 8.4** on **Figure 8.4** is influenced and characterised by valley slopes and plateau landform associated with the Lea Valley. The Site's landform slopes from approximately +131m Above Ordnance Datum (AOD) at its northeastern point, descending to around +118m AOD along the southern boundary and approximately +89m AOD near the western boundary along B653 Lower Luton Road, close to Greenacres Equestrian Centre. The topography is a defining characteristic of the Site, with the



land gently rising from the Lea Valley in the northwest towards Blackmore End plateau in the northeast.

Existing Vegetation

- 8.5.6 The Site, for the majority, comprises horse-grazed grassland fields, with native hedgerows present along the majority of the Site's boundaries and a few internal field boundaries. Several individual trees are also present, mostly in the centre and west of the site.
- 8.5.7 Chapter 9: Ecology and supporting Appendix 9.1 (Figure 9.1 Habitats and Ecological Features Plan) establish the baseline quality and condition of the existing on-site habitats. The report highlights the majority of the Site is horse-grazed fields of low ecological value, with a few notable landscape features limited to hedgerows, trees and woodland - associated with field boundaries and Common Lane. Habitats identified on the Site from the Phase 1 habitat survey (as illustrated at Appendix 9.1 on Figure 9.1) include hedgerow, scattered trees, lowland mixed deciduous woodland, bramble scrub, neutral and modified grassland and tall ruderal.
- 8.5.8 **Chapter 9: Ecology** and supporting **Appendix 9.1** habitats and ecological features plan (Figure 9.1) identifies the following habitats and landscape features of local importance worth retaining associated with the Site:
- Small areas of Lowland Mixed Deciduous woodland located in the Site's western corner, close to the equestrian building complex (Site Parcel A); and
 - The boundary native hedgerows and trees, which are considered good condition and form continuous landscape features, however, the hedgerows internally within the Site mostly appear in shorter sections.
- 8.5.9 Beyond the boundaries of the Site, extensive areas of woodland provide strong structural landscape enclosure – particularly around Bower Heath to the north, alongside Common Lane and Sauncey Wood Lane to the east and flanking the River Lee to the west.
- 8.5.10 The Arboricultural Impact Assessment (AIA) (produced by Aspect) which supports the Outline Planning Application has recorded the presence of two mature English Oak trees (T18 and T37) and a parcel of woodland (W1) set offsite to the east of Common Lane, both afforded Category A, of high quality and value within BS5837:2012 guidance. Of slightly lesser importance, category B tree cover occurs throughout the Site. The remaining trees, groups and hedges are of low arboricultural quality and significance and typically represent unremarkable, less well established examples of their type, warranting category C.
- 8.5.11 There are no records of any ancient woodland, priority habitats, notable or veteran trees within the Site. There are two TPO's associated with the Site comprising:
- TPO No. 1766: A2 – a group Tree Preservation Order (TPO) on all deciduous and evergreen broadleaf species along the Site's northern boundary.
 - TPO No. 1950: on trees T5, T6 and T7 (ref: associated with TPO) along the Site's north eastern boundary alongside Common Lane in hedgerow H10 and T4 within hedgerow H9 in the north eastern part of the Site.

Environmental Designations

- 8.5.12 The environmental designations of relevance are summarised below and illustrated on **Figure 8.8: Environmental Designations** at **Appendix 8.4**.
- The nearest statutory designation is Batford Springs Local Nature Reserve (LNR), located approximately 0.5km to the south of the site. The LNR is designated on the basis of its springs, which serve chalk streams and ponds.



- Marshalls Heath LNR, located approximately 1.4km to the east of the site. The LNR is designated on the basis of its high biodiversity, with more than 1,300 species of plant and animal recorded in recent years, including over 40 species on national lists of threatened species.
- The nearest non-statutory designation is Holcroft's Springs Local Wildlife Site (LWS), which is separated from the site by Common Lane, which forms the north-eastern boundary of the site.
- The next nearest non-statutory designations are Sauncey Woodland LWS, located 0.2km to the east, and Bower Heath Common LWS and White Gables, Bower Heath Lane LWS, both located 0.2km to the north. These are designated for ancient woodland, common land supporting acid grassland and woodland, and buildings used by protected species respectively.

8.5.13 The Site lies in a strategic position within the Hertfordshire Green Infrastructure (GI) network, where future development provides the opportunity to contribute to the sub-regional strategic GI network. The St Albans District Green Infrastructure Plan (March 2011) identifies the Hertfordshire Green Infrastructure Plan for St Albans illustrating the proposed Green Infrastructure Network and the component action zones. The Site lies at the boundary and transition between the 'Chalk Valleys Conservation Zone' and 'Woodland Enhancement Zone' illustrated on **Figure 8.8: Environmental Designations at Appendix 8.4**.

- The north western parts of the Site, on the Upper Lea Valley (LCA 33) slopes, are located in the 'Chalk Valleys Conservation Zone'; where the priority is to conserve key GI assets as part of the movement, habitat and physical landscape network, also securing links to the river valley network and associated 'Wetland Habitat Zone' along the River Lee.
- The north eastern parts of the Site, on the Blackmore End Plateau (LCA 34), are located in the 'Woodland Enhancement Zone'; where the priority is linking woodland habitats and restoring landscapes/defining the network of valleys including regionally rare Wooded Chalk Valleys.

Heritage Designations

8.5.14 The heritage designations of relevance are summarised below and illustrated on **Figure 8.7: Heritage Designations at Appendix 8.4**. The LVIA considers the contribution of heritage assets on the character of the landscape and views but does not assess direct or any other indirect effects on heritage resources, which have been assessed within a stand alone Heritage Statement (produced by RPS) report which supports the Outline Planning Application.

- There are no statutory heritage designations covering any part of the Site.
- Conservation Areas - Mackeyre End Conservation Area is over 500m to the east of the Site and Harpenden Conservation Area is over 600m to the southwest. From testing within the field, there is no intervisibility between and Site and either of these Conservation Areas, due to the extent of intervening built form, topography and vegetation. It is considered that the nature of the Proposed Development on Site would not have any impact on these receptors, therefore they are not considered further.
- Listed Buildings - the nearest listed building is the Red Cow Public House (Grade II), located approximately 100 metres to the southwest of the Site. Due to the orientation of the building (facing away from the Site) combined with the extent of intervening built form, vegetation and landform, it is considered visual effects from this receptor would be negligible at most, therefore it is not considered further as part of the LVIA.

8.5.15 In the wider study area, there are several other listed buildings and heritage designations however, due to the extent of intervening built form, topography and vegetation, it is



considered that the nature of the Proposed Development would not have any landscape and visual impact on these receptors.

Access and Recreational Routes

- 8.5.16 The access and recreational routes, including major and local roads and PRow of relevance are summarised below and illustrated on **Figure 8.5: Access and Water** at **Appendix 8.4**
- There is a non-designated existing private track which runs through the Site from the Equestrian Centre in the west to Common Lane in the north east;
 - There is existing vehicular access into the Site from Bower Heath Lane and Common Lane;
 - There is an existing public footpath (ref: Harpenden 034) which runs through the Site, from the settlement edge of Batford at Turners Close in the south to Bower Heath Lane in the north west;
 - Aside from this, the Site is currently private land and not accessible to the public;
 - There are two existing public footpaths (ref: Wheathampstead 060 and 061) adjacent or near the Site's boundaries, both connecting onto Common Lane in the north east;
 - There is a well-used extensive PRow network beyond the boundaries of the Site, used by walkers, cyclists and horse riders, providing onward connections to key GI destinations, including National Cycle Routes (NCR) 6 and 57 that run through the existing settlement of Harpenden, parallel to the River Lea (approximately 165m to the south west of the Site), along with the Chiltern Way Long Distance Footpath (1.2km to the west of the Site); and
 - Porters Hill Park (undesignated recreation area) lies directly adjacent to the southern boundary of the Site and Westfield Recreation Ground lies approximately 410m to the south west of the Site. Westfield Road Cemetery also lies approximately 500m to the south west of the Site.

Landscape Character

- 8.5.17 Published landscape character assessments relevant to the Proposed Development and wider study area have been reviewed and their extents illustrated on **Figure 8.9** at **Appendix 8.4**. These assessments include:
- National Character Area Profiles (Natural England);
 - Central Bedfordshire Character Assessment (2015); and
 - Hertfordshire Landscape Character Area Statements - St Albans District (2000 & 2005).
- 8.5.18 The published assessments provide a hierarchical appraisal of the character of the Site, its surroundings and the wider region through a recognised process of landscape characterisation. It should be noted that there are often subtle differences between and within individual landscape character areas that can give rise to variations in both actual and perceived value, quality, condition and susceptibility to change. Furthermore, boundaries between character areas do not always follow recognised features within the landscape, such as rivers, settlement edges or field boundaries, where there is a gradual change in character and is often the case with landscapes at the national and regional level.
- 8.5.19 Character areas at the national and regional level have been reviewed as part of the assessment. It is considered that, whilst these assessments inform the context for local



character assessments, they do not provide a sufficient level of detail appropriate to the nature of effects likely to arise at a local level as a result of the Proposed Development.

8.5.20 In addition, given the scale of these character areas and the local scale of effects likely from the Proposed Development, any effects on the national and regional character areas would be negligible at most. Therefore, in line with the recommendations of GLVIA3, to ensure that the scale of assessment is appropriate and proportionate to the scale of the Proposed Development, national and regional character areas have not been considered further as part of the assessment.

8.5.21 Given the distance from the Site, combined with the extent of existing intervening urban form and green infrastructure in the context surrounding the Site, the effect on all other Central Bedfordshire and Hertfordshire landscape character areas identified by the assessments noted above and illustrated on **Figure 8.9 at Appendix 8.4** would be negligible at most, therefore these were scoped out and are not considered further as part of the LVIA.

District Landscape Character

8.5.22 At a district level, as illustrated on **Figure 8.9 at Appendix 8.4**, the study area and the Site falls within the published Landscape Character Assessment: Hertfordshire Landscape Character Area Statements - St Albans District (2000 & 2005). A detailed description of each baseline Landscape Character Area (LCA) of the Site is assessed is included in **Appendix 8.8** and should be read with reference to this section.

8.5.23 The western part of the Site (Parcels A and B) is located within **LCA 33 Upper Lea Valley** and the eastern part of the Site (Parcels C and D) located within **LCA 34 Blackmore End Plateau**.

8.5.24 **LCA 33 Upper Lea Valley** is described as *“a marked valley form with a narrow river corridor. Arable cropping dominates on the slopes. A good number of estate woodlands creates a mature wooded feel to the east. Parklands are a notable feature making use of both slopes and river valley. Conversion to golf courses has been successful, while there is visual impact from 20th century settlements.”* Key characteristics, of relevance to the Site and immediate study area, include:

- Narrow and meandering river corridor.
- Strong valley slopes to north and south.
- Golf courses to the valley sides, including parkland and woodland settings.
- Discrete estate groupings of estate and plantation woodland.
- Greenway footpath (Upper Lea Valley Walk and NCR 6).
- Intrusive built edge of settlements.

8.5.25 A number of landscape management objectives are set out for the LCA, those of relevance to the Site include:

- Improve the network of woods within the open landscapes between Wheathampstead and Harpenden by planting on the tops of the slopes to emphasise the valley form and to screen the raw built edges of 20th century development.
- Use historic hedge and field boundaries to identify the most appropriate location for woodland restoration and expansion.
- Encourage the creation of wetland landscape features such as reed beds, ponds, scrapes, alders and pollarded willows.



- Promote hedgerow restoration and creation in pastoral areas to provide visual and ecological links between existing and proposed woodland areas.
- Promote hedgerow restoration through locally appropriate measures including coppicing, laying and replanting/gapping-up.
- Maintain and develop the traditional pattern of roadside verges, sunken lanes and hedgebanks as a local feature and a wildlife resource.

8.5.26 **LCA 34 Blackmore End Plateau** is described as “*an elevated plateau with extensive arable fields. Despite recent landscape change there is a strong sense of continuity closer to the settlements and around some of the notable historic houses and parklands. The area has a tranquil and remote feel with good opportunities for informal recreation.*” Key characteristics, of relevance to the Site and immediate study area, include:

- Elevated plateau area dominated by large arable fields.
- Linear and discrete woodlands, many ancient, scattered throughout the area.
- Remote quiet area with few detracting features.
- Areas of regenerated common.

8.5.27 A number of landscape management objectives are set out for the LCA, those of relevance to the Site include:

- Extend the network of woodlands across the plateau, especially where this will help in creating habitat links across arable areas.
- Maintain and extend the rights of way across the area.
- Promote the appropriate management of woodland in order to maintain a rich ground flora.
- Promote the creation of buffer zones between farmland and important semi-natural habitats and the creation of links between semi-natural habitats.
- Promote hedgerow restoration and creation throughout the area to provide visual and ecological links between existing and proposed woodland areas.
- Promote both the creation of new ponds and the retention/enhancement of existing ponds for wildlife.
- Protect the traditional pattern of local lanes and the associated features.
- Maintain the tranquil quality of the area while allowing access for visitors.

Visual Amenity

8.5.28 The visual baseline identifies views toward the Site with the potential to be impacted by the Proposed Development.

8.5.29 The baseline situation for these views is described through a series of viewpoint photographs, taken from publicly accessible locations which, alongside representing the views experienced by people at the viewpoint, are also representative of potential views for other receptors in its vicinity.

8.5.30 Viewpoint Photographs are contained in **Appendix 8.5** and **Appendix 8.6**, with the viewpoint locations illustrated on **Figure 8.10** at **Appendix 8.4**. A detailed description of each baseline



view assessed is included in **Appendix 8.9** and should be read with reference to these photographs and their relative positions within the ZTV, as illustrated on **Figures 8.2** and **8.3** at **Appendix 8.4**.

- 8.5.31 Following pre-application discussions with SACDC in May 2025, key viewpoints were agreed and AVR wirelines modelled, illustrating the Proposed Development outline and maximum storey heights to ridge as illustrated on the Parameter Plans. The wirelines give an indication of the maximum height ceiling of the Proposed Development, in relation to the baseline view - but not the overall mass, scale and location of the Proposed Development (which requires further detailed design and interpretation). The wirelines are based on the Storey Heights Parameter Plan. The AVR Viewpoint Photographs and methodology used to create the AVR wireline views is set out in the Vista3D documents at **Appendix 8.7**.
- 8.5.32 Viewpoint photographs were taken in January 2025, June 2025 and July 2024 and represent the respective winter and summer view from each location.
- 8.5.33 Views from each viewpoint may be representative of more than one receptor, for example, a viewpoint taken from a PRoW will be representative of views experienced by users of the PRoW, however it may also be representative of views experienced from nearby roads or the vicinity of nearby residential properties of a settlement - receptors which are considered to be represented by each viewpoint location are noted in **Appendix 8.9** and on each viewpoint photograph sheet in **Appendix 8.5** and **8.6**. The nature and value of these views is relative to the type of receptor experiencing the view, as reflected in the visual baseline and determination of sensitivity provided in **Appendix 8.9**.

Visibility of the Site

- 8.5.34 The process used to determine the ZTV and visual envelope for the Proposed Development is described in the LVIA Methodology at **Appendix 8.2**.
- 8.5.35 The ZTV represents the starting point for understanding the visual baseline for the Site and the Proposed Development. The findings of the ZTV were verified during field survey, which in turn led to the selection of receptors appropriate to assess the likely visual effects of the Proposed Development.
- 8.5.36 It is impractical, and disproportionate to the LVIA (as required by GLVIA3) to assess views from all receptors within the study area, therefore representative viewpoints have been selected. These viewpoints are chosen to represent views experienced from the location of the viewpoint, and for other similar views within the study area. During the field survey, some locations which appeared on the ZTV were found to have no visibility of the Site and no likely visibility of the Proposed Development. Viewpoint photography for these 'none visible viewpoints' was captured and has been included in **Discounted Viewpoints** at **Appendix 8.10** to provide contextual information on the study area only, these locations have not been assessed for impacts as part of this assessment.
- 8.5.37 As described in the Hertfordshire Landscape Character Area Statements - St Albans District, within LCA 33 Upper Lea Valley, there are extensive views into the area from the adjacent plateau areas and views along the valley are locally interrupted by belts of trees and small woodlands around the parks. Visual sensitivities are localised and comprise the built edge of the existing settlement of Harpenden. The LCA 34 Blackmore End Plateau is only locally visible from the surrounding area, as a result of its elevated topography. It is generally a coherent landscape, with some areas unified and contained, while others are downgraded by the impact of extensive arable farming with open and exposed views over the area.
- 8.5.38 Most views of the Site are constrained to its immediate vicinity, including close range views from public footpath Harpenden 035 running through the Site, public footpath Wheathamsstead 060 off Common Lane to the north of the Site, Porters Hill Park to the south of the Site and from existing properties in Batford, that side or back onto the Site.



- 8.5.39 Further afield, there are partial cross valley views of the west facing, upper valley slopes of Site Parcel B, where it transitions to the plateau at Site Parcel C, from elevated vantage points, as illustrated by **Viewpoints 6, 7, 8 and 9 at Appendix 8.5 and 8.6**. The western part of the Site is located in the low lying Lea valley, and is generally not visible from the wider landscape - due to the extent of screening provided by intervening mature hedgerows, trees, woodland, landform and built form.

Views from Residential Receptors

- 8.5.40 Several properties on the northern edge of Batford, adjacent to the southern boundary of Site Parcel B, directly side onto the Site (on Barely Rise, Turner Close, Dane Close, Saxon Close and Noke Shot). These residential receptors currently experience oblique direct to partial and/or filtered near distance views of Site Parcel B and the agricultural land beyond, from their upper storeys (albeit from less frequently habitable rooms) (**Viewpoint 3A**). The existing hedgerow and tree vegetation along the Site's boundary, provides a sense of visual containment and separation, further filtering views during summer months.
- 8.5.41 Several properties on the north eastern edge of Batford, adjacent to the southern boundary of Site Parcel C, directly back onto the Site (on Noke Shot, Viking Close and Whittings Close). These residential receptors currently experience direct to partial and/or filtered near distance views of Site Parcel C, from their upper storeys (albeit from less frequently habitable rooms) (**Viewpoint 2**). Several properties on Porters Hill and Pickford Hill, whose properties back onto Porters Hill Park, experience filtered glimpsed views of Site Parcel C, from their upper storeys (albeit from less frequently habitable rooms).
- 8.5.42 Several properties on Lower Luton Road (B653) at the junction with Westfield Road, adjacent to the south western boundary of Site Parcel A, directly back onto the Site. These residential receptors currently experience direct views of Site Parcel A, from their upper storeys (albeit from less frequently habitable rooms) (**Viewpoint 4**).
- 8.5.43 Residential receptors in Harpenden, on Coldharbour Lane, Rolt Place and Hyde View Road, whose properties are orientated facing the Site, currently experience near to middle distance cross valley views towards Site Parcel B (**Viewpoint 6**).

Views from Public Rights of Way

- 8.5.44 Walkers on public footpath Harpenden 034 (located in Site Parcel B, running south east / north west, between Turners Close in Batford to Bower Heath Lane), currently experience direct close to near distance views of Site Parcel B and filtered glimpsed near distance views of the rooftops of existing buildings in Site Parcel A. The combination of Site boundary vegetation, landform and the settlement edge of Batford visually contains and encloses wider views of the Site. The ridgeline on the western edge of Site Parcel C, is visible in the near distance, running along the horizon, featuring a telecommunications mast (**Viewpoints 3A, 3B and 3C**).
- 8.5.45 Walkers on public footpath Wheathampstead 060 (located on the northern boundary of Site Parcel C, running south east to north west, between Common Lane and Bower Heath Lane), currently experience close to near distance views of Site Parcel C, particularly on the south eastern section (**Viewpoint 1A**). Further north west on the PRoW, away from Site Parcel C, the combination of intervening landform and vegetation, reduces visibility towards the Site, with receptors experiencing near distance views of the existing boundary vegetation associated with the northern boundary of Site Parcel C, including the telecommunication mast (**Viewpoint 1B**). It is considered visual effects would be negligible further northwest, where the public footpath enters Bower Heath (Common Land and Local Wildlife Site), due to the combination of distance, landform and intervening vegetation.
- 8.5.46 Walkers on public footpath Wheathampstead 093, on the section close to Bower Heath Lane, currently experience heavily filtered middle distance views, through breaks in intervening and existing boundary vegetation of Site Parcel B, during the winter. The upper extent of the



telecommunication mast, within Site Parcel C, is visible above the wooded skyline (**Viewpoint 5**).

- 8.5.47 From National Cycle Route (NCR) 6 (approximately 850m to the northwest of the Site), there are transient views across the Lee Valley landscape, between breaks in the vegetation along the route. The telecommunications mast within Site Parcel C, is discernible in the middle distance within the treed skyline. There are partial to filtered middle distance views of Site Parcel B, viewed in the context of the settlement edge of Batford, during winter. The Site forms a small part of a transient middle distance view and is partially filtered, due to intervening vegetation and nature of the landform (**Viewpoint 8**).
- 8.5.48 Walkers on Chiltern Way Long Distance Footpath, which runs along Cooters End Lane, approximately 1.2km to the west of the Site, for the most part experience enclosed and channelled views along its length, due to the hedgerow vegetation either side of the road. There is a section (c. 50m) along the route, where the lack of vegetation provides cross valley views east across the landscape and the settlement edge of Batford and Harpenden. There are oblique, transient, distant views of the west facing grazing pastures in Site Parcel B, including the telecommunications mast in Site Parcel C. The Midland Mainline railway and associated infrastructure forms a linear visual detractor along the length of the view in the near distance view (**Viewpoint 9**).

Views from Open Space or Recreational Areas

- 8.5.49 Receptors at Porters Hill Park, in the open recreational area, located adjacent to the southern boundary of Site Parcel C, currently experience close range to near distance views of Site Parcel C. Existing scattered tree and hedgerow vegetation along the Site's boundary, filters views during the summer months (**Viewpoint 2**). Beyond the Site, to the north and north east, the existing woodland along Common Lane (Bower Heath, Holcroft's Springs and Sauncey Wood) forms a wooded horizon, visually enclosing the view.
- 8.5.50 Receptors at Westfield Recreation Ground, currently experience partial glimpsed and filtered middle distance views of the elevated slopes of Site Parcel B, between and above the roof tops of properties of Rolt Place in Harpenden. The telecommunications mast within Site Parcel C, is visible punctuating the wooded horizon (**Viewpoint 6**).
- 8.5.51 Receptors from Westfield Road Cemetery, currently experience elevated cross valley views over the settlement of Harpenden, towards the Site, where there are partial filtered views of the elevated slopes of Site Parcel B. The telecommunications mast located within Site Parcel C, is discernible in the distance punctuating the wooded skyline. Site Parcel B forms part of a distant view and is filtered, due to intervening built form and vegetation and is viewed in the context of the existing settlement edge of Batford (**Viewpoint 7**).

Views from Road Network

- 8.5.52 Vehicular and cyclist receptors on Bower Heath Lane, which abuts the north western edge of Site Parcels A and B, experience enclosed and channelled views along its length, due to wooded hedgerow vegetation either side of the road. There is the potential for transient, glimpsed and filtered views into Site Parcel A and B, through breaks in the boundary vegetation. With the residential element of the Proposed Development located on Parcel A, with targeted green infrastructure enhancements in the northern parts of Site Parcel B, it is considered visual effects from this receptor would be negligible (at most).
- 8.5.53 Vehicular and cyclist receptors on Common Lane, which abuts the north eastern edge of Site Parcels C and D, experience enclosed and channelled views along its length, due to wooded vegetation either side of the road. With the school element of the Proposed Development located on Parcel C, residential development set back behind green infrastructure on Parcel D and public open space in the north parts of Parcel C, adjacent to Common Lane it is considered visual effects from this receptor would be negligible (at most).



Baseline Evolution

Future Baseline

- 8.5.54 No development schemes have been identified as part of future baseline scenarios. The consideration against the wider allocated site is described in **Section 8.10 Cumulative Effects**. Therefore, for the future baseline, there is no anticipated change to the landscape or visual context of the Site.

8.6 Primary and Tertiary Mitigation

- 8.6.1 The Proposed Development parameters have been developed in consideration of the surrounding landscape and visual context of the Site, particularly its topography, cross valley views and the nature / scale of existing built form in the surrounding context. The tallest height built form is located in the least visually sensitive parts of the Site, where the combination of landform and existing vegetation provide a strong level of visual enclosure. This includes within Site Parcel A, off Lower Luton Road where the combination of low lying landform, existing boundary vegetation and the adjacent urban edge of Harpenden would assimilate the scale of development proposed. The north eastern and southern parts of Site Parcel C and Site Parcel D include the tallest height built form, set within the central parts of the plateau, away from the existing ridgeline. The existing woodland coverage and mature hedgerow and tree field boundaries on the Site boundaries and internally (between Site Parcels C and D) would assist in visually assimilating proposed built form in this part of the Site.
- 8.6.2 The Proposed Development parameters ensure that the tallest buildings would not be located on the visually prominent ridgeline between Site Parcels B and C, where topography transitions from valley slopes to plateau (referred to as Area A on the Parameter Plan), ensuring built form here is restricted to up to two storeys in height. This ensures that the proposed development would not form a prominent feature on the skyline of existing cross valley views from receptors to the west of the Site.
- 8.6.3 The Storey Height Parameters Plan reflects the interface with the existing settlement edge, comprising two to three storey residential developments, to provide a sympathetic transition with the northern sub-urban edge of Batford.
- 8.6.4 The Storey Height Parameter Plan has been developed to ensure an appropriate building height transition from the valley slopes (within Site Parcel B) to the plateau landform (Site Parcel C and D), ensuring a lower scale and height of proposed development on the ridgeline. From testing of storey height parameters, the AVR wirelines overlaying the Viewpoint Photographs (see **Appendix 8.7**), demonstrate the maximum height of proposed built form will not exceed the canopy height of the existing vegetation and woodland along Common Lane (Tree survey ref: W1 c. 16m high woodland canopy), in elevated cross valley panoramic views from the west. It must be noted that the wirelines illustrate the maximum height parameters and proposed built form would be designed to form a varied skyline, not full extension to all parts of the wireline.
- 8.6.5 To inform the masterplanning of the Proposed Development, the existing landscape assets on the Site were also mapped at an early stage and their value assessed as part of the various baseline environmental studies including landscape, arboriculture and ecology.
- 8.6.6 Features of value have been used to inform the development of an extensive Landscape Strategy for the Proposed Development, refer to the Green Infrastructure Parameter Plan and Landscape Framework Plan (see **Appendix 8.11**) for the broad locations of green infrastructure, proposed public open space and landscape buffer planting within and to the boundaries of the Site. In summary, this incorporates the following to mitigate the impact of the development on the landscape and visual receptors:
- The Proposed Development parameters retain, where possible, existing vegetation (as outlined in **Section 8.5**), on the Site boundaries and running internally through the Site,



supplementing with additional landscape buffer planting. This includes strategic connection of existing woodlands, hedgerows and trees within the Site and to the surrounding network.

- The Landscape Strategy for the Proposed Development refers to these green corridors, running through the Proposed Development, as 'Green Curtains', which internally separate each Site Parcel, to help define different development character areas and visually assimilate the built form into surrounding views. This approach will seek to reflect and contribute to the existing vegetated roofline character that defines the current settlement edges of Batford and Harpenden.
- A green curtain is proposed between Site Parcels A and B, following the line of the existing public footpath (ref: Harpenden 034) and existing contours. The Proposed Development parameters provide a c. 12m wide green corridor, to retain existing hedgerow vegetation and supplement with new native tree and shrub buffer planting.
- A green curtain is proposed between Site Parcels B and C, following the line of the existing ridgeline (c. 123 to 124m AOD). The Proposed Development parameters provide a c. 40m wide green corridor, to retain existing hedgerow vegetation and supplement with new native tree and shrub buffer planting.
- A green curtain is proposed between Site Parcels C and D, retaining the existing field boundary hedgerow with substantial trees (ref: H9) internally within the Site, including safeguarding TPO No. 1950: T4.
- Landscape buffer planting is proposed along the Site's northern boundary, supplementing TPO No. 1766: A2 group, with additional landscape buffer planting.
- A new parkland area is proposed in the northern part of Site Parcels B and C, to form a new defined Green Belt edge to Harpenden and ensuring Proposed Development is set back behind a large area of green infrastructure, which provides a transition out to the wider countryside.
- On establishment, tree planting associated with the landscape buffer planting outlined above would provide for strengthening of the vegetated skyline and softening of the Proposed Development and settlement edge, with other aspects of the above serving to reduce the landscape and/or visual effects.
- New woodland planting and parkland tree planting are proposed within the meadow parkland (northern area of Site Parcel B), to strengthen the woodland character of the valley slopes and plateau. This will help mitigate the visual impact of the Proposed Development, from elevated cross valley views in the west. Over time, the establishment of a robust network of woodland and tree planting will blend with and enhance the existing tree and wooded canopy, creating a well vegetated settlement edge and transition to the wider countryside.
- Biodiversity Net Gain (BNG) has been considered at the early stage of the landscape proposal. Key features such as existing hedgerow, scrub and trees have been preserved to form part of the landscape framework, creating corridors and stepping stones to support wildlife movement. As stated in **Chapter 9 Ecology**, areas allocated for biodiversity enhancement include a variety of habitats, forming a mosaic of woodlands, species rich grassland, dense scrub and wetland areas. The planting species will be selected to consider local climate conditions and biodiversity enhancement goals, ensuring that the chosen species are climate resilient and can provide critical habitat improvements for local wildlife.
- Sustainable Drainage Systems (SuDS) have been thoughtfully and sensitively incorporated into the landscape framework, utilising above ground features such as infiltration basins, linear swales and rain gardens. Consideration has been given to the design of the SuDS features, to maximise their contribution to habitat creation, as well as



enhancing the landscape character and placemaking within the new development, alongside fulfilling their primary role in flood management.

8.7 Assessment of Significant Likely Effects

Overview

- 8.7.1 A detailed assessment of the likely impacts and effects of the Proposed Development on landscape and visual amenity is provided in the Schedule of Likely Landscape Effects at **Appendix 8.8** and Schedule of Likely Visual Effects at **Appendix 8.9**. Effects are considered for the following three stages: during construction; immediately on completion (Year 0); and, during operation after establishment of landscape mitigation (Year 15). The following narrative is a summary of the assessment set out in the schedules.
- 8.7.2 The landscape and visual effects are based on a combination of sensitivity and magnitude of change (impact). Sensitivity is a term applied to a specific receptor, combining judgement on the value related to a landscape / visual receptor with the susceptibility of this receptor to the nature of change proposed. As described in the LVIA methodology, Major and Substantial effects are considered to be material to decision making and considered significant in EIA terms, with Moderate effects having potential to be material to decision making and considered potentially significant in EIA terms. Minor, Negligible and Neutral effects are considered not significant in EIA terms.
- 8.7.3 The following sections set out the impact and significance of landscape and visual effects likely as a result of the Proposed Development during both construction and operation stages.

Construction Phase

- 8.7.4 The construction phase is likely to involve initial and ongoing activities such as enabling works on Site, introduction of infrastructure as well as ongoing construction activities necessary to implement the Proposed Development (refer to **Chapter 4: Construction Methodology & Phasing**). Both initial and ongoing construction activities would generate a variety of vehicle movements. Off-site movements are likely to include light and heavy haulage, commercial and personnel vehicles. On-site movements are likely to include haulage, general plant, forklifts, mobile lifting equipment and large cranes. Temporary signage, site hoarding, tree protection measures and marketing signage are likely to be erected and construction hazard warning lighting is likely to be visible.
- 8.7.5 The assessment of likely effects during construction deals with the worst-case scenario in terms of likely impacts on landscape and visual receptors prior to the establishment of any mitigation planting.
- 8.7.6 Details of the assessment of likely effects at the construction stage are included for landscape receptors in **Appendix 8.8** and for visual receptors in **Appendix 8.9**. A summary of construction effects considered to be significant in EIA terms (moderate and above) have been identified and are provided in **Table 8.5** below.

Table 8.5: Summary of likely significant construction effects on landscape visual receptors

Receptor	Sensitivity	Magnitude of impact	Effect significance
Landscape Character of the Site	Medium	Medium Adverse	Moderate Adverse
Viewpoint 1A Walkers on Public Footpath Wheathampstead 060	Medium	Medium Adverse	Moderate Adverse



Receptor	Sensitivity	Magnitude of impact	Effect significance
Viewpoint 2 Recreation Users of Porters Hill Park	Medium	Medium – Large Adverse	Moderate – Major Adverse
Viewpoint 2 Representative of residents directly backing onto the Site in Batford	Medium	Medium – Large Adverse	Moderate – Major Adverse
Viewpoint 3A, 3B and 3C Walkers on public footpath Harpenden 034 running through the Site	Medium	Medium – Large Adverse	Moderate – Major Adverse
Viewpoint 3A Representative of residents siding onto the Site in Batford	Medium	Medium – Large Adverse	Moderate – Major Adverse

Operation (Year 0)

8.7.7 The main elements of the development with the potential to bear an impact on the landscape and visual receptors at completion (Year 0) comprise the following:

- Residential built form (including Extra Care) ranging from 2 to 3 storey development with an anticipated max ridge heights approximately 8.5m – 11.2m above finished ground level;
- Local Centre built form with an anticipated max ridge height approximately 12m above finished ground level;
- School with an anticipated max ridge height approximately 12m above finished ground level;
- Proposed vehicular access points from Lower Luton Road and Bower Heath Lane on the south eastern boundary of Site Parcel A;
- Proposed car park within Site Parcel C as part of the Parkland; and
- Proposed associated infrastructure including internal road routes.

8.7.8 Structural landscaping would unlikely be sufficiently established on completion of the built form to substantially contribute to mitigation of impacts on landscape and visual receptors. Therefore, the assessment of likely effects at completion Year 0 assume the worst-case scenario in terms of likely impacts on landscape and visual receptors.

8.7.9 Details of the assessment of likely effects at operation Year 0 are included for landscape receptors in **Appendix 8.8** and for visual receptors in **Appendix 8.9**. In accordance with the requirements of the EIA process a summary of operation Year 0 effects considered to be significant (Moderate - Major and above) have been identified and are provided in **Table 8.6** below. These are all visual effects, as all landscape effects at completion Year 0 are considered to be Minor - Moderate Adverse or less and not considered significant.



Table 8.6: Summary of likely significant completion (year 0) effects on visual receptors

Receptor	Sensitivity	Magnitude of impact	Effect significance
Viewpoint 1A Walkers on Public Footpath Wheathampstead 060	Medium	Medium Adverse	Moderate Adverse
Viewpoint 2 Recreation Users of Porters Hill Park	Medium	Medium – Large Adverse	Moderate – Major Adverse
Viewpoint 2 Representative of residents directly backing onto the Site in Batford	Medium	Medium – Large Adverse	Moderate – Major Adverse
Viewpoint 3A and 3B Walkers on public footpath Harpenden 034 running through the Site	Medium	Medium – Large Adverse	Moderate – Major Adverse
Viewpoint 3C Walkers on public footpath Harpenden 034 running through the Site	Medium	Medium Adverse	Moderate Adverse
Viewpoint 3A Representative of residents siding onto the Site in Batford	Medium	Medium – Large Adverse	Moderate – Major Adverse

8.8 Secondary Mitigation and Enhancement

8.8.1 No additional mitigation is proposed; all landscape mitigation will be inherent to the design and has been outlined in Section 8.6 above.

8.9 Residual Effects

8.9.1 Residual effects are typically defined as those that remain following the implementation of mitigation measures.

8.9.2 The initial stages of the LVIA have considered landscape and visual effects at construction and post-completion (Year 0). The mitigation related to landscape and visual matters have been incorporated into the Proposed Development as an integral part of the masterplanning, used to shape and influence the layout, scale, pattern, massing and height of the proposals.

8.9.3 However, at such an early stage, at Year 0 many of the proposed landscape mitigation measures associated with green infrastructure would not be sufficiently established to perform their intended landscape function or would deliver only a part of their intended function.

8.9.4 Therefore, the residual effects pertaining to landscape and visual matters are considered to be those that remain, once the proposed landscape mitigation measures have established and are contributing to their intended function - for example providing a strong structural green framework, shaping places, screening / softening / assimilating built form. This stage is defined as 'Post Mitigation Establishment (Year 15)'.



Post Mitigation Establishment Stage (Year 15)

- 8.9.5 At this stage of the Proposed Development, the green infrastructure as part of the Landscape Framework would have established and will be maturing well, substantially increasing the landscape resource, strengthening the vegetated skyline, creating a range of public open spaces, with enhancements to ecological resources. This green infrastructure would combine with those key elements retained to enhance the character of the landscape throughout the Proposed Development and its immediate context.
- 8.9.6 Trees planted as part of the Proposed Development (including stands of individual trees, street trees, avenues and native woodland) would have reached between 8m - 12m in height and would provide a meaningful contribution to both visual containment and green infrastructure across the Site.
- 8.9.7 Details of the assessment of likely effects at completion Year 15 are included for landscape receptors in **Appendix 8.8** and for visual receptors in **Appendix 8.9**. In accordance with the requirements of the EIA process, a summary of completion Year 15 effects considered to be significant (Moderate – Major and above) are to be identified – however, as shown in **Appendices 8.8 and 8.9**, the LVIA does not consider that there would be any significant effects in the long term.

8.10 Cumulative Effects

- 8.10.1 This LVIA has considered the following site (as illustrated on the cumulative development plan at **Appendix 5.3**) with regard to potential for cumulative impacts in combination with the Site and Proposed Development:
- Land At Cooters End Lane and Ambrose Lane Harpenden Hertfordshire (Planning Reference 5/2023/0327) - Construction of up to 550 dwellings including circa. 130 Class C2 integrated retirement homes, 40% affordable housing, early years setting, public open space, allotments and publicly accessible recreation space.
- 8.10.2 The site listed above lies 1.1km to the south west of the Site, with no potential for any visual receptor to experience views of the site in combination with the Proposed Development, due to the extent of intervening landform, vegetation and built form.
- 8.10.3 The site also lies close to the settlement of Harpenden, so would have no cumulative landscape impacts in combination with the Proposed Development. Therefore, it is considered there would be no cumulative landscape or visual impacts with the development noted above.

Consideration Against the Wider Allocated Site

- 8.10.4 The Application Site forms part of a wider allocation in the emerging SACDC Local Plan [Policy LG1 Broad Locations and Policy B2 North East Harpenden] and represents the largest component part of this draft allocation - circa 66% of draft allocated site area.
- 8.10.5 Whilst this Application is being submitted separately, Crest has been working collaboratively with the promoters of the adjoining areas of land to ensure a comprehensive approach to this overall Proposed Development.
- 8.10.6 Whilst not forming part of this Application, the remaining areas of land cannot form part of this formal ES cumulative assessment. Nevertheless, this Application has been prepared with due regard to the presence of likely future development on the adjoining areas of land and the Proposed Development has been designed to facilitate connection with the future plots, covered within **Chapter 3 The Proposed Development** 'Alternatives and Design Evolution' section.
- 8.10.7 From a landscape and visual perspective we note the following:



- The allocation as a whole has been assessed in SACDC's underlying Evidence Base;
- Consideration to adjoining site levels, existing vegetation and landscape treatment where the Site interfaces with the wider allocation Site – along the south western boundary of Site Parcel B and south east boundary of Site Parcel D.
- The Crest scheme does not compromise the future development (or formal assessment) of the remaining areas of land.

8.11 Monitoring

- 8.11.1 As noted above, there would be no long term landscape and visual effects as a result of the Proposed Development. A Landscape & Ecological Management Plan (LEMP) would be provided at the detailed design stages and this would outline long term measures for management and monitoring of the landscape as it establishes.

8.12 Considerations of Climate Change

- 8.12.1 The potential of future changes, through the increase or decrease of temperature and water cycle, could affect the future longevity and sustainability of the landscape through water logging and drought – both of which would have a direct effect on the performance of the landscape, with the potential for weakening its structure as a result of unfavourable growing conditions and an increased risk of disease. The landscape strategy for the Site has been developed in consideration of these potential impacts from the outset, incorporating measures within the design to allow the maturing landscape of the Proposed Development to be resilient and continue to achieve its intended functions, despite any changes to the climate.
- 8.12.2 During detailed design stages, planting proposals would be developed to use native locally prevalent shrub, hedgerow, tree and woodland planting - which is suited to the location but has the ability to adapt to potential future changes. The Landscape Framework proposed at this stage integrates suitable drainage and attenuation within the Site that will allow for future increases in surface water runoff, which would minimise any fluctuations in ground water level.
- 8.12.3 The planting will be designed to incorporate mixed species with a limit on single species within the landscape framework - thereby, if any particular species becomes susceptible to disease, it does not compromise the structure, character and visual amenity of the landscape. There is also the requirement to consider the ability of plants to adapt to changes in conditions and limit the over use of species that cannot tolerate a range of environments - within key areas of the landscape framework - especially where they provide valuable mitigation from any adverse effects arising from the Proposed Development.
- 8.12.4 Overall, the Proposed Development, including planting design, species selection and management will be detailed further at Reserved Matters planning stages, to provide a well-designed and well-considered landscape strategy, which has the ability to adapt to changes in temperature and water level, maintaining a robust landscape structure that is resilient to potential climate change.
- 8.12.5 No change to the sensitivity of the receptors identified in the LVIA would be anticipated to result from future climate change - and the magnitude of impact of the Proposed Development as defined throughout the assessment would not be anticipated to change as a result of future climate change - as it is assumed that vegetation management would adapt (as required) to changing conditions.
- 8.12.6 Therefore, no significant climate change effects are considered likely to arise from the Proposed Development.



8.13 Conclusions

Introduction

- 8.13.1 This LVIA has been carried out in accordance with GLVIA3, with reference to other technical notes including GLVIA3 Statement of Clarification 1/13 (2013), Landscape Institute Advice Note 06/19, Visual Representation of Development Proposals (2019) and Landscape Institute Technical Guidance Note 02/21: Assessing Landscape Value Outside National Designations (LI, 2021).
- 8.13.2 The LVIA methodology, extent of Study Area (2km radius), proposed locations for representative viewpoints and AVR wirelines viewpoints, have been agreed with SACDC as part of the EIA Scoping process - determined through a combination of desk and field-based survey work, responding to the output of Zone of Theoretical Visibility (ZTV) modelling; and, mapping of landscape and visual sensitivities.
- 8.13.3 The LVIA has included a review of planning policies from national to local level of relevance to landscape and visual matters; the content and recommendations of published landscape character assessment or studies; the existing key features and character of the Site and its context; a representative range of views towards the Site and Proposed Development. In relation to landscape character, the LVIA has made reference to the Hertfordshire Landscape Character Area Statements - St Albans District (2000 & 2005).
- 8.13.4 The Site is located at a District level within LCA 33 Upper Lea Valley and LCA 34 Blackmore End Plateau, exhibiting some characteristic features associated with its host LCA including prominent valley slopes and elevated plateau topography, proximity and visual influence of the settlement edge of Harpenden and Batford and a strong wooded context provided by the linear network of woodlands, trees and hedgerows on field boundaries.
- 8.13.5 Views of the Site range from direct close range views from adjacent residential properties in Batford, public footpath Harpenden 034 running through the Site and from Porters Hill Park (public open space). Near to middle distance cross valley views of Site Parcel B from residential properties in Harpenden and Westfield Road Cemetery and elevated distant cross valley views of Site Parcel B from Cooters End Lane and Chiltern Way Long Distance Footpath.

Demolition and Construction Effects

- 8.13.6 Landscape and visual effects have been assessed following three stages: during construction; immediately on completion (Year 0); and during operation after establishment of landscape mitigation (Year 15).
- 8.13.7 The LVIA draws together the landscape and visual baseline information and summarises the key mitigation and enhancement measures, forming part of the iterative design process and maximising the potential for positive influence of the Proposed Development on its surrounding context.
- 8.13.8 Effects on landscape character would be considered as Minor Adverse (not significant) during construction and immediately on completion for areas directly adjacent to and up to 500m of the Site, with all other landscape effects considered Neutral in the long term.
- 8.13.9 Effects on the landscape character of the Site are considered Temporary Moderate Adverse (potential to be significant) during construction reducing to Short Term Minor to Moderate Adverse (not significant) on completion.
- 8.13.10 Visual effects at the construction stage and on completion (Year 0) have been assessed to be Temporary and Short Term Moderate - Major Adverse to residents that directly abut the Site in Batford (directly adjacent to Site Parcel B and C) and on Lower Luton Road (directly adjacent to Site Parcel A), and walkers on public footpath Wheathampstead 060 directly adjacent to Site Parcel C and walkers on public footpath Harpenden 034 passing through Site Parcel B.



All other landscape and visual effects during construction would be insignificant, with most effects being Negligible or Minor.

Operation Effects (Post Landscape Mitigation Establishment Stage – Year 15)

- 8.13.11 Effects of the landscape character at operation and after establishment of the Landscape Framework and mitigation (Year 15) would reduce to Long Term Negligible Adverse (not significant), where effects on the landscape character of the Site improves to Long Term Minor Beneficial on establishment of the landscape mitigation and enhancements of the Landscape Framework will have matured.
- 8.13.12 Visual effects during operation, following establishment of landscape mitigation (Year 15) have been assessed to be Long Term Minor - Moderate Adverse to walkers that directly pass through Site Parcel B on public footpath Harpenden 034, that would interface with the proposed residential built form, with all other Long Term visual effects considered to be insignificant / most being Minor to Negligible.

8.14 References

- Guidelines for Landscape and Visual Impact Assessment, Third Edition (2013), (GLVIA3), Landscape Institute and the Institute of Environmental Management & Assessment
- GLVIA3 Statements of Clarification (2013 - 2015), Landscape Institute
- Natural England's 'An Approach to Landscape Character Assessment' (2014)
- An Approach to Landscape Sensitivity Assessment (Natural England, 2019)
- Landscape Institute Technical Guidance Note 06/19: Visual Representation of Development Proposals (LI, 2019)
- Landscape Institute Technical Guidance Note 02/21: Assessing Landscape Value Outside National Designations (LI, 2021)
- The National Planning Policy Framework (2025)
- The Environment Act (2021)
- Natural England, The Character of England: Landscape, Wildlife and Natural Features (2014)
- City and District of St Albans District Local Plan Review 1994 (Adopted 30 November 1994) Saved and Deleted Policies Version (July 2020)
- Harpenden Neighbourhood Plan 2018 – 2033 (2019)
- Wheathampstead Neighbourhood Plan 2020-2025 (2023)
- St Albans District Draft Local Plan 2041 Regulation 19 Publication (September 2024)
- Hertfordshire Green Infrastructure Strategy (August 2022)
- The St Albans District Green Infrastructure Plan (March 2011)
- Natural England National Character Areas No 86: South Suffolk and North Essex Clayland
- Central Bedfordshire Character Assessment (2015)



- Hertfordshire Landscape Character Area Statements - St Albans District (2000 & 2005)
- Ordnance Survey Mapping at 1:25,000 scale
- Aerial photography of the site and wider area (Google Earth, www.maps.google.co.uk and www.bing.com/maps)
- Multi Agency Geographic Information for the Countryside (MAGIC) interactive mapping (www.magic.gov.uk)
- Natural England Green Infrastructure Mapping (<https://designatedsites.naturalengland.org.uk/GreenInfrastructure/Map.aspx>)
- Rights of Way Mapping (www.rowmaps.com)
- UK Government Flood Risk Mapping (<https://flood-map-for-planning.service.gov.uk/>)
- National Heritage List for England Map Search, English Heritage (<http://www.english-heritage.org.uk/>)
- National Cycle Network mapping (www.sustrans.org.uk)
- British Geological Survey, Geology of Britain Viewer (<https://www.bgs.ac.uk/>)
- Ancient Tree Inventory. Woodland Trust (<https://ati.woodlandtrust.org.uk/>)



9 Biodiversity

9.1 Introduction

- 9.1.1 This Chapter assesses the likely significant effects arising from the Proposed Development with respect to biodiversity.
- 9.1.2 This Chapter has been prepared by Aspect Ecology. Aspect Ecology's established team is highly qualified in all areas of ecological planning and our ecologists are experienced in undertaking survey work within relevant terrestrial and aquatic habitat types. This chapter has been approved by a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and as such accords with CIEEM's Code of Professional Conduct
- 9.1.3 In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in **Appendix 1.3**.

9.2 Policy Context, Legislation, Guidance and Standards

- 9.2.1 Legislation, policy, guidance and standards which pertain to ecology, and of relevance to the Site, are listed below. Further discussion of the legislation is provided in relation to particular ecological features and fauna is set out in the relevant sections of this chapter and the Baseline Ecological Appraisal (see **Appendix 9.1**).

Legislation

- The Conservation of Habitats and Species Regulations ('Habitat Regulations'), 2017 (as amended);
- The Wildlife and Countryside Act ('WCA'), 1981 (as amended);
- The Natural Environment and Rural Communities ('NERC') Act, 2006;
- The Countryside and Rights of Way ('CROW') Act, 2000;
- Town and Country Planning (Environmental Impact Assessment) Regulations, 2017;
- The Hedgerows Regulations, 1997;
- The Protection of Badgers Act, 1992;
- The Wild Mammals (Protection) Act, 1969; and
- The Environment Act, 2021.

Policy

- National Planning Policy Framework ('NPPF') (2024);
- National Planning Policy Guidance ('PPG') (2014);
- ODPM Circular 06/2005;
- City and District of St Albans District Local Plan Review 1994;
- Harpenden Neighbourhood Plan;



- UK Biodiversity Action Plan ('BAP') and
- Biodiversity 2020: A strategy for England's wildlife and ecosystem services.

Standards and Guidance

- Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, updated 2024),
- Phase 1 survey methodology (Joint Nature Conservation Committee, 2010);
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition) (Bat Conservation Trust, 2023),
- UK Bat Mitigation Guidelines (CIEEM, 2023);
- Occasional Publication No.9 – Surveying Badgers (Mammal Society, 1989);
- Analytical and methodological development for improved surveillance of the Great Crested Newt (Biggs et al., 2014);
- Reptile Survey - an introduction to planning, conducting and interpreting surveys for snake and lizard conservation (Froglife, 1999);
- Evaluating local mitigation/translocation programmes: Maintaining Best Practice and lawful standards (Herpetofauna Groups of Britain and Ireland, 1998); and
- British Trust for Ornithology's (BTO) Common Bird Census methodology

9.3 Consultation

9.3.1 This assessment has been prepared following consultation with ecological advisors as part of a wider EIA scoping exercise, as detailed below at Table 9.1.

Table 9.1: Summary of Consultation

Consultation (Who and Date)	Summary of issues raised during consultation	How it has been dealt within this Chapter	Where it has been addressed within the chapter (if applicable)
Natural England 27 September 2024	High-level scope of EIA	Informed general approach to assessment	Throughout
Hertfordshire LEADS (on behalf of St Albans City and District Council) 30 October 2024	Assessment to be accompanied by up-to-date survey work	Informed general approach to assessment	See Appendix 9.1 for comprehensive survey results
	Consideration of cumulative effects	Assessment of cumulative effects undertaken	Section 9.9
	Measures to avoid, prevent, reduce or mitigate impacts, including in relation to Local Wildlife Sites	Informed general approach to assessment	Throughout



9.4 Methodology

Study Area

9.4.1 To inform the scope of the assessment, consideration has been given to the zone of influence (ZOI) of the Proposed Development. The ZOI is defined as the area over which ecological features may be affected by the biophysical changes caused by the Proposed Development and associated activities. The extent of such changes will typically reduce over distance, and whether effects are experienced is dependent on the sensitivity of individual habitats, species, or other ecological features, such that it is difficult to define a specific zone of influence which captures all potential effects arising from the Proposed Development. As such, two broad zones are identified:

- A primary zone of influence largely relating to the Site itself, incorporating habitats and associated species directly affected by the Proposed Development footprint and associated works (in terms of habitat loss or damage). This zone also includes areas affected by factors such as noise, vibration, lighting, dust and pollution, the effects of which will be focused within the nearby surrounds (i.e. within 100 m) of the Proposed Development. Survey work has been specifically focused on this area, to allow an assessment of habitats and species directly affected by the Proposed Development.
- Beyond this, a wider zone of influence exists, where ecological features may be subject to wider scale effects such as recreational disturbance, air pollution from traffic, or water pollution within the wider river catchment. The assessment of features within this zone is largely based on background information identifying ecological designations, known habitats or species populations of importance which could be sensitive to such wider scale effects.

Baseline Data Collection

9.4.2 The methodology utilised for baseline data collection can be split into three main areas: desktop study, habitat survey, and faunal survey. Further details on survey methodologies are provided in the Baseline Ecological Appraisal at **Appendix 9.1**, and a summary is set out below:

Desktop Study

9.4.3 In order to compile background information on the Site and its immediate surroundings, a number of recording organisations and online data sources were consulted:

- Herts Environmental Records Centre (HERC);
- Bedfordshire and Luton Biodiversity Recording and Monitoring Centre (BRMC);
- Multi-Agency Geographic Information for the Countryside (MAGIC) database; and
- Woodland Trust database of notable, veteran and ancient trees

Habitat Survey

9.4.4 The Site was subject to habitat surveys in May and July 2024 in order to ascertain the general ecological value of the land contained within the boundaries of the Site, to identify the main habitats and ecological features present. Full detail is provided in the Baseline Ecological Appraisal at **Appendix 9.1**.

9.4.5 The habitat survey also included a condition assessment survey to determine the pre-development biodiversity value of the Site, to inform a separate Biodiversity Net Gain Assessment.



Faunal Surveys

- 9.4.6 General faunal activity, such as mammals or birds observed visually or by call during the course of the surveys was recorded. Specific Phase 2 survey work was also undertaken for bats, Badger *Meles meles*, Great Crested Newt *Triturus cristatus*, reptiles, and breeding birds. Further detail on survey methodologies is provided in the Baseline Ecological Appraisal at **Appendix 9.1**.

Evaluation of Ecological Baseline

- 9.4.7 The evaluation of ecological features and resources should be based on sound professional judgement whilst also drawing on the latest available industry guidance and research. The approach taken in this report is based on that described in the CIEEM publication 'Guidelines for Ecological Impact Assessment in the UK and Ireland' whereby important ecological features are identified, and these are considered within a defined geographical context using the following frame of reference:
- International;
 - National;
 - Regional;
 - County;
 - District;
 - Local; and
 - Site (not of elevated importance at a local level).
- 9.4.8 Ecological features within the Site have been evaluated in terms of whether they qualify as 'important ecological features' (see **Appendix 9.1**). In this regard, CIEEM guidance states that *"it is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable"*. Accordingly, habitats considered to be of importance within the context of the Site only (Site level importance) have been scoped out of this assessment. Faunal species considered to be of importance within the context of the Site only (Site level importance) have been scoped into the assessment due to the requirement to address mitigation and legislative requirements.
- 9.4.9 Further details on this approach and the criteria used for evaluation are provided in the Baseline Ecological Appraisal at **Appendix 9.1**.

Assessment

- 9.4.10 The CIEEM publication 'Guidelines for Ecological Impact Assessment in the UK and Ireland' also sets out a methodology for the assessment of potential effects arising from development. These methods are followed which can be summarised as below.
- 9.4.11 Using the agreed parameters of the Proposed Development, likely effects are determined with reference to aspects of the ecological structure and function on which the feature or resource depends. This includes factors such as the available resources, ecological processes, human influences, historical context, ecological relationships, ecological role or function and ecosystem properties. Based on this context, the nature of the effect is characterised and considered under the following parameters:
- Beneficial or adverse – will the activity lead to a negative, positive or neutral effect;



- Extent – the size or amount of an impact, the area of habitat or number of individuals affected;
- Duration – the time for which the impact is expected to last prior to recovery or replacement, i.e. short-term or long-term;
- Reversibility – an effect may be irreversible in that recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it, i.e. permanent or temporary; and
- Timing and frequency – some changes may only cause an impact if they coincide with critical life-stages or seasons, whilst frequent events may cause a greater effect than a single event.

9.4.12 Based on these parameters, the scale of effect (or magnitude) can be summarised as shown in **Table 9.2**. This is in relation to adverse effects, although a similar scale can be applied to beneficial effects. This approach may differ to other chapters within this ES as this follows discipline-specific technical guidance.

Table 9.2: Assessment of scale of effect

Scale of Effect	Description
Major	A permanent or long-term effect on the receptor, which may result in severe damage to key characteristics and implications for the integrity of the receptor or its conservation status.
Moderate	Effects resulting in partial loss of or damage to a receptor, which could have implications for the integrity of the receptor or its conservation status.
Minor	Short-term or temporary effect resulting in only minor loss of or damage to a receptor, unlikely to have implications for the integrity of the receptor or its conservation status.
Negligible	No effect or only a short-term reversible effect with no long-term effect on the receptor.

9.4.13 Based on the nature of the effect, an assessment is then made whether the effect on a habitat or species is likely to be ecologically 'significant'. CIEEM guidance defines a 'significant effect' as *"an effect that either support or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general"*, going onto state *"significant effects encompass impacts on structure and function of defined Sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution)"*.

9.4.14 Significance is also assessed at an appropriate geographic scale. For example, a significant effect on a Site of Special Scientific Interest (SSSI) would be of national significance. Notwithstanding this however, consideration is also given to whether an effect is significant at a scale below the geographic context in which the feature is considered important.

9.4.15 For some ecological features (notable designations), there may be an existing statement of the conservation status of a feature and objectives and targets against which the effect can be judged. For example, Sites of Special Scientific Interest (SSSI) are assessed under six condition categories, namely favourable, unfavourable recovering, unfavourable no change, unfavourable declining, part destroyed and destroyed. An effect that exerts a change between these condition categories would be considered significant.

