Pilning & Severn Beach Neighbourhood Plan

Habitats Regulations Assessment

Pilning & Severn Beach Neighbourhood Plan Steering Group

September 2025

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Quality information

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1. Introduction

Background to the Project

1.1 AECOM was appointed by Pilning & Severn Beach Neighbourhood Plan Steering Group to undertake a Report to Inform the Habitats Regulations Assessment (HRA) for the Pilning & Severn Beach Neighbourhood Development Plan (P&SB NDP) 2025 – 2038 Revision 8.0. This is to inform the Parish Council and South Gloucestershire Council (as competent authority) of the potential effects of the NDP development on Habitat sites ((Special Areas of Conservation (SACs), Special Protection Areas (SPAs), and Ramsar sites (designated under the Ramsar convention)), formerly referred to as European sites, and how they are being or should be addressed in the NDP.

1.2 The P&SB NDP contains nine site allocations for residential development, with the aim of providing up to 246 homes and up to 41 sheltered units. Additionally there are policies for design, flood risk, transport, community facilities, large commercial developments (LCD) and the environment.

1.3 For the purpose of informing this report, policies contained within the South Gloucestershire Council Core Strategy 2006 – 2027 (adopted 2014)[1] and the South Gloucestershire Policies, Sites and Places Plan (adopted 2017)[2], which is part of the current Local Plan at the time of writing, have been referenced. Consideration has also been given to the emerging South Gloucestershire Local Plan 2025–2041 (Regulation 19 Draft) and its associated evidence base, to ensure this HRA reflects the most up-to-date growth context and strategic mitigation framework.

1.4 The objective of this report is to identify if any policies and/ or site allocations proposed in the P&SB NDP have the potential to cause Likely Significant Effects (LSEs) and, where identified, adverse effects on the integrity of Habitat sites, either in isolation or in combination with other plans and projects, and to determine whether policy mitigation measures are required.

Local Context

1.5 The Parish of Pilning & Severn Beach (P&SB) covers an area of approximately 3,150 hectares (ha). It is situated in the south-western corner of the unitary authority of South Gloucestershire, on the southern bank of the Severn Estuary, and its boundary extends into the estuary itself. The main London Paddington to Swansea railway line runs east to west through the Parish and includes the eastern end of the Severn Tunnel. The M4 Prince of Wales Bridge, built in the 1990's, has the new M4 section running east to west through the Parish and the M49 running north to south. The main settlements of Pilning and Severn Beach are accompanied by smaller hamlets including; Redwick, New Passage and Northwick.

1.6 The countryside has a network of drainage rhines which outflow into the estuary. The majority of the parish is located within areas of high flood risk from either tidal or fluvial sources. This is addressed in the NDP and has informed the

[1] Available at: https://beta.southglos.gov.uk/static/2d94cc7df5f44948d9203e439cec8cd7/South-Gloucestershire-Core-Strategy-2006-2027.pdf
[2] Available at: https://beta.southglos.gov.uk/static/90efa5d673f208a3109ed111ba963a01/PSP-Plan-Nov2017.pdf

Sequential Test and the accompanying Level 2 Strategic Flood Risk Assessment (SFRA), both of which underpin the design and mitigation requirements for new development sites.

1.7 The population of the Pilning & Severn Beach Parish was 3,609 at the time of the 2021 Census, living in approximately 1,458 dwellings, as noted in Section 1.5.1 of the Neighbourhood Plan. Compared to South Gloucestershire as a whole, the Parish has a lower proportion of children aged 0–15 (16.4% vs. 18.3%), a lower proportion of 16–49 year olds (38.2% vs. 43.6%), a significantly higher proportion of residents aged 50–74 (35.2% vs. 28.9%), and a slightly higher proportion of those aged 75 and over (10.1% vs. 9.2%).

1.8 Census data also shows that nearly a third of the working-age population work from home, although this figure may be influenced by pandemic conditions. The parish is generally characterised by a healthy population profile, high levels of employment, and strong rates of home ownership, despite a notable presence of caravan and mobile home occupancy in parts of Severn Beach.

1.9 However, housing affordability is a key challenge, with high prices driving younger adults and lower-income households out of the area. There is also a shortage of specialist care accommodation for older people, with provision less than one-third of local and national levels. Addressing these affordability and extra care needs is a key objective of the NDP and underpins the allocation of nine small-scale residential development sites (up to 246 homes and up to 41 sheltered units).

1.10 The parish is also characterised by high car dependency, linked to limited public transport options and employment patterns associated with nearby Severnside industrial areas. Consequently, the NDP places significant emphasis on transport improvements, parking management, and sustainable travel measures, alongside housing and community infrastructure priorities.

Legislative Framework

1.11 The UK left the EU on 31 January 2019 under the terms set out in the European Union (Withdrawal Agreement) Act 2020 (“the Withdrawal Act”). This established a transition period, which ended on 31 December 2020. The Withdrawal Act retains the body of existing EU-derived law within our domestic law. During the transition period EU law applies to and in the UK. The most recent amendments to the Habitats Regulations – the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019[3] – make it clear that the need for HRA has continued after the end of the Transition Period.

1.12 Under the Regulations, an appropriate assessment is required, where a plan or project is likely to have a significant effect upon an international site, either individually or in combination with other projects. The Directive is implemented in the UK by the Conservation of Habitats and Species Regulations 2017 (as amended) (the “Habitats Regulations”).

[3] These don’t replace the 2017 Regulations but are just another set of amendments

The legislative basis for Appropriate Assessment

Conservation of Habitats and Species Regulations 2017 (as amended)

With specific reference to Neighbourhood Plans, Regulation 106(1) states that:
'A qualifying body which submits a proposal for a neighbourhood development plan must provide such information as the competent authority [the Local Planning Authority] *may reasonably require for the purposes of the assessment under regulation 105* [which sets out the formal process for determination of 'likely significant effects' and the 'appropriate assessment']…'.

1.13 It is therefore important to note that this report has two purposes:

a. To assist the Pilning & Severn Beach Neighbourhood Plan Steering Group on behalf of the Qualifying Body (Pilning & Severn Beach Parish Council) in preparing their plan by recommending (where necessary) any adjustments required to protect international sites, thus making it more likely their plan will be deemed compliant with the Conservation of Habitats and Species Regulations 2017 (as amended); and

b. On behalf of the Qualifying Body, to assist the Local Planning Authority (South Gloucestershire Council) to discharge their duty under Regulation 105 (in their role as 'plan-making authority' within the meaning of that regulation) and Regulation 106 (in their role as 'competent authority').

1.14 As 'competent authority', the legal responsibility for ensuring that a decision of 'likely significant effects' is made, for ensuring an 'appropriate assessment' (where required) is undertaken, and for ensuring Natural England are consulted, falls on the local planning authority and the Neighbourhood Plan examiner. However, they are entitled to request from the Qualifying Body the necessary information on which to base their judgment and that is a key purpose of this report.

1.15 Over the years the phrase 'Habitats Regulations Assessment' has come into wide currency to describe the overall process set out in the Conservation of Habitats and Species Regulations from screening through to Imperative Reasons of Overriding Public Interest (IROPI). This has arisen in order to distinguish the process from the individual stage described in the law as an 'Appropriate Assessment'. Throughout this report we use the term Habitats Regulations Assessment for the overall process.

1.1 In spring 2018 the 'People Over Wind & Sweetman' European Court of Justice ruling[4], clarified that 'mitigation' (i.e., measures that are specifically introduced to avoid or reduce a harmful effect on a Habitat site that would otherwise arise) should **not** be taken into account when forming a view on likely significant effects. Mitigation should instead only be considered at the Appropriate Assessment stage. This HRA has been cognisant of that ruling.

The Layout of this Report

1.2 Chapter 2 of this report explains the methodology by which this HRA has been carried out, including the three essential tasks that form part of HRA. Chapter 3 provides details of the relevant Habitat sites. Chapter 4 provides detailed

[4] People Over Wind and Sweetman v Coillte Teoranta (C-323/17)

background on the main impact pathways identified in relation to the Neighbourhood Plan and the relevant Habitat sites. Chapter 5 undertakes the screening assessment of Likely Significant Effects (LSEs) of the Plan's policies. Chapter 6 undertakes the Appropriate Assessment of those Policies that could be screened out in Chapter 5. The conclusions arising from the HRA process are provided in Chapter 7.

