Sharpness Vale

Ecology Strategy Paper

Prepared by:
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On behalf of:
Sharpness Development LLP

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Plans

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Section 1
Introduction, Purpose and Context

1.1 This Ecology Strategy Paper has been prepared by The Environmental Dimension Partnership Ltd (EDP) on behalf of Sharpness Development LLP (hereafter referred to as 'the Client'). This report provides a summary of the baseline conditions and sets out an anticipated ecology mitigation strategy for the proposed site allocation at Sharpness Vale (hereafter referred to as 'the Site') order to deliver biodiversity gains and protect and enhance habitat and protected species interests.

1.2 The ecology baseline and appropriate mitigation strategies have formed a key part of the iterative concept masterplanning evolution to date, thereby ensuring that the inherent mitigation has been designed into the scheme from the outset. The approach has been directly informed, in collaboration with the wider project team, by the ecology survey findings, consultation, best practice guidance and professional input from experienced ecologists that are full members of the Chartered Institute of Ecology and Environmental Management (CIEEM).

1.3 This Ecology Strategy Paper should be read in conjunction with:

- Winter and Passage Bird Report (edp4792_r006 July 2021 update);
- Fisheries Walkover and eDNA Survey (APEM January 2021 update); and
- Recreational Avoidance Strategy (edp4792_r008 July 2021 update).

Site Context

1.4 The Site lies between and around the settlements of Newtown, Brookend, Wanswell and Berkeley in Gloucestershire. It is bordered by the River Severn estuary in the west and it is centred approximately at Ordnance Survey Grid Reference (OSGR) SO 677 008. The Local Planning Authority (LPA) is Stroud District Council (SDC).

1.5 The Site boundary is defined to the south and south-west by the Severn Way public footpath, which runs parallel to the north of Berkeley Pill – a tributary to the River Severn. The town of Berkeley partially borders the Site to the south-east. To the west lies the River Severn estuary, to the north and east farmland, with the hamlet of Newtown also to the north. The Site is split into four distinct sections separated by several farms and roads (including the B4066). A freight-only railway line also runs through the Site with a bridge forming the only connection between the northern and central sections.

1.6 The character of the Site is rolling farmland (predominantly grazed improved grassland) with mature hedgerows in the north-east, giving way to larger fields, drainage ditches and flatter land towards the south-west and the Severn floodplain.

Proposed Development

1.7 Sharpness Vale has been identified as a draft allocation in the emerging Stroud District Local Plan (May 2021). The allocation will deliver a sustainable new settlement comprising:

- Approximately 2400 dwellings;
- Education provision;
- 10 Hectares (ha) employment;
- Retail;
- Community uses; and
- Greenspace including:
    - Nature reserve with no public access (expanded high tide roost area);
    - Suitable Alternative Natural Green Space (SANG) including a wetland park;
    - Allotments and orchards; and
    - Other sustainable alternative natural greenspace.

1.8 A second phase of development is being promoted to the north of the allocation for a further 2600 dwellings, with the vision of creating a sustainable new settlement of approximately 5000 dwellings across Sharpness Vale. However, this would not be delivered in the current Local Plan period and while the ecology 'Study Area' covered parts of this 'Phase 2' site, it is not the focus of this strategy.

Scope of Report

1.9 The purpose of this report is to outline the important ecological features (IEFs) present within the Site and to provide a summary of the emerging ecology mitigation strategies to ensure the potential mix-used development of the Site is brought forward in accordance with wildlife legislation and planning policy, including maximising opportunities for biodiversity gain.

1.10 The report includes information on how impacts upon each of the IEFs will be avoided, mitigated and, if necessary, compensated in accordance with the mitigation hierarchy. This includes information on the design evolution and measures, which seek to protect these features and will act as enhancements for habitats and species present.

1.11 The report also includes the findings of Biodiversity Net Gain calculations in order to demonstrate that the development is capable of delivering an overall net gain of at least 10% in biodiversity, in accordance with emerging national policy.

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Section 2
Ecology Baseline

2.1 The full baseline ecology information collated to date will be set out in detail within an Ecology Baseline Report, which will support any future planning application and, if required, the Site allocation. The baseline report will detail the full methodologies employed, their findings and any limitations. A summary of the baseline is provided below and supporting plans are provided to the rear of this report, namely the Phase 1 Habitat Survey (**Plan EDP 1**) and Ecology Constraints and Opportunities (**Plan EDP 2**).

Survey Scope

2.2 Detailed surveys undertaken within the Study Area include historical surveys undertaken by All Ecology, Enzygo and EAD Ecology between 2014 and 2018. These surveys are listed in **Table EDP 2.1**. The Site and wider Study Area (the boundaries of which are shown on **Plan EDP 1**) has also been subject to a suite of desk- and field-based investigations completed by EDP between 2018 and 2021.

Table EDP 2.1 Surveys Completed and Ongoing within the Study Area

Survey/Method	Historical Surveys	EDP Surveys
Extended Phase 1 Habitat survey	Jul 2014 (Enzygo) Jan 2017 (EAD Ecology)	Aug 2018, Dec 2020
Botanical surveys	-	May 2019, June/July 2021
Hedgerow assessment	Jul/Aug 2014 (Enzygo)	Aug/Sept 2019
Breeding Bird survey	May/Jun 2014 (Enzygo)	Apr/May/Jun 2019, Apr/May/Jun 2021
Wintering Bird survey (Site)	Nov 2014–Feb 2015 (Enzygo) Nov 2015–Feb 2016 (EAD Ecology) Nov 2017–Feb 2018 (EAD Ecology)	Monthly winter bird surveys and dusk/dawn vantage point (VP) surveys Nov 2018–Mar 2019, Dec 2019–Mar 2020 and Oct 2020–Mar 2021
Wintering Bird survey (Estuary shoreline)	Nov 2015–Feb 2016 (EAD Ecology)	Monthly low and high tide surveys completed in months as above.
Bat Activity Survey (Transects)	Jun–Aug 2014 (Enzygo)	Monthly April–Aug 2019 (including dusk/dawn in Aug), a dusk/dawn survey in Sept 2020 and dusk transects in May/Jul 2021
Bat Roost survey (Preliminary roost assessment)	Jun 2014 (Enzygo)	Jan 2021
Dormouse survey (Nest tubes)	Jun–Oct 2014 and Apr–Jun 2015 (Enzygo)	Sept–Nov 2020, April to September 2021
Otter and Water Vole survey	Jun 2014 and May 2015 (Enzygo)	Sept 2020 and June 2021
Badger walkover Survey/Trail Camera	Summer 2014–Spring 2015 (Enzygo)	Mar 2020

Survey/Method	Historical Surveys	EDP Surveys
Great Crested Newt survey (Traditional methods)	May 2014 (All Ecology)	-
Great Crested Newt survey (eDNA)	2016 (EAD Ecology)	Jun 2019 and April 2021
Great Crested Newt survey (HSI)	-	Jun 2019 and June 2021
Fisheries walkover and eDNA Eel survey	-	April 2019 and October 2020 respectively (completed by APEM)

2.3 The Proposed Development's zone of influence will be defined in the Ecology Baseline Report and extends to 15km for international ecological designations, 5km for national designations and up to 2km for non-statutory designations (e.g. Local Wildlife Sites) habitats and species.

Designated Sites

Statutory Designations

2.4 The Site lies immediately adjacent to a section of the Severn Estuary, which is designated as a Special Protection Area (SPA), Special Area of Conservation (SAC) and a Ramsar site. The SPA is designated for regularly supporting 20,000 waterfowl, the SAC for the presence of an Annex I estuarine habitats and Annex II fish species, and the Ramsar designated for the internationally important habitats, diverse fish communities and abundant waterfowl.

2.5 A further SAC, namely Wye Valley and Forest of Dean Bat Sites lies within 10km of the Site. This SAC is designated for its internationally significant breeding populations of Annex II bat species (lesser (*Rhinolophus hipposideros*) and greater horseshoe (*Rhinolophus ferrumequinum*) bats).

2.6 There are five Sites of Special Scientific Interest (SSSIs) located within 5km of the Site. Four of these are designated as they are constituent parts of the designated sites listed previously. The fifth SSSI is Clarke's Pool Meadow, which lies 4.4km to the north of the Site. This SSSI is designated for its herb-rich semi-natural grassland.

Non-statutory Designations

2.7 In Gloucestershire, non-statutory designated sites are referred to as Key Wildlife Sites (KWS). Additional designated sites, which should be considered at this level, include Ancient Semi-natural Woodland (ASNW), where it is not covered by other designations.

2.8 Twelve KWSs and four unconfirmed/potential KWSs are located within 2km of the Study Area. These are shown below in **Table EDP 2.2**.

2.9 The Site also contains significant areas of land containing known Priority Habitat, including 'Coastal and Floodplain Grazing Marsh', however, these are listed as 'Low' confidence (limited confidence in spatial extent and value), and following the Extended Phase 1

survey, are not considered to be of significant value, having been converted to improved pastures. In addition, small areas of the Priority Habitats 'Deciduous Woodland', and 'Traditional Orchard' exist within the Site. The orchard contains just five trees, all of which are in poor condition.

Table EDP 2.2: Non-statutory Designations (or Equivalent Nature Conservation Value)

Name	Designation and Importance	Distance from Study Area	Reasons for Designation
Tintock Wood (inc Pitbrook Brake and Penny Grove)	KWS	<0.1km	Ancient semi-natural broad-leaved woodland site larger than 2ha.
Wanswell Hay Meadows	KWS	0.1km	Semi-natural grassland.
Sharpness Docks	KWS	0.1km	Plant interest. Nationally Scarce species.
Brooks Grove (Howes's Grove)	KWS	0.4km	Ancient semi-natural broad-leaved woodland site larger than 2ha.
Sarah's Field, Berkeley	Unconfirmed - potential KWS	0.4km	Semi-improved grassland. Floods in winter. Berkeley Town Council community site.
Sharpness Grassland	Unconfirmed - potential KWS	0.65km	Unimproved grassland with diverse flora (includes industrial areas).
Berkeley Heath Water Meadows	KWS	0.9km	Marsh, bog, swamp, mire and tall herb fen over 2.5ha.
Butler's Grove	KWS	1.1km	Ancient semi-natural broad-leaved woodland site larger than 2ha.
Bushy Grove	KWS	1.1km	Ancient semi-natural broad-leaved woodland site larger than 2ha.
Purton Timber Ponds	KWS	1.3km	Lakes and reservoirs: All lakes, gravel pits and reservoirs larger than 0.25ha.
Whitcliff Park	KWS	1.5km	Pasture Woodland and Mature Timber habitat: site with 10 or more over- mature trees, or site with an Alexander Index of saproxylic beetles of 10 or more.
Nass Cliff (Lydney Cliff)	KWS	1.8km	A narrow strip of eroding woodland along a cliff top with small-leaved lime and wild service tree. The very rare sedge, long-bracted sedge (*Carex extensa*), occurs at the base of the cliff.
Purton Meadows	Unconfirmed - potential KWS	1.8km	Orchard and meadows.
Gloucester and Sharpness Canal	KWS	1.8km	Invertebrate interest.
Red Wood	KWS	1.9km	Ancient semi-natural broad-leaved woodland site larger than 2ha.
Lydney Harbour and Dock	Unconfirmed - potential KWS	1.9km	Harbour and docks with alien plants, marshy waste ground, lowland wet meadows.

