

Land off Ploughley Road, Ambrosden

Ecological Appraisal

Prepared by: The Environmental Dimension Partnership Ltd

On behalf of: Archstone Ambrosden Ltd and Bellway Homes Ltd

September 2022 Report Reference edp4579_r001a

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Executive Summary

- S1 This Ecological Appraisal has been prepared by The Environmental Dimension Partnership Ltd (EDP) on behalf of Archstone Ambrosden Ltd and Bellway Homes Ltd (hereafter referred to as 'the Applicant'). This report considers the ecological and biodiversity implications of proposed development on Land off Ploughley Road to the northern reaches of the village of Ambrosden, Oxfordshire (hereafter named 'the Site'). The Site is to be subject to an outline planning application for up to 120 dwellings with associated access, landscaping and open space provisions.
- S2 The Site is located to the north-west of Ambrosden, Oxfordshire. It comprises of 9.46 hectares (ha) of poor semi-improved grassland. The baseline ecological investigations undertaken as part of the appraisal included a desk study, Extended Phase 1 Habitat survey and detailed (Phase 2) survey relating to hedgerows, bats, great crested newts, reptiles and butterflies.
- S3 No part of the Site is covered by any statutory designations. The closest international statutory site is the Oxford Meadows Special Areas of Conservation (SAC) c.15.1km south-west of the Site. No adverse impacts to this Site are predicted as a result of the proposed development.
- S4 There are four are Sites of Special Scientific Interest (SSSI) within 5km of the Site. Furthermore, there are five LWS, one CDWS and Buckinghamshire and Oxfordshire Wildlife Trust (BBOWT) Reserve within 2km of the Site. It is considered highly unlikely that the proposed development would adversely impact any of these designated sites given the nature of the proposals, spatial distance to the designations and lack of ecological impact pathways.
- S5 The Site is dominated by three fields of poor semi-improved grassland bound by a network of native hedgerows, broadleaved treelines and ditches. The scheme has been designed to primarily retain and enhance the most ecologically valuable features and will incorporate additional measures to enhance the Site for biodiversity.
- S6 A biodiversity impact assessment has been undertaken and this has confirmed that the proposed development is capable of achieving a net gain in habitat and hedgerow units. An update Department for Environment, Food and Rural Affairs (DEFRA) Biodiversity Impact Assessment may be required as part of the detailed design stage to ensure the scheme remains capable of providing net gains to biodiversity in accordance with local planning policy, the National Planning Policy Framework (NPPF) and the *Environment Act* 2021.
- S7 A suite of protected species surveys have been undertaken in 2021 and 2022 which has identified that the Site supports a moderate diversity of bat species with low levels of activity, an medium population of great crested newts in off-Site ponds P1 and P5, and a small population of grass snake (*Natrix helvetica*).

- S8 Policy for the conservation and enhancement of the natural environment at all levels aims to minimise impacts on biodiversity and provide net gains in biodiversity NPPF, paragraph 180). Accordingly, from the outset of the design process, EDP has contributed iteratively to the design of the proposed development to minimise impacts and deliver biodiversity enhancement.
- S9 As a result of this iterative design process the locally valuable hedgerows and mature trees have primarily been retained and buffered from development. The proposed layout will also deliver significant habitat creation and enhancement through the green infrastructure network which includes new areas of Public Open Space provisions. This will include species-rich wildlife grassland, native mixed scrub, marshy grassland and SuDS features with native species planting.
- S10 Recommendations are made for the protection of habitats and species during construction including protective fencing and sensitive clearance methods. Such mitigation measures should be detailed in an Ecological Construction Method Statement (ECMS), or equivalent document, secured via planning condition. With respect to protected species, enhancement measures include the establishment and management of new habitats and provision of new bird and bat boxes.
- S11 In summary, the ecological mitigation strategy for the scheme includes: (1) avoidance measures already embedded within the proposed layout; (2) measures that should be incorporated at the construction stage; (3) those that have been designed and specified within the landscaping scheme; and (4) management measures to ensure that the measures can be realistically achieved in the long-term.
- S12 On this basis, EDP considers that the scheme is capable of delivering significant longterm ecology benefits that exceed relevant planning policy requirements for the conservation of the natural environment at all levels.

Section 1 Introduction

- 1.1 This Ecological Appraisal has been prepared by The Environmental Dimension Partnership (EDP) on behalf of Archstone Ambrosden Ltd and Bellway Homes Ltd (hereafter referred to as 'the Applicant'). This Appraisal considers the ecological and biodiversity implications of proposed development at Land off Ploughley Road, Ambrosden (hereafter referred to as 'the Site').
- 1.2 This report has been informed and prepared with reference to the following industry standard guidelines:
 - British Standard Institution, (2013) Biodiversity. Code of Practice for Planning and Development. BS Standard. BS 42020:2013. British Standards Institute;
 - Chartered Institute of Ecology and Environmental Management (CIEEM), (2017). Guidelines for Preliminary Ecological Appraisal, 2nd Edition. CIEEM, Winchester; and
 - CIEEM, (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal version 1.2. CIEEM, Winchester.
- 1.3 EDP is an independent environmental planning consultancy with offices in Cirencester, Cheltenham and Cardiff. The practice provides advice to private and public sector clients throughout the UK in the fields of landscape, ecology, archaeology, cultural heritage, arboriculture, rights of way and masterplanning. Details of the practice can be obtained at our website (www.edp-uk.co.uk).

Site Context

- 1.4 The Site is located in the northern outskirts of Ambrosen, c.1.5km south from the suburban edge of Bicester.
- 1.5 The Site covers c.9.46 hectares (ha) and is centred approximately at Ordnance Survey Grid Reference SP 60464 20052. The Site primarily comprises three fields of poor semi-improved grassland ley bound by a network of mature hedgerows and broadleaved trees. The Site is bordered by agricultural land to the north and west, with Ploughley Road on its southern boundary and low-density residential development to the south-east.
- **1.6** The location and extents of the Site are illustrated on **Plan EDP 1**, with illustrative site photographs provided in **Appendix EDP 1**.

Development Proposals

1.7 The proposed development is for an outline planning application for up to 120 dwellings, vehicular and pedestrian access off Ploughley Road, new pedestrian access to West Hawthorn Road, surface water drainage, foul water drainage, landscaping, Public Open Space, biodiversity and associated infrastructure. Access off Ploughley Road is not reserved for future consideration. The Illustrative Framework Plan is provided as **Appendix EDP 9** to this report.

Scope of Appraisal

- **1.8** This Ecological Appraisal describes the current ecological interest within and around the Site, which has been identified through standard desk- and field-based investigations.
- 1.9 This then report considers the potential ecological impacts and opportunities for ecological enhancement based on the development proposals (incorporating inherent mitigation) in the context of relevant legislation and planning policy. Finally, this Appraisal identifies the necessary additional measures to avoid, mitigate or provide compensation for potential impacts, and the mechanisms for securing such measures.
- 1.10 The remainder of this report is structured as follows:
 - Section 2 summarises the methodology employed in determining the baseline ecological conditions within and around the Site (with further details provided within appendices and on plans where appropriate);
 - **Section 3** summarises the baseline ecological conditions (with further details provided within appendices and on plans where appropriate) and identifies and evaluates any pertinent ecological features/receptors;
 - Section 4 describes the development proposals;
 - Section 5 considers the potential impacts of the proposals on pertinent ecological features in the context of legislative, planning policy and biodiversity action planning considerations. Recommendations for mitigation and enhancement measures are provided for the current and potential future planning stages; and
 - **Section 6** summarises the inherent and recommend additional mitigation measures and provides the overall conclusions of the Ecological Appraisal.

Section 2 Methodology (Baseline Investigations)

2.1 This section summarises the methodologies employed in determining the baseline ecological conditions within the Site. The baseline surveys have been undertaken by appropriately qualified ecologists using relevant best practice methodologies wherever possible. Full details of the techniques and processes adopted are, where appropriate, provided within appendices and on plans to the rear of this report.

Desk Study

- 2.2 The desk study is an important element of undertaking an initial ecological appraisal of a site proposed for development, enabling the initial collation and review of contextual information, such as designated sites, together with known records of protected and priority species and habitats¹.
- 2.3 The desk study involved collating biodiversity information from the following sources:
 - Thames Valley Environmental Records Centre (TVERC);
 - Multi-Agency Geographic Information for the Countryside (MAGIC) website²; and
 - Freely available aerial photography from Google Maps³ and Ordnance Survey mapping ⁴.
- 2.4 The desk study was undertaken during March 2022 and involved obtaining the following information:
 - International statutory designations (15km radius around the Site);
 - National statutory designations (5km radius);
 - Non-statutory designations (2km radius);
 - Annex II bat species ⁵ records (6km radius); and
 - All other protected/priority species records (2km radius).

¹ Priority Species and Habitats relate to those listed on Section 41 of the *Natural Environment and Rural Communities Act* (2006) considered to be of principal importance for conservation of biodiversity in England.

² www.magic.gov.uk.

³ https://www.google.co.uk/maps

⁴ https://osmaps.ordnancesurvey.co.uk

⁵ Bat species listed in Annex II of the EC Habitats Directive, namely greater horseshoe, lesser horseshoe, barbastelle and Bechstein's bats.

2.5 These search areas are considered sufficient to cover the potential Zones of Influence⁶ of the proposed development in relation to designated sites, habitats and species.

Extended Phase 1 Habitat Survey

- 2.6 The survey technique adopted for the initial habitat assessment was at a level intermediate between a standard Phase 1 Habitat survey technique⁷, based on habitat mapping and description, and a Phase 2 survey, based on detailed habitat and species surveys. The survey technique is commonly known as an Extended Phase 1 Habitat survey. This level of survey does not aim to compile a complete floral and faunal inventory for the Site, but instead aims to identify and map the principal habitat types and scope potential ecological receptors occurring on the Site which may require further investigation.
- 2.7 An Extended Phase 1 Habitat survey of the Site was undertaken by a suitably experienced surveyor from EDP on 29 June 2021 during suitable, dry conditions. June is within the optimal timing period for Extended Phase 1 Habitat surveys; this survey was therefore not limited by seasonal or climatic factors.

Hedgerow Survey

- 2.8 Owing to the presence of a network of hedgerows within the Site, with variable quality, species-diversity, structure and condition, a detailed survey was undertaken to assess their value and whether any of the hedgerows qualify as 'important', with reference to the Wildlife and Landscape criteria provided in Part II of Schedule 1 of the *Hedgerows Regulations* 1997. The survey was undertaken on 29 June 2021 for all hedgerows within the Site. June is within the optimal timing period for hedgerow surveys; this survey was therefore not limited by seasonal or climatic factors.
- 2.9 Further details are provided in **Appendix EDP 2**, with hedgerow locations and references provided on **Plan EDP 1**.

Biodiversity Net Gain Assessment

2.10 To inform the Ecological Appraisal and demonstrate compliance with national and local planning policies relevant to biodiversity conservation, a Biodiversity Impact Assessment (BIA) has been calculated using the Department for Environment, Food and Rural Affairs (DEFRA) Biodiversity Metric (v.3.1 – April 2022). Full details of the methodology and assumptions for the BIA are provided within **Appendix EDP 6** of this report.

⁶ Zone of Influence - the areas and resources that may be affected by the proposed development.

⁷ Joint Nature Conservation Council (2004) Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit (reprinted with minor corrections for original Nature Conservancy Council publication)

Detailed (Phase 2) Surveys

2.11 The scope of the Phase 2 surveys undertaken at the Site was defined following the initial studies described above (desk study and Extended Phase 1 Habitat survey). The surveys 'scoped in' are summarised in turn below and a brief explanation of those surveys 'scoped out' is provided thereafter.

Bat Surveys

Bat Roosting Survey

- 2.12 During the Extended Phase 1 Habitat survey on 29 June 2021, all trees within the Site were subject to a preliminary ground-level roost assessment following current good practice guidelines⁸ by a Natural England bat licensed surveyor. Based upon the results of this assessment, each tree was assigned a bat roost suitability category from negligible to high suitability.
- 2.13 Full details of the bat roost assessment methodologies and any limitations encountered are provided in **Appendix EDP 3**.

Bat Foraging/Commuting Activity Survey

- 2.14 The Extended Phase 1 Habitat survey identified habitats of low suitability for foraging and commuting bats on Site; including dense scrub, tussocky grassland and hedgerows. Seasonal transect surveys were therefore undertaken in June, August and October 2021 to assess the diversity, distribution, and abundance of the bat foraging/commuting assemblage within the Site. Supplementary automated detector surveys were conducted in June/July, August and October 2021.
- 2.15 Full details of the bat survey methodologies and any limitations encountered are provided in **Appendix 3**. The route walked for the transect survey and location of automated detectors is shown on **Plan EDP 4**.

Badger Survey

2.16 The Extended Phase 1 Habitat survey undertaken on 29 June 2021 included a search for evidence of badger (*Meles meles*), to determine the presence and distribution of badgers and their setts across the Site. During the survey, any signs of badger activity such as holes, latrines, trails, snuffle holes and hairs on fencing or vegetation were recorded. Where holes of a size and shape consistent with badgers were identified, leaf litter, fresh spoil, tracks, old bedding and guard hairs were used to determine whether they were currently in active use.

Limitations

⁸ Bat Conservation Trust (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition. Bat Conservation Trust, London.

2.17 Badger surveys can be undertaken at any time of year, such that this survey was not constrained by seasonal or climatic factors. There were also no access limitations throughout the habitats across the Site.

Great Crested Newt Survey

Habitat Suitability Index (HSI)

2.18 A HSI assessment, as developed by Oldham et al. (2000)^{9,} was undertaken on 29 June 2021 and 6 April 2022 to assess the suitability of waterbodies within 250m of the Site (namely P1, P2, P3, P4, P5 and P6) to support great crested newt (*Triturus cristatus*). The HSI assessment follows a standardised assessment criteria using habitat features such as water quality, fish/waterfowl presence and surrounding terrestrial habitat quality to derive a suitability score, or 'index'. Water bodies with high scores are considered more likely to support great crested newts compared to those with lower scores. Full details of the HSI methodology and any limitations encountered are provided in **Appendix 4**.

eDNA Survey

- 2.19 An eDNA survey for great crested newts was undertaken on 29 June 2021 for all accessible ponds within 250m of the Site. Access was sought for all ponds within 250m of the Site and granted for ponds P2, P3, P4 and P5.
- 2.20 Full details of the great crested newt eDNA survey are provided in **Appendix EDP 4**.

Population Assessment Survey

2.21 A presence or presumed absence survey was undertaken for all accessible ponds within 250m of the Site across April to June 2022. At the time of the survey, access was only granted for P1, P2, P5 and P6. Where great crested newt presence was confirmed, a population assessment survey was undertaken. Survey visits were undertaken with reference to the survey methodology set out in the English Nature Guidelines¹⁰ and further details are provided within **Appendix EDP 4**.

Reptile Survey

- 2.22 The grassland, hedgerows and scrub on Site offer suitable habitat to support basking, foraging and dispersing reptiles.
- 2.23 To confirm the presence or likely absence of reptiles and the extent of their usage of the Site, detailed refugia-based surveys were undertaken with reference to best practice guidance ^{11,, 12}. The surveys took place in 2021 with seven survey visits undertaken between August and October inclusive.

⁹ Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10 (4), 143-155

¹⁰ English Nature (2001). Great Crested Newt Mitigation Guidelines, English Nature, Peterborough.

¹¹ Froglife (1999) Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10, Froglife, Halesworth

- 2.24 A total of 98 artificial refugia, comprising bitumen undertile felt cut to approximately 1m x 0.5m, were deployed within suitable reptile habitat across the Site on 18 August 2021. The approximate locations of the reptile refugia are illustrated on **Plan EDP 8**.
- 2.25 Reptile refugia were left undisturbed *in situ* for a minimum period of ten days prior to the commencement of reptile surveys. Detailed weather conditions recorded during each survey visit undertaken are summarised in **Table EDP 2.1**.

Visit	Date	Start Time	Air	Wind Speed	Cloud	Rain
number			temperature	(Beaufort)	Cover (%)	
			Range (°C)			
1	28/08/2021	11:55	17-18	1	95-98	Nil
2	06/09/2021	07:00	14-15	0-1	30-40	Nil
3	13/09/2021	10:15	15-16	2-3	90-100	Nil
4	20/09/2021	9:45	15.5-16	1-2	0-50	Nil
5	28/09/2021	11:08-	14-16	1-2	60	Nil
6	30/09/2022	10:30	13 - 14	2	95-100	Nil
7	04/10/2021	10:00	14 - 15	1-2	30	Nil

 Table EDP 2.1: Date, Timing and Weather Conditions of Reptile Surveys Undertaken during 2021

- 2.26 During each survey visit, artificial refugia were individually checked by an experienced ecologist with any reptiles observed recorded, along with notes on their life stage (adult/juvenile) and sex.
- 2.27 The peak survey count (maximum number of adults recorded during any one survey visit) was then used to estimate approximate population size for each reptile species recorded. Estimates of population size followed the approach given in the withdrawn draft reptile mitigation guidelines¹³; and are summarised with respect to widespread reptiles in Table EDP 2.2.