Quality Assurance

1.3 This report was undertaken in line with AECOM's Integrated Management System (IMS). Our IMS places great emphasis on professionalism, technical excellence, quality, environmental and Health and Safety management. All staff members are committed to establishing and maintaining our certification to the international standards BS EN ISO 9001:2015 and 14001:2015, ISO 44001:2017 and ISO 45001:2018. In addition, our IMS requires careful selection and monitoring of the performance of all sub-consultants and contractors.

1.4 All AECOM Ecologists working on this project are members (at the appropriate level) of the Chartered Institute of Ecology and Environmental Management[5] and follow their code of professional conduct.

[5] Chartered Institute of Ecology and Environmental Management (CIEEM). (2017)

2. Methodology

Introduction

2.1 The HRA has been carried out with reference to the general EC guidance on HRA (European Commission, 2001)[6] and general guidance on HRA published by the UK government in 2021 (Department for Environment, Food & Rural Affairs, 2021)[7].

2.2 Plate 1 below outlines the stages of HRA according to current Department for Levelling Up, Housing & Communities guidance[8]. The stages are essentially iterative, being revisited as necessary in response to more detailed information, recommendations, and any relevant changes to the Plan until no significant adverse effects remain.

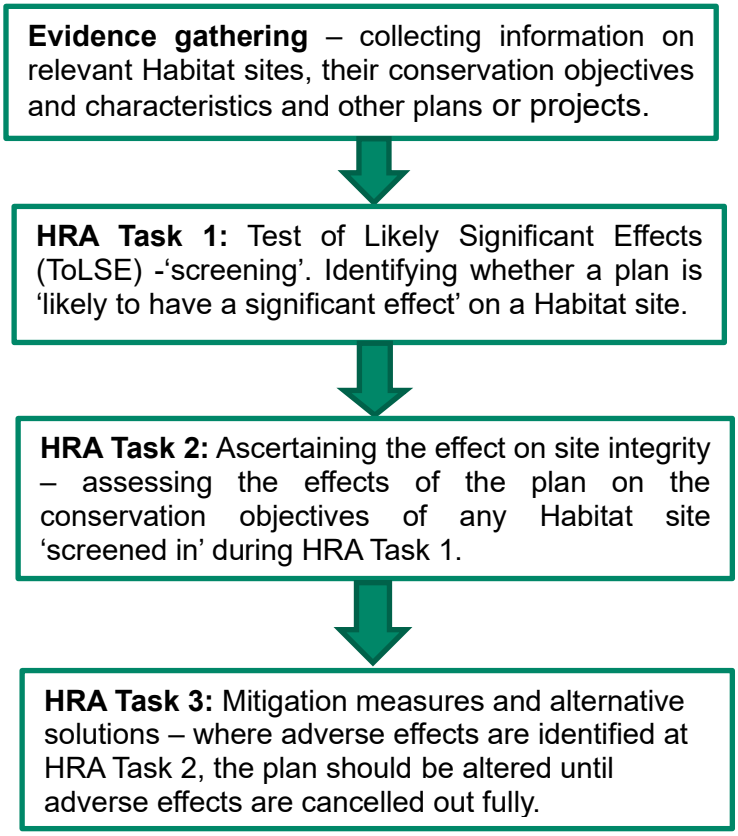

Plate 1. Four Stage Approach to Habitats Regulations Assessment (Department for Environment, Food & Rural Affairs, 2021)

HRA Task 1 – Likely Significant Effects (LSE)

2.3 Following evidence gathering, the first stage of any Habitats Regulations Assessment is a Test of Likely Significant Effect (ToLSE) test - essentially a risk

[6] European Commission (2001): Assessment of plans and projects significantly affecting Natura 2000 Sites: Methodological Guidance on the Provisions of Article 6(3) and 6(4) of the Habitats Directive
[7] Available at: https://www.gov.uk/guidance/appropriate-assessment
[8] Available at: https://www.gov.uk/guidance/appropriate-assessmen t

assessment to decide whether the full subsequent stage known as Appropriate Assessment is required. The essential question is:

"*Is the project, either alone or in combination with other relevant projects and plans, likely to result in a significant effect upon European sites?*"

2.4 The objective is to 'screen out' those plans and projects that can, without any detailed appraisal, be said to be unlikely to result in significant adverse effects upon Habitat sites, usually because there is no mechanism for an adverse interaction with Habitat sites.

2.5 In the Waddenzee case[9] the European Court of Justice ruled on the interpretation of Article 6(3) of the Habitats Directive, including that:

- An effect should be considered 'likely', *"if it cannot be excluded, on the basis of objective information, that it will have a significant effect on the site"* (para 44);
- An effect should be considered 'significant', *"if it undermines the conservation objectives"* (para 48); and
- Where a plan or project has an effect on a site *"but is not likely to undermine its conservation objectives, it cannot be considered likely to have a significant effect on the site concerned"* (para 47).

2.6 The ToLSE consists of two parts: Firstly, determining whether there are any policies that could result in negative impact pathways and secondly establishing whether there are any Habitat sites that might be affected. It identifies Habitat sites that could be affected by the Plan and also those impact pathways that are most likely to require consideration.

2.7 It is important to note that the ToLSE must generally follow the precautionary principle as its main purpose is to determine whether the subsequent stage of 'Appropriate Assessment' (i.e., a more detailed investigation) is required.

HRA Task 2: Appropriate Assessment (AA)

2.8 Where it is determined that a conclusion of 'no likely significant effect' cannot be drawn, the analysis has proceeded to the next stage of HRA known as Appropriate Assessment. Case law has clarified that 'Appropriate Assessment' is not a technical term. In other words, there are no particular technical analyses, or level of technical analysis, that are classified by law as belonging to Appropriate Assessment rather than determination of likely significant effects. It literally means '*whatever level of further assessment is appropriate to form a conclusion regarding effects on the integrity of relevant European sites'.*

2.9 In 2018 the Holohan ruling[10] handed down by the European Court of Justice included among other provisions paragraph 39 of the ruling stating that '*As regards other habitat types or species, which are present on the site, but for which that site has not been listed, and with respect to habitat types and species located outside that site, … typical habitats or species must be included in the*

[9] Case C-127/02
[10] Case C-461/17

appropriate assessment, if they are necessary to the conservation of the habitat types and species listed for the protected area' [emphasis added].

2.10 During July 2019 the Department for Levelling Up, Housing and Communities (DLUHC, 2019; updated DEFRA, 2021)[11] published guidance for Appropriate Assessment (Department for Levelling Up, Housing and Communities, 2019)[12].

2.11 Paragraph: 001 Reference ID: 65-001-20190722 explains: '*Where the potential for likely significant effects cannot be excluded, a competent authority must make an appropriate assessment of the implications of the plan or project for that site, in view of the site's conservation objectives. The competent authority may agree to the plan or project only after having ruled out adverse effects on the integrity of the habitats site. Where an adverse effect on the site's integrity cannot be ruled out, and where there are no alternative solutions, the plan or project can only proceed if there are imperative reasons of over-riding public interest and if the necessary compensatory measures can be secured*'.

2.12 One of the key considerations during Appropriate Assessment is whether there is available mitigation that would address the potential effect. In evaluating significance, AECOM will rely on professional judgement as well as the results of bespoke studies, supported by appropriate evidence/data within this assessment.

HRA Task 3 – Avoidance and Mitigation

2.13 Where necessary, measures are recommended for incorporation into the Plan in order to avoid or mitigate adverse effects on Habitat sites. There is considerable precedent concerning the level of detail that a Neighbourhood Plan document needs to contain regarding mitigation for recreational impacts on Habitat sites. The implication of this precedent is that it is not necessary for all measures that will be deployed to be fully developed prior to adoption of the Plan, but the Plan must provide an adequate policy framework within which these measures can be delivered.

2.14 In evaluating significance, AECOM has relied on professional judgement and the Local Plan HRA regarding development impacts on the Habitat sites considered within this assessment.

2.15 When discussing 'mitigation' for a Neighbourhood Plan document, one is concerned primarily with the policy framework to enable the delivery of such mitigation rather than the details of the mitigation measures themselves since the Local Development Plan document is a high-level policy document. A Neighbourhood Plan is a lower level constituent of a Local Development Plan.

Confirming Other Plans and Projects That May Act 'In Combination'

2.16 It is a requirement of the Regulations that the impacts of any land use plan being assessed are not considered in isolation but in combination with other plans and projects that may also be affecting the Habitat site(s) in question.