Habitats

2.10 The habitats present at the Site were recorded during an Extended Phase 1 Habitat survey in August 2018 and have been updated during various walkover surveys completed between 2018 and 2021. The surveys were based on mapping different habitats with a description of plant species present and followed the relevant best practice guidance[1].

2.11 A targeted botanical survey was also undertaken in May 2019 and a hedgerow survey was undertaken in August and September 2019 to ascertain whether any of the hedgerows qualified as 'important' under the Hedgerow Regulations 1997 wildlife criteria and to better understand their ecological value. Furthermore, a condition assessment survey was undertaken of the on-site woodland in June 2021 with a further condition assessment planned of the on-site grassland habitats in July 2021.

2.12 The habitats recorded on-site, and their distribution are illustrated on **Plan EDP 1**. The majority of the Site consists of farmland that is subject to livestock grazing with other parts in arable rotation. These areas are intensively managed and hold relatively limited ecological value.

2.13 Areas of habitat that hold greater ecological value within the Site include the large number of ponds, areas of semi-improved grassland with higher botanical diversity, scattered mature trees and the relatively species-rich hedgerows that surround the majority of the fields in the north of the Site. There are also several ecologically valuable, discrete instances of semi-natural broad-leaved woodland within the Site. These habitats are considered to be of at least Local value.

2.14 While the majority of the habitats present within the Site are considered to be of relatively low ecological value (predominantly arable/heavily grazed pasture), they are also capable of supporting birds, badgers, bats, reptiles, dormice, otter and water vole and amphibians.

Protected and Notable Species

2.15 A suite of surveys has been undertaken by EDP between 2018 and 2021 of the Site, and a wider Study Area, to determine the presence of protected and notable species. A summary of the findings is provided below, with further details available on request.

Birds

Breeding Birds

2.16 The data search returned a large number (7,887) of records of notable birds from within 2km of the Site. This is to be expected given the Site's location and proximity to the Severn Estuary. Indeed, the majority of these records relate to the estuary itself and the Berkeley

[1] Joint Nature Conservation Council (2010) *Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit* (reprinted with minor corrections for original Nature Conservancy Council publication).

Pill to the south of the Site with a large number also relating to the area surrounding Sharpness Dock.

2.17 Full breeding bird surveys in spring 2019 and 2021 recorded a range of farmland, wetland, woodland and urban edge species, reflecting the size of the Site and range of habitats and land-uses present. During the 2019 surveys a total of 56 species were recorded, including 8 on the Red-list of conservation concern and 14 on the Amber-list, with a further species on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended).

2.18 Farmland birds, including a small number of declining species, were most prevalent in association with the agricultural fields and hedgerows. This included a small population of breeding skylark (*Alauda arvensis*) in the south of the Site, and populations of dunnock (*Prunella modularis*) and starling (*Sturnus vulgaris*). Other farmland species recorded include yellowhammer (*Emberiza citrinella*), reed bunting (*Emberiza schoeniclus*) and linnet (*Linaria cannabina*) in small numbers.

2.19 Wetland birds were generally recorded just within the south of the Site, associated with Berkeley Pill, with a small number of recordings of mallard (*Anas platyrhynchos*) within on-site waterbodies.

2.20 The species of conservation concern recorded in the greatest numbers was house sparrow, (*passer domesticus*), which was almost exclusively associated with existing residential developments of Newtown and Wanswell.

2.21 The 2021 surveys are yet to be fully analysed but recorded a similar diversity, abundance and distribution of species. One notable difference was a pair of shelduck recorded on the first two surveys to the north-west of Oakhunger farm to the south of the site. It is considered unlikely they bred successfully.

2.22 In light of the relatively low diversity and abundance of species recorded within the Site, the breeding bird assemblage is considered to be of Local value.

Wintering Birds

2.23 The wintering bird assemblage has been assessed through a range of surveys between 2018 and 2021. A separate wintering bird report (edp4792_r006) details the methodologies and findings. Surveys at the Site comprise core counts (estuary) winter and passage intertidal (low tide) and high tide surveys, dusk and dawn 'vantage point' surveys and on-site winter farmland bird surveys. A brief summary of the findings are summarised below.

2.24 The Study Area supports a number of key high tide roosts and foraging areas between Berkeley Pill and Sharpness Docks and it is therefore of key importance to assemblages using the upper Severn Estuary. With that in mind, acknowledging that it forms a constituent part of the internationally important Severn Estuary SPA/Ramsar site wildfowl/wader assemblage, the populations recorded are considered to be valued at International-level nature conservation value. The key areas within the study area were

Berkeley Pill and a Severn Outfall Drain, which both individually qualify as important areas, supporting >1% of the Severn Estuary WeBS Peak Count of various species as shown in **Table EDP 2.3**:

Table EDP 2.3: Importance of Primary Roosts at Berkeley Pill and Core Count Sector 3

Roost	Type	Species	Peak Count	% of WeBS Severn Estuary Peak Count
Berkeley Pill (Sector 7)	Low tide	Wigeon	166	2.13
		Redshank	137	2.65
	High tide	Wigeon	255	3.27
		Mallard	42	1.55
Severn Outfall (Sector 3)	Low tide	Wigeon	162	2.08
		Redshank	150	2.91
		Lapwing	300	1.90
	High tide	None	N/A	N/A

2.25 Inland, few records were made with relevance to the Severn Estuary SPA/Ramsar, with the main exceptions including a significant flock of lapwing (>1% of the 5-year mean peak for the Severn Estuary SPA/Ramsar) recorded on two occasions in the large field directly to the south of Oakhunger Farm, and a flock of dunlin (*Calidris alpina*) on one. This field comprises of improved intensively sheep grazed pasture. These two records are not deemed sufficient to class the field as functionally linked to the SPA/Ramsar, based on the criteria set out within the pre-publication version of the Functionally Linked Land report provided by Natural England. However, the NE study did identify the field immediately adjacent to Berkley to be functionally linked, though of low importance, with flocks of lapwing recorded in this location by the local bird recorder.

2.26 In addition, two small groups of lapwing (*Vanellus vanellus*) totalling c.20 birds were recorded across the Site in 2018/19, a single curlew (*Numenius arquata*), a single redshank (*Tringa totanus*) and small groups of teal (*Anas crecca*) and mallard (*Anas platyrhynchos*) within ditches and ponds. The numbers recorded were well under the significance threshold. The most significant recordings in 2019/20 were a small flock of wigeon (*Mareca Penelope*), a small flock of redshank and a flock of 80 lapwing, although these were associated with Berkeley Pill and did not land within the Site Boundary. The lapwing were recorded just off-site within a field to the south of Saniger Farm. No activity has been recorded in this field before or since.

2.27 From the results outlined above it is concluded that only the field adjacent to Berkley Pill is potentially functionally linked to the SPA/Ramsar, with the rest of the site only subject to occasional use by individual birds or small flocks, if at all. In EDP's opinion, the wintering wader/wildfowl assemblage present on-site, in isolation, is of only District-level nature conservation value.

2.28 The on-site farmland winter bird surveys have recorded low numbers of terrestrial species (non-wader and non-wildfowl species) for the size of the Site. In EDP's opinion, the wintering farmland bird assemblage present on-site is therefore of only limited (Local-level) nature conservation value

Bats

2.29 The data search returned 51 records of greater horseshoe and lesser horseshoe bats, which are both Annex II (rare) bat species from within 6km of the Site. The vast majority of these records relate to well-known roost sites across the River Severn from the Site in the Forest of Dean. Two records relate to field observations of lesser horseshoe near Berkeley.

2.30 The small number of other bat species recorded within 2km radius of the Site includes common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared (*Plecotus auritus*), Daubenton's (*Myotis daubentonii*), and noctule (*Nyctalus noctula*). The majority of records related to field records, although there were six records relating to roosts.

Bat Roosting

2.31 A total of 96 trees and 8 tree groups were identified as having potential to support roosting bats during the ground-level tree roost assessment. This included 25 trees assessed as having high potential, 33 assessed as having moderate potential and 41 assessed as having low potential.

Bat Activity

2.32 Surveys of bat activity have been undertaken using walked transect surveys and automated static detectors between April and August 2019, September 2020 and May 2021, with a further survey planned in July 2021.

2.33 In summary, up to 11 species/species groups of bat were confirmed to be foraging and/or commuting within the Study Area. The activity surveys have recorded commuting and foraging bat activity principally associated with the internal hedgerows, woodland edge habitats and waterbodies across the Site.

2.34 During all the static detector surveys, nearly half of these recordings were attributed to common pipistrelle at 46.8% of total bat calls, with a further 18.7% relating to soprano pipistrelle. *Myotid* species accounted for 21.3% of the total bat calls, noctule 9.3%, serotine 1.5%, long eared species 1.1%. Barbastelle (*Barbastella barbastellus*), greater horseshoe, lesser horseshoe, Leisler's (*Nyctalus leisleri*) and Nathusius' pipistrelle (*Pipistrellus nathusii*) all accounted for less than 1% each.

2.35 With known roost sites within the county, lesser, and to a lesser degree, greater horseshoe bats, are widespread across Gloucestershire and Stroud District[2] . Relatively low numbers of lesser and greater horseshoe bats were recorded proportionate to the survey effort and size of the Site.