Species	Population Size Class Category			
	Small	Medium	Large	
Slow-worm	< 10	10-40	> 40	
Common lizard	< 5	5-20	> 20	
Grass snake	< 5	5-10	> 10	
Adder	< 5	5-10	> 10	

 Table EDP 2.2: Population Size Class Estimates

Black and Brown Hairstreak Survey

2.28 Three butterfly transect surveys were undertaken on the Site between July and August 2022 in accordance with UK Butterfly Monitoring Scheme (UKBMS) guidance¹⁴ to identify the

¹² DMRB (2005) Nature conservation advice in relation to reptiles and roads. Volume 10, Section 4, Part 7, HA/116/05. DMRB

¹³ Natural England (2011) Natural England Technical Information Note TIN102 Reptile Mitigation Guidelines. WITHDRAWN

¹⁴ Sevilleja, C.G., van Swaay, C.A.M.1,2, Bourn, N., Collins, S.2, Settele, J., Warren, M.S.2, Wynhoff, I., and Roy, D.B. (2019). *Butterfly Transect Counts: Manual to monitor butterflies*. Report, VS2019.016. Butterfly Conservation Europe & De Vlinderstichting/Dutch Butterfly Conservation, Wageningen.

presence or likely absence of these species. Full details of the survey are provided in **Appendix EDP 5**.

Surveys Scoped Out

2.29 **Table EDP 2.3** summarises other survey types which, while commonly required as part of an Ecological Appraisal for development sites, were not considered necessary/appropriate in this case.

Survey Type	Reasons for Scoping Out		
Botanical Surveys	Extended Phase 1 Habitat survey information was sufficient to		
	confirm habitat value, with no indication of particularly high value		
	habitats present.		
Wintering and Breeding	The Site does not support habitats suitable for breeding or		
Bird Surveys	over-wintering birds. The Site is also not located within close		
	proximity to any sites or features of importance for migratory		
	birds. The Site supports suitable habitat for common breeding		
	farmland bird species in the form of hedgerows and scrub. These		
	habitats are to be primarily retained and enhanced within the		
	scheme, as such any impacts are anticipated to be minimal.		
Dormouse	No records of dormice were returned from within 2km of the Site.		
(Muscardinus avellanarius)	Optimal woodland habitats are present within the wider		
Survey	landscape but these are poorly connected to the Site. Hedgerows		
	within the Site are also to be primarily retained and enhanced		
	within the scheme. As such, it is unlikely there will be a direct		
	impact on the species, if present.		
Otter (Lutra lutra) and	There are no wet ditches within the Site, with those present being		
Water Vole (Arvicola	dry for some period. The on-Site ditches are of limited value for		
amphibius) Survey	these species given their isolation from other suitable		
	waterbodies/watercourses in the local surroundings and the lack		
	of suitable foraging opportunities.		
Additional Invertebrates	Vast majority of the Site comprises habitats of low quality,		
Surveys	maturity and distinctiveness. Additionally, due to the nature of		
	the development, it is unlikely there will be any significant losses		
	of higher quality invertebrate habitats (e.g. hedgerow and grassy		
	field margins).		

Table EDP 2.3: Ecology Surveys Scoped Out

Section 3 Results (Baseline Conditions)

- 3.1 This section of the Ecological Appraisal summarises the baseline ecological conditions determined through the course of desk- and field-based investigations described in Section
 2. Full details of the results are, where appropriate, provided within appendices and on plans to the rear of this report.
- 3.2 Where a particular ecological feature/receptor has been confirmed to be present, or presence is inferred based on habitat suitability, the ecological value or importance of the population or assemblage is assessed on the following geographic scale ¹⁵:
 - International importance (ecological features that if impacted, would affect the distribution of this feature in Europe);
 - National importance (ecological features that if impacted, would affect the distribution of this feature in the UK);
 - Regional importance (ecological features that if impacted, would affect the distribution of this feature in central England);
 - County importance (ecological features that if impacted, would affect the distribution of this feature in Oxfordshire); and
 - Local importance (ecological features that if impacted, would affect the distribution of this feature in Ambrosden and its surroundings).
- 3.3 Any features assessed as being important at a less than Local level are considered at the Site level, or as negligible ecological importance.

Designated Sites

3.4 Information regarding designated sites was obtained during the desk study from the MAGIC website and local records centre (TVERC). Statutory designations (those receiving legal protection) and non-statutory designations (those receiving planning policy protection only) are discussed in turn below.

Statutory Designations

3.5 Statutory designations represent the most significant ecological receptors, being of recognised importance at an International and/or National level. Statutory designations of International importance include Special Protection Areas (SPAs), SACs and Ramsar sites.

¹⁵ Based on scale provided in CIEEM., (2018)., Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester

Statutory designations of National importance include Sites of Special Scientific Interest (SSSIs) and National Nature Reserves. Local Nature Reserves are also statutory designations, with their level of importance typically at County level or less.

- 3.6 No part of the Site is covered by any statutory designations, and there are no international designations within 15km of the Site. However, Oxford Meadows SAC is just on the cusp of this 15km radius, located c.15.1km south-west of the Site. This SAC is designated for supporting Lowland Hay Meadow Habitat.
- 3.7 There are four SSSIs within the Site's potential Zone of Influence. Details are provided in **Table EDP 3.1** and these sites are illustrated on **Plan EDP 2.**

Statutory	Distance	Interest Feature(s)
Designation	from Site	
	Boundary	
Arncott Bridge	1.2km	The Site comprises of a block of three fields of species-rich
Meadows	south-east	grassland on the floodplain of the River Ray.
SSSI		
Long Herdon	4km east	The Site comprises two adjoining species-rich meadows
Meadow SSSI		separated by a hedge and ditch. The fields are of very high
		nature conservation interest as they support a nationally rare
		grassland types - MG4 type grassland (meadow foxtail-greater
		burnet flood meadow) and MG5 grassland (crested dog's-tail -
		black knapweed meadow).
Wendlebury	4.3km	Wendlebury Meads consists of a series of traditionally-
Meads and	south-west	managed unimproved neutral meadows supporting a complex
Mansmoor		variety of plant communities that have developed in response
Closes SSSI		to varying management, drainage and soils.
Whitecross	4.9km	The Site primarily comprises of mature conifer plantation
Green and	south-west	which is gradually returning to a more natural structure but
Oriel Woods		there are also areas of ancient woodland with occasional
SSSI		mature oak and colonising birch.

 Table EDP 3.1: Statutory designations within the potential Zone of Influence of the Site

Non-statutory Designations

- 3.8 Non-statutory designations in Oxfordshire and Cherwell District are known as Local Wildlife Sites (LWSs). Additional designations within the District include proposed LWSs and Cherwell District Wildlife Sites (CDWS). These are sites of local importance in the Cherwell District with their own selection criteria with lower threshold and requirements than those for LWSs. These sites do not meet the criteria for LWS designation but may be included within Local Plans.
- 3.9 In addition, there are other non-statutory designations which may be pertinent in the locality. Within Oxfordshire, Conservation Target Areas have also been established by Wild Oxfordshire who have identified the most important areas for wildlife conservation in

Oxfordshire where conservation action will have the greatest benefit due to supporting Priority Habitats and Species ¹⁶.

3.10 There are no non-statutory designations within the Site. Five LWS, one CDWS and a BBOWT reserve are present within 2km of the Site. The Ray CTA also lies within 1km of the Site. A summary of the non-statutory designated sites is provided in **Table EDP 3.2**, and their locations are illustrated on **Plan EDP 3.**

Name Approximate Interest Feature(s)		Interest Feature(s)	
	Distance from Site		
Ray CTA	450m south-east	The alluvial floodplain of the River Ray, its	
		tributary streams and some areas of land	
		between these streams. Features of	
		biodiversity value include lowland meadow,	
		wet grassland/floodplain grazing marsh,	
		hedgerows, ponds and true fox sedge which is	
		found at a number of sites within the area.	
		Oxfordshire biodiversity action plan targets	
		associated with this CTA include the	
		management, restoration and creation of	
		lowland meadow, floodplain grazing marsh,	
		reedbeds, ponds, hedgerows and rivers.	
Meadows NW of	500m north-west	The Site comprises of ridge and furrow	
Blackthorn Hill LWS		lowland meadows set on heavy soils of the	
		Clay Vale.	
Blackthorn Meadow	950m north-east	-east The Site is a species-rich ridge and furrow	
LWS		meadow to the north of Blackthorn.	
		It is dominated by a range of grasses, sedges	
		and rushes, with some areas	
		dominated by broadleaved herbs.	
Field south of	970m south-east	The Site supports remnants of lowland	
Ambrosden CDWS		meadow on heavy soils with ridge and furrow.	
Upper Ray Meadows	1.2km south-east	This Site comprises of a mixture of meadows	
BBOWT Reserve		and species-rich grassland on the floodplains	
		of the upper River Ray which supports locally	
		scarce wading birds such as lapwing and	
		curlew.	
Field of River Ray	1.3km south-east	This Site is unimproved permanent pasture	
LWS		bounded to the north by the River Ray. It	
		is grazed by cattle and is subject to winter	
		flooding. It has ridge and furrow with wet	
		grassland communities including areas of	
		lowland meadow and pond-sedge.	

Table EDP 3.2: Non-Statutory Designated Sites within the Site's Potential Zone of Influence

¹⁶ Wild Oxfordshire., (2017)., The State of Nature in Oxfordshire 2017 – Full Report. Wild Oxfordshire, The Manor House, Little Wittenham, Abingdon, Oxfordshire OX14 4RA.

Name	Approximate	Interest Feature(s)
	Distance from Site	
Graven Hill LWS	1.1km south-west	The Site comprises of oak and ash woodland
		and has a mixed shrub layer including locally
		abundant hazel with hawthorn,
		English elm, Midland hawthorn, field maple
		and blackthorn.
Gavray Drive	1.6km north-east	These meadows form a mosaic of small damp
Meadows LWS		fields with ponds, divided by thick hedges with
		old trees. Most of the fields are probably
		former hay meadows over medieval ridge and
		furrow field patterns, and have a sward mostly
		dominated by tufted hair-grass with some
		meadow foxtail and meadow barley.

Habitats

- 3.11 Information on habitats within and around the Site was obtained during the desk study and Extended Phase 1 Habitat survey undertaken on 29 June 2021. Full details of each habitat present are provided in **Appendix EDP 1**.
- 3.12 The detailed hedgerow assessments are presented in **Appendix EDP 2**. In summary, none of the hedgerows were found to qualify as 'important' under the Wildlife and Landscape Criteria of the *Hedgerows Regulations* 1997, however, a single hedgerow, H7, is considered to be species-rich.
- 3.13 The distribution of different habitat types within and adjacent to the Site is illustrated on Plan EDP 1. In Summary, the Site comprises three fields of poor semi-improved grassland delineated by a network of mature hedgerows and treelines. For the purpose of this report, the field parcels have been labelled as Fields F1 F3. A summary, and qualitative assessment, of these habitats is provided in Table EDP 3.3.

Habitat or Feature	Distribution within the Site	Intrinsic Ecological Value
Tall Ruderal Vegetation	Small pockets are present within the field margins.	Site to Negligible owing to its low distinctiveness and limited extent.
Poor Semi-Improved Neutral Grassland	Present across the entirety of the Site.	Site-level, owing to the limited species diversity and distinctiveness.
Scattered and Dense Scrub	Small pockets are present within the field margins.	Site-level ecological importance given its limited extent and diversity.
Ephemerals/Short Perennials	Small pockets are present within the field margins.	Site to Negligible owing to its low distinctiveness and limited extent.
Marshy Grassland	A small portion is present towards the centre of the Site.	Site-level, owing to the limited botanical and structural diversity.

Table EDP	3.3:	Summarv	of Habitats	within the Site

Habitat or Feature	Distribution within the Site	Intrinsic Ecological Value
Hedgerows	Along the field and Site boundaries.	Local-level, despite being predominantly species-poor all hedgerows qualify as a priority habitat.
Scattered Trees	A mature treeline is present along the south-eastern Site boundary.	Local-level, owing to its maturity and intrinsic value for wildlife.

Biodiversity Impact Assessment

3.14 A BIA has been undertaken for the Site using the DEFRA Metric 3.1. The preliminary calculations (provided at Appendix EDP 7) confirm that, based on the illustrative proposals in Appendix EDP 9 and assumptions outlined in Appendix EDP 6 of this report, the development is capable of achieving a net gain in habitat units of 10.01% and a net gain of 18.17% in hedgerow units.

Protected and/or Priority Species

- 3.15 The likelihood of presence, or confirmed presence, of protected and/or priority wildlife species within the Site is summarised below with reference to desk study records, habitat suitability and detailed surveys where relevant. Further details are made available within appendices and plans where referenced.
- 3.16 Where a particular species or taxonomic group has been confirmed to be present, or presence is inferred based on habitat suitability, the ecological value of significance of the population or assemblage is assessed on a geographical scale.

Notable Plants

3.17 The data search returned records of 18 notable plants recorded within the last decade. This includes the following: bladder-sedge (Carex vesicaria), bloody crane's-bill (Geranium sanguineum), corn mint (Mentha arvensis), devil's-bit scabious (Succisa pratensis), dyer's greenweed (Genista tinctoria), figreen-winged orchid (Anacamptis morio), grey club-rush (Schoenoplectus tabernaemontani), hoary plantain (Plantago media), quaking-grass (Briza media), ragged-robin (Silene flos-cuculi) tormentil (Potentilla erecta) and true fox-sedge (Carex vulpine). The Site is not considered suitable for supporting these species, and none were recorded on the Site during the Phase 1 Habitat survey.

Breeding Birds

3.18 TVERC returned records of protected (as listed on Schedule 1 of the *Wildlife and Countryside* Act and/or Annex 1 of the Birds Directive) and notable (Red/Amber list) species within 2km of the Site. The records included hobby (*Falco Subbuteo*), little egret (*Egretta garzetta*) and Red Kite (*Milvus milvus*) which are included on Schedule 1 of the Wildlife and Countryside Act. The following Section 41 priority species have also been also recorded in the local area: curlew (*Numenius arquata*), dunnock (*Prunella modularis*), house sparrow (*Passer domesticus*), lapwing (*Vanellus vanellus*), skylark (*Alauda arvensis*), yellowhammer (*Emberiza citronella*) and starling (*Sturnus vulgaris*).

3.19 The Site supports hedgerows, mature treelines and scrub which could provide suitable breeding habitat for a range of common farmland birds. Given the nature of the habitats present and the abundance of similar habitats within the local surroundings, it is considered likely that the assemblage of breeding birds using the Site is of Site-level importance.

Bats

- 3.20 TVERC returned a number of records for bat roosts within 2km of the Site, including several low to medium significance roosts for brown long-eared bat (*Plecotus auritus*), common pipistrelle (*Pipistrellus pipistrellus*), natterer's bat (*Myotis nattereri*), soprano pipistrelle (*Pipistrellus pygmaeus*) and whiskered bat (*Myotis mystacinus*). There are also several records for foraging and commuting bat activity within 2km of the Site within the last decade. This included the above species in addition to noctule (*Nyctalus noctula*), serotine (*Eptesicus serotinus*), Leisler's bat (*Nyctalus leisleri*) and myotis (*Myotis sp.*). Three records for the Annex II species barbastelle (*Barbastella barbastellus*) were also returned within 6km of the Site, and these all comprised of aural recordings.
- 3.21 The Magic website revealed five European Protected Species (EPS) Mitigation (EPSM) licences for bats have also been granted within 2km of the Site. These were for the following:
 - Loss of a common pipistrelle and whiskered bat resting place in 2015 c.660m south of the Site;
 - Loss of a brown long-eared bat breeding and resting place in 2014 c.860m south-west of the Site;
 - Loss of a brown long-eared bat, common pipistrelle and soprano pipistrelle resting place in 2020 c.1km west of the Site; and
 - Damage to a brown long-eared bat, common pipistrelle and soprano pipistrelle resting place in 2016 c.1.5km north-west of the Site.

Bat Roosting Survey

3.22 A total of seven trees were identified as having 'Low' suitability for roosting bats due to supporting either features of limited to negligible potential for roosting bats or due to being of a sufficient size and age to contain such features although none could be observed from ground level. Furthermore, a total of four trees were identified as having 'Moderate' suitability for roosting bats. Full details are provided within **Appendix EDP 3** with tree locations shown on **Plan EDP 1**.

Bat Foraging/Commuting Activity Survey

- 3.23 Detailed results of the bat activity transects and automated detector surveys are provided in **Appendix EDP 3** and illustrated on **Plans EDP 4** to **7**. The findings are summarised below.
- 3.24 Low levels of bat foraging/commuting activity were recorded across the Site. During the transect surveys, activity solely comprised of common pipistrelle, soprano pipistrelle, long-eared bat (assumed to be brown long-eared bat due to the location of the Site outside of the known range of the grey long-eared bat (*Plecotus austriacus*) and Myotis bats (*Myotis spp*.). Activity was predominantly associated with the hedgerows along the northern, eastern and southern site boundaries.
- 3.25 A total of seven bat species/species groups (Myotis bats were not identified to species level) were confirmed to be present foraging and/or commuting within the Site during the automated detector surveys. Similarly to the transect surveys, the vast majority of activity related to common pipistrelle closely followed by noctule and Myotis species. A single recording the Annex II species barbastelle was also recorded on automated detector 2 in August 2021.
- 3.26 Bat activity levels vary across the Site, with most of the activity concentrated around the boundaries. The highest levels of activity were concentrated in the eastern edge of the Site, with lower levels of activity recorded along the northern Site boundary.