[11] DEFRA (2021). Habitats Regulations Assessments: protecting a European site. Department for Environment, Food & Rural Affairs.
[12] Available at: https://www.gov.uk/guidance/appropriate-assessment

2.17 For Pilning & Severn Beach NP area, the primary in-combination considerations are:

- Recreational pressure on the Severn Estuary SAC/SPA/Ramsar;
- Loss of functionally linked land for SPA birds and bats;
- Air quality (NOx) impacts from major transport corridors (e.g., M4, A403); and
- Water resource availability (abstraction pressures).

2.18 When undertaking this part of the assessment it is essential to bear in mind the principal intention behind the legislation i.e., to ensure that those projects or plans (which in themselves may have minor impacts) are not simply dismissed on that basis but are evaluated for any cumulative contribution they may make to an overall significant effect. In practice, in combination assessment is therefore of greatest relevance when the plan or policy would otherwise be screened out because its individual contribution is inconsequential. The overall approach is to exclude the risk of there being unassessed likely significant effects in accordance with the precautionary principle. This was first established in the seminal Waddenzee[13] case.

2.19 For the purposes of this assessment, we have determined that, due to the nature of the identified impacts, the key other plans and projects with potential for in combination likely significant effects are those schemes that have the following impact pathways: Loss of functionally linked land, recreational pressure, air quality impacts, water quality impacts and water quantity level and flow. The following plans have been assessed for their in-combination impact to interact with the Pilning & Severn Beach Neighbourhood Plan (NP):

- South Gloucestershire Council Core Strategy 2006 – 2027 (adopted 2014)[14]
- South Gloucestershire Policies, Sites and Places Plan (adopted 2017)[15],
- Emerging South Gloucestershire Local Plan 2025–2041 (Regulation 19 Draft)[16];
- Severnside Strategic Infrastructure Masterplan (SIMPS)[17];
- Wessex Water Drainage and Wastewater Management Plan (DWMP) 2023[18];
- Wessex Water Water Resources Management Plan (WRMP) 2024[19];

[13] Waddenzee case (Case C-127/02, [2004] ECR-I 7405)
[14] Available at: https://beta.southglos.gov.uk/static/2d94cc7df5f44948d9203e439cec8cd7/South-Gloucestershire-Core-Strategy-2006-2027.pdf
[15] Available at: https://beta.southglos.gov.uk/static/90efa5d673f208a3109ed111ba963a01/PSP-Plan-Nov2017.pdf
[16] South Gloucestershire Council (2025). *Emerging Local Plan 2025–2041 (Regulation 19 Draft)*. Available at: https://beta.southglos.gov.uk/new-local-plan/
[17] South Gloucestershire Council (2017). Severnside Strategic Infrastructure-led Masterplan (SIMPS)
[18] Wessex Water (2023). Final Drainage and Wastewater Management Plan (DWMP)
[19] Wessex Water (2024). Water Resources Management Plan (WRMP)

- Natural England Site Improvement Plan for the Severn Estuary (latest update)[20];
- Neighbouring authority Local Plans (e.g., Bristol City, Newport City Council) where relevant to cross-estuary growth pressures[21].

It should be noted that, while the broad potential impacts of these other projects and plans has been considered, this assessment does not undertake full HRA on each of these plans. Instead, existing HRAs that have been carried out for surrounding authorities and plans were drawn upon.

2.20 Within this document, each policy and site allocation within the NDP is subjected to HRA screening (summarised in Table 8). LSEs are then scrutinised in more detail in the main body of the report and where necessary an AA is undertaken.

[20] Natural England (2022). Site Improvement Plan: Severn Estuary (SIP013)
[21] Bristol City Council (2019). Bristol Local Plan Review (Regulation 19 Draft). Newport City Council (2020)

3. Physical Scope of the HRA

Introduction

3.1 There is no guidance that dictates the general physical scope of an HRA of a Plan document. Therefore, in considering the physical scope of the assessment, we were guided primarily by the identified impact pathways (called the source-pathway-receptor model).

3.2 Briefly defined, impact pathways are routes by which the implementation of a project can lead to an effect upon a Habitat site. An example of this would be visual and noise disturbance arising from the construction/decommissioning work or operational phase associated with a project. If there are sensitive ecological receptors within a nearby Habitat site (e.g. non-breeding overwintering birds), this could alter their foraging and roosting behaviour and potentially affect the site's integrity. For some impact pathways (notably air pollution) there is guidance that sets out distance-based zones required for assessment. For others, a professional judgment must be made based on the best available evidence.

Habitat Sites Relevant to the Neighbourhood Development Plan

3.3 In the case of the P&SB NDP, it has been determined that the Habitat sites identified in Table 1 require consideration. The background to these Habitat sites is discussed in Appendix A.

3.4 The locations of the below Habitat sites in relation to the P&SB NDP area boundary and allocated sites are illustrated in Appendix A, Figure A1.

Table 1. Habitat site descriptions and distance from P&SB NDP area

Site Name/Designation	Site Description	Distance from Neighbourhood Plan Area Boundary
Severn Estuary SPA Severn Estuary Ramsar Severn Estuary SAC	The Severn Estuary is located between Wales and England in south-west Britain. It is a large estuary with extensive intertidal mud-flats and sand-flats, rocky platforms and islands. Saltmarsh fringes the coast backed by grazing marsh with freshwater ditches and occasional brackish ditches. The subtidal seabed is rock and gravel with subtidal sandbanks. The site also supports reefs of the tube forming worm Sabellaria alveolata.	Immediately adjacent to the P&SB NDP area

Site Name/Designation	Site Description	Distance from Neighbourhood Plan Area Boundary
	The estuary's classic funnel shape, unique in the UK, is a factor causing the Severn to have one of the highest tidal ranges in the world. A consequence of the large tidal range is an extensive intertidal zone, one of the largest in the UK. The tidal regime results in plant and animal communities typical of the extreme physical conditions of liquid mud and tide-swept sand and rock. The species-poor intertidal invertebrate community includes high densities of ragworms, lugworms and other invertebrates forming an important food source for passage and wintering waders and fish. The site is of importance during the spring and autumn migration periods for waders, as well as in winter for large numbers of waterbirds, especially swans, ducks and waders. The fish fauna is very diverse with more than 110 species identified. The site is of particular importance for migratory fish.	
River Wye SAC	The River Wye SAC covers 250km of relatively natural and unmodified main river with a near-natural fluvio-geomorphological regime. The upland reaches, from the source in Powys, has a bryophyte dominated vegetation which progresses into extensive water crowfoot *Ranunculus* beds in the lowland reaches in England. The lower 23km is transitional habitat to the confluence with the Severn Estuary. The river supports a number of internationally important migratory fish, including Atlantic Salmon, Lamprey and Shad species. Otters are widespread.	1.7km north
Wye Valley Woodlands SAC	The woodlands of the lower Wye Valley form one of the most important areas for woodland conservation in Britain (comparable with the Caledonian pinewoods, the oceanic oakwoods of	6.7km north

Site Name/Designation	Site Description	Distance from Neighbourhood Plan Area Boundary
	Western Britain, the New Forest and the mixed coppices of East Anglia). Semi-natural woodland is extensive and virtually continuous along the Wye gorge and overlie a variety of geological strata and soils. Most woods are a rich mixture of stand-types, which are believed to be similar in composition to the original natural woods of the valley, with some of them rare and very localised eg the Lime-Sessile Oak stands on limestone, Beech stands on both acid and alkaline soils in which Lime (*Tilia spp*), Elm (*Ulmus spp*), Oak (*Quercus spp*) and other species share dominance. Tilio-Acerion (Lime and Ash) and *Taxus* (Yew) woodlands types are also features of the site. In addition, many rare and local plant species are present, including some of the rarest native tree species, e.g. Large-leaved lime (*Tilia platyphyllos*), Whitebeams (*Sorbus spp*) and trees close to the edge of their European range, eg Hornbeam (*Carpinus betulus*) and Beech (*Fagus sylvatica*). Furthermore, these woods sit in a matrix of unimproved grassland and other semi-natural habitats which support a number of other notable plant species. The Wye Valley Woodlands also provide an important foraging resource for the local population of lesser horseshoe bats which are known to hibernate in various disused mines and structures throughout the woodlands.	
Wye Valley and Forest of Dean Bat Sites SAC	This complex of sites on the border between England and Wales contains, at the time of listing, by far the greatest concentration of Lesser horseshoe bat in the UK, totalling about 26% of the national population. It features an exceptional breeding population. In addition, it supports a significant population of Greater horseshoe bat in the northern part of its range. The site	7.7km north