9.4.16 Where no existing statement of conservation status is available, an assessment is made against the existing status and condition of the habitat or species population, as recognised by survey data and background information, taking into account the level of ecological resilience or existing conditions that a habitat or species is currently subject to. An effect resulting in a long-term change to the existing background population trend or status at a given geographical level would be considered as significant. In this regard, a significant beneficial



impact could be defined as one that prevents or slows an existing decline in the favourable conservation status of a habitat or population as much as one that permitted a population or habitat area to increase.

9.4.17 The likelihood or uncertainty of an effect occurring as predicted is also considered. To assist with defining certainty, the following scale is used (with broad confidence levels indicated in percentage terms):

- Certain/near-certain: probability estimated at 95% chance or higher;
- Probable: probability estimated above 50% but below 95%;
- Uncertain: probability estimated above 5% but less than 50%;
- Extremely unlikely: probability estimated at less than 5%

Limitations

9.4.18 All of the species that occur in each habitat would not necessarily be detectable during survey work carried out at any given time of the year, since different species are apparent during different seasons. However, the habitat survey was undertaken within the optimal season, and additional information on the habitats present within the Site was collected during July 2024, allowing a robust assessment of habitats and botanical interest within the Site to be made.

9.4.19 Note was made of any invasive species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) that were observed during surveys. However, because the detectability of such species varies according to factors such as the time of year or Site management regime, the absence of invasive species should not be assumed even if no such species were recorded during the surveys undertaken.

9.4.20 The bat emergence surveys were undertaken in line with best practise guidance, with infra-red (IR) cameras used to cover all aspects of the buildings being surveyed wherever possible. However, a number of the buildings had some aspects which were unable to be covered by IR cameras or by surveyors, due to the presence of dense vegetation and steep banks.

9.4.21 A recognised limitation of bat activity surveys is that bat detectors can only provide an index of activity rather than determine absolute numbers of bats. The results of bat activity surveys should therefore only be considered indicative of the amount of use bats make of an area rather than a measure of the abundance of bats. In addition, some bat species that are more difficult to detect because of their quiet echolocation calls, such as Brown Long-eared Bat, may be under-recorded.

9.4.22 During the first night-time bat walkover survey, there was a fault with the Anabat Scout. A visual survey was started at 20:49, however the survey with a replacement Anabat Scout could not be started until 21:39, during the walked transect survey. No audio recordings were made in the start area; however, bats were observed flying around the buildings in the start location, likely foraging, which is in line with the results of the other surveys, such that this is not considered to be a significant constraint.

9.4.23 Densely vegetated habitats within the Site have the potential to reduce the detectability of field signs for faunal species such as Badger. A detailed survey was able to be completed and, whilst dense scrub vegetation is present within the Site, it is considered that the survey results do provide an accurate baseline.

9.4.24 Reptile mats were deployed at a density of approximately 2.9 refugia per hectare, which is below the recommended density range of 5-10 refugia per hectare. However, this does not account for the fact that the majority of the Site is unsuitable for reptiles, comprising short-sward pasture, with areas of suitable reptile habitat restricted to field boundaries and in the areas around the buildings, where the reptile mats were deployed. As such, in reality the mats were deployed at a sufficiently high density to demonstrate adequate survey effort.



Baseline Conditions

The Site

Habitats and Ecological Features

- 9.4.25 Full descriptions of habitats and ecological features within the Site and wider survey area are given in **Section 4** of the Baseline Ecological Appraisal at **Appendix 9.1**, whilst the location of habitats and ecological features are represented on **Figure 9.1 (Appendix 9.2)**.
- 9.4.26 A summary of habitats considered to be of ecological importance occurring within and adjacent to the Site (i.e. within the primary zone of influence) is given in **Table 9.3** below.

Table 9.3: Summary and evaluation of (non-designated) important habitats and ecological features present within the primary zone of influence

Habitat type	Description	Level of importance
Lowland Mixed Deciduous Woodland (W1-W2)	Areas of deciduous woodland are present to the east and west of the Site. Woodland W1, located to the east of the Site, is a small strip of a more substantial woodland which is mostly located off-Site. Woodland W2 is less developed, located within the west of the Site, among the buildings and modified grassland fields.	Local
Native Hedgerows	Native hedgerows line the majority of the Site boundary, as well as extending into the Site at the southeast, south, southwest and west. The hedgerows vary in nature but are generally dense, except those at the south of the Site (associated with offsite residential development) which are gapier and sparser in nature. Together with the woodland areas, the hedgerows within the Site form a valuable habitat network, providing connectivity for movement of wildlife across the Site.	Local

- 9.4.27 Other habitats present within the Site include other neutral grassland, modified grassland tall forbs, bramble scrub, buildings, hardstanding, horse manèges, vegetated gardens and individual trees. These habitats do not comprise important ecological features and are not subject to specific assessment.

Faunal use of the Site

- 9.4.28 A range of faunal surveys have been undertaken at the Site for bats, Badgers, Great Crested Newt, reptiles and breeding birds. In addition, general observations were made of any faunal use of the Site with particular attention paid to the potential presence of protected or notable species.
- 9.4.29 Full details of this survey work are included in the Baseline Ecological Appraisal at **Appendix 9.1**, whilst a summary of faunal species considered to be of ecological importance occurring within the Site and its immediate surrounds (i.e. the primary zone of influence) is set out in **Table 9.4** below.



Table 9.4: Summary and evaluation of important faunal species present within the primary zone of influence

Faunal species	Description	Level of importance
Bats (roosting)	Building B3b has the potential to support a Soprano Pipistrelle day roost, whilst eight trees with bat roost potential have been identified within the Site.	Site
Bats (foraging/commuting)	The majority of bat activity was recorded along the edge of woodland W1 and the off-Site woodland, and around the buildings and W2. A total of seven species or species groups were recorded with activity was dominated by Common Pipistrelle, with frequent Soprano Pipistrelle and occasional Barbastelle, Long-eared bat spp., Nathusius' Pipistrelle, Big Bat spp. and Myotis spp.	District
Badger	Evidence of Badger was recorded within and adjacent to the Site, including one active main sett, one inactive outlier sett, paths/push-throughs and latrines. During previous survey work, two additional setts were also identified; however, they appeared to be disused during the update survey work.	Local
Other Mammals (Brown Hare / Hedgehog)	Background records for these species are known from the wider vicinity of the Site, whilst the Site contains habitats that may be used by these species.	Site
Birds	The Site is considered to support a modest bird assemblage, with the species recorded typical of the habitats present on-Site. No Red List declining farmland species were recorded breeding at the Site, whilst all the Red or Amber Listed species recorded breeding within the vegetation at the Site remain abundant and widespread in a local and national context.	Site
Invertebrates	Habitats within the Site are likely to support a range of common and widespread species, with habitats such as mature trees and woodland potentially supporting more specialist invertebrate communities.	Site

The Surrounding Area

Ecological Designations

9.4.30 A summary of the local ecological designations is given in **Table 9.5** below. The table lists non-statutory designations with 2km of the Site, national level statutory designations within 5km of the Site and international level Statutory Designations within 20km of the Site. Designations within 2km of the site are shown at **Figure 9.2 (Appendix 9.2)**.

9.4.31 Further detail is provided in Section 3 of the Baseline Ecological Appraisal at **Appendix 9.1**.

Table 9.5: Ecological designations situated within the vicinity of the Site (international destinations within 20km, other statutory designations to 5km, non-statutory designations to 2km)

Name	Designation	Brief description	Distance from the Site	Level of value
Statutory Designations – international designations				
Chilterns Beechwoods	Special Areas of Conservation (SAC)	Designated for its <i>Asperulo-Fagetum</i> beech forests, with other qualifying features including semi-natural dry grasslands and	14.9 km W	International



Name	Designation	Brief description	Distance from the Site	Level of value
		scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>), and the presence of Stag Beetle <i>Lucanus cervus</i> .		
Wormley-Hoddesdonpark Woods	SAC	Designated on the basis of its Sub-Atlantic and medio-European Oak or Oak-Hornbeam forests of the <i>Carpinus betuli</i> .	19.1 km SE	International
Statutory Designations – national designations				
Batford Springs Local Nature Reserve	Local Nature Reserve (LNR)	Designated on the basis of its springs, which serve chalk streams and ponds.	0.5 km S	National
Marshall's Heath	LNR	Designated on the basis of its high biodiversity, with more than 1,300 species of plant and animal recorded in recent years, including over 40 species on national lists of threatened species.	1.4 km E	National
Wheathampstead Development Centre	LNR	Designated on the basis of its mosaic of habitats including unimproved neutral grassland, secondary woodland, scrub and a pond which supports a variety of wildflowers, invertebrates and birds.	3.6 km SE	National
Non-statutory Designations				
Holcroft's Springs	Local Wildlife Site (LWS)	Designated as potentially comprising ancient Pedunculate Oak <i>Quercus robur</i> /Hornbeam <i>Carpinus betulus</i> woodland (albeit it is noted that this woodland is not identified as comprising ancient woodland on Natural England's Ancient Woodland Inventory).	Separated from the Site by Common Lane, which forms the north-eastern boundary of the Site (0.005 km).	District
Sauncey Woodland	LWS	Designated for ancient woodland, common land supporting acid grassland and woodland, and buildings used by protected species respectively.	0.2 km E	District
Bower Heath Common	LWS	Comprises common land supporting secondary woodland, scrub and semi-improved acidic grassland.	0.2 km N	District
White Gables, Bower Heath Lane	LWS	Designated as its buildings and environs are important for protected species.	0.2 km N	District
Wall Wood	LWS	Designated for its old semi-natural woodland.	0.3 km N	District
River Lea Pastures, N. of Harpenden	LWS	Designated for the extensive pastures either side of the River Lea, supporting a reasonable species mix and grassland indicators.	0.3 km W	District



Name	Designation	Brief description	Distance from the Site	Level of value
Batford Springs and Meadow	LWS	Partially overlaps with Batford Springs LNR. Designated for its mosaic of habitats including grassland, derelict cress beds, five natural springs (which emerge from the underlying chalk aquifer), broadleaved plantation, semi-natural woodland and the River Lea.	0.5 km S	District
Westfield Wood	LWS	Designated for its ancient Pedunculate Oak/Hornbeam woodland.	0.6 km W	District
Grasslands near Mackerye End	LWS	Comprises two small species-rich, neutral unimproved grasslands.	0.8 km E	District
Ambrose Wood	LWS	Designated for its ancient Pedunculate Oak/Hornbeam woodland.	1.0 km SW	District
Hill Farm, Bowers Heath	LWS	Designated as its buildings and environs are important for protected species.	1.0 km N	District
Bishey Wood Green Lane	LWS	Comprises a green lane with substantial hedgerows.	1.0 km N	District
The Nicky Line	LWS	Comprises a disused railway line bordered by a species-rich mosaic of linear woodland and scrub and open areas.	1.1 km SW	District
Marshalsheath Wood	LWS	Designated for its ancient Hornbeam coppiced woodland.	1.1 km E	District
Castle Farm Woodland by River Lea	LWS	Designated for its mosaic of habitats including woodland, reed swamp, damp semi-improved neutral grassland, the river Lea and an excavated fishing lake surrounded by disturbed, rough ground.	1.2 km SE	District
Leasey Bridge Dismantled Railway	LWS	Comprises a disused railway line supporting a mosaic of diverse rough neutral grassland and mixed scrub.	1.2 km SE	District
Plummers Lane	LWS	Comprises an ancient green lane with substantial hedgerows and small patches of broadleaved woodland.	1.2 km N	District
Marshalls Heath	LWS	Overlaps with the LNR of the same name and is designated for the same reasons.	1.4 km E	District
Bishey Wood	LWS	Designated for its ancient Pedunculate Oak/Hornbeam woodland.	1.4 km E	District
Piggotshill Wood	LWS	Designated for its ancient Pedunculate Oak/Hornbeam woodland.	1.6 km SE	District
Harpenden Common	LWS	Designated for its mosaic of habitats including unimproved and semi-improved neutral grassland, acid grassland and scrubland.	1.9 km S	District



Priority habitats, ancient woodland and notable trees

- 9.4.32 Of the habitats on-Site, the lowland mixed deciduous woodland and the hedgerows are considered to comprise Priority Habitat. There are no records of any ancient woodland, or notable or veteran trees within the Site. The closest area to the Site mapped as comprising ancient semi-natural woodland in Natural England's Ancient Woodland Inventory is Sauncey Woodland, located approximately 0.2km to the east of the Site. However, Holcroft's Springs LWS, which lies almost adjacent to the north-eastern boundary of the Site, is designated on the basis that it potentially comprises ancient woodland, due to field evidence suggesting an ancient origin; and the fact it is shown on Bryant's map (1822).

Baseline Evolution

- 9.4.33 The future baseline of the Site is unlikely to differ significantly from the current baseline in the absence of the Proposed Development as it is assumed that the current use of the land as a riding school / livery would continue.

9.5 Primary and Tertiary Mitigation

- 9.5.1 The Proposed Development that is assessed in terms of likely significant effects has been developed following an iterative process of design, with a number of mitigation measures incorporated as part of the Proposed Development. Particular measures with regards to ecology are discussed below.

Primary Mitigation

Demolition

- 9.5.2 No primary mitigation measures are relevant to ecology during the demolition phase.

Construction

- 9.5.3 No primary mitigation measures are relevant to ecology during the construction phase.

Operation

- 9.5.4 During the operation phase, the following primary mitigation is relevant to ecology:
- Retention of the habitats of elevated ecological value wherever possible, notably woodland and hedgerows, as shown on Open Green Infrastructure Parameter Plan (**Appendix 1.2**).
 - Retention of habitats/areas of elevated value for faunal species where possible. With specific regards to foraging and commuting bats, woodland W1, where the much of the bat activity was focussed, is to be fully retained, as well as the majority of the hedgerows and other vegetation around the Site boundaries.
 - Provision of substantial areas of open space within the northern part of the Site, which will be subject to habitat enhancement and creation works, such as enhancement of the existing grassland to create a more diverse sward, tree planting and creation of wetland areas in the form of Sustainable Drainage Systems (SuDS).

Tertiary Mitigation

Demolition

- 9.5.5 Roosting Bats: Building B3b is considered to support a Soprano Pipistrelle day roost (see Plan 6818/ECO4 in the Baseline Ecological Appraisal at **Appendix 9.1**), which will be lost to facilitate the Proposed Development. To address legislative requirements with regards to



roosting bats, demolition of this building will need to be carried out under European Protected Species ('EPS') development licence obtained from Natural England, with implementation of an appropriate mitigation strategy.

- 9.5.6 The exact mitigation measures to be implemented will be agreed with Natural England as part of the licence application. However, measures are likely to include restrictions on timing of works, check surveys prior to works commencing and staged removal of building features offering bat potential under the supervision of a licensed ecologist. New roosting opportunities will be provided to compensate for habitat losses.
- 9.5.7 Nesting Birds: The potential loss of active nests during demolition will be avoided by either undertaking demolition outside of the bird nesting season (March to August inclusive) or, if necessary, preceding demolition with an inspection by a suitably qualified ecologist. If any active nests are identified within the buildings, demolition will be postponed until the chicks have fledged or, in the case of Barn Owl, are no longer dependent upon the nest Site. These checks should be undertaken immediately prior to the start of works or no more than 48 hours in advance of works. Given the nature of proposed works, multiple checks may need to be undertaken if works to the buildings are phased.

Construction

- 9.5.8 It is considered that standard management measures and measures to demonstrate legal compliance would be implemented as part of the construction phase of the Development, to be detailed within a Construction Environmental Management Plan (CEMP). Such measures include:
- Installation of protective fencing and toolbox talks to minimise the risk of retained habitats being subject to disturbance or damage during construction activities;
 - Standard measures to avoid pollutant spills and control drainage during construction works;
 - Avoidance of lighting where possible during construction works, with any lighting required for security purposes to be located away from sensitive habitats such as woodlands, watercourses and trees;
 - Adoption of industry best practice to minimise dust generating activities and noise disturbance during construction;
 - Implementation of measures to avoid killing or injury of protected species, such as Hedgehog or Brown Hare, to include timing constraints and hand searches, where required; and
 - General safeguarding measures in relation to other animal species, to include inspections and means of escape from trenches/pits, and secure storage of chemicals.
- 9.5.9 In addition to the CEMP, specific faunal mitigation measures are also anticipated to be required for legislative purposes, to be secured by way of a suitably worded planning condition, as set out below:
- 9.5.10 Badger: Considering this species are known to be present on-Site, a check survey will be undertaken prior to the commencement of construction works. If it is not possible to accommodate existing setts within the confines of the Proposed Development, closure of the sett(s) would be required, to be carried out under a licence obtained from Natural England, with implementation of an appropriate mitigation strategy.
- 9.5.11 The exact mitigation measures to be implemented will be agreed with Natural England as part of the licence applications. However, measures are likely to include provision of an alternative sett if the likely main sett is affected, along with an exclusion exercise and removal of sett(s) to be carried out under the supervision of a licensed ecologist.



- 9.5.12 Nesting Birds: The potential loss of active nests during construction will be avoided by either undertaking clearance of potential bird nesting habitat outside of the bird nesting season (March to August inclusive) or, if necessary, preceding any clearance with an inspection by a suitably qualified ecologist. Any active nests will be cordoned off (minimum 5 m buffer) or works to an area postponed where necessary until the chicks have fledged or, in the case of Barn Owl, are no longer dependent upon the nest Site. These checks should be undertaken immediately prior to the start of works or no more than 48 hours in advance of works. Given the nature of proposed works, multiple checks may need to be undertaken if removal of the vegetation are phased.
- 9.5.13 Further detail on how these embedded measures avoid or mitigate significant effects is given in **Section 9.6**.

Operation

- 9.5.14 No tertiary mitigation measures are relevant to ecology during the operational phase.

9.6 Assessment of Significant Likely Effects

- 9.6.1 This section describes likely signification effects of the ecological assessment, with the inclusion of primary and tertiary mitigation measures.

Demolition

- 9.6.2 The potential effects considered within this section are those relating to temporary factors arising from the demolition process, and considered solely in relation to roosting bats and birds.

Bats – Roosting

- 9.6.3 Building B3b was considered likely to support a Soprano Pipistrelle day roost of low conservation significance. This building is located within the development footprint and will therefore be removed to facilitate the Proposed Development which could result in killing/injury to any bats present at the time of the works. However, such effects would be avoided through implementation of mitigation, to include safeguards to be implemented during building demolition, as detailed within a method statement, to be agreed with Natural England as part of a European Protected Species licence application (see Tertiary Mitigation).
- 9.6.4 As such, taking into account implementation of suitable safeguards detailed within a Natural England licence application, demolition effects on roosting bats are considered to be **negligible** and **not-significant**, with a **probable** likelihood of the assessment made.

Birds

- 9.6.5 Potential effects on bird species during the demolition phase relate to a direct loss of active nests in buildings, resulting in a direct effect on local populations and also constituting an offence under the Wildlife and Countryside Act 1981 (as amended), which affords protection to wild birds and their eggs. However, such effects could be avoided with demolition scheduled outside of the bird nesting season (March to August inclusive) or, if necessary, preceding demolition with an inspection by a suitably qualified ecologist (see Tertiary Mitigation).
- 9.6.6 As such, taking into account implementation of suitable safeguards, demolition effects on birds are considered to be **negligible** and **not-significant**, with a **probable** likelihood of the assessment made.

Construction

- 9.6.7 The potential effects considered within this section are those relating to temporary factors arising from the construction process, which will cease to apply following completion of the



Proposed Development (referred to as 'Operational Phase'). Thus, loss of habitats through permanent land take for development is considered as an 'Operational Phase' effect, although the land take actually occurs during the construction phase of the Proposed Development.

Statutory Ecological Designations

- 9.6.8 The nearest statutory designation is Batford Springs LNR, located 0.5 km to the south of the Site. At this distance, this LNR and other more distant ecological designations are highly unlikely to be affected during the construction phase, particularly following implementation of tertiary mitigation in the form of the CEMP. Effects on statutory ecological designations are therefore considered to be **negligible** and **not-significant**, with a **near certain** likelihood of the effect occurring.

Non-statutory Ecological Designations

- 9.6.9 Several non-statutory ecological designations are present within the area surrounding the Site, the nearest of which is Holcroft's Springs Local Wildlife Site (LWS) located approximately 0.005 km from the Site, beyond Common Lane, which forms the Site's north-east boundary. As the LWS is off-site, and not hydrologically connected to the Site, the majority of adverse effects resulting from construction are unlikely following adoption of industry best practice measures as detailed within the CEMP in the form of construction safeguards such as control of dust and construction lighting (see Tertiary Mitigation).
- 9.6.10 A number of other non-statutory designations are located over 0.2 km from the Site. At this distance, ecological designations are highly unlikely to be affected during the construction phase.
- 9.6.11 As such, taking into account measures within the CEMP, construction effects on non-statutory ecological designations are therefore considered to be **negligible** and **not-significant**, with a **near certain** likelihood of the assessment made.

Habitats and Ecological Features

- 9.6.12 Large parts of the Site will be subject to construction works resulting in the loss of existing habitats. This permanent land-take of habitats (and resultant effects on fauna supported by such habitats) is discussed in the Operational Phase section below. This section relates to effects during the construction phase, which are largely temporary in nature.
- 9.6.13 Habitats of importance within and adjacent to the Site, namely woodland and hedgerows are largely retained within the Proposed Development. Retained habitats may be subject to potential effects such as dust deposition, damage from compaction or other damage from construction machinery or vehicles, and surface run-off of contaminants. However, following adoption of industry best practice measures as detailed within the CEMP, such effects would be controlled to a level that would not result in a significant effect on retained and adjacent habitats (see Tertiary Mitigation).
- 9.6.14 As such, taking into account measures within the CEMP, construction effects on habitats of importance within the Site are considered to be **negligible** and **not-significant**, with a **probable** likelihood of the assessment made.

Bats – Foraging and Commuting

- 9.6.15 Foraging and commuting bats could be affected during the construction phase by lighting of construction areas. However, such effects would only be for the duration of the construction phase, whilst the requirement for lighting during construction works will be minimal given the Site will comply with standard construction hours (Monday to Friday between 07:00 to 19:00 and Saturday 08:00 and 13:00). Further, lighting requirements are likely to be mostly during the winter months when bats are hibernating and less likely to be using these habitats. Foraging and commuting bats could also be affected by noise disturbance, although this would be mostly during the day when foraging or commuting bats would be absent. However,



such effects could be avoided through the implementation of safeguards detailed within the CEMP (see Tertiary Mitigation).

- 9.6.16 Other construction effects such as airborne pollutants are unlikely to result in a direct effect on foraging or commuting bats.
- 9.6.17 As such, taking into account measures within the CEMP, construction effects on foraging and commuting bats are considered to be **negligible** and **not-significant**, with a **probable** likelihood of the assessment made.

Bats – Roosting

- 9.6.18 Eight trees have been identified within the Site which were recorded to support bat roosting potential. All such features are accommodated within the Proposed Development, whilst following adoption of industry best practice measures as detailed within the CEMP, disturbance effects during the construction phase (notably lighting and noise) could be avoided.
- 9.6.19 As such, taking into account implementation of suitable measures within the CEMP, construction effects on roosting bats are considered to be **negligible** and **not-significant**, with a **probable** likelihood of the assessment made.

Badger

- 9.6.20 A small number of Badger setts have been recorded within/adjacent the Application Site, including a likely main sett. Given the outline nature of the proposals, there may be scope to accommodate these setts within the development during the detailed design. However, in the event this is not possible, development works could result in killing/injury to any Badgers present at the time of the works. However, such effects would be avoided through implementation of mitigation, to include safeguards to be implemented during sett closure, as detailed within a method statement, to be agreed with Natural England as part of a licence application (see Tertiary Mitigation, paragraph 9.5.8).
- 9.6.21 Any retained setts could also be impacted by works within close proximity, whilst construction activities could also result in temporary disruption or severance of commuting routes between setts and retained foraging areas, whilst areas of the Site will also be unavailable to foraging Badgers for the duration of construction works until new habitats are established. Badgers could also be subject to disturbance from lighting of construction areas, and would be at risk from construction hazards, e.g. through the creation of trenches in which Badgers could become trapped. However, such effects could be avoided through the implementation of safeguards detailed within the CEMP.
- 9.6.22 As such, taking into account implementation of suitable safeguards detailed within a Natural England licence application and measures within the CEMP, construction effects on Badger are considered to be **negligible** and **not-significant**, with a **probable** likelihood of the assessment made.

Other Mammals

- 9.6.23 Brown Hare and Hedgehog are known to be present in the wider Site surrounds, whilst areas of grassland, woodland and hedgerows provide suitable habitat. Mammals within these habitats would be at risk of injury from construction activities such as vegetation clearance and tracking of vehicles. However, such effects could be avoided through the implementation of safeguards detailed within the CEMP.
- 9.6.24 As such, taking into account implementation of suitable safeguards detailed within the CEMP, construction effects on Brown Hare and Hedgehog are considered to be **negligible** and **not-significant**, with a **probable** likelihood of the assessment made.



Birds

- 9.6.25 Potential effects on bird species during the construction phase relate to a direct loss of active nests, resulting in a direct effect on local populations and also constituting an offence under the Wildlife and Countryside Act 1981 (as amended), which affords protection to wild birds and their eggs. In this regard, a number of sections of hedgerow and woodland are to be removed under the Proposed Development. However, such effects could be avoided through clearance of potential bird nesting habitat outside of the bird nesting season (March to August inclusive) or, if necessary, preceding any clearance with an inspection by a suitably qualified ecologist (see Tertiary Mitigation).
- 9.6.26 Construction activities could also result in noise and visual disturbance to nesting birds in close proximity to construction areas, albeit these effects are anticipated to be highly localised and would be avoided through the implementation of safeguards detailed within the CEMP (see Tertiary Mitigation).
- 9.6.27 As such, taking into account implementation of suitable safeguards and measures within the CEMP, construction effects on birds are considered to be **negligible** and **not-significant**, with a **probable** likelihood of the assessment made.

Invertebrates

- 9.6.28 Invertebrates could be subject to adverse effects during the construction phase through the generation of dust and its subsequent deposition on vegetation which could potentially affect invertebrates and egg-laying Sites within retained habitats. However, such effects would be temporary in nature and could be avoided following adoption of industry best practice measures as detailed within the CEMP with regard to dust management (see Tertiary Mitigation).
- 9.6.29 As such, taking into account implementation of suitable safeguards and measures within the CEMP, construction effects on invertebrates are considered to be **negligible** and **not-significant**, with a **probable** likelihood of the assessment made.

Operation

- 9.6.30 The potential effects considered within this section are those relating to the 'operational' phase of the Proposed Development. This includes the loss of habitats through permanent land take for development, in addition to potential effects resulting from the operation of the Proposed Development such as recreational pressure, noise, and light disturbance.

Statutory Ecological Designations

- 9.6.31 Three statutory designations are located within 5 km of the Site, namely Batford Springs LNR, Marshalls Heath LNR and Wheathampstead Development Centre LNR, located 0.5 km to the south, 1.4 km to the east and 3.6 km to the south-east of the Site respectively.
- 9.6.32 These designations will not be affected by land take associated with the Proposed Development, given their distance to the Site. They are also unlikely to be subject to indirect effects during the operational phase such as noise and lighting. However, these designations have the potential to be subject to indirect effects as a result of recreational pressure, particularly Batford Springs LNR, which would be in walking distance from the Proposed Development. However, part of the purpose of LNRs is to provide access to the public where possible, offering opportunities to learn about and/or enjoy nature, and they are inherently much less sensitive than other statutory designations such as Sites of Special Scientific Interest (SSSIs). Batford Springs is an urban LNR in Harpenden, already surrounded by residential areas, such that it is likely already subject to a high degree of use, and it is not anticipated that additional recreational use arising from the Proposed Development would be likely to have a significant adverse effect upon this receptor. The other LNRs within 5 km are better separated from the Site and not as readily accessible, such that these would not be expected to be subject to any particular increase in recreational pressure.



- 9.6.33 In addition, the substantial amount of open space and walking routes provided on-Site as part of embedded primary mitigation is likely to provide a desirable alternative to the LNRs, reducing the number of people who might otherwise use them.
- 9.6.34 On this basis, effects on Batford Springs LNR, Marshalls Heath LNR and Wheathampstead Development Centre LNR, are considered to be **negligible** and **not-significant**, while it is **probable** that the effect will occur.
- 9.6.35 No European designations are located within the immediate vicinity of the Site, with the nearest, namely Chiltern Beechwoods SAC, located approximately 14.9 km to the west of the Site. Given the separation between the designation and the Site, no direct effects (such as noise and lighting) are anticipated as a result of the development, whilst the Site is also located outside of the identified 12.6 km Zone of Influence for recreational disturbance. Other European designations are located further afield and therefore also unlikely to be adversely affected. In terms of assessment under the Habitats Regulations, it is therefore considered that the Proposed Development can be screened out in terms of a likely significant effect on internationally designated Sites, and an Appropriate Assessment would not be required.

Non-statutory Ecological Designations

- 9.6.36 A number of non-statutory ecological designations are present within the area surrounding the Site, the nearest of which is Holcroft's Springs LWS located beyond Common Lane, which forms the north-east boundary of the Site.
- 9.6.37 Holcroft's Springs LWS is fully retained under the proposals, lying outside of the Site, with buffer provided from the built development areas. However, given the close proximity of residential development, it could potentially be subject to adverse effects during the operational phase including air quality, hydrology, recreational pressure, cat predation and other urbanisation and disturbance effects.
- 9.6.38 The LWS is located more than 200 m away from main roads, such that it is not likely to be subject to air quality effects, and there is no obvious hydrological connectivity between the LWS and the Site. The LWS is also in private ownership with no public rights of way, and is therefore unlikely to be subject to any increase in recreational activity. The LWS may be impacted by cat predation and disturbance from the Proposed Development (particularly increased lightspill), albeit given the separation of the LWS to the Site by Common Lane, no effects such as dumping of garden waste and informal garden extensions are expected to occur.
- 9.6.39 Other non-statutory designations are further removed from the Site and are also unlikely to be subject to adverse effects from air-quality and hydrological impacts. Given they are a greater separation from the Site than Holcroft's Springs LWS, are also unlikely to be subject to cat predation and disturbance.
- 9.6.40 The Proposed Development could contribute to existing recreational pressure at these designations, particularly Bower Heath Common LWS to the north of the Site, which can be accessed via Common Lane which passes through the designation.
- 9.6.41 Overall, prior to secondary mitigation, non-statutory designations in the vicinity of the Site could be subject to a **minor, adverse** and **long-term** effect during the operational phase of the development, which could be **significant** at the **district** level (uncertain).

Habitats and Ecological Features

- 9.6.42 An assessment of completed development effects on habitats considered to form important ecological features is set out below. This largely relates to permanent habitat loss, together with anthropogenic effects such as damage to vegetation from recreational disturbance and pollution. This assessment is expanded in a separate Biodiversity Net Gain Assessment, which quantifies the change in habitats and hedgerows present at the site, following implementation of the Proposed Development.



- 9.6.43 Lowland Mixed Deciduous Woodland: Approximately 43% of woodland within the Site will be lost to the Proposed Development, all of which is located within the west of the Site.
- 9.6.44 Retained woodlands may be subject to adverse effects as a result of recreational disturbance, although given the secondary nature of the majority of these woodlands, retained woodlands are largely not considered to be particularly sensitive to recreational disturbance. Retained woodlands could also be subject to informal garden extensions and dumping of garden waste where woodlands lie adjacent to residential areas.
- 9.6.45 On this basis, prior to secondary mitigation, completed development effects on woodland are considered to be **moderate**, **adverse** and **long-term**, and **significant** at the **local** level (probable).
- 9.6.46 Hedgerows: The majority of hedgerows are retained and protected as part of the green infrastructure for the Proposed Development, with losses required predominately for access. In total, approximately 15% of hedgerows within the Site will be lost to the Proposed Development.
- 9.6.47 On this basis, prior to mitigation, completed development effects on hedgerows are considered to be **minor**, **adverse** and **long-term**, and **significant** at the **local** level (probable).

Bats – Roosting

- 9.6.48 Building B3b was recorded to support a likely Soprano Pipistrelle day roost of low conservation significance, which will be lost to facilitate the Proposed Development.
- 9.6.49 The Site supports eight trees with bat roost potential, all of which are located within green space and can be retained under within the Proposed Development. Potential roosting habitat within and adjacent to the Application Site may be at risk of some disturbance due to the built development, notably from lighting, particularly those in close proximity to the proposed sports facilities.
- 9.6.50 Therefore, operational effects on roosting bats are considered to be **minor**, **adverse** and **long-term** and **significant** at the **Site** level (probable).

Bats – Foraging and Commuting

- 9.6.51 The Site is considered to support moderate levels of bat activity, with at least seven bat species (or species groups) recorded over the course of the survey work at the Site.
- 9.6.52 Whilst large areas of habitat are to be affected by the Proposed Development, this largely comprises grassland pasture, which is of relatively low value to foraging and commuting bats, whilst a network of green infrastructure corridors and areas of semi-natural open space will be provided through and around the built development, maintaining suitable habitat and connectivity between these areas. The majority of boundary woodland and hedgerows forming higher value bat habitat are retained, although there will be partial losses of these habitat areas, particularly in the west around the existing buildings. Creation of roads and severance of hedgerows will impact on habitat connectivity for bats across the Site. Furthermore, bat species may be affected by disturbance associated with the Proposed Development, notably as a result of light spill into areas used by foraging and commuting bats.
- 9.6.53 The effects of lighting vary between species, with some bat species such as Common Pipistrelle and Soprano Pipistrelle able to cope with relatively high light levels (of up to 14 lux) and known to utilise lights as a foraging focus for insects attracted to lights. However, many bat species (particularly late emerging species such as Brown Long-Eared and *Myotis* bats) will avoid lit areas, and attraction of insects to lit areas can result in adjacent habitats supporting reduced numbers of insects, further impacting on the ability of bats being able to feed. Activity was dominated by Common Pipistrelle and Soprano Pipistrelle, which are relatively tolerant of higher light levels than most other species, with other species recorded in



very low numbers. Nonetheless, where present, these other species could be particularly impacted by increased lighting associated with the Proposed Development.

- 9.6.54 Bats may also be at risk of traffic collisions where roads are located across commuting routes, although given that roads are likely to be subject to speed restrictions due to the urban setting and are unlikely to be subject to high levels of use at night, the risk of traffic collisions is relatively minimal.
- 9.6.55 Therefore, largely as a result of increased light levels, effects on foraging and commuting bats from the completed development prior to secondary mitigation are considered to be **minor, adverse and long-term**, and would be **significant** at the **district** level, although **uncertain** to occur.

Badger

- 9.6.56 As detailed previously in relation to construction effects, a small number of Badger setts have been recorded within/adjacent the Application Site, including a likely main sett. Given the outline nature of the proposals, there may be scope to accommodate these setts within the development during the detailed design. In the event these setts cannot be accommodated, these will be closed under licence and, in the case of the main sett, a replacement sett provided within the area of open space within the north of the Site.
- 9.6.57 Foraging habitat will also be maintained within retained areas of open space, although given the loss of grassland and woodland, Badgers are likely to experience moderate reductions in terms of the available foraging resource. Nevertheless, Badgers are highly adaptable in their foraging behaviour and large areas of alternative foraging habitat will remain in the Site surrounds.
- 9.6.58 Construction of roads could create barriers to movement of Badgers (subject to design) and may lead to a risk of traffic accidents, particularly where these cross commuting corridors. However, given that roads are likely to be subject to speed restrictions due to the residential setting and are unlikely to be subject to high levels of use at night, such effects are likely to be minimal.
- 9.6.59 Lighting and disturbance associated with built development areas may also discourage use of habitats within and adjacent to built development by Badgers, whilst setts located within open space could be affected by recreational disturbance.
- 9.6.60 Overall therefore, effects on Badger from the completed development prior to secondary mitigation are considered to be **minor, adverse and long-term**, and would be **significant** at the **local** level (probable).

Other Mammals

- 9.6.61 Habitats considered to be of elevated value for other mammal species such as Brown Hare and Hedgehog would be subject to partial losses as part of the Proposed Development. However, establishment of gardens and other open space under the proposals will maintain suitable habitat opportunities for Hedgehog particularly, although these species could be subject to some adverse effects such as lightspill or recreational disturbance of these areas.
- 9.6.62 Accordingly, prior to secondary mitigation, overall effects other mammals from the completed development are considered to be **minor, adverse and long-term**, and **not-significant (probable)**.

Birds

- 9.6.63 The Proposed Development will entail the permanent loss of habitats, which will result in a reduction in nesting habitat for a range of species, particularly those associated with the stable buildings such as Swall and House Sparrow. However, the majority of species recorded at the



Site are associated with woodland and hedgerows, which are largely retained under the Proposed Development and would be likely to benefit from new habitat creation.

- 9.6.64 Some common garden species such as Blue Tit, Great Tit, Robin and Blackbird will likely benefit from new habitats provided by gardens as they establish, and from supplementary feeding by residents.
- 9.6.65 Birds may also be affected by cat predation, disturbance associated with recreational use and residential areas, and increased risk of road traffic accidents (albeit this is less likely given the low traffic speeds which will be in place). Some bird species may also be affected by light-spill from the new development.
- 9.6.66 Overall therefore, effects on birds from the completed development prior to secondary mitigation are considered to be **minor-negligible, adverse and long-term**, and **not-significant** (probable).

Invertebrates

- 9.6.67 Habitats considered to be of elevated value for invertebrate species include woodland, hedgerows and associated mature trees, which would be subject to partial losses. However, establishment of gardens and other open space under the proposals will maintain suitable habitat opportunities for invertebrates, with the diversity of plant species to be provided within such areas likely providing more favourable foraging and shelter resources than the existing intensively grazed grassland pasture. Invertebrates may however be subject to some adverse effects such as lightspill or recreational disturbance of areas used for nesting or shelter.
- 9.6.68 Accordingly, prior to secondary mitigation, overall effects on invertebrates from the completed development are considered to be **minor, adverse and long-term**, and **not-significant** (probable).

9.7 Secondary Mitigation and Enhancement

Demolition

- 9.7.1 No significant adverse effects are anticipated following implementation of primary and tertiary mitigation. Accordingly, no secondary mitigation is considered necessary.

Construction

- 9.7.2 No significant adverse effects are anticipated following implementation of primary and tertiary mitigation. Accordingly, no secondary mitigation is considered necessary.

Operation

- 9.7.3 Potentially significant effects have been identified in relation to non-statutory designations, habitats and ecological features, bats (roosting and foraging/commuting) and Badger. These effects are largely as a result of habitat losses, together with disturbance and urbanisation effects associated with new development, notably lighting. An overview of secondary mitigation proposed to avoid or mitigate significant adverse effects is set out below.

Sensitive Lighting Design

- 9.7.4 To minimise effects on foraging and commuting bats (and other nocturnal species) as a result of lightspill, a lighting design for the Proposed Development will be prepared at the detailed design stage incorporating measures to reduce the effects of lighting on bats, to be secured by way of a suitably worded planning condition. This will be reviewed by a suitably qualified



ecologist to provide assurances that effects on sensitive habitats are avoided. Measures which will be incorporated into the lighting design include:

- Avoidance of lighting where practical within green infrastructure areas, particularly along boundary habitats;
- Where lighting is required, consideration will be given to the use of low-level bollard lighting, solar studs or handrail lighting, avoiding upward lightspill into tree canopies. Otherwise, directional lighting should be implemented, with the use of louvres, shields or hoods as required to avoid lightspill away from features to be lit;
- Where road crossings are proposed through green infrastructure areas, consideration will be given to spacing of lighting columns or other lighting control measures to maintain a central dark or low light area;
- Low pressure sodium lights will be used where appropriate, as these have a lower attraction to insects;
- Use of specialist sports pitch lighting, if required, which will create minimal spill beyond the pitch extremities and introduction of limitation on the evening and late night uses of the floodlights and facilities, will limit the hours during which light-spill occurs.
- In addition, 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 and residential areas.

Design of the Built Development

9.7.5 A number of measures will be implemented as part of the detailed design of the built development to minimise adverse effects on habitats and ecological designations during the operational phase. This will include:

- Where practical, housing areas will be designed to face out onto retained woodland, providing visual surveillance and avoiding gardens backing onto boundary habitats, preventing issues such as informal garden extensions and fly-tipping. This will be further reinforced by provision of a hard edge to the built development where practical, in the form of roads or footpaths. A similar approach will be adopted where housing is located adjacent to other open space areas (such as green corridors) where practical.
- A SUDS scheme will be implemented to manage run-off from built development areas, comprising a network of swales, soakaways, infiltration trenches and balancing ponds. The use of SUDS features will help to reduce the potential effect of point source pollution incidents from garden chemicals and/or domestic chemicals. Pollution control measures such as filter drains or petrol / water interceptors will also be used to minimise the risk of polluted surface water runoff. Attenuation areas are also proposed to control surface water runoff rates to the required greenfield rate and to attenuate pollutants prior to discharge into the wider surface water network.
- To maintain connectivity across the Site for ground-based fauna such as Hedgehogs, other small mammals, amphibians and reptiles, boundary treatment solutions such as fence cut-outs, missing bricks at wall bases, or landscaped boundaries (e.g. hedgerows) will be employed within areas of built development.

Management of Recreational Activity

9.7.6 Substantial areas of public open space are to be provided under the Proposed Development. This will provide a recreational resource for new residents, providing a variety of attractive greenspace for activities such as dog walking, which would help to reduce recreational



pressure at off-Site areas including non-statutory designations. The natural and semi-natural meadow parkland within the northern parts of the Site will comprise a diversity of semi-natural habitats including meadow grassland, woodland, trees and scrub, forming key habitats for faunal species and recreational resource for residents. Where necessary, fencing or shrub planting will be utilised to discourage access to any specific interest features (such as notable trees or Badger setts).

- 9.7.7 Such habitat creation will create a corridor of high-quality habitat linking up nearby non-statutory designations and important habitat areas, as well as acting as a 'stepping stone' for wildlife such as commuting bats. The creation of wildflower grassland and planting of mixed scrub and native trees will maximise the Site's open space potential, complementing the habitats present in the nearby landscape.

Enhancement Measures

- 9.7.8 The National Planning Policy Framework (NPPF) encourages new developments to maximise the opportunities for biodiversity through incorporation of enhancement measures. The proposals present the opportunity to deliver ecological enhancements at the Site for the benefit of local biodiversity. Such measures will also help to offset non-significant habitat losses and other effects of the Proposed Development, helping to achieve an overall net gain in biodiversity. Such enhancement measures would be explored further at part of the detailed design and are expected to be secured by an appropriately worded planning condition.
- 9.7.9 Habitat Creation and Management: Large areas of open space are to be provided within the Site, forming a dedicated area for informal public recreation and new habitat creation, whilst additional open space areas will be provided between and around built development areas, forming a network of green infrastructure within the Site. Within these areas, it is proposed that a range of habitats are created:
- Native tree and shrub planting will be provided within areas of open space across the Site, forming new blocks of shrubs, scattered wooded vegetation and treelines. This will benefit woodland species such as Song Thrush and Brown Long-eared bat;
 - Tree and shrub planting will also be provided within built development areas. Although a proportion of this is likely to include ornamental species or cultivars, species of wildlife benefit will be chosen where appropriate, providing additional resources for wildlife such as fruits or nectar. Areas of orchard planting within the Community Garden will also provide benefits for wildlife, providing a food source for species such as Badger and a range of bird species;
 - Scrub habitat will be established along woodland margins, hedgerows and within grassland areas creating scrub mosaics and forming valuable ecotone habitats for a range of wildlife, including reptiles, small mammals and invertebrates; and
 - Open grassland areas will be established as wildflower grassland, subject to a varied management regime to provide a range of sward types including meadow, subject to cutting 2-3 times a year to promote a flower rich sward, whilst areas of rough, tussocky grassland will be established along woodland and hedgerow margins. As such, grassland areas will provide a rich habitat resource for invertebrate species, in turn providing increased foraging opportunities for wildlife including birds, bats and Badger.
- 9.7.10 Faunal Enhancements: The above habitat creation and enhancement measures will provide benefits to a range of fauna. In addition, to provide specific nesting and roosting opportunities for a range of faunal species under the Proposed Development, it is proposed that faunal habitat features are provided in association with new buildings and open space areas:
- Bat boxes will be provided on new buildings and retained trees within the Site. Box specifications will be selected to be long lasting and provide benefits to Priority Species recorded in the local area, such as Brown Long-eared Bat, Soprano Pipistrelle and Noctule;



- Nesting opportunities for birds will be provided in the form of nest boxes installed on new buildings and retained trees. Box specifications will be selected to benefit the UK Priority Species Starling and House Sparrow, and the Amber List species Swift; and
- Provision of habitat piles will provide shelter for small mammals, such as Hedgehog, and invertebrate species.

9.8 Residual Effects

Demolition

- 9.8.1 No secondary mitigation measures have been identified for the demolition phase, therefore all residual demolition effects remain as identified in **Section 9.6** and are considered to be **not-significant**.

Construction

- 9.8.2 No secondary mitigation measures have been identified for the construction phase, therefore all residual construction effects remain as identified in **Section 9.6** and are considered to be **not-significant**.

Operation

- 9.8.3 Mitigation to be implemented as part operational development is considered to avoid or minimise effects from recreational activity and urbanisation effects (notably lighting disturbance). As such, residual effects in relation to non-statutory designations, bats (roosting and foraging/commuting) and Badger are considered to be reduced to **not-significant** levels.
- 9.8.4 The following significant effects were identified in relation to habitats and ecological features:
- Woodland – Loss of 43% of the woodland resource at the Site is considered to be **minor, adverse** and **significant** at the local level; and
 - Hedgerows – Loss of 15% of the hedgerow network at the Site is considered to be **minor, adverse** and **significant** at the local level.
- 9.8.5 These habitat losses will be compensated for through new habitat creation offsite or through the purchase of offsetting units, to be secured as part of the habitat measures to achieve biodiversity net gain (further information is provided in the Biodiversity Net Gain assessment, submitted to accompany the planning application). Following implementation of an appropriate strategy to achieve Biodiversity Net Gain, these residual effects are considered to be reduced to **non-significant** effects.

9.9 Cumulative Effects

Demolition

- 9.9.1 No other large scale planning applications are currently active in immediate proximity to the Site, with 'Land at Cooters End Lane and Ambrose Lane' being located approximately 1km to the south-west of the Site, such that it is unlikely that demolition at the Site would coincide with any other large scale local demolition works. In any event, use of the buildings within the site by roosting bats and nesting birds are anticipated to be highly localised and low level, such that loss of other roosting/nesting opportunities are unlikely to result in a significant cumulative impact on bats and birds.
- 9.9.2 Accordingly cumulative effects during demolition are considered to be **negligible** and **not-significant**.



Construction

- 9.9.3 No other large scale planning applications are currently active in immediate proximity to the Site, with 'Land at Cooters End Lane and Ambrose Lane' being located approximately 1 km to the south-west of the Site, such that it is unlikely that construction at the Site would coincide with any other large scale local construction works. Even if this were not the case, as long as all construction work adhered to standard best practice measures, no cumulative impacts would be anticipated to occur.
- 9.9.4 Accordingly cumulative effects during construction are considered to be **negligible and not-significant**.

During operation

- 9.9.5 With regards to ecological designations, there may be the potential for developments within Harpenden and the wider area to increase recreational pressure upon nearby ecological designations. However, given the separation between the Site and the proposed development 'Land at Cooters End Lane and Ambrose Lane', recreational activity is unlikely to be focused on the same designations, whilst as outlined previously, proposed mitigation measures at the Site include provision of alternative open space. This is anticipated to reduce the impacts of recreational pressure originating from the Site to a non-significant level.
- 9.9.6 The habitats and the majority of protected species on-Site would be unlikely to be subject to cumulative impacts, due to the degree of separation between the Site and development at 'Land at Cooters End Lane and Ambrose Lane'.
- 9.9.7 Accordingly cumulative effects during operation are considered to be **negligible and not-significant**.

9.10 Monitoring

- 9.10.1 Long term (30 years+) management of habitats will be secured through a HMMP as part of BNG requirements.

9.11 Consideration of Climate Change

- 9.11.1 Climate change has the potential to affect the distribution of habitats and fauna within the UK and alter the timing of seasonal events. Due to the nature of climate change, no perceivable impacts on the ecological receptors are expected in the short-term, including the construction phase, with potential impacts relevant to the medium-to-long term impacts, during the operational phase of the development.
- 9.11.2 The projected general trends of climate change in the 21st century shows a progressive increase in mean air temperatures during summer and winter, a reduction in the rate of precipitation during the summer months but an increase during the winter months, with a slight reduction in average wind speed in the summer and a small increase during the winter. Retained and newly created habitats on-Site (e.g. woodlands and hedgerows) may experience changes in species assemblages due to climate change, although they are not of elevated importance for particular species, and accordingly are likely to be relatively resilient to future climate changes. Plant species tolerant to drought will be included within the proposed planting plans, whilst ongoing management and supplementary planting with species more resistant to drier, hotter summers will also mediate any changes.
- 9.11.3 Faunal species ranges may shift slightly due to climate change, however this is not expected to significantly influence or exacerbate the effects of the Proposed Development. Creation of a diversity of habitat opportunities will help faunal species better respond to climatic changes.



9.12 Conclusions

Introduction

- 9.12.1 Ecological surveys of the Application Site have been undertaken, including a desktop study, an extended Phase 1 Habitat survey and a range of Phase 2 faunal surveys.
- 9.12.2 A number of ecological designations were identified by the desktop study. The nearest statutory designation is Batford Springs Local Nature Reserve (LNR), located approximately 0.5 km to the south of the Site, whilst the nearest non-statutory designation is Holcroft's Springs Local Wildlife Site (LWS), located approximately 0.005 km from the Site boundary, separated from the Site by Common Lane, which forms the Site's north-eastern boundary.
- 9.12.3 The Application Site is itself largely dominated by horse-grazed fields with areas of modified grassland, woodland, tall ruderal vegetation, vegetated gardens, buildings and hardstanding present in the western corner of the Site, and woodland and tall forb vegetation present along the eastern boundary. Habitats forming important ecological features comprise woodland and native hedgerows, both of which comprise Priority Habitats. Surveys of faunal species have found that the Application Site supports a potential low status bat roost, moderate numbers of foraging and commuting bats and Badger, together with a range of birds, invertebrates and likely presence of other mammal species, namely Brown Hare and Hedgehog.
- 9.12.4 The Proposed Development and mitigation scheme have been designed to achieve compliance with relevant legislation and planning policy. Measures are proposed to avoid killing or injury of protected species such as bats, Badger and birds (protected under the Wildlife and Countryside Act 1981, the Conservation of Habitats and Species Regulations 2010 and the Protection of Badgers Act 1992) and opportunities for enhancements to biodiversity are also proposed, in accordance with NPPF, the NERC Act 2006 and local policy.

Demolition Effects

- 9.12.5 Primary and tertiary mitigation to be employed during demolition comprise safeguards with respect of roosting bats and nesting birds, carried out following grant of a Natural England licence, and demolition outside of the bird nesting season (or following a check by a competent ecologist for presence of nesting birds).
- 9.12.6 Following implementation of the mitigation measures set out above, all demolition effects are considered to be non-significant. Accordingly, no secondary mitigation is required and no residual effects are anticipated during the demolition phase.

Construction Effects

- 9.12.7 Primary and tertiary mitigation to be employed during construction comprise the adoption of industry best practice measures during construction, to be detailed with a CEMP, safeguards during Badger sett closure, carried out following grant of a Natural England licence, and clearance of nesting bird habitat outside of the bird nesting season (or following a check by a competent ecologist for presence of nesting birds).
- 9.12.8 Following implementation of the mitigation measures set out above, all construction effects are considered to be non-significant. Accordingly, no secondary mitigation is required and no residual effects are anticipated during the construction phase.

Operation Effects

- 9.12.9 Primary and tertiary mitigation to be employed during the operational phase of development comprise the retention of habitats of elevated ecological value, where possible, and provision of substantial open space. Potentially significant effects have been identified in relation to non-statutory designations, habitats and ecological features, bats (roosting and foraging/commuting) and Badger. These effects are largely as a result of habitat losses,



together with disturbance and urbanisation effects associated with new development, notably lighting.

9.12.10 Secondary mitigation to address these significant effects comprise the implementation of a sensitive lighting scheme, design considerations for the built development to include siting of buildings away from retained habitats and management of recreational activity. Following implementation of the mitigation measures set out above, residual impacts comprise loss of priority habitats, namely woodland and hedgerows, which are considered to be significant at the local level. However, following implementation of compensation as required by Statutory Biodiversity Net Gain, these residual effects are considered to be reduced to non-significant effects.

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10 Transport and Access

10.1 Introduction

10.1.1 This Chapter assesses the likely significant effects arising from the Proposed Development with regards to Transport and Access and has been prepared by SLR Consulting Ltd (SLR).

10.1.2 This chapter identifies the likely significant effects, requirements for mitigation, potential cumulative effects and the residual Transport and Access effects of the Proposed Development during construction and the completed development when it is operational.

10.1.3 This chapter is supported by the following appendices:

Transport Assessment;

Residential Travel Plan; and

School Travel Plan.

10.1.4 The development description is as follows:

“Outline Application for demolition of existing buildings and structures and construction of a mixed-use development comprising residential dwellings (including affordable housing), children’s home, elderly extra care facility, local centre (flexible retail/ health/ community use), sports pitches and associated building, green infrastructure and landscaping works (to include public open space and community growing space); primary school with early years provision, vehicular and active travel infrastructure (including pedestrian and cycle access) and diversion of Bower Heath Lane; drainage works; and related infrastructure. All matters reserved save for access from Lower Luton Road.”

10.1.5 In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in Appendix 1.3.

Table 10.1: Individual Pen Profiles

Company	Individual	Pen Profile	Role
SLR Consulting Ltd	<i>Ian Dix</i>	<u>Qualifications:</u> MSc Transport Planning and Management, Geography and Computing degree, CMILT, MIHT <u>Relevant Experience and Expertise:</u> <i>Ian has over 34 years’ experience in the design and assessment of highway and transport schemes. Ian has experience working on a wide variety of development projects in both the public and private sectors including a large number of new residential areas which have been successfully implemented. This includes working on a variety of projects where the environmental implications of transport have been assessed through as part of an Environmental Statement.</i>	<i>Director</i>



Company	Individual	Pen Profile	Role
SLR Consulting Ltd	Taylor Davis	Qualifications: BA Geography (Hons), MCIHT Relevant Experience and Expertise: Taylor has over 6 years' experience in transport planning and has worked on a wide range of projects including residential, commercial and educational schemes. This includes preparing Transport chapters of Environmental Statements for a number of residential-led schemes.	Principal Transport Planner

Table 10.2: Organisational Pen Profiles

EIA Topic	Organisation	Relevant Expertise
Transport and Access	SLR Consulting Ltd	SLR Consulting Limited is an IEMA accredited organisation and is a member of the EIA Quality Mark. SLR has a dedicated ESIA team that specialises in EIA's across a diverse range of sectors and development projects, including within the Built Environment, Minerals and Waste, Energy and Renewables, Infrastructure, and Governmental sectors. SLR both leads and assists in preparing EIAs, with our diverse range of technical disciplines (including Transport) being competent experts in accordance with the EIA Regulations.

10.2 Policy Context, Legislation, Guidance and Standards

Policy

National Planning Policy Framework

- 10.2.1 The National Planning Policy Framework (NPPF) was last updated in February 2025 and identifies the Government's core principles behind the planning for and delivery of sustainable development.
- 10.2.2 Section 9 of the NPPF covers sustainable transport and how the impact of development should be considered from the transport perspective.
- 10.2.3 The approach in the NPPF is that sites should be considered on their relative sustainability – locally and across the district – and their economic, social and environmental impacts should be fully considered and how development will impact positively and negatively in these respects on surrounding communities.
- 10.2.4 Paragraph 115 prescribes that in assessing sites and applications for development, “it should be ensured that:
- (a) sustainable transport modes are prioritised taking account of the vision for the site, the type of development and its location;
 - (b) safe and suitable access to the site can be achieved for all users;
 - (c) the design of streets, parking areas, other transport elements and the content of associated standards reflects current national guidance including the National Design Guide and the National Model Design Code; and



(d) 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 through a vision-led approach.”

10.2.5 The NPPF at Paragraph 116 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, following mitigation, would be severe, taking into account all reasonable future scenarios*”.

10.2.6 Paragraph 117 states that “applications for development should:

“give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport...”

10.2.7 Paragraph 118 emphasises that:

“All developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a vision-led Transport Statement or Transport Assessment so that the likely impacts of the proposal can be assessed and monitored.”

National Planning Practice Guidance

10.2.8 On 6 March 2014, the Department for Communities and Local Government (DCLG) launched the National Planning Practice Guidance (NPPG) web-based resource. One section relates specifically to Transport and is titled ‘Travel Plans, Transport Assessments and Statements in decision-taking’ and this provides the overarching principles of Travel Plans, Transport Assessments and Statements.

10.2.9 The guidance explains the role of Transport Assessments and Statements in paragraph 004 as “ways of assessing the potential transport impacts of developments (and they may propose mitigation measures to promote sustainable development. Where that mitigation relates to matters that can be addressed by management measures, the mitigation may inform the preparation of Travel Plans)”. The guidance also states that Travel Plans are “long term management strategies for integrating proposals for sustainable travel into the planning process”. They should be brought forward in parallel with development proposals and should be integrated in to the design of developments.