[2] https://glosbats.org.uk/bats-in-gloucestershire/

2.36 The core sustenance zones for lesser horseshoe bats and greater horseshoe bats are typically considered to be 2km and 3km respectively[3]. Given spatial separation of the proposed allocation from the nearest component SAC roost (>6km), the barrier to regular movements likely to be imposed by the estuary and the relatively small number of recordings, it can be confidently concluded that the allocation is not an important foraging resource for the SAC populations of either of these species.

2.37 The presence of greater and lesser horseshoe bats is not rare within Gloucestershire or Stroud District[4] with the area considered to be a stronghold for both species, albeit at the northern limit of the greater horseshoe range. Based on EDP's experience from other sites in the region, the number of recordings is not considered to be particularly notable, given the size of the site and survey effort. However, it is plausible that the bats utilising the site maybe associated with the wider meta-population, incorporating the SAC populations, and an increase in activity in September might be suggestive of movement across the local landscape between maternity, transitional and hibernation roosts. However, given the relatively low numbers recorded and year on year variation in such recordings, it is very unlikely the Site is important to this population.

2.38 Although nationally rare, barbastelle bats, are also considered to be relatively widespread in the county. Both Leisler's and Nathusius' bats are also considered to be probably rare but under-recorded within the county.

2.39 Owing to the habitats present, it is considered that the Site and wider Study Area supports a mosaic of relatively valuable habitats for foraging or commuting bats. This is attributed to the presence of areas of broad-leaved woodland habitat within and adjacent to the Study Area, mature tree lines, hedgerows and waterbodies. The habitats of value to the foraging and roosting bat populations within the Study Area are, however, relatively common within the local area and widespread within the landscape. Areas considered to be key foraging and commuting zones for bats have been highlighted on **Plan EDP 2**.

2.40 Based on the size of the Site, the assemblage of bats recorded, their national and local distribution and current conservation status, the overall bat population supported by the Site is assessed as being of Local-level Importance.

Badger

2.41 The data search returned no records of badger (*Meles meles*) within 2km of the Site. Badger setts have previously been recorded within the Site.

2.42 The badger survey undertaken by EDP in 2020 identified nine badger setts within the Study Area, eight of which are active or partially active. This includes one large main sett in the north-west of the Site. However, given that the badger is a common and widespread species, the population present is of no greater than Local-level value.

[3] Core sustenance zones and habitats of importance for designing biodiversity net gain for bats (BCT July 2020) - https://cdn.bats.org.uk/images/Bat-Species-Core-Sustenance-Zones-and-Habitats-for-Biodiversity-Net-Gain.pdf?mtime=20200808090241&focal=none

[4] https://glosbats.org.uk/bats-in-gloucestershire/

Dormouse

2.43 The data search returned one record of dormouse (*Muscardinus avellanarius*) located within woodland to the 2km to the north-west of the Site, across the River Severn.

2.44 Detailed dormouse surveys commenced in September 2020 and are ongoing. To date two confirmed dormouse nests have been recorded during the surveys, with several additional possible dormouse nests also recorded. The confirmed dormouse nests were located within hedgerows bounding the same field in the north-east of the Site, as shown on **Plan EDP 2**.

Otter and Water Vole

2.45 The desk study returned four records of water vole (*Arvicola amphibious*), two from waterbodies to the south of Berkeley and two records from locations across the River Severn. Nineteen otter (*Lutra lutra*) records were returned from the record centre within 2km of the Study Area, with the majority of the records relating to the streams and field drains to the south-west of the Site, south of Berkeley. A number of records also relate to the River Severn and the Berkeley Pill.

2.46 Suitable habitats are present along the field boundaries for both otter and water vole including the River Severn to the west, a section of the Berkeley Pill to the south of the Site and a network of dry and wet ditches across the Site.

2.47 Otter and water vole surveys were undertaken on 22 September 2020 and 04 June 2021 to determine the presence/likely absence and distribution of both species across the Site.

2.48 Many dry fragmented otter spraint were found underneath Lynch Road bridge across the Berkeley Pill, suggesting that otter are frequent visitors the area. The Pill is considered to provide suitable foraging and dispersal habitat as well as offering potential for holts/lay-ups. Several ditches adjacent to the River Severn provide some suitable foraging habitat for otter, however, the majority of the ditch network is limited in value, though will provide some dispersal opportunities across the Site.

2.49 Signs of water vole were recorded along the entire length of Berkley Pill adjacent to the southern Site boundary with latrines, burrows, feeding signs and footprints identified. The Pill offers good habitat along much of its length with dense stands of bankside vegetation and limited shading. Two old disused water vole burrows were also found in an on-site ditch in the south of the Site, likely associated with a seasonal expansion of the population into sub-optimal habitats. This ditch was largely dry at the time of the survey though the floral assemblage suggests that it is ephemerally wet. A further two ditches were also considered to have suitability for use by water vole, however, no signs were recorded.

2.50 Both of these species are relatively common and widespread in southern England and Gloucestershire, although water vole are undergoing national declines. Based on the survey findings otter and water vole are considered likely to be restricted to Berkeley Pill and the surrounding wet ditches in the south of the Site, with opportunities for these

species across the rest of the Site very limited. Both species are considered to be of Local-level importance.

Reptiles

2.51 The desk study returned nine records of grass snake (*Natrix helvetica*) and two for slow worm (*Anguis fragilis*) from within 2km of the Site. The Site supports habitats suitable for reptiles, namely rough grassland, woodland edge, scrub and hedgerows and was therefore subject to survey in summer 2020.

2.52 The reptile surveys recorded three slow worms within the Site. This species is common and widespread in this part of the UK and the population present appears to be small and restricted in distribution due to the limited availability of suitable habitat. The assemblage is therefore only considered to be of Site value.

Amphibians (Great Crested Newts)

2.53 The desk study returned 40 records of great crested newt (*Triturus cristatus*) from within 2km of the Study Area, the closest of which are 150m to the south of the Site and 250m to the east of the Site. Also returned from the desk study were several records for common frog (*Rana temporaria*), common toad (*Bufo bufo*), smooth newt (*Lissotriton vulgaris*) and palmate newt (*Lissotriton helveticus*).

2.54 Previous surveys by All Ecology in 2014 recorded great crested newt presence in two ponds north-east of the Study Area (at approximately 275m and 325m from the Site boundary). Surveys conducted by Arcadis in relation to development at Sharpness Docks recorded great crested newts in two ponds to the north-west of the Site, both ponds are located more than 1.5km from the Site boundary.

2.55 There are 54 waterbodies within approximately 250m of the Study Area boundary, 24 of the ponds were subject to Habitat Suitability Index (HSI) assessment in June 2019 and April 2021.

2.56 Further to the HSI assessment, all accessible and suitable waterbodies within the Study Area and within 250m of the boundaries were sampled and tested for great crested newt DNA (environmental DNA, i.e. eDNA) in June 2019 and April 2021. A number of the ponds initially identified were not accessible or found to be dry at the time of survey. Some additional ponds were found to be wet and surveyed in 2021.

2.57 No evidence of great crested newt eDNA was found in any of the ponds surveyed (as reported by SureScreen Scientifics on 27 June 2019 and 06 May 2021).

Fish

2.58 One record of European eel (*Anguilla anguilla*) was returned from the data search. This record pertains to a watercourse 1.7km to the south-east of the Site.

2.59 APEM ecology was commissioned to undertake a walkover assessment of the Site to identify the potential for any on-site water bodies to support the Severn Estuary SAC and Ramsar fish species interests.

2.60 The walkover survey identified that the potential for Ramsar and SAC fish species within the Site is limited to the possible presence of European eel within two ponds adjacent to small streams. These ponds were subsequently subject to eDNA survey, though one was found to be dry, thereby ruling out its potential to support this species. The other pond (shown on **Plan EDP 2**) did return a positive result. Eels are listed on the Ramsar citation and as such this waterbody could be considered as potentially functionally linked, though the population is only valued at a district-level given the limited potential for the pond to support a notable population.

Invertebrates

2.61 The data search returned records of notable invertebrates from within 2km of the Site, including 26 notable moth species and 4 notable species of butterfly. One stag beetle (*Lucanus cervus*) record was also returned from the 2km search radius around the Site.

2.62 Habitats capable of supporting a notable assemblage of invertebrates are limited to the higher quality boundary habitats, predominantly the mature and veteran trees and established hedgerows. The ponds within the allocation Site are also of interest, though many of these dry frequently.

2.63 The invertebrate assemblage within the site is considered to likely be of Site-level value.

Other Protected/Notable Species

2.64 The desk study returned records of hedgehog (*Erinaceus europaeus*) and brown hare (*Lepus europaeus*) within close proximity to the Study Area. The habitats within the Study Area are considered to provide suitable opportunities for breeding, foraging and dispersal of these species. Although listed as a Priority Species, and despite the national decline of hedgehogs, both species are relatively common and widespread in south-west England.

2.65 The desk study also returned a small number of records for grey and common seal (*Halichoerus grypus* and *Phoca vitulina* respectively) associated with the River Severn. A seal was also recorded as an incidental sighting in the estuary during a core count bird survey in 2020.

Summary of Important Ecological Features

2.66 Ecology surveys undertaken within the Site and wider Study Area have identified the following ecological receptors that are pertinent to the potential development of the Site:

- Statutory and non-statutory designated sites present within the Site's potential zone of influence. Most notably this includes the Severn Estuary, which lies adjacent to the Site and is designated as a SPA, SAC and a Ramsar site;

- Wye Valley and Forest of Dean Bats Sites SAC, which lies 6.2km north-west of the Site across the River Severn;

- Five SSSIs within 5km of the Site and 18 KWS that fall within 2km of the Study Area;

- Priority Habitats, including small areas of 'Deciduous Woodland', a 'Traditional Orchard' in poor condition and 'important' hedgerows (Local-level value);

- Breeding bird assemblage, including a relatively small number of declining farmland, wetland and woodland species (Local-level value);

- Wintering farmland bird (discussed fully in separate report; edp4792_r006) assemblage similar to the breeding bird assemblage, with some additional passage and winter migrants (Local-level value);

- Wintering wader/wildfowl assemblage present within the Site itself (excluding the estuary frontage), is of only of District-level nature conservation value as surveys have not identified any important 'functionally linked' land to the Ramsar/SPA by EDPs surveys;

- Notable bat roosting potential within trees (Local-level value);

- Foraging and commuting bat assemblage, including relatively low numbers of Annex II species barbastelle, greater horseshoe and lesser horseshoe, principally associated with the hedgerow and woodland field margins (Local-level value);

- Badger population, including nine setts (Site to Local-level value);

- Dormouse population recorded within hedgerows (Local-level value);

- Presence of otter and water vole associated with Berkeley Pill to the south of the Site and surrounding wet ditches (Local-level value);

- Low population of slow worm with a peak count of one individual (Site-level value); and

- Presence of European eel in one pond on-site (District-level value though potentially functionally linked to Ramsar).