Site Name/Designation	Site Description	Distance from Neighbourhood Plan Area Boundary
	contains the main maternity roost and hibernacula for this species in this area.	
Avon Gorge Woodlands SAC	The Avon Gorge Woodlands SAC is good example of Tilio-Acerion forests in south-west England. It is important because of the high concentration of Small-leaved lime *Tilia cordata* and the presence of rare whitebeams *Sorbus spp*., including at least two which are unique to the Avon Gorge (*S. bristoliensis* and *S. wilmottiana*), and other Nationally Scarce plants, such as Angular Solomon's-seal *Polygonatum odoratum*. The associated species-rich transitions to scrub and herb-rich calcareous open limestone grassland often found on cliff ledges support a high number of Nationally Rare and Scarce species, such as Bristol rock-cress *Arabis scabra*, round-headed leek ('Bristol onion') *Allium sphaerocephalon* and honewort *Trinia glauca*. Part of the Leigh Woods side of the SAC is considered to be important remnant wood pasture habitat which was managed as a wood pasture for many hundreds of years. This is shown by the presence of large numbers of veteran pollards, which are also highly likely to be important for saproxylic invertebrates	6.1km south

4. Impact Pathways

Introduction

4.1 In carrying out an HRA it is important to avoid confining oneself to effectively arbitrary boundaries (such as Local Authority or parish boundaries), but to use an understanding of the various ways in which Land Use Plans can impact on Habitat sites to evaluate whether development is connected with Habitat sites, in some cases many kilometres distant. Briefly defined, impact pathways are routes by which a change in activity associated with a development can lead to an effect upon a Habitat site. As highlighted earlier, it is also important to bear in mind DLUHC (formerly MHCLG) guidance which states that the AA should be '*proportionate and sufficient to support the task of the competent authority in determining whether the plan or project will adversely affect the integrity of the site.'* (DLUHC, 2019, paragraph 003 Reference ID: 65-003-20190722.[22] , updated DEFRA, 2021[23]).

4.2 The Habitat sites that are described in Table 1 and Appendix A are located within 10 km radius of the P&SB NDP area boundary.

4.3 Based upon Natural England Site Improvement Plans, Supplementary Advice on Conservation Objectives and professional judgement, there are several pathways that require consideration regarding increased development within the P&SB NDP area and said Habitat sites. These are:

- Recreational pressure (particularly on the Severn Estuary SAC/SPA/Ramsar);
- Loss of functionally linked habitat (for mobile species associated with the Severn Estuary SPA and Wye Valley and Forest of Dean Bat Sitesat SAC);
- Noise and visual disturbance regarding Severn Estuary SPA/Ramsar (construction and urbanisation near sensitive estuarine habitats);
- Atmospheric pollution (from roads near sensitive habitats such as the Severn Estuary SAC/Ramsar, and Wye Valley Woodlands SAC);
- Water resource abstraction (affecting water-dependent SACs if relevant);
- Coastal squeeze (long-term sea level rise interacting with development near defended estuarine margins).

[22] Available at: https://www.gov.uk/guidance/appropriate-assessment#what-must-an-appropriate-assessment-contain
[23] DEFRA (2021). Habitats Regulations Assessments: protecting a European site. Department for Environment, Food & Rural Affairs.

Background to Recreational Pressure and Disturbance

Disturbance

4.4 Concern regarding the effects of disturbance on birds stems from the fact that they are expending energy unnecessarily by fear reactions or taking flight and the time they spend responding to disturbance is time that is not spent feeding (this will apply all year round)[24]. Disturbance therefore risks increasing energetic output while reducing energetic input, which can adversely affect the "condition" and ultimately survival of the birds. In addition, displacement of birds from one feeding site to others can increase the pressure on the resources available within the remaining sites, as they have to sustain a greater number of birds[25]. Moreover, the more time a breeding bird spends disturbed from its nest, the more its eggs are likely to cool and the more vulnerable they, or any nestlings, are to predators.

4.5 The potential for disturbance may be less in winter than in summer, in that there are often a smaller number of recreational users. In addition, the consequences of disturbance at a population level may be reduced because birds are not breeding. However, activity outside of the summer months can still cause important disturbance, especially as birds are particularly vulnerable at this time of year due to food shortages. Disturbance which results in abandonment of suitable feeding areas can have severe consequences for those birds involved and their ability to find alternative feeding areas. Several empirical studies have, through correlative analysis, demonstrated that out-of-season (October-March) recreational activity can result in quantifiable disturbance:

- Tuite et al[26] found that during periods of high recreational activity, bird numbers at Llangorse Lake decreased by 30% as the morning progressed, matching the increase in recreational activity towards midday. During periods of low recreational activity, however, no change in numbers was observed as the morning progressed. In addition, all species were found to spend less time in their 'preferred zones' (the areas of the lake used most in the absence of recreational activity) as recreational intensity increased;
- Underhill et al[27] counted waterfowl and all disturbance events on 54 water bodies within the South West London Water Bodies Special Protection Area and clearly correlated disturbance with a decrease in bird numbers at weekends in smaller sites and with the movement of birds within larger sites from disturbed to less disturbed areas;

[24] Riddington, R. *et al*. 1996. The impact of disturbance on the behaviour and energy budgets of Brent geese. *Bird Study* 43:269-279
[25] Gill, J.A., Sutherland, W.J. & Norris, K. 1998. The consequences of human disturbance for estuarine birds. *RSPB Conservation Review* 12: 67-72
[26] Tuite, C. H., Owen, M. & Paynter, D. 1983. Interaction between wildfowl and recreation at Llangorse Lake and Talybont Reservoir, South Wales. *Wildfowl* 34: 48-63
[27] Underhill, M.C. et al. 1993. Use of Waterbodies in South West London by Waterfowl. An Investigation of the Factors Affecting Distribution, Abundance and Community Structure. Report to Thames Water Utilities Ltd. and English Nature. Wetlands Advisory Service, Slimbridge

- Evans & Warrington[28] found that on Sundays total water bird numbers (including shoveler and gadwall) were 19% higher on Stocker's Lake LNR in Hertfordshire and attributed this to observed greater recreational activity on surrounding water bodies at weekends relative to weekdays displacing birds into the LNR. However, in this study, recreational activity was not quantified in detail, nor were individual recreational activities evaluated separately; and

- Tuite et al[29] used a large (379 site), long-term (10-year) dataset (September – March species counts) to correlate seasonal changes in wildfowl abundance with the presence of various recreational activities. They found that shoveler was one of the most sensitive species to disturbance. The greatest impact on wildfowl numbers during these months was associated with sailing/windsurfing and rowing.

4.6 More recent research has established that human activity including recreational activity can be linked to disturbance of wintering waterfowl populations[30] [31].

4.7 Human activity can affect birds either directly (e.g. by causing them to flee) or indirectly (e.g. by damaging their habitat). The most obvious direct effect is that of immediate mortality such as death by shooting, but human activity can also lead to behavioural changes (e.g. alterations in feeding behaviour, avoidance of certain areas *etc.*) and physiological changes (e.g. an increase in heart rate) that, although less noticeable, may ultimately result in major population-level effects by altering the balance between immigration/birth and emigration/death[32].

4.8 The degree of impact that varying levels of noise will have on different species of bird is poorly understood except that a number of studies have found that an increase in traffic levels on roads does lead to a reduction in the bird abundance within adjacent hedgerows - Reijnen et al (1995) examined the distribution of 43 passerine species (i.e. 'songbirds'), of which 60% had a lower density closer to the roadside than further away. By controlling vehicle usage, they also found that the density generally was lower along busier roads than quieter roads[33].