10.2.10 The guidance explains that when preparing Transport Assessments and Travel Plans the following key principles should be taken into account:

- *“proportionate to the size and scope of the proposed development to which they relate and build on existing information wherever possible;*
- *established at the earliest practicable possible stage of a development proposal;*
- *be tailored to particular local circumstances (other locally-determined factors and information beyond those which are set out in this guidance may need to be considered in these studies provided there is robust evidence for doing so locally);*
- *be brought forward through collaborative ongoing working between the Local Planning Authority/ Transport Authority, transport operators, Rail Network Operators, Highways Agency where there may be implications for the strategic road network and other relevant bodies. Engaging communities and local businesses in Travel Plans, Transport Assessments and Statements can be beneficial in positively supporting higher levels of walking and cycling (which in turn can encourage greater social inclusion, community cohesion and healthier communities).”*



10.2.11 The guidance demonstrates that Transport Assessments and Statements and Travel Plans can positively contribute in the following ways:

- *“encouraging sustainable travel;*
- *lessening traffic generation and its detrimental impacts;*
- *reducing carbon emissions and climate impacts;*
- *creating accessible, connected, inclusive communities;*
- *improving health outcomes and quality of life;*
- *improving road safety; and*
- *reducing the need for new development to increase existing road capacity or provide new roads.”*

Hertfordshire Local Transport Plan 4

10.2.12 The Hertfordshire Local Transport Plan 4 (LTP4) adopted in May 2018 builds on the gains of the Local Transport Plan 3 which was published in 2011 and sets out a blueprint for achieving a safe, efficient and responsive transport system which will support the broader aspirations of Hertfordshire County for the policy period spanning 2018 – 2031.

10.2.13 The LTP outlines an overarching ‘Hertfordshire Vision’ from which objectives and policies are adopted.

“We want Hertfordshire to continue to be a county where people have to opportunity to live healthy, fulfilling lives in thriving, prosperous communities.”

10.2.14 The LTP adopts three broad themes and identifies transport as a common contributing factor which could significantly contribute to the achievement of set objectives under these three themes:

Prosperity: Transport can sustain and strengthen the local economy by providing a link to other regional, national economic growth centres and international gateways. creating links,

People: Transport provides access to services and amenities available within a locality healthcare, leisure, education and employment. Access to these is crucial to a happy, fulfilled and healthy lives and enhance participation in society.

Place: Transport can enhance affect the attractiveness, accessibility and vibrancy of a place.

10.2.15 Policy 1 of the LTP4 on Transport User Hierarchy provides a guide for considering road users for transport strategies and proposals.

“To support the creation of built environments that encourage greater and safer use of sustainable transport modes, the county council will in the design of any scheme and development of any transport strategy consider in the following order:

- *Opportunities to reduce travel demand and the need to travel*
- *Vulnerable road user needs (such as pedestrians and cyclists)*
- *Passenger transport user needs*
- *Powered two-wheeler (mopeds and motorbikes) user needs*



- *Other motor vehicle user needs”*

10.2.16 Policy 5 on Development Management outlines some criteria for considering planning proposals.

“The county council will to work with development promoters and the district and borough councils to:

- *Ensure the location and design of proposals reflect the LTP Transport User Hierarchy and encourage movement by sustainable transport modes and reduced travel demand.*
- *Ensure access arrangements are safe, suitable for all people, built to an adequate standard and adhere to the county council’s Highway Design Standards.*
- *Consider the adoption of access roads and internal road layouts where they comply with the appropriate adoption requirements and will offer demonstrable utility to the wider public. Where internal roads are not adopted the county council will expect suitable private management arrangements to be in place*
- *Secure developer mitigation measures to limit the impacts of development on the transport network, and resist development where the residual cumulative impact of development is considered to be severe.*
- *Require a travel plan for developments according to the requirements of ‘Hertfordshire’s Travel Plan Guidance’.*
- *Only consider new accesses onto primary and main distributor roads where special circumstances can be demonstrated in favour of the proposals.*
- *Resist development that would either severely affect the rural or residential character of a road or other right of way, or which would severely affect safety on rural roads, local roads and rights of way especially for vulnerable road users. This should include other routes which are important for sustainable transport or leisure.*
- *Ensure that any new parking provision in new developments provides facilities for electric charging of vehicles, as well as shared mobility solutions such as car clubs and thought should be made for autonomous vehicles in the future.”*

St Albans City and District Council Local Plan Review (Adopted 1994)

10.2.17 The Albans City and District Council Local Plan adopted in 1994 outlines the proposals for the development and use of land and a set of policies guiding development within the local area for the time period spanning 1981 - 1996.

10.2.18 The objectives of the local plan as outlined within the policy document are:

- *“Metropolitan Green Belt: To continue to protect and maintain the Green Belt*
- *Settlement Hierarchy: To protect and enhance the character of existing settlements and define the nature and intensity of development acceptable in the following settlement hierarchy*
 - *Towns;*
 - *Specified settlements – the larger villages excluded from the Green Belt;*
 - *Green Belt settlements – smaller villages located within the Green Belt;*



- *Housing: to make provision for a 1981 – 1996 dwelling increase of 6400 and 10986 – 2001 dwelling increase of 7200 and to seek to influence the type of dwellings provided to help meet the needs of the area.*
- *Hospital Sites: to consider the future use of Hill End, Cell Barnes and Napsbury Hospitals in the context of Circular 12/91 (Redundant Hospital Sites in Green Belts; Planning Guidelines)*
- *Employment: to provide sufficient land and floorspace to cater for full employment and provide for different kinds of employment use whilst not encouraging substantial additional commuting into the District.*
- *Transport: to consider the transportation needs of the District including:*
 - *Improvements to highway systems;*
 - *Traffic management schemes including improvements to the environment of residential and shopping areas;*
 - *Car parking, pedestrian and cyclist requirements;*
 - *The future role of public transport;*
 - *The implications of future development proposals.*
- *Shopping: to maintain the viability and vitality of existing shopping centres and to make reasonable provision for new forms of retailing.*
- *Environment and Conservation: to carefully consider the environmental effects of planning decisions and to conserve and improve the historic, architectural and archaeological fabric of settlements in particular St Albans City Centre and Roman Verulamium.*
- *Leisure and Tourism: to make provision for leisure uses especially taking advantage of opportunities to restore minerals sites in the Upper Colne Valley Area and to support tourism related development in appropriate sites.*
- *Countryside: to protect and enhance the natural beauty, amenity and ecology of the countryside and to retain high quality agricultural land.”*

10.2.19 Policy 34 of the local plan on Highways Considerations and Development Control goes on to outline the parameters for assessing development proposals from a transport perspective.

“Development likely to generate a significant amount of traffic or which involves the creation or improvement of an access onto the public highway will not normally be permitted unless acceptable in terms of the following highway considerations:

- *Road Safety, particular requirements are adequate visibility, turning radii and provision for pedestrians and cyclists for disabled and other disadvantaged people;*
- *Environmental impact of traffic, especially in residential areas;*
- *Road capacity, including present and predicted future year assessment;*
- *Road hierarchy, new road shall be of design appropriate to their position in the hierarchy. New accesses to primary roads are main distributor roads will normally be resisted but where access is permitted a high standard of provision will be required;*
- *Car parking provision*
- *St. Albans city centre in strength on development;*



- Local roads, particular regard will be had to increases in:
 - the risk of accidents especially to pedestrians and cyclists
 - the use of roads that are poor in terms of width, alignment on structural condition
 - Adverse impacts on local environment either to the rural character of the road or residential properties alongside it....

10.2.20 Policy 36A on Location of New Development in Relation to Public Transport Network outlines the Council's aspirations in terms of encouraging the use of public transport within the Council area.

“The District Council with generally encourage the use of public transport. In considering the impact of development, account will be taken of its proximity to the public transport network and whether facilities will be provided within the development to cater for use of the network.”

Guidance

10.2.21 Guidance for preparing an assessment of the likely significant effects of a Proposed Development on transport is provided within the following documents:

- Guidelines for Institute of Environmental Management and Assessment Guidelines for the Environmental Assessment of Road Traffic (IEMA Guidelines), 2023); and
- Planning Practice Guidance: Travel Plans, Transport Assessments and Statements, Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (Live Online Resource).

10.3 Consultation

10.3.1 Through the pre-application process, a number of meetings have been arranged with Hertfordshire County Council to discuss the development and the off-site impact. Through these discussions, a package of off-site mitigation measures has been developed and these discussions have assisted in shaping the layout of the proposed development.

Table 10.3: Summary of Consultation

Consultation (Who and Date)	Summary of issues raised during consultation	How it has been dealt within this Chapter	Where it has been addressed within the chapter (if applicable)
St Albans District & City Council (EIA Scoping process)	• Committed Development	• Agreed committed development schemes used within assessment	Considered within baseline evolution and cumulative impacts section of chapter.
Hertfordshire County Council Highways (18 th March 2025, 2 nd May 2025 and 3 rd July 2025)	• Trip generation • Mitigation measures • Off-site modelling • Internal layout of the site	• Trip generation agreed and used to estimate off-site impact • Mitigation measures discussed with HCC included within the layout • Off-site modelling informs “driver delay” topic	Throughout



10.4 Methodology

Study Area

10.4.1 Within the IEMA guidance, two broad rules are suggested to be used as a screening process to determine the geographic extent of assessment:

- Rule 1: include highway links where traffic flows or HGVs would increase by more than 30%; and
- Rule 2: include any other specifically sensitive areas where traffic flows have increased by 10% or more.

10.4.2 After a review of the surrounding highway network it was deemed that one sensitive area on the surrounding road network exists and this is considered to be Harpenden town centre.

Baseline Data Collection

10.4.3 All traffic flows that have been collected to inform the baseline position were collected by independent traffic survey specialists (Paul Castle Associates) with over 40 years' experience of data collection.

10.4.4 Turning count traffic surveys were undertaken in June and July 2024 and were undertaken at the following junction:

- Lower Luton Road/Bower Heath Lane/Westfield Road staggered crossroads;
- Lower Luton Road/Station Road mini-roundabout;
- Lower Luton Road/Common Lane mini-roundabout;
- Lower Luton Road/Station Road/Codicote Road roundabout; and
- Station Road/High Street/St Albans Road mini roundabout.

10.4.5 The surveys at the aforementioned locations also recorded queue lengths. The turning count surveys collected data between the hours of 07:00-10:00 and 16:00-19:00 on a neutral weekday in line with guidance within Department for Transport TAG UNIT M1.2¹².

10.4.6 Automatic traffic count (ATC) surveys were undertaken in June 2024 and were undertaken on Lower Luton Road in the vicinity of the proposed site access location. The ATC survey collected data for a 7-day period 24-hours a day.

Assessment

10.4.7 This section provides an outline of the methodology utilised within this assessment with reference to published standards, guidelines and best practice.

Significance Criteria

10.4.8 Reference is made to the Institute Environmental Management and Assessment (IEMA) Guidelines for the Environmental Assessment of Road Traffic. The IEMA guidelines make reference to the Department for Transport (DfT) document 'Manual of Environmental

¹² <https://assets.publishing.service.gov.uk/media/664db4debd01f5ed32793ffc/tag-m1-2-data-sources-and-surveys.pdf>



Appraisal'. This manual suggests that changes in traffic flow of 30%, 60% and 90% would produce 'slight', 'moderate' and 'substantial' impacts respectively.

10.4.9 In accordance with IEMA Guidelines, the degree of beneficial and adverse impacts of the proposals are further defined as:

- Slight – Changes in flow patterns between 10% and 30%;
- Moderate – Changes in flow patterns between 30% and 60%; and
- Substantial – Changes in flow patterns over 60%.

10.4.10 Other than the degree of impact, the Beneficial, Negligible or Adverse nature of any impact is defined as:

- Beneficial – An environmental benefit in transportation terms (i.e. overall traffic flows or HGV percentage decrease, or improvement to pedestrian, cyclist, or public transport facilities);
- Negligible – Changes are too small to meaningfully measure where changes are typically less than 10%; and
- Adverse – an environmental disadvantage in transportation terms ((i.e. overall traffic flows or HGV percentage increase, or deterioration to pedestrian, cyclist, or public transport facilities).

10.4.11 The application of these significance criteria within this report has been based on assessment and professional interpretation.

Characterisation of Impact

10.4.12 The potential impact on the surrounding highway network can be split to the impact on pedestrians and road users; this is further broken down to individual impacts.

Pedestrian Severance

10.4.13 Severance is the perceived barrier to pedestrian movements caused by either traffic or physical barriers created by the road itself. The greater the volume of traffic on a road, the greater the level of severance. Severance can be mitigated in a number of ways, including the creation of formal pedestrian crossing points, or the removal of street furniture.

10.4.14 The Design Manual for Road and Bridges (DMRB) provides a set of measures for the identification of community severance and offers guidance as to the level of pedestrian diversion that may follow in terms of the two-way flow present on a link.

10.4.15 **Table 10.4** outlines the thresholds of community severance as prescribed by the DMRB.

Table 10.4: Severance Thresholds

Severance Level	Traffic Flow (AADT)	Length of Diversion
Slight	<8,000	<250m
Moderate	8-16,000	250-500m
Significant	>16,000	<500m



10.4.16 The DMRB (Ref D2) provides guidance on the level of relief of severance that may be afforded by pedestrian crossings. This is summarised in **Table 10.5**. Where these facilities are placed to accommodate pedestrian desire lines, the DMRB suggests that the effect of severance can be reduced by up to 90%.

Table 10.5: Severance Relief

Location	Slight	Moderate	Significant
Built-up-area	<30%	30-60%	>60%
Rural area	60-75%	75-90%	>90%

Pedestrian Delay

10.4.17 IEMA Guidelines state that changes in traffic volume, speed or composition may impact the ability of pedestrians to cross roads. As with severance, the increase of traffic volumes result in an increase in pedestrian delay. Additionally, increased pedestrian activity also contributes.

10.4.18 Whilst the IEMA Guidelines do not set any thresholds or criteria, this assessment will utilise professional judgement to determine the significance of the impact.

Pedestrian Amenity

10.4.19 IEMA Guidelines define pedestrian amenity as the relative pleasantness of a journey. This relates to the provision of pedestrian facilities along a route, including, but not limited to, paving, lighting, width of footpaths, and traffic volumes and composition. IEMA Guidelines suggest thresholds of significance would be where traffic flows are doubled or halved.

Fear and Intimidation

10.4.20 The IEMA Guidelines also consider fear and intimidation of pedestrians. This also takes into account pedestrian facilities, such as verges, overlooking properties, street lighting, and the nature of the streets. Fear and intimidation is also influenced by the level of HGV traffic.

Driver Delay

10.4.21 IEMA guidelines state that driver delay to existing traffic can occur at several points on the network; particularly at peak times. As such, this report will examine the delay experienced in both the network AM and PM peak periods (0730 – 0830 and 1645 – 1745 respectively).

Accidents and Safety

10.4.22 IEMA Guidelines do not include any definition of accidents or safety. As such, professional judgement will be utilised to assess the impact of the development on the safety and accidents on the local highway network.

Magnitude of Change

10.4.23 Based on the definitions of each impact identified above, a summary of the criteria that have been used to determine magnitude of change from the baseline conditions as a result of the Proposed Development are set out in **Table 10.6** below.

10.4.24 It should also be noted, however, that the absolute effect is also important e.g. the total flow of traffic or HGVs on a link. This is because an increase of 100% in the traffic flow on a road is



likely to lead to an insignificant impact if the existing flows are very low. Where this is applicable, professional judgement will be applied.

Table 10.6: Definitions of Magnitude of Change

	Very Low	Low	Medium	High
Severance	Change in total traffic or HGV flows of less than 30%	Change in total traffic or HGV flows of 30-60%	Change in total traffic or HGV flows of 60-90%	Change in total traffic or HGV flows over 90%
Driver and passenger delay	A judgement based on the journey time assessment within the traffic model			
Pedestrian and cycle delay	Two-way traffic flows < 1,400 vehicles per hour	A judgement based on the road links with two-way traffic flow exceeding 1,400 vehicles per hour in the context of the individual characteristics		
Pedestrian and cycle amenity	Change in total traffic or HGV < 100%	A judgement based on the routes with > 100% change in the context of their individual characteristics		
Fear and intimidation	A judgement based on the volume of traffic, HGV composition, proximity to people and the level of protection and summarised in the ES chapter			
Accidents and Safety	A judgement based on quantitative analysis as set out in the Transport Assessment and summarised in the ES chapter			

10.4.25 To help define the value and sensitivity of receptors, IEMA advice on affected groups and special interests was reviewed. **Table 10.7** details the assessment framework adapted from the advice.

Table 10.7: Receptor Sensitivity Framework

Receptor Type	Receptor Sensitivity
Receptors with low sensitivity to traffic flows and those sufficiently distant from affected roads and junctions	Very Low
Receptors with some sensitivity to traffic flow: places of worship, public open space, tourist attractions and residential areas with adequate footway provision	Low
Traffic flows sensitive receptors: congested junctions / links, doctor's surgeries, hospitals, shopping area with roadside frontage, roads with narrow footways, recreation facilities	Medium
Receptors of greatest sensitivity to traffic flows: schools, colleges, playgrounds, accident clusters, retirement homes, roads without footways that are used by pedestrians	High

10.4.26 **Table 10.8** describes the significance criteria adopted based on receptor sensitivity and impact magnitude.

Table 10.8: Magnitude of Impact

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



Limitations

- 10.4.27 The methodology for calculating the vehicular trip generation associated with the Proposed Development has been outlined within the accompanying Transport Assessment. The methodology utilises a variety of data sources and professional judgement.
- 10.4.28 Cumulative development as identified within the EIA Screening Response has been included within the assessment. The impact of the remainder of the NE Harpenden allocation is also included as a sensitivity test.
- 10.4.29 As the Proposed Development will include a range of complimentary land uses, it is reasonable to assume that the number of background network vehicular trips to be expected on the wider road network will be less than included within the assessment. The assessment therefore provides a robust assessment of the local highway network.

10.5 Baseline Conditions

The Site

- 10.5.1 The Site is currently undeveloped and used for agricultural purposes and an equestrian centre. As such, it does not generate any meaningful level of vehicular traffic in the context of the Proposed Development.

The Surrounding Area

Local Highway Network

- 10.5.2 The site is bounded by Lower Luton Road to the south west. Lower Luton Road provides access towards Luton to the north, and Wheathampstead to the south. Lower Luton Road is a single carriageway two-way road for its length, measuring approximately 7m in width and with a posted speed limit of 30mph in the vicinity of the site. Lower Luton Road will be used for access to the proposed development.
- 10.5.3 Common Lane abuts the site to the north. Common Lane provides access to Lower Luton Road and Bower Heath Lane. It is rural by nature and therefore does not benefit from streetlighting and is subject to the national speed limit. The road width is narrow on Common Lane. No vehicular access will be provided to Common Lane from the site.
- 10.5.4 Westfield Road is located to the west of the proposed development. It connects to Lower Luton Road and provides access towards the centre of Harpenden. Westfield Road is residential by nature and is a single carriageway two-way road for its length. The speed limit on Westfield Road is 30mph for the entire extent and streetlighting and pedestrian footways are provided.

Table 10.9 shows a summary of the 2024 Base flows on key roads within the vicinity of the Site. The flows shown are as observed on the local highway network during traffic surveys undertaken in June & July 2024.

Table 10.9: 2024 Baseline Traffic Flows (AADT)

Link	Location	2024 Base	
		Total Veh	HGV%
1	Lower Luton Road (West of Bower Heath Lane)	11379	2.4%
2	Bower Heath Lane	1769	2.5%



Link	Location	2024 Base	
		Total Veh	HGV%
3	Lower Luton Road (East of Westfield Road)	10953	3.0%
4	Westfield Road	4440	2.7%
5	Lower Luton Road (West of Station Road)	11915	2.9%
6	Lower Luton Road (East of Station Road)	14160	3.2%
7	Station Road (South of Lower Luton Road)	10290	1.8%
8	Lower Luton Road (West of Common Lane)	13928	3.5%
9	Common Lane	2068	1.5%
10	Lower Luton Road (East of Common Lane)	13900	3.6%
11	Lower Luton Road (West of Wheathampstead)	13961	3.7%
12	Laimer Lane	4512	3.9%
13	Codicote Road	15033	3.2%
14	Station Road (Wheathampstead approach)	5839	2.8%
15	High Street (West of Station Road)	14094	3.2%
16	Station Road (North of High Street)	9023	2.1%
17	St Albans Road (East of Station Road)	15420	3.0%

10.5.5 As can be seen from **Table 10.9**, the surrounding links presently experience either slight or moderate (below 16,000 AADT) levels of severance. The highest proportion of HGV is 3.9% on Laimer Lane.

Rail

10.5.6 The nearest railway station to the site is Harpenden railway station, located approximately 2.2km to the south of the site access. This is considered to be within an acceptable cycling distance and for many this would be within an acceptable walking distance.

10.5.7 Harpenden railway station benefits from 548 cycle parking spaces situated on platform 1 and 4 and within the station car park. The station also benefits from a ticket office, ticket machines, refreshment facilities, seating and waiting areas and step free access for all platforms.



10.5.8 The station provides a total of 674 car parking spaces. The 366 bus that operates within the vicinity of the site also serves Harpenden railway station which can be accessed within a bus journey of 6 minutes.

10.5.9 Several destinations can be reached within a realistic travel time of Harpenden railway station, including Bedford, Luton and London.

10.5.10 The key direct services which operate from Harpenden railway station are summarised in **Table 10.10**. This accounts for direct weekday services only.

Table 10.10: Rail Services from Harpenden Railway Station

Destination	Key Points	Calling	First / Last	Typical Frequency (Direct Services)	Duration (Direct Service)
Luton	Luton Parkway	Airport	24 hour service available	7 per hour	9 - 13 mins
Bedford	Luton, Flitwick		24 hour service available	5 per hour	33 - 35 mins
Three Bridges	St Albans City, London St Pancras Intl, Gatwick Airport		24 hour service available	4 per hour	1hr 17 mins – 1hr 35 mins
Brighton	St Albans City, London St Pancras Intl, Gatwick Airport		03:49/00:18	2 per hour	1hr 51 mins
Rainham (Kent)	St Albans City, London St Pancras Intl, Gravesend, Rochester, Gillingham		06:34/19:34	2 per hour	2hr 20 mins

Bus

10.5.11 There are two local bus stops which benefit from differing bus services. The closest bus stop is located immediately adjacent to the site access on Lower Luton Road and offers access to the number 357 bus service and is infrequently served by the 366, 367, 612 and 807 bus service. The other bus stop is located on Westfield Road approximately 100m from the site access and offers more frequent access to the 366 and 367 bus services and is infrequently served by the 45 and 807 bus services.

10.5.12 **Table 10.11** summarises the weekday timings, route and frequencies of the bus services that operate at the Lower Luton Road bus stops. **Table 10.12** presents the same information for bus services that operate at the Westfield Road bus stops.



Table 10.11: Lower Luton Road Bus Services

Service	Route	First/Last	Average Frequency
357 (Red Rose Travel)	Harpenden – Borehamwood	06:37 / 18:34 (S/B)	1 per hour
		08:14 / 19:50 (N/B)	
366 (Centrebus (South))	Luton – South Hatfield	N/A (S/B)	1 per day (N/B only)
		10:09 / 10:09 (N/B)	
367 (Centrebus (South))	Luton – South Hatfield	N/A (S/B)	1 per day (N/B only)
		08:07 / 08:07	
612 (Uno)	Luton – Hatfield	07:50 / 07:50 (S/B)	1 per day
		17:37 / 17:37 (N/B)	
807 (Red Eagle)	Markyate – Harpenden	08:19 / 08:26 (S/B)	2 per day (S/B only)
		N/A (N/B)	

Table 10.12: Westfield Road Bus Services

Service	Route	First/Last	Average Frequency
45 (Centrebus (South))	Stevenage - Luton	15:52 / 18:17 (S/B)	1 per day for N/B and 2 per day for S/B
		08:29 / 08:29 (N/B)	
357 (Red Rose Travel)	Harpenden – Borehamwood	08:15 / 19:51 (S/B)	1 per hour
		06:37 / 18:34 (N/B)	
366 (Centrebus (South))	Luton – South Hatfield	11:10 / 17:50 (S/B)	Typically 1 per 2 hours)
		08:24 / 18:00 (N/B)	
367 (Centrebus (South))	Luton – South Hatfield	08:08 / 08:08 (S/B)	1 per day
		N/A (N/B)	
807 (Red Eagle)	Markyate – Harpenden	N/A (S/B)	1 per day (N/B only)
		15:40 (N/B)	

Walking and Cycling

10.5.13 The primary desire lines from the site are expected to be towards Harpenden town centre, Harpenden railway station and Katherine Warrington School.



- 10.5.14 The pedestrian and cycle route from the site to Harpenden town centre, which is the location of a number of key facilities and amenities follows Westfield Road and Sun Lane. The nature of this route is residential and is subject to a 30mph speed limit for vehicles. Footways are provided on at least one side of the carriageway at all points on this route. Streetlighting is also provided on this route.
- 10.5.15 There is a missing link between the Proposed Development and Westfield Road where pedestrians are unable to safely cross Lower Luton Road. This missing link will be provided as a signal-controlled crossing as part of the proposed development.
- 10.5.16 The pedestrian and cycle route from the site to Harpenden railway station, which offers the potential for long-distance sustainable transport follows Westfield Road, Sun Lane and Carlton Road. The nature of this route is residential and is subject to a 30mph speed limit for vehicles. Footways are provided on at least one side of the carriageway at all points on this route. Streetlighting is also provided on this route.
- 10.5.17 As per the route to Harpenden town centre, there is a missing link at the site access to cross Lower Luton Road which will be addressed as part of the Proposed Development.
- 10.5.18 The pedestrian and cycle route from the site to Katherine Warington School, which is the most local secondary school passes through the existing Batford residential area. The route passes through residential roads which are street lit and subject to 30mph speed limit. Pedestrian footways are provided throughout this route. The route lacks dropped kerbs and tactile paving at some crossing points and the Proposed Development will seek to improve this route on this basis.
- 10.5.19 There are a number of cycle routes within the surrounding area including National Cycle Network Route 6 and 57 which provide access to Luton and Hemel Hempstead respectively. The NCN routes are a network of traffic free or lightly trafficked routes which are conducive to pedestrians and cyclists.
- 10.5.20 In summary, there are an extensive number of existing key facilities and amenities within easy walking and cycling distance of the proposed development, with a well-connected series of footways and cycle paths which are conducive to active travel.

Accident Analysis

- 10.5.21 Full accident analysis has been undertaken within the supporting Transport Assessment. This concludes that there are no highway deficiencies identified within the surrounding highway network.

Baseline Evolution

- 10.5.22 A future year baseline scenario (referred to as the '2036 Reference Case') has been evolved from the 2024 Base scenario to reflect a 'no development' scenario. The 2036 Reference Case considers likely future trends in terms of network traffic growth and the consideration of cumulative development sites. In light of the EIA screening response, the cumulative scheme at Cooters End Lane (5/2023/0327) is considered as part of the future year scenario.
- 10.5.23 The 2036 Reference Case presents expected traffic flows in 2036, which is forecast to be the completion year for the proposed development. Growth factors for the period between 2024 and 2036 have been obtained from TEMPro. Details of the TEMPro growth factors applied are presented within the supporting Transport Assessment.
- 10.5.24 The inclusion of TEMPro growth factors applied to the 2024 baseline traffic flows allows for a robust assessment as in reality economic development does not necessarily result in increase traffic flows. This is evidenced at various locations across the UK whereby significant development has come forward and not resulted in a reflective increase in traffic flows.



10.5.25 **Table 10.13** presents the 2036 Reference Case traffic flows for links surrounding the proposed development. For ease of reference, the 2024 Base traffic flows are also shown.

Table 10.13: 2036 Reference Case Traffic Flows (AADT)

Link	Location	2024 Base		2036 Ref	
		Total Veh	HGV%	Total Veh	HGV%
1	Lower Luton Road (West of Bower Heath Lane)	11379	2.4%	11902	2.4%
2	Bower Heath Lane	1769	2.5%	1851	2.5%
3	Lower Luton Road (East of Westfield Road)	10953	3.0%	11457	3.0%
4	Westfield Road	4440	2.7%	4644	2.7%
5	Lower Luton Road (West of Station Road)	11915	2.9%	12463	2.9%
6	Lower Luton Road (East of Station Road)	14160	3.2%	14973	3.2%
7	Station Road (South of Lower Luton Road)	10290	1.8%	10925	1.8%
8	Lower Luton Road (West of Common Lane)	13928	3.5%	14731	3.5%
9	Common Lane	2068	1.5%	2163	1.5%
10	Lower Luton Road (East of Common Lane)	13900	3.6%	14702	3.5%
11	Lower Luton Road (West of Wheathampstead)	13961	3.7%	14741	3.7%
12	Laimer Lane	4512	3.9%	4719	3.9%
13	Codicote Road	15033	3.2%	15830	3.2%
14	Station Road (Wheathampstead approach)	5839	2.8%	6107	2.8%
15	High Street (West of Station Road)	14094	3.2%	15129	3.1%
16	Station Road (North of High Street)	9023	2.1%	9438	2.1%
17	St Albans Road (East of Station Road)	15420	3.0%	16517	2.9%

10.5.26 As can be seen from **Table 10.13**, within the 2036 Reference case scenario the majority of links continue to experience severance of either slight or moderate (below 16,000 AADT). The exception to this being St Albans Road which experiences significant (above 16,000 AADT) levels of severance and exceeds the 16,000 AADT threshold by approximately 500 vehicles. The highest proportion of HGV is 3.9% on Laimer Lane.



10.6 Primary and Tertiary Mitigation

- 10.6.1 This section sets out the Primary and Tertiary mitigation measures to be implemented as part of the Proposed Development.

Primary Mitigation

Construction

- 10.6.2 No primary mitigation measures are to be provided during the construction period.

Operation

- 10.6.3 The Proposed Development is located within the wider NE Harpenden allocation. The allocation is predominantly residential however will benefit from additional land uses including a primary school, local centre and medical centre. The provision of these on-site facilities will allow residents to undertake day-to-day journeys without needing to leave the site.
- 10.6.4 The Proposed Development will provide direct active travel links to the adjoining Batford residential area to the south east of the Site. Whilst this will allow for direct travel to facilities in Batford including Porters Hill Park, Sauncey Wood Primary School, Batford Nursery School and onwards to Katherine Warrington School, this link will also allow existing residents to access the Proposed Development and the facilities that are included.
- 10.6.5 The Proposed Development will provide additional pedestrian and cycle access points on to Lower Luton Road which in turn will allow for connection to the existing network for pedestrians and cyclists. The enhancement of the pedestrian and cycle network will provide greater permeability of movements when compared to the private car.

Tertiary Mitigation

Construction

- 10.6.6 A CEMP will be implemented in order to minimise the risk of any environmental effects occurring during the construction phase and to effectively reduce the effect associated with construction activities, including the use of defined haulage routes and timing of heavy loads. The type of vehicle that will transport materials to the Site will be determined in advance to ensure safe and efficient delivery taking into consideration local constraints. Construction traffic movements will be kept to agreed working hours where practicable and designed to minimise disruption to the highway network and local residents (including during the night time). The measures set out in the CEMP will be implemented and monitored in accordance with best practice construction management processes.

Operation

- 10.6.7 A Travel Plan will be developed for the residential element of the development and separately for the primary school element of the development. The delivery of a Travel Plan is required to achieve the goals and objectives set out in the Hertfordshire County Council Local Transport Plan 4.
- 10.6.8 The Travel Plan documents will be prepared in line with the latest Hertfordshire County Council guidance available and the purpose of these documents will be to encourage future residents and students and staff of the primary school to travel using sustainable modes of transport.
- 10.6.9 The implementation of a Travel Plan has the ability to reduce the reliance on the private car and therefore limit the potential off-site impact of the proposed development.



10.6.10 The effectiveness of the Travel Plans will be monitored in accordance with the management strategy set out within the respective document.

10.7 Assessment of Significant Likely Effects

Construction

- 10.7.1 Details of construction traffic are not yet available, however it can be confirmed that the construction traffic would be significantly less than when the Site is operational and therefore the assessment of operational traffic provides a worst case scenario for the assessment.
- 10.7.2 The volume of construction traffic will depend on the rate at which dwellings are constructed, which in turn will depend on the economic climate at the time. At present, the construction of the development would be phased over a number of years, following an initial period of infrastructure works. The commencement of development will be dependent upon a number of factors, including the length of time taken to determine the outline planning application and any subsequent reserved matters approvals. The development could potentially begin in 2025, with development likely to be completed by 2036.
- 10.7.3 In order to estimate the potential volume of construction traffic that could be generated by the Site, reference has been made to survey information from the Cambourne New Settlement.
- 10.7.4 The Cambourne New Settlement site is situated 8km to the west of Cambridge, and comprises 3,500 dwellings, a large business park, a supermarket, a hotel and a variety of administrative, commercial, leisure and retail premises. Although much larger than the Proposed Development, the traffic associated with the rate of construction of the Cambourne New Settlement is considered to provide a reasonable representation of construction traffic (pro-rata).
- 10.7.5 An Automatic Traffic Counter (ATC) was laid during the summer of 2006 on the single access road to the Cambourne New Settlement site in order to collect construction data on neutral working days. At the time of the survey, the build rate at the development was 350 dwellings per year. The survey data is summarised in **Table 10.14**, together with the resultant trip rate and forecast construction traffic associated with the Proposed Development. A robust build-out rate of 100 dwellings per year has been assumed for the Proposed Development.

Table 10.14: Forecast Construction Trip Generation

Time Period	Two-way Traffic Flow (Daily)		
	Non-HGV	HGV	Total
Daily Surveyed Flow	430	181	611
Trip Rate	1.229	0.517	1.746
Proposed Development (100 dwellings per year)	123	52	175

- 10.7.6 It is likely that construction traffic would be routed along Lower Luton Road either north towards the M1, or south towards the A1(M). The addition of 175 vehicles per day along Lower Luton Road would result in less than a 10% increase, when compared with the 2024 baseline flows shown at **Table 10.9**; which is considered a negligible impact. As such no further assessment of the impact of the construction phase is proposed.



Operational

10.7.7 An assessment has been undertaken for the 2036 Reference case and the 2036 Reference + Development case. This accounts only for traffic associated with the proposed development. Consideration of the remainder of the allocation will be provided subsequently within this chapter.

10.7.8 **Table 10.15** outlines the impact of the proposed development in comparison to the 2036 Baseline.

Table 10.15: 2036 Reference + Proposed Development Traffic Flows (AADT)

Link	Location	2036 Ref		2036 Ref + Dev		Impact
		Total Veh	HGV%	Total Veh	HGV%	Total Veh Impact (%)
1	Lower Luton Road (West of Bower Heath Lane)	11902	2.4%	12573	2.3%	5.6%
2	Bower Heath Lane	1851	2.5%	1917	2.4%	3.6%
3	Lower Luton Road (East of Westfield Road)	11457	3.0%	13304	2.6%	16.1%
4	Westfield Road	4644	2.7%	5773	2.2%	24.3%
5	Lower Luton Road (West of Station Road)	12463	2.9%	14043	2.5%	12.7%
6	Lower Luton Road (East of Station Road)	14973	3.2%	15565	3.0%	4.0%
7	Station Road (South of Lower Luton Road)	10925	1.8%	11913	1.7%	9.0%
8	Lower Luton Road (West of Common Lane)	14731	3.5%	15322	3.4%	4.0%
9	Common Lane	2163	1.5%	2163	1.5%	0.0%
10	Lower Luton Road (East of Common Lane)	14702	3.5%	15293	3.4%	4.0%
11	Lower Luton Road (West of Wheathampstead)	14741	3.7%	15097	3.6%	2.4%
12	Laimer Lane	4719	3.9%	4719	3.9%	0.0%
13	Codicote Road	15830	3.2%	16133	3.1%	1.9%
14	Station Road (Wheathampstead approach)	6107	2.8%	6161	2.8%	0.9%
15	High Street (West of Station Road)	15129	3.1%	15129	3.1%	0.0%
16	Station Road (North of High Street)	9438	2.1%	9787	2.0%	3.7%



Link	Location	2036 Ref		2036 Ref + Dev		Impact
		Total Veh	HGV%	Total Veh	HGV%	Total Veh Impact (%)
17	St Albans Road (East of Station Road)	16517	2.9%	16866	2.8%	2.1%

10.7.9 As can be seen from **Table 10.15**, with the exception of Lower Luton Road adjacent to the site access and Westfield Road, where the development traffic is most prominent, the percentage impact falls below the minimum 10% increase thresholds as outlined previously within this chapter. The impact also remains below the 30% “moderate” threshold on all remaining links.

10.7.10 Due to the minimal change in flows at the sensitive receptor, it is considered that the impact on Harpenden town centre does not need to be assessed further within this report.

10.7.11 Link 3, 4 and 5 all experience increases in AADT of 10% or more following the addition of development traffic and therefore require further consideration.

Lower Luton Road

10.7.12 Lower Luton Road experiences a maximum of a 16.1% increase in AADT flows in the 2036 Reference Case + Development scenario. This increase equates to a permanent slight adverse impact in IEMA terms as set out previously within this chapter.

10.7.13 The increase in traffic is as a result of the Proposed Development being located immediately adjacent to Lower Luton Road. As such, all development traffic will be using Lower Luton Road.

10.7.14 Lower Luton Road is a secondary distributor route with footways provided on both sides of the carriageway. The carriageway benefits from one lane on either side of the road and is suitable for the forecast level of traffic.

10.7.15 Lower Luton Road at the links identified (east of Westfield Road and west of Station Road) presently does not provide direct vehicular access to residential frontage. As such, it is considered that Lower Luton Road is a very low sensitivity receptor. A slight increase in traffic flows on a low sensitivity receptor would equate to a negligible magnitude of change.

10.7.16 Notwithstanding the above, the proposed development will provide improvements that will mitigate the impact on Lower Luton Road.

10.7.17 Firstly, a new signal-controlled crossing will be provided on Lower Luton Road to the east of the proposed site access junction. This will facilitate pedestrian movements from the site to Westfield Road which is a key pedestrian route towards the centre of Harpenden.

10.7.18 Secondly, a new signal-controlled crossing will be provided on Lower Luton Road to the west of Porters Hill. This will facilitate pedestrian movements from the site towards the centre of Harpenden and to Harpenden railway station.

10.7.19 It is proposed that the development will also deliver gateway features on Lower Luton Road on the entry to Batford with the intention of reducing vehicle speeds.

10.7.20 The proposed improvements will have a beneficial impact on fear and intimidation (by providing safer crossing points), pedestrian severance and delay (by providing more direct and frequent crossing of Lower Luton Road) and accidents.

10.7.21 The signal-controlled crossings may have a slight impact on driver delay, however in the hierarchy of road users, delay to drivers is of less importance than safety of vulnerable road users, including pedestrians.



10.7.22 Detailed junction modelling has been undertaken on key junctions on Lower Luton Road including the proposed site access junction, the junction with Westfield Road and Bower Heath Lane and the junction with Station Road. The modelling work has demonstrated that all junctions will remain within capacity following the addition of the proposed development and this would not result in a detrimental impact on driver delay. Full modelling results are provided in the TA.

Westfield Road

10.7.23 Westfield Road experiences a maximum of a 24.3% increase in AADT flows in the 2036 Reference Case + Development scenario. This increase equates to a permanent slight adverse impact in IEMA terms as set out previously within this chapter.

10.7.24 The increase in traffic is as a result of the Proposed Development being located in close proximity to Westfield Road, and existing baseline flows being relatively low.

10.7.25 Following the addition of the development traffic the AADT on Westfield Road is under 6,000.

10.7.26 Westfield Road is a two-way residential route with footways provided on both sides of the carriageway. The carriageway benefits from one lane on either side of the road and is suitable for the forecast level of traffic.

10.7.27 Westfield Road at the link identified (south of Lower Luton Road) presently provides direct vehicular access to residential frontage. As such, it is considered that Westfield Road is a low sensitivity receptor. A slight increase in traffic flows on a low sensitivity receptor would equate to a negligible magnitude of change. On this basis it is not considered that mitigation is required.

10.7.28 Notwithstanding the above, the proposed development will provide pedestrian and cycle crossing improvements that will mitigate the impact on Westfield Road. It is proposed that a parallel crossing facility is provided on Westfield Road at the location of the existing narrowing to allow safe crossing of pedestrians and cyclists using the Luton Greenway cycle route. This parallel crossing would provide pedestrians and cyclists with priority when crossing Westfield Road.

10.7.29 The proposed development has also identified a number of locations whereby dropped kerbs and tactile paving is not present on Westfield Road and these could be provided to deliver a safer environment for pedestrians. These are to be provided by the development.

10.7.30 Furthermore, detailed junction modelling has been undertaken at the Lower Luton Road/Westfield Road junction. The modelling work demonstrated that the junction would remain within capacity following the addition of the proposed development and this would not result in a significant detrimental impact on driver delay. Full modelling results are provided in the TA.

10.8 Secondary Mitigation and Enhancement

10.8.1 It is not considered that any secondary mitigation or enhancement is required to address the impacts of the proposed development. As set out previously, the impact of the development proposal is not considered to be significant nor requires secondary mitigation.

10.8.2 Nonetheless, the development will provide a number of mitigation measures which will further reduce the impact of the development. To note, the impact of these measures has not been accounted for within the trip generation of the site or the off-site impact.

10.8.3 The development will be supported by residential and school Travel Plan documents with the purpose of encouraging pupils, staff and residents of the site to travel by sustainable modes of transport. This has potential to reduce the vehicular trip generation of the site.



10.8.4 The development will be designed to accommodate bus services routing through the site. Discussions have been held with HCC and it is agreed that a bus service could be diverted into the site. The bus service would be able to use a bus turning loop “teardrop” arrangement within the site to return to Lower Luton Road, loop around the proposed local centre and school (avoiding the need for a teardrop arrangement), or the bus route could continue through the remainder of the allocation and exit the site via Common Lane. The site and routing of the bus service is designed so that residents will be able to access services within a short walk from their household, encouraging uptake of public transport.

10.8.5 A number of off-site improvements will be delivered by the proposed development, this includes the following:

- Signalised crossings on Lower Luton Road
- Parallel crossing on Westfield Road;
- Implementation of 20mph speed limit in Batford estate with associated physical speed restriction measures;
- Off-site pedestrian improvements at minor road junction crossings for key routes;
- Gateway features on approach to Batford; and
- Pedestrian and cycle connections to the site from Batford.

10.9 Cumulative Effects

10.9.1 The baseline scenario is that of a forecast year, with committed development. This report assesses the impact of the development on this baseline scenario and therefore considers the cumulative effects of development.

10.9.2 Notwithstanding this, the impacts of the wider allocation has been considered to allow a complete assessment.

Construction

10.9.3 The construction impact of the wider allocation would be as per that identified for the Proposed Development.

Operational

10.9.4 An assessment has been undertaken for the 2036 Reference case and the 2036 Reference Case + Full Allocation case.

10.9.5 **Table 10.16** outlines the impact of the full allocation in comparison to the 2036 Reference Case.

Table 10.16: 2036 Reference Case + Full Allocation Traffic Flows (AADT)

Link	Location	2036 Ref		2036 Ref + Full Allocation		Impact
		Total Veh	HGV%	Total Veh	HGV%	Total Veh Impact (%)
1	Lower Luton Road (West of Bower Heath Lane)	11902	2.4%	12860	2.2%	8.0%
2	Bower Heath Lane	1851	2.5%	1946	2.4%	5.2%



Link	Location	2036 Ref		2036 Ref + Full Allocation		Impact
		Total Veh	HGV%	Total Veh	HGV%	Total Veh Impact (%)
3	Lower Luton Road (East of Westfield Road)	11457	3.0%	13716	2.5%	19.7%
4	Westfield Road	4644	2.7%	6022	2.1%	29.7%
5	Lower Luton Road (West of Station Road)	12463	2.9%	14465	2.5%	16.1%
6	Lower Luton Road (East of Station Road)	14973	3.2%	15778	3.0%	5.4%
7	Station Road (South of Lower Luton Road)	10925	1.8%	12123	1.6%	11.0%
8	Lower Luton Road (West of Common Lane)	14731	3.5%	15535	3.3%	5.5%
9	Common Lane	2163	1.5%	2163	1.5%	0.0%
10	Lower Luton Road (East of Common Lane)	14702	3.5%	15506	3.4%	5.5%
11	Lower Luton Road (West of Wheathampstead)	14741	3.7%	15252	3.6%	3.5%
12	Laimer Lane	4719	3.9%	4719	3.9%	0.0%
13	Codicote Road	15830	3.2%	16267	3.1%	2.8%
14	Station Road (Wheathampstead approach)	6107	2.8%	6182	2.8%	1.2%
15	High Street (West of Station Road)	15129	3.1%	15129	3.1%	0.0%
16	Station Road (North of High Street)	9438	2.1%	9930	2.0%	5.2%
17	St Albans Road (East of Station Road)	16517	2.9%	17008	2.8%	3.0%

10.9.6 As can be seen from **Table 10.16**, with the exception of Lower Luton Road adjacent to the site access, Westfield Road, and Station Road, the percentage impact of the full allocation falls below the minimum 10% increase threshold as outlined previously within this chapter. The impact also remains below the 30% “moderate” impact on all links.

10.9.7 Due to the minimal change in flows at the sensitive receptor, it is considered that the impact on Harpenden town centre does not need to be assessed further within this report.

10.9.8 Link 3, 4 and 5 were all considered as part of the assessment that considered the Proposed Development and the assessment findings are unchanged when considering the full allocation and therefore is not considered further within this section.

10.9.9 Link 7 is the only new link that experiences an increase in AADT of 10% or more following the addition of traffic associated with the full allocation and is therefore considered further.



Station Road

- 10.9.10 Station Road experiences a maximum of an 11.0% increase in AADT flows in the 2036 Reference Case + Full Allocation scenario. This increase equates to a permanent slight adverse impact in IEMA terms as set out previously within this chapter. The increase of 11.0% is only marginally above the level that is considered necessary for assessment (+10%).
- 10.9.11 The increase in traffic is as a result of Station Road being a key route for vehicle trips from the proposed development towards Harpenden town centre and onwards to St Albans.
- 10.9.12 Station Road is a connector road from Lower Luton Road to the centre of Harpenden and is provided with footways on both sides of the carriageway. The carriageway benefits from one lane on either side of the road and is suitable for the forecast level of traffic.
- 10.9.13 Station Road at the link identified (south of Lower Luton Road) presently provides direct vehicular access to residential frontage. As such, it is considered that Station Road is a low sensitivity receptor. A slight increase in traffic flows on a low sensitivity receptor would equate to a negligible magnitude of change. On this basis it is not considered that mitigation is required.
- 10.9.14 Detailed junction modelling has been undertaken at the Lower Luton Road/Station Road junction. The modelling work demonstrates that the junction would continue to remain within capacity following the addition of traffic associated with the full allocation and this is therefore not considered to result in any significant adverse impact in terms of driver delay. Full modelling results are presented within the TA.

10.10 Monitoring

- 10.10.1 On the basis that no significant adverse effects are identified within this chapter, it is not considered that any monitoring is required.

10.11 Consideration of Climate Change

- 10.11.1 It is not considered that the impact on climate change would have any effect on the Transport and Access to the site.

10.12 Conclusions

Introduction

- 10.12.1 This chapter has been prepared with consideration of national and local planning policy documents including the National Planning Policy Framework and the St Albans City & District Council Local Plan.
- 10.12.2 Guidelines for Institute of Environmental Management and Assessment Guidelines for the Environmental Assessment of Road Traffic has been followed in the preparation of this chapter.
- 10.12.3 The assessment characterises impact of the Proposed development based on pedestrian severance, pedestrian delay, pedestrian amenity, fear and intimidation, driver delay and accidents and safety.
- 10.12.4 The site is located within a sustainable location with existing pedestrian and cyclist routes within close proximity of the site, and bus stops located immediately adjacent to the site on Westfield Road and Lower Luton Road. Harpenden railway station is situated within suitable walking distance of the site and local facilities within the centre of Harpenden can be reached within a short walk which will encourage future pedestrians to travel sustainably for day-to-day journeys.



Demolition and Construction Effects

10.12.5 The effects during the demolition and construction phases of the Development are forecast to be negligible.

10.12.6 A construction traffic management plan will be prepared to control traffic associated with the construction phase and further mitigate any impacts.

Operation Effects

10.12.7 The effects of the Proposed Development once operational are not considered to be significant. This chapter has demonstrated that the impact of the proposed development exceeds 10% increase in traffic flows at just three locations (2 locations on Lower Luton Road and Westfield Road). When considering the full allocation the 10% increase threshold is exceeded at four locations (previously mentioned locations plus Station Road).

10.12.8 The impact of the proposed development will be suitably mitigated through the delivery of various mitigation measures including production of a Travel Plan (for residential and education land uses), delivery of off-site measures, and the design of the Proposed Development encouraging trips to be made by sustainable modes of transport.

10.13 References

- National Planning Policy Framework, Department for Levelling Up, Housing and Communities, 2025
- National Planning Practice Guidance, Department for Communities and Local Government, 2014
- Hertfordshire Local Transport Plan 4, Hertfordshire County Council, 2018
- St Albans City and District Local Plan Review, St Albans City and District Council, 1994
- Guidelines for the Environmental Assessment of Road Traffic, Institute of Environmental Management and Assessment, 2023



11 Noise & Vibration

11.1 Introduction

11.1.1 This chapter of the ES assesses the likely significant environmental effects of the Proposed Development with respect to noise and vibration.

11.1.2 This chapter is supported by the following appendices:

- Appendix 11.1 Glossary of Acoustic Terminology
- Appendix 11.2 Policy, Standards and Guidance
- Appendix 11.3 Noise and Vibration Assessment
- Appendix 11.4 Pen Profiles

11.1.3 This chapter has been prepared by Create Consulting Engineers Ltd who are corporate members of the Institute of Acoustics (IOA) and the Association of Noise Consultants (ANC).

11.1.4 In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in **Appendix 11.4**.

11.2 Policy Context, Legislation, Guidance and Standards

11.2.1 There are numerous Local and National policies which are relevant to Noise and Vibration, which have been included in Appendix 11.2.

11.2.2 The relevant National and Local policies include;

- National Planning Policy Framework (December 2024)
- National Planning Policy Guidance (2019)
- Noise Policy Statement for England (2010)
- St Albans City and District Local Plan Review 1994 (Adopted November 1994)
- St Albans City and District Draft Local Plan 2041 (under review)

11.2.3 The relevant Legislation, Guidance and Standards include;

- Control of Pollution Act
- Calculation of Road Traffic noise (CRTN) (Department of Transport)
- BS 7445-1:2003 Description and Measurement of Environmental Noise
- BS 4142:2014 (+A1:2019) Method for Rating and Assessing Industrial and Commercial Sound
- BS 4866:2010 Mechanical vibration and shock – Vibration of Fixed Structures – Guidelines for the Measurement of Vibrations and Evaluation of their Effects on Structures
- BS 6472-1:2008 Guide to Evaluation of Human Exposure to Vibration in Buildings. Vibration sources other than blasting



- BS 5228-1:2019 (+A1:2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise
- BS 5228-2:2019 (+A1:2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration
- BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings
- ISO 9613-2:1996 Acoustics — Attenuation of sound during propagation outdoors Part 2: General method of calculation
- ISO 9613-2:2024 Acoustics — Attenuation of sound during propagation outdoors Part 2: Engineering method for the prediction of sound pressure levels outdoors
- Design Manual for Roads and Bridges (DMRB) LA111 Noise and Vibration(The Highways Agency)
- Guidelines for Community Noise (World Health Organisation (WHO))
- Sport England – Artificial Grass Pitch (AGP) Acoustics – Planning Implications (2015)
- IEC 60268-16:2020 Acoustics — Sound system equipment - Objective rating of speech intelligibility by speech transmission index

11.3 Consultation

- 11.3.1 No consultation has been undertaken at this stage of the assessment. The assessment has been carried out in accordance with national and local policies.

11.4 Methodology

Study Area

- 11.4.1 The Study Area assessed includes the Site and surrounding noise and vibration sensitive properties, as shown in **Figure 11.1**.
- 11.4.2 The main noise and vibration sensitive receptors assessed within this assessment have been included within **Table 11.1** below.

Table 11.1: Noise and Vibration Sensitive Receptors

Figure 11.1 Reference	Name of Noise Sensitive Receptor (NSR)	Location of NSR From Site	Distance to NSR From Boundary of The Site
NSR1	1-77 Noke Shot	South	18m
NSR2	1-12 Whitings Close	South-East	18m
NSR3	43-87 Pickford hill	South-South-East	35m
NSR4	1-9 Sauncey Wood	East	40m
NSR5	202 Lower Luton Road	West	45m
NSR6	1-9 Baulk Close	West-South-West	110m
NSR7	1-4 Barley Rise	South-West	48m
NSR8	1-12 Riverbanks Close	South-West	165m
NSR9	Kings Heath Road	North	380m
NSR10	St Kilda	North	310m
NSR11	Bowersbury Farm	North-North-East	350m



- 11.4.3 The sensitive receptors set out in **Table 11.1** above were identified through the use of aerial photography as well as a detailed Site reconnaissance visit in person prior to undertaking any baseline noise measurements.

Baseline Data Collection

- 11.4.4 Environmental noise monitoring was completed for both unmanned (automatic) and manned surveys in line with the recommendations within BS 7445-1:2003. Automatic monitoring was undertaken from Thursday 18th July 2024 through to Monday 22nd July 2024. Manned monitoring was undertaken during the same period.
- 11.4.5 The monitoring locations across the Site were selected to represent the baseline noise conditions for the proposed residential properties on the Proposed Development. All existing noise sources, including high-altitude aircraft serving London Luton Airport, local train lines, and the local road network including Lower Luton Road and Common Lane, as well as for the existing noise sensitive receptors have been considered.
- 11.4.6 The existing ambient and maximum event levels are used to assess the impact on future dwellings, while the background sound levels are used to consider the impact on all existing dwellings (those identified in **Table 11.1**) when the Proposed Development is in use.
- 11.4.7 The ambient levels are also used to inform construction noise limits.
- 11.4.8 The baseline survey data was compared to additional sources of sound levels for the area, including the noise contour plans for London Luton Airport expansion proposals (Luton Rising) for the “Do Something” and “Do Nothing” scenarios for the year 2036. These additional measures were taken to reduce the level of uncertainty as far as reasonably practicable.
- 11.4.9 There were no existing vibrational sources noted either at the Site, or the immediate surrounding area to the Site. From researching available data, there were no signs of rail services running below ground at this Site. Vibration levels were therefore deemed to be at acceptable levels across the Site for the existing residents and future residents within the Proposed Development.

Assessment

- 11.4.10 In line with the assessment methodology set out in the EIA Scoping Report, the scope of this assessment includes an assessment of:
- Construction plant noise effects from the Proposed Development;
 - Construction plant vibration effects from the Proposed Development;
 - Site Suitability;
 - Operational noise due to changes in the road traffic level with and without the Proposed Development; and
 - Operational noise egress from the Proposed Development’s building services plant and associated activities.

Construction Noise

- 11.4.11 The assessment of the effects of noise generated by the construction activities for the Proposed Development have considered a range of recognised calculations and modelling methodologies which have been detailed in Section 11.2. The main reference document used was BS 5228:2009+A1:2014 Part 1 (Noise).
- 11.4.12 In accordance with Annexes C and D of BS 5228 Part 1, typical sound levels for assumed construction plant and activities have been considered in the assessment.



11.4.13 Using the calculation method in Annex F of BS 5228 Part 1, assumptions for typical on-time and corrected for distance to establish the predicted sound levels at the relevant NSRs have been incorporated into the assessment. Predictions of the construction plant noise levels at the NSRs have been made in terms of $L_{Aeq,10h}$ measured over the working day during the key phases of works, comprising:

- Demolition;
- Site clearance;
- Road construction; and
- Construction of buildings and structures.

11.4.14 These predicted levels were then assessed against the relevant ABC threshold categories as detailed in 'The ABC Method' Table E.1 of BS 5228 Part 1.

11.4.15 This report considered the impact to the worst effected locations during the construction phasing of the site. The worst impacted location will demonstrate the degree of mitigation required to the work processes and equipment and as such is likely to result in lower impacts to the remainder of the receptors.

Construction Vibration

11.4.16 The effects of the vibration impacts from the construction activities have been assessed using the recognised calculations and modelling methodologies within BS 5228:2009+A1:2014 Part 2 (Vibration).

11.4.17 In accordance with Annexes C and D of BS 5228 Part 2, typical vibration levels for assumed construction plant and activities have been considered in the assessment.

11.4.18 Using the calculation method in Annex E of BS 5228 Part 2 and information provided by Hiller and Crabb, the predicted vibration levels at the relevant vibration sensitive receptors have been calculated.

11.4.19 Annex B of BS5228-2 relates to the significance of vibration effects. Table B.1 of BS 5228-2 provides data on the response to vibration for the average human. Table B.2 assesses the likelihood of cosmetic damage to a range of buildings resulting from temporary construction activities.

11.4.20 Vibrational excitement is categorised and quantified by peak particle velocity (PPV) and the typical display units are millimetres-per-second (mm/s).

Site Suitability

11.4.21 The nature of the Proposed Development is predominantly residential. Therefore, an assessment has been undertaken of the suitability of the Site for the Proposed Development and whether any mitigation measures are required in order to provide an adequate environment for future occupants.

Operational Phase

11.4.22 The operational noise levels have been adjusted for growth using the transport consultant's information and assessed for the following scenarios;

- Baseline Year (2022);
- Future Year 2036 Baseline + Committed Development (Do Nothing); and
- Future year 2036 Baseline + Proposed Development (Do Something).