Section 3
Likely Effects of the Proposed Development

3.1 Without the implementation of mitigation measures, the Proposed Development would result in the direct loss or indirect degradation of habitats and/or direct/indirect disturbance to species supported by habitats on- and off-site during both construction and operation, as summarised below.

Construction Phase

3.2 During the construction phase of the Proposed Development, the impacts and effects on ecology without mitigation would result from habitat loss and degradation, and direct and indirect disturbance/harm to species.

3.3 Direct impacts from the Proposed Development would involve the loss of habitats, loss of refuge for species, physical harm from construction process and vehicles, and potential pollution/contamination events from chemicals and materials used.

3.4 Indirect impacts would potentially involve increased lighting during construction affecting foraging and commuting nocturnal species, noise disturbance, vibration disturbance and potential off-site effects from pollution/contamination, such as contaminated run-off into hydrological systems and dust deposition on off-site habitats.

Operational Phase

3.5 Operational effects of the Proposed Development without mitigation include the potential disturbance to habitats and species from increased recreational pressure within the Site. This can result in damage to habitats through trampling and disturbance to species in retained habitats through physical presence.

3.6 Other impacts include increased lighting, noise and disturbance as a result of traffic that will adversely affect the foraging and commuting resources within the retained and created habitats. It also increases the potential of road traffic collisions with species. The increase in traffic may also result in adverse air quality that could affect surrounding habitats.

3.7 The provision of habitats of greater biodiversity than those currently present on the Site and the implementation of appropriate management of the retained and created habitats will maximise opportunities to deliver biodiversity gain.

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Section 4
Mitigation Strategies

4.1 This section of the report details the mitigation strategies proposed for each of the IEFs identified within or adjacent to the Site, as listed in **Section 2**.

4.2 The mitigation strategies outlined below discuss how the IEFs will be incorporated and safeguarded within the potential future development and how opportunities for biodiversity gain can be maximised. This includes information on how habitats will be retained and buffered within the proposals, and specific design features associated with achieving this and enhancing opportunities for protected species.

4.3 Detailed measures relating to the protection of species and habitats throughout the construction phase of the development have not been included as these are considered to be standard industry proven measures. It is anticipated that any such measures would be included in an Ecological Construction Method Statement (ECMS) at the detailed design stage, with the appropriate measures outlined as part of any subsequent Ecological Impact Assessment accompanying a planning application.

4.4 It was also not deemed to be necessary at this stage of the allocation process to include detailed prescriptions relating to the long-term management of habitats and species. It is anticipated that such measures would be secured through Landscape and Ecology Management Plans (LEMP) at the detailed design stage, with an overarching framework LEMP provided at outline stage to demonstrate what will be achieved.

Overarching Mitigation Strategy

4.5 The iterative masterplanning process has sought to follow the mitigation hierarchy, whereby impacts upon IEFs are sought to: 1) be avoided; 2) be mitigated; and as a last resort, 3) compensated. As such, sensitive ecological design has been fundamental to the design evolution from the outset and as a result 'inherent' mitigation (i.e. the retention and buffering of key habitats and corridors) has underpinned the early concept design. Through an ongoing collaborative approach with the design team, including other disciplines, this has ensured that potential impacts upon IEFs will be minimised wherever feasible to do so.

4.6 Opportunities to provide complementary design benefits across disciplines is also being sought to deliver biodiversity gains. As a result, not only will the important existing habitats and associated species be retained and enhanced, but a variety of new and valuable complementary habitats and wildlife corridors will also be created.

Designated Sites

4.7 The Severn Estuary (SPA, SAC, Ramsar site and SSSI) bounds the west of the Site. To meet the requirements of Regulation 63 of The Conservation of Habitat and Species Regulations 2017 (as amended), an applicant is required to submit sufficient scientific evidence to enable the authority to complete Habitat Regulations Assessment (HRA) screening and, if required, Appropriate Assessment (AA) of a proposed development/allocation.

4.8 A HRA of the Stroud District Local Plan (SDLP) has been completed by Footprint Ecology on behalf of SDC in 2021 to assess the potential for likely significant effects upon the Severn Estuary SPA/SAC/Ramsar site, amongst other international designations, as a result of the plan, including the proposed allocation at Sharpness Vale. The Local Plan and HRA has been informed by a suite of technical material provided by the Sharpness Development LLP in relation to recreational disturbance impacts, urbanisation, water quality and loss of functionally linked land.

4.9 The assessment and information contained in these reports is not repeated here, though the proposed mitigation strategy confers benefits for a variety of habitats and species and underpins the overall mitigation strategy. It is anticipated that a shadow AA would be provided with any future planning application to demonstrate that no likely significant effects upon these European designations would arise.

4.10 It is proposed as part of the Recreational Avoidance Strategy (RAS) (edp4792_r008 July 2021 update) that the estuary and its tributary 'Berkeley Pill' will be provided with a substantial (400+m) buffer from the development proposals, with a nature reserve and public wetland park with Sustainable Alternative Natural Greenspace (SANG) created between it and residential areas. The proposed nature reserve near Berkeley Pill, will be inaccessible to the public and include 'scrapes' to enhance the habitat for protected wetland birds, such as lapwing and wigeon. As such, no direct impacts on the estuary or its associated SSSIs are anticipated to arise. However, the designation is potentially vulnerable to indirect impacts from increased recreational pressures associated with any new residential population, including disturbance of bird interests and habitat degradation.

4.11 A proposed RAS has been prepared to demonstrate how the Site can be brought forward without resulting in significant recreational impacts upon SPA/Ramsar bird interests. This strategy includes a suite of mitigation measures, such as SANG and Strategic Access Management and Monitoring (SAMM) contributions in line with Stroud District Council's existing Severn Estuary Recreational Avoidance Strategy. Full details of this approach have not been presented in this strategy paper.

4.12 The Severn Way public right of way (PRoW) currently follows the shoreline of the estuary, turning inland at Berkeley Pill. To prevent degradation of the estuary shoreline and Berkeley Pill, public access to this section of the shoreline will be prevented, subject to agreement, through the installation of fencing and by the diversion of the PRoW to take a more inland route. Access to the public wetland park within the SANGs will be encouraged through the installation of boardwalks, bird hides, benches and interpretation boards, allowing for local residents to engage with, and value, nature. This combination of

accessible and inaccessible land will protect the estuary shoreline and Berkeley Pill from recreational pressures whilst maintaining their suitability to support protected species.

4.13 Alternative areas for recreation will be created across the Site including approximately up to 10ha of SANG per 1000 residents as part of the Phase 1 development, along with parks, play areas, wildflower rich grassland and woodland with clearly defined routes for dog walking and other recreation. This semi-natural Green Infrastructure, combined with a network of new footpaths and cycle routes will draw potential recreational pressures from the estuary in a controlled and managed environment, that is still capable of delivering significant biodiversity enhancements.

4.14 The Green Infrastructure strategy for the wider site has also been designed to maintain and enhance habitat connectivity between existing areas of woodland both on and off site. Complimentary woodland and tree planting along such corridors will benefit associated species interests.

4.15 A newly created nature reserve of c.35ha adjacent to Berkley Pill will be enhanced and managed over the long-term by an appropriate management body, with wardening and monitoring used to educate local people and inform management prescriptions that ensure the habitat and species interests are maintained, and where possible enhanced. It is anticipated that the developer would be responsible for the initial enhancement works, in accordance with the requirements set out in an LEMP. A Framework LEMP would be provided to set out the principles for the site wide approach to the long-term management of habitat and species in order to maximise biodiversity benefits and assist with demonstrating compliance with biodiversity related planning policy through each phase of development.

4.16 It is feasible that populations of greater and lesser horseshoe bats from Wye Valley and Forest of Dean Bat SAC populations move across the local landscape between maternity, transitional and hibernation roosts at certain times of year. However, given the relatively low numbers recorded and year on year variation in such recordings, it is very unlikely that the development of the allocation Site would have a negative effect on the integrity of the SAC population. Regardless of this, the retention and buffering of key Green Infrastructure corridors and implementation of dark zones will prevent significant impacts upon the bat assemblage occurring. Furthermore, the Green Infrastructure proposals, including significant woodland and wetland creation could enhance opportunities for the SAC species.

4.17 The measures set out within the RAS and summarised above to protect the Severn Estuary SPA/Ramsar have been reflected in the Local Plan policy wording for the Sharpness Vale allocation and the latest iteration of the Local Plan HRA (May 2021) concludes that no likely significant effects would result from the development at Sharpness Vale on that basis. Such measures would also protect local wildlife site interests.

Habitats

Woodland

4.18 All retained mature woodland on-site will be provided with a minimum 20m buffer. Designated footpaths and signage will be used to prevent public access where this is not desirable and public access will be permitted and encouraged in less valuable and vulnerable areas of plantation woodland, through the provision of footpaths and bicycle trails.

4.19 As part of the Green Infrastructure strategy, existing wildlife corridors will be strengthened, and new corridors created, to link isolated parcels of woodland to one another, maximising their value to protected species.

4.20 Woodland habitat management prescriptions, including monitoring and remedial actions where required, will be set out in the LEMP to ensure that the woodlands are maintained in good condition over the long-term.

Hedgerows and Trees

4.21 The existing network of hedgerows and associated trees, including a small number of veteran specimens, is predominantly being retained and buffered from the development proposals. The value of hedgerows, as evaluated through a Hedgerow Regulation Survey (1997), and tree stock, as evaluated through survey, is being used to inform the masterplan evolution. This will ensure that, where losses do occur to facilitate a cohesive development and infrastructure links, these will largely be restricted to the lower value species-poor hedgerows and low-quality trees.