4.9 A study on recreational disturbance on the Humber[34] assesses different types of noise disturbance on waterfowl referring to studies relating to aircraft (see Drewitt 1999[35]), traffic (Reijnen, Foppen, & Veenbaas 1997)[36], dogs (Lord, Waas, & Innes 1997[37]; Banks & Bryant 2007[38]) and machinery (Delaney et al. 1999; Tempel & Gutierrez 2003). These studies identified that there is still relatively little work on the effects of different types of water based craft and the impacts

[28] Evans, D.M. & Warrington, S. 1997. The effects of recreational disturbance on wintering waterbirds on a mature gravel pitlake near London. International Journal of Environmental Studies 53: 167-182
[29] Tuite, C.H., Hanson, P.R. & Owen, M. 1984. Some ecological factors affecting winter wildfowl distribution on inland waters in England and Wales and the influence of water-based recreation. *Journal of Applied Ecology* 21: 41-62
[30] Footprint Ecology. 2010. Recreational Disturbance to Birds on the Humber Estuary
[31] Footprint Ecology, Jonathan Cox Associates & Bournemouth University. 2010. Solent disturbance and mitigation project – various reports.
[32] Riley, J. 2003. Review of Recreational Disturbance Research on Selected Wildlife in Scotland. Scottish Natural Heritage.
[33] Reijnen, R. et al. 1995. The effects of car traffic on breeding bird populations in woodland. III. Reduction of density in relation to the proximity of main roads. Journal of Applied Ecology 32: 187-202
[34] Helen Fearnley Durwyn Liley and Katie Cruickshanks (2012) Results of Recreational Visitor Survey across the Humber Estuary produced by Footprint Ecology
[35] Drewitt, A. (1999) Disturbance effects of aircraft on birds. English Nature, Peterborough.
[36] Reijnen, R., Foppen, R. & Veenbaas, G. (1997) Disturbance by traffic of breeding birds: evaluation of the effect and considerations in planning and managing road corridors. Biodiversity and Conservation, 6, 567-581.
[37] Lord, A., Waas, J.R. & Innes, J. (1997) Effects of human activity on the behaviour of northern New Zealand dotterel Charadrius obscurus aquilonius chicks. Biological Conservation, 82,15-20.
[38] Banks, P.B. & Bryant, J.V. (2007) Four-legged friend of foe? Dog-walking displaces native birds from natural areas. Biology Letters, 3, 611-613.

from jet skis, kite surfers, windsurfers etc. (see Kirby et al. 2004[39] for a review). Some types of disturbance are clearly likely to invoke different responses. In very general terms, both distance from the source of disturbance and the scale of the disturbance (noise level, group size) will both influence the response (Delaney et al. 1999[40]; Beale & Monaghan 2005[41]). On UK estuaries and coastal sites, a review of WeBS data showed that, among the volunteer WeBS surveyors, driving of motor vehicles and shooting were the two activities most perceived to cause disturbance (Robinson & Pollitt 2002)[42].

4.10 Other disturbing activities are on a continuum. The most disturbing activities are likely to be those that involve irregular, infrequent, unpredictable loud noise events, movement or vibration of long duration. Birds are least likely to be disturbed by activities that involve regular, frequent, predictable, quiet patterns of sound or movement or minimal vibration. The further any activity is from the birds, the less likely it is to result in disturbance.

4.11 Recreational catchments vary from European site to European site but for catchments for inland sites are often in the range of 2-7km while those for coastal sites are often larger. Various research reports have provided compelling links between changes in housing and access levels. The results of studies compiling visitor survey data for a range of European sites[43] demonstrate that more housing consistently means more visitors to protected sites, across most habitats. This is particularly the case for on-foot visitors that originate from housing within 1.5 km, highlighting that additional housing development in close proximity to protected sites is likely to significantly increase recreation pressure. For those sites with car parks, levels of housing within 15 km of protected sites were also a significant predictor of visitor pressure but depended on habitat type.

4.12 In the NP area, the Severn Estuary SAC/SPA/Ramsar site is likely to have the largest recreational catchment. There has been detailed visitor survey work undertaken, and recreation mitigation produced in some authorities for, the Severn Estuary SPA/SAC:

- LUC (2019) Further work on recreational pressures on European sites in West of England. Unpublished report for the West of England UAs
- The Severn Estuary Partnership[44] and the State of the Severn Estuary Report (2011)[45]
- The Severn Estuary High Tide Study reports:
  - Identification of wintering waterfowl high tide roosts on the Severn Estuary SSSI/SPA (Brean Down to Clevedon) 2015 (RP02262)

[39] Kirby, J.S., Clee, C. & Seager, V. (1993) Impact and extent of recreational disturbance to wader roosts on the Dee estuary: some preliminary results. Wader Study Group Bulletin, 68, 53-58.
[40] Delaney, D.K., Grubb, T.G., Beier, P., Pater, L.L.M. & Reiser, H. (1999) Effects of Helicopter Noise on Mexican Spotted Owls. The Journal of Wildlife Management, 63, 60-76.
[41] Beale, C.M. & Monaghan, P. (2005) Modeling the Effects of Limiting the Number of Visitors on Failure Rates of Seabird Nests. Conservation Biology, 19, 2015-2019.
[42] Robinson, J.A. & Pollitt, M.S. (2002) Sources and extent of human disturbance to waterbirds in the UK: an analysis of Wetland Bird Survey data, 1995/96 to 1998/99: Less than 32% of counters record disturbance at their site, with differences in causes between coastal and inland sites. Bird Study, 49, 205.
[43] Weitowitz D.C., Panter C., Hoskin R. & Liley D. 2019. The effect of urban development on visitor numbers to nearby protected nature conservation sites. Journal of Urban Ecology 5. https://doi.org/10.1093/jue/juz019
[44] Available at: Severn Estuary Partnership. [accessed 09/04/2021]
[45] Available at: SOSER.pdf (severnestuarypartnership.org.uk) [accessed 09/04/2021]

  - Identification of wintering waterfowl roosts in the Severn Estuary SPA/SAC and Ramsar site; Phases 2 and 3 (RP02366)
  - Identification Of Wintering Waterfowl High Tide Roosts On The Severn Estuary SSSI/SPA Phase 4 (Gloucestershire, With Part Of South Gloucestershire) (RP02966)

- Southgate, J. and Colebourn, K. (2016). Severn Estuary (Stroud District) Visitor Survey Report. Report for Stroud District Council. Ecological Planning & Research, Winchester[46].
- Liley, D., Panter, C. & Hoskin, R (2017). Lydney Severn Estuary Visitor Survey and Recreation Strategy. Unpublished report by Footprint Ecology for the Forest of Dean District Council[47].
- The Forgotten Landscape high-tide roost monitoring project report 2019, which assessed disturbance to hight tide roosts along the South Gloucestershire section of the Severn Estuary.

4.13 For this site, therefore, a range of visitor surveys have been undertaken by different local councils including Lydney, Stroud District and unpublished survey work by AECOM for Monmouthshire and Torfaen Councils in Wales, as well as survey work undertaken for the West of England UAs by LUC. The Lydney survey indicated that the visit patterns in the Severn Estuary SAC, particularly those of dog walkers, walker and joggers, highlight that visitors tend to live very close to the SAC.

4.14 For example, dog walkers travelled a median distance of 2.3km. The Stroud visitor survey identified that the 75th percentile for Stroud residents was 7.7km (i.e. 75% of visitors living in Stroud lived within 7.7km of the SAC/SPA/Ramsar site). The emerging surveys for Monmouthshire and Torfaen are identifying a core recreational catchment for residents of those authorities of 6.8km. Visitor survey work undertaken for the West of England authorities by Land Use Consultants in February 2019 covered four survey locations: two in North Somerset and two in South Gloucestershire. It led to a proposed core catchment/zone of influence of 7.36km. The buffer covers 93.4% of respondents who reported visiting the sites at least once a week and included 89.6% of dog walkers. Stroud District Council and Forest of Dean Council have both recently increased the recreational catchment in their area for Severn Estuary from 7km to 12.6km, based on more recent visitor survey from 2022. The South Gloucestershire Regulation 19 Local Plan HRA uses a distance of 12.3km.

4.15 Therefore, the **Severn Estuary SAC/SPA/Ramsar** is identified as the Habitats site most sensitive to recreational disturbance from growth within the P&SB NDP area.