Operational Noise Due to Changes in the Road Traffic Level

- 11.4.23 In order to predict the future noise levels within the occupied Proposed Development, a 3D noise propagation model has been constructed. The noise model considered all potential noise sources and methods of acoustic attenuation and was subsequently used to predict the noise levels both resulting from and impacting upon the existing residents in the vicinity of the Site and the future residents of the Proposed Development. The primary source of noise generated by the operational Development has been identified as road traffic, which has been assessed at the completion of the Proposed Development in order to assess the worst case scenario.
- 11.4.24 As such, this assessment has considered the existing levels of road traffic and predicted road traffic levels as provided by the project transport consultant, including traffic to be generated by the Proposed Development as well as the cumulative effects with other local, committed developments. The methodologies within the CRTN and DMRB documents have been utilised along with the predicted traffic flows for the Proposed Development and the other local, committed developments.
- 11.4.25 The predicted effect has been assessed using three-dimensional acoustic modelling software, CadnaA v4.1.155. Modelling images have been included within the detailed Noise and Vibration Impact Assessment.

Operational Noise Due to Building Services Plant

- 11.4.26 Based on the measured existing background sound levels, a noise rating level has been proposed, which would relate to all building services plant used on the Proposed Development, along with any associated activities of the commercial uses, including deliveries.
- 11.4.27 These noise rating levels have been derived in accordance with BS 4142:2014+A1:2019 and include all acoustic corrections which would be applied for specific acoustical characteristics.

Operational Noise Due to New Sports Pitches

- 11.4.28 An assessment of impact from the proposed community sports pitches has been undertaken in line with the guidance contained in the Sports England Guidance on Artificial Grass Pitch (AGP) Acoustics – Planning Implications (2015).
- 11.4.29 The predicted effect has been assessed using three-dimensional acoustic modelling software, CadnaA v4.1.155. Modelling images have been included within the detailed Noise and Vibration Impact Assessment.

Significance Criteria

- 11.4.30 The sensitivity of a receptor has been based on the relative importance of the receptor using a mixture of professional experience and industry standards, which are detailed in **Table 11.2 below**. This refers to the sensitivity for both noise and vibration.

Table 11.2: Receptor Sensitivity Descriptors

Sensitivity	Descriptor
High	The receptor has little ability to absorb change without fundamentally altering its present character or is of national or international importance. This includes: residential dwellings, hospitals, care homes, hotels, schools, universities, research facilities and national parks.
Moderate	The receptor has a moderate capacity to absorb change without significantly altering its present character or is of high importance. Examples comprising: offices, shops, outdoor amenity spaces, footpaths, doctor's surgeries, sports facilities and places of worship.
Low	The receptor is tolerant of change without detriment to its character, is of low or local importance. For example: warehouses, light industry, car parks, agricultural land.
Negligible	The receptor will be tolerant and generally emit high sound and / or vibration levels themselves. For example: Heavy industry, motorways, railway lines, airports.



11.4.31 All receptors considered throughout this report are considered to have a high sensitivity.

Magnitude of Impact: Construction Noise

11.4.32 The magnitude of impact for construction noise is defined by the matrix shown in **Table 11.3** below. The level referred to as the Lowest Observed Adverse Effect Level 'LOAEL' is the baseline noise levels and the Significant Observed Adverse Effect Level 'SOAEL' is the threshold level as determined by the BS 5228 document.

Table 11.3: Magnitude of Impact From Construction Noise

Magnitude of Impact	Construction Noise Level
Major	Above or equal to SOAEL + 5 dB
Moderate	Above or equal to SOAEL and below SOAEL + 5 dB
Minor	Above of equal to LOAEL and below SOAEL
Negligible	Below LOAEL

Magnitude of Impact: Construction Vibration

11.4.33 In accordance with the DMRB LA111 document, the magnitude of impact for construction vibration is defined by the matrix shown in **Table 11.4** below. The level referred to as the 'LOAEL' is the vibration level of 0.3 mm/s PPV during all time periods and the 'SOAEL' is the vibration level of 1.0 mm/s PPV during all time periods.

Table 11.4: Magnitude of Impact From Construction Vibration

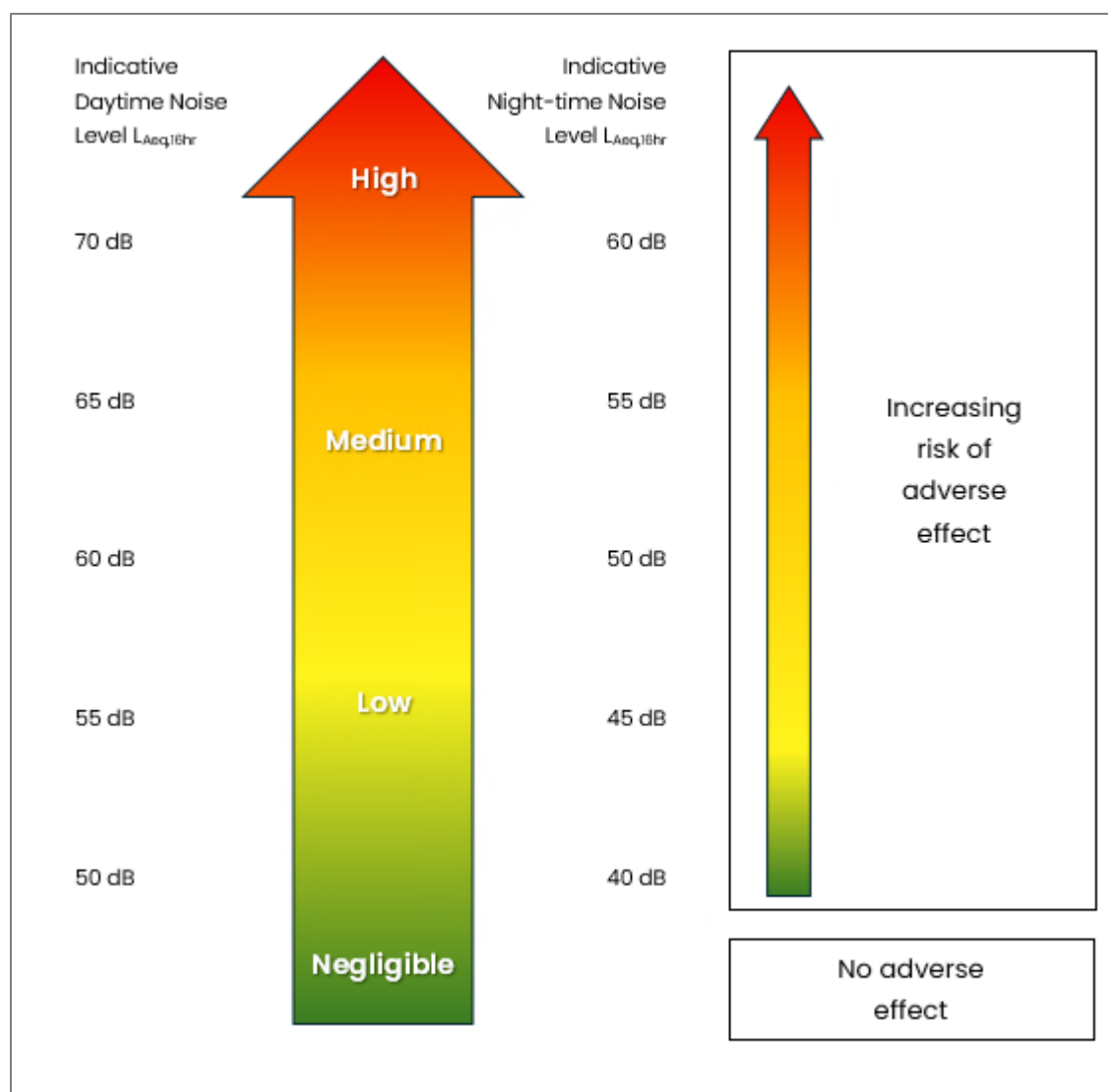
Magnitude of Impact	Construction Vibration Level
Major	Above or equal to 10 mm/s PPV
Moderate	Above or equal to SOAEL and below 10 mm/s PPV (1.0 – 10 mm/s)
Minor	Above of equal to LOAEL and below SOAEL (0.3- 1.0 mm/s)
Negligible	Below LOAEL (<0.3 mm/s)

Magnitude of Impact: Existing and Operational Road Traffic Noise

11.4.34 The assessment of impact from the Proposed Development requires an initial assessment of noise to determine the potential for suitable internal levels to be met in line with BS 8233 and the WHO Guidelines on community noise though either openable windows or by requiring façade mitigation.

11.4.35 The following image shows the indicative scale of impact detailed in the Professional Practice Guidance: Planning & Noise 2017 (ProPG). This document provides guidance on managing noise in the planning system, particularly for new residential developments in England.





11.4.36 Effectively any existing impact from the Proposed Development that is not found to be negligible in relation to ProPG would warrant mitigation to ensure acceptable internal in relation to BS 8233 and the WHO guidelines on community noise.

11.4.37 The magnitude of impact for changes to the operational noise levels relate to short term and long term increases. The short term is generally considered to be the first year after opening and the long term is typically 15 years after opening. **Table 11.5** shows the magnitude of impact for the various increases on road traffic noise levels as set out in the DMRB.

Table 11.5: Magnitude of Impact From Operational Phase Road Traffic Noise

Magnitude of Impact	Noise Change in Short Term	Noise Change in Long Term
	dB $L_{Aeq,18h}$	dB $L_{Aeq,18h}$
Major	5.0 dB and above	10.0 dB and above
Moderate	3.0 dB – 4.9 dB	5.0 dB – 9.9 dB
Minor	1.0 dB – 2.9 dB	3.0 dB – 4.9 dB
Negligible	0.1 dB – 0.9 dB	0.1 dB – 2.9 dB
No Change	0.0 dB	0.0 dB



Magnitude of Impact: Operational Building Services Plant Noise

- 11.4.38 In this assessment, the impact of plant noise has been considered in accordance with the BS 4142. Unlike the other best practice guidance considered in this assessment, BS 4142 does not use the terminology for defining magnitude as either 'negligible', 'minor', 'moderate' or 'major'. Instead, a difference between the 'rated' sound pressure level and the existing background sound level of around +10 dB is considered to be an indication of a significant adverse impact, depending on the context of the sound. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on context. The lower the rating level is relative to the background sound level, the less likely it is to be an adverse impact, depending on the context. If the rated level is below the background sound level, this is an indication of a minor/negligible impact, again, depending on context.
- 11.4.39 The rated sound level is defined as being the specific sound level for the item of plant, inclusive of any penalties for acoustical characteristics, such as tonality, impulsivity, intermittency or any other distinguishable feature.
- 11.4.40 **Table 11.6** below defines the magnitude of impact from operational plant noise but uses terminology consistent with the rest of the assessment.

Table 11.6: Magnitude of Impact from Operational Building Services Plant Noise

Magnitude of Impact	'Rated' Plant Sound Level
Major	More than 10 dB above background sound level
Moderate	Between 5 dB and 9.9 dB above background sound level
Minor	Between 0 dB and 4.9 dB above background sound level
Negligible	Below background sound level

Magnitude of Impact: Operational Noise Due to New Sports Pitches

- 11.4.41 The guidance available on impact from sporting activity does not set magnitude of impact, but instead discusses various methods of considering impact in line with the IOA/IEMA guidelines, the Planning Policy Guidance Document 24 and other guidance contained in BS 8233 and the WHO guideline.
- 11.4.42 The guidance states that 50 dB $L_{Aeq,1-hour}$, should be considered the upper guideline limit to residential properties and external living areas.
- 11.4.43 This is justified based on an assumed 15 dB level difference across a partially open window, which would bring internal daytime levels inline with the requirements of BS 8233.
- 11.4.44 It must be understood that the guidance in BS 8233 and the WHO guidelines is intended for anonymous noise sources and may not be directly applicable to sports activity, which the guidance claims comprise predominantly the sound of players voices.
- 11.4.45 With this in mind an external level of 50 dB $L_{Aeq,1-hour}$ or an internal level of 35 dB $L_{Aeq,1-hour}$ would be considered a negligible/minor impact on the basis that it meets the Sports England guidance but does not meet the requirements of BS 8233 in terms of non-descript noise. Less than this would be considered a negligible impact and above this has been considered a moderate to major impact.
- 11.4.46  This is a bespoke proposal based on the guidance available at the time of writing.



Effect Significance

11.4.47 The significance of an environmental effect is determined by the interaction of magnitude and sensitivity. The 'Effect Significance' matrix is set out in **Table 11.7** below and is relevant to both noise and vibration for the construction and operational phases of the Proposed Development and is derived from guidance contained in the Institute of Environmental Management and Assessment's Guidelines for Environmental Noise Impact Assessment (IEMA Guidelines).

Table 11.7: Matrix for Determining the Effect Significance

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

11.4.48 **Table 11.8** below provides definitions of the significance of effects set out in **Table 11.7** above which has been based on the Institute of Acoustics and the Institute of Environmental Management and Assessment Guidelines and the ProPG: Planning and noise document. Reference has been made to the magnitude of adverse impact with the 'LOAEL' and 'SOAEL' as detailed within the Noise Policy Statement for England (NPSE).

11.4.49 The ProPG: Planning and Noise document continues to state that it is not possible to have a single objective noise-based measure that defines SOAEL for all circumstances, therefore the acceptance of a LOAEL and SOAEL impact are considered to be different for different receptors at varying times. Essentially, noise levels which exceed the SOAEL would require mitigation in all circumstances and levels which exceed the LOAEL may require mitigation, depending on the context.

Table 11.8: Classification of Noise and Vibration Effects

Level of Significance	Description of Effect	Exceeds SOAEL?	Exceeds LOAEL?	Acceptance
Major	The noise or vibration is distinguishable which can cause a material change in behaviour and/or attitude. There is the potential for sleep disturbance with the quality of life diminished due to changes in the area.	✓	✓	✗
Moderate	Intrusive noises which can be heard or vibration levels which can be readily determined. These levels can cause small changes in behaviour and/or attitude such as increasing the level of the TV. There is the potential for non-awakening sleep disturbance and can affect the overall character of the area due to the perceived change in the quality of life	✗	✓	Temporary Noise (Construction) ✓ Permanent Noise (Plant) ✗
Minor	Non-intrusive noise or vibration levels which can be heard or felt but would not cause any change in behaviour or attitude. This could lead to changes in the character of the area, but not where there would be a perceived change in the quality of life.	✗	✗	✓
Negligible	No discernible effect on the receptor	✗	✗	✓



Limitations

- 11.4.50 The long term noise monitoring locations (MP1 and MP2) shown in Figure 11.2 are included in Table 11.9 and are deemed to be representative of noise levels in the area as far as reasonably practicable.
- 11.4.51 The monitoring duration of five days provided a thorough review of the existing sound levels, with a view to minimising the uncertainties associated with environmental noise monitoring. These measurements were bolstered by several short term, time-aligned noise measurements, to gather an understanding of the sound levels across the wider parcel of the Site, again shown in Figure 11.2.
- 11.4.52 The monitoring equipment, when calibrated before and after the measurements, showed a low degree of drift in calibration, therefore any uncertainty due to measurement calibration is low.
- 11.4.53 Assumptions on the construction process used for the site have been made at this stage, due to the outline nature of the application. The equipment required has been based on professional judgement following experience of similar projects.
- 11.4.54 Calculations using the CadnaA v4.1.155 computer software were carried out in accordance with ISO 9613-2. The standard states that there is a +/- 3 dB error associated with the calculation method. In practice the assumptions used in the calculation method are the worst-case assumption for propagation, and uncertainty associated with the calculation method is not expected to alter the outcome of the assessment. It should be noted that a new version of the above standard has been released in 2024. This standard addresses reduced performances of barriers that may occur over large distances. This review does not consider the impact of barriers or obstacles and a significant degree of uncertainty is not associated with the changes to the standard.
- 11.4.55 The weather during the manned noise monitoring was measured continuously on a PCE-FWS-20N weather station, with data logger, and was considered to be suitable for the purposes of environmental noise monitoring.

11.5 Baseline Conditions

The Site

- 11.5.1 Subjectively, the Site was relatively quiet. Although distant trains and high altitude aircraft could be heard, the sound levels from these were not dominant. For the majority of the Site, the most dominant noise sources were bird song and passing walkers.
- 11.5.2 Objectively, the sound levels for the two long term locations are provided in **Table 11.9**.

Table 11.9: Existing Sound Levels at Long Term Monitoring Positions

Descriptor	Location	
	MP1 (Close to Lower Luton Rd)	MP2 (Close to Sauncey Wood School)
Daytime Ambient Sound Level Range	53 – 55 dB L _{Aeq,16h}	45 – 48 dB L _{Aeq,16h}
Average Daytime Ambient Sound Level	54 dB L _{Aeq,16h}	47 dB L _{Aeq,16h}
Representative Daytime Background Sound Level	46 dB L _{A90,1hour}	37 dB L _{A90,1hour}
Night-time Ambient Sound Level Range	44 - 49 dB L _{Aeq,8h}	35 - 39 dB L _{Aeq,8h}
Average Night-time Ambient Sound Level	47 dB L _{Aeq,8h}	37 dB L _{Aeq,8h}
Representative Night-time Background Sound Level	30 dB L _{A90,15mins}	30 dB L _{A90,15mins}



Descriptor	Location	
	MP1 (Close to Lower Luton Rd)	MP2 (Close to Sauncey Wood School)
Night-time Max Event Sound Level	68 dB L _{AF,Max,1minute}	55 dB L _{AF,Max,1minute}

11.5.3 Measurements taken in measurement position 1 (MP1) are therefore considered representative for receptors close to Lower Luton Road, while measurement position 2 (MP2) are considered representative of the wider site.

11.5.4 Measurements and modelling outputs show the proposed school should not be subject to significantly high noise levels so as to warrant mitigation from external noise levels. This receptor has, therefore, not been considered further in this assessment.

The Surrounding Areas

11.5.5 Noise Sensitive Receptors surrounding the Site solely comprise of residential housing. **Figure 11.1** shows the locations of the receptors considered in this assessment.

Baseline Evolution

11.5.6 The natural growth from the transport network, which has been quantified by the transport consultant in **Chapter 10: Transport and Access** has been considered by comparison of the 2022 Baseline traffic flow, 2036 Baseline traffic flow with and without the Proposed Development. An average increase in noise levels in the order of 0.3 dB is expected with the highest road increase also being shown to be 0.3 dB.

11.5.7 When considered in the context of DMRB there would be a negligible change to the worst impacted areas during the short term and long term assessment scenarios.

11.5.8 Chapter 16 of the Luton Airport Expansion Preliminary Environmental Information Report provides noise contour difference maps due to the proposals for 2019, 2027, 2039 and 2043. In all cases the Proposed Development falls outside of the lowest contour map for the airport, and hence growth of the activities associated with the airport would be negligible on the Proposed Development site when considering the impact from the surrounding roads and the criteria relevant to this assessment.

11.6 Primary and Tertiary Mitigation

Primary Mitigation

Construction Noise

11.6.1 No primary mitigation measures to reduce construction noise are anticipated at this stage.

Construction Vibration

11.6.2 No primary mitigation measures to reduce construction vibration are anticipated at this stage.

Site Suitability

11.6.3 No primary mitigation measures to reduce operational noise are anticipated at this stage.

11.6.4 Additional mitigation measures are required to the southwest extent of the Site.



Operational Noise - Road Traffic

11.6.5 No primary mitigation measures are anticipated at this stage.

Operation Noise – Building Services Plant

11.6.6 No primary mitigation measures to reduce noise from mechanical plant are anticipated at this stage.

Operational Noise - New Sports Pitches

11.6.7 No primary mitigation measures to reduce noise from the sports pitches are anticipated at this stage.

Tertiary Mitigation

Construction Noise

11.6.8 The following mitigation measures are assumed to be embedded within a Construction Environmental Management Plan (CEMP) as part of the Proposed Development and the construction methods as part of the Proposed Development, as set out in the Code of Construction Practice (CoCP11).

11.6.9 The CEMP is to be secured by conditions in the deemed planning permission.

11.6.10 The Best Practicable Means (BPM) as defined in the Control of Pollution Act 1974 will be adopted to minimise noise and vibration from construction works. This will be reflected in a Construction Environmental Management Plan and submitted as part of a Section 106 Agreement. The most relevant and specific commitments with respect to noise are set out below:

- Noise control at source - for example, the selection of equipment that is quiet, review of construction programme and methodology to consider quieter methods, location of equipment on site, control of working hours, the provision of acoustic enclosures and the use of less intrusive alarms, such as broadband vehicle reversing warnings;
- Acoustic screening - for example, local screening of equipment, perimeter hoarding or the use of temporary stockpiles;
- Public Communications – for example, letter drops to nearby residents to inform them of the construction programme and any periods of significant work, as well as a phone number to contact for any complaints; and
- Avoidance of potentially sensitive periods or events which, for example, may have been flagged during the community liaison exercise.

11.6.11 The mitigation set out above will reduce the overall effect of the construction activities at nearby receptors although the exact reduction cannot be quantified without a detailed construction method statement.

11.6.12 There will be no noisy or vibratory works on Sundays or Bank Holidays. Noisy and/or vibratory construction works will be restricted to take place between the hours of 07.00 – 18.00 Monday to Friday and 08.00 to 13.00 on Saturdays, with vehicles mainly accessing the Site during these working hours. For logistical reasons, it may be necessary to have occasional deliveries outside of these hours, for example, if any abnormal loads are required for transporting large items such as the delivery of the tower crane. On-site construction working hours will be set out in the CEMP, to be secured by a planning condition to the planning permission. Any works required to be outside of these hours will be requested through a Section 61 application.

11.6.13 In addition, the adverse impact from construction traffic would be mitigated through the Traffic Management Plan as referred to in the CEMP.



11.6.14 Although a prediction of the construction and demolition noise has been included in this assessment, a detailed construction noise assessment will be completed once the demolition and construction methods and plant have been finalised.

11.6.15 'Best Practicable Means' will be adopted at all times to keep annoyances to a minimum. A clear line of communication between the developer and nearby occupants is essential to keep relations amicable throughout the duration of the project.

Construction Vibration

11.6.16 The following mitigation measures are assumed to be embedded within a Construction Environmental Management Plan (CEMP) as part of the Proposed Development and the construction methods as part of the Proposed Development, as set out in the Code of Construction Practice (CoCP11).

11.6.17 The CEMP is to be secured by conditions in the deemed planning permission.

11.6.18 The Best Practicable Means (BPM) as defined in the Control of Pollution Act 1974 will be adopted to minimise noise and vibration from construction works. This will be reflected in a Construction Environmental Management Plan and submitted as part of a Section 106 Agreement. The most relevant and specific commitments with respect to vibration are set out below:

- Vibration control at source - for example, the selection of equipment that generates low levels of vibration, location of equipment on site, control of working hours;
- Public Communications – for example, letter drops to nearby residents to inform them of the construction programme and any periods of significant work, as well as a phone number to contact for any complaints; and
- Avoidance of potentially sensitive periods or events which, for example, may have been flagged during the community liaison exercise.

11.6.19 Vibration is unlikely to result in a significant adverse impact to the surrounding area. Percussive or vibratory piling and vibratory rollers are a known source of high vibration.

11.6.20 Where piling is required, low vibration piling techniques, such as continuous flight auger (CFA) piling will be used to minimise any potential adverse effects.

11.6.21 Vibration from rollers will be reduced or turned off when compacting close to residential properties.

11.6.22 Alternative piling and rolling methods will require a separate assessment to determine the significance of impact.

Site Suitability

11.6.23 The site is required to comply with local, national and international guidance documents and planning policies. None of which provide mitigation measures which have a quantifiable impact and instead require a specific assessment of the impact.

11.6.24 This is discussed further in the following sections.

Operational - Road Traffic

11.6.25 No tertiary mitigation is considered relevant to the operational Road Traffic noise.

Operation Noise – Building Services Plant

11.6.26 The extent of plant is unknown at this stage and hence no tertiary mitigation is considered relevant at this stage, although by adhering to the plant noise rating levels, this will mitigate sufficiently. This will be secured through a relevant planning condition.



Operational Noise - New Sports Pitches

11.6.27 No tertiary mitigation is considered relevant to the noise from the new sports pitches.

11.7 Assessment of Significant Likely Effects

Construction – Noise

11.7.1 The Site is currently undeveloped land, with no existing structures close to residential properties apart from the equestrian facility which is to be removed. As can be seen in Figure 11.2, there is currently a radio tower located towards the centre of the Proposed Development area. This is to be removed or relocated.

11.7.2 **Figure 11.7** indicates the representative demolition areas and noise sensitive receptor locations for this assessment.

11.7.3 **Tables 11.10 to 11.11** show the predicted impact on surrounding receptors without mitigation.

Table 11.10: Demolition Noise From Equestrian Facility (Location A) ($L_{Aeq,T}$ dB)

BS 5228-1 Calculation Method	Equestrian Facility (Location A)			Category Threshold (dB): 65			
Equipment Type	dB at 10m	Number of Units	Percent on Time	dB Result at 10m	NSR 5 15 mtrs	NSR 6 100 mtrs	NSR 8 180 mtrs
Dozer	75	1	50%	72	68	52	47
8-ton excavator	68	1	30%	63	59	43	38
6-ton dumper	79	1	50%	76	72	56	51
Dump Truck (Empty)	87	1	25%	81	77	61	56
Dump Truck (Tipping Fill)	79	1	25%	73	69	53	48
Breaker on Excavator	90	1	25%	84	80	64	59
Cumulative dB Sum at NSR Magnitude of Impact					83 Major	67 Moderate	62 Minor

Table 11.11: Demolition Noise From Radio Tower (Location B) ($L_{Aeq,T}$ dB)

BS 5228-1 Calculation Method	Radio Tower (Location B)			Category Threshold (dB): 65			
Equipment Type	dB at 10m	Number of Units	Percent on Time	dB Result at 10m	NSR 1 150 mtrs	NSR 7 320 mtrs	NSR 2 400 mtrs
Dozer	75	1	50%	72	48	42	40
8-ton excavator	68	1	30%	63	39	33	31
6-ton dumper	79	1	50%	76	52	46	44
Dump Truck (Empty)	87	1	25%	81	57	51	49
Dump Truck (Tipping Fill)	79	1	25%	73	49	43	41
Breaker on Excavator	90	1	25%	84	60	54	52



BS 5228-1 Calculation Method	Radio Tower (Location B)			Category Threshold (dB):			65
Equipment Type	dB at 10m	Number of Units	Percent on Time	dB Result at 10m	NSR 1 150 mtrs	NSR 7 320 mtrs	NSR 2 400 mtrs
Grinder	80	1	20%	73	49	43	41
Cumulative dB Sum at NSR					63	57	55
Magnitude of Impact					Minor	Minor	Minor

11.7.4 Without mitigation the assessment shows the ABC threshold level from demolition of the Equestrian Facility is shown to produce levels 18 dB above the threshold levels at NSR 5. The **Major Magnitude** of impact to a **High Sensitivity Receptors** would therefore result in a **Major Effect** at NSR 5 when assessed against the criteria in Table 11.3 and 11.7.

11.7.5 The assessment shows that demolition of the Radio Tower would be 2 dB below the ABC threshold level. However the demolition noise levels are likely to be above the baseline sound levels, hence the **Minor Magnitude** of impact to a **High Sensitivity Receptors** would therefore result in a **Minor Effect** when assessed against the criteria in Table 11.3 and 11.7.

11.7.6 **Figure 11.5** indicates the representative construction source and noise sensitive receptor locations used in the subsequent assessment.

- **Tables 11.12 to 11.15** show the predicted impact on the surrounding receptors without mitigation.

Table 11.12: Construction Noise From Locations A (L_{Aeq,T} dB)

BS 5228-1 Calculation Method	Location A			Category Threshold (dB):			65
Equipment Type	dB at 10m	Number of Units	Percent on Time	dB Result at 10m	NSR 5 30 mtrs	NSR 6 100 mtrs	NSR 8 180 mtrs
13-ton excavator	70	5	30%	72	62	52	47
8-ton excavator	68	3	30%	68	58	48	42
6-ton dumper	79	2	50%	79	69	59	54
Compressor	65	5	15%	64	54	44	39
Dump Truck (Empty)	87	2	25%	84	74	64	59
Dump Truck (Tipping Fill)	79	2	25%	76	66	56	51
Rollers	74	1	20%	67	57	47	42
Concrete Pump	75	1	50%	72	62	52	47
Cumulative dB Sum at NSR					76	66	61
Magnitude of Impact					Major	Moderate	Minor

Table 11.13: Construction Noise From Locations B (L_{Aeq,T} dB)

BS 5228-1 Calculation Method	Location B			Category Threshold (dB):			65
Equipment Type	dB at 10m	Number of Units	Percent on Time	dB Result at 10m	NSR 1 24 mtrs	NSR 7 100 mtrs	NSR 8 200 mtrs
13-ton excavator	70	5	30%	72	64	52	46



BS 5228-1 Calculation Method		Location B		Category Threshold (dB):			65
Equipment Type	dB at 10m	Number of Units	Percent on Time	dB Result at 10m	NSR 1 24 mtrs	NSR 7 100 mtrs	NSR 8 200 mtrs
8-ton excavator	68	3	30%	68	60	48	42
6-ton dumper	79	2	50%	79	71	59	53
Compressor	65	5	15%	64	56	44	38
Dump Truck (Empty)	87	2	25%	84	76	64	58
Dump Truck (Tipping Fill)	79	2	25%	76	68	56	50
Rollers	74	1	20%	67	59	47	41
Concrete Pump	75	1	50%	72	64	52	46
Cumulative dB Sum at NSR					78	66	60
Magnitude of Impact					Major	Moderate	Minor

Table 11.14: Construction Noise From Locations C (L_{Aeq,T} dB)

BS 5228-1 Calculation Method		Location C		Category Threshold (dB):			65
Equipment Type	dB at 10m	Number of Units	Percent on Time	dB Result at 10m	NSR 1 30 mtrs	NSR 3 210 mtrs	NSR 2 250 mtrs
13-ton excavator	70	5	30%	72	62	45	44
8-ton excavator	68	3	30%	68	58	41	40
6-ton dumper	79	2	50%	79	69	53	51
Compressor	65	5	15%	64	54	37	36
Dump Truck (Empty)	87	2	25%	84	74	58	56
Dump Truck (Tipping Fill)	79	2	25%	76	66	50	48
Rollers	74	1	20%	67	57	41	39
Concrete Pump	75	1	50%	72	62	46	44
Cumulative dB Sum at NSR					76	60	58
Magnitude of Impact					Major	Minor	Minor

Table 11.15: Construction Noise From Locations D (L_{Aeq,T} dB)

BS 5228-1 Calculation Method		Location D		Category Threshold (dB):			65
Equipment Type	dB at 10m	Number of Units	Percent on Time	dB Result at 10m	NSR 3 60 mtrs	NSR 2 210 mtrs	NSR 4 300 mtrs
13-ton excavator	70	5	30%	72	56	45	42
8-ton excavator	68	3	30%	68	52	41	38
6-ton dumper	79	2	50%	79	63	53	49
Compressor	65	5	15%	64	48	37	34



BS 5228-1 Calculation Method		Location D		Category Threshold (dB):			65
Equipment Type	dB at 10m	Number of Units	Percent on Time	dB Result at 10m	NSR 3 60 mtrs	NSR 2 210 mtrs	NSR 4 300 mtrs
Dump Truck (Empty)	87	2	25%	84	68	58	54
Dump Truck (Tipping Fill)	79	2	25%	76	60	50	46
Rollers	74	1	20%	67	51	41	37
Concrete Pump	75	1	50%	72	56	46	42
Cumulative dB Sum at NSR					70	60	56
Magnitude of Impact					Major	Minor	Minor

11.7.7 Without mitigation the assessment shows the ABC threshold level will exceed the ABC threshold at several locations by more than 5 dB, with the worst assessment location shown to produce levels 13 dB above the threshold levels. The **Major Magnitude** of impact to a **High Sensitivity Receptors** would therefore result in a **Major Effect** when assessed against the criteria in Table 11.3 and 11.7.

Construction – Vibration

11.7.8 In accordance with BPM required as tertiary mitigation we have considered that percussive or vibratory piling will not be required on site, and no vibratory compaction will be conducted within 30 metres of an existing receptor.

11.7.9 This distance has been based on manufacturer's data for a commonly used medium sized vibratory roller. The resultant velocity values, and the sensitivity of receptors have been categorised as per tables B1 and B.2 of BS5228-2 [calculation methods as per Table E.1 of BS5228-2].

11.7.10 Following BPM being implemented, this will result in a **Minor to Negligible** impact, which to **High Sensitivity Receptors** would result in a **Minor to Negligible Effect** when assessed against the criteria in Table 11.4 and 11.7.

Site Suitability

11.7.11 The site has been shown to be suitable from a noise perspective. Only the proposed properties to the south west of the site, as shown in Figure 11.4, would be subjected to higher noise levels from the roads. With respect to the noise from the road, there would be a **negligible** impact for the majority of the site and a **minor** impact to the proposed dwelling houses to the southwest. For **High Sensitivity Receptors** this would result in a **Minor to Negligible Effect**.

Operational Noise - Road Traffic

11.7.12 The transport consultant has predicted an increase in traffic on the surrounding road network due to the Proposed Development. In the worst impacted area of the Site a 0.9 dB increase in noise levels will result. When considered in the context of DMRB guidance this would be a **Negligible Impact** change to the worst impacted areas during the short term and long term, and to some assessment locations No change will be present.

11.7.13 A Negligible Impact to High Sensitivity Receptors would therefore result in a **Negligible Effect**.

Operational Noise – Building Services Plant

11.7.14 At the time of writing, plant details are not known.



11.7.15 Plant noise rating levels have, therefore, been proposed within the accompanying Noise and Vibration Assessment provided in Appendix 11.3.

11.7.16 The proposed noise rating levels are 42 dB $L_{A,T,r}$ during the daytime and 35 dB $L_{A,T,r}$ during the night-time hours. These proposed noise rating levels are inclusive of any specific acoustic characteristics, such as tonality, impulsivity, cyclical or any other noise which would make the plant noticeable.

11.7.17 These levels have been set at 5 dB above the representative background sound levels, which is the point at which BS 4142:2014+A1:2019 suggests an adverse impact may start to occur, depending on the context.

11.7.18 Adherence to these noise limits will result in a **Minor Adverse** impact to **Negligible Adverse** impact at all noise sensitive receptors.

11.7.19 A Minor to Negligible Impact to High Sensitivity Receptors would therefore result in a **Minor to Negligible Effect**.

Operational Noise - New Sports Pitches

11.7.20 The assessment identifies external sound levels in the order of 57 dB $L_{Aeq,1-hour}$ during sporting activities.

11.7.21 This exceeds the 50 dB $L_{Aeq,1-hour}$ criteria and hence will result in a **Moderate to Major Impact**.

11.7.22 A Moderate to Major Impact to High Sensitivity Receptors would therefore result in a **Moderate to Major Effect**.

11.8 Secondary Mitigation and Enhancement

Construction Noise

11.8.1 The primary source of noise impacting the surrounding area is from breaking activities. Where breaking is occurring it should be undertaken by hand tools or compact breaking equipment so that an enclosure can be installed around the work area. This has been reflected in the mitigation proposals below.

11.8.2 The use of Site hoarding can provide up to 9 dB of sound reduction to ground floor receptors when close to the noise source. However, barriers lose effectiveness the greater the source is from the barrier and at increased heights for the receiver. The effect of Site hoarding has not been considered in this assessment.

11.8.3 Mitigation methods are simple and effective to use, ranging from the use of mufflers, additional near field screening and enclosures. The efficacy of a selection of mitigation measures are highlighted in Table B.1 of BS 5228-1:2009 + A1:2014. This assessment has considered the use of the mitigative methods shown in the Tables 11.16 to 11.17.

Table 11.16: Demolition Noise From Equestrian Facility (Location A) With Mitigation ($L_{Aeq,T}$ dB)

BS 5228-1 Calculation Method		Equestrian Facility (Location A)					Category Threshold (dB):			65
Equipment Type	dB at 10m	Number of Units	Source Mitigation	dB Reduction	Percent on Time	dB Result at 10m	NSR 5 15 mtrs	NSR 6 100 mtrs	NSR 8 180 mtrs	
Dozer	75	1	Exhaust Muffler	10	50%	62	58	42	37	
8-ton excavator	68	1	Exhaust Muffler	10	30%	53	49	33	28	



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BS 5228-1 Calculation Method	Equestrian Facility (Location A)					Category Threshold (dB):				65
Equipment Type	dB at 10m	Number of Units	Source Mitigation	dB Reduction	Percent on Time	dB Result at 10m	NSR 5 15 mtrs	NSR 6 100 mtrs	NSR 8 180 mtrs	
6-ton dumper	79	1	Exhaust Muffler	10	50%	66	62	46	41	
Dump Truck (Empty)	87	1	Exhaust Muffler	10	25%	71	67	51	46	
Dump Truck (Tipping Fill)	79	1	Exhaust Muffler	10	25%	63	59	43	38	
Pneumatic Breaker	87	1	Enclosure	20	25%	61	57	41	36	
Cumulative dB Sum at NSR Magnitude of Impact							69 Moderate	53 Negligible	48 Negligible	

Table 11.17: Demolition Noise From Radio Tower (Location B) With Mitigation (L_{Aeq,T} dB)

BS 5228-1 Calculation Method	Radio Tower (Location B)					Category Threshold (dB):				65
Equipment Type	dB at 10m	Number of Units	Source Mitigation	dB Reduction	Percent on Time	dB Result at 10m	NSR 1 150 mtrs	NSR 7 320 mtrs	NSR 2 400 mtrs	
Dozer	75	1	Exhaust Muffler	10	50%	62	38	32	30	
8-ton excavator	68	1	Exhaust Muffler	10	30%	53	29	23	21	
6-ton dumper	79	1	Exhaust Muffler	10	50%	66	42	36	34	
Dump Truck (Empty)	87	1	Exhaust Muffler	10	25%	71	47	41	39	
Dump Truck (Tipping Fill)	79	1	Exhaust Muffler	10	25%	63	39	33	31	
Breaker on Excavator	90	1	Acoustic Screen	10	25%	74	50	44	42	
Grinder	80	1	Acoustic Screen	10	20%	63	39	33	31	
Cumulative dB Sum at NSR Magnitude of Impact							54 Minor	48 Minor	46 Negligible	

11.8.4 With the proposed mitigation the assessment shows the ABC threshold level during demolition of the Equestrian Facility is likely to be exceeded at the closest noise sensitive receptors by less than 5 dB, but will be below the ABC threshold for all other receptors. The demolition noise levels are likely to be above the baseline sound levels to some locations, hence a **Moderate Magnitude** when assessed to



NSR1 and **Minor to Negligible Magnitude** when assessed to other receptors against the criteria in Table 11.3 and 11.7.

- 11.8.5 It is important to note the wording in the DMRB document. Construction noise and construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding 10 or more days or nights in any 15 consecutive days or nights; or a total number of days exceeding 40 in any 6 consecutive months. This will be monitored during construction so that the empty dump trucks are stored away from the receptors.
- 11.8.6 It can be seen in table 11.16 that the Dump Truck moving whilst empty has been predicted to be the major contributor to this exceedance. In addition to the considerate placement and operation of the empty dump trucks, the dump trucks will have anti vibration pads adhered to the outside of the buckets to reduce the impact noise. This will reduce the noise levels further for these receptors, whilst the works are undergoing on the demolition of the equestrian facility.
- 11.8.7 Once all above mitigation has been implemented, a **Minor to Negligible Impact** is predicted throughout the Site for this Proposed Development. For **High Sensitivity Receptors** would result in a **Minor to Negligible Effect**.
- 11.8.8 With the proposed mitigation the assessment shows the ABC threshold level during demolition of the Radio Tower is unlikely to be exceeded at all locations. The demolition noise levels are likely to be at the baseline sound levels, hence the demolition of the radio tower to **High Sensitivity Receptors** would result in a **Minor to Negligible Magnitude** when assessed against the criteria in Tables 11.3 and 11.7.
- 11.8.9 Activities during construction of the site are considered in Tables 11.18 to 11.21 below.

Table 11.18: Construction Noise From Locations A ($L_{Aeq,T}$ dB) With Mitigation

BS 5228-1 Calculation Method		Location A				Category Threshold (dB):				65
Equipment Type	dB at 10 m	Number of Units	Source Mitigation	dB Reduction	Percent on Time	dB Result at 10m	NSR 5 30 mtrs	NSR 6 100 mtrs	NSR 8 180 mtrs	
13-ton excavator	70	5	Exhaust Muffler	10	30%	62	52	42	37	
8-ton excavator	68	3	Exhaust Muffler	10	30%	58	48	38	32	
6-ton dumper	79	2	Exhaust Muffler	10	50%	69	59	49	44	
Compressor	65	5	Enclosure	20	15%	44	34	24	19	
Dump Truck (Empty)	87	2	Exhaust Muffler	10	25%	74	64	54	49	
Dump Truck (Tipping Fill)	79	2	Exhaust Muffler	10	25%	66	56	46	41	
Rollers	74	1	Exhaust Muffler	10	20%	57	47	37	32	
Concrete Pump	75	1	Enclosure	20	50%	52	42	32	27	
Cumulative dB Sum at NSR Magnitude of Impact							66 Moderate	56 Minor	51 Negligible	



Table 11.19: Construction Noise From Locations B ($L_{Aeq,T}$ dB) With Mitigation

BS 5228-1 Calculation Method		Location B				Category Threshold (dB):			65
Equipment Type	dB at 10 m	Number of Units	Source Mitigation	dB Reduction	Percentage on Time	dB Result at 10m	NSR 1 24 mtrs	NSR 7 100 mtrs	NSR 8 200 mtrs
13-ton excavator	70	5	Exhaust Muffler	10	30%	62	54	42	36
8-ton excavator	68	3	Exhaust Muffler	10	30%	58	50	38	32
6-ton dumper	79	2	Exhaust Muffler	10	50%	69	61	49	43
Compressor	65	5	Enclosure	20	15%	44	36	24	18
Dump Truck (Empty)	87	2	Exhaust Muffler	10	25%	74	66	54	48
Dump Truck (Tipping Fill)	79	2	Exhaust Muffler	10	25%	66	58	46	40
Rollers	74	1	Exhaust Muffler	10	20%	57	49	37	31
Concrete Pump	75	1	Enclosure	20	50%	52	44	32	26
Cumulative dB Sum at NSR Magnitude of Impact							68 Moderate	56 Minor	50 Minor

Table 11.20: Construction Noise From Locations C ($L_{Aeq,T}$ dB) With Mitigation

BS 5228-1 Calculation Method		Location C				Category Threshold (dB):			65
Equipment Type	dB at 10 m	Number of Units	Source Mitigation	dB Reduction	Percentage on Time	dB Result at 10m	NSR 1 30 mtrs	NSR 3 210 mtrs	NSR 2 250 mtrs
13-ton excavator	70	5	Exhaust Muffler	10	30%	62	52	35	34
8-ton excavator	68	3	Exhaust Muffler	10	30%	58	48	31	30
6-ton dumper	79	2	Exhaust Muffler	10	50%	69	59	43	41
Compressor	65	5	Enclosure	20	15%	44	34	17	16
Dump Truck (Empty)	87	2	Exhaust Muffler	10	25%	74	64	48	46
Dump Truck	79	2	Exhaust Muffler	10	25%	66	56	40	38



BS 5228-1 Calculation Method		Location C				Category Threshold (dB):				65
Equipment Type	dB at 10 m	Number of Units	Source Mitigation	dB Reduction	Percentage on Time	dB Result at 10m	NSR 1 30 mtrs	NSR 3 210 mtrs	NSR 2 250 mtrs	
(Tipping Fill)										
Rollers	74	1	Exhaust Muffler	10	20%	57	47	31	29	
Concrete Pump	75	1	Enclosure	20	50%	52	42	26	24	
Cumulative dB Sum at NSR							66	50	48	
Magnitude of Impact							Moderate	Minor	Minor	

Table 11.21: Construction Noise From Locations D ($L_{Aeq,T}$ dB) With Mitigation

BS 5228-1 Calculation Method		Location D				Category Threshold (dB):				65
Equipment Type	dB at 10 m	Number of Units	Source Mitigation	dB Reduction	Percentage on Time	dB Result at 10m	NSR 3 60 mtrs	NSR 2 210 mtrs	NSR 4 300 mtrs	
13-ton excavator	70	5	Exhaust Muffler	10	30%	62	46	35	32	
8-ton excavator	68	3	Exhaust Muffler	10	30%	58	42	31	28	
6-ton dumper	79	2	Exhaust Muffler	10	50%	69	53	43	39	
Compressor	65	5	Enclosure	20	15%	44	28	17	14	
Dump Truck (Empty)	87	2	Exhaust Muffler	10	25%	74	58	48	44	
Dump Truck (Tipping Fill)	79	2	Exhaust Muffler	10	25%	66	50	40	36	
Rollers	74	1	Exhaust Muffler	10	20%	57	41	31	27	
Concrete Pump	75	1	Enclosure	20	50%	52	36	26	22	
Cumulative dB Sum at NSR							60	50	46	
Magnitude of Impact							Minor	Minor	Negligible	

11.8.10 By implementing the same practices as detailed in paragraphs 11.8.5 and 11.8.6 a **Minor to Negligible Impact** is predicted throughout the Site for this Proposed Development. For **High Sensitivity Receptors** would result in a **Minor to Negligible Effect**.



Construction - Vibration

- 11.8.11 Considering the above tertiary measures, vibration is expected to result in a **Minor** or **Negligible** impact at this stage of the assessment. To **High Sensitivity Receptors** would result in a **Minor** to **Negligible Effect** when assessed against the criteria in Table 11.4 and 11.7.

Site Suitability

- 11.8.12 Mitigation in the form of acoustically rated glazing and (where used) ventilator elements will be required for the plots detailed within Appendix 11.3.
- 11.8.13 The report identifies the need for 34 dB R_w glazing units (or equivalent/better) and trickle vents capable of achieving at least 39 dB $D_{n,e,w} + 10 \times \log(N)$, where N is the number of units in the space. This will need to be considered during the design development. Areas where this is required are shown in Figure 11.3.
- 11.8.14 To control noise to external areas, the report recommends garden fences in areas of the Site shown in grey in Figure 11.4 should be at least 1.8 metres high, imperforate, and meet a mass per unit at least 10 kg/m². This can normally be achieved with a 20 mm solid timber fence.

Operational Noise - Road Traffic

- 11.8.15 No secondary mitigation proposals are considered necessary based on the information provided by the transport consultant.
- 11.8.16 The outcome from noise increase due to road traffic remains a **Negligible Impact**, which to **High Sensitivity Receptors** would result in a **Negligible Effect**.

Operational Noise – Building Services Plant

- 11.8.17 Again, at the time of writing, plant details are not known.
- 11.8.18 Provided that the noise limits proposed will be adhered to there will be a **Minor** impact to **Negligible** impact at all noise sensitive receptors.
- 11.8.19 A **Minor to Negligible Impact** to **High Sensitivity Receptors** would therefore result in a **Minor to Negligible Effect**.

Operational Noise - New Sports Pitches

- 11.8.20 Due to the site layout it is expected that barriers will provide limited benefit unless installed along the touchline or goal line of the pitch. This has not been undertaken due to the application being at the outline planning stage. It is likely that any nearfield screening could limit the use of the proposed pitches, so mitigation in the form of acoustically rated glazing and (where used) ventilator elements will be used to reduce internal noise limits to within reasonable limits.
- 11.8.21 The report identifies the need for 40 dB R_w glazing units (or equivalent/better) and trickle vents capable of achieving at least 39 dB $D_{n,e,w} + 10 \times \log(N)$, where N is the number of units in the space. This will need to be considered during the design development.
- 11.8.22 The proposals should achieve internal sound levels of 30 dB $L_{Aeq,1-hour}$, which is 5 dB below the criteria derived from the guidance, in an effort to achieve a negligible impact.
- 11.8.23 Residential amenity areas have not been identified close to the pitches, other than the pitches themselves, hence control of noise to external areas is not considered necessary at the time of writing.
- 11.8.24 Operation and management of the pitches will play an important role in the mitigation of noise and reducing the levels of impact.



11.8.25 This typically includes the submission of a noise management plan which addresses controlling noise from crowds, implementing signage and incorporating rebound panels or behind clamp bars to reduce impact noise from any fencing.

11.8.26 As with construction noise this is often secured through condition.

11.8.27 With the proposed mitigation there will be a **Minor** impact to **Negligible** impact at all noise sensitive receptors.

11.8.28 A **Minor to Negligible Impact** to **High Sensitivity Receptors** would therefore result in a **Minor to Negligible Effect**.

11.9 Residual Effects

Construction Noise

11.9.1 With mitigation the construction noise would be considered to result in a **Minor to Negligible Impact** predicted to the development when assessed against the criteria in Table 11.3.

11.9.2 To **High Sensitivity Receptors** this would be a **Minor to Negligible Effect** to the Site.

11.9.3 Following the mitigation measures being implemented for the demolition of the Equestrian Facility, the noise from activities would be mitigated below the ABC threshold, so the residual effect would be **Minor** to all receptors.

Construction Vibration

11.9.4 Following the recommended mitigation being implemented, the magnitude of impact would be considered **Minor to Negligible** when assessed against the criteria in Table 11.4.

11.9.5 Sources of construction vibration will result in a **Minor to Negligible** impact.

Site Suitability

11.9.6 With the implementation of the proposed mitigation, the assessment shows all internal levels will meet the guidance available and hence the impact on to all receptors would be **Negligible**. Given these are all **High Sensitivity Receptors** this results in a **Negligible Effect**

11.9.7 By implementing the proposed mitigation all dwellings, the assessment shows that external noise levels would be below the upper limits of the WHO guidelines and BS 8233 and marginally above the lower limits. The assessment shows all internal levels can meet the guidance available and hence the impact on to all receptors would be **Minor** or **Negligible**.

11.9.8 Given these are all **High Sensitivity Receptors** this results in a **Minor to Negligible Effect**

Operation Noise - Road Traffic

11.9.9 Impact due to additional road traffic on the surrounding road networks remains **Negligible**.

11.9.10 Given these are all **High Sensitivity Receptors** this results in a **Negligible Effect**.

Operation Noise – Building Services Plant

11.9.11 Adherence to the noise limits proposed would result in a **Minor** or **Negligible** impact to receptors.

11.9.12 Given these are all **High Sensitivity Receptors** this results in a **Minor to Negligible Effect**.

Operational Noise - New Sports Pitches



11.9.13 Impact due to the proposed sports pitches remains **Minor** or **Negligible** impact to receptors.

11.9.14 Given these are all **High Sensitivity Receptors** this results in a **Minor** or **Negligible Effect**.

11.10 Cumulative Effects

11.10.1 The predicted cumulative effects arising from the Proposed Development in combination with the cumulative scheme (located approximately 1 km from the Site) on NSR locations in the vicinity of the Site have been considered within this section.

11.10.2 There is specific guidance within the DMRB relating to schemes which should or should not be considered due to distances. These have been discussed in more detail within this section.

Construction Phase Noise

11.10.3 Construction of the Proposed Development could occur simultaneously with the construction of some of the cumulative schemes. This section of the chapter therefore assesses the effect from construction noise from the Proposed Development on the cumulative schemes as well as the effect of construction noise from the cumulative schemes on the Proposed Development.

11.10.4 Note 1 of the DMRB LA 111, paragraph 3.5 states the following recommendation;

A study area of 300 m from the closest construction activity is normally sufficient to encompass noise sensitive receptors.

11.10.5 For this reason, the cumulative construction phase noise effects need not be considered further.

Construction Phase Vibration

11.10.6 Construction of the Proposed Development could occur simultaneously with the construction of some of the cumulative schemes. This section of the chapter therefore assesses the effect from construction vibration from the Proposed Development on the cumulative schemes as well as the effect of construction vibration from the cumulative schemes on the Proposed Development.

11.10.7 Note 1 of the DMRB LA 111, paragraph 3.29 states the following recommendation;

A study area of 100 m from the closest construction activity with the potential to generate vibration is normally sufficient to encompass vibration sensitive receptors.

11.10.8 For this reason, the cumulative construction phase vibration effects need not be considered further.

Operational Phase

11.10.9 Operation of the Proposed Development could occur with the operation of the scheme at Cooters End Lane and Ambrose Lane, Harpenden.

11.10.10 Note 1 of the DMRB LA 111, paragraph 3.44 states the following recommendation relating to the study area;

1) the area within 600 m of new road links or road links physically changed or bypassed by the project;

2) the area within 50 m of other road links with the potential to experience a short term BNL change of more than 1.0 dB(A) as a result of the project.

11.10.11 As the Site is approximately 1 km northeast of the Cooters End scheme, this negates this scheme to be considered further.



11.11 Monitoring

- 11.11.1 In general, the effects predicted from the mitigated development is considered to be low to negligible, with the exception of potential impact from demolition and construction noise at some of the existing sensitive receptors, which although demonstrated to potentially result in a moderate effect, is considered acceptable given that it is a temporary noise source.
- 11.11.2 Following the detailed construction noise and vibration impact assessment being undertaken, if monitoring is predicted to be required, then automated noise and vibration monitoring will be implemented for the Demolition and Construction phases, whilst close to existing receptors.
- 11.11.3 If required, the monitors will be located along the site boundary close to receptors and limits set to ensure sound and vibration levels are not exceeded at the closest noise sensitive receptors.
- 11.11.4 If required, monitoring will be undertaken so long as the works are within 300 metres of a noise sensitive receptor or 100 metres of a vibration sensitive receptor.
- 11.11.5 It is normal for regular reports to be generated so that a record of activities is logged and evidenced in the event of any site inspection or noise or vibration complaint.
- 11.11.6 Monitoring during the operation phase of the development will not be required.

11.12 Conclusions

- This assessment has considered the likely significant effects on noise and vibration from the Proposed Development.
- An acoustic baseline survey was carried out in order to establish the prevailing noise environment at the Site.
- In line with BS 8233:2014, the internal and external ambient noise levels were assessed and found to comply with the requirements of BS 8233 and also satisfy the World Health Organisation requirements through the majority of the Site without the need for mitigation. In a small area of the Site noise mitigation strategies have been described in more detail within the accompanying Noise and Vibration Assessment forming part of the ES Technical Appendices. These include the use of relocation and orientation of houses and sensitive room types, and where this is not possible, through the use of uprated acoustic glazing and forced ventilation.
- The external amenity spaces have also been assessed and the sound levels are below the recommended level in line with BS 8233 and the WHO in most amenity spaces. Mitigation in the form of resident's fences have been proposed.
- An assessment of the likely significant effects of construction noise generated by the demolition and construction phase of the Proposed Development has been carried out and noise mitigation measures to be implemented have been identified. Prior to the implementation of these mitigation measures, Major effects have been identified. Mitigation measures should be adopted to reduce these impacts to Moderate, Minor or Negligible effects.
- An assessment of the likely significant effects of construction vibration generated by the construction phase of the Proposed Development has been carried out and deemed to be Minor to Negligible at all receptors following the implementation of the mitigative measures.
- Plant information is not available at this time. An assessment of the likely significant effects of plant noise generated by the operational Proposed Development has been undertaken which has provided guidance on the maximum permissible sound level for any externally mounted or vented plant, inclusive of any special acoustical characteristics. All plant will be installed in line with the requirements of BS 4142.



- Effects from road traffic noise generated by the operational Proposed Development on existing residents in the vicinity of the Site and future occupants of the Proposed Development would be negligible and no mitigation measures are required.
- An assessment has been made of the construction noise and vibration effects from the Proposed Development to other committed developments and existing residential receptors in close vicinity of the Site. The construction phase has been assessed and the noise and vibration impacts have been shown to be minor adverse and negligible for the majority of sensitive receptors, following the implementation of the proposed mitigation. Due to the distances between the Site and the committed development sites, construction noise and vibration will be negligible.
- The assessment of the sports pitches identified the need for mitigation to reduce the predicted moderate/major effects to minor/negligible. The mitigation proposals will reduce these effects so as to tend to a more negligible effect rather than minor.
- The operational noise from the Proposed Development has also been assessed in terms of increased road traffic and plant noise. The impact from the Proposed Development has been shown to be negligible and not significant, assuming the proposed mitigation is implemented. Likewise, the impact on existing and future residents from the increased road traffic and plant noise from the committed developments should result in Negligible effects, based on the distances involved and mitigation steps required for plant.
- The cumulative short term effects for this Proposed Development and the other committed developments would be moderate to negligible to existing or future residents.
- The cumulative long term effects for this Proposed Development and the other committed developments would be minor to negligible to existing or future residents.