4.22 The hedgerow and tree network, which underpins the Green Infrastructure strategy, will be strengthened through planting of gaps, planting of new sections of hedgerow and hedge laying, where appropriate, to form wildlife corridors across the Site. Where losses are unavoidable to facilitate layout, a sufficient quantum of additional species-rich hedgerow planting will be provided to ensure net gains in linear habitats.

4.23 Long-term management of these hedgerows will have a focus on providing ecologically valuable habitat, with cutting taking place on a rotational and cyclical basis, at a time of year least likely to disturb protected species such as nesting birds and dormice. Hedgerows outside areas of residential development will be left to grow bushy, increasing their value to wildlife and providing screening from the development to adjacent habitats.

Ponds

4.24 A number of the existing ponds within the Site are to be retained. These ponds will be buffered from the development, to maintain their ecological value. The existing retained ponds are predominantly in poor condition, frequently drying out and heavily overgrown. These ponds will be enhanced to reduce scrub encroachment, create riparian wetland

habitat and maintain areas of permanent open water to maximise their value to biodiversity.

4.25 New ponds, lakes and wetland habitats including areas of floodplain are to be created within the Site, to strengthen the existing waterbody network. These features will be designed to benefit biodiversity, with permanently wet areas, varying profiles and depths, and planting of aquatic and marginal plant species of local provenance.

4.26 New and existing waterbodies and wetland will be subject to long-term management, as informed by monitoring to ensure they maintain their ecological value. Within some areas of the nature reserve, public access will be prevented, in order to minimise disturbance to wildlife. Reedbeds will also be established to provide refuge for wildlife from recreational pressures and cat predation.

Streams

4.27 There are a number of streams and wet ditches running through the Site. A large number of these are only seasonally wet. The majority of these features have been retained within Blue and Green Infrastructure corridors and will be enhanced through re-profiling and bank stabilisation where necessary, to ensure their longevity.

4.28 Management of the bankside vegetation will be undertaken to create valuable wildlife corridors, while ensuring the streams/ditches do not become over-shaded, to maximise their biodiversity value.

4.29 The enhancement of existing streams and ditches and the creation of Sustainable Urban Drainage features will improve the Blue Infrastructure across the Site, forming a network of aquatic habitats. The drainage strategy will be designed around this to provide complementary wetland habitats that interlink with the existing features and provide new and enhanced opportunities for wetland species of flora and fauna.

Species

Birds

4.30 SPA/Ramsar interests are covered under designated sites.

4.31 The unavoidable loss of farmland will reduce the breeding and foraging habitats available to the farmland bird populations recorded during the winter and breeding bird surveys. It is likely that much of the existing population will be displaced into the extensive arable and pastoral habitats that are present around the Site.

4.32 Sensitive masterplanning, including the retention and buffering of higher value habitats will protect more general and woodland bird species interests. The proposed extensive mosaic of wetland habitats will also expand the existing opportunities and provide new opportunities for rare and/or notable species associated with the estuary and saltmarsh habitats.

4.33 Woodland and grassland habitats will provide opportunities for a variety of more generalist and widespread species of birds, including many urban edge dwelling species that are of conservation concern (e.g. house sparrow and starling).

4.34 To provide further opportunities for nesting birds, bird boxes will be installed/integrated on new buildings and retained mature trees across the development. The boxes will be of varying models to provide nesting opportunities for a range of species which have been recorded within the Site and the local area.

4.35 In addition, the creation of new valuable habitats such as wildflower grassland, scrub and hedgerow planting could also be utilised to provide refuge and nesting opportunities, while delivering further gains in biodiversity.

Bats

4.36 Impacts upon bat commuting and foraging habitats will be minimised through inherent mitigation incorporated into the sensitive masterplan design, principally the retention of higher value habitats such as hedgerow corridors. In addition, areas of the Site identified as key foraging and commuting routes for bats will be maintained as dark zones, to avoid severance of these flight routes. This will include the woodland edges and hedgerows, as well as the wildlife corridors that are created throughout the Site. Buffer planting along the woodland edges and new planting within Green Infrastructure corridors will further screen light pollution impacts and provide new foraging opportunities. A sensitive lighting strategy, including restricting hours of lighting and using directional low light pollution LED lights, would maintain these dark corridors.

4.37 Trees that are identified as having potential to support roosting bats will be retained where possible, with suitable buffering from the development, and will remain unlit by artificial lighting. Should any trees with bat roosting potential require removal, further investigation would be required and if any roosts are identified, appropriate mitigation implemented accordingly with works implemented under Natural England derogation licence.

4.38 In addition to new woodland and tree planting, further roosting opportunities for bats will be included across the development in the form of bat boxes and features installed/integrated on new buildings and retained mature trees. These boxes will be sited in areas where there is connectivity to suitable off-site habitat and where there is no artificial light.

4.39 The new and existing wildlife corridors and strengthened network of hedgerows will facilitate the movement of bats across the Site. Newly created habitat such as the wildflower grassland, lakes and ponds will provide valuable habitat for invertebrate species which will provide increased foraging opportunities for bats.

Badger

4.40 Badger setts have been identified within and adjacent to the Site (as shown on **Plan EDP 2**). Where possible, they will be retained and buffered from the development by

30m, in which no development will take place. A derogation licence will be required from Natural England if any setts are to be lost or potential disturbance to setts is anticipated. Measures to avoid disturbance to badger will be required throughout construction.

4.41 Habitat connectivity will be maintained between the retained setts and suitable foraging habitat on and off-site through green corridors. These wildlife corridors will remain unlit by artificial lighting to create enhanced dispersal and foraging opportunities for badger and other nocturnal species.

4.42 The planting of meadow flower grassland, new shrubs and fruit trees within the development will provide an additional foraging resource for badger.

Dormouse

4.43 Evidence of dormice has been recorded within the Site. The hedgerow network and woodland habitats are considered to afford good opportunities for this species. Where impacts upon dormouse habitat are anticipated these will require a derogation licence from Natural England and appropriate mitigation strategy.

4.44 Strengthening of the hedgerow network and the creation of wildlife corridors linking areas of woodland will increase habitat connectivity across the Site for dormice, if present. The wildlife corridors are to remain unlit, in accordance with bat dark zones, so that they remain suitable for use by nocturnal species including dormice.

4.45 Public access into areas of woodland will be discouraged through the use of signage and designated footpaths and cycle ways, reducing the likelihood of potential disturbance. Extensive new scrub and woodland planting will provide additional suitable habitat for this species and also reduce the risk of cat predation.

4.46 Additional nesting opportunities for dormice will be installed within the woodland areas in the form of dormouse nest boxes.

Otter and Water Vole

4.47 Presence of both species has been confirmed within a wet ditch in the south of the Site with further evidence noted to the south of the Site along Berkeley Pill. These habitats are of a sufficient distance from the developable areas, that no significant direct or indirect impacts are anticipated on these species, particularly as the proposed diversion of the Severn Way would reduce levels of disturbance around Berkley Pill.

4.48 The proposals present an opportunity to significantly enhance prospects for these species within the green spaces on-site including the SANG and nature reserve area. The drainage infrastructure strategy has therefore sought to provide a network of waterbodies and sustainable drainage features, that connect with retained and off-site waterbodies. These waterbodies will be designed according to wildlife friendly principles, including permanent water elements, variable bank profiles, reedbeds and islands, to maximise opportunities for these species.

Other Mammals

4.49 It is likely that hedgehogs, a Priority Species, are present on-site. This species would potentially benefit from the change in land use from large open arable fields to mixed-use development that incorporates gardens and the creation of high-quality habitats, despite the increased risk of predation and collisions with traffic. To facilitate movement of this species and other small fauna across the Site, it is proposed that gaps are provided under any close board fencing between gardens.

Great Crested Newt

4.50 To date no on-site ponds have been identified as supporting great crested newts. If great crested newts are found to be using the Site. A great crested newt mitigation strategy will need to be developed and a derogation licence from Natural England sought for any future development to proceed given the potential loss of breeding and/or terrestrial habitat and impacts upon migration routes. Subject to development impacts, this strategy may need to include a capture and translocation exercise.

4.51 New ponds to be created will be designed to provide optimal conditions for great crested newt and other wildlife, with permanently wet areas, varying profiles with areas of deeper open water and shallow margins and planting with species of local provenance.

4.52 Log piles and hibernacula will be installed in undisturbed locations across the Site to provide additional refuge opportunities for great crested newt and other species. The creation of new wildflower and pond habitats will encourage a diverse assemblage of invertebrate species, providing increased foraging opportunities for great crested newt.

Reptiles

4.53 The small population of slow worm (only two recorded and limited habitat suitability) will be accommodated within the development. These populations are considered to be associated with the hedgerow/field margin habitat across the Site, and therefore the retention and strengthening of the hedgerow network described above will benefit these species and allow for their dispersal across the development. Harm to reptiles during construction can likely be avoided, given the small numbers recorded, through the precautionary clearance methods, rather than a full capture and translocation exercise.

4.54 New ponds, areas of wildflower grassland and scrub planting will provide additional habitat for reptile species, forming wildlife corridors, which will be linked via blocks of woodland as illustrated on **Plan EDP 1**. These new habitats will encourage invertebrate species within the Site, providing enhanced foraging opportunities for reptiles. The installation of log piles and hibernacula in undisturbed locations within the development will provide new refuge opportunities.

Fish

4.55 The on-site pond, which returned a positive result for eel, a qualifying species for the Severn Estuary Ramsar site, is retained within an area of Green Infrastructure as part of the concept masterplanning and falls within the 400+m development exclusion zone proposed from the estuary. Furthermore, the new wetland creation offers a significant opportunity to benefit some of this species.

Invertebrates

4.56 Habitats of the highest value to invertebrates include the mature oak trees scattered across the Site and within hedgerows, the ponds and the mature hedgerows, which have structural diversity. The retention and buffering of these more valuable habitats will act as a surrogate to protect invertebrate interests.

4.57 The creation of new wetland habitats, ponds and areas of wildflower planting along with the planting of new hedgerows, scrub and woodland habitat will provide additional resource for invertebrate species. Planting and management will specifically seek to utilise and maximise opportunities for native flowering species that will provide an attractive resource for invertebrates. The enhanced and newly created wildlife corridors will remain unlit, minimising disturbance on nocturnal species such as moths.