Evaluation

- 3.27 The bat assemblage recorded within the Site is considered relatively typical for an urban edge farmland site in the south of England. The vast majority of foraging and commuting activity was attributed to common and widespread generalist species, namely common pipistrelle. A small number of uncommon species including serotine and barbastelle were also recorded, albeit in relatively low numbers and considered only to use the Site for infrequent, low-level foraging/commuting. The hedgerows around the boundaries of the Site are considered, in the context of the other habitats present, to provide foraging and commuting commuting corridors for bats in the local area.
- 3.28 Based on the findings summarised above, the bat foraging/commuting assemblage within the Site is considered to be of Local-level importance.

Badger and Hedgehog



3.30 The small populations of both species potentially supported by the Site are considered to be of Site-level ecological importance due to the legal protection afforded to badgers and the rapid decline in the hedgehog population numbers.

Great Crested Newt

- 3.31 Great crested newts have been recorded in pond P1 c.35m directly east of the Site and pond P5 c.130m north-west of the Site in 2018. The population estimate survey recorded a small population (peak count 4) in P5 in 2018 whilst great crested newt presence in P1 was identified via an eDNA survey.
- 3.32 The Magic website revealed four (EPSM) licences for great crested newt have been granted within 2km of the Site. The closest and most recent is from 2020 and involved the destruction to a resting place c.960m south-west of the Site.
- 3.33 A suite of great crested newt surveys have been undertaken between 2021 and 2022, and full details are provided in **Appendix EDP 4**. Pond locations can be seen in **Plan EDP 1**. In summary, great crested newts were identified as being present in off-Site ponds P1, P3 and P5 and were found to be likely absent from P2 and P4 in 2021. This was further confirmed by a population estimate survey in 2022 which, based on peak counts, identified a 'medium' population of great crested newts in off-Site ponds P1 and P5.
- 3.34 The Site itself does not support any waterbodies but it supports suitable terrestrial habitat in the form of hedgerows, scrub and tussocky poor semi-improved grassland which is primarily restricted to the field margins. Given that the Site lies between ponds P1 and P5, which support known populations of great crested newt, their presence within these suitable terrestrial habitats on the Site is considered likely. The terrestrial population of great crested newt supported by the Site is considered to be of Local-level importance.

Reptiles

- 3.35 A single record for common lizard (*Zootoca vivipara*) and grass snake (*Natrix helvetica*) from 2013 was returned during the desk study. These are located 1.7km south-east and 1.85km north of the Site respectively.
- 3.36 The Site supports suitable habitat for common reptile species with opportunities being primarily restricted to the field margins. A presence/presumed absence survey was undertaken on the Site which recorded a peak count of 1 grass snake along the south-eastern Site boundary during the first survey visit. No other reptile species was recorded during the surveys. Full details of the survey are provided below in **Table EDP 3.4**.

	Visit Date	Reptiles within the Site		
Visit		Grass Snake		
		Adult	Juvenile	
1	28/08/2021	1	-	
2	06/09/2021	-	-	
3	13/09/2021	-	-	
4	20/09/2021	-	-	
5	28/09/2021	-	-	
6	30/09/2022	-	-	
7	04/10/2021	-	-	
Peak Adult Survey Count:			1	

 Table EDP 3.4: Number and Peak Adult Survey Count of Reptiles Recorded in 2021

Evaluation

3.37 The habitats present within the Site are suitable for use by common reptile species. The detailed surveys have identified a small-sized population of grass snake utilising the south-eastern site boundary. Due to the low number recorded, it is considered that the population of grass snake is of no greater than Site-level importance.

Butterflies

- 3.38 TVERC returned records for three butterfly species within the 2km search area. These are for the Priority Species black hairstreak butterfly (Satyrium pruni), brown hairstreak (*Thecla betulae*) and small heath (*Coenonympha pamphilus*).
- 3.39 The Site offers some, albeit limited, opportunities for black and brown hairstreak butterflies in the form of species-poor semi-improved grassland and presence of blackthorn (*Prunus spinosa*) within the hedgerows.
- 3.40 Three butterfly transect surveys were undertaken on the Site between July and August 2022 during which no evidence of either black or brown hairstreak butterflies were recorded within the Site. Furthermore, no other rare or notable butterfly species were recorded during these surveys. Black and brown hairstreak butterflies are therefore considered to not be supported by the Site.

Summary of Key Issues Arising from Survey Findings

- 3.41 Based on the survey findings described above, the key ecological features/receptors pertinent to the development proposals are as follows:
 - One international statutory designated site within potential Zone of Influence of the Site, namely Oxford Meadows SAC c.15.1km south-west of the Site;

- Four national statutory designated sites within potential Zone of Influence of the Site, namely Arncott Bridge Meadows SSSI, Long Herdon Meadow SSSI, Wendlebury Meads and Mansmoor Closes SSSI and Whitecross Green and Oriel Woods SSSI;
- There are five non-statutory local sites within the Site's potential Zone of Influence;
- Habitats Hedgerows and scattered trees are of Local-level importance;
- Birds The Site is suitable for a range of common breeding bird species of Site-level importance;
- Bats:
 - Roosting resource (trees): Approximately 11 trees with low to moderate suitability to support roosting bats within the Site;
 - Foraging/commuting activity: Bat species assemblage of Local-level importance comprising moderate species diversity, with low to moderate levels of activity around the peripheries of the Site.
- Great crested newt Off-Site ponds P1 and P5 support a medium population of great crested newts of Local-level importance; and
- Reptiles Small population of grass snake within the Site of Site-level importance.

Section 4 Details of Proposed Development

- 4.1 EDP has provided input throughout the iterative design process so the proposed layout already reflects some important measures suggested by EDP, to avoid, mitigate or compensate for ecological impacts as well as other measures designed to provide long-term ecological enhancements. A vision for the Public Open Spaces and natural areas is presented within the Illustrative Landscape Strategy Plan enclosed as **Appendix EDP 9**. The key inherent measures included within the strategy's design to provide long term benefits to biodiversity are as follows:
 - Retention, buffering and enhancement of the majority of boundary features, including the habitats of value within the Site which are the hedgerows and mature treelines; and
 - Provision an attractive, multi-functional green space with areas designed to maximise biodiversity, whilst providing recreational opportunities to enhance on-Site and local biodiversity.
- 4.2 Further measures designed to ensure that the proposals enhance the natural environment to "identify and pursue opportunities for securing measurable net gains for biodiversity" in accordance with paragraph 179 of the National Planning Policy Framework (NPPF), are discussed further in **Section 5** of this Appraisal.

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Section 5 Predicted Impacts and Mitigation

- 5.1 This section of the Ecological Appraisal considers the likely impacts of the development proposals on the existing ecological resource as illustrated in **Appendix EDP 9**. Where impacts cannot be avoided by inherent mitigation alone, additional mitigation or enhancement measures are recommended, which, if implemented, would ensure the proposed development is undertaken in accordance with legislative and planning policy requirements.
- 5.2 In accordance with the *Natural Environment and Rural Communities* (NERC) *Act* 2006, within England, Local Planning Authorities (LPAs) have a statutory duty to have regard to effects upon biodiversity when exercising their functions; this includes consideration of effects upon ecological features such as designations and Priority Habitats/Priority Species when determining planning applications. In accordance with planning policy at all levels, LPAs must also consider whether or not 'significant harm' to biodiversity may occur due to effects upon such ecological features. This, and the statutory protection afforded to certain designations and species, is explored in further detail below.

Policy Context

5.3 There are several mechanisms through which habitats receive protection with the statutory and non-statutory designated site frameworks. For instance, certain habitats are identified in policies within the NPPF. Furthermore, the NPPF states:

"180. when determining planning applications, local planning authorities should apply the following principles:

a) If significant harm to biodiversity resulting from a development cannot be avoided (through locating on alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;

...

- c) development proposals resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and
- d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains in biodiversity or enhance public access to nature where this is appropriate."
- 5.4 In addition, the *Environment Act* 2021, subject to the 2-year adoption period, includes additional policy for protecting and improving the natural environment. This includes a

requirement for new developments to deliver 10% biodiversity gain, as evaluated using a BIA calculator.

- 5.5 At a local level, the Cherwell Local Plan 2011 2031 (adopted July 2015) affords policy protection to biodiversity via Policy EN10: Protection and Enhancement of Biodiversity and the Natural Environment. This states that the council will support proposals which provide a net gain in biodiversity by "protecting, managing, enhancing and extending existing resources, and by creating new resources". Furthermore, "development proposals will be expected to incorporate features to encourage biodiversity and retain and where possible enhance existing features of nature conservation value within the site."
- 5.6 Policy ESD11: Conservation Target Areas requires development within or adjacent to a Conservation Target Area to undertake a biodiversity survey and a report to identify constraints and opportunities for biodiversity enhancement.

Designated Sites

- 5.7 Statutory designations receive legal protection under various international and national legislative instruments. This protection is also reflected in policies included within NPPF (July 2021), paragraphs 174 to 182, which are given material consideration during the planning application process.
- 5.8 The Oxford Meadows SAC also receives protection at a Local-level by the Cherwell Local Plan, under Policy ESD 9: Protection of the Oxford Meadows SAC:

"Developers will be required to demonstrate that:

During construction of the development there will be no adverse effects on the water quality or quantity of any adjacent or nearby watercourse. During operation of the development any run-off of water into adjacent or surrounding watercourses will meet Environmental Quality Standards (and where necessary oil interceptors, silt traps and Sustainable Drainage Systems will be included) New development will not significantly alter groundwater flows and that the hydrological regime of the Oxford Meadows SAC is maintained in terms of water quantity and quality Run-off rates of surface water from the development will be maintained at greenfield rates."

5.9 As described in **Section 3**, the Site does not fall within any statutory designations although there are a number of such designations that lie within the potential Zone of Influence of the proposed development. These designations are described in full in **Section 3** and discussed further below.

International Designated Sites

5.10 In accordance with Part 6 of the *Conservation of Habitats and Species Regulations* 2017 (as amended), a Habitat Regulations Assessment (HRA) is required where a plan or project may give rise to significant effects upon any European site designated to conserve natural habitats and species that are rare, endangered, vulnerable or endemic within the European

Community. This includes SACs designated for their habitats and/or species of European importance, and SPAs classified for rare, vulnerable and regularly occurring migratory bird species.

5.11 The Oxford Meadows SAC, referred to within Policy ESD 9, of the Cherwell Local Plan is situated c.15.1km south-west of the Site. Given the spatial separation of the SAC from the proposed development, the lack of any direct and indirect receptor pathways in addition to the nature and extent of the proposals, no adverse impacts to this SAC are considered likely. As such, likely significant effects upon Oxford Meadows SAC resulting from the proposed development can be screened out based on the lack of impact pathways and an appropriate assessment would therefore not be required.

National Designated Sites

- 5.12 There are four nationally designated sites within 5km of the Site, the closest of which is the Arncott Bridge Meadows SSSI 1.2km south-east of the Site. Given the spatial separation of this site from the proposed development, adverse direct impacts to this site are considered highly unlikely. The Site is not publicly accessible, as such, indirect impacts from increases to recreational impacts are not considered applicable. The remaining sites are located over 4km from the proposed development; given their spatial separation from the Site and nature and extent of the proposals, no adverse impacts on these designations are anticipated.
- 5.13 The Site falls within the SSSI impact risk zone for the Arncott Bridge Meadows SSSI, however, the proposals do not fall within one of the development categories identified by Natural England where impacts to the notified interest features of the SSSI are likely to occur.

Non-Statutory Designated Sites

- 5.14 Non-statutory designations/local sites do not receive any formal legal protection. However, they do receive planning policy protection as reflected in the NPPF (paragraph 174). At the Local-level, local sites are protected by the Cherwell Local Plan under Core Policy 10: Protection and Enhancement of Biodiversity and the Natural Environment (see above) and Policy ESD 11: Conservation Target Areas.
- 5.15 There five non-statutory sites within 2km of the Site. No direct impacts to these sites are anticipated as a result of the proposed development, and indirect impacts from recreational pressure will be minimised through the provision of on-Site Public Open Space.
- 5.16 The Site is not located on or directly adjacent to the Ray Conservation Target Area, as such the proposals are not required to contribute towards the targets associated with this CTA. Despite this, the scheme will contribute towards the overall aims of this area by retaining and enhancing the majority of existing hedgerows and providing significant quantities of new native hedgerow planting to compensate for the minor hedgerow loss.

Habitats

- 5.17 There are several mechanisms through which habitats receive protection with the statutory and non-statutory designated site frameworks. Certain habitats are also identified in paragraph 180 within the NPPF, as detailed above.
- 5.18 Of relevance to habitat loss/gain, the NPPF also states:

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

••••

- (d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures."
- 5.19 The Site is dominated by three fields poor semi-improved grassland with areas of tall ruderals, scattered scrub and marshy grassland towards the field margins. These are of site-level ecological value. The most ecologically valuable habitats on the Site are the hedgerows and broadleaved scattered trees which are considered to be of local-level importance given their maturity, botanical diversity and location within the local ecological network. Hedgerows also have the status of a Priority Habitat although none of the hedgerows within the Site are considered to be 'Important'.
- 5.20 These locally valuable habitats do not pose an 'in principle' constraint to the proposed development. Furthermore, these habitats will primarily be retained and enhanced with supplementary planting in gaps and the implementation of an appropriate management regime. There will be a minor unavoidable loss of 0.15km of hedgerow across H1, H2 and H3 to accommodate new access arrangements. This minor loss will be significantly compensated for through the provision of 1.05km of new native, species-rich hedgerows along the Site boundaries.
- 5.21 To avoid damage/disturbance of retained features during construction, it is recommended that Ecological Protection Zones (EPZs) with an appropriate buffer should be established during the construction phase. These EPZs are to be achieved through coordination with tree protection measures required as good arboricultural practice, including temporary protective fencing and signage as illustrated on the Tree Protection Plan in the Arboricultural Impact Assessment (report ref: edp4579_r009) to be submitted as part of the planning application.
- 5.22 As a result of an iterative design process, the proposals will provide significant green-infrastructure within the scheme. The Illustrative Landscape Strategy Plan in Appendix EDP
 8 provides details of areas of new habitats of ecological value within the Public Open Space, including the following:
 - Native, species-rich hedgerow planting along the western site boundary and parallel to retained hedgerows;
 - Native tree planting within the POS and along new roads;

- Species-rich wildflower meadow grassland created on the northern, eastern and western portions of the Site; and
- A drainage network which will include areas of marshy grassland.

Biodiversity Impact Assessment

- 5.23 The scheme within the Illustrative Framework Plan is capable of achieving a biodiversity net gain of over 10% in both habitat and hedgerow units. This is, however, based on a precautionary approach which includes number of assumptions outlined in **Appendix EDP 7**, given the absence of more detailed habitat and landscaping plans at this stage in the project. This may be subject to variation at the detailed design stage, as such an DEFRA BIA calculator should be undertaken at the detailed design stage to ensure the scheme remains capable of delivering biodiversity net gain.
- 5.24 It should be noted that the retained and proposed habitats and their target conditions will require some level of management and monitoring to ensure that the habitats achieve the desired outcomes in the long-term. It is considered that the proposed habitats are realistically achievable on Site. A Habitat Management and Monitoring Plan (HMMP) should be produced to detail how these habitats will be created and subsequently maintained at their target habitat type and condition, and this can be secured by a suitably worded planning condition. Periodic monitoring will be necessary to determine whether habitats are achieving their target condition and will be able to highlight where further management and maintenance activities may be required to address any failures in habitat establishment.

Protected and/or Priority Species

- 5.25 Certain species receive legal protection in the United Kingdom and are commonly known as 'protected species'. In reality, the level of protection for different species varies considerably, from protection solely against 'killing and injury' to full protection of the species and their places of refuge. Where pertinent, details of legal protection afforded to species/species-groups are provided below.
- 5.26 In addition to protected species, there are other species/species-groups that do not receive legal protection, but which are notable owing to their conservation status as Priority Species or other status. Details of any actual or potential notable species within the Site are identified below.
- 5.27 Baseline investigations have identified protected species implications for the Site relating to breeding birds, foraging bats, great crested newts and reptiles which are discussed in turn below.