4.16 In the South Gloucestershire Regulation 19 Local Plan HRA Avon Gorge Woodlands SAC and Wye Valley Woodlands SAC are both given core recreational catchments of 7km which would bring Pilning & Severn Beach Parish within the core catchments of both sites. However, the closest area that would receive housing or employment growth in the parish is approximately 9km from Wye Valley Woodlands SAC and this does not take account of the necessity

[46] Available at: severnestuaryvs_report_15581c_final_060616.pdf (stroud.gov.uk) [accessed 28/01/2021]
[47] Available at: Liley et al 2017 Lydney Severn Estuary Visitor Survey and Recreation Strategy.pdf (footprint-ecology.co.uk) [accessed 29/01/2021]

of crossing the River Severn to reach the SAC. As such it is considered beyond the zone of influence for recreational pressure. Similarly, the nearest location that would receive new housing within the parish is at least 8km from Avon Gorge Woodlands SAC and thus outside the recreational catchment. Moreover, recreation at Avon Gorge Woodlands SAC is likely to be dominated by residents of Bristol, and to a lesser extent the urban areas of South Gloucestershire within the M5 and M32 motorways, and North Somerset. Therefore, recreational pressure on Avon Gorge Woodlands from the Neighbourhood Plan can also be dismissed.

Background to Noise and Visual Disturbance

4.17 As detailed in the section on recreational pressure above, human activity can affect birds either directly (e.g., by causing them to flee) or indirectly (e.g. by damaging their habitat). Human activity can also lead to behavioural changes (e.g., alterations in feeding behaviour, avoidance of certain areas etc.) and physiological changes (e.g., an increase in heart rate) that, although less noticeable, may ultimately result in major population-level effects[48].

4.18 Recreational pressure is not the only potential source of disturbance. Construction work taking place immediately adjacent to the designated site or functionally linked habitats could cause disturbance and displacement of designated birds. While any impact relating to demolition and construction activities will be temporary (birds would likely return once construction work ceases and the disturbance stimulus is removed) the resulting effect on population survival could be significant if it occurs during the winter / passage period and prevents birds from using feeding areas on which they rely. It should be noted that any operational activities are likely to be permanent and thus their impact could result in a more severe negative impacts on designated bird features.

4.19 The degree of impact that varying levels of noise will have on different species of bird is relatively poorly understood. Several studies have found that an increase in traffic levels on roads leads to a reduction in the bird abundance within adjacent hedgerows - Reijnen et al (1995) examined the distribution of 43 passerine species (i.e., 'songbirds'), of which 60% had a lower density closer to the roadside than further away. By controlling vehicle usage, they also found that the density generally was lower along busier roads than quieter roads[49].

4.20 A review on recreational disturbance on the Humber[50] assessed different types of noise disturbance on waterfowl referring to studies relating to aircraft (see Drewitt 1999[51]), traffic (Reijnen, Foppen, & Veenbaas 1997)[52], dogs (Lord, Waas, & Innes 1997[53]; Banks & Bryant 2007[54]) and machinery (Delaney et al. 1999; Tempel & Gutierrez 2003). These studies identified that there is still relatively little

[48] Riley, J. 2003. Review of Recreational Disturbance Research on Selected Wildlife in Scotland. Scottish Natural Heritage.
[49] Reijnen, R. et al. 1995. The effects of car traffic on breeding bird populations in woodland. III. Reduction of density in relation to the proximity of main roads. Journal of Applied Ecology 32: 187-202
[50] Helen Fearnley Durwyn Liley and Katie Cruickshanks (2012) Results of Recreational Visitor Survey across the Humber Estuary produced by Footprint Ecology
[51] Drewitt, A. (1999) Disturbance effects of aircraft on birds. English Nature, Peterborough.
[52] Reijnen, R., Foppen, R. & Veenbaas, G. (1997) Disturbance by traffic of breeding birds: evaluation of the effect and considerations in planning and managing road corridors. Biodiversity and Conservation, 6, 567-581.
[53] Lord, A., Waas, J.R. & Innes, J. (1997) Effects of human activity on the behaviour of northern New Zealand dotterel Charadrius obscurus aquilonius chicks. Biological Conservation, 82,15-20.
[54] Banks, P.B. & Bryant, J.V. (2007) Four-legged friend of foe? Dog-walking displaces native birds from natural areas. Biology Letters, 3, 611-613.

work on the effects of different types of water-based craft and the impacts from jet skis, kite surfers, windsurfers etc. (see Kirby et al. 2004[55] for a review). Some types of disturbance are clearly likely to invoke different responses. In very general terms, both distance from the source of disturbance and the scale of the disturbance (noise level, group size) will influence the response (Delaney et al. 1999[56]; Beale & Monaghan 2005[57]). On UK estuaries and coastal sites, a review of WeBS data showed that, among the volunteer WeBS surveyors, driving of motor vehicles and shooting were the two activities most perceived to cause disturbance (Robinson & Pollitt 2002)[58].

4.21 Additionally, animals can be disturbed by the movement of ships. For instance, a DTI study of birds of the North West coast noted that: "*Divers and scoters were absent from the mouths of some busier estuaries, notably the Mersey... Both species are known to be susceptible to disturbance from boats, and their relative scarcity in these areas... may in part reflect the volume of boat traffic in these areas*"[59].

4.22 Three of the most important factors determining the magnitude of disturbance appear to be species sensitivity, proximity of the disturbance source and timing / duration of the disturbance. Generally, the most disturbing activities are likely to be those that involve irregular, infrequent and unpredictable loud noise events, movements or vibrations. Birds are least likely to be disturbed by activities that involve regular, frequent, predictable, quiet patterns of sound, movement and vibration. The further any activity is from the birds, the less likely it is to result in disturbance.

4.23 An increasing amount of research on visual and noise disturbance of waterfowl from construction (and other activities) is now available[60]. Both visual and noise stimuli may elicit disturbance responses, potentially affecting the fitness and survival of waterfowl and waders. Noise is a complex disturbance parameter requiring the consideration of multiple parameters, including its non-linear scale, non-additive effect and the source-receptor distance. A high level of noise disturbance constitutes a sudden noise event of over 60dB or prolonged noise of over 72dB. Bird responses to high noise levels include major flight or the cessation of feeding, both of which might affect the survival of birds particularly if other stressors are present (e.g., cold weather, food scarcity).

4.24 Generally, research has shown that above noise levels of 84dB waterfowl show a flight response, while at levels below 55dB there are no behavioural effects. These two thresholds are therefore considered useful as defining two extremes. The same authors have shown that regular noise levels should be below 70dB at the bird, as birds will habituate to noise levels below this level. Generally, noise is attenuated by 6dB with every doubling of distance from the source. For example, impact piling, which is a particularly noisy construction process of

[55] Kirby, J.S., Clee, C. & Seager, V. (1993) Impact and extent of recreational disturbance to wader roosts on the Dee estuary: some preliminary results. Wader Study Group Bulletin, 68, 53-58.
[56] Delaney, D.K., Grubb, T.G., Beier, P., Pater, L.L.M. & Reiser, H. (1999) Effects of Helicopter Noise on Mexican Spotted Owls. The Journal of Wildlife Management, 63, 60-76.
[57] Beale, C.M. & Monaghan, P. (2005) Modeling the Effects of Limiting the Number of Visitors on Failure Rates of Seabird Nests. Conservation Biology, 19, 2015-2019.
[58] Robinson, J.A. & Pollitt, M.S. (2002) Sources and extent of human disturbance to waterbirds in the UK: an analysis of Wetland Bird Survey data, 1995/96 to 1998/99: Less than 32% of counters record disturbance at their site, with differences in causes between coastal and inland sites. Bird Study, 49, 205.
[59] DTI (2006). Aerial Surveys of Waterbirds in Strategic Wind Farm Areas: 2004/05 Final Report
[60] Institute of Estuarine & Coastal Studies (IECS), University of Hull. (2013). Waterbird Disturbance Mitigation Toolkit – Informing Estuarine Planning & Construction Projects. 36pp.

approx.. 110dB at 0.67m from source, will therefore reduce to 67 – 68dB by 100m from the source. Overall, the loudest construction noise will have fallen to below disturbing levels by 100m, and certainly by 200m, from the source even without mitigation.

4.25 Visual disturbance is generally considered to have a higher impact than noise disturbance as, in most instances, visual stimuli will elicit a disturbance response at greater distances than noise. For example, a flight response is triggered in most species when they are approached to within 150m across a mudflat. Visual disturbance can be exacerbated by workers operating equipment outside machinery, undertaking sudden movements and using large machinery. Some species are particularly sensitive to visual disturbance, including curlew (taking flight at 275m), redshank (at 250m), shelduck (at 199m) and bar-tailed godwit (at 163m).

4.26 For the purpose of this assessment, a precautionary buffer of 300m has been used for visual and noise disturbance impacts.