Table 11.22: Summary of Mitigation and Monitoring Measures

ES Chapter / Topic	Likely Significant Effects	Mitigation Measures
1) Measures incorporated into the Development Parameters		
Acoustic bunding / Fencing	N/A	This is not required for the site. There are areas which show elevated sound levels, but these can be treated locally through boundary fences to a few key plots as shown in Appendix 11.3.
2) Measures to be incorporated into the Detailed Design		
Internal Noise Levels	Major/Moderate/Minor	- Area delineated by red zone will require acoustically enhanced glazing and ventilation. Once installed, the significant effect would be reduced to negligible. - Areas close to the sports pitches will require acoustically enhanced glazing and ventilation. Once installed, the significant effect would be reduced to minor/negligible. - All other areas are suitable for natural ventilation without risk of increasing internal noise levels.
External Noise Levels	Major/Moderate	- Area delineated by red zone will require suitable perimeter fencing of at least 1.8m in height. - All other areas are suitable for private external amenity spaces.
Mitigation Measures to be applied during construction		
Demolition / Construction Noise	Major	- Implementation of BPM. - Site Hoarding and localised screening. - Use of low noise plant and equipment. - Through the above mitigation, the significant effect would be reduced to minor.
Construction Vibration	Minor/Negligible	- Implementation of BPM. - Use of low vibration plant and equipment. High vibration rolling should not occur within 30 m of existing properties. - Main potential for vibration has been considered to be from piling. If piling is to be used, then CFA piling will be utilised. Through the use of CFA piling, the significant effect would be reduced to minor/negligible.
4) Mitigation Measures to be applied post construction		
Mechanical Plant Noise	Minor/Negligible	- A noise rating level has been proposed. - All private plant will be installed to not exceed the noise rating levels proposed, which must be agreed by the LPA. - All commercial plant will be installed to not exceed the noise rating levels proposed, which must be agreed by the LPA. This includes plant associated with the school buildings. - By adhering to these mitigation measures, the effect would be reduced to minor/negligible.



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Table 11.23: Significance Table

Topic	Stage of Development	Residual Effects	Duration of Effect	Geographical Importance							Significance of Residual Effect
				I	UK	E	R	C	B	L	
Noise and Vibration	Construction	Increased construction noise levels – Mitigated through CMEP	Temporary							*	Minor to Negligible
		Increased construction vibration levels – Mitigated through CEMP	Temporary							*	Minor to Negligible
	Completed Development	Increased road traffic level	Permanent							*	Negligible
		Building services plant noise	Permanent							*	Minor to Negligible
		Internal sound levels – mitigated through enhanced glazing and ventilation in red zone only. All other areas suitable for natural ventilation	Permanent							*	Minor to Negligible
		External private amenity sound levels – mitigated through perimeter fences in red zone only. All other areas are suitable.	Permanent							*	Negligible
		External public amenity spaces are all within noise criteria so suitable	Permanent							*	Negligible
	Committed Developments	Construction Noise – Over 300m away	Temporary							*	Negligible
		Construction Vibration – Over 100m away	Temporary							*	Negligible
		Operational Noise – Over 600m from new road links	Permanent							*	Negligible



11.13 References

11.13.1 The documents used when compiling this EIA chapter are as follows;

- National Planning Policy Framework (December 2024)
- National Planning Policy Guidance (2019)
- Noise Policy Statement for England (2010)
- St Albans City and District Local Plan Review 1994 (Adopted November 1994)
- St Albans City and District Draft Local Plan 2041 (under review)
- Control of Pollution Act
- Calculation of Road Traffic noise (Department of Transport)
- BS 7445-1:2003 Description and Measurement of Environmental Noise
- BS 4142:2014 (+A1:2019) Method for Rating and Assessing Industrial and Commercial Sound
- BS 4866:2010 Mechanical vibration and shock – Vibration of Fixed Structures – Guidelines for the Measurement of Vibrations and Evaluation of their Effects on Structures
- BS 6472-1:2008 Guide to Evaluation of Human Exposure to Vibration in Buildings. Vibration sources other than blasting
- BS 5228-1:2019 (+A1:2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise
- BS 5228-2:2019 (+A1:2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration
- BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings
- Design Manual for Roads and Bridges (DMRB) LA111 (The Highways Agency)
- Guidelines for Community Noise (World Health Organisation)



12 Air Quality

12.1 Overview

- 12.1.1 This chapter of the ES assesses the likely significant environmental effects of the Proposed Development with respect to air quality. The chapter determines the Site's suitability for existing human receptors, future users, and ecological receptors, in relation to air quality comprising of NO_x, NO₂ and dust (PM₁₀ and PM_{2.5}), during the construction and operational phases.
- 12.1.2 This chapter first outlines the relevant policies, assessment approach, methodology, and baseline conditions. It then assesses the potential air quality impacts during construction and operation on existing receptors. Mitigation measures to prevent, reduce, or offset any significant adverse effects are set out, followed by an evaluation of the likely air quality assessment residual effects after mitigation.
- 12.1.3 This chapter has been prepared by Create Consulting Engineers Ltd who are corporate members of the Institution of Environmental Sciences (IES) as Associate Members (AMIEEnvSc) and the Institute of Air Quality Management (IAQM).
- 12.1.4 This Chapter of the ES has been prepared by Stantec. In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in **Appendix 1.3**.
- 12.1.5 This chapter is supported by the following appendices:
- **Appendix 12.1** describes the methodology used to assess dust impacts during the construction phase.
 - **Appendix 12.2** details the methodology applied to assess air quality impacts during the operational phase of the Proposed Development.
 - **Appendix 12.3** outlines the relevant policies, legislation, and guidance referenced in this assessment.

12.2 Legislation and Policy Context

- 12.2.1 The relevant National and Local policies include;
- Environment Act 1995
 - Clean Air Strategy 2019
 - Environment Act 2021
 - National Planning Policy Framework (December 2024)
 - Environmental Protection Act 1990
 - National Planning Policy Guidance (2019)
 - Noise Policy Statement for England (2010)
 - St Albans City and District Local Plan Review 1994 (Adopted November 1994)
 - St Albans City and District Draft Local Plan 2041 (under review)



- The relevant Guidance and Standards include;
- Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)
- Land Use Planning and Development Control: Planning for Air Quality (EPUK-IAQM, 2017)
- A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites (IAQM 2020)
- Local Air Quality Management Technical Guidance (LAQM.TG22)
- PM_{2.5}Targets: Interim Planning Guidance

12.3 Consultation

- 12.3.1 A Scoping Report was submitted to SACDC in September 2024 summarising the likely significant effects on local air quality as a result of the Proposed Development, as well as the anticipated methodology. A Scoping Opinion was received from SACDC which confirmed that the air quality assessment methodology was agreeable and that Air Quality should be scoped into the EIA.

12.4 Methodology

- 12.4.1 The assessment methodology detailed in the following sections has been applied to ascertain the potential impacts of emissions to air in order to identify their significance and compliance with policy and regulatory requirements and whether or not additional mitigation is required.

Study Area

- 12.4.2 The study area adopted for this assessment is as follows:
- 12.4.3 for the construction phase assessment, the study area (based on IAQM guidance, Appendix I2.1) is defined as up to 250 m from the site or 50 m from the route of construction vehicles (up to 500 m from the Site entrance).
- 12.4.4 for the operational phase assessment, the study area (based on EPUK / IAQM guidance) is defined as all roads within 250 m of the Site and other roads predicted to exceed the screening criteria outlined in Appendix I2.2.

Baseline Data Collection

- 12.4.5 Information on baseline air quality in the study area has been obtained by collating the results of monitoring carried out by SACDC and their LAQM reports to identify potential AQMAs. Background concentrations for the study area have been defined using the national pollution maps published by DEFRA which cover the whole country on a 1x1 km grid.

Assessment

Construction Phase Dust Assessment Summary

- 12.4.6 The potential for fugitive dust emissions during the construction phase has been assessed in accordance with the Institute of Air Quality Management's (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (Version 2.2, 2024). The methodology for this assessment is detailed in **Appendix 12.1**.
- 12.4.7 The assessment considers four key activity types: demolition, earthworks, construction, and trackout, each evaluated for their potential to generate dust and particulate matter (PM₁₀).



12.4.8 The methodology follows a structured four-step approach:

Step 1: Screening

12.4.9 Determines the need for a detailed assessment based on the proximity of human and ecological receptors to the Site and construction vehicle routes.

Step 2: Risk Assessment

12.4.10 Evaluates the potential dust emission magnitude and the sensitivity of the surrounding area. These factors are combined to assign a risk category (negligible, low, medium, or high) for each activity type.

Step 3: Mitigation Measures

12.4.11 Identifies appropriate Site-specific mitigation measures based on the assigned risk levels. Where risks are negligible, only legislative requirements apply; otherwise, best practice mitigation is recommended.

Step 4: Significance of Effects

12.4.12 Assesses whether residual effects are likely to be significant after mitigation. In most cases, effective mitigation ensures that dust impacts are not significant. However, site-specific constraints (e.g. limited access to water for dust suppression) may require further consideration.

12.4.13 The assessment also considers potential impacts on ecological receptors, referencing guidance from Defra and the need for consultation with ecologists where sensitive habitats are nearby. Overall, the approach provides a robust evaluation of dust-related impacts and supports the implementation of effective mitigation to protect local air quality and sensitive receptors.

Operational Phase Air Quality Assessment Summary

12.4.14 The operational phase air quality assessment has been undertaken in accordance with guidance from Environmental Protection UK (EPUK), the Institute of Air Quality Management (IAQM), and Defra's *Local Air Quality Management Technical Guidance (LAQM.TG22)*. The assessment evaluates the potential impacts of road traffic emissions associated with the Proposed Development on local air quality, focusing on nitrogen dioxide (NO₂), particulate matter (PM₁₀ and PM_{2.5})

12.4.15 A detailed dispersion modelling exercise was carried out using three scenarios:

- S1 – Baseline Year (2022): Reflects existing traffic conditions using Department for Transport data.
- S2 – Completion Year Without Development (2036): Projects future traffic flows without the Proposed Development.
- S3 – Completion Year With Development (2036): Includes traffic generated by the Proposed Development and committed development.

12.4.16 To provide a conservative and robust assessment, 2022 background concentrations and emission factors were applied to 2036 traffic data, representing a worst-case scenario.

12.4.17 Sensitive receptors within 500 m of the affected road network were identified, including residential properties, schools, hospitals, and care homes, in line with IAQM guidance. A desktop study was conducted to locate existing and future receptors potentially affected by changes in pollutant concentrations.



12.4.18 The significance of impacts was determined using criteria adapted from EPUK-IAQM guidance, considering:

- The number and type of receptors affected;
- The magnitude and percentage change in pollutant concentrations;
- Whether air quality objectives are exceeded or improved;
- The extent of exceedance above objective thresholds.

12.4.19 Predicted impacts at individual receptors were classified using descriptors such as 'negligible', 'slight', 'moderate', or 'substantial'. However, overall significance was determined using professional judgement, taking into account broader contextual factors and cumulative effects.

Limitations

12.4.20 The air quality assessment has been undertaken using standard methodologies and the best available data at the time of writing. However, as with any modelling-based assessment, there are inherent limitations and uncertainties associated with the approach. These include:

Demolition Phase:

- The timing, methods, and duration of demolition works are based on indicative information available at this stage and may change as the project develops.
- The assessment of dust impacts from demolition relies on qualitative, risk-based methods and professional judgement, which are subject to uncertainty due to factors such as the type of materials present, weather conditions, and on-site management practices.

Construction Phase:

- The construction programme, activities, and phasing details are based on assumptions or indicative information provided at this stage of the planning process.
- The assessment of dust impacts relies on qualitative risk-based methods, which require professional judgement and are subject to uncertainty due to site-specific factors such as weather conditions and actual management practices.
- Construction traffic assumptions are based on estimated vehicle numbers and routing, which may vary as the project progresses.

Operational Phase:

- The dispersion modelling of traffic-related emissions is based on projected traffic flows and emission factors, both of which carry uncertainty due to potential changes in traffic behaviour, fleet composition, and technological improvements.
- Future-year modelling relies on predicted background concentrations and emission reduction trends, which may not fully reflect real-world conditions.
- The model necessarily simplifies complex real-world atmospheric conditions, and predicted concentrations may differ from those measured in the future.
- Verification has been undertaken using the most recent available monitoring data; however, localised variations or changes over time may affect future conditions.

12.4.21 In addition, predicted results may differ from actual concentrations due to:



- Estimates of background pollutant levels;
- Variability in meteorological conditions;
- Uncertainty in source activity data such as traffic flows and emission factors;
- Inherent limitations of the dispersion model itself; and
- Uncertainties in monitoring data, including siting and representativeness.

12.4.22 Despite these limitations, the assessment provides a robust and reasonable basis for evaluating the likely air quality impacts of the Proposed Development.

12.5 Baseline Conditions

Sensitive Receptors

12.5.1 For the operational phase assessment existing and future human receptors were modelled at locations across the Proposed Development. Human receptors were modelled at a height of 1.5 m to represent ground-level exposure, as detailed in Table 12.1.

12.5.2 The ecological receptor locations were modelled at a height of 0 m to represent vegetation level.

12.5.3 Human receptors (R1-R13) were modelled at a height of 1.5 m to represent ground floor height. The Batford Springs LNR, represented by receptors E1 and E2, was modelled at a height of 0 m to reflect vegetation level.

Table 12.1: Sensitive Receptors

Receptor ID	Location	NGR (m)	
		X- Axis	Y-Axis
R1	Sauncey Wood Primary School	514710	215632
R2	Katherine Warrington School	514997	215095
R3	39 Common Ln	514968	215287
R4	1 Sauncey Wood	514970	215956
R5	Bower Heath Lane	514295	216641
R6	Bower Heath Lane	514276	216471
R7	River Lea	514096	215872
R8	Noah's Ark Pre-School	514143	215786
R9	12 Riverbanks Cl	514188	215714
R10	8 Millstone Wy	514206	215646
R11	162 Lower Luton Rd	514242	215621
R12	28 Millstone Wy	514248	215539
R13	Kelverion UK Ltd	514326	215429
E1	Batford Springs LNR	514582	215220
E2	Batford Springs LNR	514630	215190



Ecological Receptors

- 12.5.4 Ecological receptors were analysed using Magic Maps website which provides authoritative geographic information about the natural environment from across the government. This application is managed by Natural England. The application showed that the Site boundary and trackout route are not within 50 m of an ecological receptor.
- 12.5.5 Batford Springs local Nature Reserve (LNR) is 450m to the southwest of the Aite. The Batford Springs LNR was considered in this assessment as receptors E1 and E2, where pollutant concentrations were predicted. The LNR to give confidence that potential impacts were fully considered, even though formal guidance did not require its inclusion

The Site

Predicted Background Concentrations at the Site

- 12.5.6 Predictions of background pollutant concentrations on a 1km-by-1km grid basis have been produced by DEFRA for the entire of UK to assist Local Authorities (LAs) in their Review and Assessment of air quality.
- 12.5.7 The Proposed Development Site is located in grid squares NGR: 514500, 216500. Predicted background concentrations for the baseline year (2022), the present year (2025), and 2030 are shown in Table 12.2.
- 12.5.8 There is no background data for 2036 when the development is expected to be fully completed and therefore 2030 has been used to provide the furthest predicted data available.

Table 12.2: DEFRA Predicted Background Concentrations

Pollutant	Predicted Background Concentration ($\mu\text{g}/\text{m}^3$)		
	2022	2025	2030
NO _x	12.93	12.10	10.45
NO ₂	9.86	9.20	8.07
PM ₁₀	14.30	13.95	13.76
PM _{2.5}	9.15	8.88	8.73

- 12.5.9 As shown in Table 12.3, background concentrations do not exceed the relevant AQOs and are predicted to decline further by the year of completion.

The Surrounding Area

Ambient Air Quality

- 12.5.10 As required by the Environment Act (1995), SACDC has undertaken a review and assessment of air quality within their administrative area. There is one designated AQMA for elevated annual mean NO₂ and 24-hour mean PM₁₀ concentrations above their respective AQOs.
- 12.5.11 This AQMA is not located within close proximity of the Proposed Development. There are no other neighbouring AQMA's within close proximity of the Proposed Development. Therefore, AQMAs have not been assessed any further within this report.

Air Quality Monitoring Data

- 12.5.12 There is no automatic monitoring undertaken by St Albans City & District Council in 2022.



12.5.13 SACDC operated 50 passive monitoring stations (diffusion tubes) within the area in 2023. Table 12.3 shows diffusion tube monitoring results within 2 km of the Site. The closest monitoring site, SA110, is approximately 1,410 m south of the Site, while SA109 is approximately 1,850 m southwest.

Table 12.3: Diffusion Tube Monitoring Results

Site ID	Site Name	NGR		Site Type	Annual Mean NO ₂ Concentrations (µg/m ³)				
		X	Y		2019	2020	2021	2022	2023
SA110	Crabtree JMI	514438	214353	Kerbside	21.2	12.3	12.9	13.0	11.5
SA109	Crabtree Lane Harpenden	513427	214308	Kerbside	26.9	15.9	18.0	19.3	17.9
SA112	High Street Harpenden	517727	214041	Kerbside	26.1	19.6	20.6	19.7	17.9
SA159	High Street Wheathampstead	517727	213901	Roadside	28.8	19.4	21.1	20.2	18.8

12.5.14 Table 12.3 shows there have been no exceedances of the annual mean NO₂ AQO at any monitoring station in recent years.

Baseline Evolution

12.5.15 Baseline concentrations of NO₂, PM₁₀ and PM_{2.5} are predicted to decrease between 2019 and 2036, the expected operational year. Vehicle emission factors and background concentrations are expected to improve over this period due to technological advances and national and international regulatory regimes.

12.6 Primary and Tertiary Mitigation

12.6.1 The primary and tertiary mitigation which has been evaluated as part of the assessment is outlined below. Any secondary mitigation measures deemed to be required following the assessment of significant effects are outlined in **Section 12.8**

Primary

12.6.2 The energy strategy for the Proposed Development is Air Source Heat Pumps, with no proposed combustion sources. As such, no local air quality impacts are anticipated and the impacts of emissions from the plant are considered to be not significant. The use of Air Source Heat Pumps is a primary mitigation measure.

Construction

12.6.3 No primary mitigation measures are to be provided during the construction period.

Operation

12.6.4 The following measures are embedded into the operational design of the development to proactively reduce air quality impacts:

- Landscaping and green infrastructure (e.g., tree planting, green walls) have been incorporated to act as natural barriers to airborne pollutants and improve local air quality.
- Site access and internal circulation routes have been designed to minimise vehicle idling and congestion, reducing emissions.
- Secure cycle storage and pedestrian-friendly pathways to promote active travel and reduce reliance on private vehicles.



Tertiary

Construction Phase

- 12.6.5 In accordance with Part 4 of the IAQM construction dust guidance (IAQM, 2024), all Non-Road Mobile Machinery (NRMM) will need to adhere to the NRMM emission standards for NO₂ and PM₁₀ outlined in the European Directive 2016/1628. This is considered an integral part of the Proposed Development and will be implemented through a Demolition and Construction Environmental Management Plan (DCEMP) secured by a suitably worded planning condition on any permission.
- 12.6.6 Table 12.4 outlines tertiary mitigation measures reflect standard construction practices and regulatory requirements. These will be implemented as part of good construction management and are not dependent on the EIA process.

Table 12.4: Fugitive Dust Mitigation Measures

Guidance	Comment
Communications	- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. - Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. - Display the head or regional office contact information. - Develop and implement a Dust Management Plan.
Site Management	- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. - Make the complaints log available to the local authority when asked. - Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook. - Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.
Monitoring	- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary. - Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.



Guidance	Comment
	• Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. • Agree dust deposition, dust flux, or real-time PM₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences.
Preparing and Maintaining the Site	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. • Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. • Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period. • Avoid site runoff of water or mud. • Keep site fencing, barriers and scaffolding clean using wet methods. • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. • Cover, seed or fence stockpiles to prevent wind whipping.
Operating Vehicle/ Machinery and Sustainable Travel	• Ensure all vehicles switch off engines when stationary - no idling vehicles. • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable. • Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate). • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials. • Implement a Travel Plan that supports and encourages sustainable travel.
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.



Guidance	Comment
	• Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. • Use enclosed chutes and conveyors and covered skips. • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. • Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Waste Management	• Avoid bonfires and burning of waste materials.
Earthworks	• Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. • Only remove the cover in small areas during work and not all at once.
Construction	• Avoid scabbling (roughening of concrete surfaces) if possible. • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. • For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.
Trackout	• Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site, This may require the sweeper being continuously in use. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. • Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. • Record all inspections of haul routes and any subsequent action in a site logbook.



Guidance

Comment

- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

Operation Phase

- 12.6.7 Electric vehicle charging facilities will be provided at the Site in line with Building Regulations. A minimum of 10% of total car parking spaces will be allocated electric vehicle charging points, resulting in a minimum of 20 electric vehicle charging spaces.

12.7 Assessment of Significant Likely Effects

Demolition and Construction Dust Impacts

Screening Assessment

- 12.7.1 The Proposed Development is surrounded by residential receptors to the east and south of the Site boundary. Additionally, to south lies Arborfield Studios. There are a few industrial developments located within close proximity to the Site.
- 12.7.2 Based on the criteria shown in Table A12.2, Appendix 12.1, the sensitivity of the receiving environment to potential dust impacts is considered to be high for residential receptors and medium for industrial and commercial receptors. This is because users would expect to enjoy a high and reasonable level of amenity, respectively.
- 12.7.3 There are no ecological designations in close proximity to, the Site including Sites of Special Scientific Interest, Special Areas of Conservation, or Special Protection Areas. Batford Springs local Nature Reserve (LNR) is 450m to the southwest of the Site and Marshalls Heath LNR is 1km to the southeast.
- 12.7.4 The Batford Springs LNR was considered in this assessment as receptors E1 and E2, where pollutant concentrations were predicted.

Further Assessment

Dust Emission Magnitude

- 12.7.5 The dust emissions magnitude of demolition, earthworks and construction, and trackout activities have been determined based the criteria shown in Table A12.1, Appendix 12.1.

Demolition

- 12.7.6 It is proposed to demolish the existing Green Acres Equestrian Centre. The total building volume to be demolished is less than 12,000 m³ and includes potentially dusty materials such as



concrete. Demolition activities, including on-site crushing, will occur at heights between 6 m and 12 m above ground level.

- 12.7.7 In accordance with the criteria outlined in Table A12.1, the magnitude of potential dust emissions from earthworks is therefore medium.

Earthworks

- 12.7.8 Earthworks will primarily involve excavating material, haulage, as well as Site levelling and landscaping. The British Geological Survey website informs that the soil types lie beneath the Site is Lewes Nodular Chalk Formation and Seaford Chalk Formation, alongside Holywell Nodular Chalk Formation and New Pit Chalk Formation. The total Site area is more than 110,000 m². Due to the size of the Site area, there may be more than 10 HGVs active at any one time. Height of bunds expected to be up to 6 m.

- 12.7.9 In accordance with the criteria outlined in Table A12.1, the magnitude of potential dust emissions from earthworks is therefore large.

Construction

- 12.7.10 The construction activities will involve the erection of up to 500 residential units, a primary school, care home and associated infrastructure. The total construction volume will be over 75,000 m³. Various materials will be used for the construction of dwellings including concrete, timber, metals and/or cladding. It is unknown if on-site concrete batching and/or sandblasting will take place and therefore has been included in this assessment.

- 12.7.11 In accordance with the criteria outlined in Table A12.1, the magnitude of potential dust emissions from construction works is therefore large.

Trackout

- 12.7.12 Trackout activities will include vehicles accessing and leaving the Site with new construction materials and Site waste. Unpaved road is expected to be more than 100, m with trackout materials comprising from chalk. The number of HGV movements per day is expected to be more than 50 movements.

- 12.7.13 In accordance with the criteria outlined in Table A12.1, the magnitude of potential dust emissions from trackout activities is therefore large.

Sensitivity of the Surrounding Area

- 12.7.14 Receptors sensitive to potential dust impacts during all construction activities were identified from a desk-top study of the area up to 250 m from the development boundary. These are summarised in Table 12.5.

Table 12.5: Construction Activities Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of High Sensitivity Receptors
Less than 20	10 – 100
Less than 50	10 – 100
Less than 100	More than 100
Less than 350	More than 100



12.7.15 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 250 m of the Site and within 50 m of the road. These are summarised in Table 12.6.

12.7.16 The exact construction vehicle access routes are not available for the purpose of this assessment as they will depend on sourcing of materials. This is likely to be decided by the contractor. It is expected that vehicles will use Lower Luton Road either north towards the M1, or south towards the A1(M) to access the Proposed Development.

Table 12.6: Trackout Activities Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Medium Sensitivity Receptors	Approximate Number of High Sensitivity Receptors
Less than 20	More than 100	10-100
Less than 50	More than 100	More than 100

12.7.17 Sensitive receptors have been assessed based on distance from the source and annual mean PM₁₀ concentrations within the area. This has been used to determine the sensitivity of the surrounding area to demolition, earthworks, construction and trackout activities.

12.7.18 Table 12.7 shows the sensitivity of the surrounding area in relation to dust soiling, human health impacts and ecological impacts for each of the construction activities.

Table 12.7: Sensitivity of the Surrounding Area

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

Risk of Impacts

12.7.19 The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation. Table 12.8 provides a summary of the risk of impacts for the Proposed Development. The highest risk category identified for each construction activity has been used to determine the level of mitigation required.

Table 12.8 Summary of Potential Unmitigated Dust Risks

Potential Impact	Unmitigated Dust Risks		
	Earthworks	Construction	Trackout
Dust Soiling	High	High	High
Human Health	Low	Low	Low



12.7.20 As indicated in Table 12.8, the highest risk from all activities is high. The overall dust risk level is classified as high for all non-specified activities.

12.7.21 It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the Site boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phases.

12.7.22 The tertiary mitigation measures presented in Table 12.8 have been identified based on the assessed risk of demolition and construction dust impacts. Without mitigation, the unmitigated dust risks are summarised in Table 12.8, showing high risk of dust soiling during earthworks, construction, and trackout, and low risk to human health. The implementation of the tertiary mitigation measures reduces these effects to a level that is **Not Significant**.

Operational Effects

12.7.23 The dispersion modelling assessment has been undertaken to determine annual concentrations of NO₂, PM₁₀ and PM_{2.5} at the proposed operational development for the expected operational year of 2036. These have been depicted as follows:

- S2 – without the development
- S3 – with the development plus committed development

12.7.24 Human receptors (R1-R13) were modelled at a height of 1.5 m to represent ground floor height. The Batford Springs LNR, represented by receptors E1 and E2, was modelled at a height of 0 m to reflect vegetation level.

Nitrogen Dioxide (NO₂) Impacts

12.7.25 In accordance with the assessment criteria the annual mean NO₂ concentrations were predicted for S2 and S3 scenarios and are summarised in Table 12.9.

Table 12.9: Predicted Annual Mean NO₂ Concentrations for S2 and S3

Sensitive Receptor	Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
	S2	S3	Change
R1	10.51	10.51	0.0010
R2	10.51	10.51	0.0008
R3	10.52	10.52	0.0007
R4	10.51	10.51	0.0004
R5	10.52	10.52	0.0013
R6	10.51	10.51	0.0012
R7	10.55	10.56	0.0092
R8	10.58	10.59	0.0128
R9	10.61	10.63	0.0176
R10	10.61	10.62	0.0170



Sensitive Receptor	Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
	S2	S3	Change
R11	10.63	10.65	0.0210
R12	10.59	10.60	0.0142
R13	10.62	10.63	0.0148
E1	10.78	10.79	0.0135
E2	10.74	10.76	0.0118

12.7.26 As indicated in Table 12.9, predicted annual mean NO₂ concentrations are below the AQO at all modelled sensitive receptor locations. There are small changes in concentrations with the Proposed Development in place.

12.7.27 Impacts on the Air Quality Assessment Level (AQAL) for the predicted annual mean NO₂ concentrations at the human sensitive receptor locations are summarised in Table 12.10.

Table 12.10: Predicted NO₂ Impacts as a Result of the Proposed Development

Sensitive Receptor	% Change in Concentration Relative to AQAL	Long Term Average Concentration	Impact
R1	0.0097	26.27	Negligible
R2	0.0077	26.28	Negligible
R3	0.0067	26.31	Negligible
R4	0.0039	26.27	Negligible
R5	0.0124	26.29	Negligible
R6	0.0114	26.28	Negligible
R7	0.0870	26.41	Negligible
R8	0.1209	26.47	Negligible
R9	0.1659	26.56	Negligible
R10	0.1602	26.56	Negligible
R11	0.1973	26.63	Negligible
R12	0.1335	26.51	Negligible
R13	0.1390	26.58	Negligible
E1	0.1253	26.97	Negligible
E2	0.1098	26.89	Negligible
R1	0.0097	26.27	Negligible



12.7.28 Overall, as indicated in Table 12.10, the significance of impacts of annual mean NO₂ concentrations as a result of the development was predicted to be **Not Significant** at all receptor locations, in accordance with EPUK-IAQM guidance.

12.7.29 Predictions of 1-hour NO₂ concentrations were not produced as part of the dispersion modelling assessment. However, as stated in LAQM.TG22 if annual mean NO₂ concentrations are below 60 µg/m³ then it is unlikely that the 1-hour AQO will be exceeded. As such, it is not predicted that concentrations will exceed the 1-hour mean AQO for NO₂ across the modelled site for the Proposed Development's proposed operational year, 2036.

12.7.30 It should also be noted that background NO₂ levels are likely to be lower at elevated heights due to increased distance from emission sources, such as the local road network. Therefore, predicted concentrations at heights above ground floor level are considered to be acceptable in regard to pollutant exposure across all receptor locations and have not been assessed further.

12.7.31 The assessment shows a negligible impact with the Proposed Development in place and predicted annual NO₂ concentrations below the AQO. Therefore, the Site is considered to be suitable for the proposed use without the implementation of mitigation techniques to protect existing receptors and future Site users from elevated NO₂ concentrations.

Particulate Matter (PM₁₀) Impacts

12.7.32 In accordance with the assessment criteria the annual mean PM₁₀ concentrations were predicted for S2 and S3 scenarios and are summarised in Table 12.11.

Table 12.11: Predicted Annual Mean PM₁₀ Concentrations for S2 and S3

Sensitive Receptor	Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
	S2	S3	Change
R1	15.28	15.29	0.0051
R2	15.30	15.30	0.0040
R3	15.36	15.36	0.0035
R4	15.29	15.29	0.0020
R5	15.32	15.32	0.0062
R6	15.30	15.30	0.0055
R7	15.51	15.56	0.0468
R8	15.62	15.69	0.0653
R9	15.77	15.86	0.0898
R10	15.76	15.84	0.0866
R11	15.88	15.99	0.1070
R12	15.68	15.75	0.0719
R13	15.72	15.80	0.0730
R14	16.58	16.65	0.0685
R15	16.42	16.48	0.0602

12.7.33 As indicated in Table 12.11, predicted annual mean PM₁₀ concentrations are below the AQO at all the modelled sensitive receptor locations. There are small changes in concentrations with the Proposed Development in place.

12.7.34 Impacts on the AQAL for the predicted annual mean PM₁₀ concentrations at sensitive receptor locations are summarised in Table 12.12.



Table 12.12: Predicted PM₁₀ Impacts as a Result of the Proposed Development

Sensitive Receptor	% Change in Concentration Relative to AQAL	Long Term Average Concentration	Impact
R1	0.0334	76.43	Negligible
R2	0.0264	76.52	Negligible
R3	0.0229	76.80	Negligible
R4	0.0132	76.47	Negligible
R5	0.0403	76.62	Negligible
R6	0.0362	76.51	Negligible
R7	0.3009	77.80	Negligible
R8	0.4165	78.44	Negligible
R9	0.5663	79.31	Negligible
R10	0.5468	79.21	Negligible
R11	0.6689	79.95	Negligible
R12	0.4569	78.73	Negligible
R13	0.4622	78.98	Negligible
R14	0.4117	83.24	Negligible
R15	0.3654	82.42	Negligible

12.7.35 As indicated in Table 12.12, impacts on annual mean PM₁₀ concentrations as a result of the Proposed Development were predicted to be **Not Significant** at all receptor locations, in accordance with EPUK-IAQM guidance.

12.7.36 Similar to NO₂ concentrations, it should also be noted that background PM₁₀ levels are likely to be lower at elevated heights due to increased distance from emission sources, such as the local road network. Therefore, predicted concentrations at heights above ground floor level are considered to be acceptable in regard to pollutant exposure across all receptor locations and have not been assessed further.

12.7.37 The assessment shows a negligible impact with the Proposed Development in place and predicted annual PM₁₀ concentrations below the AQO. Therefore, the Site is considered to be suitable for the proposed use without the implementation of mitigation techniques to protect existing receptors and future Site users from elevated PM₁₀ concentrations.

Particulate Matter (PM_{2.5}) Impacts

12.7.38 The annual PM_{2.5} AQO has been revised by the government. There is an interim target and legally binding target for this pollutant as follows:

- Interim Target by 2028: 12 µg/m³
- Legally binding target by 2040: 10 µg/m³

12.7.39 These two targets have been assessed for the impact of PM_{2.5} as a result of the Proposed Development.

12.7.40 In accordance with the assessment criteria the annual mean PM_{2.5} concentrations were predicted for S2 and S3 scenarios and are summarised in Table 12.13.



Table 12.13: Predicted Annual Mean PM_{2.5} Concentrations for S2 and S3

Sensitive Receptor	Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
	S2	S3	Change
R1	9.77	9.77	0.0026
R2	9.78	9.78	0.0021
R3	9.81	9.81	0.0019
R4	9.78	9.78	0.0011
R5	9.79	9.79	0.0032
R6	9.78	9.78	0.0030
R7	9.89	9.92	0.0245
R8	9.95	9.98	0.0342
R9	10.03	10.08	0.0471
R10	10.02	10.07	0.0455
R11	10.09	10.14	0.0561
R12	9.98	10.01	0.0377
R13	10.00	10.04	0.0382
E1	10.45	10.49	0.0359
E2	10.37	10.40	0.0316

12.7.41 As indicated in Table 12.13, predicted annual mean PM_{2.5} concentrations are below the interim target of 12 µg/m³ at all existing sensitive receptor locations. However, receptors R9 to R11 and ecological receptors E1 and E2 already exceed the legally binding AQO of 10 µg/m³ in S2 (without the Proposed Development). There are small changes in concentrations with the Proposed Development in place.

12.7.42 Impacts on the AQAL for the predicted annual mean PM_{2.5} concentrations at sensitive receptor locations are summarised in Tables 12.14 and 12.15.

Table 12.14: Predicted PM_{2.5} Impacts as a Result of the Proposed Development for the 2028 Interim Target (12 µg/m³)

Sensitive Receptor	% Change in Concentration Relative to AQAL	Long Term Average Concentration	Impact
R1	0.0270	81.45	Negligible
R2	0.0214	81.52	Negligible
R3	0.0191	81.77	Negligible
R4	0.0112	81.48	Negligible
R5	0.0329	81.62	Negligible
R6	0.0305	81.52	Negligible
R7	0.2470	82.64	Negligible
R8	0.3427	83.20	Negligible
R9	0.4673	83.96	Negligible
R10	0.4518	83.88	Negligible
R11	0.5536	84.52	Negligible
R12	0.3765	83.46	Negligible
R13	0.3810	83.67	Negligible



Sensitive Receptor	% Change in Concentration Relative to AQAL	Long Term Average Concentration	Impact
R14	0.3426	87.40	Negligible
R15	0.3037	86.68	Negligible

Table 12.15: Predicted PM_{2.5} Impacts as a Result of the Development for the 2040 Target (10 µg/m³)

Sensitive Receptor	% Change in Concentration Relative to AQAL	Long Term Average Concentration	Impact
R1	0.0270	97.73	Negligible
R2	0.0214	97.82	Negligible
R3	0.0191	98.12	Negligible
R4	0.0112	97.77	Negligible
R5	0.0329	97.94	Negligible
R6	0.0305	97.82	Negligible
R7	0.2470	99.17	Negligible
R8	0.3427	99.84	Negligible
R9	0.4673	100.75	Negligible
R10	0.4518	100.65	Negligible
R11	0.5536	101.43	Negligible
R12	0.3765	100.15	Negligible
R13	0.3810	100.40	Negligible
R14	0.3426	104.88	Negligible
R15	0.3037	104.02	Negligible

12.7.43 As shown in Tables 12.14 and 12.15, the impacts on annual mean PM_{2.5} concentrations resulting from the Proposed Development are predicted to be **Not Significant** at all receptor locations for both the interim 2028 target and the legally binding 2040 target, in accordance with EPUK-IAQM guidance.

12.7.44 Similar to NO₂ and PM₁₀ concentrations, it should also be noted that background PM_{2.5} levels are likely to be lower at elevated heights due to increased distance from emission sources, such as the local road network. Therefore, predicted concentrations at heights above ground floor level are considered to be lower than those modelled within the assessment.

12.7.45 Although predicted annual PM_{2.5} concentrations slightly exceed the legally binding AQO in both the S2 and S3 scenarios at a few receptors, pollutant levels have been decreasing year on year. This decline can be attributed to changes in traffic patterns following the COVID pandemic and improvements in vehicle technologies.

12.7.46 Additionally, the responses to the two questions provided by DEFRA to support the interim process are summarised in Table 12.16:

Table 12.16: Interim Planning Guidance Questions and Responses

Question	Response
How has exposure to PM _{2.5} been considered when selecting the development site?	



Question	Response
Applicants are advised to consider the following in their application: • Site proximity to people (particularly large populations and/or vulnerable groups, e.g. schools, hospitals, care homes, areas of deprivation) and the impact of the development on these. • Exposure and emissions during both construction and in-use • Site proximity to pollution sources and the impact of these on users of the development.	• Sauncey Wood Primary School is located near the site and has been considered in the assessment as R1. The modelling results show that annual mean NO₂, PM₁₀, and PM_{2.5} concentrations at R1 are below the relevant AQOs, and the development will have a negligible impact on it • By implementing the mitigation measures outlined in Table 5.5 during the construction phase, fugitive dust emissions will be minimised to an insignificant level, reducing potential exposure at off-site locations. • The site is not located near a major A road or motorway. It is adjacent to the B653; however, the proposed units will be more than 70 m from the road. The plans include preserving the existing vegetation, planting additional trees around the site, and creating a pond near the road. These will act as a natural screen to protect future site users from emissions from the B653.
What actions and/or mitigations have been considered to reduce PM_{2.5} exposure for development users and nearby receptors (houses, hospitals, schools etc.) and to reduce emissions of PM_{2.5} and its precursors? Actions can refer to, but are not limited to, the following: • Site layout • The development's design • Technology used in the construction or installed for use in the development • Construction and future use of the development.	The Proposed Development will include the following: • Trees and green spaces around the perimeter. These will serve as a natural barrier, filtering pollutants and improving air quality by trapping particulate matter and absorbing NO₂. • Best practice measures to further reduce air quality impacts: Recommendations for additional measures are outlined in Section 7. • Mitigation measures listed in Table 5.5: These measures will be implemented to minimise dust generation from associated activities.

12.8 Secondary Mitigation and Enhancement

Construction Phase

12.8.1 No additional mitigation for the construction phase is required.

Operational Phase

12.8.2 The impacts of road traffic emissions associated with the Proposed Development on local air quality are considered to be not significant, and as such, no further mitigation is deemed necessary. Similarly, the impact of existing air quality on future users of the Proposed Development is also considered not significant, and no mitigation is considered necessary.

12.8.3 Notwithstanding this, a range of potential best-practice mitigation measures recommended by the IAQM to further reduce operational impacts are outlined below. While not exhaustive, this list provides examples of measures that could be explored at the reserved matters stage of the development:

- A Welcome Pack available to all residents online and as a booklet, containing information and incentives to encourage the use of sustainable transport modes; and



- Car club provision within the Development or support given to local car club/Electric vehicle car clubs.

12.9 Residual Effects

Construction Phase

- 12.9.1 As no secondary mitigation or enhancement is required for the construction phase, the residual effects remain the same as those reported in Table 12.4 and are considered to be Not Significant.

Operational Phase

- 12.9.2 As no secondary mitigation or enhancement is required for the operational phase, the residual effects remain the same as those reported in Section 12.8 and are considered to be Not Significant.

12.10 Cumulative Assessment

Construction Phase

- 12.10.1 There is the potential for the Proposed Development to be in construction at the same time as other consented developments in the local area. However, demolition and construction work would have to be taking place concurrently in proximity to a receptor for cumulative effects to occur, which is considered unlikely. In addition, all consented development will require robust dust management procedures and construction vehicle routing strategies to prevent significant effects, and it is considered that these will be adequate to prevent the risk of significant in-combination effects associated with construction dust and construction traffic. As such, no cumulative construction phase impacts are predicted, and the overall cumulative effect is considered 'Not Significant'.

Operational Phase

- 12.10.2 The assessment has included the committed development associated with planning application Ref: 5/2023/0327. Traffic generated by this development has been incorporated into the 'with development' (S3) scenario. Based on this, the cumulative impact during the operational phase is considered insignificant.

12.11 Monitoring

- 12.11.1 The assessment has demonstrated that residual effects from the Proposed Development on air quality are considered Not Significant, therefore no monitoring is required.

12.12 Conclusion

- 12.12.1 An Air Quality Assessment has been undertaken to support the Proposed Development at Land Northeast of Harpenden.
- 12.12.2 Construction-phase dust impacts have been assessed as negligible, assuming good practice mitigation is implemented. Operational phase modelling predicts that concentrations of NO₂, PM₁₀, and PM_{2.5} will remain below relevant air quality objectives, with negligible impacts at all human receptor locations. With the mitigation measures outlined in Table 12.3, air quality is not considered a constraint to the Proposed Development.
- 12.12.3 The construction activities associated with the Proposed Development have the potential to create dust. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by demolition, earthworks, construction, and trackout activities was predicted to be not significant.



12.12.4 Predicted annual mean NO₂, PM₁₀, and PM_{2.5} concentrations across the development site boundary and at all human receptor locations are below the relevant AQOs for the proposed operational year, 2036. Additionally, the development will have a negligible impact on all human receptor locations, in line with EPUK-IAQM guidance.

12.12.5 No significant air quality effects are predicted as a result of the Proposed Development. The development is therefore considered to be in accordance with the requirements of the NPPF and relevant local and national air quality guidance.

12.13 References

- Air emissions risk assessment for your environmental permit. Environment Agency & Department for Environment, Food and Rural Affairs (2023)
- A Guide To The Assessment Of Air Quality Impacts On Designated Nature Conservation Sites. IAQM, Holman et al (2020)
- 2024 Air Quality Annual Status Report (ASR). St Albans City and District Council (June 2024)
- Clean Air Strategy 2019. Department for Environment, Food and Rural Affairs (2019)
- Environment Act 1995. Environment Agency, Scottish Environment Protection Agency (1995)
- Environment Act 2021. Secretary of State, The Welsh Ministers (2021).
- Guidance on the assessment of dust from demolition and construction (version 2.2). IAQM, Stoaling. et al (2024)
- Harpenden Neighbourhood Plan 2018 – 2033. St. Albans City and Borough Council (2018)
- Land-Use Planning and Development Control: Planning for Air Quality. EPUK & IAQM, Moorcroft, Barrowcliffe. et al (2017)
- Local Air Quality Management Technical Guidance (LAQM.TG22). Department for Environment, Food and Rural Affairs (2022)
- National Planning Policy Framework. Ministry of Housing, Communities and Local Government (2024)
- PM2.5 Targets: Interim Planning Guidance. Department for Environment Food & Rural Affairs (DEFRA). [Online] Available at <uk-air.defra.gov.uk/pm25targets/planning> [Accessed 24/01/2025]
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 1). Department for Environment, Food and Rural Affairs in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland (2007)
- The Environmental Target (Fine Particulate Matter) (England) Regulations 2023). Secretary of State, Department for Environment, Food and Rural Affairs (2023)



13 Climate Change

13.1 Introduction

- 13.1.1 This Chapter of the ES assesses the likely significant effects of the Proposed Development on the environment in respect of climate change. This includes identification of the scale and scope of the Proposed Development's initial design and its potential impact on the receiving environment, taking into account how this will be affected by a changing climate.
- 13.1.2 These assessments have different policy contexts, guidance documents, methodologies, baseline conditions, potential impacts and mitigation measures. This Chapter therefore presents the Greenhouse Gas Emissions Assessment and Climate Change Risk Assessment separately. Following this introduction, this Chapter is structured as follows:
- **Part 1: Greenhouse Gas (GHG) Emissions Assessment** – a quantitative, assumptions-based assessment of the Proposed Development's impacts on climate change by its potential to emit GHGs. This section also outlines what mitigation measures have been embedded within the Proposed Development to reduce GHG emissions during construction and operation.
 - **Part 2: Climate Change Risk Assessment (CCRA)** – outlines the projected climatic changes in the region, identifies receptors vulnerable to climate change, and the mitigation measures to address climate change, embed adaptation measures and improve resilience.
 - Summary and References.
- 13.1.3 For context and further information regarding the mitigation outlined in this chapter, this ES Chapter should be read alongside other technical chapters within this ES including **Chapter 9: Biodiversity**, **Chapter 8: Landscape Character and Visual Amenity**, **Chapter 10: Transport and Access**, as well as the Flood Risk Assessment (JPP, 2025) and Energy and Sustainability Statement (AES, 2025) (both have been submitted with the planning application).
- 13.1.4 The associated appendices for this chapter are:
- **Appendix 13.1:** Climate Change Policy and Guidance;
 - **Appendix 13.2:** Climate Projections Data and Figures.
- 13.1.5 This ES Chapter was completed by Stantec UK Limited. In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in **Appendix 1.3**.

Part 1: GHG Emissions Assessment

13.2 Policy Context, Legislation, Guidance and Standards

- 13.2.1 The following legislation and policy have informed the assessment of effects within this section. Further details are provided in **Appendix 13.1**.
- **Climate Change Legislation**, including Town and Country Planning (Environmental Impact Assessment) Regulations (2017); Climate Change Act (2008) (2050 Target Amendment) Order 2019, Carbon Budget Orders (2009, 2011, 2016 and 2021), Carbon Budget Delivery Plan (2023).



- **International Agreements**, including the Paris Agreement (2015) and United Nations Climate Change Conference – COP26 Glasgow (2021), COP27 Sharm el Sheikh (2022), COP28 UAE (2023), COP29 Baku (2024), COP 30 Belem (2025).
- **National Planning Policy**, including Planning Policy Statement 1 (Supplement) (2009), National Planning Policy Framework (NPPF, 2024) and Planning Practice Guidance (PPG, 2021).
- **Policy Papers**, including the Transport Decarbonisation Plan (2021), Net Zero Strategy (2021), Review of Net Zero (2023), Ten Point Plan for an Industrial Revolution (2020), Powering up Britain (2023), The Road to Zero (2018), and Clean Growth Strategy (2017).

Local Policy

13.2.2 The Site lies within the administrative council of SADC Key plans are outlined below, with further details provided in **Appendix 13.1**.

- District Local Plan Review 1994, Paragraph 8.4;
- Draft local Plan 2041, Strategic Policy SP2, Policy CE1, Policy CE2;
- Harpenden Neighbourhood Plan 2018-2033, Policies ESD15, ESD16, ESD17, ESD19; and
- South West Hertfordshire Joint Strategic Plan.

Climate Emergency

13.2.3 In 2019, SADC declared a Climate Emergency and produced a strategy with more than 100 actions for 2020 to 2023. A new sustainability and climate crisis strategy was launched in 2024 which sets out the aim of achieving net zero by 2030.

Technical Guidance

13.2.4 Several standards and guidance documents have been used to inform the GHG emissions assessment methodology and potential mitigation measures. Full details are provided in **Appendix 13.1**:

- Environmental Impact Assessment (EIA) Guidance on assessing greenhouse gas emission and significance (Institute of Sustainability and Environmental Professionals (ISEP) 2022).
- Publicly Available Standard (PAS) 2080:2023 Carbon management in Infrastructure (British Standards Institute (BSI), 2023).
- World Business Council for Sustainable Development (WBCSD) and World Resources Institute (WRI) Greenhouse Gas Protocol guidance (WBCSD and WRI, 2004).
- Building Regulations (Department for Levelling Up, House and Communities, 2023)
- Future Homes Standard (Ministry of Housing, Communities & Local Government, 2021)

13.3 Consultation

13.3.1 The EIA Scoping Opinion identified the requirement for a climate change ES Chapter, stating that:

“Given the scale of development proposed, there is potential for significant environmental effects relating to climate change. Climate change should therefore be scoped in to the EIA.



The assessment of likely significant effects regarding climate change mitigation and adaptation should include a consideration of greenhouse gas emissions arising from activities and traffic associated with both the construction and operation of the proposed development. The chapter should also include an assessment of the potential impacts of climate change on the proposed development during both construction and operation”.

13.3.2 This ES Chapter has been prepared with due regard to the above.

13.4 Methodology

Study Area

- 13.4.1 The GHG emissions assessment study area includes the Site and extends to include activities that occur beyond the Site boundary, such as the generation of electricity off site.
- 13.4.2 The data available to allow an assessment of GHG emissions from vehicle movements associated with the Proposed Development is limited to the study area included within the transport model.
- 13.4.3 As GHG impacts are global and cumulative with all other sources of emissions, no specific geographical study area is defined for the remainder of the identified GHG emission sources that are set out in **Table 13.1**.

Baseline Data Collection

- 13.4.4 A high-level review of existing land use and associated activities on Site has been undertaken to identify the baseline GHG emissions. Local, regional, and national baseline GHG emissions have been identified through a review of the UK Carbon Budget Orders and UK local authority GHG inventory data (Department for Energy Security and Net Zero (DESNZ), 2024).
- 13.4.5 The Local Carbon Budget has been calculated using The Tyndall Centre carbon budget tool (The Tyndall Centre, 2025). The Tyndall Centre carbon budget tool scales down the UK national carbon budget between Local Planning Authorities (LPA), to show how each LPA can make its ‘fair’ contribution towards a 1.5-degree warming trajectory and net zero. The Tyndall Centre carbon budget tool is informed by the latest science on climate change and defined by the science-based carbon budget setting. To align the 2020 to 2100 carbon budget with the budget periods in the Climate Change Act, the estimated CO₂ emissions for 2018 and 2019 have been based on Department for Business, Energy & Industrial Strategy (BEIS) provisional national emissions data for 2018 and assuming the same year on year reduction rate applied to 2019. Note that the Local Carbon Budgets apply to CO₂ emissions from the energy system only, including emissions from fossil combustion within the region and a share of the emissions from national electricity generation (The Tyndall Centre, 2025).
- 13.4.6 In relation to vehicle GHG emissions, the baseline for the Site is defined as the current carbon emissions arising from vehicles in the transport network. The baseline conditions of the Site were based on the trip rates and existing published data sets provided by the Transport Consultant.

Assessment

- 13.4.7 There is no nationally adopted method for assessing climate change within EIA and therefore the assessment approach draws upon ISEP guidance (ISEP, 2022). It identifies that all new GHG emissions contribute to a negative environmental impact and contribute to climate change, thus might be considered significant. It therefore suggests the impact of a development on climate should be based on its potential to emit GHGs.
- 13.4.8 The GHG emissions assessment has been based on the broad parameters of the Proposed Development. A review has also been undertaken of relevant reports that will be submitted with the planning application including the Energy and Sustainability Statement. Where



information from reporting outside the ES has been considered, all relevant information to inform the assessment of likely significant effects on the environment has been summarised within this Chapter.

13.4.9 ISEP guidance emphasises the need for proportionality in the context of national, sector and local GHG emissions. As detailed in **Table 13.1**, several activities have been assessed quantitatively. Where detailed information is not available, a qualitative appraisal has been undertaken, and recommendations have been made to limit effects associated with the construction and operational phases of the Proposed Development. The guidance recognises that qualitative assessments are acceptable, particularly where mitigation measures are agreed early on in the design stage.

13.4.10 The sources of emissions that are considered within this assessment, in line with ISEP Guidance, are discussed in **Table 13.1**.

13.4.11 The GHG Protocol (WBCSD and WRI, 2019) categorises direct and indirect emissions into three broad scopes:

- **Scope 1:** all direct GHG emissions;
- **Scope 2:** indirect GHG emissions from the generation of purchased electricity, heat, or steam; and
- **Scope 3:** other indirect emissions, such as the extraction and production of purchased materials and fuels, electricity-related activities not covered in Scope 2, outsourced activities, waste disposal, etc.

13.4.12 In addition, PAS 2080 (BSI, 2023) defines lifecycle modules. The scope of the GHG Emissions assessment using the GHG Protocol and PAS 2080 lifecycle stages is set out in **Table 13.1** and within **Appendix 13.1**.

Table 13.1: GHG Emissions Sources and Assessment Scope

PAS2080 Lifecycle Stages	Emission Scope	Activity Assessed
A1- A3 Product Stages	Scope 3	A quantitative assessment of emissions associated with the embodied carbon of purchased materials used to construct the Proposed Development.
A4 Transport to Works Site	Scope 3	A quantitative assessment of emissions associated with the combustion of fossil fuels during the transportation of building materials to Site, and construction staff commuting to Site.
A5 Construction-Installation Process	Scope 1 and 3	A quantitative assessment of the emissions associated with demolition and construction processes such as emissions resulting from the combustion of fuels for plants or equipment used for construction of the Proposed Development. A quantitative assessment of emissions associated with demolition and construction waste disposal. A qualitative assessment of emissions associated with water supply and treatment.
	Scope 2	A quantitative assessment of the emissions associated with electricity from off-site generation needed for plant and welfare facilities.
B1 Use	Scope 1 and Scope 3	A quantitative assessment of emissions associated with vehicle trips generated by the Proposed Development.



PAS2080 Lifecycle Stages	Emission Scope	Activity Assessed
		A quantitative assessment of the carbon sequestration associated with landscaping and green infrastructure.
		A quantitative assessment of emissions associated with operational waste disposal.
B2-B5 Maintenance, Repair, Replacement, Refurbishment.	Scope 1 and Scope 3	A quantitative assessment of embodied carbon and transport emissions from purchased materials and onsite fuel use required for maintenance, repair, replacement and refurbishment. Processing waste associated with replaced materials or infrastructure.
B6 Operational Energy Use	Scope 2	A quantitative assessment of emissions associated with purchased electricity from the National Grid and distribution network during operation of the Proposed Development.
B7 Operational Water Use	Scope 3	A quantitative assessment of emissions associated with water supply and treatment.

13.4.13 Due to the nature of the Proposed Development (mixed-use residential), it has not been designed with a fixed lifetime and therefore the end-of-life stage, or demolition, is difficult to define. In addition, it is anticipated that the construction and operation of the Proposed Development will have the greatest potential to emit GHGs compared to the end-of-life stage, particularly when considering the trend of national decarbonisation over time and the legislative requirement for the UK to meet carbon neutral targets by 2050. It is therefore anticipated that, when the Proposed Development will reach end-of-life, there will be a zero-carbon economy and principles for a circular economy will be utilised. Emissions associated with the end-of-life stage of the Proposed Development are therefore scoped out of the assessment.

Demolition

13.4.14 Emissions associated with demolition have been calculated using a benchmark from the RICS Whole Life Carbon Assessment for the Built Environment (RICS, 2023). The RICS guidance provides a standard assumption of 35kgCO₂e/m² for areas to be demolished. The m² to be demolished has been determined based on the Asbestos Survey Report (Eton, 2025).

Soil Movement and Land Disturbance

13.4.15 Emissions associated with soil movement and land disturbance have been calculated using the habitat areas and type taken from the BNG metric baseline and Natural England's Carbon Storage and Sequestration by Habitat 2021, which provides tonnes of CO₂ equivalent per hectare (ha) year (tCO₂eq/ha/yr) for differing types of habitats. Habitats to be retained are not included within the calculation.

Construction Vehicle GHG Emissions

13.4.16 Construction vehicle numbers have been provided by the Transport Consultant and a reasonable worst-case assumption on trip distances has been confirmed with the Applicant. Construction transport emissions have been calculated using the latest conversion factors published by the Government (Department for Energy Security and Net Zero (DESNZ), 2025).

Construction Waste Disposal

13.4.17 Emissions associated with waste disposal of construction materials have been calculated using construction waste volumes provided by the project waste consultant and GHG Conversion Factors (DESNZ, 2025).



On Site Construction Activities

13.4.18 Emissions associated with construction activities on Site (e.g. energy consumption and use of plant) have been calculated using a benchmark from the RICS Whole Life Carbon Assessment for the Built Environment (RICS, 2023). The RICS guidance provides a value of 40kgCO₂e/m² GIA for baseline building-specific impacts related to construction activities in the UK. The GEA for areas of built development has been utilised as this is the information available from the Applicant and represents a worst-case when compared to GIA.

Embodied Carbon

13.4.19 Embodied carbon has been based on the expected floor area (Gross External Area - GEA) of the various use classes, as provided by the Applicant, and calculated using the Royal Institution of Chartered Surveyors (RICS) Embodied Carbon Benchmarks (RICS, 2014).

13.4.20 The GEAs have been provided by the Applicant and are based on the parameter plans.

13.4.21 The embodied carbon calculations do not account for the construction of roads and infrastructure, as detailed information is not available at outline planning stage.

Operational Vehicle GHG Emissions

13.4.22 Transport emissions have been calculated using the Emissions Factors Toolkit (EFT) V13.1 published by Defra (2025). The EFT requires various input data, including traffic flows (in Average Annual Daily Traffic format), vehicle composition (i.e. the proportion of Heavy Duty Vehicles (HDVs), length of the road link, road type and average vehicle speed.

13.4.23 24-hour, Average Annual Daily Traffic (AADT) flows were provided the Transport Consultant for the Proposed Development, for the following scenarios:

- Baseline Scenario (2024);
- Future Baseline (2036);
- Proposed Development (2036); and
- Full Allocation (2036).

13.4.24 To calculate the operational vehicle GHG emissions, the EFT has been run using the future baseline year of 2036 to align with the anticipated completion of the Proposed Development.

13.4.25 The Proposed Development's yearly operational vehicular GHG emissions are calculated by comparing the difference in the emissions for the 2036 future baseline scenario and the 2036 full allocation scenario. The operational vehicular GHG emissions assessment is therefore inherently cumulative as it accounts for the Proposed Development, committed developments, and the wider allocation.