Breeding Birds

- 5.28 All wild birds, their nests and eggs are protected under Section 1 of the 'Wildlife and *Countryside Act*' 1981 (as amended), with certain species afforded additional protection measures. In addition, certain conservation concern species are listed as UK Priority Species.
- 5.29 The breeding bird assemblage across the Site is expected to support a range of common breeding farmland bird species within the hedgerows, mature scattered trees and scrub, which are to be largely retained as part of the proposed development.
- 5.30 The proposed development will result in the minor loss of hedgerows and this is considered likely to result in only minimal displacement of any on-site populations of farmland birds. This is considered unlikely to be significant given the proportion of retained and created habitat on the Site and within the local surroundings, with any displaced individuals likely being absorbed into the wider farmland landscape without significant effects to the local population.
- 5.31 Given the protection afforded to all breeding birds, their nests, eggs and young, any required vegetation clearance should be timed to avoid the main bird breeding season as far as possible (i.e. March to September inclusive). Should this seasonal constraint prove impractical, then a pre-commencement check for active bird nests will be undertaken by a suitably qualified ecologist/Ecological Clerk of Works (ECoW) immediately prior to the commencement of works. If an active bird nest is identified, a c.5m buffer (dependent on individual species requirements, and potentially greater, as specified by the ECoW at the time) will be established around the active nest, with no works permitted within this buffer until all young have fledged and the nest confirmed inactive by the ECoW.
- 5.32 The provision of EPZs around the retained hedgerows and trees, as discussed previously, will protect any birds that are using these habitats during construction. The provision of new native trees and hedgerows will significantly increase the carrying capacity of the Site for breeding birds.
- 5.33 It is recommended that artificial nest boxes should be erected on new trees and incorporated into new buildings within the Site and displayed on an Ecological Enhancement Plan. This should include boxes specifically designed for swifts. New native species-rich hedgerows and treelines to be created on-site will further improve the local ecological network. Bats
- 5.34 All species of British bat are listed as EPS on Schedule 2 of the *Conservation Regulations* (Annex IV(a) to the *Habitats Directive*). This affords them strict protection under the *Conservation of Habitats and Species Regulations* 2017 (as amended), making it an offence to:
 - Deliberately capture, injure or kill a wild animal of an EPS;
 - Deliberately disturb wild animals of an EPS wherever they are occurring, in particular any disturbance that is likely to impair their ability to survive, to breed or reproduce, or in

the case of hibernating or migratory species, to hibernate or migrate; or to affect significantly the local distribution or abundance of the species to which they belong; or/and

- Damage or destroy a breeding site or resting place of a wild animal of an EPS.
- 5.35 Additional protection for bats is also afforded under the '*Wildlife and Countryside Act*' 1981 (as amended), making it an offence to intentionally or recklessly disturb bats whilst they are occupying a structure or place which is used for shelter or protection, or to obstruct access to this structure or place.

Roosting Bats

- 5.36 The Site supports 11 trees with suitability to support roosting bats including seven trees with 'Low' suitability for roosting bats and four trees with 'Moderate' suitability for roosting bats.
- 5.37 The proposed layout and accompanying Arboricultural Impact Assessment prepared for the Site (report ref: edp4579_r009) anticipates that all trees identified as supporting suitability for roosting bats will be retained as part of the proposed development. Based on current proposals, it is anticipated that existing flightlines to these features will also be maintained. As such, and in anticipation that a sensitive lighting scheme (as detailed below) will be installed, there will be no potential impacts on this roosting resource or bats potentially roosting within it, such that further surveys of these trees are currently not considered necessary to inform the Ecological Appraisal.
- 5.38 The roosting potential of trees can vary over time as a result of storms and natural decay. As such, should the proposals change or the requirement for any felling/pruning works be identified, an update tree roost assessment should be undertaken by a suitably experienced ecologist prior to these works to ensure there have been no changes to the roost suitability of the tree(s), and to advise on any required further survey/mitigation if required.
- 5.39 To enhance roosting opportunities on the Site for the local bat assemblage, it is recommended that durable bat boxes are installed upon suitable, semi-mature trees retained along the peripheries of the Site where practical. The specification and location of proposed bat roosting features should be shown on the detailed landscape design and full details of their management/maintenance should be included in the HMMP for the development which can be secured via condition.

Foraging/Commuting Bats

- 5.40 The manual transect and automated detector surveys recorded a bat population of moderate species diversity that is of Local-level ecological importance. The surveys found there were low levels of activity within the Site with the majority of activity being associated with the boundary hedgerows and treelines.
- 5.41 Inherent mitigation includes the retention of the majority of the boundary hedgerows and treelines. The proposals will result in minor loss of sections of hedgerow, however, the

scheme will compensate for this loss with the creation of 1.05 km of native, species-rich hedgerow planting which will ensure the local linear ecological network is maintained.

5.42 The development footprint will also result in the loss of grassland, tall ruderal and scrub habitat. Only limited foraging activity was observed over these features during the transect surveys, likely due to these habitats being species-poor and therefore supporting limited invertebrate prey, as such, the habitats are not considered to provide an important foraging source. The scheme will compensate for these losses by providing wildflower grassland and scrub planting which will provide more valuable foraging opportunities for bats post-development. Therefore, the habitats losses are not considered likely to significantly impact the local bat populations.

Lighting

- 5.43 To maintain the functionality of the retained hedgerows along the Site boundaries, which will be used by foraging/commuting bats and birds, a sensitive lighting strategy is to be adopted both throughout the construction phase of the development and within the development layout at the detailed design stage. The principles of this strategy are set out below:
 - The use of artificial lighting is to be limited to the essential minimum throughout the Site, and any lighting to be used should avoid upward pointing lights, with the spread of light being kept near to or below the horizontal;
 - During construction any illuminated site compounds will be sited away from all retained features of ecological interest described in this document, namely the retained hedgerows;
 - Where required, the times that lights are on should be controlled to avoid lights illuminated between, and including, dusk and dawn hours to allow some dark periods for bats and other wildlife; and
 - Lighting with a low UV component should be used to reduce invertebrate attraction, and directional lighting/shielding of lights with accessories such as hoods, covers, louvers and shields to be used throughout to avoid excessive light spill.
- 5.44 A suitable lighting design for the final development layout could be secured by condition attached to a planning consent.

Badger and Hedgehog

- 5.45 Badger receives a legal protection under *The Protection of Badgers Act* 1992. The protection is afforded due to animal welfare grounds rather than due to the adverse conservation status of the species, since badgers are a species which is generally common and widespread in lowland England.
- 5.46 Whilst hedgehogs are not a protected species their populations have declined significantly in recent years and are a priority species for conservation.

- 5.47 No evidence of badger or hedgehog activity was found at the Site, although the Site is considered to provide foraging opportunities for both species. As badgers frequently establish new setts, an update survey for this species must be undertaken prior to construction works to confirm the continued absence of setts from the Site. If any new setts are found, the ecologist will advise on any required mitigation and/or licensing.
- 5.48 As hedgehogs hibernate within piles of dead vegetation, removal of such material should be conducted outside of November to February inclusive. During the construction phase, it is also recommended that materials should not be stored near areas of retained habitat or should be hand searched prior to removal.
- 5.49 During the construction phase, fencing used for the EPZs could temporarily obstruct foraging routes and there is a risk of hedgehogs or badgers falling into any trenches or excavations on site. Therefore, it is recommended that the following precautionary measures set out within an ECMS are followed:
 - Toolbox talks should be conducted to site personnel prior to any fencing installation;
 - All fencing used during construction (perimeter and tree protection zones), contains hedgehog holes or channels;
 - Good practice construction measures to ensure hedgehogs or badgers cannot become trapped in excavations (e.g. through covering up at night or inserting an 'escape ramp'); and
 - Subject to these recommendations being fulfilled, no significant impacts upon badgers or hedgehogs are anticipated to arise as a result of the development.

Great Crested Newts

- 5.50 Great crested newts are a EPS; receiving legislative protection in the UK via the *Habitat Regulations* 2017 (as amended) which transposes the EU Habitats Directive and affords them the same level of protection as bats. The great crested newt is also listed as a Priority Species.
- 5.51 A medium population of great crested newt has been confirmed as breeding in two offsite ponds, P1 and P5, which are located c.30m east and c.90m west of the Site respectively. The proposals will not directly impact of either of these ponds, however, the development will result in the loss of c.9.46ha of suitable terrestrial habitat. Given the proximity of these ponds to the Site, it is considered likely that great crested newt are present within the Site and would be impacted by the proposed development without any suitable mitigation measures in place.
- 5.52 Given the above and the EPS of this species, a licence will be required to allow the works to be undertaken lawfully. NatureSpace Partnership now operates across Oxfordshire, as such there are two options for licensing on site, namely a standard Natural England EPS mitigation licence, or entry into the district-wide licence scheme run by NatureSpace. Through the entry into the district scheme or a standard mitigation licence, there are opportunities to benefit

the conservation status of great crested newts in the long term. The required licence will be obtained prior to commencement of any works at the Site. The illustrative layout has been designed to ensure there are opportunities to incorporate the appropriate mitigation and compensation measures for each licencing scheme into the proposals should these be required. This includes a minimum 5m grassland buffer alongside retained hedgerows to maintain habitat connectivity between the off-site breeding ponds for great crested newt, and new permanently wet areas as part of the SuDs scheme that will provide an increase in suitable aquatic habitat in the local area.

5.53 The undertaking of the development under a district-level or Natural England EPS mitigation licence would ensure the favourable conservation status of great crested newts is maintained and the development would be undertaken lawfully.

Reptiles

- 5.54 In England and Wales all reptile species are listed on Schedule 5 of the *Wildlife and Countryside Act* 1981 (as amended). This affords them protection against killing and injuring.
- 5.55 All species of widespread reptile (including common lizard, slow-worm (*Anguis fragilis*) and grass snake) receive at least limited protection from harm under the *Wildlife and Countryside* Act 1981 (as amended).
- 5.56 Reptile surveys have identified a small population of grass snake along the eastern site boundary. Suitable reptile habitat within the Site includes the hedgerows and grassland, which, with the exception of the grassland will be largely retained. In order to avoid offences under the *Wildlife and Countryside Act* 1981 (as amended), precautionary working methods must be adopted during the removal of any suitable vegetation such as the grassland and sections of hedgerows for access.
- 5.57 In order to temporarily displace and exclude the reptiles from areas of suitable habitat identified above, prior to construction, a phased vegetation clearance must take place, as detailed below:
 - A fingertip search of suitable vegetation will take place prior to any works;
 - The first cut will be undertaken towards vegetation which is to be retained, i.e. towards the off-site boundary areas, so as to allow for any wildlife present to disperse safely towards this resource;
 - This initial cut will aim to reduce vegetation height to no less than 200mm and should be undertaken with the use of a hand-held- strimmer or brush cutter;
 - All arisings from the initial cut will be raked and checked for reptiles before being removed from the Site;
- The second cut will be undertaken the following day, during which the vegetation should be reduced to ground level; and
- Vegetation will be maintained at this height throughout the construction works to prevent reptiles dispersing back into the Site.
- 5.58 In addition, the following habitat creation and enhancement measures are recommended, to provide benefits for reptile species:
 - Provision of areas of wildflower grassland within the Site to create a significant area of new suitable reptile habitat, providing substantial new areas for breeding, sheltering, foraging and dispersal;
 - Creation of new hedgerow planting maintain dispersal routes around the Site; and
 - Creation of a reptile refuge, hibernating and breeding habitat, including a hibernaculum comprising a mixture of log wood, topsoil, brick rubble, straw and carpet, as well as the grass cuttings from the management of the meadow area which will be heaped into piles and placed around the peripheries of the Site to create egg-laying sites for grass snake.

Butterflies

- 5.59 The hedgerows and grassland on the Site were not found to support any brown or black hairstreak butterflies. This is likely owing to the limited distribution of blackthorn and the frequency of hedgerow management. The majority of suitable habitat is to be retained as part of the proposed development, with supplementary planting to enhance these features for wildlife, and new native hedgerow planting will be created, which will include blackthorn, their primary larval foodplant and upon which they lay their eggs.
- 5.60 In order to enhance the Site for both species, the retained hedgerows and scrub edge, in addition to new hedgerow planting once established, should be cut on rotation (e.g. with only one of the four hedgerows flailed in any one year), to minimise brown and black hairstreak egg mortality rates in these habitats.

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Section 6 Summary and Conclusions

6.1 This section of the Ecological Appraisal summarises the ecology strategy for the proposed development, in terms of inherent and recommended additional mitigation measures, and then provides the overall conclusions of the Appraisal.

Summary of Ecology Strategy

Inherent Mitigation Embedded in the Planning Layout

- 6.2 The following mitigation is embedded within the proposals:
 - The retention and enhancement of 1.39km of boundary hedgerows and treeline;
 - Provision of a multi-functional green space with areas designed to maximise biodiversity, whilst providing recreational opportunities; and
 - Provision of areas of POS which will include wildflower grassland and native mixed scrub planting.

Construction Measures

- 6.3 It is proposed that the following measures are adhered to during construction:
 - Briefing of site personnel (toolbox talk) and supervision of certain construction/enabling works by a suitably experienced ecologist;
 - Protection of retained habitats within EPZs where construction personnel, vehicles, equipment and materials are excluded;
 - Pre-commencement update walkover survey for badger setts;
 - Sensitive timing and methods of vegetation clearance with regards to nesting birds, reptiles, amphibians and hedgehog, where suitable habitat losses occur;
 - Good practice construction measures to ensure hedgehogs or badgers cannot become trapped in excavations (e.g. through covering up at night or inserting an 'escape ramp ').
 - Any artificial lighting used is to be kept to a minimum with the provision of dark periods; and
 - Any artificial lighting used is to be directional through the use of hoods to prevent light spill.

6.4 It is recommended that these measures are detailed within an ECMS secured by a suitably worded pre-commencement condition attached to planning consent.

Detailed Design Measures

- 6.5 The following measures are proposed to be incorporated into the Detailed Landscape Design, which will enhance the Site for biodiversity:
 - Creation of wildflower grassland within the green infrastructure and POS network;
 - Enhancement and strengthening of the existing hedgerows through gap and tree planting of native species including blackthorn;
 - Provision of new species-rich hedgerow planting across the Site;
 - Provision of durable bird and bat boxes, and inbuilt bat roosting features on new residential dwellings/garages or mature retained trees within the Site;
 - Sensitive lighting scheme to minimise disturbance to bats and birds;
 - Provision of areas of suitable reptile habitat including rough grassland, scrub and hibernaculum; and
 - Creation of a SuDS features with native species planting and permanently wet areas to enhance aquatic diversity.

Overall Conclusions

- 6.6 Desk and field-based baseline investigations have demonstrated that the designated sites, habitats and species present within and adjacent to the Site do not pose an 'in principle' constraint to the proposed development. There are no statutory or non-statutory nature conservation sites within the Site, and it is considered those within the local area will not be materially affected by the proposals.
- 6.7 Several habitats and protected species have, however, been identified within the Site that require due consideration and mitigation should be embedded into any future applications. These include the hedgerows and scattered trees, in addition to breeding birds, bats, badger, hedgehog, great crested newt and reptiles.
- 6.8 National and local policy for the conservation and enhancement of the natural environment expects developments to minimise impacts on and provide net gains for biodiversity (NPPF paragraph 180). A proportional and appropriate response for the avoidance, mitigation and compensation of any predicted impacts and ecological effects is considered within this report and summarised above. These measures include: (1) those already embedded within the design; (2) measures that should be incorporated at the construction stage; (3) those

that should be designed and specified within the detailed landscaping scheme; and (4) management measures to ensure that the design vision is achieved in the long term.

6.9 The habitats and protected and priority species interest within the Site do not pose a notable constraint to development, and the scope of the proposed mitigation measures are sufficient to mitigate for the biodiversity impacts resulting from the development. The illustrative scheme is capable of achieving a biodiversity net gain in habitat and hedgerow units. An update biodiversity impact assessment should be undertaken at the detailed design stage to ensure the scheme remains capable of delivering biodiversity net gain in accordance with the NPPF, local planning policies and the *Environment Act* 2021.

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Appendix EDP 1 Habitat Descriptions and Illustrative Photographs

A1.1 The principal habitats within and around the Site are described below, with illustrative photographs provided where appropriate. The following should be read in conjunction with **Plan EDP 1**.

Poor Semi-improved Grassland

- A1.2 The three fields (F1, F2 and F3) on the Site comprise of poor semi-improved grassland, and an overview field F2 can be seen in **Image EDP A2.1**. This central field appeared to have been previously grazed given the presence of hoof prints and sheep droppings, but at the time of the survey, vegetation is approximately c.15cm tall. Perennial rye-grass (*Lolium perenne*) and cocksfoot (*Dactylis glomerata*) are abundant with intermittent annual meadow-grass (*Poa annua*), red fescue (*Festuca rubra*) and creeping bent (*Agrostis stolonifera*). Frequent herbs include creeping buttercup (*Ranunculus repens*), creeping thistle (*Cirsium arvense*) and field mouse-ear (*Cerastium arvense*) whilst species such as meadow buttercup (*Ranunculus acris*), common hogweed (*Heracleum sphondylium*) and field bindweed (*Convolvulus arvensis*) are present intermittently.
- A1.3 The field margins supported a greater diversity of species with additional species being present including false oat-grass (*Arrhenatherum elatius*), small cat's-tail (*Phleum bertolonii*), curled dock (*Rumex crispus*), ground ivy (*Glechoma hederacea*), cleavers (*Galium aparine*), cut-leaved cranesbill (*Geranium dissectum*), meadow vetchling (*Lathyrus pratensis*) and black medic (*Medicago lupulina*).
- A1.4 The grasslands are primarily species-poor, however, the fields are considered to be of at least site-level ecological importance given their suitability for foraging and commuting amphibians and reptiles.



Image EDP A1.1: An overview of F2 looking south-west.

Marshy Grassland

A1.5 A small pocket of marshy grassland is present towards the centre of the Site and this can be seen in **Image EDP A1.2**. This area is likely a result of surface run-off from the adjacent field and minor changes to the underlying soil conditions. The grassland supported similar species to the adjacent grassland including perennial rye-grass and creeping bent. Additional species present in this area include occasional tufted hair-grass (*Deschampsia cespitosa*), velvet bent (*Agrostis canina*), marsh foxtail (*Alopecurus geniculatus*) and Yorkshire fog (*Holcus lanatus*). This grassland is considered to be of site-level ecological importance given its limited extent and species diversity.



Image EDP A1.2: An overview of the marshy grassland looking south.