4.27 The following protected sites are considered susceptible to noise and visual disturbance within the context of the Pilning & Severn Beach NP, should works be within 300m of a protected site or functionally linked habitat:

- **Severn Estuary SAC/SPA/Ramsar**

Background to Loss of Functionally Linked Habitat

4.28 While most European sites have been geographically defined in order to encompass the key features that are necessary for coherence of their structure and function, this is not the case for all such sites. Due to the highly mobile nature of waterfowl, it is inevitable that areas of habitat of crucial importance to the maintenance of their populations are outside the physical limits of the European site for which they are an interest feature. However, this area will still be essential for maintenance of the structure and function of the interest feature for which the site was designated and land use plans that may affect this land should still therefore be subject to further assessment. This has been underlined by a recent European Court of Justice ruling (C-461/17, known as the Holohan ruling[61]) which in paragraphs 37 to 40 confirms the need for an appropriate to consider the implications of a plan or project on habitats and species outside the European site boundary provided that those implications are liable to affect the conservation objectives of the site.

Bat Sites

4.29 For the Wye Valley & Forest of Dean Bat Sites SAC, issues relating to loss of habitat, disturbance to and deteriorating habitats has been identified as a potential threat to the SAC and its bat species. The designated bat features use functionally linked land surrounding the SACs to forage, commute and use for seasonal migration into the wider countryside.

4.30 The following are key evidence sources in relation to functionally linked land at the bat SAC sites:

[61] The Holohan ruling also requires all the interest features of the European sites discussed to be catalogued (i.e. listed) in the HRA. That is the purpose of Appendix B.

- Mitigation strategies already developed for Bath and Bradford on Avon Bats SAC to protect roosting and foraging habitat, such as the Trowbridge Bat Mitigation Strategy SPD for Bath and Bradford on Avon Bats SAC (adopted February 2020)[62] which provides tailored recreational pressure zones of impact:
  - Red Zone: new development unlikely to be granted permission due to high risks.
  - Yellow Zone: new development on greenfield sites outside the settlement boundaries will need to demonstrate no adverse effect on the integrity of the SAC, undertake appropriate bat surveys, mitigate for all impacts on target bat species on site through retaining and enhancing wide swathes of unlit bat habitat with associated buffer zones, and for each allocated site, it is anticipated that in most circumstances the full residual green space will be required for mitigation and proposals within these yellow zones should expect to make a payment for habitat mitigation.
  - Grey (hatched) Zone: development proposals are required to make a payment for recreational pressure mitigation.
- Similar mitigation strategies devised for the North Somerset & Mendip Bats SAC, such as that by North Somerset Council[63]. That guidance identifies that:
  - The Juvenile Sustenance Zones of 1 kilometre (km) around the maternity roosts for greater horseshoe bats and 600m for lesser horseshoe bats. New build development on green field sites should be avoided in the Juvenile Sustenance Zones (JSZs)
  - The “Bat Consultation Zone” where horseshoe bats may be found, divided into bands A, B and C, reflecting the likely importance of the habitat for the bats and proximity to maternity and other roosts. Functionally linked habitat bands around greater horseshoe bats maternity roosts extend up to 8km (Band C) and 4.1km (Band C) around lesser horseshoe bats maternity roosts. It is important to note that the 8km and 4km distances from which Band C is derived is measured not purely from the SAC boundary but from satellite roosts that are functionally linked to the SAC. As such Zone C extends more than 8km from the SAC itself in some places Other roosts (e.g. hibernation) for greater horseshoe bats Band C extends up to 2.4km from the roost and for lesser horseshoe bats Band C extends up to 1.3km from the roost. Greater horseshoe bats forage from roosts at a greater distance than lesser horseshoes. However. although it is recognised that greater horseshoe bats mostly forage within 2.2 km of a maternity roost (within Band A) and this will correspond with the habitats of most importance for the SAC population, they can also make regular foraging trips up to 8km and therefore habitats within this band must also be considered to be of value when considering placement of development.

[62] https://www.wiltshire.gov.uk/media/3928/Trowbridge-Bat-Mitigation-Strategy-SPD/pdf/whsap-trowbridge-bat-mitigation-strategy.pdf?m=637273390249630000 [accessed 27/01/2021]
[63] https://www.n-somerset.gov.uk/sites/default/files/2020-02/NSC%20and%20Mendip%20Bats%20SAC%20guidance%20-%20supplementary%20planning%20document.pdf [accessed 27/01/2021]

4.31 The area of greatest bat activity surrounding a roost is defined as the Core Sustenance Zone (CSZ)[64]. This term refers to the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost. This bat species uses commuting corridors along linear landscape features and forages in permanent pasture and woodland. The Bat Conservation Trust identifies a weighted average CSZ of 3km for greater horseshoe bats[65] based on weighted averages from four studies. However, confidence in this zone size is described in the guidance as Moderate because the calculation is based on a reasonable sample size from multiple colonies and studies but is rounded down from weighted average. Other radio-tracking research on greater horseshoe bats has shown that they make longer foraging trips foraging from their roost sites than lesser horseshoe bats, up to 9-10km from their roost[66] [67] and the West of England LTP4 HRA cites studies[68] that identify greater horseshoe bats have shown to have a maximum home range of up to 8km from a roost.

4.32 Given the somewhat conflicting evidence, on balance an 8km zone would be reasonable to define the area of greatest importance for a greater horseshoe colony, being precautionary (compared to the CSZ approach) but without trying to encapsulate every area that might be visited by greater horseshoe bats associated with a given SAC. The use of such a zone would not mean that greater horseshoe bat habitat more than 8km from the SAC (or from an important satellite roost) did not also need preserving, but more distant habitat could be dealt with as part of the Ecological Impact Assessment process for any planning application since bats are protected species and material considerations in the planning process wherever they are found.

4.33 Generally, lesser horseshoe bats forage between 2 and 3km from their roost but they have been observed to range up to 4km in their nightly foraging trips[69]. The Bat Conservation Trust identifies a weighted average CSZ of 2km for lesser horseshoe bats. Confidence in this zone size is described in the guidance as good, because the calculation is based on a reasonable sample size from multiple colonies and studies. As a result, 4km sounds a reasonable precautionary distance. The use of a 4km zone would also identify the area within which positive habitat creation and enhancement should be targeted. The use of such a zone would not mean that lesser horseshoe bat habitat more than 4km from the SAC did not also need preserving, but more distant habitat could be dealt with as part of the Ecological Impact Assessment process for any planning application since bats are protected species and material considerations in the planning process wherever they are found.

4.34 Within the P&SB NP, all allocations are beyond these core sustenance zones (CSZs): the closest housing sites (H1–H3) are approximately 8 km from the SAC

64 https://cdn.bats.org.uk/pdf/Resources/Core_Sustenance_Zones_Explained_04.02.16.pdf?mtime=20190219173135 [Accessed on the 26/05/21]
65 Schofield H.W. 2008. The Lesser Horseshoe Bat Conservation Handbook.
66 Billington G. 2008. Radio-tracking Study of Greater Horseshoe Bats at Dean Hall, Littledean, Cinderford. Natural England Commissioned Report NERR012.
67 Billington G. 2009. Radio Tracking Study of Greater Horseshoe Bats at Dean Hall, Littledean, Cinderford. Natural England Commissioned Report. NECR021.
68 Billington, G. 2003. Radio tracking study of Greater Horseshoe bats at Buckfastleigh Caves Site of Special Scientific Interest: English Nature Research Report no. 573. Peterborough: English Nature.
Billington, G. 2001. Radio tracking study of Greater Horseshoe bats at Brockley Hall Stables Site of Special Scientific Interest, May – August 2001.English Nature Research Report No. 442. Peterborough: English Nature
69 Schofield H.W. 2008. The Lesser Horseshoe Bat Conservation Handbook.

boundary, and therefore on the edge of the potential for FLL impacts; however, that does not take account of the Severn Estuary which while it is unlikely to be a total barrier to bat movement does reduce the likelihood that bats associated with Wye Valley & Forest of Dean Bat Sites SAC would make significant use of land within Pilning and Severn Beach Parish.