Operational Energy Use GHG Emissions

13.4.26 AES has calculated the carbon emissions associated with energy demand for the Proposed Development. The AES methodology and assumptions for calculating the emissions per house type can be found in the Sustainability and Energy Statement. The total Proposed Development energy emissions were calculated based on an assumed equal split of all the unit types, up to a total of 500 units.

13.4.27 Emissions have not yet been calculated for the non-domestic elements of the Proposed Development and will be detailed at Reserved Matters stage.



Carbon Sequestration

- 13.4.28 The carbon sequestration potential (i.e. the potential to remove CO₂ from the atmosphere) from the proposed habitats within the Site has been estimated, to assess the carbon sequestration potential on Site. The habitats used for the post-development carbon sequestration calculations are based only upon what planning permission is sought for, deriving information from the Biodiversity Metric Calculations and BNG assessment submitted as part of the planning application.
- 13.4.29 The carbon sequestration potential is provided by Natural England's Capital Accounts and Natural England's Carbon Storage and Sequestration by Habitat October 2021, which provides tonnes of CO₂ equivalent per hectare (ha) year (tCO₂eq/ha/yr) for differing types of habitats.
- 13.4.30 The habitat types proposed have been matched to those provided by Natural England's Natural Capital Accounts as closely as possible. Where the habitat proposed on Site does not accurately fit a classification provided, a worst-case scenario assumption of the habitat sequestering no carbon has been undertaken.

Maintenance and Repair

- 13.4.31 In line with RICS guidance (RICS, 2024) emissions associated with maintenance have been calculated as 1% of the emissions from A1-A5. Emissions associated with repair have been calculated as 25% of the calculated maintenance emissions.

Operational Water Use

- 13.4.32 Emissions associated with operational water use have been calculated using the expected population of the Proposed Development and the latest conversion factors published by the Government (DESNZ, 2025).

Operational Waste Disposal

- 13.4.33 Emissions associated with waste disposal during the operational phase have been calculated using expected operational waste volumes provided by the project waste consultant and GHG Conversion Factors 2025 (DESNZ, 2025).

Qualitative Assessments

- 13.4.34 Where detailed information is not available from the project team and Applicant in order to calculate GHG emissions, a qualitative appraisal has been undertaken. The following sources have been qualitatively assessed:

- A qualitative assessment of emissions associated with water supply and treatment during construction.

Contextualisation of GHG Emissions

- 13.4.35 The Proposed Development's yearly GHG emissions have been multiplied by the number of years the Proposed Development will be operational within each carbon budget, in order to estimate the Proposed Development's contribution towards the carbon budgets.

Sensitive Receptors

- 13.4.36 GHG emissions have a global effect rather than directly affecting specific local receptors to which levels of sensitivity can be assigned. The global climate has therefore been treated as a single receptor. Given the global scale and severe consequences of climate change and limited recoverability, the receptor sensitivity is considered to be high.



Determining Significance

13.4.37 There is an absence of a defined threshold for determining the significance of effects resulting from GHG emissions in EIA. Significance of effects have therefore been determined using professional judgement, and consideration of the following elements:

- ISEP EIA Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (ISEP, 2022).
- Appraisal of the Proposed Development’s emissions in the context of national, regional and local emissions through establishing the current and future baseline.
- How the Proposed Development has embedded design features to reduce GHG emissions and identified opportunities for further mitigation in the Proposed Development’s design and delivery.

13.4.38 ISEP guidance (ISEP, 2022) identifies three underlying principles to inform the assessment of significance and conclude that:

- *“The GHG emissions from all projects will contribute to climate change, the largest interrelated cumulative environmental effect.*
- *The consequences of a changing climate have the potential to lead to significant environmental effects on all topics in the EIA Directive (e.g. human health, biodiversity, water, land use, air quality).*
- *GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit; as such any GHG emissions or reductions from a project might be considered to be significant.”*

13.4.39 Key to determining significance is setting a context for the magnitude of GHG emissions. The relevant context here are the national carbon budgets which defines a level of GHG emissions that would result in dangerous climate change. The UK has set a legally binding GHG reduction target for 2050 which, according to the Climate Change Committee (CCC), is compatible with the magnitude and rate of GHG emission reductions required in the UK to meet the goals of the Paris Agreement.

13.4.40 Given this, ISEP guidance states that *“the crux of significance is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050.”*

13.4.41 **Appendix 13.1** sets out the background to significance with regards to policy requirements including the Paris Agreement and 2050 Target.

13.4.42 This assessment has applied the following significance criteria set out in **Table 13.2** that is set out in the ISEP guidance (ISEP, 2022). Major or moderate adverse effects and beneficial effects are considered to be ‘significant’. Minor adverse and negligible effects are considered to be ‘not significant’.

Table 13.2: GHG Significance (ISEP, 2022)

Significance	Measure of Impact
Major Adverse	The project’s GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK’s trajectory towards net zero.



Significance	Measure of Impact
Moderate Adverse	The project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.
Minor Adverse	The project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.
Negligible	The project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
Beneficial	The project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

Limitations

- 13.4.43 The assessment of climate change and GHG emissions is based on available best practice information.
- 13.4.44 Carbon emissions calculations are based on project information provided by the Applicant and project team, which at the outline planning stage are often assumptions-based and high-level. Assumptions made have generally been sought to reflect a realistic worst-case scenario.
- 13.4.45 Carbon factors, benchmarks, and future emissions are based on the best available data which aims to provide the best estimate through professional judgement. As noted above, carbon factors and benchmarks have been obtained from industry accepted sources including UK Government's Carbon Factors (DESNZ, 2025), Natural England Carbon Factors (NE, 2021), RICS Embodied Carbon Benchmarks, and RICS Whole Life Carbon Assessment for The Built Environment guidance.
- 13.4.46 The values given to the baseline and the proposed habitat areas assume the habitats are mature, and that the proposed habitats reach maturity within the lifetime of the Proposed Development, and the restored habitat is in a healthy state. This may lead to an overestimation of carbon sequestration from proposed planting within the Site.
- 13.4.47 The future baseline has taken into consideration how national policy and Government strategies are likely to cause a reduction in emissions from transport and energy in the coming decades. This assessment has assumed that the uptake of electric vehicles (EVs) and the decarbonisation of the National Grid will occur as set out in national strategies that have been adopted by the UK Government. For example, the uptake of EVs and hydrogen is anticipated to increase in line with Government policies, as petrol and diesel car sales will be banned by 2035. It is therefore assumed that an increase in EV uptake will result in a reduction in transport emissions associated with the Proposed Development in the long term, as vehicles will be powered by lower (or zero) emitting electricity sources. The Defra EFT uses data from the National Atmospheric Emissions Inventory (NAEI) to account for likely changes to national vehicle fleet composition such as increasing uptake of electric vehicles (EVs).
- 13.4.48 The trajectory of GHG emissions into the future is dependent on influences outside of the Applicant's control, for example Government policy and global technology and economic shifts, which are difficult to predict. The UK carbon budgets are legally binding, and the



Government have an array of policies and levers to be deployed if the carbon budgets are not likely to be met.

- 13.4.49 There are inherent assumptions and limitations associated with local carbon budgets. For example, the local budgets do not downscale aviation and shipping emissions from the UK national level. The local budgets are energy only, while the emissions calculated for the Proposed Development include a broader scope (see **Table 13.1**). Therefore, contextualisation against the local budgets is not an equivalent comparison and represents a limitation in the methodology. However, as the assessment considers the Proposed Development’s net construction and operation emissions, this is considered to be a conservative approach.
- 13.4.50 The Tyndall Centre carbon budgets are no longer available to view online; however these have been used for this purpose of this assessment in the absence of additional local authority carbon data.

13.5 Baseline Conditions

National and Regional Emissions

- 13.5.1 This section establishes the existing GHG emissions at a national and regional level. GHG emissions do not have a local receptor as, once they are emitted, they are not limited to geographic boundaries.
- 13.5.2 The Climate Change Act 2008, as amended, requires the government to set five-yearly carbon budgets, after taking advice from the Committee on Climate Change (CCC). The budgets are fixed in advance and set five-year caps on the total GHG emissions allowed to ensure the UK meets its emissions reductions commitments.
- 13.5.3 The carbon budgets enable net increases in emissions to be managed within the carbon budgets by balancing with performance in other sectors. Governments can use an array of policies and levers to achieve the net reductions necessary to meet the carbon budgets whilst taking an economy-wide and national approach to securing overall emissions reductions whilst facilitating other objectives including economic growth, energy security and levelling up.
- 13.5.4 **Table 13.3** sets out the UK carbon budgets from 2008 to present day. The first, second and third carbon budgets were met, culminating in a 37% reduction below 1990 carbon emissions.

Table 13.3: 2008-2022 UK Carbon Budget

UK Budget	Carbon budget level (million tonnes carbon dioxide equivalents - MtCO ₂ e)	Reduction below 1990 levels	UK Emissions
1st carbon budget (2008 to 2012)	3,018 MtCO ₂ e	25%	2,982 MtCO ₂ e
2nd carbon budget (2013 to 2017)	2,782 MtCO ₂ e	31%	2,398 MtCO ₂ e
3rd Carbon Budget (2018-2022)	2,544 MtCO ₂ e	37%	2,153 MtCO ₂ e
4 th Carbon Budget (2023-2027)	1,950 MtCO ₂ e	51%	Current Period

- 13.5.5 From a national perspective, in 2023 UK total net territorial GHG emissions were estimated to be 385 million tonnes carbon dioxide equivalents (MtCO₂e), a decrease of 5% compared to 2022 (DSENZ, 2025a) mainly due to a decrease in gas use in electricity supply. UK territorial GHG emissions in 2023 were 53% lower than they were in 1990 (DSENZ, 2025a). Provisional figures for 2024 show an estimate of 371 MtCO₂e, a decrease of 4% from the 2023 due to decreased gas and coal in the electricity supply (DSENZ, 2025b).



- 13.5.6 DESNZ sets out the CO₂e emissions estimates from a number of sources for 2005-2023 and is the most up to date available figures for the UK, East of England, and St Albans (DESNZ, 2025). The CO₂e estimates for 2023 is presented in **Table 13.4** below.

Table 13.4: National, East of England, and St Albans CO₂ estimates for 2023

Sector	National (ktCO ₂ e)	St Albans (ktCO ₂ e)	East of England (ktCO ₂ e)
Industry	56,675.0	19.9	2,543.4
Commercial	29,590.4	51.2	2,560.8
Public Sector	10,379.8	16.3	836.3
Domestic	76,896.6	190.3	7,167.0
Transport	113,306.6	493.4	12,389.8
Land Use, Land Use Change and Forestry	1,119.7	-6.1	2,545.4
Agriculture	48,287.7	20.4	4,023.0
Waste Management	19,838.2	40.9	2,736.6
Total	356,094.1	826.1	34,802.2

- 13.5.7 St Albans accounts for approximately 2.37% of the total CO₂ emissions in the East of England, and 0.23% of the total UK emissions. The largest source of emissions within St Albans is Transport (59.72%), followed by Domestic (23.04%) and then Commercial (6.2%).

Local Emissions

- 13.5.8 The 32.9370ha Site is comprised of pasture fields with further fields, hedgerows, and woodlands to the north, east and west. It is expected that existing farming practices within the Site may provide a source of GHG emissions due to equipment use, soil disturbance, fertilisers and pesticides. The vegetation on Site may provide a limited amount of carbon sequestration. For the purpose of the assessment and to facilitate a conservative approach, the baseline emissions within the Site are considered to be zero.

Baseline Evolution

National and Regional Emissions

- 13.5.1 The fourth, fifth and sixth Carbon Budgets, as set out in **Table 13.5** below, are the next milestones on the UK's pathway to net zero. The sixth Carbon Budget, for the period 2033-37, is the first budget to consider the UK's 2050 net zero target. This pathway is in line with the UK's Nationally Determined Contributions (NDCs) and therefore on a trajectory that is consistent with the Paris Agreement.

Table 13.5: UK Carbon Budget Targets (2023-2042)

UK Budget	Carbon budget level (million tonnes carbon dioxide equivalents - MtCO ₂ e)	Reduction below 1990 levels
4 th carbon budget (2023 to 2027)	1,950 MtCO ₂ e	51% by 2025
5 th carbon budget (2028-2032)	1,725 MtCO ₂ e	57% by 2030



UK Budget	Carbon budget level (million tonnes carbon dioxide equivalents - MtCO ₂ e)	Reduction below 1990 levels
6 th carbon budget (2033-2037)	965 MtCO ₂ e	78% by 2035
Recommended* 7 th carbon budget (2038-2042)	535 MtCO ₂ e	87%

*As recommended by CCC (CCC, 2025) and not yet set into UK law.

13.5.2 The construction phase for the Proposed Development is anticipated to commence in 2028 for a period of 9 years. The Proposed Development is anticipated to be fully operational by 2036. Based on these timescales, construction activities are assumed to fall within the fifth carbon budgets (5 years) and sixth carbon budget (4 years). Operational emissions are assumed to occur for 1 year within the sixth Carbon Budget and continue into the seventh Carbon Budget. There are no Carbon Budgets currently published for beyond the 2042 (the end of the recommended seventh Carbon Budget), although it is noted that the Proposed Development will continue to operate after this point.

13.5.3 **Table 13.6** below presents the St Albans energy CO₂ only indicative budget in the format of the 5-year carbon budget periods in the UK Climate Change Act.

Table 13.6: St Albans Carbon Budgets (Source: the Tyndall Centre Carbon Budget Tool)

St Albans Budget	Carbon budget level (million tonnes carbon dioxide equivalents - MtCO ₂ e)
4 th (2023-2027)	1.9
5 th (2028-2032)	0.9
6 th (2033-2037)	0.4
7 th (2038-2042)	0.2

13.5.4 Sources of GHG emissions would include emissions associated with transport. In 2018, the UK Government launched the Road to Zero strategy, which sets out its ambition to reduce emissions from vehicles on UK roads and promote the uptake of zero emissions vehicles (DfT, 2018). Proposed support mechanisms to facilitate this transition include increasing the supply and sustainability of low carbon fuels in the UK through a legally-binding 15-year strategy, offering grants for plug-in vehicles and introduce a voluntary industry-supported commitment to reduce Heavy Goods Vehicles GHG emissions by 15% by 2025, from 2015 levels.

13.5.5 In March 2020, the Electric Vehicles and Infrastructure paper was published, which outlined how the infrastructure for EVs have been planned for and what incentives are available to encourage growth. In November 2020, the UK Government announced that the sale of new petrol and diesel cars will be stopped in the UK by 2030 (DfT, 2020). In September 2023, Rishi Sunak pushed the ban on new petrol and diesel cars back to 2035.

13.5.6 Significant investment has been allocated to support the greater uptake of zero emission vehicles, including £1.8 billion to build more charge points, as well as £582 million in grants.

13.5.7 The National Grid is currently decarbonising, which is anticipated to continue over the next decade. This is an outcome of the continued uptake of renewable energies and the decline of coal-fired power stations across the UK. The increasing share of low carbon, renewable energy sources with a corresponding decrease in the use of fossil fuels, is termed “decarbonisation”. This change is significant as it encourages the use of grid-supplied electricity systems, such as air source heat pumps, over gas-fired plant.

13.5.8 Furthermore, technologies generating on-site electricity (such as gas-engine combined heat and power (CHP)) will not achieve the carbon savings they have to date (because they are offsetting less ‘carbon’ as the grid decarbonises). Therefore, the emissions per unit of electricity generated (grams of carbon dioxide per kilowatt hour) is reducing. The



Government's policy paper 'Transitioning to a net zero energy system: smart systems and flexibility plan' (July 2021), see **Appendix 13.1**, further supports the decarbonisation of energy across the UK. As a result, GHG emissions within the extant planning consent from elements dependant on grid energy, including EV charging, would reduce.

Local Emissions

- 13.5.9 If the Site continues in its current use, there would be ongoing emissions from agricultural uses. However, as outlined above, emissions as a result of energy consumption can expect to decrease due to grid decarbonisation. The Site would likely sequester carbon at its current rate, although vegetation would mature.
- 13.5.10 The future baseline emissions for 2036 have been calculated using the EFT and traffic data provided by the Transport Consultant. The 2036 future baseline emissions are estimated to be 1,358 tCO₂e/year.

13.6 Primary and Tertiary Mitigation

Primary Mitigation

Construction

- 13.6.1 No primary mitigation measures have been identified for the construction phase.

Operation

Transport

- 13.6.2 The Proposed Development incorporates measures to reduce emissions associated with transport.
- 13.6.3 The Proposed Development is located within the wider NE Harpenden allocation. The allocation is predominantly residential however will benefit from additional land uses including a primary school, local centre and medical centre. The provision of these on-site facilities will allow residents to undertake day-to-day journeys without needing to leave the Site.
- 13.6.4 As detailed on the access and movement parameter plan in **Appendix 1.2**, the Proposed Development includes an active travel network, which promotes walking and cycling through a safe and attractive route. The enhancement of the pedestrian and cycle network will provide greater permeability of movements when compared to the private car.

Green Infrastructure

- 13.6.5 Green infrastructure can provide a form of carbon sequestration on the Site, reducing the level of CO₂ within the atmosphere. The Proposed Development parameters retain, where possible, existing vegetation on Site boundaries and running internally through the Site. The Proposed Development includes provision of green infrastructure including green corridors, native tree and shrub planting, landscape buffer planting, new parkland, species rich grassland, wetland areas, and Sustainable Drainage Systems (SuDS).

Tertiary Mitigation

Construction

Construction Environmental Management Plan (CEMP)

- 13.6.6 A Construction Environmental Management Plan (CEMP) will be prepared prior to the commencement of construction works at the Site and is anticipated to be secured via planning condition. The CEMP will include mitigation measures covering transport, materials, waste and



air quality during construction. Measures that will reduce GHG emissions during construction include, for example, no unnecessary idling of engines, maintenance of plant equipment to check they are operating optimally and efficient use of materials to reduce waste. The measures included in the CEMP contribute to the mitigation of GHG emissions by reducing energy consumption and waste/pollutant generation during construction, thereby leading to a lower carbon footprint.

- 13.6.7 As stated in the Sustainability and Energy Statement (AES, 2025), during construction of the Proposed Development, choices will be made to reduce the consumption of primary materials, including incorporation of recycled content and responsibly sourced construction materials. These measures will be secured through the CEMP.
- 13.6.8 The CEMP will include traffic management measures, which will set out the routing plans for working and deliveries, scheduling and timing of deliveries, and logistics plans. This will help to improve the efficiencies of vehicle movements during construction and in turn, reduce GHG emissions associated with construction traffic.

Operation

Energy

- 13.6.9 The Proposed Development will be built out according to the relevant Building Regulations and standards that are applicable at the time.
- 13.6.10 All dwellings must comply with Building Regulations Part L 2021 which came into effect in June 2022. The new Building Regulations enforce higher fabric performance and therefore more energy-efficient dwellings. It also considers the use of zero and low carbon energy generation at an early stage of the design process.
- 13.6.11 The Future Homes Standard, as an uplift to energy efficiency standards, will provide a pathway to highly efficient homes and non-domestic buildings which are 'zero carbon ready'. As such, it is expected that any phases of development that come forward after the adoption of this standard will be required to comply with it.
- 13.6.12 As stated in the Energy Statement (AES, 2025), the energy demand reduction strategy for the Proposed Development will follow the energy hierarchy approach. The energy hierarchy is as follows:
- 1) Be Lean – Reduce Energy Demand.
 - 2) Be Clean – Supply Energy Efficiently.
 - 3) Be Green – Use renewable Energy.
- 13.6.13 In line with stage 1 of the energy hierarchy, the design of the Proposed Development will assist in reducing energy demand through the following:
- The Proposed Development will be designed so that the dwellings are able to benefit from passive solar gain. Appropriate orientation of buildings can assist with passive solar gain. Future RMAs will set out how these principles have been incorporated into the Proposed Development.
 - The Proposed Development will take a fabric first approach which concentrates on improving U-values, reducing thermal bridging, improving airtightness, and installing energy efficient ventilation and heating services.
 - Dwellings will be designed to minimise heat loss through the fabric, in line with Part L 2021 as a minimum. The Energy Statement includes a proposed construction specification.



- The Proposed Development should minimise unnecessary thermal bridging of insulation layers.
- The Energy Statement (AES, 2025) sets an assumed minimum airtightness standard.
- Heat generation and distribution systems will be designed to give the occupants a high level of control over their use, encouraging energy efficient behaviours.
- Internal lighting would be low energy wherever possible, and sensors utilised.

13.6.14 As stated in the Energy Statement (AES, 2025), in order to meet the carbon reduction requirements of the Future Homes and Future Building Standards, it is proposed that all buildings will supply heat through air source heat pump (ASHP) systems. ASHP deliver an effective carbon intensity of heat of 2.5-3.5 times lower than the electricity grid. These technologies will reduce the GHG emissions associated with energy use during the operation of the Proposed Development.

13.6.15 It is therefore anticipated that dwellings will be built to a very high level of energy efficiency.

Water Efficiency

13.6.16 Each new dwelling will minimise water usage to at least 110 litres/person/day, which is in line with the current national optional standards (Building Regulations Part G 2016 sets a standard of 125 litres/person/day, and an optional standard of 110 litres/person/day).

13.6.17 As set out in the Energy Statement (AES, 2025), to meet this standard, the Proposed Development is expected to include measures such as using dual flush toilets and flow control devices to reduce water consumption and installing water-efficient appliances. This contributes to reducing emissions as water is conserved meaning energy used to distribute and supply water is reduced and less emissions are produced.

Waste

13.6.18 The Proposed Development will provide recycling facilities in line with local policy requirements, enabling users to recycle and reduce the volume of waste sent to landfill.

13.6.19 A comprehensive Operational Waste and Recycling Management Strategy (OWRMS) has been prepared to support the planning application. This outlines the measures that will be implemented to ensure that operational waste is managed in accordance with the Waste Hierarchy, relevant legislation, and best practice, including the Waste (England and Wales) Regulations 2011 (as amended), British Standard BS 5906:2005, and Part H6 of the Building Regulations. The targets aim for ≥65% recycling and ≥95% diversion from landfill across all uses.

Transport

13.6.20 Electric vehicle (EV) charging infrastructure will be provided at the Development in line with the standards of Building Regulations Part S 2021. This encourages the uptake of EVs and helps reduce the use of petrol and diesel vehicles on the Site, which produce direct Scope 1 emissions.

13.6.21 A Travel Plan will be developed for the residential element of the Proposed Development and separately for the primary school element of the Proposed Development. The delivery of a Travel Plan is required to achieve the goals and objectives set out in the Hertfordshire County Council Local Transport Plan 4.

13.6.22 The primary purpose of the Travel Plans will be to encourage future residents and students and staff of the primary school to travel using sustainable modes of transport. The implementation of a Travel Plan has the ability to reduce the reliance on the private car and therefore reduce traffic movements and associated GHG emissions.



13.7 Assessment of Significant Likely Effects

Demolition and Construction

A1-A3 Product Stage

- 13.7.1 A1-A3 product stage includes embodied emissions from raw materials supply and transport within the supply chain required to construct the Proposed Development. Embodied carbon emissions result from extracting raw materials, processing them, assembling them into usable products and transporting them to Site during construction. It is noted that a large proportion of GHG emissions from a development may be accounted for within scope 3 embodied carbon. The embodied carbon associated with the Proposed Development will be heavily influenced by the type and amount of material required to construct the Proposed Development. Extraction and production processes can be carbon intensive, particularly for materials such as concrete. It is also noted that embodied carbon is heavily influenced by available materials and supply chains in the local and wider area.
- 13.7.2 **Table 13.7** below sets out the carbon emissions calculated for the A1-A3 Product Stage. The main source of embodied carbon is from the proposed residential dwellings. It should be noted that the embodied carbon emissions calculated only account for the uses detailed in the table below, and do not account for the construction of roads and other infrastructure.

Table 13.7: Carbon emissions from A1-A3 Product Stage

Use	GEA (m ²)	Benchmark (kgCO ₂ e/m ²)	Carbon Emissions (tCO ₂ e)	Source
Residential	132,000	550	71,255.80	RICS Methodology to calculate embodied carbon of materials, figure 6. Low rise apartment / detached family home.
School	20,000	690	13,524.00	RICS Methodology to calculate embodied carbon of materials, figure 6. Primary school/kindergarten/nursery
Elderly Care	6,100	1075	6,426.35	RICS Methodology to calculate embodied carbon of materials, figure 6. Hospital (community, mental health).
Local centre	5,500	690	3,719.10	RICS Methodology to calculate embodied carbon of materials, figure 6. Local/neighbourhood centre.
TOTAL			94,925.25	

A4 Transport to Works Site

- 13.7.3 A4 transport to works site includes emissions from fossil fuels during the transportation of building materials and waste by Heavy Goods Vehicles (HGV) and construction staff commuting to and from the Site (LGV). Emissions from construction vehicles are shown in **Table 13.8**.

Table 13.8: Construction vehicle emissions

No. of Vehicles per day	Distance (km)	Carbon factor (kgCO ₂ e/km)	Carbon Emissions (tCO ₂ e)	Source
123 (HGV)	80	0.99992	31,675.38	UK Gov GHG Conversion Factors 2025 (full_set_for_advanced_users). Freighting goods - HGV (all diesel) - All HGVs - 100% laden



No. of Vehicles per day	Distance (km)	Carbon factor (kgCO ₂ e/km)	Carbon Emissions (tCO ₂ e)	Source
52 (LDV)	50	0.17316	1,449.38	UK Gov GHG Conversion Factors 2025 (full_set_for_advanced_users). Business travel - land. Average car. Diesel.
TOTAL			33,124.76	

A5 Construction - Installation

13.7.4 Emissions associated with demolition of the equestrian centre are shown in **Table 13.9** below.

Table 13.9 Demolition of the Equestrian Centre Emissions

Floor area (m ²)	Carbon factor (kgCO ₂ e/m ²)	Carbon Emissions (tCO ₂ e)	Source
2,416	35	82.87	RICS Whole life carbon assessment for the built environment (RICS, 2023)
TOTAL		82.87	

13.7.5 All phases of construction waste management, such as reuse, recycling and recovery before disposal to landfill, will result in GHG emissions. The emissions associated with construction waste disposal are shown in **Table 13.10** below.

Table 13.10: Demolition and Construction Waste Disposal Emissions

Activity	Tonnes	Carbon factor (kgCO ₂ e/t)	Carbon Emissions (tCO ₂ e)	Source
Construction	5,241.60	1.00835	5.18	UK Gov GHG Conversion Factors 2025 (full_set_for_advanced_users). Waste disposal - average construction
Excavation	11,400	1.00835	11.27	UK Gov GHG Conversion Factors 2025 (full_set_for_advanced_users). Waste disposal - soils
TOTAL			16.44	

13.7.6 A5 construction- installation also includes the enabling activities and land clearance activities required for the construction of the Proposed Development which will result in direct GHG emissions released from movement and disturbance of soil on Site. The emissions associated with soil disturbance and land use change as estimated to be 1,704 tCO₂e, as shown **Table 13.11** below.

Table 13.11: Soil Disturbance and Land Use Change Emissions

Habitat Type	Area (ha) or Length (km)	Carbon factor (kgCO ₂ e/kg)	Carbon Emissions (tCO ₂ e)	Source
Vegetated Garden	0.07	130.0	9.10	Natural England Carbon Storage and Sequestration by Habitat 2021.



Habitat Type	Area (ha) or Length (km)	Carbon factor (kgCO ₂ e/kg)	Carbon Emissions (tCO ₂ e)	Source
				Appendix 1 Improved grassland
Modified Grassland	0.24	130.0	31.2	Natural England Carbon Storage and Sequestration by Habitat 2021. Appendix 1 Improved grassland
Other Neutral Grassland	25.77	60.0	1546.2	Natural England Carbon Storage and Sequestration by Habitat 2021. Appendix 1 Semi- natural grassland > Neutral Grassland
Bramble Scrub	0.01	94.0	0.94	Natural England Carbon Storage and Sequestration by Habitat 2021. Appendix 1 Upland & Lowland Heathland
Tall Forbs	0.16	60	9.6	Natural England Carbon Storage and Sequestration by Habitat 2021. Appendix 1 Semi- natural grassland > Neutral Grassland
Lowland Mixed Deciduous Woodland	0.35	151.0	52.85	Natural England Carbon Storage and Sequestration by Habitat 2021. Appendix 1 30 year mixed broadleaved native woodland on mineral soil (to 1m)
Rural Tree	0.07	151.0	10.57	Natural England Carbon Storage and Sequestration by Habitat 2021. Appendix 1 30 year mixed broadleaved native woodland on mineral soil (to 1m)
Hedgerow	0.44	98.7	43.428	Natural England Carbon Storage and Sequestration by Habitat 2021. Appendix 1 Minimal/Unmanaged Hedgerows
TOTAL			1,703.9	

13.7.7 There will be emissions associated with construction activities on Site. This includes electricity purchased from the National Grid; the temporary construction office, welfare facilities, and temporary lighting on the Site will require electricity purchased from the National Grid. This will result in indirect GHG emissions generated from the burning of fossil fuels to deliver electricity to the National Grid. Construction of the Proposed Development is anticipated to come



forward as the National Grid continues to decarbonise. There will also be emissions from combustion of fuels in the Applicant's owned/controlled vehicles, plant, or equipment. This could include plant such as excavators and dumpers, and on-site generators if required. Plant and equipment emissions will be reduced through measures secured through the CEMP, such as no unnecessary idling.

Table 13.12: Construction Activities Emissions

Use	GEA (m ²)	Carbon factor (kgCO ₂ e/m ²)	Carbon Emissions (tCO ₂ e)	Source
Residential	132,200	40	5182.24	RICS Whole life carbon assessment for the built environment (RICS, 2023)
School	20,000	40	784.00	RICS Whole life carbon assessment for the built environment (RICS, 2023)
Elderly Care	6,100	40	239.12	RICS Whole life carbon assessment for the built environment (RICS, 2023)
Local Centre	5,500	40	215.60	RICS Whole life carbon assessment for the built environment (RICS, 2023)
TOTAL			6420.96	

- 13.7.8 Emissions associated with water use during construction have been assessed qualitatively at this stage. There will be emissions associated with construction phase water use, for example for welfare purposes or wheel wash facilities. It is expected that this would represent a very small proportion of the overall construction phase emissions.

Construction Emissions Summary

- 13.7.9 **Table 13.13** below summarises all of the carbon emissions calculated for the construction phase. As shown in **Table 13.11**, the construction phase emissions across the 9-year programme are estimated to be 136,274 tCO₂e.

Table 13.13: Construction Emissions Summary

Lifecycle Stage	tCO ₂ e
A1-A3 Product Stage	94,925
A4 Transport to Works Site	33,125
A5 Construction-Installation	8,225
TOTAL CONSTRUCTION (9-year programme)	136,274
AVERAGE CONSTRUCTION EMISSIONS PER YEAR	15,142



Significance

13.7.10 While it is considered that the Proposed Development meets the applicable adopted policy during construction, it would not contribute to decarbonisation in line with the 2050 net zero trajectory. Given the carbon intensive nature of construction over the 9-year construction period and with consideration of the GHG emission sources noted above, it is considered that the Proposed Development will have a **Major Adverse**, and therefore **Significant**, effect without further mitigation.

Operation

B1 Use

13.7.11 The Proposed Development will generate an increase in traffic volumes throughout the Site and along the local transport network, thereby generating GHG emissions from burning fossil fuels through road transport. The vehicle GHG emissions calculated using the EFT are shown in **Table 13.12** below. As shown in **Table 13.14**, the Proposed Development is estimated to result in an increase of approximately 84.48 tCO₂e/year, when compared against the 2036 future baseline scenario.

Table 13.14: Operational Vehicle GHG Emissions

Assessment Scenario	Vehicle GHG Emissions (tCO ₂ e/year)
2036 Future Baseline	1,357.77
2036 Future Baseline + Full Allocation	1,442.25
Proposed Development operational vehicle emissions	84.48

13.7.12 The carbon sequestration potential (i.e. the potential to remove CO₂ from the atmosphere) from the proposed habitats within the Site has been estimated to assess the carbon sequestration potential on Site. The carbon sequestration potential of the Proposed Development is shown in **Table 13.15** below. As shown in **Table 13.15**, the Proposed Development is estimated to sequester -42 tCO₂e per year.

Table 13.15: Carbon Sequestration

Habitat Type	Habitat Creation Area (ha) or length (km)	Carbon factor (kgCO ₂ e/kg)	Carbon Sequestration (tCO ₂ e/year)	Sources
Orchards	0.2175	-2.89	-0.63	Natural England Carbon Storage and Sequestration by Habitat 2021. Appendix 2 Carbon Fluxes by Habitat. Traditional orchard with low intensity management
Allotments	0.325	No data	No data	
Modified Grassland	3.8125	-0.36	-1.37	Natural England Carbon Storage and Sequestration by Habitat 2021. Appendix 2 Carbon Fluxes by Habitat. Improved grasslands.
Urban (unvegetated)	13.265	No data	No data	



Habitat Type	Habitat Creation Area (ha) or length (km)	Carbon factor (kgCO ₂ e/kg)	Carbon Sequestration (tCO ₂ e/year)	Sources
Mixed scrub	1.185	0.054	0.06	Natural England Carbon Storage and Sequestration by Habitat 2021. Appendix 2 Carbon Fluxes by Habitat. Lowland heathland and upland heathland
Neutral grassland	1.9075	-0.36	-0.69	Natural England Carbon Storage and Sequestration by Habitat 2021. Appendix 2 Carbon Fluxes by Habitat. Improved grasslands.
Woodland, Broadleaved	1.81	-14.5	-26.25	Natural England Carbon Storage and Sequestration by Habitat 2021. Appendix 2 Carbon Fluxes by Habitat. Mixed native broadleaved woodland 30 years
Vegetated garden	5.26	No data	No data	
Rural tree	0.8143	-14.5	-11.81	Natural England Carbon Storage and Sequestration by Habitat 2021. Appendix 2 Carbon Fluxes by Habitat. Mixed native broadleaved woodland 30 years
Species-rich native hedgerow	0.55	-1.99	-1.09	Natural England Carbon Storage and Sequestration by Habitat 2021. Appendix 2 Carbon Fluxes by Habitat. Traditional orchard with low intensity management
TOTAL Per Year			-41.76	
TOTAL 60 Years			-2,506	

13.7.13 Operational waste management including reuse, recycling and recovery before disposal to landfill, will result in GHG emissions. The emissions associated with operational waste disposal are shown in **Table 13.16** below.

Table 13.16: Operational Waste Disposal Emissions

Waste Type	Tonnes	Carbon factor (kgCO ₂ e/kg)	Carbon Emissions (tCO ₂ e/year)	Source
Mixed Dry Recyclables (MDR) including Cans, Plastics, Glass, Paper and Cardboard	357	Landfill: 1164.4894 Closed loop: 4.68568	21.93	UK Gov GHG Conversion Factors 2025 (full_set_for_advanced_users). Waste disposal – Paper and Board. 5% landfill. 95% closed loop.
Food	357	Landfill: 656.08614 Anaerobic digestion: 8.98311	14.46	UK Gov GHG Conversion Factors 2025 (full_set_for_advanced_users). Waste disposal – organic: mixed food and garden waste. 5% landfill. 95% Anaerobic digestion.



Waste Type	Tonnes	Carbon factor (kgCO ₂ e/kg)	Carbon Emissions (tCO ₂ e/year)	Source
Residual	360	Landfill: 497.24244 Incineration with energy recovery: 4.68568	10.34	UK Gov GHG Conversion Factors 2025 (full_set_for_advanced_users). Waste disposal – residual waste. 5% landfill. 95% incineration with energy recovery.
TOTAL			46.73	

13.7.14 In total, the emissions from operational vehicle movements, carbon sequestration, and operational waste disposal (as set out in **Tables 13.14-13.16** above) are estimated to be 116.42 tCO₂e per year.

B2-B5 Maintenance

13.7.15 Embodied carbon from purchased materials required for maintenance has been calculated as 1% of the emissions from A1-A5. Embodied carbon emissions associated with maintenance are estimated to be 1,435tCO₂e/year. Embodied carbon from repair is calculated as 25% of the maintenance emissions, therefore emissions associated with repair are estimated to be 359 tCO₂e/year. Total B2-B5 maintenance is therefore estimated to be 1,794 tCO₂e/year.

B6 Operational Energy

13.7.16 GHG emissions will be produced as electricity from the National Grid is purchased for electric heating and powering appliances with the proposed residential and commercial units, as well as maintaining lighting on the proposed road network.

13.7.17 As noted above in the future baseline, over the next 10 years, the amount of GHGs released due to electricity demand from the National Grid is expected to decrease. This anticipated reduction is a direct result of rapid decarbonisation efforts.

13.7.18 Emissions from operational electricity and energy demand for the residential elements of the Proposed Development have been calculated by AES. If designed to be Part L 2021 compliant, the emissions from the Proposed Development's operational electricity and energy demand are estimated to be 477,943 kgCO₂/year. Following the proposed strategy of incorporating heat pumps, the emissions from the Proposed Development's operational electricity and energy demand are estimated to be 163,045 kgCO₂/year (159.78 tCO₂/year) this represents carbon reductions of 75.09% over Part L 2021 standards.

B7 Water Use

13.7.19 During operation, indirect scope 3 emissions will result from the provision and treatment of water supplies. The Proposed Development will incorporate water efficiency measures. Each new dwelling will minimise water usage to at least 110 litres/person/day, which is in line with the current national optional standards (Building Regulations Part G 2016 sets a standard of 125 litres/person/day, and an optional standard of 110 litres/person/day). This reduces the GHG emissions produced from water use.

13.7.20 As estimated for **Chapter 7: Population and Human Health**, the estimated population of the Proposed Development is 1,308 people.

13.7.21 As shown in **Table 13.17** emissions associated with operational water consumption are estimated to be 9.85 tCO₂e per year.



Table 13.17: Water Use Emissions

Yearly water consumption (million litres)	Carbon factor (kg CO ₂ e/million litres)	Carbon Emissions (KgCO ₂ e/year)	Carbon Emissions (tCO ₂ e/year)	Source
52.51	191.30156	10046.43	9.85	UK Gov GHG Conversion Factors 2025 (full_set_for_advanced_users). Water supply - water supply - million litres

Operational Emissions Summary

13.7.22 **Table 13.18** below shows a summary of operational emissions. The Proposed Development is estimated to emit 2,079 tCO₂e/year.

Table 13.18: Summary of Operational Emissions

Lifecycle Stage	tCO ₂ e/year
B1 Use - Transport, carbon sequestration	89
B2-B5 Maintenance	1,703
B6 Operational Energy	160
B7 Water Use	10
TOTAL OPERATION (annual)	1,963

Significance

13.7.23 It is considered that the Proposed Development is fully consistent with existing and emerging policy requirements (as outlined in **Appendix 13.1**) and good practice design standards for projects of this type through the implementation of the primary and tertiary mitigation. Commitment to incorporate renewable energy measures which would reduce carbon emissions beyond the requirements of Building Regulations Part L 2021, and implementing sustainable transport methods is considered to be in line with current and forthcoming policy requirements and measures necessary to achieve the UK's trajectory towards net zero. At detailed design stage it is anticipated that the Future Homes Standard will be adopted for phases that come forward after this date. This will uplift energy performance standards and consider the UK net zero trajectory. Therefore, it is anticipated that there will be a **Minor Adverse** and therefore **Not Significant** effect, without further mitigation.

Net Lifecycle Emissions

13.7.24 **Table 13.19** below presents a summary of the net emissions associated with the Proposed Development, including the 9-year construction period and 60-year operational phase.

Table 13.19: Net GHG Emissions

Lifecycle Stage	tCO ₂ e
Construction (9 years)	136,274
Operation (60 years)	117,751
Net GHG Emissions	254,025

13.7.25 The Proposed Development's carbon emissions have been contextualised against the UK and local carbon budgets in **Table 13.20** and **Table 13.21**.



Table 13.20: Contextualisation of the Proposed Developments Carbon Emissions Against the UK Carbon Budgets

Carbon budget Period	Total UK Carbon Budget (tCO ₂ e)	Project Contribution (tCO ₂ e)	Project contribution (%)
4 th (2023-2027)	1,950,000,000	0	0.0000
5 th (2028-2032)	1,725,000,000	75,708	0.0044
6 th (2033-2037)	965,000,000	62,529	0.0065
7 th (2038-2042)	535,000,000	9,813	0.0018

Table 13.21: Contextualisation of the Proposed Developments Carbon Emissions Against the Local Carbon Budgets

Carbon budget Period	Total Local Carbon Budget (tCO ₂ e)	Project Contribution (tCO ₂ e)	Project contribution (%)
4 th (2023-2027)	1,900,000	0	0
5 th (2028-2032)	900,000	75,708	8.4
6 th (2033-2037)	400,000	62,529	15.6
7 th (2038-2042)	200,00	9,813	4.9

13.7.26 The net GHG emissions from the Proposed Development will result in an increase in absolute GHG emissions against the future baseline for the Site. These emissions are shown to contribute a small percentage to the UK Carbon Budgets. On a local scale, these emissions are more pronounced, although it should be noted that not all emissions will occur within the administrative boundary of St Albans.

13.7.27 The primary and tertiary mitigation measures embedded into the design of the Proposed Development are in line with national and local policy, and achieving GHG reductions through the energy strategy and compliance with Building Regulations. The main emissions source across the lifetime of the Proposed Development is embodied carbon.

13.7.28 There will be an initial larger volume of GHG emissions during the 9 year construction period, after which yearly emissions will reduce during the operation stage. While it is considered that overall, the Proposed Development will comply with national and local net zero policy through the incorporation of primary and tertiary mitigation measures, the GHG emissions released during the construction period are only partly mitigated, with embodied carbon resulting in the construction phase to not fully contribute to decarbonisation in line with a UK trajectory to net zero. However, during operation, emissions will be fully mitigated to be compatible with a UK trajectory to net zero due measures such as the incorporation of Air Source Heat Pumps. The net GHG emissions of the Proposed Development are concluded to have an initial **Moderate Adverse** effect which would reduce to **Minor Adverse** and **Not Significant** once the Proposed Development is fully operational.

13.8 Secondary Mitigation and Enhancement

Construction

Embodied Carbon

13.8.1 As set out in the Energy Statement (AES, 2025), choices will be made in order to reduce the consumption of primary resources and use materials with fewer negative impacts on the environment, typical measures include:

- Use fewer resources and less energy through designing buildings more efficiently;



- Incorporate recycled content, use resource- efficient products, and give due consideration to end of life uses;
- Influence, specify, and source increasing amounts of materials which can be reused and consider future deconstruction and recovery.;
- Selection of materials with high natural content;
- Selection of low embodied carbon option for all materials;
- Recycled plastics in windows, pipework, and cavity closers;
- Recycled content in gypsum plasterboard;
- Use of recycled aggregate as hardcore; and
- Recycle elevation treatments where feasible.

13.8.2 Best practice standards are being adopted through LETI and RIBA and will be considered when setting any targets for the Proposed Development, with an aim to improve on current practice.

13.8.3 **Chapter 14: Materials and Waste** also includes several measures to minimise environmental impacts associated with materials consumption. Sustainability targets, including resource efficiency objectives, will be formally incorporated into all relevant procurement documentation and contractor requirements. These will include provisions for monitoring and reporting, enabling early and ongoing assessment of compliance. Full details of the proposed mitigation measures in relation to resource efficiency can be found in **Chapter 14**.

Site Waste Management Plan (SWMP)

13.8.4 As detailed in **Chapter 14**, An Outline SWMP has been submitted in support of the application, and a detailed SWMP will be prepared prior to commencement of construction. The SWMP will set out a site-specific framework for waste minimisation, segregation, reuse, recycling, and lawful disposal. This assists in reducing the embodied carbon associated with construction materials and emissions associated with waste management processes.

Operation

Energy Efficiency

13.8.5 In order to confirm that building design and appropriate passive design measures have been incorporated to minimise heat loss, thermal modelling will be undertaken to assess the performance of all main building junctions. Additionally, pressure testing of all dwellings will be undertaken on completion to confirm that the design figure has been met. (AES, 2025).

Renewable Technologies

13.8.6 As stated in the Energy Statement (AES, 2025), the specific model of the proposed heat pump systems will be established at detailed design stage. Solar PV is also considered a feasible option for future incorporation into the design if required. However, it is not considered a necessary commitment to meet renewable targets or compliance margins in accordance with Part L. Consideration of Solar PV will be undertaken at reserved matters stage in line with the design SAP assessments, or to meet the requirements of the forthcoming Future Homes Standard.

Landscape and Ecology

13.8.7 The planting strategy will consider climate change, native species, resilience and biosecurity as important factors in selecting species and will be appropriate to the location, full details of



which will be provided at reserved matters and/or by condition. This is expected to reduce water demand related to the watering of plants, which will reduce GHG emissions associated with water supply.

- 13.8.8 A Landscape and Ecological Management Plan (LEMP) will be prepared for the Site that should be secured by way a planning condition. Due regard should be given to the Natural England and RSPB Climate Change Adaptation Manual (2020) when preparing the HMP, as well as Natural England's Carbon Storage and Sequestration by Habitat report (2021) and the British Ecological Society's nature-based solutions report (2021). The LEMP should include consideration of the maintenance / management measures associated with onsite ecological networks and features that are to be retained, enhanced and created within the Proposed Development. This will help the maturation of existing, retained and proposed planting which will continue to sequester carbon on Site.

Operational Waste

- 13.8.9 A condition will be sought to secure an updated Detailed OWRMS prior to occupation. This document will build on the Outline Strategy submitted at application stage and incorporate final layouts, unit counts, and confirmed collection arrangements.
- 13.8.10 To support compliance with the Waste Hierarchy and reduce the risk of cross-contamination, occupiers (residential and commercial) will be provided with guidance outlining acceptable waste practices, bin use, and collection frequency. This may be included within resident welcome packs and tenant fit-out guidance documents, and its delivery will be secured through a planning condition tied to operational management plans.

13.9 Residual Effects

Demolition and Construction

- 13.9.1 Demolition and construction waste will be managed through the implementation of the SWMP, with a preference of prevention, reuse, recycling and recovery before disposal to landfill. At future design stages, methods to reduce embodied carbon will be considered.
- 13.9.2 While it is considered that the Proposed Development meets the applicable adopted policy during construction, it would not contribute to decarbonisation in line with the 2050 net zero trajectory. The emissions generated from construction are partly mitigated through the implementation of the CEMP and SWMP but only through 'business as usual' measures that are not fully in line with the UK net zero trajectory. Following implementation of secondary mitigation measures, it is considered that the Proposed Development will have a **Moderate Adverse** and **Significant effect**.

Operation

- 13.9.3 The assessment identified a minor adverse effect resulting from GHG emissions during the operation stage. Further mitigation measures have been identified and the mitigation for the Proposed Development is considered to be in line with local policy and measures necessary to achieve the UK's trajectory towards net zero. There will however still be residual emissions following secondary mitigation and it is therefore considered that the effect will remain **Minor Adverse** and **Not Significant**.

13.10 Cumulative Effects

- 13.10.1 ISEP guidance (ISEP, 2022) identifies that all global cumulative GHG sources are relevant to the effect on climate change. This is taken into account in defining the receptor as being of high sensitivity to further emissions. For this reason, the guidance recommends that effects of GHG emissions from specific cumulative projects should not be individually assessed, as there is no basis for selecting particular cumulative projects that have GHG emissions over others. By its nature, the contextualisation of GHG emissions to the national carbon budgets



incorporates cumulative contributions of other GHG sources which make up that context. Therefore, a separate cumulative assessment has not been undertaken for the GHG assessment.

13.11 Monitoring

- 13.11.1 Construction activities, including transport, energy consumption and plant emissions will be monitored and managed through the CEMP. The CEMP will be updated during construction to make sure the document continues to fulfil its objectives to reduce environmental effects. This will include a review of current legislation, standards, plant, processes, etc.
- 13.11.2 The travel patterns of the Proposed Development will be monitored as identified in the Travel Plan.
- 13.11.3 Part L 2021 introduced a BREL (Buildings Regulations England Part L) report and photographic evidence requirement which will make sure that key areas of the build affecting thermal performance of each home must be inspected, photographed, and reviewed.
- 13.11.4 Energy use will be regulated as the Proposed Development comes forward in more detail, detailing how the energy commitments have been met through the design.
- 13.11.5 Monitoring of the existing retained and proposed planting will be undertaken as part of the LEMP.

Part 2: Climate Change Risk Assessment

13.12 Introduction

- 13.12.1 This section presents the assessment of likely significant effects of climate change upon the Proposed Development. Assessing climate change resilience and adaptation aims to determine the vulnerability of key environmental receptors to climate change, the likely significant effects climate change would have on these receptors and outline the mitigation measures that the Proposed Development takes to adapt to the projected climate change effects. The Climate Change Risk Assessment (CCRA) is presented in **Table 13.21**.

13.13 Policy, Legislation, and Guidance

- 13.13.1 The overarching planning policy framework applicable to this EIA for the Proposed Development is outlined in **Chapter 6: Planning and Policy Context**. The below provides an overview of the policies of specific relevance to this climate change risk assessment.

National Policy and Legislation

- 13.13.2 The following national legislation has informed the assessment of effects within this section. Further details are provided in **Appendix 13.1**:
- **Climate Change Legislation**, including Climate Change Act (2008) (2050 Target Amendment) Order 2019.
 - **National Guidance**, including the Third National Adaptation Programme (NAP3) (Defra, 2023) UK Climate Change Risk Assessment 2022 (Defra, 2022) and the Climate Change Committee's (CCC) Climate Change Risk Assessment 2021 (CCRA3) (CCC, 2021).
 - **National Planning Policy**, including National Planning Policy Framework (NPPF, 2024), Planning Practice Guidance (PPG, 2021 and Town and County Planning (Environmental Impact Assessment) Regulations (2017) (as amended).



Local Policy

13.13.3 Relevant Local Plans and policies are outlined below, with further details provided in **Appendix 13.1**.

- Draft Local Plan 2041, Strategic Policy SP2, Policy CE1, Strategic Policy SP10, Policy NEB8, Strategic Policy SP13.
- Harpenden Neighbourhood Plan 2018-2033 policies ESD15 and ESD18.
- South West Hertfordshire Joint Strategic Plan.

Guidance

13.13.4 Several standards and guidance documents have been used to inform this chapter. Full details of how the following documents have been considered in climate change resilience and adaptation is provided in **Appendix 13.1**:

- EIA Guidance on Climate Change Resilience & Adaptation (ISEP, 2020).
- UK Climate Change Projections 2018 (UKCP18) Guidance: How to use the UKCP18 Land Projections (Met Office, 2018a).

13.14 Consultation

13.14.1 The EIA Scoping Opinion identified the requirement for a climate change ES Chapter, stating that:

"Given the scale of development proposed, there is potential for significant environmental effects relating to climate change. Climate change should therefore be scoped in to the EIA.

The assessment of likely significant effects regarding climate change mitigation and adaptation should include a consideration of greenhouse gas emissions arising from activities and traffic associated with both the construction and operation of the proposed development. The chapter should also include an assessment of the potential impacts of climate change on the proposed development during both construction and operation".

13.14.2 This ES Chapter has been prepared with due regard to the above.

13.15 Methodology

Study Area

13.15.1 The CCRA uses the UKCP18 data provided by the UK Met Office (Met Office, 2018) for the 25 km grid cell within which the Site is located, although the area of influence for potential climate vulnerability impacts is expected to be limited to the Site and the immediate area around this.

Baseline Data Collection

13.15.2 The following data sources were reviewed to establish baseline conditions:

- Met Office historic climate data (Met office, N.Da) – to identify the historic trends of relevant climatic factors for the geographic area of the Proposed Development.
- UKCP18 (Met Office, 2018) – to identify the climate projections for the geographic area and appropriate temporal scope of the Proposed Development.



- A literature review of relevant publications which are referenced where relevant within Part 2 of this chapter, for variables for which UKCP18 does not provide information (for example, wind direction).

13.15.3 In addition, a review was undertaken of the following chapters within the ES and additional assessments which directly feed into the CCRA:

- **Chapter 9: Biodiversity and**
- **Chapter 8: Landscape and Visual.**

UKCP18

13.15.4 The UKCP18 produced by the UK Met Office (Met Office, 2018) is the main source of information on the future baselines.

13.15.5 UKCP18 uses observations of weather and climate combined with climate models to create a range of climate projections for different emissions scenarios. UKCP18 builds upon previous projections to provide information on how the climate of the UK may change over the rest of this century, describing how climatic conditions, long term seasonal averages and extreme weather conditions may change over future decades. The baseline data is complemented a literature review of relevant publications.

13.15.6 UKCP18 uses Representative Concentration Pathways (RCPs) to develop projections and consider factors such as economic activity, population growth and land use change, which will result in a different range of global mean temperature increases until 2099. RCP8.5 is the most conservative, highest-impact scenario. The scenario reflects an average increase in global mean surface temperature compared to the pre-industrial period of 4.3°C by 2081-2099. ISEP guidance (2020) generally recommends that the high emission scenario, RCP8.5, is used for climate change risk assessments. This is also considered the most appropriate scenario for assessing the impact of climate change on the Proposed Development based on policy and legislation for the UK to achieve net zero carbon by 2050, which is in line with limiting global temperature increases to 1.5°C, and professional judgement.

13.15.7 ISEP guidance recommends that the climatic baseline should consider extremes in short-term weather events, such as heatwaves; long-term climatic variability, such as seasonal changes in precipitation; and average climate norms, such as ambient temperature.

- A review of the following data from this projection has been undertaken:
- Average Summer Precipitation (% change);
- Average Winter Precipitation (% change);
- Average Annual Precipitation (% change);
- Maximum Average Summer Temperature;
- Minimum Average Winter Temperature; and
- Annual Mean Temperature.

13.15.8 The projections (**Appendix 13.3**) show the potential change in temperature and precipitation above or below the observed temperature and precipitation for 1981-2000.



Assessment

13.15.9 In accordance with ISEP guidance, the vulnerability and resilience of the Proposed Development to climate change has been identified by undertaking a risk assessment that includes:

- *“Identifying potential climate change risks to a scheme or project;*
- *Assessing these risks (potentially prioritising to identify the most severe); and*
- *“Formulating mitigation actions to reduce the impact of the identified risks.” (ISEP, 2020)*

13.15.10 The risk assessment considers the likelihood of a hazard occurring that could result in an impact on sensitive receptors. In addition, the magnitude of effects on the Proposed Development will depend on the severity of the consequence of the impact, and the vulnerability of the receptor itself. The definitions of these terms can therefore be summarised as follows (ISEP 2020):

- **Hazard** is an effect of climate change which has the potential to cause an impact on sensitive receptors associated with the Proposed Development;
- **Magnitude** is the likelihood of impact occurring and the consequence of the impact of a hazard; and
- **Vulnerability** is the degree to which receptors are susceptible to adverse impacts and is influenced by sensitivity, adaptive capacity, and exposure to climate hazards.

Sensitive Receptors

13.15.11 Receptors that may be affected by climate change have been identified with consideration of both extreme weather events and gradual climatic changes in the study area for the Proposed Development. In accordance with ISEP guidance, the sensitivity of receptors to climate change effects during operation is described in **Table 13.22**. In ascribing the sensitivity of receptors in relation to potential climate change effects, the susceptibility of the receptor (e.g. ability to be affected by a change) and the vulnerability of the receptor (e.g. potential exposure to a change) must be taken into account. These are defined in ISEP (2020) guidance as follows:

“The susceptibility of the receptor can be determined using the following scale:

- *High susceptibility = receptor has no ability to withstand/not be substantially altered by the projected changes to the existing/prevaling climatic factors (e.g. lose much of its original function and form).*
- *Moderate susceptibility = receptor has some limited ability to withstand/not be altered by the projected changes to the existing/prevaling climatic conditions (e.g. retain elements of its original function and form).*
- *Low susceptibility = receptor has the ability to withstand/not be altered much by the projected changes to the existing/prevaling climatic factors (e.g. retain much of its original function and form).*

13.15.12 The vulnerability of a receptor can be defined using the following scale:

- **High vulnerability** = receptor is directly dependent on existing/prevaling climatic factors and reliant on these specific existing climate conditions continuing in future (e.g. river flows and groundwater level) or only able to tolerate a very limited variation in climate conditions.



- **Moderate vulnerability** = receptor is dependent on some climatic factors but able to tolerate a range of conditions (e.g. a species which has a wide geographic range across the entire UK but is not found in southern Spain).
- **Low vulnerability** = climatic factors have little influence on the receptors."

Table 13.22: Receptor Sensitivity

Receptor	Sensitivity	Reasoning
Construction		
Construction workers	Moderate	During the construction phase, it is anticipated that the risk of climate hazards (e.g. heatwaves or periods of heavy precipitation) may increase which could affect construction workers.
Construction Equipment	Moderate	Construction equipment is not directly dependent on climatic factors but could be affected by some changes to climate.
Existing Ecology, Landscaping and Planting	Moderate	Existing species on Site include bats, badger, other mammals (brown hare/hedgehog) birds, and invertebrates. Existing habitats on Site comprise other neutral grassland, modified grassland, scrub, buildings, hard standing, horse manages, vegetated gardens, individual trees, lowland mixed deciduous woodland, and native hedgerows. These habitats are common and widespread and are therefore not considered to be at high vulnerability to the broad effects of climate change.
Land Stability	Moderate	Earthworks during construction may expose soil and leave it vulnerable to erosion.
Operation		
Future users of the Site (residents, employees, students)	Moderate to High	Some future users of the Site will be more susceptible to climate change than others, depending on a range of factors such as age (children, young people and the elderly) and existing poor health.
Infrastructure including buildings and roads	Moderate	Infrastructure across the Proposed Development ranges in value. Critical infrastructure, such as energy and water pipes/cables are considered to be of moderate susceptibility given that it can tolerate some changes in climate but is critical for the operation of the Proposed Development.
Ecology, Landscaping and Planting	Moderate	Existing species that may utilise the Site include bats, badger, other mammals (brown hare/hedgehog) birds, and invertebrates. Retained and newly created habitats on-Site (e.g. woodlands and hedgerows) may experience changes in species assemblages due to climate change, although they are not of elevated importance for particular species and accordingly are likely to be relatively resilient to future climate changes.