Tall Ruderal

- A1.6 Small clusters of tall ruderals are present within the field margins. An example of a cluster of tall ruderals within the field margins can be seen in **Image EDP A1.3**. Common nettle (*Urtica dioica*) is dominant with intermittent broadleaved dock (*Rumex obtusifolius*) and barren brome (*Anisantha sterilis*).
- A1.7 These fast-growing, aggressive species require high nutrient levels and can easily outcompete more desirable wildflowers which favour nutrient poor areas. Tall ruderals are considered to be of low to negligible ecological value.



Image EDP A1.3: Cluster of tall ruderals around the veteran tree on the Site.

Scrub

A1.8 Dense and scattered scrub is also present within the field margins and within F2 as can be seen in **Image EDP A1.4**. Species present includes hawthorn (*Crataegus monogyna*) and bramble (*Rubus fruticosus agg.*) with intermittent blackthorn saplings.



Image EDP A1.4: Scattered hawthorn scrub in F2.

Ephemerals/Short Perennials

A1.9 Short perennials have established on a small strip of bare earth as can be seen in **Image EDP A1.5**. Perennial rye-grass, common knot grass (*Polygonum aviculare*) and common whitlow grass (*Erophila verna*) appear frequently with occasional black medic, greater plantain (*Plantago major*) and scentless mayweed (*Tripleurospermum inodorum*).



Image EDP A1.5: Short perennial growing on an area of bare earth.

Bare Earth

A1.10 A small strip of bare earth is present towards the south-eastern corner of the Site. This is dominated by short perennials as can be seen in **Image EDP A1.5** above.

Hedgerows

A1.11 There are seven hedgerows along the field and site boundaries which support varying levels of structural and botanical diversity. Species present include hawthorn, blackthorn, dogwood (*Cornus sanguinea*), field maple (*Acer campestris*), English oak (*Quercus robur*), English elm (*Ulmus procera*), hazel (*Corylus avellana*), willow species (*Salix spp.*) and elder (*Sambucus nigra*). Hedgerow H5 can be seen in **Image EDP A1.6**.

- A1.12 The ground flora within the hedgerow network supported common and widespread species including a number of species indicative of agricultural improvement. This includes cleavers (*Galium aparine*), common nettle, common hogweed (*Heracleum sphondylium*), hedge woundwort (*Stachys sylvatica*), hedge bindweed (*Calystegia sepium ssp sepium*) and cow parsley (*Anthriscus sylvestris*). Black bryony (*Tamus communis*) and white bryony (*Bryonia dioica*) are also intermittently present.
- A1.13 A detailed hedgerow assessment was undertaken on the Site, as discussed in full in **Appendix EDP 2**. The hedgerow survey confirmed that no hedgerows qualify as 'important' under the Wildlife and Landscape criteria of the *Hedgerow Regulations* (1997). Only one hedgerow (H7) is considered to be species-rich.
- A1.14 The hedgerow network within the Site is considered to be of local-level ecological importance for a variety of wildlife including foraging, commuting and roosting bats, and common reptiles.



Image EDP A1.6: Hedgerow H5 along the northern site boundary. View looking east.

Broadleaved Trees

A1.15 Scattered broadleaved trees are intermixed with the hedgerows on the Site and a mature broadleaved treeline is present along the south-eastern site boundary. The broadleaved treeline can be seen in **Image EDP A1.7**. Species present includes English oak, field maple and ash (*Fraxinus excelsior*). A full assessment of trees was undertaken with regards to their potential to support roosting bats, these details are provided in **Appendix EDP 3**.

- A1.16 Mature trees are of intrinsic value for wildlife. Collectively, trees in combination with the hedgerow network within the Site is considered to be of Local-level ecological value.
- A1.17 Further details of the tree stock within the Site, and their arboricultural value, can be found within the Arboricultural Impact Assessment (Report ref: edp4579_r009) prepared by EDP and submitted along with the planning application.



Image EDP A1.7: Broadleaved treeline along the south-eastern site boundary. This page has been left blank intentionally

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Appendix EDP 2 Hedgerow Survey

Methodology

- A2.1 A hedgerow assessment was undertaken in accordance with the *Hedgerows Regulations* 1997 by an experienced EDP ecologist for all qualifying hedgerows during the Extended Phase 1 survey on 29 June 2021.
- A2.2 Reference was made to the Wildlife and Landscape criteria provided in Part II of Schedule 1 of the *Hedgerows Regulations* 1997 to determine the ecological importance of the Site's hedgerows. The *Hedgerows Regulations* 1997 serve the purpose of ensuring the retention of important countryside hedgerows; their removal only being approved by the relevant local authority.
- A2.3 The aims of the hedgerow assessment were to:
 - i. Identify hedgerows that are classified as 'important' under the ecological criteria of the *Hedgerows Regulations* (1997); and
 - ii. Identify hedgerows that, although not deemed 'important' under the ecological criteria of the *Hedgerows Regulations* 1997, have ecological value in terms of species diversity, or as potential wildlife corridors.
- A2.4 A total of seven hedgerows located within the Site were surveyed against the *Hedgerow Regulations* 1997 criteria.
- A2.5 Hedgerows qualify for assessment by exceeding 20m in length or by being connected at both ends to another hedgerow of any length. The middle 30m of all hedgerows up to 100m in length were surveyed, whilst two 30m sections were surveyed for hedgerows up to 200m in length where access was possible. For hedgerows exceeding 200m in length, three 30m sections were surveyed. Hedgerows surveyed were assigned points dependent upon the number of qualifying 'features' as defined by the *Hedgerows Regulations* 1997, with total scores per hedgerow determining their status.
- A2.6 Qualifying as an 'important' hedgerow requires the hedgerow assessed to be greater than 30 years of age and contain species listed in Schedule 5 (animals) and 8 (plants) of the *Wildlife and Countryside Act* 1981 (as amended), birds categorised as declining breeders (Category 3) within the 'Red Data Birds in Britain' (Batten, 1990), or any species categorised as 'endangered', 'extinct', 'rare' or 'vulnerable' by any of the British Red Data Books.
- A2.7 Hedgerows are also considered important should they satisfy any of the following criteria:

- That the hedgerow is referred to in a record held by a biological records centre as containing protected plants (within ten years) or birds and animals (within five years);
- That the hedgerow contains one of the following criteria per average 30m section surveyed:
 - o 7 of the Schedule 3 species;
 - o 6 of the Schedule 3 species and 3 listed features (see below);
 - 6 of the Schedule 3 species, including 1 of the following: black poplar, largeleaved lime, small-leaved lime or wild service-tree;
 - o 5 of the Schedule 3 species and four listed features; and
 - 4 of the Schedule 3 species, two listed features and lying adjacent to a bridleway or footpath.
- Listed features to include:
 - o A bank or wall which supports the hedgerow along at least half of its length;
 - o Gaps which together do not exceed 10% of the length of the hedgerow;
 - At least one standard tree per 50m of hedge;
 - o At least three Schedule 2 woodland species within the hedgerow;
 - o A ditch along at least one half of the length of the hedgerow;
 - Connections scoring 4 points or more (1 point per connection of the hedgerow with another, 2 points per connection of the hedgerow to a pond or broad-leaved woodland; and
 - A parallel hedge within 15m of the hedgerow.
- A2.8 Where a hedgerow did not meet the 'important' hedgerow criteria, it was considered whether this boundary feature had ecological value, in terms of species diversity, or as potential wildlife corridors.

Results

- A2.9 The detailed results of the hedgerow survey are provided in **Table EDP A2.1** and the location of hedgerows is illustrated on **Plan EDP 1**.
- A2.10 In summary, none of the hedgerows surveyed qualify as 'Important' under the *Hedgerow Regulations* 1997 however, H7 is considered to be species-rich.

Table EDP /	Table EDP A2.1: Hedgerow Survey Results										
Hedgerow Number	Woody Species Mean Count ¹⁷	Species- rich Hedgerow	Number of Schedule 2 and 3 Woodland Plants	Bank⁄ Wall	Gaps <10%	Standard Trees (min. 1/50m)	Ditch	Connections (4 or >4)	Parallel Hedge	Adjacent Footpath/ Bridleway/ Public Path	Important Hedgerow
H1	3				\checkmark						
H2	4				\checkmark					 ✓ 	
H3	4				✓	\checkmark	✓				
H4	4				✓		✓				
H5	3				✓	\checkmark					
H6	4				~	\checkmark					
H7	6	\checkmark			✓	\checkmark					

¹⁷ Mean count of Schedule 3 Species from the 30m Samples (sample size).

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Appendix EDP 3 Bat Surveys

Methodology

A3.1 The scope of bat surveys undertaken at the Site was determined following completion of the Extended Phase 1 Habitat survey and review of relevant desk study findings and with reference to good practice guidelines published by the Bat Conservation Trust ^{18.}

Bat Roost Surveys

Preliminary Assessment of Trees

- A3.2 Owing to the presence of suitably mature trees within or adjacent to the Site, a preliminary ground level visual assessment of these trees was undertaken to record any evidence of roosting bats or any features capable of supporting roosting bats.
- A3.3 The survey was undertaken on 29 June 2021 by a Natural England bat licensed ecologist in accordance with the good practice guidelines referred to above. The trees were searched as thoroughly as possible from ground level with all elevations covered where these could be accessed.
- A3.4 Suitable features for roosting bats recorded (where present) include the following:
 - Loose/peeling/fissured bark plates;
 - Natural holes e.g., rot holes and holes from fallen limbs;
 - Woodpecker holes;
 - Cracks/splits or hollow tree trunks/limbs; and
 - Thick-stemmed ivy.
- A3.5 Signs of roosting bat presence recorded (where present) include the following:
 - Bat/s roosting *in situ*;
 - Bat droppings within or beneath a feature (hole or split);
 - Staining around or beneath a feature;
 - Audible squeaking from the roost; and

¹⁸ Collins, J. (ed.) (2016). Bat Surveys: for Professional Ecologists: Good Practice Guidelines (3rd edition). The Bat Conservation Trust, London

- Large/regularly used roosts or regularly used sites may produce an odour.
- A3.6 Based upon the evidence/features identified, each tree was assigned to one of the following categories:
 - Known or confirmed roost EPS licence likely to be required for works to tree to be completed lawfully;
 - High suitability Tree supports one or more features that are obviously suitable for use by larger numbers of bats on a more regular basis, and potentially for longer periods of time;
 - Moderate suitability Tree supports one or more features that could be used by bats but are unlikely to support a roost type of high conservation status (with respect to roost type only);
 - Low suitability A tree of sufficient size and age to contain features but with none seen from the ground, or features seen but with only very limited roosting potential; and
 - Negligible suitability No potential to support roosting bats.

Limitations

- A3.7 As with any ground level assessments of trees, certain features may not be visible or fully visible from the ground and access to survey all aspects of a tree is not always possible when located at a boundary, meaning features of potential interest to roosting bats may be missed during a survey.
- A3.8 Bats are mobile animals and will move between a series of different tree roost sites, frequently establishing and occupying different features, depending on seasonal requirements and resources available locally. Furthermore, existing features on trees can be transient and new features formed regularly. This survey, therefore, only provides a snapshot of the conditions present at the Site at the time of survey.
- A3.9 It should be noted that this type of assessment is based on features visible from ground level and is not considered to be a definitive bat roosting survey. As no impacts on any of the trees with bat roost suitability are anticipated, no further survey was considered necessary to inform this Appraisal. Should the design change such that trees may be impacted, an update survey, along with any required further roost presence/absence surveys, must be undertaken prior to works.

Bat Activity Surveys

A3.10 During the Extended Phase 1 Habitat survey, an initial assessment was undertaken of suitability of the habitats within and immediately adjacent to the Site for foraging and

commuting bats. In accordance with the good practice guidelines referred to above, the Site was assigned to one of the following categories:

- High suitability Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, treelined watercourses and grazed parkland. The Site is close to and connected to known roosts;
- Moderate suitability Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water;
- Low suitability Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub; and
- Negligible suitability Negligible habitat features on the Site likely to be used by commuting or foraging bats.
- A3.11 Having determined that the overall habitat suitability of the Site best fit within the low suitability category, a proportionate level of survey effort was expended in terms of the number and frequency of manual transect surveys and automated detector surveys. The surveys are described in further detail below.

Manual Transect Surveys

- A3.12 Manual transect surveys were undertaken across the Site to identify areas of bat foraging activity and commuting routes used by bats. With reference to best practice guidelines, surveys were completed across 2021 within the survey seasons of late spring (June) summer (August) and autumn (October).
- A3.13 Full details including the survey type, date, timing, and weather conditions during each of the transect surveys undertaken is given in **Table EDP A3.1**. Weather conditions on the surveys were optimal for bats, being relatively warm with light to medium winds and no rain. As such, the surveys are not considered to be seasonally or climatically constrained.

Survey	Dusk/	Survey	Sunrise/	Weather Conditions			
Date	Dawn	Start –	Sunset	Start –	Cloud	Wind	Precipitation
		End	Time	End	Cover	(Beaufort)	
		Times		Temp	(%)		
				(°C)			
28/06/21	Dusk	21:27 -	21:27	16 - 15	7	1-2	Nil
		23:27					
05/08/21	Dusk	20:48 -	20:48	18	7 -8	2-3	Brief shower
		22:48					prior to survey
06/10/21	Dusk	18:30 -	18:30	15 - 13	5	1	Nil
		20:30					

 Table EDP A3.1: Date, Timing and Weather Conditions of Bat Activity Transect Surveys.

- A3.14 Manual transect surveys were completed by experienced bat surveyors, walking two laps of a single transect route at a slow and steady pace. The transect route was designed to cover all trees, hedgerows and other potential foraging or commuting habitat within the Site, as illustrated on **Plan EDP 4**. All bats seen or heard were recorded, and their behaviour, where seen, marked on survey maps in order to characterise the value of the Site and its component habitats to foraging and commuting bats.
- A3.15 Transect surveys were conducted using BatLogger M full spectrum detectors. Observations of the time, location, and activity of all bats seen or heard were noted. Bats were identified on the basis of their characteristic echolocation calls, which were recorded and analysed using computer sonogram analysis (BatExplorer) to confirm species identification. Species of Myotis bat and long-eared bat (*Plecotus sp.*) are difficult to tell apart solely from their echolocation calls and were therefore grouped as such.

Automated Detector Surveys

- A3.16 To supplement the transect survey data, bat activity within the Site was also sampled using static bat detectors, which automatically trigger and record bat echolocation calls. These surveys were conducted over at least five consecutive evenings during June, July August and October 2021, providing a total of 15 nights of automated detector recordings.
- A3.17 Three Anabat Express automated bat detectors were deployed in three locations across the Site during the three sampling periods, as shown on **Plan EDP 4**. The automated detectors were fixed in a secure position, with an external microphone attached 1.5 to 2m above ground and directed away from the tree/hedgerow to maximise detection sensitivity. **Table EDP A3.2** presents the sampling dates, temperature range and microphone details for the automated detectors deployed during the sampling periods.

Sampling Period Loca		Location Temperature		Microphone		
	Number	Range (°C)		Height (m)	Direction	
29/06/2021 -	1	16-22	Little to no	2	S	
03/07/2021	2		rain.	1.5	W	

Fable EDP A3.2: Automated Detector S	ampling Dates and Weather Details
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Sampling Period	Location	Temperature	Rainfall	Microphone		
	Number	Range (°C)		Height (m)	Direction	
	3			2.5	SE	
05/08/2021-	05/08/2021- 1 12 - 22 Litt		Little to no	1.5	S	
09/08/2021	9/08/2021 <u>3</u> rain.	rain.	2	S		
18/08/2021 - 22/08/2021	2	13 - 22	No Rain	1.5	SW	
06/10/2021- 10/10/2021	1	9 - 18	Little to no rain.	1.5	S	
	2		2	W		
	3			1.5	SW	

A3.18 The echolocation calls recorded by the automated detectors were filtered for noise files (i.e. sound files created when background noise triggers the detector to record) and then specifically for each of the UK's bat species using Analook software's filter function. The parameters for the noise filter are based on that proposed by Chris Corben and Kim Livengood ¹⁹. Once separated into approximate species/noise groups, all files were then checked manually using sonogram analysis (AnalookW) in accordance with published parameters ²⁰ to confirm the species identification of each bat call.

Table EDP A3.3: Filtration Values used by Analook Software to Remove Noise Files
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Filter	Smoothness	Frequency		Duration (ms)		
		Min	Max	Min	Max	
Noise	50	15	120	2	50	

Limitations

- A3.19 The survey effort did not include the core spring survey season, however, it is considered that the level of summer and autumn data recorded is sufficient to understand the value of the bat assemblage present and their usage of the Site.
- A3.20 The identification of calls and species using Analook software is dependent upon the quality of the recording made, which may limit levels of activity and species recorded and can be influenced by the following factors:
 - Weather conditions rainfall and wind;
 - Distance of bat from detector microphone;
 - Presence of obstructions through which the noise must pass i.e. trees; and
 - Proximity of other noise sources such as roads.

¹⁹ Taken from Analook W training course and workshop, September 2013

²⁰ Russ, J., (2021). Bat Calls of Britain and Europe, a guide to species identification. Pelagic Publishing, Exeter.

A3.21 There were technical issues with the static detector at location 2 during the August survey meaning that no data was obtained from this location, however, another detector was deployed from 18 August 2021. This difference in survey timing/weather conditions for this location was considered during analysis of the data. As such, this is not considered to have significantly constrained the results.

Results

Preliminary Assessment of Trees

A3.22 During the initial visual assessment of mature trees for roosting bats, no bats or evidence of bats was found. However, at least four trees within the Site were assessed to be of Moderate suitability for roosting bats and seven were of Low suitability. Locations of trees with bat roosting suitability are illustrated on **Plan EDP 1** with further details provided within **Table EDP A3.4**.