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Section 5
Biodiversity Impact Assessment

5.1 The ecology mitigation strategy has been devised to retain and, where possible, enhance the existing valuable habitats and restore or create new habitats to maximise net gains in biodiversity.

5.2 The forthcoming Environment Bill 2020, subject to its adoption, includes additional policy relating to protecting and improving the natural environment. This includes a requirement for new developments to deliver 10% biodiversity gain, as evaluated using a Biodiversity Impact Assessment (BIA) calculator.

5.3 A high-level BIA has therefore been undertaken, based on the indicative site proposals, to objectively assess the potential net effects of the Proposed Development on biodiversity, in order to inform the Local Plan allocation process. The indicative calculations have been undertaken using the Department for Environment, Food and Rural Affairs (DEFRA) Biodiversity Metric 2.0 (December 2019 version).

5.4 Pre-development habitats have been based on existing habitat information derived from Site surveys and illustrated on **Plan EDP 1**.

5.5 The assessment has been undertaken based on the indicative habitats illustrated on the Landscape Vision (**Appendix EDP 2**) and Illustrative Nature Reserve and SANG Design (edp4792_d037). GIS software has been used to broadly calculate areas of habitat to be retained, enhanced/restored and recreated; these measured areas are approximately illustrated on **Plan EDP 3**.

5.6 The BIA calculations pertaining to habitat areas and linear habitat features are provided in **Appendix EDP 1** with full spreadsheets and GIS files for both versions available upon request. The limitations and assumptions used in the calculations are also provided in the appendix.

5.7 Since these calculations were completed in January 2021 the masterplan and red line has changed. While the calculations are therefore no longer as accurate, the changes are likely to have increased the potential to deliver biodiversity gain and therefore are not fundamental to the overall outcome.

5.8 It is worth noting that these calculations are provided as a guide to the allocation's potential to deliver biodiversity net gain based on the emerging proposals, with significant potential for future refinement in line with more detailed landscape masterplanning. Precautionary principles have been adopted when making assumptions about existing and proposed habitat types. It is worth noting that the calculator should only be used as a tool, alongside professional judgement.

5.9 Further habitat enhancements including, bird and bat boxes, log piles, hibernaculum, bug hotels and hedgehog highways cannot be included within the calculations but will further enhance the Site for biodiversity.

Summary of Results

5.10 Overall, the proposed allocation is expected to provide a net gain in area biodiversity units and a loss in linear biodiversity units, as summarised in **Table EDP 5.1**. The full results for Version 1 are provided in **Appendix EDP 1** and broadly illustrated on **Plan EDP 2**.

Table EDP 5.1: Biodiversity Impact Assessment Summary

Biodiversity Value	Area Calculations	Linear Calculations
Existing Site	514.30	158.93
Post Development	745.23	144.53
Net Balance (units)	+230.93	-14.40
Net Balance (%)	**44.90**	**-9.06***

*Significant linear habitat gain is anticipated at a more detailed masterplanning and landscaping stage.

5.11 Based on the existing habitat baseline, the proposals are capable of delivering significant net gains in area biodiversity units (+44.90%). The area units will exceed planning policy requirements and deliver benefits for a number of different habitat types and species. This is a reflection of the inherently low value of the large intensively farmed improved grassland fields that comprise the majority of the Site, coupled with the provision of new habitats within the new nature reserve, SANG and other areas of public open space and nature reserves. Furthermore, the conservative approach to the calculations mean that greater enhancements are likely to be achievable on-site as the more detailed designs progress.

5.12 The linear calculations currently provide a net negative result, however, there is significant scope to retain a greater proportion of hedgerows within the detailed designs of the development parcels and deliver significant gains in new hedgerow planting. The masterplanning and landscape design is not currently at this level of detail.

5.13 In light of the above, it can be concluded that the proposed allocation is capable of achieving net gains for biodiversity, thereby meeting and/or exceeding planning policy requirements and delivering tangible benefits to local habitat networks and species populations.

Section 6
Summary and Conclusion

6.1 The comprehensive suite of surveys and assessment undertaken to date have identified the presence of designated sites and local to internationally important habitats and populations of protected species within or adjacent to the site.

6.2 Potential adverse effects arising from the Proposed Development primarily include direct loss or indirect degradation of habitats and/or direct/indirect disturbance to species within the Site's zone of influence. Adverse effects on other IEFs will principally be avoided and/or minimised through the ongoing iterative design process, which has sought to retain and protect the key habitat and species interests, thereby significantly reducing the risk of any significant effects arising.

6.3 The strategies outlined in this paper are considered to provide a robust approach to protecting, maintaining and enhancing the IEF's identified within the Site's zone of influence.

6.4 Potential adverse recreation and disturbance effects upon designated sites will be mitigated and compensated for through a bespoke recreational avoidance strategy (see edp4792_r008) to protect SPA/Ramsar interests including:

- A no development zone of 400+m from the Severn Estuary SPA/Ramsar/SAC;
- Creation of substantial areas of SANG (up to 10ha SANG/1000 residents);
- Creation of a 35ha nature reserve near to the confirmed primary high tide roost at Berkeley Pill with restricted public access, management and wardening;
- Diversion of the Severn Way inland from Berkeley Pill and the estuary frontage (subject to agreement); management of the PRoW network, including specific management measures around the other high tide roost adjacent to the sewage treatment works;
- A programme of education to ensure new residents and visitors understand the value of the SPA and the importance of minimising recreational impacts; and
- Developer contributions in accordance with SDC's 'Strategy for Avoidance of Likely Significant Adverse Effects on the Severn Estuary Ramsar/SPA/SAC' document, or future iterations of this strategy to fund specific mitigation projects along the Severn Estuary.

6.5 Such measures will form part of the integrated Green Infrastructure Strategy, which seeks to deliver multi-functional green spaces that fulfil wildlife, drainage and amenity aspirations for the Proposed Development.

6.6 The network of retained habitats will be protected during construction and expanded and enhanced through appropriate habitat creation and management measures to strengthen connectivity to surrounding habitats and safeguard protected species interests. It is proposed that this includes the creation of substantial areas of new wetland, woodland and grassland, in order to maximize opportunities for wildlife and deliver a significant gain in these habitat types.

6.7 Species-specific mitigation strategies principally include: the creation of an extensive network of wetland habitat and waterbodies to protect existing water bird habitat and provide new foraging, roosting and nesting opportunities; and the creation of dark Green Infrastructure corridors for species such as bats, dormice and badgers.

6.8 Bird, bat, dormouse, reptile, amphibian, water vole, otter, badger and invertebrate interests would be further protected through sensitive working methodologies during construction. Sensitive wetland management on and off-site will mitigate for impacts upon the wetland bird assemblage.

6.9 High level biodiversity calculations have demonstrated that the allocation is capable of achieving significant net gains in biodiversity that exceed the 10% net gain required by emerging planning policy.

6.10 By virtue of the predominance of relatively low value habitats within the allocation Site, coupled with the scope of the proposed mitigation measures briefly outlined, the Proposed Development is considered to be capable of compliance with relevant legislation and planning policy for conservation of the natural environment at all levels.

Appendix EDP 1
Biodiversity Net Gain Calculations

A1.1 A Biodiversity Impact Assessment (BIA) has been undertaken using the DEFRA Biodiversity Metric 2.0 (December 2019 version), by an ecologist with considerable experience of using such calculators. The BIA has been produced to objectively assess the net effects of the proposals on biodiversity in line with local and national planning policy.

A1.2 The assumptions and limitations used in the calculations, in addition to the key spreadsheet outputs for the existing baseline scenario are provided below. The Excel spreadsheets are available on request. The areas used to inform the calculations, based on the current baseline, are broadly illustrated in **Plan EDP 2**.

A1.3 It is worth noting, that these calculations are provided as a guide to the allocation's potential to deliver biodiversity net gain based on the emerging proposals, with significant potential for future refinement in line with more detailed landscape masterplanning.

A1.4 Since these calculations were completed in January 2021 the masterplan and red line has changed to include greater areas of green space. While the calculations are therefore no longer as accurate, the changes are likely to have increased the potential to deliver biodiversity gain and therefore are not fundamental to the overall outcome.

Assumptions

A1.5 Various assumptions have been made for the purposes of the calculations. Where appropriate, these have been highlighted in the comment's column of the impact calculation table and/or summarised below.

Existing Habitats

- The improved grassland to the west of the Site has been classified as 'moderate' rather than 'poor' due to its value as an occasional floodplain;
- Species-poor semi-improved grassland has been entered as 'modified grassland' of moderate condition with improved grassland classified as 'modified grassland' of poor condition;
- All linear habitats have been assumed to be of high connectivity due to the expansive hedgerow network across the Site and local area; and
- Linear calculations have assumed the quality of the existing linear features as:
    - Defunct, species-poor hedgerow as poor quality;

- Intact species-poor hedgerow as moderate quality;
- Intact species-rich hedgerow as moderate quality; and
- Tree lines as moderate quality.

Proposed Habitats

- The ratio of vegetated gardens has been estimated at 32% of developed areas. This figure is based upon a high-density scheme of 47.5 dwellings per hectare. This figure has been derived from finalised layouts of housing schemes that EDPs master planning team have previously been involved with. A far lower density scheme, as anticipated, is likely to provide a higher proportion of vegetated gardens. The calculations are therefore considered to represent a worst-case scenario;

- Amenity grassland has been assigned as being of 'fairly poor' condition. To achieve a 'fairly poor' condition these areas should be seeded with a flowering lawn mixture that is tolerant of regular mowing. These areas should be managed without the use of herbicides, pesticides and fertilisers;

- The realistic target condition of wildflower habitat grassland (neutral grassland) will vary across the Site depending on the locality, and therefore 'moderate' target condition has been used for the majority of enhanced and newly created areas of this habitat;

- It is assumed that 40% of the woodland across the Site is to be planted as mixed scrub. The areas of mixed scrub shall be planted along the edges of the woodland habitats to protect them from recreational pressures and disturbance. Over a long period of time, it is expected that the succession of the scrub will result in further areas of woodland;

- It is assumed that 35% of the newly created lakes will be planted with reedbeds to enhance these habitats for wetland wildfowl; and

- All newly planted hedgerows are assumed to be species rich and comprise native species. There is scope to retain and enhance more of the hedgerows within the detailed design for each phase of the development. Detailed designs will include specifications for further hedgerows within the parcels.