Determining Significance

- 13.15.13 There is an absence of significance criteria for determining the significance of effects resulting from climate change. ISEP guidance states that receptor vulnerability and uncertainties must be considered. Significance has therefore been determined by ISEP guidance and professional judgement.
- 13.15.14 Effects that are described as 'minor' or 'negligible' are determined to be 'Not Significant' and effects that are described as 'moderate', 'major' or 'substantial' are determined to be 'Significant'.



Limitations

- 13.15.15 Scientific evidence shows that our climate is changing. However, there are significant uncertainties in the magnitude, frequency and spatial occurrence within the climate projections utilised in this assessment. The UKCP18 are not predictions or forecasts but simulations of potential scenarios of future climate under a range of hypothetical emissions scenarios and assumptions, and therefore cannot be treated as exact or factual, but projection options. The projections are dependent on future global GHG emissions and, while several different scenarios are provided, it cannot be reliably predicted which (if any) emission scenario will occur over the next 80 years (Fung et al., 2018).
- 13.15.16 Additionally, projections after the 2040s increasingly diverge between scenarios and provide greater confidence for long-term climate averages than extreme events. For example, there is greater confidence around changes in temperature than there is in relation to wind. Levels of confidence and certainty are considered when assessing the likelihood and consequence of climate hazards.
- 13.15.17 This ES chapter reports the climate change risk assessment which has used the latest information sources available at the time of submission. New climate information is published regularly as more in-depth analysis of climate changes is completed, which may supersede the information used to inform this assessment.
- 13.15.18 The assessment is largely qualitative, with the exception of assessments relevant to drainage assets and flood risk, which have been informed by the Environment Agency climate change allowances for increases in peak river flow and rainfall intensity.
- 13.15.19 There is often uncertainty in the relationship between changes in climate hazards and the respective response in terms of Proposed Development performance. This uncertainty has been assessed qualitatively.
- 13.15.20 The assessment assumes that mitigation will be effectively implemented.

13.16 Baseline Conditions

UK Observations

13.16.1 Observed climate changes over the UK include:

- The most recent decade (2012–2021) has been on average 0.2°C warmer than the 1991–2020 average and 1.0°C warmer than 1961–1990 (Kendon et al., 2022).
- A new highest daily minimum temperature record was recorded during the July 2022 heatwave of 26.8°C (Met Office, 2022).
- A new highest daily maximum temperature was recorded during the July 2022 heatwave, with a temperature of 40.3°C (Met Office, 2022).
- In the past few decades there has been an increase in annual average rainfall over the UK. However, natural variations are also seen in the longer observational record (Lowe et al., 2019).
- The most recent decade (2012–2021) has been on average 2% wetter than 1991–2020 and 10% wetter than 1961–1990 for the UK overall (Kendon et al., 2022).
- There have been fewer occurrences of max gust speeds exceeding 40/50/60 Kt for the latest two decades compared to 1980s and 1990s. The UK annual mean wind speed from 1969 to 2021 shows a downtrend, consistent with global observations (Kendon et al. 2022).



- Widespread and substantial snow events have occurred in 2021, 2018, 2013, 2010 and 2009, but their number and severity have generally declined since the 1960s (Pirret et al., 2021).

Regional Observations

13.16.2 Historic climate averages during the period 1991-2020 for the closest climate station to the Site (Rothamsted), obtained from the Met Office website (Met office, N.D), indicates the following:

- Average annual maximum temperature was 14.10°C;
- Warmest month on average was July (mean maximum temperatures of 22.08°C);
- Coldest month on average was February (mean minimum temperature of 1.52°C);
- Average total annual rainfall was 714.52 mm;
- Wettest month on average was October (average monthly rainfall of 78.23 mm); and
- Driest month on average was March (average monthly rainfall of 42.72 mm).

Local Observations

13.16.3 The Site lies with an area issued with a red warning for extreme heat between the 16th and 19th July 2022. The unprecedented heatwave marked a milestone in UK climate history as the first year that 40°C was recorded within the UK.

13.16.4 In January 2025, an amber cold warning was issued for Hertfordshire. The UK Health Security Agency warned that the weather was expected to have severe impacts across health and social care services.

13.16.5 As detailed in the FRA (JPP, 2025), the majority Site is at low risk from all potential flood sources. There are small areas of the Site that are at medium risk of flooding, within proximity to the River Lea.

13.17 Baseline Evolution

13.17.1 This section presents the future climate simulations extracted from UKCP18 up to 2099. **Figures 1.1 – 1.6 in Appendix 13.3** show the grid square projections for average summer, winter and annual precipitation, maximum average summer temperature, minimum average winter temperature and annual mean temperature. A summary of the projections is provided below. This is supported by data extracted from the probabilistic projections which is also presented in **Appendix 13.3**, a summary of which is provided in **Table 13.22** below.

Table 13.23: 50th Percentile Climate Projections at 25 km grid square 512500.0, 212500.0 using baseline 1981-2000 scenario RCP 8.5

Year	Climate Variable at 50th Percentile					
	Mean air temperature anomaly at 1.5 m (°C)	Annual Precipitation rate anomaly (%)	Maximum Summer air temperature anomaly at 1.5 m (°C)	Average Summer Precipitation rate anomaly (%)	Minimum Winter air temperature anomaly at 1.5 m (°C)	Average Winter Precipitation rate anomaly (%)
2028	1.0182056	1.0866612	1.427526	-9.515885	0.8850717	8.3858595
2036	1.2759736	-0.06503571	1.8040372	-12.992642	1.1417875	9.122289



Year	Climate Variable at 50th Percentile					
	Mean air temperature anomaly at 1.5 m (°C)	Annual Precipitation rate anomaly (%)	Maximum Summer air temperature anomaly at 1.5 m (°C)	Average Summer Precipitation rate anomaly (%)	Minimum Winter air temperature anomaly at 1.5 m (°C)	Average Winter Precipitation rate anomaly (%)
2050	1.870177	-2.2943156	2.689957	-20.279886	1.705584	10.989688
2075	3.2590537	-2.8310034	4.8208036	-33.986355	2.8059673	19.115559
2099	5.00194	-4.032283	7.6205463	-54.9484	4.296191	28.054325

*Anomaly refers to the change compared to the baseline. The projections are not absolute values.

13.17.2 The projections show a continuous increase in annual average temperature over the next 80 years (**Figure 1.1** in **Appendix 13.2**). Annual precipitation is shown to decrease year on year (**Figure 1.2** in **Appendix 13.2**).

13.17.3 The projections suggest that summers will become warmer and drier, with an expected increase in maximum summer temperatures and overall decline in summer precipitation (**Figures 1.3 and 1.4** in **Appendix 13.2**). Natural variations may mean that some cooler and/or wet summers will occur.

13.17.4 Winters may become milder and wetter, with an overall increase in both minimum winter temperature and winter precipitation. Natural variations may mean that some cold and/or dry winters may still occur (**Figure 1.5 and 1.6** in **Appendix 13.2**).

13.17.5 In the UK, the heaviest snowfalls tend to occur when the air temperature is between zero and 2°C (Met Office, N.D). There is less certainty in the magnitude of change to snow occurrence and amount, although climate models do show a downward trend in both falling and lying snow over time.

Extreme Weather Events

Heatwaves

13.17.6 A heatwave is an extended period of hot weather relative to the expected conditions of the area at that time of year, which may be accompanied by high humidity. For the UK, the Met Office defines a heatwave as “*when a location records a period of at least three consecutive days with daily maximum temperatures meeting or exceeding the heatwave temperature threshold*” (Met Office, 2022). The threshold varies by county, which for the Site is 27°C. As outlined in **Table 13.22** above, maximum summer air temperatures are projected to increase by 7.62°C by 2099, which could result in the heatwave threshold being met more frequently.

13.17.7 Research has found that the likelihood of heatwave events in the UK is about 10 times higher due to climate change (Vautard R. *et al.*, 2019). As discussed above, the maximum summer air temperature and annual average air temperature is expected to increase over the next 80 years, which could result in more intense and more frequent heatwaves.

Extreme Cold Snaps

13.17.8 The number of icing days (when the daily maximum temperature stays below 0 °C) has been decreasing since the 1960s. These long-term trends point to a long-term warming trend of the UK’s climate and a reduction in cold events (Kendon et al, 2021).

13.17.9 It is projected that winters may become increasingly milder, with minimum temperatures set to rise by over 4°C by 2099. Natural variations may mean that some cold and/or dry winters may still occur.



Heavier Rainfall

- 13.17.10 Heavy rainfall that may lead to flooding is hard to predict in the long term. A study has shown that an extended period of extreme winter rainfall in the UK is now about seven times more likely due to human-induced climate change (Christidis and Stott, 2015), although the largest changes in heavy rainfall since 1961 have occurred in Scotland and northern England.
- 13.17.11 The climate projections for the Site show there will be an increase in average winter precipitation (**Figure 1.6 in Appendix 13.2**).
- 13.17.12 While projections indicate a trend that summers will become dryer toward the end of the century, there is also evidence that summer rainfall events may become more intense when they do occur.

Low Rainfall and Drought

- 13.17.13 Droughts are natural events which occur when a period of low rainfall creates a shortage of water. The UKCP18 projections show a trend toward drier summers on average, although the uncertainties of these are wide ranging. Research on the influence of climate change on drought in the UK is limited and given the several different factors that influence droughts (meteorological, hydrological, and societal), it is challenging to identify whether drought events will become more common and prolonged in the future.

High Winds

- 13.17.14 On average throughout the year, near-surface wind speeds are projected to decrease. However, during the winter season, where more significant impacts of winds are experienced (Met Office, 2019), near-surface winds speeds are projected to rise towards the second half of the 21st Century.
- 13.17.15 However, these projections are modest compared to natural variability from month to month and season to season. Projections of future wind and storm occurrence and intensity are uncertain and confidence in projections is low. Research has shown that there are no compelling trends in maximum gust speeds over the last four decades (Kendon *et al.*, 2019) and therefore there is no evidence that link climate change and storms.
- 13.17.16 Due to the little evidence that storms may increase in frequency or severity as a result of climate change, likely significant effects resulting from storms and high winds are scoped out of further assessment.

Summary of Projected Climatic Changes

- 13.17.17 In summary, it is anticipated that the Proposed Development will experience the following climatic changes:
- An increase in average annual temperature
 - An increase in maximum temperature, particularly in the summer
 - An increase in winter rainfall
 - A reduction in summer rainfall
- 13.17.18 The projected climatic changes outlined above may have a direct impact on the Proposed Development, or result in secondary impacts which may impact the performance or integrity of the Proposed Development i.e. a 'climate hazard'. As a result of the projected climatic changes, there is an increased risk of:
- Long term changes to climate norms;



- Heatwaves;
- Low rainfall and drought; and
- Heavy rainfall and flooding.

13.18 Primary and Tertiary Mitigation

Primary Mitigation

Construction

13.18.1 No primary mitigation measures have been identified for the construction phase.

Operation

Flood Risk

13.18.2 The Proposed Development incorporates a Sustainable Drainage System (SuDS) to reduce flood risk on the Site. SuDS also helps to control the quality and quantity of surface water runoff conveyed to the local watercourses. Flows will be conveyed through a combination of swales and flow control devices. This will support the management of storm water during extreme rainfall events (sufficient storage for events up to and including the 1 in 100-year plus 40% climate change event will be provided) and can store rainwater for irrigation purposes. This provides additional water security, which is particularly important during periods of drought.

Ecology and Planting

13.18.3 Planting will be provided as shown on parameter plans, as shown in **Appendix 1.2**. The planting provides resilience in several ways, including reducing the urban heat island effect, sequestering carbon dioxide, providing shading for buildings and users of outdoor areas, and improving air quality.

Tertiary Mitigation

Construction

13.18.4 Health and safety for workers will be managed in accordance with relevant legislation and best practice. This will include the implementation of risk assessments for the Site to plan for sudden shifts in weather conditions or heat-related risks. It is expected that, with meeting legislation requirements, appropriate PPE and site safety measures will be implemented along with, for example, the provision of shelter and water for workers. These measures will be set out within a CEMP.

Operation

13.18.5 Part O (Overheating) of the Building Regulations came into effect in June 2022. Part O 2021 sets standards for overheating in new residential dwellings for internal thermal comfort, with the likely increases in temperature in the future in the UK.

13.18.6 As detailed in the Sustainability and Energy Statement (AES, 2025), the following measures will be incorporated within the Proposed Development:

- The layout incorporates substantial green space around the units, reducing the potential for heat build-up in external areas such as tarmac and dark roofs;
- Glazing specification considered to balance the requirements for useful winter solar gain with unwanted summer gain, assuming a g-value of 0.55 for residential units;



- Inclusion of mechanical ventilation where required to provide a consistent background air flow;
- The Proposed Development layout, orientation and massing has been considered to maximise useful passive solar gain; and
- All dwellings will benefit from cross-ventilation (dual-aspect) to remove warm air from the property.

Water Efficiency

- 13.18.7 Each new dwelling will minimise water usage to at least 110 litres/person/day, which is in line with the current national optional standards (Building Regulations Part G 2016 sets a standard of 125 litres/person/day, and an optional standard of 110 litres/person/day).

Infrastructure, Design, and Land Stability

- 13.18.8 Infrastructure such as ground cables and pipes may be affected by changes in climatic norms. Therefore, more maintenance and repair may be required on the Site in the future. The design of foundations and drainage within the Site will take into consideration the ground conditions and will be designed in accordance with UK standards for the soil type and condition found on Site. This will be managed at detailed design stage, where risk assessments will be undertaken to manage risks from future climate change in accordance with nationally accepted standards and guidance.

13.19 Assessment of Significant Likely Effects

Construction

- 13.19.1 Climate hazards have the potential to disrupt or delay the construction programme and affect suitable working hours due to unsafe conditions for workers and potential damage to equipment or works. The risk of climate hazards, for example from heatwaves or periods of heavy precipitation may increase during the construction period however it is expected that these will be managed through standard construction and health and safety practices outlined in the CEMP and required by legislation, such as securing material/equipment and not undertaking works during periods of extreme rainfall. The effect of climate change on the Proposed Development during the construction phase is therefore likely to be **Negligible and Not Significant**.

Operation

- 13.19.2 **Table 13.24** outlines the potential significant effects from climate on the identified receptors within the Proposed Development.



Table 13.24: Assessment of Significant Likely Effects

Climate Hazard	Receptor	Receptor Sensitivity	Potential Effect (with Primary and Tertiary Mitigation)	Significance
Long term changes to climate norms	Future users of the Site	Moderate to High	Increased temperatures and drier summers may affect human behaviour with, for example, an increase in outdoor activity. The Proposed Development includes open space which encourages outdoor activity. The warmer winters and reduced risk of cold snaps may have potentially positive outcomes for those with circulatory and respiratory impacts.	Negligible
	Infrastructure, including buildings and roads	Moderate	Infrastructure may require more maintenance and repair as changes to climatic norms may cause increased stress on, for example, below ground cables and pipes. This will be managed at the detailed design stage, where risk assessments will be undertaken to manage risks from future climate change in accordance with nationally accepted standards and guidance.	Negligible
	Ecology, landscaping and planting	Moderate	Warmer, drier summers and milder wetter winters are likely to have a long-term impact on species' ranges, potentially causing flora and fauna to relocate to more tolerable climate conditions. The changes in annual and seasonal averages may also impact the timing of seasonal biological activities, such as migrating birds. Climate change is understood to be having an effect on the migration patterns of some bird species, with 'short stopping' a recognised effect, whereby birds stop short of completing historical migrations because suitable foraging resources remain available closer to their breeding grounds. However, this is not expected to significantly influence or exacerbate the effects of the Proposed Development. Creation of a diversity of habitat opportunities will help faunal species better respond to climatic changes.	Minor Adverse
Heatwaves	Future users of the Site	Moderate to High	Increased frequency and intensity of heatwaves may adversely impact human health by increasing the risk of mortality and morbidity due to heat (NHS, 2012). Embedded mitigation in the design of the Proposed Development, for example the provision of open space will help to provide evaporative cooling at night. This will help to reduce the risk of building overheating and maintain thermal comfort during periods of extreme heat. The Proposed Development will also need to align with Part O (Overheating) of the Building Regulations, which sets standards for overheating in new residential dwellings for internal thermal comfort. This will help to reduce the risk of building overheating and maintain thermal comfort during periods of extreme heat.	Minor Adverse
	Infrastructure, including buildings and roads	Moderate	Extremes in temperatures have the potential to damage infrastructure, for example causing tarmac to soften, melt and be more susceptible to damage. As a result, additional maintenance and emergency repairs may be required. This will be managed at the detailed design stage, where risk assessments will be undertaken to manage risks from future climate change in accordance with nationally accepted standards and guidance	Negligible



Climate Hazard	Receptor	Receptor Sensitivity	Potential Effect (with Primary and Tertiary Mitigation)	Significance
	Ecology, landscaping and planting	Moderate	Increased frequency of extreme weather events such as heatwaves could change the type and structure of vegetation without the implementation of further mitigation.	Moderate Adverse
Low rainfall and drought	Future users of the Site	Moderate to High	Periods of low rainfall and drought have the potential to adversely affect public water supply. Each new dwelling will minimise water usage to at least 110 litres/person/day, which is in line with the current national optional standards. Water companies also have a statutory duty to maintain a secure water supply during a drought and to produce Water Resources Management Plans (WRMP), which consider climate change and drought	Negligible
	Infrastructure, including buildings and roads	Moderate	Reduction in rainfall could cause soil moisture deficits, which may affect soil stability. This may increase risk of damage to infrastructure. Soil conditions and ground water levels would be considered during the detailed design of the foundations which would be constructed in accordance with UK standards. It is considered that design guidance already allows for fluctuations in groundwater levels.	Negligible
	Ecology, landscaping and planting	Moderate	Increased frequency of low rainfall and droughts combined with higher average temperatures may adversely impact the productivity, function and structure of ecosystem services by, for example, causing an increase in erosion as soils and substrates dry out.	Moderate Adverse
Heavy rainfall and flooding	Future users of the Site	Moderate to High	Flooding has the potential to isolate future users of the Site, disrupt service provision, damage homes and increase risk to human health, in particular mental health. The Surface Water Drainage Strategy allows up to the 1 in 100 year plus 40% climate change event to be managed on Site. Therefore, the effect is considered to be negligible.	Negligible
	Infrastructure, including buildings and roads	Moderate	Increased precipitation during the winter and more intense rainfall events are likely to increase flood risk and surface water run-off. This could prevent the use of and/or damage infrastructure and also adversely affect water quality. The Surface Water Drainage Strategy allows up to the 1 in 100 year plus 40% climate change event to be managed on Site. Therefore, the effect is considered to be negligible.	Negligible
	Ecology, landscaping and planting	Moderate	Flooding has the potential to damage planting and habitats on Site, however the proposed drainage strategy will be designed to accommodate surface water flows.	Negligible



In-Combination Effects

- 13.19.3 There is potential for in-combination climate change effects to exacerbate other environmental effects identified in other topic chapters without mitigation. There is a need to deliver a co-ordinated approach to the climate change mitigation measures to provide climate resilience within the Proposed Development. It is considered that, with the implementation of the embedded mitigation measures identified in this Chapter and careful consideration of climate change mitigation and adaptation measures at the design stages, the effects identified within the topic chapters will not be exacerbated as a result of climate change. In-combination effects are therefore **Negligible** and **Not Significant**.

13.20 Secondary Mitigation and Enhancement

LEMP

- 13.20.1 A Landscape and Ecological Management Plan (LEMP) will be prepared for the Site and secured by way of a planning condition. Due regard should be given to the Natural England and RSPB Climate Change Adaptation Manual (2020) when preparing the LEMP, as well as Natural England's Carbon Storage and Sequestration by Habitat report (2021) and the British Ecological Society's nature-based solutions report (2021).
- 13.20.2 The LEMP should include consideration of the maintenance / management measures associated with onsite ecological networks and features that are to be retained, enhanced and created within the Proposed Development. This would increase the long-term resilience of habitats and species within the Site and managing areas that may be affected by droughts.
- 13.20.3 Selected species for the proposed planting within the Site should include those tolerant to higher temperatures, drought resistant, and need less irrigation. Ongoing management and supplementary planting with species more resistant to drier, hotter summers will also mediate any changes. This will increase resilience and reduce pressure on water supply during a drought.

Overheating

- 13.20.4 Approved Document Part O requires a more in-depth assessment of the risk of overheating, taking into account site location, residential unit orientation, glazing proportions, and operable window areas for natural ventilation. This assessment will be undertaken at the start of detailed design and any mitigation that may be required will be built in.

13.21 Residual Effects

- 13.21.1 Potential minor adverse effects to future users of the Site were identified resulting from heatwaves. Mitigating these effects beyond the further mitigation proposed is reliant on aspects outside of the scope of the Proposed Development, such as increasing the resilience of health services and availability of emergency services. Therefore, the likely effect remains **minor adverse** and **Not Significant**.
- 13.21.2 Potential moderate adverse effects were identified for ecology, landscaping and planting resulting from droughts, heatwaves, and changes to climatic norms. This would be managed through the implementation of a planting regime that considered climatic-changes and implementation of the LEMP. Following these further mitigation measures, the likely effect is therefore considered to be **minor adverse** and **Not Significant**.
- 13.21.3 All other potential effects identified in Table **13.24**. remain the same following further mitigation.



13.22 Cumulative Effects

13.22.1 There are no cumulative or inter-project climate vulnerability and resilience effects between the Proposed Development and other approved developments in the surrounding area, as the identified potential impacts and mitigation measures are specific to the Proposed Development.

13.23 Monitoring

13.23.1 Monitoring of the existing retained and proposed planting will be undertaken as part of the LEMP.

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14 Materials and Waste

14.1 Introduction

- 14.1.1 This chapter assesses the likely significant effects arising from the Proposed Development with respect to material resources and waste.
- 14.1.2 This 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 in combination with other developments.
- 14.1.3 This Chapter of the ES has been prepared by KaNect Limited. In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in **Appendix 1.3**.

14.2 Policy Context, Legislation, Guidance and Standards

National Legislation

- 14.2.1 Legislation considered relevant to the management of waste and of relevance to the Site includes:

The Animal By-Products (Enforcement) (England) (Amendment) Regulations 2015

- 14.2.2 Establish guidelines for the safe handling, disposal, and use of animal by-products (ABPs) not intended for human consumption. These regulations categorise ABPs into three risk levels, with specific disposal methods such as rendering, incineration, and use in biogas or composting plants. They also mandate proper transport and storage to prevent contamination and require businesses to maintain detailed records of ABP quantities, categories, and destinations. These measures are essential for protecting public and animal health, as well as the environment.

Clean Neighbourhoods and Environment Act 2005 (as amended)

- 14.2.3 Is a key piece of legislation aimed at enhancing local environmental quality and addressing anti-social behaviour. It empowers local authorities to manage household and commercial waste more effectively, including the collection, recycling, and disposal processes. The Act also includes measures to combat littering, fly-tipping, and illegal waste disposal, ensuring that waste is handled by registered carriers and disposed of legally. Additionally, it addresses issues related to graffiti, flyposting, and abandoned vehicles, contributing to cleaner and safer neighbourhoods. These provisions help minimise environmental impact and promote responsible waste management practices in both residential and commercial areas.

Control of Pollution Act (COPA) 1974 (as amended)

- 14.2.4 Is a foundational UK environmental law that established comprehensive regulations for managing pollution across various mediums, including air, water, and land. In terms of waste management, COPA introduced stringent controls over the disposal and handling of waste materials. It mandated proper licensing for waste disposal sites, set out responsibilities for waste producers and handlers, and empowered local authorities to enforce these regulations. These measures aimed to ensure safe and environmentally sound waste management practices, significantly reducing the risk of environmental contamination and promoting public health.



The Controlled Waste (England and Wales) (Amendment) (England) Regulations 2023

- 14.2.5 Define and classify waste as household, industrial, or commercial under the Environmental Protection Act 1990, setting out when local authorities may charge for collection and disposal, and specifying exemptions for certain premises and waste types

The Environment Act 2021 (as amended)

- 14.2.6 Legally binding targets for air and water quality, waste reduction, and wildlife conservation. The Act also establishes the Office for Environmental Protection (OEP) to oversee compliance and enforce environmental laws. Key provisions include measures to increase recycling, reduce plastic waste, and prevent the export of plastic waste to developing countries. Additionally, the Act introduces new rules to stop the import of commodities from areas of illegal deforestation and promotes biodiversity offsetting

Environmental Protection Act 1990 (as amended)

- 14.2.7 Is a cornerstone of UK environmental legislation, providing a comprehensive framework for waste management. It includes stringent requirements for the handling, storage, and disposal of waste to prevent environmental harm. Key provisions include the classification of controlled wastes, the establishment of a duty of care for those involved in waste management, and penalties for non-compliance. This Act ensures that waste is managed responsibly, reducing pollution and protecting public health

The Waste (England and Wales) Regulations 2011 (as amended)

- 14.2.8 Implement the EU Waste Framework Directive 2008/98/EC, establishing a comprehensive framework for waste management. These regulations mandate the application of the waste hierarchy, prioritising waste prevention, reuse, recycling, and recovery before disposal. They also require the development of waste prevention programs and management plans, ensuring that waste is handled in an environmentally responsible manner. By setting clear guidelines and responsibilities, these regulations aim to minimise waste's environmental impact and promote sustainable waste management practices

The Landfill Tax Regulations 1996 (as amended)

- 14.2.9 Were introduced to reduce the amount of waste sent to landfills by imposing a tax on waste disposal. This tax incentivises waste producers to seek alternative waste management methods, such as recycling, composting, and recovery, rather than relying on landfills. By financially discouraging landfill use, these regulations aim to promote more sustainable waste management practices and reduce environmental impacts associated with landfill sites

The Producer Responsibility Obligations (Packaging Waste) (Amendment) (England and Wales) Regulations 2023

- 14.2.10 Require businesses involved in the production, use, or handling of packaging to take responsibility for the environmental impact of their packaging waste. These regulations set annual recovery and recycling targets for various materials, such as glass, plastic, aluminium, steel, paper/board, and wood. Producers must register with an approved compliance scheme, report the amount of packaging they handle, and ensure a specified percentage is recovered and recycled. The aim is to minimise packaging waste sent to landfill and promote sustainable waste management practices

The Waste Batteries and Accumulators Regulations 2009 (as amended)

- 14.2.11 Aim to protect the environment by ensuring the proper collection, treatment, and recycling of batteries and accumulators. These regulations categorise batteries into automotive, industrial, and portable types, each with specific obligations for producers. Producers must register with



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the appropriate environmental regulator, report the tonnage and chemistry of batteries placed on the market, and join a Battery Compliance Scheme if they place more than one tonne of portable batteries annually. The regulations also mandate that producers provide free collection of waste batteries from end users and prevent batteries from being incinerated or dumped in landfills

The Waste Electrical and Electronic Equipment (WEEE) Regulations 2015 (as amended)

- 14.2.12 Aim to reduce the environmental impact of electrical and electronic equipment by promoting the collection, treatment, recycling, and recovery of WEEE. These regulations place financial responsibility on producers for managing the waste from products they place on the market. Key amendments include updates to definitions, obligations for producers, and the introduction of evidence notes for tracking WEEE. The regulations also ensure that very small WEEE is properly managed

The Hazardous Waste (England and Wales) Regulations 2005 (as amended)

- 14.2.13 Establish a comprehensive framework for managing hazardous waste to protect human health and the environment. These regulations define what constitutes hazardous waste, set out waste codes, and provide detailed guidelines for its proper handling, storage, transportation, and disposal. By ensuring that hazardous waste is managed safely and effectively, these regulations help prevent environmental contamination and promote responsible waste management practices

National Planning Policies

Ministry of Housing, Communities and Local Governments (MHCLG) National Planning Policy Framework (NPPF)

- 14.2.14 The revised National Planning Policy Framework (NPPF), published on 7 February 2025, outlines the government's planning policies for England and emphasises sustainable development across economic, social, and environmental objectives. It replaces earlier versions and encourages local communities to develop their own plans tailored to their specific needs. The NPPF also underscores the importance of waste management and resource efficiency, to be considered alongside guidance such as the National Planning Policy for Waste (2014) and the Waste Management Plan for England (2021).

Department for Levelling Up, Housing and Communities (DLHC) National Planning Policy for Waste

- 14.2.15 The National Planning Policy for Waste provides the planning framework to enable local authorities to put forward, through local waste management plans, strategies that identify sites and areas that are suitable for new or enhanced facilities to meet the waste management needs of their areas.

Department for Environment, Food & Rural Affairs (DEFRA) Waste Management Plan for England

- 14.2.16 The Waste Management Plan for England sets out strategies to achieve a zero-waste economy and meets legal obligations under both the Waste Framework Directive and the Waste (England and Wales) Regulations 2011. It reviews current waste practices and progress towards the directive's objectives.

DEFRA A Green Future: Our 25 Year Plan to Improve the Environment

- 14.2.17 Make sure that resources are used more efficiently and kept in use for longer to minimise waste and reduce its environmental impacts by promoting reuse, remanufacturing, and recycling. Works towards eliminating all avoidable waste by 2050 and all avoidable plastic waste by end of 2025.



DEFRA and Environment Agency (EA) Our Waste, Our Resources: A Strategy for England

- 14.2.18 Extended Producer Responsibility (EPR) makes producers responsible for their products after use, encouraging better product design for reuse and recycling. The Deposit Return Scheme (DRS) adds a small deposit to drink containers, refunded when returned for recycling. Proposed legislation also aims to standardise the set of recyclable materials collected across all local authorities and to require separate food waste collections, pending further consultation.

Regional and Local Planning Policies

Hertfordshire County Council (HCC) Waste Development Framework Waste Core Strategy & Development Management Policies Development Plan Document 2011-2026

- 14.2.19 The plan prioritises waste reduction, considers climate change impacts, and supports sustainable construction and demolition practices.

Technical Standards and Guidance

The Institute of Sustainability and Environmental Professional (ISEP) guide to: Materials and Waste in Environmental Impact Assessment (2020)

- 14.2.20 Aims to provide guidance on the concepts and considerations for assessing the environmental impacts and effects of materials and waste as part of the EIA process.

14.3 Consultation

- 14.3.1 To inform the scope and content of the ES, including the Materials and Waste chapter, consultation was undertaken following the Town and Country Planning (EIA) Regulations 2017. Formal engagement was held with the Local Planning Authority (LPA) SADC and the Waste Planning Authority (HCC Minerals and Waste Policy Team).
- 14.3.2 On 17 October 2024, the Waste Planning Authority confirmed that while the application site falls within the defined 'Sand and Gravel Belt', there are no known economically practical mineral deposits, and therefore no sterilisation concerns were raised.
- 14.3.3 However, with regards to waste, the Authority asked that the ES explicitly addresses Policy 12 of the Hertfordshire Waste Core Strategy and Development Management Policies (2012). This includes the preparation of a Site Waste Management Plan (SWMP) to maximise reuse and recovery and reduce off-site disposal. The LPA's Scoping Opinion dated 7 November 2024 (as provided in Appendix 5.2), formally scoped 'Waste' into the ES and noted that the Proposed Development had the potential to give rise to significant environmental impacts in this regard. It was confirmed that the ES must respond to the consultation responses and include a CEMP and SWMP, as recommended. The outcomes of this consultation have informed the structure of the assessment, the identification of likely significant effects, and the development of mitigation measures incorporated into the design and planning commitments of the Proposed Development.
- 14.3.4 Considering the above, this Material and Waste ES Chapter has been prepared.



14.4 Methodology

Study Area

14.4.1 The study area for the assessment of waste and materials comprises the Proposed Development site boundary. In addition, the study area encompasses the wider geographical context relevant to the sourcing of construction materials and the management of waste arisings, including local and regional waste management infrastructure (e.g. inert, non-hazardous and hazardous landfill) within the host LPA area and surrounding counties where applicable. The spatial extent has been defined to capture the full lifecycle of material use and waste flows, consistent with the requirements of the Waste (England and Wales) Regulations 2011 and informed by relevant guidance including the ISEP (guidance on Materials and Waste in EIA (2020)). This allows that both on-site activities and off-site capacity constraints are considered in evaluating potential significant effects on the waste management network and resource efficiency.

Baseline Data Collection

14.4.2 In line with the guidance provided within the ISEP document, this assessment pinpoints the environmental impacts tied to the use of material resources and the waste generated from the construction, demolition and excavation (hereafter referred to as construction) phases, as well as the operational phases of the Proposed Development. It also outlines the measures that will be put into action to mitigate these impacts.

14.4.3 The terms material resources and waste are explained in detail below:

- Material resources include primary raw materials, such as aggregates and minerals, and manufactured construction products which include recycled and secondary aggregates.
- Waste is defined in Article 1(a) of the European Waste Framework Directive 2008/98/EC as ‘any substance or object in the categories set out in Annex I which the holder discards or intends to discard or is required to discard’.

14.4.4 The ISEP guidelines require evaluating the impact of the Proposed Development on material consumption during both construction and operational phases, assessing material use in relation to national production levels. The main construction materials considered include steel various aggregates such as crushed rock land-won and marine sand and gravel cement concrete products, ready-mixed, asphalt and wood. These figures, sourced from industry and government reports, provide context for understanding the Proposed Development’s material requirements against national supply.

14.4.5 As per ISEP guidance, waste generation from construction and operation should be assessed against inert, non-hazardous, and hazardous landfill capacities. Landfill baseline data is based on the Environmental Agency’s 2023 figures for remaining capacity.

Assessment

Materials

14.4.6 To robustly evaluate the effects of the Proposed Development on material resources, a structured assessment methodology has been adopted. This approach considers both the availability and sensitivity of key construction materials, as well as the magnitude of potential impacts arising from material consumption throughout the project lifecycle. **Table 14.1** presents the classification system for determining the sensitivity of materials availability, while **Table 14.2** details the corresponding criteria for evaluating the magnitude of impact associated with material use.

Table 14.1: Sensitivity of materials availability



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Negligible	Low	Medium	High	Very High
Are forecast (through trend analysis and other information) to be free from known issues regarding supply and stock.	Are forecast (through trend analysis and other information) to be generally free from known issues regarding supply and stock.	Are forecast (through trend analysis and other information) to be suffer from some potential issues regarding supply and stock.	Are forecast (through trend analysis and other information) to suffer from known issues regarding supply and stock.	Are known to be insufficient in terms of production, supply and/or stock.

Table 14.2: Magnitude of Impact - material consumption

No Change	Negligible	Minor	Moderate	Major
Through a development, the consumption of no materials is required.	Through a development, the consumption of no individual material type is equal or greater than 1% by volume of the regional (where justified national) baseline availability.	Through a development, the consumption of one or more materials is between 1-5% by volume of the regional (where justified national) baseline availability.	Through a development, the consumption of one or more materials is between 6-10% by volume of the regional (where justified national) baseline availability.	Through a development, the consumption of one or more materials is >10% by volume of the regional (where justified national) baseline availability.

Waste

- 14.4.7 The following section provides an overview of the assessment criteria and sensitivity ratings applied to waste generation in relation to development activities. **Table 14-3** through **Table 14-6** outline thresholds for categorising the magnitude of potential impacts and the sensitivity of regional or national resources, including inert and non-hazardous and hazardous landfill void capacity.

Table 14.3: Sensitivity of waste - inert and non-hazardous landfill void capacity

Negligible	Low	Medium	High	Very High
The baseline (i.e., without development) of regional or national inert and non-hazardous landfill void capacity is expected to remain unchanged or is expected to increase through a committed change in capacity.	The baseline (i.e., without development) of regional or national inert and non-hazardous landfill void capacity is expected to reduce minimally: by <1% as a result of wastes forecast.	The baseline (i.e., without development) of regional or national inert and non-hazardous landfill void capacity is expected to reduce noticeably: by 1-5% as a result of wastes forecast.	The baseline (i.e., without development) of regional or national inert and non-hazardous landfill void capacity is expected to reduce considerably: by 6-10% as a result of wastes forecast.	The baseline (i.e., without development) of regional or national inert and non-hazardous landfill void capacity is expected to reduce very considerably (by >10%); end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand.



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Table 14.4: Sensitivity of waste - hazardous landfill void capacity

Negligible	Low	Medium	High	Very High
The baseline (i.e., without development) of regional or national hazardous landfill void capacity is expected to remain unchanged or is expected to increase through a committed change in capacity.	The baseline (i.e., without development) of regional or national hazardous landfill void capacity is expected to reduce minimally: by <0.1% as a result of wastes forecast.	The baseline (i.e., without development) of regional or national hazardous landfill void capacity is expected to reduce noticeably: by 0.1-0.5% as a result of wastes forecast.	The baseline (i.e., without development) of regional or national hazardous landfill void capacity is expected to reduce considerably: by 0.5-1% as a result of wastes forecast.	The baseline (i.e., without development) of regional or national hazardous landfill void capacity is expected to reduce very considerably (by >1%); end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand.

Table 14.5: Magnitude of impact – inert and non-hazardous landfill void capacity

No Change	Negligible	Minor	Moderate	Major
Zero waste generation and disposal from the development.	Waste generated by the development will reduce regional (where justified national) void landfill void capacity baseline by <1%.	Waste generated by the development will reduce regional (where justified national) void landfill void capacity baseline by 1-5%.	Waste generated by the development will reduce regional (where justified national) void landfill void capacity baseline by 6-10%.	Waste generated by the development will reduce regional (where justified national) void landfill void capacity baseline by >10%.

Table 14.6: Magnitude of impact - hazardous landfill void capacity

No Change	Negligible	Minor	Moderate	Major
Zero waste generation and disposal from the development.	Waste generated by the development will reduce national landfill void capacity baseline by <0.1%	Waste generated by the development will reduce national landfill void capacity baseline by 0.1-0.5%	Waste generated by the development will reduce national landfill void capacity baseline by <0.5-1%	Waste generated by the development will reduce national landfill void capacity baseline by >1%

Significance of Effects

- 14.4.8 The threshold and significance of effects due to material resources and waste arisings during the construction and operational phases of the Proposed Development have been assessed against the criteria provided in **Table 14-7 - Table 14-8** below.



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Table 14.7: Threshold of effects

Sensitivity Receptor	Magnitude of impact					
		No Change	Negligible	Minor	Moderate	Major
	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
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Table 14.8: Significance of Effect

Effect	Materials	Waste
Neutral	Not significant	Not significant
Slight		
Moderate	Significant	Significant
Large		
Very large		

Limitations

- 14.4.9 This section outlines the current limitations and assumptions associated with the assessment of material use, construction waste, and operational waste arisings for the Proposed Development.

Material

- The application is currently at the outline stage, so specific details regarding construction materials are not yet available.
- Preliminary estimates have been made based on comparable projects of similar scale and type.
- These details will be updated as further information becomes available.

Construction:

- Construction methodologies, material specifications, and phasing details have not yet been confirmed.
- The assessment of construction waste arisings is therefore based on high-level assumptions.
- As a result, the estimated quantities of construction waste are indicative only.
- These estimates may change once detailed information on material procurement, construction techniques, and site logistics becomes available.



Operational

- The Proposed Development is evolving, including potential changes to unit layouts, uses, and final occupancy arrangements.
- Accordingly, the information regarding the management of waste and recycling materials is indicative at this stage.
- The estimated volumes of operational waste and recycling arisings presented in this assessment are subject to change.
- Any variation in final design or usage patterns may affect the actual quantum of waste generated during the operational phase.

14.5 Baseline Conditions

The Site and Surrounding Area

Materials

- 14.5.1 The ISEP guidelines stipulate that the impact of the Proposed Development on materials during the construction and operational phases should be evaluated in relation to material availability and consumption.
- 14.5.2 **Table 14.9** below provides the UK material production figures per annum for the main construction materials.

Table 14.9: Material production figures – national

Material	UK production	Source
Steel	Approximately 5.6 million tonnes.	Make.uk – Key Statistic Guide May 2024
Aggregate - Crushed Rock	148.2 million tonnes.	Profile_of_the_UK_Mineral_Products_Industry_2023.pdf
Aggregate – Sand & Gravel – land won	47.7 million tonnes.	
Aggregate – Sand & Gravel – marine	14.3 million tonnes	
Cement	9 million tonnes.	
Concrete Products	24.8 million tonnes.	
Ready-Mixed Concrete	52.7 million tonnes.	
Asphalt	28.3 million tonnes.	
Wood	Approximately 9.8 million tonnes.	UK Forest Research – Key Points for 2023.



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Waste

- 14.5.3 In accordance with the ISEP guidance, the effects of the Proposed Development during the construction and operational phases, resulting from waste generation, should be evaluated against the capacity of inert, non-hazardous, and hazardous landfill.
- 14.5.4 To establish a baseline for landfill void capacity, data from the EA on the remaining landfill capacity for 2023 has been used.
- 14.5.5 **Table 14.10** below provides information on the remaining regional (i.e., Hertfordshire) landfill capacity for inert landfills.
- 14.5.6 At this stage, Hertfordshire doesn't operate any non-hazardous landfill, as most of the non-hazardous waste is exported out to different counties such as East of England, London and South East. Therefore, the non-hazardous waste (Household, Commercial and Industrial (HIC)) will be assessed against the remaining landfill void capacities in the other counties, which are provided in **Table 14.11**.
- 14.5.7 **Table 14.12** provides information on the remaining national landfill capacity for hazardous landfills.

Table 14.10: Regional remaining landfill (inert) capacity

Facility name	Site type	Remaining capacity (end 2023) m ³
Tytenhanger Landfill Site	L05 - Inert Landfill	4,978,396
Hatfield Quarry (Cut Field)	L05 - Inert Landfill	20,000
Hatfield Aerodrome - Inert Landfill, Waste Treatment & Mining Waste Operations	L05 - Inert Landfill	1,559,250
Panshanger Quarry	L05 - Inert Landfill	364,048
Stanboroughbury Quarry	L05 - Inert Landfill	450,000
Total		7,371,694

Table 14.11: Remaining landfill (non-hazardous) capacity

Facility Name	Location	Site Type	Remaining Capacity (end of 2023) m ³
Thalia waste management park	East of England	L04 - Non Hazardous	1,597,401
Aldeby landfill	East of England	L04 - Non Hazardous	29,137
Src martells quarry	East of England	L04 - Non Hazardous	1,327,973
Eye north eastern landfill	East of England	L04 - Non Hazardous	80,000
Calvert landfill site - pit 6	South East	L04 - Non Hazardous	4,720,373
Blue haze landfill	South East	L04 - Non Hazardous	362,395
Barrington works landfill	East of England	L04 - Non Hazardous	8,184,782
Milton landfill	East of England	L04 - Non Hazardous	112,147



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Facility Name	Location	Site Type	Remaining Capacity (end of 2023) m ³
March landfill site	East of England	L04 - Non Hazardous	963,629
Sutton courtenay	South East	L04 - Non Hazardous	1,364,137
Dix pit landfill site	South East	L04 - Non Hazardous	182,617
Grunty fen landfill site	East of England	L04 - Non Hazardous	232,449
Feltwell landfill site	East of England	L04 - Non Hazardous	1,204,035
Rainham landfill	London	L04 - Non Hazardous	1,169,423
Pitsea landfill	East of England	L04 - Non Hazardous	100,000
Finmere quarry landfill	South East	L04 - Non Hazardous	30,000
Silt Lagoons, Rainham and Wennington Marshes	London	L04 - Non Hazardous	2,290,540
Tilbury ash disposal site	East of England	L04 - Non Hazardous	145,455
Blackborough end landfill (green land)	East of England	L04 - Non Hazardous	2,246,686
Witcham meadlands landfill	East of England	L04 - Non Hazardous	190,000
Elsenham landfill	East of England	L04 - Non Hazardous	814,141
Bellhouse landfill site	East of England	L04 - Non Hazardous	1,312,968
Ockendon area ii & iii landfill	East of England	L04 - Non Hazardous	3,288,928
Buckden landfill site	East of England	L04 - Non Hazardous	780,383
Elstow south - epr/sp3100sr	East of England	L04 - Non Hazardous	2,500,000
Sutton courtenay (phase 3) landfill site	South East	L04 - Non Hazardous	410,829
Standen heath landfill site	South East	L04 - Non Hazardous	141,403
Beddington farmlands landfill site	London	L04 - Non Hazardous	483,220
Ruislip southern sustainable placement s2	London	L04 - Non Hazardous	194,428
Springfield farm landfill	South East	L04 - Non Hazardous	8,384,985
Shelford landfill site	South East	L04 - Non Hazardous	852,931
Total			45,697,395



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Table 14.12: Remaining landfill (hazardous) capacity – national

Facility Name	Location	Site Type	Remaining Capacity (end of 2023) m ³
Winsford rock salt mine waste disposal facility	North West	L01 - Hazardous Merchant Landfill	1,352,224
Randle landfill site	North West	L01 - Hazardous Merchant Landfill	95,955
Wingmoor farm	South West	L01 - Hazardous Merchant Landfill	120,512
Port Clarence landfill Site (Haz)	North East	L01 - Hazardous Merchant Landfill	2,015,000
Eardswick hall landfill site	North West	L01 - Hazardous Merchant Landfill	19,690
Pinden quarry	South East	L01 - Hazardous Merchant Landfill	73,034
Minworth landfill	West Midlands	L06 - Hazardous Restricted Landfill	195,048
Winterton south landfill	Yorkshire & the Humber	L01 - Hazardous Merchant Landfill	466,320
Whitemoss landfill	North West	L01 - Hazardous Merchant Landfill	1,541,993
Ici no 3 teesport	North East	L01 - Hazardous Merchant Landfill	1,776,662
Southam landfill	West Midlands	L06 - Hazardous Restricted Landfill	340,000
Parkgate Farm Hazardous waste landfill	South West	L01 - Hazardous Merchant Landfill	218,613
East northants resource management facility	East Midlands	L01 - Hazardous Merchant Landfill	2,000,000
Norwood farm landfill (east)	South East	L06 - Hazardous Restricted Landfill	159,742
Total			10,374,793

Baseline Evolution

- 14.5.8 In accordance with the EIA Regulations, this section considers the likely evolution of the baseline conditions in relation to materials and waste in the absence of the Proposed Development. This 'no development' scenario includes consideration of committed developments, as well as relevant sector trends and policy context.
- 14.5.9 At the time of writing, one committed development has been identified within the vicinity of the Site that may influence the future baseline: Land at Cooters End Lane and Ambrose Lane, Harpenden, Hertfordshire (planning reference: 5/2023/0327), which is anticipated to deliver approximately 550 residential dwellings.
- 14.5.10 No publicly available data has been identified on the types or quantities of construction materials that will be required for this committed scheme. However, given the scale of the scheme, it is considered reasonable to assume that the material demand will not exceed 1% of total national material availability. In accordance with the criteria set out in Table 1, the sensitivity of material resources is assessed to be **high**, taking into account ongoing pressures on domestic supply and recent reductions in UK material imports.



- 14.5.11 Applying the thresholds in **Table 14-2**, the magnitude of impact on material resources associated with the committed scheme is considered to be **negligible**. Using the assessment methodology provided in **Table 14-7** (Threshold of Effect), this results in an effect of **slight significance**. As such, and in line with the criteria in **Table 14-8** (Significance of Effect), the impact of material consumption from the committed development is considered to be **not significant**.
- 14.5.12 Although the quantitative effect of this single committed development is low, it is acknowledged that cumulative pressures on the regional waste network and landfill capacity are expected to increase in the medium to long term. These pressures are likely to be driven by new housing growth, infrastructure investment, and continued limitations on void space due to planning constraints. Accordingly, the sensitivity of landfill infrastructure is designated as **high**.
- 14.5.13 While no data is currently available on demolition or excavation quantities associated with the committed development, it is anticipated that opportunities for the reuse and recycling of materials will be explored. For example, suitable concrete arisings (if present) may be crushed and reused as fill material, and excavated soils could be reused in landscaping or for general filling purposes. Such practices would align with national waste hierarchy principles and standard industry practice.
- 14.5.14 To estimate waste arisings during the construction phase, it is assumed that all residential units will be two-bedroom dwellings with an average floor area of 79 m². Using an indicative construction cost benchmark of £2,450/m², the total construction cost is estimated to be approximately £106.5 million. Based on WRAP's good practice benchmarks for construction waste intensity (reflecting schemes seeking higher BREEAM credits), this equates to an estimated 3,200 tonnes of construction waste.
- 14.5.15 Operational waste arisings are estimated using guidance published by SADC for flatted developments. Assuming all 550 units are flats, the scheme is expected to generate approximately 936 tonnes of municipal waste per annum once fully occupied.
- 14.5.16 From a capacity perspective, the evolution of the baseline must also reflect the availability of waste infrastructure i.e., landfill. As provided in **Table 14-10**, the available void capacity for inert landfill is approximately 7.37 million tonnes, and for non-hazardous landfill, approximately 45.7 million tonnes (as provided in **Table 14-11**). The construction waste arising from the committed development (approx. 3,200 tonnes) represents just 0.04% of the inert void capacity, while operational waste represents just 0.002% of the non-hazardous void.
- 14.5.17 As per the criteria provided in **Table 14-5**, both waste streams are considered to exert a **negligible** impact on landfill infrastructure. Given the limited influence of these quantities and applying the threshold matrix in **Table 14-7**, the resulting effect is considered **slight**, which is assessed as **not significant** under the classification in **Table 14-8**.

14.6 Primary and Tertiary Mitigation

Primary Mitigation

Materials

- 14.6.1 To minimise the environmental impacts associated with materials consumption, a suite of primary mitigation measures will be embedded into the design and procurement strategy of the Proposed Development. Sustainability targets, including resource efficiency objectives, will be formally incorporated into all relevant procurement documentation and contractor requirements. These will include provisions for monitoring and reporting, enabling early and ongoing assessment of compliance.
- 14.6.2 Contractors will be required to implement responsible sourcing practices through alignment with the BES 6001 certification scheme, which provides a recognised framework for the



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evaluation of organisational governance, supply chain management, and environmental and social sustainability in construction products. This approach allows that materials are sourced from suppliers with independently verified sustainability credentials, thereby reducing embedded environmental impacts across the supply chain (BRE Group, 2021).

- 14.6.3 All timber and timber-based products used during construction and operation will be procured from legal and sustainable sources. Materials will be specified to meet the requirements of internationally recognised certification schemes, including those accredited by the Forest Stewardship Council (FSC), the Programme for the Endorsement of Forest Certification (PEFC), or those covered by the EU Forest Law Enforcement, Governance and Trade (FLEGT) licensing system. This aligns with the UK Government Timber Procurement Policy (DEFRA, 2022) and will be a condition of material approval and supply.
- 14.6.4 Material selection during the design and specification phase will take into account the depletion of finite natural resources (e.g. aggregates, sands, and minerals). Products and components will be chosen based on their environmental performance, durability, embodied carbon content, and potential for reuse or recycling. This will include evaluation of lifecycle impacts in accordance with the principles of BS EN 15978 (Sustainability of construction works – Assessment of environmental performance of buildings) and BS 8895 (Designing for material efficiency in building projects).
- 14.6.5 Wherever technically and economically feasible, construction materials will incorporate quantifiable levels of recycled content. Specifications will require suppliers to disclose and verify recycled input percentages in accordance with the Waste and Resources Action Programme (WRAP) Quality Protocol and PAS 2050 where relevant, thereby reducing the demand for virgin material extraction and associated emissions.

Construction Waste

- 14.6.6 A detailed Site Waste Management Plan (SWMP) will be prepared by the Principal Contractor prior to commencement of construction. This will build upon the Outline SWMP submitted in support of the planning application. The SWMP will set out a site-specific framework for waste minimisation, segregation, reuse, recycling, and lawful disposal. Primary mitigation measures anticipated at this stage are summarised below.

Resource Efficiency

- 14.6.7 During construction, the Principal Contractor will implement best-practice resource efficiency measures, including:
- Participating in return schemes for timber pallets and racking systems.
 - Consolidating material deliveries to minimise packaging and reduce vehicle trips.
 - Exploring the use of reusable or sustainable transit packaging solutions.
- 14.6.8 To reduce material waste:
- Procurement will be limited to quantities that reflect actual site requirements.
 - Where practicable, prefabricated or pre-cut materials will be specified to reduce off-cuts and on-site wastage.
 - Materials will be stored in designated, secure areas away from vehicle routes to minimise accidental damage.
 - Items will be stored on pallets or raised platforms to avoid contact with standing water.
 - Materials will be protected from weather exposure using sheeting or suitable coverings.



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- Surplus materials will be considered for donation to reuse charities, such as Community Wood Recycling schemes.
- The use of reclaimed or recycled materials will be prioritised, subject to compliance with design specifications.
- Opportunities for on-site reuse of excavated or demolition materials will be maximised to reduce imported material needs and associated transport impacts.

Waste Segregation, Storage, and Handling

14.6.9 All waste generated on-site will be managed in line with the waste hierarchy and legal duty of care obligations. Specific measures include:

- Establishing a clearly signed waste storage compound, containing containers for segregated waste streams.
- Using ICE colour-coded containers to aid visual compliance and promote correct segregation.
- Securing containers with lids or sheeting to prevent windblown litter and access by pests.
- Positioning waste storage areas away from watercourses, drainage infrastructure, and sensitive receptors.
- Ensuring ease of access for construction personnel and waste collection contractors.
- Labelling all containers with appropriate signage and material-specific stickers.
- Preventing contamination or degradation of waste by keeping containers dry and protected from on-site water sources.
- Conducting regular site inspections to check for litter, leaks, or damaged containers.
- Segregating waste into hazardous, non-hazardous, and inert categories with appropriate documentation.
- Keeping material stockpiles sorted by type to facilitate reuse or recycling.
- Prohibiting waste storage within 10 metres of any controlled watercourse, borehole, spring, or drainage system.

Additional Measures

14.6.10 The following supplementary measures will also be implemented to ensure high environmental performance:

- Appointing a Waste Champion or Environmental Manager to oversee waste management compliance on-site.
- Delivering toolbox talks and inductions to all site staff and subcontractors to reinforce the importance of correct waste handling and segregation.
- Maintaining up-to-date waste transfer documentation and ensuring that all waste carriers and disposal sites are appropriately licensed.
- Monitoring and reporting waste generation rates and recovery performance in accordance with the final SWMP.



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- Reviewing waste management performance regularly as part of the Principal Contractor's site environmental management procedures.

Operation Waste

- 14.6.11 A comprehensive Operational Waste and Recycling Management Strategy (OWRMS) has been prepared to support the planning application. This outlines the measures that will be implemented to ensure that operational waste is managed in accordance with the Waste Hierarchy, relevant legislation, and best practice, including the Waste (England and Wales) Regulations 2011 (as amended), British Standard BS 5906:2005, and Part H6 of the Building Regulations.
- 14.6.12 The Proposed Development will promote a circular approach to operational waste management by integrating a range of embedded measures. These include the provision of adequate storage capacity to support source segregation, regular collection in line with local authority and commercial waste management schedules, and the facilitation of recycling and landfill diversion, with targets aiming for $\geq 65\%$ recycling and $\geq 95\%$ diversion from landfill across all uses. These measures are consistent with the principles of the Circular Economy.
- 14.6.13 Dedicated internal and external waste storage facilities will be provided across the development to accommodate the forecasted volumes of municipal and commercial waste. These have been designed in accordance with SADC guidance, ensuring operational efficiency, accessibility, and compliance with relevant health, fire, and safety standards. For the residential component, all houses will utilise kerbside collection, while flats will be serviced from dedicated bin stores located within 30 m of all units and within 10 m of the collection vehicle access points.
- 14.6.14 Provision will also be made for the management of bulky waste, unique waste streams (e.g. WEEE, paints, oils), and where relevant, hazardous waste, with storage infrastructure and access arrangements designed to allow for safe handling and lawful disposal via licensed contractors.
- 14.6.15 For commercial units, temporary bin storage will be accommodated within each tenant's curtilage, and collection will be arranged on a weekly basis (or as otherwise agreed) with operatives able to access bins within 10 m of a refuse collection vehicle stopping point. Operational waste collection arrangements will be refined and confirmed through future updates to the OWRMS as more detail becomes available during the detailed design phase.

Tertiary Mitigation

Materials

- 14.6.16 Material consumption during construction and operation will be managed in accordance with established legal and regulatory requirements, industry codes of practice, and standardised environmental management procedures. Compliance with the Waste (England and Wales) Regulations 2011 will ensure that materials are used efficiently and the waste hierarchy is applied during procurement and site operations.
- 14.6.17 In accordance with the Construction (Design and Management) Regulations 2015 construction teams will ensure that materials are safely handled, stored, and protected from damage or degradation, thereby minimising unnecessary consumption and loss. Environmental management procedures aligned with ISO 14001 will be implemented via the contractor's Environmental Management System (EMS), which includes control measures for the monitoring of material use and reporting of environmental performance.
- 14.6.18 Additionally, construction activities will be subject to regular site audits and toolbox talks, which will reinforce best practice in material efficiency, handling, and stock control.