Tree No.	Species	Comments	Bat Roosting Suitability
T1	Ash	Mature tree with no obvious features but did	Low
		support dense ivy cover which could obscure	
		features suitable for roosting bats.	
T2	Ash	Mature tree with minor crack on eastern	Low
		elevation. Feature of very limited suitability for	
		roosting bats.	
T3	Ash	Mature tree with a broken trunk and several	Low
		minor crevices. Features of very limited suitability	
		for roosting bats.	
T4	Ash	Mature tree of a sufficient age and size to support	Low
		suitable features although none could be	
		observed at ground level.	
T5	Willow sp.	Mature tree with a minor split in a branch and	Low
		very minor crevices in the trunk. Features of very	
		limited suitability for roosting bats.	
T6	Willow sp.	Mature tree with a minor snapped branch on the	Moderate
		northern aspect and a small individual crevices on	
		a western facing branch.	
T7	Ash	Mature tree with a broken limb on the southern	Low
		aspect. Minor ivy cover of some stems. Features	
		of very limited suitability for roosting bats.	
T8	Pedunculate	Mature tree with tear outs on southern aspect	Moderate
	oak	with several minor cracks and crevices. Minor	
		lifted bark and a hole in a north facing limb.	
T9	Pedunculate	Mature tree with 3 woodpecker holes on the	Moderate
	oak	southern aspect and a further 2 holes on the	
		northern aspect. Minor small splits in broken	
		branches.	
T10	Ash	Multiple woodpecker holes up northern aspect of	Moderate
		central trunk. Large hollow in central trunk.	
G1	Mixture of	Cluster of mature trees along the eastern sites	Low to Moderate
	ash and	boundary. Majority of trees supported dense ivy	
	pedunculate	with the occasional minor feature such as a small	
	oak	rot hole.	

Table	FDP A3 4	Preliminary	Ground Level	Tree Roost	Assessment Results
lanc	EPI AUT.	ricininary		1100 110030	Assessment nesults.

Manual Transect Surveys

- A3.23 The dusk survey undertaken on 28 June 2021 recorded low levels of common pipistrelle activity (20 of the total of 21 bat call recordings were identified as this species). Activity was primarily foraging activity associated within the site's boundary hedgerows and treelines. Low levels of soprano pipistrelle activity was observed adjacent to the north-western hedgerow boundary whilst a single Myotis bat pass was heard during the survey adjacent to the treeline along the eastern site's boundary. The results from this survey are illustrated on **Plan EDP 5**.
- A3.24 Similarly, common pipistrelle foraging activity accounted for the vast majority of activity recorded during the dusk transect survey on 05 August 2021 (25 of the 29 recordings

were identified as this species). Activity was primarily recorded adjacent to the northern site hedgerows with occasional passes adjacent to the central and southern features. Three passes by a soprano pipistrelle and a single pass by a brown long-eared bat were heard but not seen. The results from this survey are illustrated on **Plan EDP 6**.

A3.25 The dusk survey undertaken on 06 October 2021 recorded low levels of common pipistrelle activity (8 of the total of 9 bat call recordings). This activity was again recorded adjacent to the northern features but the activity was primarily heard and not seen, indicating the bats were likely commuting or foraging high overhead. Additionally, a soprano pipistrelle bat was observed commuting from the central field over the northern hedgerow. The results from this survey are illustrated on **Plan EDP 7**.

Automated Detector Surveys

- A3.26 The results from the automated detector survey are summarised in **Table EDP A3.5**. The locations of the automated bat detectors are illustrated on **Plan EDP 4**.
- A3.27 In summary, there were echolocation calls recorded of seven bat species/species groups throughout the survey period, with a peak count of six species being recorded during the October survey period.

		Species Recorded									
Month	Common pipistrelle	Noctule	Myotis spp.	Soprano pipistrelle	Brown Long-eared Bat	Serotine	Barbastelle				
June	173	29	9	2	1	1	0				
August	140	35	24	7	2	0	1				
October	178	55	47	28	19	1	0				
Grand Total	491	119	80	37	22	2	1				
Percentage of Grand Total (%)	65	16	11	5	3	<0.5	<0.25				

Table EDP A3.5: Overall Summary Results of Automated Detector Surveys throughout 2021

A3.28 As illustrated in **Table EDP A3.5**, the majority of registrations made related to common pipistrelle, which totalled 65% of all calls. This was followed by noctule which accounted for 16% of all recording and then Myotis species which totalled 11% of the registrations. The remaining species, comprising of serotine, brown long-eared bat, barbastelle and soprano pipistrelle, accounted for less than 10% of the total.

E		Average Registrations per Night (total number of registrations / number of nights recording)									
Locatio	Month	C.pip	Myotis	Long-eared bat	Noctule	S.pip	Serotine	Barbastelle			
	June	11.4	0.2	0	0	0	0	0			
1	August	10.4	2.6	0	<1	0	0	0			
	October	5. 8	4	<mark>3.</mark> 6	4.8	4.2	0	0			
	June	9.6	<1	0	<mark>5.6</mark>	0	0	0			
2	August	11.6	1.4	0	3.2	<mark>0.8</mark>	0	<1			
	October	8.4	1.6	0	3.2	1.2	0	0			
	June	13.4	1	<1	<1	<1	<1	0			
3	August	<1	0	0	0	<1	0	0			
	October	21.4	3.8	<1	3.2	<1	<1	0			

 Table EDP A5.6: Average Number of Registrations per Detector Location in 2021*C.pip = common pipistrelle; S.pip = soprano pipestelle;

A3.29 As illustrated in **Table EDP A3.6**, the highest number of average registrations per night were made by common pipistrelle with the peak number of registrations being recorded in October 2021, with the average number of registrations recorded by all other species being <10 per night.

Species Diversity and Abundance

- A3.30 Species diversity within the Site in 2021 was moderate, with seven bat species/species groups (Myotis were not identified to species level) confirmed to be present foraging and/or commuting. During the automated detector surveys, the majority of bat activity (over 65.16%) related to common pipistrelle bats. Noctule accounted for 15.82% of all registrations whilst myotis calls formed 10.64% of all registrations. Those species recorded at low levels were serotine, long-eared bats, soprano pipistrelle and barbastelle.
- A3.31 All seven species/species groups that were recorded during the activity surveys have been previously recorded within Oxfordshire²¹. **Table EDP A3.7** shows the conservation status and distribution in South-East of England to The Wash, of each of the bat species that were recorded at the Site. The conservation statuses have been defined according to The National Bat Monitoring Programme Annual Report 2021²² and through consideration of those species considered Priority species.

²¹ Oxfordshire Bat Group. http://www.oxfordshirebats.org/oxfordshire-bats.php

²² Bat Conservation Trust, 2021. The National Bat Monitoring Programme Annual Report 2021. Bat Conservation Trust, London. Available at www.bats.org.uk/our-work/national-bat-monitoringprogramme/reports/nbmp-annualreport.

Species	Distribution and Conservation Status				
Common pipistrelle	Abundant and widespread.				
Serotine	Rare or selected data deficient.				
Soprano pipistrelle	Abundant and widespread.				
Noctule	Less abundant or selected data deficient.				
Myotis sp.	Dependent on species.				
Long-eared bat*	Less abundant or selected data deficient.				
Barbastelle	Widespread through uncommon woodland-roosting bat.				

 Table EDP A3.7: Summary of Rarity Status in South-East of England to The Wash, of Bat Species

 Recorded in the Survey Area

* Due to geographic location the long-eared bats recorded are considered to be brown long-eared.

Evaluation of Overall Bat Assemblage

- A3.32 The bat assemblage recorded on-site is considered to be fairly typical of an urban edge farmland site in the south of England with common and widespread generalist species accounting for the vast majority of foraging and commuting activity.
- A3.33 Myotis sp. calls cannot be reliably identified to species level via sonogram analysis, however, it is highly unlikely that any of the Myotis calls were from Bechstein's bat (*Myotis bechsteinii*, an Annex II species), as this species is largely associated with woodland habitat which is absent from the Site and limited in the wider area around the Site.
- A3.34 Barbastelle are considered to be infrequent and vulnerable in the UK. Their presence on the Site is considered unlikely to be noteworthy given that only a single registration was detected throughout the survey period. This finding suggests that the Site is infrequently used for commuting by an individual bat.
- A3.35 Owing to the nature of the habitats present, and presence of potential roosting opportunities on-site, it is considered that the boundary habitats, namely hedgerows and trees, are used primarily by common bat species as part of their wider network of habitats for foraging and commuting, as well as possible roosting habitat.
- A3.36 The overall bat assemblage, taking into consideration the presence of rare and uncommon species (albeit only present in low numbers and using the Site for infrequent/ sporadic foraging/commuting), is considered to be of Local-level value.

Appendix EDP 4 Great Crested Newt Survey

A4.1 No waterbodies are present within the Site, but six waterbodies (ponds) lie within 250m of the Site boundaries (as illustrated in **Plan EDP 1**). These ponds were subject to varying degrees of great crested newt survey effort owing to pre-existing eDNA information, the ponds having dried up and/or limited access.

Methodology

Habitat Suitability Index

A4.2 Ponds P1, P2, P3, P4, P5 and P6 were assessed for their suitability to support great crested newt using the standard HSI assessment, as developed by Oldham *et al.* (2000)²⁴. The survey was undertaken on 29 June 2021 and 06 April 2022. The HSI assessment follows a standardised assessment criteria using habitat components such as water quality, fish/waterfowl presence and surrounding terrestrial habitat quality to derive a suitability score, or 'index'. Waterbodies with high scores are considered more likely to support great crested newts compared to those with lower scores. HSI scores and the inferred suitability of the pond assessed to support great crested newt are described within **Table EDP A4.1**.

HSI Score	Pond Suitability to Support Great Crested Newts
<0.5	Poor suitability
0.5 - 0.59	Below average suitability
0.6 - 0.69	Average suitability
0.7 - 0.79	Good suitability
> 0.8	Excellent suitability

Table EDP A4.1: HSI Scores and Inferred Pond Suitability

Environmental DNA Surveys

- A4.3 Waterbodies P2, P3, P4 and P5 were subject to water sampling for environmental DNA (eDNA) on 29 June 2021. This technique aims to collect DNA from the environment in which an organism lives. In aquatic environments, animals including amphibians shed cellular material into the water via their saliva, urine, faeces, skin cells, etc., with eDNA persisting for several weeks. Its collection via water sampling allows its analysis to determine the presence of the target species of interest (i.e. great crested newt) within the water body sampled.
- A4.4 Water samples were collected from water bodies by suitably qualified and licensed ecologists in accordance with those methodologies set out by the Freshwater Habitats Trust²³. Briefly, the protocol involves:

²³ Great crested newt eDNA protocol, P. Williams, Freshwater Habitats Trust. August 2013

- Collecting 20 water samples from selected areas evenly spread around the accessible perimeter of the waterbody, including both open water and vegetated areas;
- Collecting a ladle of water at each sampling location, stirring the water column without disturbing sediment, and shaking the sample thoroughly once all 20 ladles are collected;
- Extracting 15ml of this mixed sample into six conical tubes per pond containing preserved fluid, shaken thoroughly to homogenize the sample; and
- Subjecting each tube to real-time Polymerase Chain Reaction (PCR) analysis as detailed within Biggs et al. (2014)²⁴.

Limitations

A4.5 Permission was sought and not granted not granted to survey ponds P1 and P6 within the local area. This is not considered to be a significant limitation as P1 is known to support great crested newt and P6 was able to be accessed for aquatic surveys (described below) in 2022.

Population Assessment

- A4.6 Survey visits were undertaken with reference to the survey methodology set out in the English Nature Guidelines by a holder of a Natural England great crested newt class survey licence and assistant. In accordance with the guidelines, the following three preferred survey techniques were employed to determine the presence/absence of great crested newts:
 - Torching: This involves searching water bodies by torchlight, between dusk and midnight, and is an effective means of detecting adult newts. Each surveyor used a 1,000,000-candle power torch during this part of the survey;
 - Bottle Trapping: This involves the use of funnel traps (made from 2-litre plastic bottles), which are inserted into the water along the margin of the water bodies during the evening and checked the following morning. Access permitting, the traps are spaced at roughly 2m intervals around the margins of the water bodies; and
 - Egg Searching: A search of any suitable aquatic vegetation to check for great crested newt eggs.

²⁴ Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F 2014. Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA. Freshwater Habitats Trust, Oxford

- A4.7 The standard survey procedure involves a minimum of four survey visits to each pond to confirm the presence/absence of great crested newt. If during any of these four visits evidence is found of this species, then a further two survey visits are required to allow for an estimate of population size. Despite the initial eDNA survey indicating the likely absence of great crested newt from P2, presence/presumed absence surveys were undertaken for this pond given its proximity to P5 which tested positive for the presence of great crested newt eDNA.
- A4.8 The survey visits and survey conditions are summarised in **Table EDP A4.2** below.

Visit Number	Date	Ponds Surveyed	Night Air Temperature (°C)
1	06/04/2022	P1, P2, P5 and P6	10
2	13/04/2022	P1, P2, P5 and P6	13
3	26/04/2022	P1, P2 and P5	17
4	03/05/2022	P1, P2 and P5	14
5	26/05/2022	P1 and P5	15
6	06/06/2022	P1 and P5	16

 Table EDP A4.2: Summary of the Survey Dates and Over-night Air Temperatures.

Limitations

A4.9 Access was sought but not granted to survey pond P3. P6 dried up after the first two survey visits.

Results

Habitat Suitability Assessment

A4.10 Pond descriptions are provided in **Table EDP A4.3** below and the full results of the HSI are provided within **Table EDP A4.4** below. In summary, pond P1 is considered to be of 'Excellent' suitability to support great crested newts, waterbodies P3, P4, P5 and P6 are considered to be of 'Good' suitability and waterbody P2 is considered to be of 'Average' suitability to support great crested newts.

ReferencedescriptionMethods UsedP1A small pond created as part of the adjacent Briar Furlong development.Torching Bottle Trapping Egg SearchesAccess not Trapping Egg granted in 2021P2P2Image: Comparison of the part of the adjacent Briar Pond is bound by tussocky grassland and to the west of the Site bound by dense scrub.eDNA Torching Bottle ont Tapping SearchesP2Image: Comparison of the site part of the part of the part of the adjacent Briar Furlong development. Pond is bound by tussocky grassland and to the west of the Site bound by dense scrub grassland further afarP2Image: Comparison of the site part of the site<
P1A small pond created as part of the adjacent Briar FurlongTorching Bottle rrapping granted EggAccess not rrapping granted but was development. Pond is bound by tussocky grassland and dense scrub.Torching Bottle tursocky grassland and to the west of the Site bound by tursocky grassland further afar.Torching Bottle to searchesAccess not not rrapping granted in 2021.P2Image: Construction of the source point is bound by tursocky grassland and dense scrub.eDNA Torching Bottle Searches-
P1 A small pond created as part of the adjacent Briar Furlong development. Pond is bound by tussocky grassland and dense scrub. Torching Bottle Trapping Egg Access not granted in 2021 P2 Image: Comparison of the site bound by tussocky grassland and dense scrub. • • • • • • • • • • • • • • • • • • •
P2Created as part of the adjacent Briar Furlong granted in 2021Bottle granted in 2021P2Furlong version granted in 2022.Searches but was granted in 2022.P2Furlong version granted in 2022.A small pond to the west of the Site bound by dense scrub grassland to the with tussocky grassland to the west of the Site bound by dense scrub grassland the Site bound by dense scrub grassland the Site bound by dense scrub grassland the Site bound by dense scrub grassland further afar
P2A small pond to the west of the Site bound by tursocky grassland fur long dense scrub.PONA to the west of the Site bound by tursocky grassland fur long dense scrubP2A small pond to the west of the Site bound by dense scrub-P2A small pond to the west of the Site bound by dense scrub-
P2A small pond to the west of the Site bound by turssocky grassland dense scrub.eDNA Torching Bottle Trapping Egg Searches-P2Image: Comparison of the site bound by turssocky grassland dense scrub.eDNA Torching Bottle Trapping Egg Searches-
P2Furlong development. Pond is bound by tussocky grassland and dense scrub.Searches granted in 2022.but was granted in 2022.P2Image: Comparison of the site bound by dense scrubA small pond to the west of the Site bound by dense scrubeDNA Torching Bottle Trapping Egg Searches-
P2A small pond to the west of to the west of the Site bound by tussocky grassland and dense scrub.eDNA -P2A small pond to the west of the Site bound by dense scrub-P2A small pond to the west of the Site bound by dense scrub-FileBottle Source the Site bound by dense scrub-FileBottle bound by dense scrub the Site bound by dense scrub the Site bound by dense scrub the Site the Site bound by dense scrub the Site bound by dense scrub the Site the Site the Site bound by dense scrub the Site the Site <b< th=""></b<>
P2Pond is bound by tussocky grassland and dense scrub.eDNA-P2A small pond to the west of the Site bound by dense scrubeDNA-Torching Bottle the Site bound by dense scrubBottle Trapping Egg Searches-
P2 A small pond to the west of the Site bound by dense scrub. - Bottle Torching Bottle Bottle Version Trapping Egg With tussocky grassland further afar. Egg
P2 A small pond to the west of the Site bound by dense scrub. - P2 Torching Bottle - Variable Trapping Egg - Vith tussocky grassland further afar. Searches
P2 P2 P2 P2 P2 P2 P2 P2 P2 P2
P2 A small pond to the west of the Site bound by dense scrub grassland further afar.
to the west of the Site Bottle Bottle bound by Trapping dense scrub Egg with tussocky grassland further afar.
the Site Bottle bound by Trapping dense scrub Egg with tussocky grassland further afar.
bound by Trapping dense scrub Egg with tussocky grassland further afar.
dense scrub with tussocky grassland further afar.
with tussocky grassland further afar.
grassland further afar.
further afar.
P3 A small eDNA Sampled
ephemeral for great
pond located crested
in a sheep newt
grazed field. eDNA in
2021.
Access
not
granted
III 2022.
A large Sampled
Institution of the part of the
the north-east crested
or the Site.
Pond supports eDNA In
carp and is 2021
bound by and
manageu returned
grassialiu aliu a
Introduced negative

 Table EDP A4.3:
 Pond descriptions undertaken as part of the HSI and summary of survey methods used.