Limitations

A1.6 Calculations are based on *Green Infrastructure Network Concept* and the *Green Infrastructure Vision* are of a high level. They should therefore only be considered as indicative of what the Site can achieve and will be subject to change at more detailed design stages.

A1.7 The BIA calculator does not consider further habitat enhancements including, bird and bat boxes, log piles, hibernaculum, bug hotels and hedgehog highways. These enhancements cannot be included within the calculations but will provide further net gains for biodiversity within the Site.

Further Enhancements

A1.8 Other enhancements could be undertaken to improve the Site for biodiversity. Existing woodlands and ponds have not been shown as being enhanced. If subject to a management regime then there is potential to increase the condition of these habitats from their current condition of moderate.

A1.9 Street trees are to be planted throughout the development but have not been included within the calculations as the numbers and sizes of trees to be planted will be determined within the detailed design stage.

A1.10 There is scope to retain and enhance more of the hedgerows within the detailed design for each phase of the development. Detailed designs will also include specifications for further hedgerow planting within the parcels. There is therefore considered to be scope to deliver significant linear habitat gains.

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Headline Results

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On-site baseline	*Habitat units*	514.30
	Hedgerow units	158.93
	River units	0.00
On-site post-intervention (Including habitat retention, creation, enhancement & succession)	*Habitat units*	745.23
	Hedgerow units	144.53
	River units	0.00
Off-site baseline	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Off-site post-intervention (Including habitat retention, creation, enhancement & succession)	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Total net unit change (including all on-site & off-site habitat retention/creation)	*Habitat units*	230.93
	Hedgerow units	-14.40
	River units	0.00

Total net % change (including all on-site & off-site habitat creation + retained habitats)		
	Habitat units	44.90%
	Hedgerow units	-9.06%
	River units	0.00%

A-1 Site Habitat Baseline

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Ref	Habitats and areas			Habitat distinctiveness		Habitat condition		Ecological connectivity			Strategic significance			Suggested action to address habitat losses	Ecological baseline	Retention category biodiversity value								Bespoke compensation agreed for unacceptable losses	Comments	
	Broad Habitat	Habitat type	Area (hectares)	Distinctiveness	Score	Condition	Score	Ecological connectivity	Connectivity	Connectivity multiplier	Strategic significance	Strategic significance	Strategic position multiplier		Total habitat units	Area retained	Area enhanced	Area succession	Baseline units retained	Baseline units enhanced	Baseline units succession	Area lost	Units lost		Assessor comments	Reviewer comments
1	Cropland	Cropland - Cereal crops	38.96	Low	2	N/A - Agricultural	1	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required	77.92				0.00	0.00	0.00	38.96	77.92			
2	Urban	Urban - Vacant/derelict land/ bareground	0.82	Low	2	Poor	1	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required	1.64				0.00	0.00	0.00	0.82	1.64			
3	Woodland and forest	Woodland and forest - Other woodland; broadleaved	3.21	Medium	4	Moderate	2	Medium	Moderately connected habitat	1.1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same broad habitat or a higher distinctiveness habitat required	28.25	3.19			28.07	0.00	0.00	0.02	0.18			
4	Urban	Urban - Developed land; sealed surface	1.88	V.Low	0	N/A - Other	0	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Compensation Not Required	0.00				0.00	0.00	0.00	1.88	0.00			
5	Heathland and shrub	Heathland and shrub - Bramble scrub	0.38	Medium	4	Poor	1	Medium	Moderately connected habitat	1.1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same broad habitat or a higher distinctiveness habitat required	1.67	0.16			0.70	0.00	0.00	0.22	0.97			
6	Grassland	Grassland - Modified grassland	139.52	Low	2	Poor	1	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required	279.04		17.31		0.00	34.62	0.00	122.21	244.42		Improved grassland	
7	Grassland	Grassland - Modified grassland	9.4	Low	2	Fairly Poor	1.5	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required	28.20		1.04		0.00	3.12	0.00	8.36	25.08		Semi-improved grassland	
8	Coastal saltmarsh	Coastal Saltmarsh -saltmarshes and saline reedbeds	4.28	High	6	Moderate	2	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same habitat required	51.36	4.21			50.52	0.00	0.00	0.07	0.84			
9	Grassland	Grassland - Other neutral grassland	3.22	Medium	4	Poor	1	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same broad habitat or a higher distinctiveness habitat required	14.81	1.76	1.13		8.10	5.20	0.00	0.33	1.52			
10	Lakes	Lakes - Ponds (Priority Habitat)	0.16	High	6	Moderate	2	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same habitat required	1.92	0.15			1.80	0.00	0.00	0.01	0.12			
11	Sparsely vegetated land	Sparsely vegetated land - Ruderal/Ephemeral	0.82	Low	2	Poor	1	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required	1.64				0.00	0.00	0.00	0.82	1.64			
12	Grassland	Grassland - Modified grassland	6.77	Low	2	Fairly Poor	1.5	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required	20.31		6.77		0.00	20.31	0.00	0.00	0.00			
13	Grassland	Grassland - Modified grassland	3.77	Low	2	Poor	1	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required	7.54		3.77		0.00	7.54	0.00	0.00	0.00			
14																										
15																										
16																										
		Total site area ha	213.19											Total Site baseline	514.30	9.47	30.02	0.00	89.19	70.79	0.00	173.70	354.32			

A-2 Site Habitat Creation

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Post development/ post intervention habitats																		Comments	
						Ecological connectivity			Strategic significance			Temporal multiplier		Difficulty multipliers					
Proposed habitat	Area (hectares)	Distinctiveness	Score	Condition	Score	Ecological connectivity	Connectivity	Connectivity multiplier	Strategic significance	Strategic significance	Strategic position multiplier	Time to target condition/years	Time to target multiplier	Difficulty of creation category	Difficulty of creation multiplier	Habitat units delivered	Assessor comments	Reviewer comments
Urban - Developed land; sealed surface	68.2	V.Low	0	N/A - Other	0	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	0	1.000	Low	1	0.00		
Urban - Vegetated garden	32.1	Low	2	Poor	1	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	1	0.965	Low	1	61.95	32% of urban based on density of 47.5dph	
Urban - Amenity grassland	5.67	Low	2	Fairly Poor	1.5	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	2	0.931	Low	1	15.84		
Grassland - Other neutral grassland	34.52	Medium	4	Moderate	2	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	10	0.700	Low	1	222.40		
Woodland and forest - Other woodland; broadleaved	12.71	Medium	4	Moderate	2	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	30	0.343	Medium	0.67	26.90		
Urban - Sustainable urban drainage feature	4.96	Low	2	Moderate	2	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	3	0.899	Medium	0.67	11.95		
Lakes - Ponds (Priority Habitat)	2.94	High	6	Fairly Good	2.5	Low	Unconnected habitat	1	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1	7	0.779	Medium	0.67	25.33		
Urban - Allotments	0.88	Medium	4	Fairly Poor	1.5	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	1	0.965	Low	1	5.10		
Urban - Bioswale	0.69	Low	2	Fairly Good	2.5	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	2	0.931	Medium	0.67	2.15		
Urban - Orchard	0.97	Medium	4	Moderate	2	Low	Unconnected habitat	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	15	0.586	Low	1	4.55		
Wetland - Reedbeds	1.59	High	6	Good	3	Low	Unconnected habitat	1	Location ecologically desirable but not in local strategy	Medium strategic significance	1.1	15	0.586	Medium	0.67	12.36	35% of lakes	
Heathland and shrub - Mixed scrub	8.47	Medium	4	Fairly Good	2.5	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	5	0.837	Low	1	81.51	40% of newly planted woodland. To along the edges of the woodland habitats to buffer from recreational disturbance.	
Totals	173.70														Total Units	470.04		

A-3 Site Habitat Enhancement

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Post development/ post intervention habitats																
	Baseline habitats	Change in distinctiveness and condition			Area (hectares)	Distinctiveness	Condition	Ecological connectivity	Strategic significance	Temporal multiplier	Difficulty multipliers	Habitat units delivered	Comments	
Baseline ref	Baseline habitat	Proposed habitat (Pre-populated but can be overridden)	Distinctiveness change	Condition change				Ecological connectivity score	Strategic significance	Time to target condition/years	Difficulty of enhancement category		Assessor comments	Reviewer comments
6	Grassland - Modified grassland	Grassland - Other neutral grassland	Low - Medium	Lower Distinctiveness Habitat - Moderate	17.31	Medium	Moderate	High	Area/compensation not in local strategy/ no local strategy	10	Low	123.45		
7	Grassland - Modified grassland	Grassland - Other neutral grassland	Low - Medium	Lower Distinctiveness Habitat - Moderate	1.04	Medium	Moderate	High	Area/compensation not in local strategy/ no local strategy	10	Low	7.78		
9	Grassland - Other neutral grassland	Grassland - Floodplain Wetland Mosaic (CFGM)	Medium - High	Lower Distinctiveness Habitat - Moderate	1.13	High	Moderate	Low	Location ecologically desirable but not in local strategy	20	High	6.58		
12	Grassland - Modified grassland	Grassland - Floodplain Wetland Mosaic (CFGM)	Low - High	Lower Distinctiveness Habitat - Moderate	6.77	High	Moderate	Low	Location ecologically desirable but not in local strategy	20	High	33.19		
13	Grassland - Modified grassland	Grassland - Floodplain Wetland Mosaic (CFGM)	Low - High	Lower Distinctiveness Habitat - Moderate	3.77	High	Moderate	Low	Location ecologically desirable but not in local strategy	20	High	15.01		