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Construction Waste

- 14.6.19 Standard construction-phase environmental controls will be secured through the preparation and implementation of a Construction Environmental Management Plan (CEMP). The CEMP will be prepared by the Principal Contractor and approved by the LPA prior to commencement of works. It will incorporate a range of procedures relevant to materials and waste management.
- 14.6.20 The CEMP will build upon the submitted Outline SWMP and will include measures to ensure legal compliance with the duty of care, minimise waste generation, and promote reuse and recycling where practicable. This may include protocols for waste segregation, secure on-site storage, and appropriate disposal through licensed carriers.
- 14.6.21 Site personnel will be provided with basic training or toolbox talks, as appropriate, to ensure awareness of waste management procedures. Clear signage will be used to support compliance with segregation and handling protocols.
- 14.6.22 The CEMP will also include general measures to reduce the risk of pollution, nuisance, and material loss, such as locating storage away from sensitive areas, maintaining containers in good condition, and undertaking regular site inspections.
- 14.6.23 All mitigation will be proportionate to the nature and scale of construction activities and will reflect good industry practice and relevant regulatory requirements in place at the time of construction.

Operation Waste

- 14.6.24 No tertiary mitigation measures are considered necessary for operational materials and waste. The design incorporates appropriate infrastructure and management controls, as detailed in the OWRMS, to ensure ongoing compliance and minimise environmental effects.

14.7 Assessment of Significant Likely Effects

Materials

- 14.7.1 As per the Building Materials and Components statistics for April 2024 it is noteworthy that the overall import of construction materials in 2023 has decreased compared to 2022. This could be attributed to a national decrease in construction activities. Despite this, the UK continues to import a substantial quantity of construction materials. Given this context, Materials is assigned a **high sensitivity**.
- 14.7.2 Due to the unavailability of information on the types and quantities of materials required during the construction phase of the Proposed Development, considering the extent and nature of the Proposed Development, it is envisioned that the materials required during the construction will be less than 1% of the material availability. Thus, considering this rationale, the impact magnitude attributed to material consumption is considered to be **negligible**.
- 14.7.3 By applying the threshold determination criteria outlined in Table 7, it is observed that the effect threshold is classified as **slight**. Hence, by utilising the significance determination criteria from Table 8, the significance of the effect on materials is deemed to be **not significant**.

Construction

Construction Waste

- 14.7.4 Construction waste quantities have been estimated using a bespoke tool informed by BRE SmartWaste data and benchmarks published by the Construction Resources and Waste Platform (CRWP)



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- 14.7.5 While precise figures are difficult to determine at this stage, the estimates reflect typical waste generation patterns, accounting for material over-ordering and handling losses. The Proposed Development comprises a mixed-use scheme including residential, commercial, education, and healthcare uses, and waste arisings will vary depending on construction methods and material choices.
- 14.7.6 It is understood that currently the Site is occupied by an equestrian centre, which includes associated domestic houses. To estimate the demolition waste arising, a bespoke demolition tool has been used, that estimates the quantities of waste based on the type of construction and the dimensions of the buildings. As no measured survey has been undertaken at this stage, the dimensions of the buildings have been estimated using online measuring tools (such as google earth.).
- 14.7.7 Based on the information provided on the extent of the buildings, it is estimated that the demolition activities will result in the generation of approximately 7,876 tonnes of waste.
- 14.7.8 It is noted from the asbestos report (Management Survey for Asbestos-Containing Materials (ETON, September 2022) that there might be some areas in the existing buildings of the Site, that have shown the presence of asbestos containing materials (ACM). Although the exact tonnages of ACM is unknown, however, based on the extent provided in the asbestos report, it is estimated that approximately 13% of the total existing building might contain ACM. Therefore, applying the same percentage to the total demolition waste, only 77% of the demolition waste will be assessed against the inert landfill void capacity, whereas the remaining 13% of the demolition waste will be assessed against the hazardous landfill void capacity.
- 14.7.9 Given the outline stage of the application, precise details regarding excavation works such as the removal of topsoil and subsoil are not yet available. However, it is currently estimated that approximately 19,000 m² of hardstanding exists on-site, which is anticipated to be removed. To date, no site surveys have been conducted to determine the exact thickness of the hardstanding; therefore, an approximate thickness of 0.3 m has been assumed. Based on these assumptions, it is projected that around 11,400 tonnes of surplus material will be generated on-Site.
- 14.7.10 While the final management methods for this excess material have yet to be confirmed, it is understood that the design team intends to achieve a balanced cut-and-fill across the Site. Nevertheless, for the purposes of a conservative assessment, it has been assumed that all excess materials will be disposed of off-Site.
- 14.7.11 **Table 14-13** provides the estimated quantities of waste that could be generated during the construction phase.

Table 14.13: Quantities of inert and non-hazardous waste arising during construction activities

Activity	Quantity (tonnes)
Construction	5,241.6
Demolition (including ACM)	7,876
Excavation	11,400
Total	24,517.6

- 14.7.12 Owing to the restricted land availability in England, the sensitivity for waste i.e., the inert and non-hazardous landfill void capacity is designated as **high**.
- 14.7.13 **Table 14-14** conducts an evaluation of the inert waste generated during the construction phases of the Proposed Development against the accessible inert landfill void capacity (as illustrated in **Table 14-10**). This will ascertain the magnitude of impact of non hazardous and inert construction waste on the inert landfill void capacity.



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Table 14.14: Magnitude of Impacts - inert and non-hazardous construction waste

Waste activity	Potential quantity in tonnes (A) (Excluding hazardous waste)	Landfill void capacity (B)	Percentage (A/B x 100)
Construction	24,517.6 tonnes.	7,371,694 tonnes.	0.3%

14.7.14 As observed from **Table 14-14**, the quantities of inert waste generated during the construction phase of the Proposed Development constitute less than 0.3% of the available inert landfill void capacity. Therefore, the magnitude of impact assigned to landfill void capacity for all waste types (including inert) arising from the construction phases of the Proposed Development is deemed **negligible**.

14.7.15 Utilising the criteria provided in **Table 14.7** it is observed that the effect threshold for regional inert landfill void capacity is **slight**. Therefore, using the criteria provided in **Table 14.8**, the significance of the effect for inert waste generated during the construction phases of the Proposed Development is determined to be **not significant**.

14.7.16 **Table 14.15** provides an evaluation of the hazardous waste generated during the demolition activities of the Proposed Development against the available hazardous landfill void capacity (as shown in **Table 14.12**). This will ascertain the magnitude of impact of hazardous demolition waste on the hazardous landfill void capacity.

Table 14.15: Magnitude of Impacts - hazardous demolition waste

Waste activity	Potential quantity in tonnes (A)	Landfill void capacity (B)	Percentage (A/B x 100)
Hazardous – Demolition	1,024 tonnes.	10,374,793 tonnes.	0.01%

14.7.17 As observed from **Table 14.15**, the quantities of hazardous waste generated during the construction phase of the Proposed Development constitute less than 0.1% of the available hazardous landfill void capacity. Therefore, the magnitude of impact assigned to landfill void capacity for hazardous waste arising from the construction phases of the Proposed Development is deemed **negligible**.

14.7.18 Utilising the criteria provided in **Table 14-7**, it is observed that the effect threshold for national hazardous landfill void capacity is **slight**. Therefore, using the criteria provided in **Table 14-8**, the significance of the effect for hazardous waste generated during the construction phases of the Proposed Development is determined to be **not significant**.

Operation

14.7.19 The operational waste and recycling material quantities arising from the Proposed Development are calculated using the methodology provided by SADC in their guidance document 'Waste and Recycling; Storage and Collection Guidance'

14.7.20 **Table 14.16** provides the estimated quantities of waste that could be generated during the operational phase.

Table 14.16: Quantities of Operational Waste

Waste Type	Quantity (tonnes/annum)
Mixed Dry Recyclables (MDR) including Cans, Plastics, Glass, Paper and Cardboard	357



Waste Type	Quantity (tonnes/annum)
Food	357
Residual	360
Total	1,074
The following densities have been used: MDR: 0.07 kg/L, Food: 0.5 kg/L, Residual: 0.08 kg/L, Cans, Plastics and Glass: 0.03 kg/L and Paper and Cardboard: 0.11 kg/L.	

14.7.21 **Table 14.17** conducts an evaluation of the non-hazardous waste generated during the operational phase of the Proposed Development against the accessible non-hazardous landfill void capacity (as illustrated in **Table 14.11**). This will ascertain the magnitude of impact of waste on the non-hazardous waste on the landfill void capacity.

Table 14.17: Magnitude of Impacts – operational waste

Waste Type	Potential quantity in tonnes (A)	Landfill void capacity (B)	Percentage (A/B x 100)
Operational	1,074 tonnes.	45,697,395 tonnes.	0.002%

14.7.22 As observed from **Table 14.17**, the quantities of non-hazardous waste generated during the operational phase of the Proposed Development constitute less than 1% of the available non-hazardous landfill void capacity. Therefore, the magnitude of impact assigned to landfill void capacity for all waste types (non-hazardous) arising from the operational phases of the Proposed Development is deemed **negligible**.

14.7.23 Utilising the criteria provided in **Table 14.7** it is observed that the effect threshold for non-hazardous landfill void capacity is **slight**. Therefore, using the criteria provided in **Table 14.8**, the significance of the effect for non-hazardous waste generated during the operational phase of the Proposed Development is determined to be **not significant**.

14.7.24 At this stage, it is to be noted that no hazardous waste will be generated during the operational phases, therefore assessment against the hazardous landfill void capacity is not required.

14.8 Secondary Mitigation and Enhancement

Materials

- 14.8.1 Operational measures will be implemented during construction to reduce material wastage arising from over-ordering, on-Site damage, and inefficient storage. This will include the adoption of 'just-in-time' delivery principles, supported by detailed logistics planning to optimise delivery schedules, storage capacity, and handling procedures. These measures will be formalised through the SWMP and CEMP and will be subject to Site monitoring during the construction phase.
- 14.8.2 Where feasible, consideration will be given to the use of reclaimed, reused, or remanufactured materials from external or on-Site sources, subject to compliance with specification, safety, and quality requirements. Opportunities for sourcing materials from local suppliers will also be reviewed to reduce transportation impacts and support regional supply chains. These actions will be undertaken where practicable and do not form an embedded design commitment.

Construction Waste

- 14.8.3 To support the delivery of the measures set out in the Outline SWMP, a Detailed SWMP will be prepared and submitted to the LPA or retained on-Site by the Principal Contractor prior to commencement of construction. This document will reflect the final construction programme, phasing, materials quantities, and trade contractor responsibilities, and will set out how waste targets will be monitored, reported, and adjusted throughout the works. The need for this



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updated plan may be secured by a suitably worded planning condition or through contractual requirements.

- 14.8.4 Prior to the start of any demolition or excavation activity, a Pre-construction Waste Audit will be undertaken (if relevant) to identify materials suitable for recovery, reuse, or diversion from landfill. This process will inform Site-specific targets and will be secured either via planning condition or as a requirement of the contractor's environmental management procedures.
- 14.8.5 A protocol will be established for the regular review and update of the SWMP, including the reporting of material recovery rates and waste carrier performance. This will ensure the SWMP remains a live document and is used to inform Site operations rather than being static. Updates may be provided to the planning authority upon request or retained in the project's environmental compliance file.
- 14.8.6 In order to achieve effective implementation of the SWMP and CEMP requirements, it is anticipated that roles and responsibilities for waste management will be formalised within the Principal Contractor's construction phase plan.
- 14.8.7 If agreed with the client, further enhancement measures may be adopted to support planning acceptability, such as:
- Participation in the Considerate Constructors Scheme, with a focus on waste minimisation scoring;
 - Implementation of Site-based reuse initiatives (e.g. reclaimed timber for hoarding);
 - Inclusion of social value initiatives, such as donation of surplus materials to local reuse charities.

Operation Waste

- 14.8.8 Secondary mitigation is proposed in the form of post-consent management measures. These measures are necessary to achieve the anticipated outcomes of high levels of recycling and landfill diversion, and to reduce any residual operational effects on the local waste management network.
- 14.8.9 A condition will be sought to secure an updated Detailed OWRMS prior to occupation. This document will build on the Outline Strategy submitted at application stage and incorporate final layouts, unit counts, and confirmed collection arrangements. It will also confirm the location, sizing, and servicing of bin stores for each residential block and commercial unit.
- 14.8.10 Management responsibilities for communal waste storage (e.g. in flatted blocks and commercial curtilage) will be formalised through the building's management company or facilities operator. This will include regular maintenance of bin stores, litter control, and liaison with the relevant collection authority or commercial waste contractors.
- 14.8.11 Where waste streams fall outside standard collection regimes such as bulky waste, WEEE, or hazardous building maintenance waste the Detailed Strategy will set out protocols for their safe temporary storage and appropriate removal by licensed contractors, in accordance with the Environmental Protection Act 1990, the Hazardous Waste (Amendment) Regulations 2016, and the WEEE Regulations 2013.
- 14.8.12 To support compliance with the Waste Hierarchy and reduce the risk of cross-contamination, occupiers (residential and commercial) will be provided with guidance outlining acceptable waste practices, bin use, and collection frequency. This may be included within resident welcome packs and tenant fit-out guidance documents, and its delivery will be secured through a planning condition tied to operational management plans.
- 14.8.13 Where agreed with the client or building operator, enhancement measures may also be introduced to promote sustainable waste behaviours. Examples include:



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- Incorporating on-Site signage with colour-coded stream labelling;
- Installing separate containers for reusable items or textiles, subject to management capacity; and,
- Providing space for community reuse schemes or drop-off points, where feasible.

14.9 Residual Effects

Construction Waste

- 14.9.1 Following the implementation of the primary, secondary, and tertiary mitigation measures detailed in this chapter, the residual effect on materials use and construction waste generation is assessed to be **not significant**. This conclusion reflects the adoption of a Site-specific SWMP, measures to reduce off-cuts and packaging, on-Site segregation, and the use of licensed contractors for lawful disposal. When compared to the 'no development' scenario where limited material demand and minor construction waste generation would arise from the single committed scheme the residual effects of the Proposed Development remain of a similar magnitude and are not predicted to introduce any cumulative pressure on regional material supply or landfill infrastructure. On this basis, the Proposed Development does not result in a significant residual effect during the construction period.

Operation Waste

- 14.9.2 During operation, the residual effect of the Proposed Development in terms of waste arisings and infrastructure capacity is similarly assessed to be not significant. Waste management performance is underpinned by embedded design measures, including appropriately sized and located storage, effective segregation systems, and collection arrangements aligned with local authority protocols. Secondary mitigation, such as operational waste plan updates and occupier guidance, further supports compliance. When compared to the no development scenario, in which only limited additional operational waste would be generated by the identified committed development, the Proposed Development does not materially alter the overall pressure on local or regional waste infrastructure. Accordingly, the residual effect in the operational phase is also considered **not significant**.

14.10 Cumulative Effects

- 14.10.1 This has been informed in the Evolution of Baseline section.

14.11 Monitoring

- 14.11.1 Although no monitoring is required for the Proposed Development, the Client's representative will conduct regular and risk-based inspections (RBI) to ensure compliance with the standard operating procedures. These inspections will provide continuous feedback on the Site's environmental performance, highlighting areas for commendation and identifying opportunities for improvement.

14.12 Conclusions

Introduction

- 14.12.1 This chapter evaluates the likely significant environmental effects of the Proposed Development on materials and waste, in accordance with the EIA Regulations 2017 (as amended). The assessment adheres to guidance issued by the ISEP (2020) and aligns with relevant legislation, including the Waste (England and Wales) Regulations 2011, the Environmental Protection Act 1990, and the DEFRA Resources and Waste Strategy (2018).



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14.12.2 The methodology is structured to assess potential effects during both construction and operational phases. This includes defining the study area to cover both on-Site activities and the surrounding waste management infrastructure, categorising material and waste sensitivity and impact magnitude, and applying a matrix to determine effect significance.

14.12.3 Baseline conditions indicate that UK material production is sufficient to meet the projected needs of the development, with key materials such as aggregates, timber, steel, and concrete assessed against national availability. Regional inert landfill void capacity in Hertfordshire is approximately 7.37 million m³, while non-hazardous capacity in neighbouring counties is over 45 million m³. The national capacity for hazardous waste disposal exceeds 10 million m³, although no hazardous waste is expected to be generated by the Proposed Development.

Demolition and Construction Effects

Mitigation Measures

Materials:

14.12.4 Primary mitigation includes setting sustainability targets in procurement, using responsibly sourced and certified materials (e.g. FSC/PEFC timber), and embedding environmental performance criteria (BS EN 15978, BS 8895) in material selection. Quantifiable recycled content is to be used where feasible.

Waste:

14.12.5 Construction-phase waste will be managed through a detailed SWMP aligned with the Outline SWMP, implementing measures such as:

- On-Site segregation and secure storage.
- Waste handling training and toolbox talks.
- Duty of care compliance, lawful disposal, and documentation.
- Active monitoring and reporting of waste performance.

14.12.6 Secondary mitigation includes just-in-time delivery logistics, reuse of excavated materials, and prioritising local suppliers. A Pre-Construction Waste Audit (if applicable) will inform material recovery and reuse strategies. Site responsibilities for waste will be defined in the Principal Contractor's Construction Phase Plan.

- Tertiary mitigation includes incorporation of CEMP and EMS protocols (aligned with ISO 14001) for environmental control, including regular audits, inspections, and compliance reinforcement.

Residual Effects:

14.12.7 Following full implementation of all mitigation measures, the residual effects associated with material use and construction waste generation are assessed as not significant. This is due to the low proportion of total materials required (<1% of national availability), negligible impact (<0.1%) on regional inert landfill void capacity, and negligible impact (<0.1%) on national hazardous landfill void capacity is anticipated.

Operation Effects

Mitigation Measures

Materials:



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14.12.8 Operational materials use is not anticipated to be significant, and no specific mitigation beyond compliance with existing legislation and standards (e.g. Waste Regulations 2011) is necessary.

Waste:

14.12.9 An OWRMS is in place, incorporating the following embedded and secondary measures:

- Source segregation aligned with local authority requirements.
- Targets of ≥65% recycling and ≥95% landfill diversion.
- Dedicated internal/external bin stores within 30 m of flats and 10 m of collection points.
- Provision for bulky and hazardous waste via licensed contractors.
- Occupier guidance on waste segregation and collection frequency.
- Post-consent Detailed Operational Waste Strategy updates secured via planning condition.
- Where feasible, enhancements such as signage, reuse collection points, and community engagement initiatives may be introduced.

Residual Effects:

14.12.10 The residual operational effects are also deemed not significant. Waste generation (1,074 tonnes/year) represents only 0.002% of regional non-hazardous landfill capacity. Embedded infrastructure and management protocols support compliance, effective segregation, and diversion, ensuring that the Proposed Development does not create undue pressure on local or regional waste systems.

14.13 References

- The Animal By-Products (Enforcement) (England) (Amendment) Regulations 2015 [<https://www.legislation.gov.uk/uksi/2015/1980/contents>]
- Clean Neighbourhoods and Environment Act 2005 (as amended) [<https://www.legislation.gov.uk/ukpga/2005/16/contents>]
- Control of Pollution Act (COPA) 1974 (as amended) [<https://www.legislation.gov.uk/ukpga/1974/40/contents>]
- The Controlled Waste (England and Wales) (Amendment) (England) Regulations 2023 [<https://www.legislation.gov.uk/uksi/2023/1243/contents/made>]
- The Environment Act 2021 (as amended) [<https://www.legislation.gov.uk/ukpga/2021/30/contents>]
- Environmental Protection Act 1990 (as amended) [<https://www.legislation.gov.uk/ukpga/1990/43/contents>]
- The Waste (England and Wales) Regulations 2011 (as amended) [<https://www.legislation.gov.uk/uksi/2011/988/contents>]
- The Landfill Tax Regulations 1996 (as amended) [<https://www.legislation.gov.uk/uksi/1996/1527/contents>]



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- The Packaging (Essential Requirements) Regulations 2015 (as amended) [<https://www.legislation.gov.uk/uksi/2015/1640/contents>]
- The Producer Responsibility Obligations (Packaging Waste) (Amendment) (England and Wales) Regulations 2023 [<https://www.legislation.gov.uk/uksi/2023/1244/contents/made>]
- The Waste Batteries and Accumulators Regulations 2009 (as amended) [<https://www.legislation.gov.uk/uksi/2009/890/contents>]
- The Waste Electrical and Electronic Equipment (WEEE) Regulations 2015 (as amended) [<https://www.legislation.gov.uk/uksi/2015/1968/contents>]
- The Waste Management (England and Wales) Regulations 2006 (as amended) [<https://www.legislation.gov.uk/uksi/2006/937>]
- The Hazardous Waste (England and Wales) Regulations 2005 (as amended) [<https://www.legislation.gov.uk/uksi/2005/894/contents>]
- The Environmental Permitting (England and Wales) Regulations 2016 (as amended) [<https://www.legislation.gov.uk/uksi/2016/1154/contents>]
- Ministry of Housing, Communities and Local Governments (MHCLG) National Planning Policy Framework (NPPF) [accessed via: <https://www.gov.uk/guidance/national-planning-policy-framework>]
- Department for Levelling Up, Housing and Communities (DLHC) National Planning Policy for Waste [accessed via: <https://www.gov.uk/government/publications/national-planning-policy-for-waste/national-planning-policy-for-waste>]
- Department for Environment, Food & Rural Affairs (DEFRA) Waste Management Plan for England [accessed via: <https://www.gov.uk/government/publications/waste-management-plan-for-england-2021>]
- DEFRA A Green Future: Our 25 Year Plan to Improve the Environment [accessed via: <https://www.gov.uk/government/publications/25-year-environment-plan>]
- DEFRA and Environment Agency (EA) Our Waste, Our Resources: A Strategy for England [accessed via: <https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england>]
- HCC Waste Development Framework Waste Core Strategy & Development Management Policies Development Plan Document 2011-2026 [accessed via: <https://www.hertfordshire.gov.uk/media-library/documents/environment-and-planning/planning/planning-in-hertfordshire/waste-local-plan/waste-core-strategy-and-development-management-policies-document.pdf>]
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15 Impact Interactions

15.1 Introduction

- 15.1.1 Significant environmental effects can result from incremental changes caused by the interactions between effects resulting from a development.
- 15.1.2 The direct and indirect effects of the Proposed Development have been assessed within the relevant topic chapters of the ES prepared by suitable technical specialists. Environmental effects are assessed relative to the topic under consideration. This approach can lead to the interaction of effects being reported in separate chapters but the collective effect on the same environmental resource(s) not being considered.
- 15.1.3 This Chapter assesses the potential for impact interactions. Some topics in this ES, such as ecology, inherently consider effects from other topics chapters on receptors that are assessed within their assessment. This has been considered in the below.

15.2 Methodology

- 15.2.1 The assessment methodology involves the identification of impact interactions associated with the construction and operation phases of the Proposed Development upon one or more environmental resources (defined as 'Natural Resources' or 'Human Beings and Society'). This is undertaken using a qualitative appraisal process.
- 15.2.2 The residual effects identified in **Chapters 7 – 14** have been used to help identify where there is a likelihood for potential significant adverse impact interactions to occur. This has been determined by considering the capacity of the receptors to accommodate the changes likely to occur as a result of the identified impacts.

15.3 Construction Impact Interactions

- 15.3.1 The following section discusses impact interactions associated with the construction phase.

Natural Resources

- 15.3.2 The following residual effects on natural resources have been identified during the construction phase:
- **Chapter 9 Biodiversity** concluded that all construction effects are negligible and **not significant**.
 - **Chapter 12 Air Quality** has identified that the effect of demolition and construction dust emissions on ecological receptors is **not significant**.
 - **Chapter 13: Climate Change** identified that the construction phase will have a **moderate adverse** and **significant** effect as a result of GHG emissions.
- 15.3.3 **Chapter 12 Air Quality** considers air quality impacts on identified ecological receptors inherently within its assessment, therefore, any impact interactions between air quality and biodiversity effects have already been assessed and no significant adverse effects have been identified.
- 15.3.4 It is considered the combined effect of climate change and air quality will not have the potential to result in greater impacts than already been identified within **Chapter 12**.
- 15.3.5 The potential impact of climate change on biodiversity has been considered within **Chapter 8** and concluded that retained and newly created habitats on-Site (e.g. woodlands and



hedgerows) may experience changes in species assemblages due to climate change, although they are not of elevated importance for particular species, and accordingly are likely to be relatively resilient to future climate changes. Plant species tolerant to drought will be included within the proposed planting plans, whilst ongoing management and supplementary planting with species more resistant to drier, hotter summers will also mediate any changes. Faunal species ranges may shift slightly due to climate change, however this is not expected to significantly influence or exacerbate the effects of the Proposed Development. Creation of a diversity of habitat opportunities will help faunal species better respond to climatic changes.

Human Beings and Society

15.3.6 The following residual effects on human beings and society have been identified as a result of construction:

- **Chapter 7 Population and Human Health** identified a major beneficial effect on employment, a negligible effect of transport and active travel, a minor adverse effect as a result of air quality, and a minor adverse effect as a result of noise and vibration.
- **Chapter 8 Landscape and Visual** identified that the construction phase would result in a moderate adverse effect on PRoW users at viewpoint 1A; a minor-moderate adverse effect on PRoW at Viewpoint 1B; a moderate-major adverse effect on recreational users and residents at viewpoints 2, 3A, 3B, and 3C; and a minor adverse effect on all other visual receptors.
- **Chapter 12 Air Quality** has identified that the effect on human receptors is **not significant**.
- **Chapter 11 Noise and Vibration** has identified that the effect noise during construction is **moderate adverse** at locations closest to the works, and a **negligible-minor** at all other receptors.

15.3.7 The Proposed Development incorporates several mitigation and enhancement measures to avoid, prevent and / or minimise any significant adverse effects in relation to noise, dust, traffic, and visual (see **Chapter 16** for a summary of mitigation and monitoring). Environmental effects associated with the construction phase will be managed through a CEMP, which will be prepared and secured through planning condition prior to the commencement of construction. It is expected that the CEMP would contain communications protocols, which should include a system for recording, investigating, and remedying (where appropriate) and responding to any comments from local residents.

15.3.8 **Chapter 7 Population and Human Health** inherently takes into account effects from other disciplines. Therefore, no impact interactions are expected beyond those identified in **Chapter 7**, which concludes that there are no significant adverse effects on population and human health during the construction phase.

15.4 Operation Effects

15.4.1 The following section discusses impact interactions associated with the operational phase.

Natural Resources

15.4.2 The following residual effects on natural resources have been identified as a result of the operational phase:

- **Chapter 9 Biodiversity** identified **minor adverse** and **significant** effects on woodland and hedgerow loss; however, this is reduced to **negligible** and **not significant** once BNG requirements are met. Effects on all other receptors are not significant.



- **Chapter 13 Climate Change** identified that there would be a **minor adverse** and **not significant effect** during the operational phase as a result of GHG emissions.

15.4.3 **Chapter 12 Air Quality** considers air quality impacts on identified biodiversity receptors inherently within its assessment; therefore, any impact interactions have already been assessed, and no significant adverse effects have been identified.

15.4.4 As detailed in **paragraph 15.3.5** above, the potential impact interactions between biodiversity and climate change have already been considered. The CCRA set out in **Chapter 13** also considered the impacts of climatic changes on ecology and landscaping and identified no significant adverse effects.

Human Beings and Society

15.4.5 The following residual effects on human beings and society have been identified as a result of the operational phase:

- **Chapter 8 Landscape and Visual** identified that effects on all visual receptors at 15 years would be **not significant**.
- **Chapter 11 Noise and Vibration** identified **negligible-minor** adverse effects on existing and proposed human receptors.
- **Chapter 12 Air Quality** assessed the impact of operational emissions on human receptors and identified that effects would be **not significant**.
- **Chapter 13: Climate Change** identified that effects on future users on the site as a result of long-term changes to climate norms, heatwaves, low rainfall and drought, and heavy rainfall and flooding, would be **not significant**.

15.4.6 **Chapter 7 Population and Human Health** inherently takes into account effects from other disciplines. Therefore, no impact interactions are expected beyond those identified in **Chapter 7**, which concludes that there are no significant adverse effects on population and human health during the operational phase.

15.4.7 Conclusion

15.4.8 Based on the qualitative appraisal of impact interactions undertaken in this Chapter, it is not expected that there will be any additional impact interactions over and above the level of effects previously reported in **Chapters 7-14**.



16 Schedule of Mitigation and Monitoring

16.1 Introduction

16.1.1 This Chapter provides a consolidated schedule of mitigation and enhancement measures proposed to avoid significant adverse effects and enhance beneficial effects from the Proposed Development. The chapter is provided to assist SADC with its obligation under the 2017 EIA Regulations to secure, as appropriate, mitigation measures and monitoring arrangements relating to significant adverse effects within any planning permission decision notice granted for the Proposed Development.

16.1.2 Schedule 4, part 1 of the EIA Regulations require an ES to include:

“A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.”

16.1.3 The mitigation included in this ES falls into one of three categories:

- Primary mitigation is defined as the measures which are designed to be an inherent part of the Proposed Development;
- Secondary mitigation are measures that are subsequently identified in order to prevent, reduce or offset any remaining significant adverse effect; and
- Tertiary mitigation are measures that would be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects. Tertiary mitigation would occur with or without input from the EIA in the design process.

16.2 Proposed Mitigation

16.2.1 Proposed Mitigation **Table 16.1** details the primary, secondary and tertiary measures committed to by the Applicant for the construction and operational phases of the Proposed Development. A summary of the nature of each measure and suggested compliance mechanism is provided, together with a cross-reference to the relevant technical assessment section of this ES where further details of the required measure(s) are set out. It is considered that most secondary mitigation measures can be secured through suitably worded planning conditions. Primary mitigation measures which are inherent in the development design and have been considered in the initial assessment of effects are identified in each technical chapter. **Table 16.1** outlines secondary mitigation measures which are required in addition to embedded mitigation measures to further reduce potential significant adverse effects.

16.3 Proposed Monitoring

16.3.1 Part 1(2) of the EIA Regulations defines a ‘monitoring measure’ as a ‘provision requiring the monitoring of any significant adverse effects on the environment or development including any measures contained in – (a) a condition imposed on the grant of planning permission; or (b) a planning obligation’.

16.3.2 As required by the EIA Regulations, this chapter sets out any monitoring proposed during construction and operation of the Proposed Development (**Table 16.1**), as identified in the relevant topic chapters.

16.3.3 Proposed monitoring is in relation to the significant adverse effects, not the proposed mitigation which have been combined in the below table for ease of readability.



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Table 16.1: Summary of Mitigation and Monitoring Measures

ES Chapter / Topic	Measures incorporated into the Development Parameters	Measures to be incorporated into the Detailed Design	Measures to be applied during construction	Measures to be applied post-construction	Monitoring
Population and Human Health	Land safeguarded for the delivery of 2FE primary school incorporating early years provision. Local centre with flexibility in potential uses. This includes the potential for a new medical facility to be delivered should the ICB deem a new facility is required, and/or a creche, and/or community floorspace, and/or retail provision. Open space, incorporating play space Provision of active travel links from Site to adjoining Batford residential are to south east of the Site to allow for direct travel to facilities in Batford and to allow existing residents to access facilities included within this Site. Provision of additional pedestrian and cycle access points on to Lower Luton Road	Most mitigation measures included for health are specified in other corresponding chapters (e.g., Transport & Access, Air Quality & Noise and Vibration) so have not included to avoid duplication.			No significant residual adverse population and human health effects have been identified and therefore no monitoring is required.
Landscape Character and Visual Amenity – landscape receptors	To inform the masterplanning of the Proposed Development, the existing landscape assets on the Site were also mapped at an early stage and their value assessed as part of the various baseline environmental studies including landscape, arboriculture and ecology.	Planting in accordance with the Landscape Strategy for the Proposed Development (at year 15) A Landscape & Ecological Management Plan	Existing tree and scrub / shrub vegetation currently serving as a screen to adjacent landscape and visual receptors, but to be removed as part of the Proposed	New and existing on-site vegetation and planting managed in accordance with the Landscape & Ecological Management Plan (LEMP) to ensure	There would be no long term landscape and visual effects as a result of the Proposed Development. A Landscape & Ecological Management Plan (LEMP) would be



ES Chapter / Topic	Measures incorporated into the Development Parameters	Measures to be incorporated into the Detailed Design	Measures to be applied during construction	Measures to be applied post-construction	Monitoring
	Features of value have been used to inform the development of an extensive Landscape Strategy for the Proposed Development The Proposed Development parameters retain, where possible, existing vegetation on the Site boundaries and running internally through the Site, supplementing with additional landscape buffer planting. This includes strategic connection of existing woodlands, hedgerows and trees within the Site and to the surrounding network. A new parkland area is proposed in the northern part of Site Parcels B and C, to form a new defined Green Belt edge to Harpenden and ensuring Proposed Development is set back behind a large area of green infrastructure, which provides a transition out to the wider countryside.	(LEMP) would be provided at the detailed design stages Implementation of a sensitive lighting scheme to reduce light glare in night time views	Development, would be retained within the construction Site for as long as possible to minimise the impacts from the works; Existing tree and scrub / shrub and woodland vegetation to be retained as part of the Proposed Development (as indicated on the Parameter Plans) would be protected in accordance with BS5837:2012; Protective fencing will be installed to all areas of retained woodland and trees prior to the onset of development. Where individual trees occur outside those fence lines, each tree will be protected by fencing (to be installed at the outer edge of the root protection area, as defined in an arboricultural report and Tree Protection Plan, in accordance with BS5837:2012).	successful establishment.	provided at the detailed design stages and this would outline long term measures for management and monitoring of the landscape as it established.



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Landscape Character and Visual Amenity – visual receptors	The tallest height built form is located in the least visually sensitive parts of the Site, where the combination of landform and existing vegetation provide a strong level of visual enclosure. This includes within Site Parcel A, off Lower Luton Road where the combination of low lying landform, existing boundary vegetation and the adjacent urban edge of Harpenden would assimilate the scale of development proposed. The north eastern and southern parts of Site Parcel C and Site Parcel D include the tallest height built form, set within the central parts of the plateau, away from the existing ridgeline. The Storey height parameter plan has been developed to ensure an appropriate building height transition from the valley slopes (within Site Parcel B) to the plateau landform (Site Parcel C and D), ensuring a lower scale and height of proposed development on the ridgeline	The Landscape Strategy for the Proposed Development refers to these green corridors, running through the Proposed Development, as 'Green Curtains', which internally separate each Site Parcel, to help define different development character areas and visually assimilate the built form into surrounding views. New woodland planting and parkland tree planting are proposed within the meadow parkland (northern area of Site Parcel B), to strengthen the woodland character of the valley slopes and plateau. This will help mitigate the visual impact of the Proposed Development, from elevated cross valley views in the west. Over time, the establishment of a robust network of woodland and tree planting will blend with and enhance the existing tree and wooded canopy, creating a well vegetated settlement edge and transition to the wider countryside.		Site hoarding around the Site's perimeter will minimise the visual impact on these visual receptors directly adjacent and/or in close proximity of the Site, during the construction stages. Construction operations and lighting carried out in accordance with the Construction Environmental Management Plan (CEMP) Specific mitigation measures to minimise the adverse effects of construction lighting can be controlled by planning condition and/or through the preparation of a Construction Environmental Management Plan. Implementation of Construction Environmental Management Plan (CEMP)	New and existing on-site vegetation and planting managed in accordance with the Landscape & Ecological Management Plan (LEMP) to ensure successful establishment.



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				Early planting of the landscape buffers running through the Site, particularly along the ridgeline of the Site, in the first available season after commencement of works, to provide early establishment of vegetation to control views between the Proposed Development and visual receptors to the south west of the Site.	
Ecology	Retention of the habitats of elevated ecological value wherever possible, notably the areas of woodland and the hedgerows. Provision of substantial areas of open space within the northern part of the Site, which will be subject to habitat enhancement and creation works	Reduce potential effects where possible, particularly on habitats of ecological value (woodland and hedgerows) and faunal species, particularly Badger setts. Built development to be designed to minimise potential adverse effects on habitats and ecological features, for example through avoiding gardens backing onto boundary habitats, implementation of	Implementation of Construction Environmental Management Plan (CEMP) Demolition of building recorded to support bat roost to be undertaken under licence from Natural England and following implementation of an appropriate mitigation strategy. Closure of Badger setts undertaken under	Management of recreational activity	30-year management requirements secured through a HMMP as part of BNG.



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		SuDS and cut-out in fences to maintain connectivity for faunal species. Implementation of a sensitive lighting scheme.	licence from Natural England and following implementation of an appropriate mitigation strategy. Clearance of bird habitat outside of bird nesting season or following an inspection by a suitably qualified ecologist.		
Transport and Access	Pedestrian and cycle connections within development. Mix of on-site land uses. Bus stops within Site. Signalised crossing at site access junction on Lower Luton Road. Dwellings to be provided with on-plot cycle parking	20mph zone within Batford. Off-site walking & cycling route improvements. Gateway features on approach to Harpenden.	Construction Traffic Management Plan.	School Travel Plan. Residential Travel Plan	On the basis that no significant adverse effects are identified within this chapter, it is not considered that any monitoring is required.
Noise and Vibration	Acoustic bunding / fencing is not required for the site. There are areas which show elevated sound levels, but these can be treated locally.	Area delineated by red zone for internal noise areas will require acoustically enhanced glazing and ventilation. All other areas are suitable for natural ventilation without risk	Implementation of best practise measures. Site Hoarding and localised screening.	Noise rating level has been proposed. All private plant will be installed to not exceed the noise rating levels proposed, which must be agreed by the LPA.	The only stage of the project which justifies monitoring is the construction and demolition stage works. Noise and vibration levels should be monitored at the



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		of increasing internal noise levels.	During demolition, empty dump trucks are to be stored away from the receptors. In addition to the considerate placement and operation of the empty dump trucks, the dump trucks will have anti vibration pads adhered to the outside of the buckets to reduce the impact noise. Use of low noise and vibration plant and equipment. High vibration rolling should not occur within 30 m of existing properties. Main potential for vibration has been considered to be from piling. If piling is to be used, then CFA piling will be utilised.	All commercial plant will be installed to not exceed the noise rating levels proposed, which must be agreed by the LPA. This includes plant associated with the school buildings. Operation and management of the pitches will play an important role in the mitigation of noise and reducing the levels of impact. This typically includes the submission of a noise management plan which addresses controlling noise from crowds, implementing signage and incorporating rebound panels or behind clamp bars to reduce impact noise from any fencing.	closest noise sensitive receptors to the area or works. The monitoring should confirm that the design limits are not exceeded during the works and to demonstrate compliance with a Section 106 agreement. Monitoring of noise levels following the completion of the Proposed Development to demonstrate compliance with planning conditions relating to the acoustic design is not normally required.
Air Quality	Landscaping and green infrastructure (e.g., tree planting, green walls) have been incorporated to act as natural barriers to airborne pollutants and improve local air quality.	Site access and internal circulation routes have been designed to minimise vehicle idling and	Implementation of IAQM-recommended dust control measures.	Continued promotion of sustainable transport modes to maintain low emissions	The assessment has demonstrated that residual effects from the Proposed Development on air



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		congestion, reducing emissions. Provision of electric vehicle (EV) charging infrastructure to encourage the use of low-emission vehicles. Secure cycle storage and pedestrian-friendly pathways to promote active travel and reduce reliance on private vehicles. A Welcome Pack available to all residents online and as a booklet, containing information and incentives to encourage the use of sustainable transport modes. Car club provision within the Proposed Development or support given to local car club/Electric vehicle car clubs.	Monitoring of dust levels and visual inspections to ensure compliance. Use of low-emission construction machinery and vehicles where feasible.		quality are considered Not Significant, therefore no monitoring is required.



ES Chapter / Topic	Measures incorporated into the Development Parameters	Measures to be incorporated into the Detailed Design	Measures to be applied during construction	Measures to be applied post-construction	Monitoring
Climate Change (GHG Assessment)	The Proposed Development includes an active travel network, which promotes walking and cycling through a safe and attractive route. Green infrastructure can provide a form of carbon sequestration on the Site, reducing the level of CO2 within the atmosphere. The Proposed Development parameters retain, where possible, existing vegetation on Site boundaries and running internally through the Site. The Proposed Development includes provision of green infrastructure including green corridors, native tree and shrub planting, landscape buffer planting, new parkland, species rich grassland, wetland areas, and Sustainable Drainage Systems (SuDS).	All dwellings must comply with Building Regulations Part L 2021 which came into effect in June 2022. The energy demand reduction strategy for the Proposed Development will follow the energy hierarchy approach. In line with stage 1 of the energy hierarchy the design of the Proposed Development will assist in reducing energy demand. In order to meet the carbon reduction requirements of the Future Homes and Future Building Standards, it is proposed that all buildings will supply heat through air source heat pump (ASHP) systems. ASHP deliver an effective carbon intensity of heat of 2.5-3.5 times lower than the electricity grid. These technologies will reduce the GHG emissions associated with energy use during	A Construction Environmental Management Plan (CEMP) will be prepared prior to the commencement of construction works at the Site and is anticipated to be secured via planning condition. The CEMP will include mitigation measures covering transport, materials, waste and air quality during construction. Measures that will reduce GHG emissions during construction include, for example, no unnecessary idling of engines, maintenance of plant equipment to check they are operating optimally and efficient use of materials to reduce waste. Choices will be made in order to reduce the consumption of primary resources and use materials with fewer negative impacts on the environment.	A Travel Plan will be developed for the residential element of the Proposed Development and separately for the primary school element of the Proposed Development. The primary purpose of the Travel Plans will be to encourage future residents and students and staff of the primary school to travel using sustainable modes of transport. In order to confirm that building design and appropriate passive design measures have been incorporated to minimise heat loss, thermal modelling will be undertaken to assess the performance of all main building junctions. Additionally, pressure testing of all dwellings will be undertaken on completion to confirm that the design figure has been met.	Construction activities, including transport, energy consumption and plant emissions will be monitored and managed through the CEMP. The CEMP will be updated during construction to make sure the document continues to fulfil its objectives to reduce environmental effects. This will include a review of current legislation, standards, plant, processes, etc. The travel patterns of the Proposed Development will be monitored as identified in the Travel Plan. Part L 2021 introduced a BREL (Buildings Regulations England Part L) report and photographic evidence requirement which will make sure that key areas of the build affecting thermal performance of each home must be inspected, photographed, and reviewed.



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		the operation of the Proposed Development. Each new dwelling will minimise water usage to at least 110 litres/person/day, which is in line with the current national optional standards (Building Regulations Part G 2016 sets a standard of 125 litres/person/day, and an optional standard of 110 litres/person/day). To meet this standard, the Proposed Development is expected to include measures such as using dual flush toilets and flow control devices to reduce water consumption and installing water-efficient appliances. The Proposed Development will provide recycling facilities in line with local policy requirements, enabling users to recycle and reduce the volume of	Best practice standards are being adopted through LETI and RIBA and will be considered when setting any targets for the Proposed Development, with an aim to improve on current practice. Chapter 14: Materials and Waste also includes several measures to minimise environmental impacts associated with materials consumption. Sustainability targets, including resource efficiency objectives, will be formally incorporated into all relevant procurement documentation and contractor requirements. An Outline SWMP has been submitted in support of the application, and a detailed SWMP will be prepared prior to commencement of construction. The SWMP will set out a site-specific framework	A Landscape and Ecological Management Plan (LEMP) will be prepared for the Site that should be secured by way a planning condition. To support compliance with the Waste Hierarchy and reduce the risk of cross-contamination, occupiers (residential and commercial) will be provided with guidance outlining acceptable waste practices, bin use, and collection frequency. This may be included within resident welcome packs and tenant fit-out guidance documents, and its delivery will be secured through a planning condition tied to operational management plans.	Energy use will be regulated as the Proposed Development comes forward in more detail, detailing how the energy commitments have been met through the design. Monitoring of the existing retained and proposed planting will be undertaken as part of the LEMP.



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		waste sent to landfill. A comprehensive Operational Waste and Recycling Management Strategy (OWRMS) has been prepared to support the planning application. This outlines the measures that will be implemented to ensure that operational waste is managed in accordance with the Waste Hierarchy, relevant legislation, and best practice. Electric vehicle (EV) charging infrastructure will be provided at the Development in line with the standards of Building Regulations Part S 2021. The specific model of the proposed heat pump systems will be established at detailed design stage. Solar PV is also considered a feasible option for future incorporation into the design if required. However, it is	for waste minimisation, segregation, reuse, recycling, and lawful disposal.		



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		not considered a necessary commitment to meet renewable targets or compliance margins in accordance with Part L. Consideration of Solar PV will be undertaken at reserved matters stage in line with the design SAP assessments, or to meet the requirements of the forthcoming Future Homes Standard. The planting strategy will consider climate change, native species, resilience and biosecurity as important factors in selecting species and will be appropriate to the location, full details of which will be provided at reserved matters and/or by condition. A condition will be sought to secure an updated Detailed OWRMS prior to occupation. This document will build on the Outline Strategy			



ES Chapter / Topic	Measures incorporated into the Development Parameters	Measures to be incorporated into the Detailed Design	Measures to be applied during construction	Measures to be applied post-construction	Monitoring
		submitted at application stage and incorporate final layouts, unit counts, and confirmed collection arrangements.			
Climate Change (CCRA)	The Proposed Development incorporates a Sustainable Drainage System (SuDS) to reduce flood risk on the Site. SuDS also helps to control the quality and quantity of surface water runoff conveyed to the local watercourses. Flows will be conveyed through a combination of swales and flow control devices. This will support the management of storm water during extreme rainfall events (sufficient storage for events up to and including the 1 in 100-year plus 40% climate change event will be provided) and can store rainwater for irrigation purposes. Planting will be provided as shown on parameter plans. Planting provides resilience in several ways, including reducing the urban heat island effect, sequestering carbon dioxide, providing shading for buildings and users of outdoor areas, and improving air quality.	Part O (Overheating) of the Building Regulations came into effect in June 2022. Part O 2021 sets standards for overheating in new residential dwellings for internal thermal comfort. Several measures will be incorporated into the Proposed Development such as incorporation of green space, glazing specifications, mechanical ventilation, consideration or orientation and massing, and cross-ventilation. Each new dwelling will minimise water usage to at least 110 litres/person/day, which is in line with the current national	Health and safety for workers will be managed in accordance with relevant legislation and best practice. This will include the implementation of risk assessments for the Site to plan for sudden shifts in weather conditions or heat-related risks. It is expected that, with meeting legislation requirements, appropriate PPE and site safety measures will be implemented along with, for example, the provision of shelter and water for workers. These measures will be set out within a CEMP.	A Landscape and Ecological Management Plan (LEMP) will be prepared for the Site and secured by way of a planning condition.	Monitoring of the existing retained and proposed planting will be undertaken as part of the LEMP.



ES Chapter / Topic	Measures incorporated into the Development Parameters	Measures to be incorporated into the Detailed Design	Measures to be applied during construction	Measures to be applied post-construction	Monitoring
		optional standards (Building Regulations Part G 2016 sets a standard of 125 litres/person/day, and an optional standard of 110 litres/person/day). The design of foundations and drainage within the Site will take into consideration the ground conditions and will be designed in accordance with UK standards for the soil type and condition found on Site. This will be managed at detailed design stage, where risk assessments will be undertaken to manage risks from future climate change in accordance with nationally accepted standards and guidance. Approved Document Part O requires a more in-depth assessment of the risk of overheating, taking into account site location, residential unit orientation, glazing			



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ES Chapter / Topic	Measures incorporated into the Development Parameters	Measures to be incorporated into the Detailed Design	Measures to be applied during construction	Measures to be applied post-construction	Monitoring
		proportions, and openable window areas for natural ventilation. This assessment will be undertaken at the start of detailed design and any mitigation that may be required will be built in.			
Waste	Integration of sustainability targets and responsible sourcing principles into the design and procurement strategy. Commitment to the use of legally and sustainably sourced timber in accordance with FSC, PEFC, or FLEGT standards. Site layout designed to accommodate internal/external waste storage and collection infrastructure, ensuring compliance with SADC and BS 5906:2005.	Specification of materials with low embodied carbon, high durability, and potential for reuse or recycling (as per BS EN 15978 and BS 8895). Design of waste storage areas in residential and commercial units to support source segregation and efficient collection. Detailed OWRMS to be developed post-consent, reflecting final unit mix, access arrangements, and servicing.	Preparation of a Detailed SWMP, including protocols for segregation, reuse, lawful disposal, and monitoring. Implementation of best-practice resource efficiency measures (e.g. just-in-time delivery, use of prefabricated components, weatherproof storage). Site-wide segregation using colour-coded containers and clear signage to aid compliance. Staff training (toolbox talks) and appointment	Implementation of the OWRMS to ensure appropriate waste segregation and storage across all use types. Provision of guidance to occupiers (e.g. in welcome packs) on bin use and recycling practices. Formalisation of management responsibilities for waste within building management or facilities teams. Safe storage and lawful disposal of special waste streams (e.g. WEEE, bulky	Although no monitoring is required for the Proposed Development, the Client's representative will conduct regular and risk-based inspections (RBI) to ensure compliance with the standard operating procedures. These inspections will provide continuous feedback on the Site's environmental performance, highlighting areas for commendation and identifying opportunities for improvement.



Environmental Statement

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ES Chapter / Topic	Measures incorporated into the Development Parameters	Measures to be incorporated into the Detailed Design	Measures to be applied during construction	Measures to be applied post-construction	Monitoring
			of a Waste Champion or Environmental Manager. Regular inspections, record-keeping of waste carriers, and application of duty of care controls. Integration of construction-phase environmental controls through a CEMP, aligned with ISO 14001 EMS.	waste) through licensed contractors. Periodic updates to the OWRMS to reflect operational learning and optimise diversion rates.	



17 Statement of Significance

17.1 Residual Effects

- 17.1.1 The residual effects of the Proposed Development following implementation of the proposed measures outlined in the preceding technical chapters and in **Chapter 17** have been assessed. Each technical chapter contains detailed consideration of residual effects, however, **Table 17.1** summarises the main residual effects of the Proposed Development. The significance criteria are set out in **Chapter 5** and within relevant technical chapters where a different approach is followed.
- 17.1.2 The preparation of the ES was undertaken in parallel with the design process. Consequently, many measures to mitigate likely significant adverse environmental effects have been incorporated into the Proposed Development design in order to avoid, reduce or offset such effects. With respect to management of the construction process, it is intended that best practice techniques and procedures will be adopted through implementation of a CEMP. These will address relevant environmental issues, such as noise, air quality and dust, hours of work, site drainage, and protection from or minimisation of surface/ground-water pollution, and protection of environmental and amenity resources. It is anticipated that the mitigation measures identified will be secured by planning obligations or conditions, to ensure that the high quality scheme proposed by the Applicant is delivered.



Enviromental Statement
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Table 17.1 Significance Table

Topic	Stage of Development	Residual Effects	Duration of Effect	Geographical Importance							Significance of Residual Effect
				I	U K	E	R	C	B	L	
Population and Human Health	Construction	Employment	Temporary						*		Major beneficial
		Transport & Active Travel	Temporary							*	Negligible
		Air Quality	Temporary							*	Minor adverse
		Noise and Vibration	Temporary							*	Minor adverse
	Operation	Housing market	Permanent						*		Major beneficial
		Household expenditure	Permanent						*		Negligible
		Early Years Education	Permanent							*	Negligible
		Primary Education	Permanent							*	Minor beneficial
		Secondary Education	Permanent							*	Minor adverse
		GP Provision	Permanent							*	Minor adverse
		Employment	Permanent						*		Negligible
		Open / Play Space	Permanent							*	Major beneficial
		Transport & Active Travel	Permanent							*	Moderate beneficial
		Air Quality	Permanent							*	Negligible
Noise and Vibration	Permanent							*	Minor adverse / negligible		
Landscape and Visual	Construction	LCA 33 Upper Lea Valley	Temporary						*		Minor Adverse (Not Significant)
		LCA 34 Blackmore End Plateau	Temporary						*		Minor Adverse (Not Significant)
		Landscape Character of Site	Temporary							*	Moderate Adverse (Potential to be Significant)
		PRoW users at Viewpoint 1A	Temporary							*	Moderate Adverse (Potential to be Significant)



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Topic	Stage of Development	Residual Effects	Duration of Effect	Geographical Importance							Significance of Residual Effect	
				I	U K	E	R	C	B	L		
		PRoW users at Viewpoint 1B	Temporary								*	Minor to Moderate Adverse (Not Significant)
		Recreational users & residents at Viewpoint 2	Temporary								*	Moderate to Major Adverse (Significant)
		PRoW users & residents at Viewpoints 3A, 3B & 3C	Temporary								*	Moderate to Major Adverse (Significant)
		Users at Westfield Road Viewpoint 4	Temporary								*	Minor Adverse (Not Significant)
		PRoW users at Viewpoint 5	Temporary								*	Minor Adverse (Not Significant)
		Recreational users & residents at Viewpoint 6	Temporary								*	Minor Adverse (Not Significant)
		Westfield Road cemetery users at Viewpoint 7	Temporary								*	Minor Adverse (Not Significant)
		PRoW users at Viewpoint 8	Temporary								*	Minor Adverse (Not Significant)
		PRoW users at Viewpoint 9	Temporary								*	Minor Adverse (Not Significant)
		Completed Development (Year 15)										
	LCA 33 Upper Lea Valley		Long Term							*		Negligible Adverse (Not Significant)
	LCA 34 Blackmore End Plateau		Long Term							*		Negligible Adverse (Not Significant)
	Landscape Character of Site		Long Term								*	Minor Beneficial (Not Significant)
	PRoW users at ViewpointS 1A and 1B		Long Term								*	Minor Adverse (Not Significant)



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Topic	Stage of Development	Residual Effects	Duration of Effect	Geographical Importance							Significance of Residual Effect
				I	U K	E	R	C	B	L	
		Recreational users & residents at Viewpoint 2	Long Term							*	Minor to Moderate Adverse (Not Significant)
		PRoW users & residents at Viewpoints 3A, 3B & 3C	Long Term							*	Minor to Moderate Adverse (Not Significant)
		Users at Westfield Road Viewpoint 4	Long Term							*	Neutral (Not Significant)
		PRoW users at Viewpoint 5	Long Term							*	Negligible Adverse (Not Significant)
		Recreational users & residents at Viewpoint 6	Long Term							*	Negligible Adverse (Not Significant)
		Westfield Road cemetery users at Viewpoint 7	Long Term							*	Negligible Adverse (Not Significant)
		PRoW users at Viewpoint 8	Long Term							*	Negligible Adverse (Not Significant)
		PRoW users at Viewpoint 9	Long Term							*	Negligible Adverse (Not Significant)
		LCA 33 Upper Lea Valley	Long Term						*		Negligible Adverse (Not Significant)
Biodiversity	Construction	All receptors	Temporary								Negligible and Not Significant
	Completed Development	Woodland and hedgerow loss	Permanent							*	Minor Adverse and Significant (reduced to Negligible and Not Significant once statutory BNG requirements met)
		All other receptors	Permanent							*	Not Significant
	Construction	Increased HGV movements	Temporary							*	Minor Adverse



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Topic	Stage of Development	Residual Effects	Duration of Effect	Geographical Importance						Significance of Residual Effect	
				I	U K	E	R	C	B		L
Transport and Access		HGV routing	Temporary							*	Minor Adverse to Negligible
	Completed Development	Increased trip generation	Permanent						*	*	Minor Adverse
		Increased Severance	Permanent							*	Minor to Moderate Beneficial
		Increased Driver Stress	Permanent							*	Negligible to Minor Adverse
		Reduction in Pedestrian Amenity	Permanent							*	Negligible to Minor Beneficial
		Reduction in Cyclist Amenity	Permanent							*	Negligible to Minor Beneficial
		Increase in Fear and Intimidation	Permanent							*	Negligible to Minor Beneficial
		Reduction in Safety	Permanent							*	Negligible to Minor Adverse
	Noise and Vibration	Construction	Increased construction noise levels – Mitigated through CEMP	Temporary							*
Increased construction vibration levels – Mitigated through CEMP			Temporary							*	Minor Adverse to Negligible
Completed Development		Increased road traffic level	Permanent							*	Negligible
		Building services plant noise	Permanent							*	Minor Adverse to Negligible
		Internal sound levels – mitigated through enhanced glazing and ventilation in red zone only. All other areas suitable for natural ventilation	Permanent							*	Negligible
		External private amenity sound levels – mitigated through perimeter fences in red zone only. All other areas are suitable.	Permanent							*	Minor Adverse to Negligible
		External public amenity spaces are all within noise criteria so suitable	Permanent							*	Negligible



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Topic	Stage of Development	Residual Effects	Duration of Effect	Geographical Importance							Significance of Residual Effect
				I	U K	E	R	C	B	L	
		New Sports Pitches								*	Minor Adverse to Negligible
Air Quality	Construction	Dust and emissions from machinery	Temporary							*	Not significant
		Increased vehicle movements	Temporary							*	Not significant
	Completed Development	Changes in traffic flow	Permanent						*	*	Not significant
		Increased trips leading to changes in NO ₂ , PM ₁₀ , and PM _{2.5} concentrations	Permanent							*	Not significant
Climate Change	Construction	GHG Emissions	Permanent	*							Moderate Adverse
		Climate Hazards	Temporary							*	Negligible
	Completed Development	GHG Emissions	Permanent	*							Minor Adverse
		Long term changes to climate norms	Permanent							*	Negligible-Minor Adverse
		Heatwaves	Permanent							*	Negligible-Minor Adverse
		Low Rainfall and Drought	Permanent							*	Negligible-Minor Adverse
		Heavy Rainfall and Flooding	Permanent							*	Negligible
Waste Management	Construction	Construction Waste	Temporary						*		Not significant
	Completed Development	Operational Waste	Permanent						*		Not significant