Ρ5	A small pond to the west of the Site bound by dense scrub with tussocky grassland further afar.	-
P6	A small ephemeral pond south of Ploughley Road.	Access not granted in 2021 but was granted in 2022.

Suitability	Criteria	P1	P2	P3	P4	P5	P6
Indices							
SI1	Geographic	1	1	1	1	1	1
	Location						
SI2	Pond Area	0.8	0.2	0.2	0.9	0.2	0.8
	Pond surface						
	area to the						
SI ₃	Permanence	1	1	0.5	0.9	1	0.5
SI4	Water Quality	0.67	0.67	0.67	0.33	0.67	0.67
SI ₅	Shade	1	0.6	1	1	1	1
SI ₆	Waterfowl	1	1	1	0.67	1	1
SI7	Fish	1	1	1	0.67	1	1
SI ₈	Pond Count	1	1	1	1	1	1
SI9	Terrestrial	0.67	1	0.67	1	1	0.33
	Habitat						
SI10	Macrophytes	0.7	0.2	0.9	0.5	0.7	0.5
HSI	Score =	0.87	0.66	0.73	0.73	0.79	0.73
(SI1*SI2*SI	3*SI4*SI5*SI6						
*SI7*SI8*3	SI9*SI10)1/10						
Pond Suitability*		Excelle	Average	Good	Good	Good	Good
	nt line line line line line line line line						
* (<0.5 = poor; 0.5-0.59 = below average; 0.6-0.69 = average; 0.7-0.79 = good; >0.8 = excellent)							

Environmental DNA Surveys

A4.11 Ponds P3 and P5 returned a positive result for great crested newt eDNA whilst the remaining ponds were negative for the presence of great crested newt eDNA (as reported by SureScreen Scientifics on 15 July 2021). Analysis was conducted in accordance with current best practice guidelines, and in the presence of the following controls: extraction blank, appropriate positive and negative PCR controls (great crested newt degradation and inhibition). All controls performed as expected. The full eDNA results are presented in **Table EDP A4.5**.

Waterbody	SureScreen	Sample	Inhibition	Great Crested
Reference	Sample Ref.	Integrity		Newt Detection
2	2674	Pass	Pass	Negative
3	6980	Pass	Pass	Positive
4	6987	Pass	Pass	Negative
5	7006	Pass	Pass	Positive

Table EDP A4.5: eDNA Survey Results

Population Assessment

- A4.12 Results obtained to date have identified a medium population of great crested newts are supported between off-site ponds P1 and P5. This population is considered to be of Local importance.
- A4.13 None of the remaining ponds surveyed were found to support great crested newt however, other amphibian species were recorded including smooth newt. The full survey results are provided in **Table EDP A4.6**.

Date	Survey	Method	Results			
	Number		Great Crested Newts		ewts	Other Species Recorded
			Male	Female	Total	
Pond 1						
06/04/2022	1	Bottle	3	5	8	Peak count of 2 male and
		Trapping				1 female smooth newts
		Torching	1	11	12	recorded.
		Eggs	Ν			
		Found?				
13/04/2022	2	Bottle	3	1	4	Peak count of 2 male
		Trapping				smooth newts recorded.
		Torching	6	17	23	
		Eggs	Ν			
		Found?				

 Table EDP A4.6: Detailed Survey Results from 2022
Date	Survey	Method	Results										
	Number		Great	Crested N	ewts	Other Species Recorded							
			Male	Female	Total								
26/04/2022	3	Bottle	2	0	2	Peak count of 5 male and							
		Trapping				2 female smooth newts							
		Torching	11	7	18	recorded.							
		Eggs	Ν										
		Found?											
03/05/2022	4	Bottle	3	0	3	Peak count of 7 male and							
		Trapping				1 female smooth newts							
		Torching	8	8	16	recorded.							
		Eggs	N										
		Found?				-							
26/05/2022	5	Bottle	9	5	14	Peak count of 1 male and							
		Trapping				1 female smooth newts							
		Torching	1	1	2	recorded.							
		Eggs	N										
		Found?				1							
06/06/2022	6	Bottle	5	7	12	Peak count of 12 male							
		Trapping	-		_	and 11 female smooth							
		Torching	4	4	8	newts recorded.							
		Eggs	N										
		Found?											
Pond 2						1							
06/04/2022	1	Bottle	0	0	0	-							
		Trapping											
		Torching	0	0	0								
		Eggs	N										
	_	Found?			_								
13/04/2022	2	Bottle	0	0	0	-							
		Trapping	0	0		_							
		Torching	0	0	0								
		Eggs	N										
00/04/0000		Found?											
26/04/2022	3	Bottle	0	0	0	-							
		Trapping	0	0	0	_							
		Torching	0	0	0								
		Eggs	N										
02/05/0000	4	Found?		0		Ι							
03/05/2022	4	Bottle	0	0	0	-							
		Torobing	0	0	0								
				U	0	-							
		Eggs	N										
		Found?	1		1								

Date	Survey	Method	Results									
	Number		Great	Crested N	ewts	Other Species Recorded						
			Male	Female	Total	-						
26/05/2022	5	Bottle	0	0	0	-						
		Trapping										
		Torching	0	0	0							
		Eggs	Ν									
		Found?										
06/06/2022	6	Bottle	0	0	0	-						
		Trapping										
		Torching	0	0	0							
		Eggs	Ν									
		Found?										
Pond 5												
06/04/2022	1	Bottle	0	0	0	-						
		Trapping										
		Torching	0	0	0							
		Eggs	Ν									
		Found?										
13/04/2022	2	Bottle	0	0	0	-						
		Trapping										
		Torching	0	0	0							
		Eggs	N									
		Found?										
26/04/2022	3	Bottle	0	0	0	-						
		Trapping				_						
		Torching	0	0	0							
		Eggs	N									
00/05/0000	4	Found?	0	0								
03/05/2022	4	Bottle	0	0	0	Peak count of 1 female						
		Tapping	0	1	1	Shooti newc						
			N	T	1							
		Eggs Found2	IN									
26/05/2022	5	Bottle	0	0	0	Peak count of 1 female						
20/03/2022	5	Trapping	Ŭ			smooth newt						
		Torching	0	1	0							
		Forde	N	-								
		Found?										
06/06/2022	6	Bottle	0	0	0	-						
		Trapping	Ĭ		Ĭ							
13/04/2022	2	Torching	0	0	0	-						
26/04/2022	3	Eggs	N									
		Found?										

Date	Survey	Method	Results										
	Number		Great	Crested N	ewts	Other Species Recorded							
			Male	Female	Total								
Pond 6	-		-										
06/04/2022	1	Bottle Trapping	0	0	0	-							
		Torching	0	0	0								
		Eggs Found?	N										
13/04/2022	2	Bottle Trapping	0	0	0	-							
		Torching	0	0	0								
		Eggs Found?	N										
26/04/2022	3	Pond Dry	-										
03/05/2022	4	1											

Appendix EDP 5 Brown and Black Hairstreak Butterfly Surveys

Methodology

- A5.1 The Site supports some suitable habitat for brown hairstreak (*Thecla betulae*) and black hairstreak (*Satyrium pruni*) in the form of hedgerows with blackthorn (*Prunus spinosa* the larval foodplant for both species). These species are both Priority Species which have a stronghold in Oxfordshire.
- A5.2 Three transect surveys were undertaken on the Site between July and August 2022 to identify the presence or likely absence of these species. The weather conditions recorded during each survey visit undertaken are summarised in **Table EDP A5.1**.

Date	Time	Air temperature Range (°C)	Wind Speed (Beaufort)	Rain
27/07/2022	11:00 - 12:20	20	0	Nil
09/08/2022	11:00 - 12:20	27 - 29	0	Nil
24/08/2022	11:00 - 12:20	21-23	1	Nil

Table EDP A5.1: Summary of the Survey Dates and Weather Conditions

A5.3 The survey was undertaken following the standard UKBMS transect protocol with a total of three survey visits being undertaken. The transect route was designed to take in as much of the Site as possible, whilst focusing on areas of higher suitability for brown and black hairstreak (hedgerows which support blackthorn). The route is shown on **Plan EDP 9**. The survey was undertaken between 11am and 3pm in warm (20 - 29°C), sunny conditions with little wind and occasional cloud. The transect sections were walked at a slow pace, recording all butterflies within 2.5m either side of the transect line and 5m ahead of the surveyor.

Limitations

A5.4 The transect surveys undertaken within the Site were completed during suitable weather conditions and within recognised months for these surveys (July - August when adults are on the wing). The survey effort is therefore considered sufficient to confirm presence/likely absence of adult brown and black hairstreak butterflies.

Results

A5.5 Brown hairstreak has been recorded within 500m of the Site whilst black hairstreak has been recorded within 2km of the Site. The most recent record within 2km of the Site for brown hairstreak is from 2015 whilst for black hairstreak, it is from 2011. Both black and brown hairstreak are listed under Schedule 5 of the *Wildlife and Countryside Act* 1981 (as amended). These species are typically associated with blackthorn which is the favoured egg laying plant and food source for their caterpillars. The hedgerows within the

Site are of low suitability for these species due to supporting only intermittent blackthorn and being intensively managed.

- A5.6 No evidence of brown or black hairstreak butterflies were recorded during any of the transect surveys. Due to this, and the low suitability of the habitats present, it is considered that these species are likely-absent from the Site. Furthermore, no other rare or notable butterfly species were identified within or directly adjacent to the Site.
- A5.7 Records for a further 18 priority invertebrate species were returned within 2km of the Site. These primarily records relate to beetle, butterfly and moth species. The majority of the Site is, however, of relatively low suitability for these species due to the lack of botanical diversity in the majority of the habitats. Nevertheless, habitats of greater ecological importance occur on site, including a small pocket of marshy grassland. Assuming these habitats are retained or mitigated for, then then priority invertebrate species, which typically associate with these habitats will also be retained and mitigated for.

Appendix EDP 6 Biodiversity Impact Assessment

Introduction

- A6.1 The BIA of the proposed residential development at the Site was undertaken in August 2022 using the DEFRA Biodiversity Metric 3.1 (version date: 28 April 2022), by an ecologist with experience of using such calculators, in accordance with the Biodiversity Metric 3.1 best practice guidance ²⁵.
- A6.2 The BIA has been produced to objectively assess the net effects of the proposals on biodiversity in line with local and national planning policy.
- A6.3 The assessment is based on the existing habitat information derived from the extended Phase 1 Habitat survey undertaken by EDP in June 2021 as Illustrated on the Phase 1 Habitat Plan (**Plan EDP 1**) and proposed habitats as shown on the Illustrative Masterplan in **Appendix EDP 8**. GIS software has been used to accurately calculate areas of habitat to be retained, enhanced and created. The proposed habitats and schemes are illustrated in **Plan EDP 10**. The Biodiversity Metric 3.1 condition assessment calculator reference sheets ²⁶ have been used to inform the conditions used for existing habitats alongside professional judgement.
- A6.4 The condition assessment of the habitats on the Site was undertaken in June 2021 in accordance with the methodology and condition assessment criteria set out by DEFRA. This Site visit was undertaken within the optimal season for surveys requiring botanical species identification; as such species identification was sufficient to adequately assess the condition of the habitats present.
- A6.5 Detailed landscaping plans and consideration of specific habitat types are yet to be confirmed; therefore, this BIA is considered to be a high-level assessment only, providing an indicative assessment of what could realistically be achieved on the Site. In addition, some assumptions have had to be made regarding the value and condition of the proposed habitats.
- A6.6 As with all BIA calculations, they do not account for protected species mitigation and enhancement measures such as the provision of bird/bat boxes or amphibian/reptile refugia.

²⁵ Stephen Panks, Nick White, Amanda Newsome, Mungo Nash, Jack Potter, Matt Heydon, Edward Mayhew, Maria Alvarez, Trudy Russell, Clare Chason, Finn Goddard, Sarah J. Scott, Max Heaver, Sarah H. Scott, Jo Treweek, Bill Butcher and Dave Stone, 2022. Biodiversity p 3.1: Auditing and accounting for biodiversity – User Guide. Natural England.

²⁶ http://publications.naturalengland.org.uk/publication/6049804846366720

A6.7 Note that the calculations deal with linear features (hedgerows) and other habitats separately, resulting in two separate scores. Any additional information required (for example the full set of calculations, condition criteria and GIS files) are available upon request. It should also be noted that this is the preliminary round of calculations for the proposals, intended to demonstrate potential achievable scores for the Site, and inform the future landscape design evolution.

Baseline Condition

A6.8 The baseline conditions for the existing and proposed habitats are summarised below.

Existing Habitats

- A6.9 The Site is currently dominated by three fields of poor semi-improved grassland with small areas of bare earth, marshy grassland, tall ruderals and scattered scrub present towards the field margins. The fields are bound by native hedgerows (predominantly species-poor and one species-rich) and a broadleaved treeline.
- A6.10 Based on this assessment, the Site measures c.9.46 hectares (ha) and its current biodiversity value is 38.14 for the baseline habitat (area) units and 14.92 for the baseline hedgerow (linear) units.

Proposed Site Habitats

- A6.11 The proposed development is for the erection of up to 120 residential dwellings. The development parcels will comprise of buildings, gardens and associated hardstanding infrastructure including a new access road. These will be surrounded by a series of created and enhanced habitats to provide a green infrastructure network and Public Open Space. The created and enhanced habitats will comprise of the following:
 - Species-rich meadow grassland;
 - Amenity grassland playing fields;
 - Public Open Space which will be split 40% wildflower grassland, 40% amenity grassland and 20% mixed scrub;
 - A variety of small native trees within the development footprint;
 - A mixture of medium and large trees within the green infrastructure network;
 - A Sustainable Urban Drainage System comprising of a SuDS pond and swales;

- Planting of additional native, species-rich hedgerows along the field and the sites boundaries to enhance the existing hedgerow network; and
- Retention and enhancement of the majority of existing hedgerows.

Assumptions

A6.12 Various general assumptions on the proposed habitats have been made for the purposes of the calculations as there are currently no detailed landscaping plans for the Site. As such, the type and location of planting in some areas has been assumed and summarised below. Where appropriate, these have been added to the impact calculation table in the 'comments' column. This may be subject to variation at the detailed design stage.

Habitat Retention and Enhancement

- A6.13 A number of the existing habitats on the Site will be enhanced within the Illustrative Masterplan. This includes the retention of c.0.87km of species-poor intact hedgerow and species-poor hedgerows with trees to be retained and enhanced to species-rich hedgerows in 'good' condition. The species-rich hedgerow with trees c.0.11 km in length and c.0.25km of broadleaved treeline will also be retained and maintained to their current 'good' condition.
- A6.14 It is considered that the hedgerows can be enhanced with the careful selection of native species planting and management, including considered timings for cuttings and appropriate cutting methods. This would ensure the hedgerows are maintained to an appropriate height and width with limited gaps at the base and within the hedgerow canopy to enable a good condition to be achieved. Appropriate management would also minimise the establishment of undesirable species and damaged caused by anthropogenic activities.