B-1 Site Hedge Baseline

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	UK Habitats - existing habitats			Habitat distinctiveness		Habitat condition		Ecological connectivity			Strategic significance				Ecological baseline	Retention category biodiversity value						Comments	
Baseline ref	Hedge number	Hedgerow type	length KM	Distinctiveness	Score	Condition	Score	Ecological connectivity	Connectivity	Connectivity multiplier	Strategic significance	Strategic significance	Strategic position multiplier	Suggested action to address habitat losses	Total hedgerow units	Length retained	Length enhanced	Units retained	Units enhanced	Length lost	Units lost	Assessor comments	Reviewer comments
1		Native Hedgerow	0.48	Low	2	Poor	1	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness band or better	1.104		0.16	0	0.368	0.32	0.736		
2		Native Hedgerow - Associated with bank or ditch	0.41	Medium	4	Poor	1	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Like for like or better	1.886		0.41	0	1.886	0	0		
3		Native Hedgerow with trees	0.5	Low	2	Poor	1	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness band or better	1.15		0.5	0	1.15	0	0		
4		Native Species Rich Hedgerow	0.31	Medium	4	Poor	1	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Like for like or better	1.426		0.31	0	1.426	0	0		
5		Line of Trees	0.13	Low	2	Moderate	2	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness band or better	0.598	0.09		0.414	0	0.04	0.184		
6		Line of Trees - Associated with bank or ditch	0.12	Low	2	Moderate	2	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness band or better	0.552	0.12		0.552	0	0	0		
7		Native Hedgerow	8.19	Low	2	Moderate	2	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness band or better	37.674	5.67		26.082	0	2.52	11.592		
8		Native Hedgerow - Associated with bank or ditch	2.38	Medium	4	Moderate	2	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Like for like or better	21.896	1.96		18.032	0	0.42	3.864		
9		Native Hedgerow with trees	3.24	Low	2	Moderate	2	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness band or better	14.904	2.13		9.798	0	1.11	5.106		
10		Native Hedgerow with trees - Associated with bank or ditch	0.1	Medium	4	Moderate	2	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Like for like or better	0.92	0.1		0.92	0	0	0		
11		Native Species Rich Hedgerow	2.7	Medium	4	Moderate	2	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Like for like or better	24.84	1.83		16.836	0	0.87	8.004		
12		Native Species Rich Hedgerow - Associated with bank or ditch	0.8	High	6	Moderate	2	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Like for like	11.04	0.55		7.59	0	0.25	3.45		
13		Native Species Rich Hedgerow with trees	2.97	Medium	4	Moderate	2	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Like for like or better	27.324	2.68		24.656	0	0.29	2.668		
14		Native Species Rich Hedgerow with trees	1.48	Medium	4	Moderate	2	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Like for like or better	13.616	1.23		11.316	0	0.25	2.3		

B-2 Site Hedge Creation

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		Proposed habitats		Habitat distinctiveness		Habitat condition		Multipliers								Difficulty of creation multiplier	Hedge units delivered	Comments	
								Ecological connectivity			Spatial quality: Strategic significance			Temporal multiplier					
Baseline ref	New hedge number	Habitat type	Length km	Distinctiveness	Score	Condition	Score	Ecological connectivity	Connectivity	Connectivity multiplier	Strategic significance	Strategic significance	Strategic position multiplier	Time to target condition/years	Time to target multiplier			Assessor comments	Reviewer comments
1		Native Species Rich Hedgerow	3.98	Medium	4	Moderate	2	High	Highly connected habitat	1.15	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	5	0.837	0.67	20.53		

B-3 Site Hedge Enhancement

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	Baseline Habitats		Post development/ post intervention habitats										Comments	
			Change in distinctiveness and condition						Strategic significance	Temporal multiplier	Difficulty Multipliers			
Baseline ref	Baseline habitat	Proposed	Distinctiveness movement	Condition movement	Length KM	Distinctiveness	Condition	Ecological connectivity	Strategic significance	Time to target condition/years	Difficulty of enhancement Category	Hedge units delivered	Assessor comments	Reviewer comments
1	Native Hedgerow	Native Hedgerow	Low - Low	Poor - Moderate	0.16	Low	Moderate	High	Area/compensation not in local strategy/ no local strategy	5	Low	0.68	Gap planting to take hedgerows from defunct to intact.	
2	Native Hedgerow - Associated with bank or ditch	Native Hedgerow - Associated with bank or ditch	Medium - Medium	Poor - Moderate	0.41	Medium	Moderate	High	Area/compensation not in local strategy/ no local strategy	5	Medium	2.94	Gap planting to take hedgerows from defunct to intact.	
3	Native Hedgerow with trees	Native Hedgerow with trees	Low - Low	Poor - Moderate	0.5	Low	Moderate	High	Area/compensation not in local strategy/ no local strategy	10	Low	1.96	Gap planting to take hedgerows from defunct to intact.	
4	Native Species Rich Hedgerow	Native Species Rich Hedgerow	Medium - Medium	Poor - Moderate	0.31	Medium	Moderate	High	Area/compensation not in local strategy/ no local strategy	5	Medium	2.23	Gap planting to take hedgerows from defunct to intact.	

Appendix EDP 2
Landscape Vision

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Sharpness Natural Neighbourhoods

LANDSCAPE VISION

1. Nature Reserve - Re-wilding estuary habitat with scrapes to form wet meadow habitats
2. Community allotments and orchard
3. Wetlands Park with severn view/bird watching tower and network of boardwalks (dogs on lead)
4. Destination Natural Play Ground
5. Dog walking areas (SANG)
6. Schools
7. Central Avenue
8. Natural ponds connected to linear swales
9. Entrance Green Space with urban character
10. Green bridge
11. Woodland corridor alongside Wanwell Brook Park
12. Central Village Green space with cricket pitch and amenity parkland
13. Destination play ground
14. Eastern woodlands form a visual enclosure and ecology corridor
15. Buffering to listed building and retention of open space to the eastern side
16. Brookend stream park with oak pasture character, meadow grassland and woodland clusters
17. Connection to Sharpness Docks

edp

date **21 JULY 2021** - drawing number **edp4729_sk002g** - scale **Refer to scale bar @ A1** - [redacted]

[redacted]

Plans

Plan EDP 1	Phase 1 Habitat Plan (edp4792_d008c 21 July 2021 GY/WC)
Plan EDP 2	Ecological Constraints and Opportunities (edp4792_d009c 21 July 2021 GY/WC)
Plan EDP 3	Biodiversity Impact Assessment- Proposed Habitats (edp4792_d059a 29 January 2021 GY/ME)

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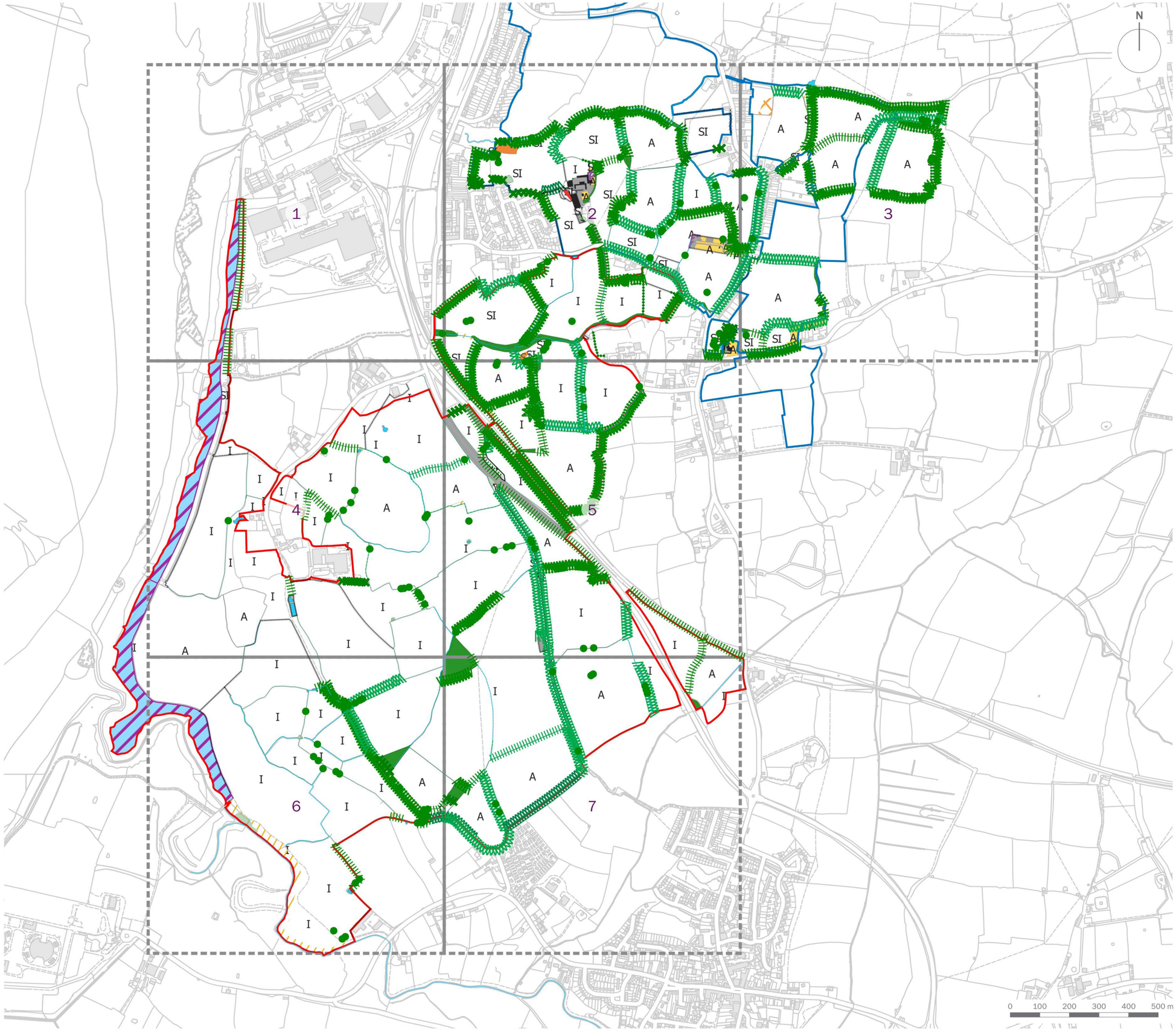

Phase 1 Site Boundary

Phase 2 Site Boundary

client

Sharpness Developments LLP

project title

Sharpness Vale

drawing title

Plan EDP 1: Phase 1 Habitat Plan (Overview)

date	**21 JULY 2021**	drawn by	[redacted]
drawing number	**edp4792_d008c**	checked	
scale	**1:12,500 @ A3**	QA	

the environmental dimension partnership

Registered office [redacted]