Habitat Creation

- A6.15 Several new habitats are to be created on the Site including areas of Public Open Space and wildflower grassland. It has been assumed the Public Open Space will be split into 40% amenity grassland, 40% wildflower grassland and 20% mixed scrub. The assumptions for these habitats are outlined below:
 - Amenity grassland in the Public Open Space and community areas have been categorised as 'modified grassland' of poor condition due to its amenity use and potentially greater levels of disturbance;
 - A native wildflower grassland mix will be used for the areas of wildflower grassland. These have been included as 'other neutral grassland' in 'moderate' condition which

could be achieved with the careful planting of these areas away from public footpaths to minimise impacts from trampling and the implementation of an appropriate management regime to maintain structural and botanical diversity; and

- Mixed scrub planting will comprise of a variety of native species from a range of age groups. The scrub could realistically achieve 'good' good condition with the careful selection of species and the implementation of an appropriate management regime.
- A6.16 The 'species-rich meadow grassland' has been categorised as 'good' condition 'other neutral grassland'. This could be achieved with the careful selection of a wildflower meadow seed mix and a considered management regime. In order to maintain good condition in the long-term, the management will need to focus on maintaining a diverse sward height and to remediate areas of bare ground, bracken and undesirable species. A mown strip, covering 5% of this area, will be provided through the centre of this grassland to provide a public footpath. The remaining grassland will be fenced off with post and rails or similar to restrict public access into these areas. The mown footpaths have been included as modified grassland in 'moderate' condition which can be reached with the planting of an appropriate seed mix tolerant to some trampling and management.
- A6.17 A drainage network comprising of a SuDs pond and swales is proposed for the western portion of the Site. It has been proposed that the SuDs pond is planted with a native wetland seed mix to create botanical diversity and an appropriate management regime is implemented in order to create and maintain botanical and structural diversity in addition to maintaining the water table up to or near to the surface. For the swales and along the upper edge of the SuDs pond, it is proposed that a marshy grassland seed mix is sewn and appropriately managed to create a wet grassland habitat within these areas. The management would aim to maintain structural diversity and minimise the establishment of bare ground, bracken, scrub, undesirable species and physical damage in order to achieve 'moderate' condition.
- A6.18 It is proposed that a variety of native urban trees will be planted within the development footprint within amenity grass verges. It has been assumed that these will comprise of small trees in 'poor' condition only given their location within built development which will likely limit their growth and value for wildlife.
- A6.19 A mixture of native small and medium-sized trees have also been proposed within the green infrastructure network around the development footprint. If appropriate native species are used and these trees are appropriately managed with limited usage of pesticides or excessive over-pruning, these trees could reach 'moderate' condition.
- A6.20 Additional hedgerow planting will be undertaken adjacent to the northern boundary hedgerows to create 'double hedgerows' where two hedgerows are present with a gap between to provide commuting opportunities for wildlife. A new hedgerow with a ditch is also proposed along the western site boundary to improve connectivity around the Site post-development. Native hedgerow and tree species should be used, and if these hedgerows are appropriately managed once established, these hedgerows could achieve 'moderate' condition.

Results Summary

A6.21 The full BIA calculations pertaining to habitat units and hedgerow (linear) units based on the Illustrative Masterplan are provided in **Appendix EDP 9** and these calculations are summarised in **Table EDP A6.1**.

Biodiversity Value	Habitat (Area) Units	Hedgerow (Linear) Units
Existing Site	37.80	14.58
Post-development	41.58	17.23
Net Balance (units)	3.78	2.65
Net Balance (%)	10.01%	18.17%

 Table EDP A6.1: Biodiversity Impact Assessment Summary

- A6.22 The calculations confirm that, based on the illustrative proposals and the above assumptions, the development is capable of achieving a net gain in habitat units of 10.01% and a net gain of 32.73% in hedgerow units.
- A6.23 The Metric includes an assessment of whether certain trading rules have been met by the proposed scheme. Trading rules applied by the Metric require that any loss of habitat is replaced on a 'like for like' or 'like for better' distinctiveness basis, to prevent 'trading down', whereby more ecologically valuable habitats are lost and replaced with larger areas of lower value habitats. Under the above assessment, the Trading Rules for the Metric have been satisfied.

Appendix EDP 7 Biodiversity Assessment Calculations

Headline Results

Return to results menu

	Habitat units	37.80
On-site baseline	Hedgerow units	14.58
	River units	0.00
	Habitat units	41.58
On-site post-intervention	Hedgerow units	17.23
(Including habitat retention, creation & enhancement)	River units	0.00
	Habitat units	10.01%
On-site net % change	Hedgerow units	18.17%
(Including habitat retention, creation & enhancement)	River units	0.00%
	Habitat units	0.00
Off-site baseline	Hedgerow units	0.00
	River units	0.00
	Habitat units	0.00
Off-site post-intervention	Hedgerow units	0.00
(Including habitat retention, creation & enhancement)	River units	0.00
	Habitat units	3.78
Total net unit change	Habitat units Hedgerow units	3.78 2.65
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)	Habitat units Hedgerow units River units	3.78 2.65 0.00
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)	Habitat units Hedgerow units River units Habitat units	3.78 2.65 0.00 10.01%
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement) Total on-site net % change plus off-site surplus	Habitat units Hedgerow units River units Habitat units Hedgerow units	3.78 2.65 0.00 10.01% 18.17%
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement) Total on-site net % change plus off-site surplus (including all on-site & off-site habitat retention, creation & enhancement)	Habitat units Hedgerow units River units Habitat units Hedgerow units River units	3.78 2.65 0.00 10.01% 18.17% 0.00%

Trading rules Satisfied? Yes √



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Ref	Broad Habitat	Habitat Type	Area (bectares)	Distactiveness	Score	Condition	Score	Strategic significance	Straingic Algolficance	Straiegic Significance multiplier	habitat loases	Total habitat units	Area	Area echance	a Daseline units retained	Daselno units enhanced	Area habitat lost	Units lost	agreed for usacceptable losses	Assessor comments	Reviewer comments
1	Grassland	Modified grassland	0.04	Low	2	Moderate	2	Area/compensation not in local strategy/no local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required 2	0.16			0.00	0.00	0.04	016		Marshy grassland. Grassland. s in moderate condition due to failing criteria 1 and 2	
2	Grassland	Modified grassland	9.06	Low	2	Moderate	2	Assa compensation not in local strategy/ no local strategy	Low Strateg c Signif cappe	4.00	Same distinctiveness or better habitat required 2	27 44			0.00	0.00	9.35	37.44		Poor semi- reproved grassland. Grassland is n moderate cond for due to failing order a 2 and 3	
3	Sparsely vegetated land	Ruderal Sphemeral	0.02	Low	2	Poor	1	Area compensation not in local strategy ino local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required 2	0.04			0.00	0.00	0.02	0.04		Tal ruderals. In poor condition due to is ling criteria 1 and 2	
4	Heathland and shrub	Branible scrub	0.02	Medium	4	Cond Son A UNA	1	Area compensation not in local strategy/ no	Low Strategic S f	1.00	Same broad hab tator a higher d.t.t.b.b.t.t.d.	0.00			0.00	0.00	0.02	0.02		Brambie scrub	
s	Urban	Artificial unvegetated unrealed surface	0.03	V Low	0	NA-Ober	0	Area compensation not in local strategy ino local strategy	Low Strategic Significance	1	Compensation Not Required	0.00			0.00	0.00	0.03	0.00		Bare earth	
8	Sparsely vegetated land	Ruderal Ephemeral	0.02	Low	2	Poor	1	Area compensation not in local strategy/ no local strategy	Low Strateg c Signif cappe	1.00	Same distinctiveness or better habitat required 2	0.04			0.00	0.00	0.02	0.04		Short personials in poor condition due to failing or ter a 1 and 2	
7	Heathland and shrub	Hawthom scrub	0.01	Medium	-4	Poor	1	Area compensation not in local strategy/ no 1 1 t t	Low Strategic S f	1.00	Same broad hab tator a higher d t t b b t d	0.04			0.00	0.00	0.01	0.04		Hawthorn scrub is F2 is poor condition due to failing t 2.3 d.5	
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10																					
11														-							
ш		Total habitat area	0.50		-		-					27,60	0.00	0.00	0.03	0.00	P 50	37.60		1	
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Total area lost (excluding area of Urban treas and Green walls) 9.50

A-2 Site Habitat Creation

Main Menu

Condense / Show Rows Instructions

			-		Post development/ post inte	-	(hanna sada				
			Distinctiveness	Condition	Strategic significance	Temporal multiplier		Difficulty		Con	nments
Broad Habitat	Proposed habitat	Area (hectares)	Distinctiveness	Condition	Strategic significance	Standard or adjusted time to target condition	Final time to target condition/years	Final difficulty of creation	Habitat units delivered	Assessor comments	Reviewer comments
Urban	Developed land; sealed surface	1 64	V.Low	N/A - Other	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	0	Medium	0 00	Residential footprint and associated hardstanding. A ratio of 70% hardstanding/ buildings and 30% gardens has been	
Urban	Vegetated garden	0.7	Low	Condition Assessment N/A	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	1	Low	1 35	Gardens. A ratio of 70% hardstanding/ buildings and 30% gardens has been assumed	
Grassland	Modified grassland	0 65	Low	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	4	Low	2 25	Community/Leisure facilities area. Intense management and trampling will likely result in the grassland failing critera 1, 2, 4, and 5	
Urban	Sustainable urban drainage feature	0 09	Low	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	3	Medium	0 22	SuDS pond. If appropriately planted with a native seed mix and appropriately managed in the long term to maintain botanical diversity and the water table levels to or near the surface. This feature will likely fail	
Grassland	Modified grassland	0.13	Low	Moderate	Årea/compensation not in local strategy/ no local strategy	Standard time to target condition applied	4	Low	0.45	POS split into 40% amenity, 40% wildflower grassland and 20% mixed scrub. This is the mixed scrub component which will likely fail criteria 1 and 5.	
Heathland and shrub	Mixed scrub	0 07	Medium	Good	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	10	Low	0 59	POS split into 40% amenity, 40% wildflower grassland and 20% mixed scrub. This is the mixed scrub component which could pass all criteria if appropriately planted and managed in the long-term to create clearings and a well-developed scrub edge.	
Urban	Developed land; sealed surface	1 91	V.Low	N/A - Other	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	0	Medium	0 00	Other hardstanding incl. driveways, roads, paths etc. Includes 10% hardstanding in the community/ leisure facilities area. A ratio of 95% hardstanding to 5% wildflower crassland verges has been assumed	
Grassland	Other neutral grassland	0.13	Medium	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	5	Low	0.87	grassland and 20% mixed sorub. This is the wildflower grassland component. The grassland will likely fail criteria 1 and 2. management regime to achieve 'moderate' condition through management of a diversity of grassland sward heights, and minimisation of bare ground, bracken, scrub, undesirable species and physical domard.	
Urban	Urban Tree	0 3174	Medium	Poor	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	10	Low	0 89	78 Small trees within the residential footprint. Trees will likely establish to a poor condition only due to failing criteria 1, 2, 3	
Grassland	Other neutral grassland	0 26	Medium	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	5	Low	1.74	and Swales to be planted with a marshy grassland seed mix. Marshy grassland seed mix to be sown within swale and habitat to be managed as marshy grassland following management regime to achieve 'moderate' condition through management of a diversity of grassland sward heights, and minimisation of bare ground, bracken, scrub, undesirable species and physical damage	
Grassland	Modified grassland	0.19	Low	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	4	Low	0 66	Wildflower grassland verges - assumed to form 5% of the remaining hardstanding footprint. Grassland will establish to a moderate condition only due to failing criteria 1, 2, 4 and 5.	
Grassland	Other neutral grassland	3.515	Medium	Good	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	10	Low	29.54	considered management regime and careful selection of a wildflower meadows sowing mix it would be possible to meet the definition of other neutral grassland in UKHab, as well as maintain a diverse sward height and management to remediate areas of bare ground, bracken and undesirable species.	
Urban	Urban Tree	0.78	Medium	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	27	Low	2 38	18 Small and 70 medium street trees within the green infrastructure and public open space. Trees could establish to a moderate condition if appropriately managed and protected from excessive management. In the long-term, the trees will still likely fail	
Urban	Developed land; sealed surface	0 03	V.Low	N/A - Other	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	0	Medium	0 00	LEAP - assumed to comprise of solely hardstanding.	
Grassland	Modified grassland	0.185	Low	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	4	Low	0 64	Mown footpaths through the wildflower grassland - covering c. 5% of this area. IT has been assumed that this will be in moderate condition due to intermitent	
	Total habitat area	10.60			·				41.58		
			-								
	Site Area (Excluding area of Urban trees and Green walls)	9.50									

	A-3 Site Habitat Enhancement														
Conde	ense / Show Columns Conciense / Show Rows														
	Main Menu Instructions				Post development/ post intervention	n habitats									
	Baseline habitats			Change in distinctiv	eness and condition				Strategic significance	Temporal risk multip	lier	Difficulty risk	The best of	¢	omments
Baseline		Propos	ed Habitat (Pre-populated but can be overridden)			Area (hectares)	Distinctiveness	Condition		Standard or adjusted time to target	Final time to	multipliers	units		
ref	Baseline habitat	Proposed Broad Habitat	Proposed habitat	Distinctiveness change	Condition change	(traciet es)			Strategic significance	condition	target condition/vears	enhancement	delivered	Assessor comments	Reviewer comments
			Urban Tree			#20/A	Medium	Good	Area/compensation not in local strategy/ no			Low			
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	Baso ino Habita s		Change in distnct yeness and condition		Change is distinctiveness and condition Distinctiveness Con-		Condition	Straingic sign ficance	io sign ficance Temporal multiplier Diff		Diff outy rusk moltipliers		Common a	
Baseline ref	Resolute habitet	Proposed (Pre-populated but can be overridden)	Distinctiveness movement	Coudifice movement	(km)	Distinctiveness	Ceedition	Strategic significance	Standard or adjusted time to arget condition	Final time to target condition/years	Final difficulty of ephanoement	Hedge units delawared	Assessor constructs	Reviewer comments
1	Hatve Hedgerow	Matve Spec es Rich Hedgerow	Low - Medium	Lower Distinctiveness Hab tat- Good	0.17	Median	Good	Area compensation not in local strategy ino local strategy	Standard time to target condit on applied	5	Low	1.07		
2	Native Hedgerow	Matve Spec es Rich Hedgerow	Low - Medium	Lower Distinctiveness Hab tat- Good	0.11	Medium	Good	Area compensation not in local strategy ino	Standard time to target condition	5	Low	1.21		
2	Slat ve Hedgerow wi h trees.	Natue Species Rich Hedgerow with press	Medium - High	Lower Distinctiveness Hab tat- Good	0.18	High	Good	Area compensation not in local strategy ino local strategy	Standard time to target condition applied	5	Low	3.06		
4	Native Hedgerow with press - Associated at hibask or ditch	Native Spec on Rich Heckgerow - Associated with bank or d tch	High - High	Brees Hertika berkes a	0.17	High	Good	Area compensation not in local strategy no local strategy	Check details - is there exidence that habitat has reached target could for?		Low			
	Nat ve Hedgerow with trees.	Natue Species Rich Hedgerow with press	Medium - High	Lower Distinctiveness Hab tat- Good	0.16	High	Good	Area compensation not in local strategy ino	Standard time to target condit on 1 d	5	Low	2 72		
4	Slat ve Hedgerow with trees.	Natue Species Rich Hedgerow with press	Medium - High	Lower Distinctiveness Hab tat- Good	0.08	High	Good	Area compensation not in local strategy ino local strategy	Standard time to target condition applied	5	Low	1.35		
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Appendix EDP 8 Illustrative Landscape Strategy Plan

(edp4579_d025b 06 September 2022 LTi/BCo)



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dimension partnership

1:2,500 @ A3

06 SEPTEMBER 2022 drawn by LTI

the environmenta

checked BCo

RBa

QA

Site Boundary

Existing Vegetation to be Retained and Enhanced Where Appropriate

Proposed Species Rich Wildflower

Indicative Location of Wildlife Pond

Note: Location of proposed SUDs features to be confirmed at the

Indicative Location of Play Area

Proposed Tree Planting

Proposed Amenity Grass

Proposed Hedgerow

Meadow

detailed stage.

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Appendix EDP 9 Illustrative Framework Plan



To a single the description of the stand Single Set Set

A Site access

- B Existing hedges and trees to be retained and enhanced.
- C New Pedestrian Link to connect site to West Hawthome Road.
- D Potential play/recreational facilities
- E Potential attenuation feature
- Main spine road to have street tree
 planting
- G Pedestrian Link to Ploughley Road
- Development around the edges of the site to be more informal to provide a rural edge character.
- Primary street to have greater formality with emphasis on structured landscape and tree planting to front gardens
- J Extensive green spaces that interconnect to provide green considers and enhance the rural feel of the development as well as potential for biodiversity enhancement.
- K A mix of 2, 3 & 4 bedroom houses with an emphasis on smaller family homes.
- North West boundary to have new hedge planting and potential ditch feature
- M Indicative Pumping Station Location



Ploughley Road, Ambroaden:

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Plans

Plan EDP 1	Extended Phase 1 Habitat Plan (edp4579_d010a 25 August 2022 VMS/JBr)
Plan EDP 2	Statutory Sites within 5km (edp4579_d027 24 August 2022 GYo/JBr)
Plan EDP 3	Non-statutory Sites within 2km (edp4579_d028 24 August 2022 RBa/JBr)
Plan EDP 4	Bat Activity Transect Route and Anabat Locations (edp4579_d001 24 August 2022 GYo/JBr)
Plan EDP 5	Bat Activity Survey – Dusk June 2021 (edp4579_d026 24 August 2022 GYo/JBr)
Plan EDP 6	Bat Activity Survey – Dusk August 2021 (edp4579_d006 24 August 2022 GYo/JBr)
Plan EDP 7	Bat Activity Survey – Dusk October 2021 (edp4579_d007 24 August 2022 GYo/JBr)
Plan EDP 8	Reptile Survey Plan (edp4579_d009 24 August 2022 GYo/JBr)
Plan EDP 9	Butterfly Transect Survey (edp4579_d029 24 August 2022 GYo/JBr)
Plan EDP 10	Post-development Habitat Map (edp4579_d022a 14 August 2022 JBr/PNe)





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Site Boundary

5km Range Ring



Site of Special Scientific Interest (SSSI)

client

Archstone Ambrosden Ltd & Bellway Homes Ltd

project title

Land off Ploughley Road, Ambrosden

drawing title

-

Statutory Designated Sites within 5km

dote	24 AUGUST 2022	drawn by	ά¥ο
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Archstone Ambrosden Ltd & Bellway Homes

Land off Ploughley Road, Ambrosden

Bat Activity Transect Route and Anabat

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