Avian Sites

4.35 Natural England Impact Risk Zones for each SSSI and guidance that underlies those zones will be utilised. The main document of reference is:

- Natural England (2019). Impact Risk Zones Guidance Summary Sites of Special Scientific Interest Notified for Birds. Version 1.1

4.36 This identifies the typical distances that wintering waterfowl will travel from their SPAs to forage. Relevant Impact Risk Zones are identified as follows:

Table 2. Natural England Impact Risk Zones for Designated Bird Features

Assemblage	Impact Risk Zone (foraging distance)
Wintering birds (except wintering waders and grazing wildfowl; wigeon and geese)	Up to 500m
Dabbling ducks such as teal, mallard and gadwall	Home ranges could extend beyond site boundaries at coastal sites, but less likely to do so at inland water bodies.
Wintering waders (except golden plover and lapwing), brent goose & wigeon	Maximum foraging distance is 2km
Wintering lapwing and golden plover	Maximum foraging distance is 15-20km. Golden plover can forage up to 15km from a roost site within a protected site. Lapwing can also forage similar distances. Both species use lowland farmland in winter and it is difficult to distinguish between designated populations and those present within the wider environment. Developments affecting functionally linked land more than 10km from the site are unlikely to impact significantly on designated populations.
Wintering white-fronted goose, greylag goose, Bewick's swan, whooper swan & wintering bean goose	Maximum foraging distance is 10km. A bespoke functional land IRZ has replaced the individual Birds 6/7 IRZs for sites supporting the following goose and swan species: pink-footed geese, barnacle goose, Bewick's swan, white-fronted goose and whooper swan. The IRZ is based on GIS distribution records of feeding pink-footed geese from a study undertaken for Natural England by the Wildfowl & Wetlands Trust and the results of work undertaken by the British Trust for Ornithology to

identify functionally connected habitat used by barnacle goose, Bewick's swan, white-fronted goose and whooper swan based on WeBS site and BirdTrack data and focuses on only the areas of land that we know are being used as functional habitat by designated populations

4.37 The aforementioned Natural England document further identifies that for SSSIs designated for wintering waterfowl and waders (other than golden plover and lapwing) a maximum of 2km is appropriate for the identification of potential functionally-linked land for development with the exception of wind energy (3km) and airports (10km). Severn Estuary SPA/Ramsar is designated for Bewick's swan, shelduck, gadwall, dunlin, redshank, and greater white-fronted goose. It is also designated for its non-breeding waterfowl assemblage, but the Regulation 33 advice does not mention either golden plover or lapwing in the list of assemblage species. Therefore, it is reasonable (and precautionary) to use 4km as a zone of influence for this impact pathway.

4.38 The following Habitat sites are considered susceptible to loss of functionally linked habitat arising from the Pilning & Severn Beach NP:

- **Severn Estuary SAC/SPA/Ramsar**

Background to Water Quality

The water level, its flow rates and the mixing conditions are important determinants of the condition of Habitats Sites and their qualifying features. Hydrological processes are critical in influencing habitat characteristics in coastal waters, including current velocity, water depth, dissolved oxygen levels, salinity and water temperature. In turn these parameters determine the short- and long-term viability of plant and animal species, as well as overall ecosystem composition. Changes to the water flow rate within an estuary can be associated with a multitude of further impact pathways, including substratum loss, smothering and changes in wave exposure.

Coastal environments rely on hydrological connections with freshwater bodies, such as rivers, streams and lakes. However, while the natural fluctuation of water levels within narrow limits is desirable, excess or too little water supply might cause water levels to be outside of the required range of qualifying birds and fish, or the invertebrate or plant assemblages they depend upon. There are two mechanisms through which urban development might negatively affect the water level in Habitats Sites:

- The supply of new housing with potable water will require increased abstraction of water from surface water and groundwater bodies. Depending on the level of water stress in the geographic region, this may impact the aquatic conditions in Habitats Sites sharing the same catchment.

- The proliferation of impermeable surfaces in urban areas increases the volume and speed of surface runoff, particularly during intense rainfall events. Traditional drainage systems often cannot cope with the volume of stormwater and sewer overflows are designed to discharge untreated water directly into watercourses. Often this pluvial flooding results in downstream inundation of watercourses and larger volumes of water reaching designated sites.

4.39 Increases to the quantity and rate of water delivery can result in summer flooding and prolonged / deeper winter flooding. This in turn results in the reduction of feeding and roosting sites for birds. For example, in areas where water is too deep, most waders will be unable to reach their food sources close to the ground.

4.40 The Pilning & Severn Beach Neighbourhood Area is located within proximity to Habitats Sites that are sensitive to changes in the prevailing hydrological regime. However, it is noted that there is no nutrient neutrality requirement for the Severn Estuary because local wastewater treatment works have sufficient capacity and permit controls to maintain water quality and accommodate housing growth without adverse effects.

Background to Urban Impacts

4.41 The list of urbanisation impacts can be extensive, but core impacts can be singled out (note that this list does not imply that all these impacts are expected to occur):

Increased Fly-Tipping

4.42 Whilst fly-tipping is generally considered more of a localised and visual problem, a negative ecological effect of tipping is the introduction of pollutants, plastics and non-native plants to the environment. This can create physical and chemical hazards for wildlife and could potentially damage habitats.

4.43 Residents of Pilning and Severn Beach Parish have weekly recycling bin collections and fortnightly general rubbish bin collections[70] and access to a household recycling centre (tip) in Thornbury or Bristol to prevent the spread of waste into the environment. This combined with the very open and public nature of the relevant Habitat sites makes it highly unlikely that there will be increased fly-tipping as a result of the Plining & Severn Beach NP and this impact pathway is therefore not considered further in this HRA.

Cat Predation

4.44 A survey undertaken in 1997 indicated that nine million British cats brought home 92 million prey items over a five-month period[71]. A large proportion of domestic cats are found in urban settings, and residential development is likely to lead to increased cat predation if the development is located sufficiently close to Habitat sites designated for sensitive bird species (particularly ground nesting birds).

4.45 The average roaming distance of domestic cats is approx. 40-200m from home[72] and LSEs due to cat predation may be an issue where allocated sites are within 200m of an SPA/ Ramsar.

4.46 Within Pilning and Severn Beach Parish, the Severn Estuary SAC/SPA/Ramsar falls within the parish boundary. However, none of the NP's allocated housing sites lie within 200 m of the estuary edge. Consequently, cat predation impacts are screened out as a pathway for this HRA.

[70] https://beta.southglos.gov.uk/waste-and-recycling-collection-date/
[71] Woods, M. et al. 2003. Predation of wildlife by domestic cats *Felis catus* in Great Britain. Mammal Review 33, 2 174-188
[72] Available at: https://www.petplan.co.uk/pet-information/cat/advice/roaming

Background to Atmospheric Pollution

4.47 The main pollutants of concern for Habitats Sites are oxides of nitrogen (NOx), ammonia (NH_3) and sulphur dioxide (SO_2) and are summarised in Table 3. NH_3 can have a directly toxic effect upon vegetation, particularly at close distances to the source such as near road verges[73]. NOx can also be toxic at very high concentrations (far above the annual average Critical Level). However, NOx and NH_3 exert their main impacts on ecosystems via determining the total nitrogen (N) deposition to soils, potentially leading to deleterious knock-on effects. Increases in N deposition from the atmosphere is widely known to enhance soil fertility and leading to eutrophication. This often has adverse effects on community composition and the quality of semi-natural, nitrogen-limited terrestrial and aquatic habitats[74] [75].

Table 3: Main sources and effects of air pollutants on habitats and species[76].

Pollutant	Source	Effects on habitats and species
Sulphur Dioxide (SO_2)	The main sources of SO_2 are electricity generation, and industrial and domestic fuel combustion. However, total SO_2 emissions in the UK have decreased substantially since the 1980's. Another origin of sulphur dioxide is the shipping industry and high atmospheric concentrations of SO_2 have been documented in busy ports. In future years shipping is likely to become one of the most important contributors to SO_2 emissions in the UK.	Wet and dry deposition of SO_2 acidifies soils and freshwater and may alter the composition of plant and animal communities. The magnitude of effects depends on levels of deposition, the buffering capacity of soils and the sensitivity of impacted species. However, SO_2 background levels have fallen considerably since the 1970's and are now not regarded a threat to plant communities. For example, decreases in Sulphur dioxide concentrations have been linked to returning lichen species and improved tree health in London.
Acid deposition	Leads to acidification of soils and freshwater via atmospheric deposition of SO_2, NOx, ammonia and hydrochloric acid. Acid deposition from rain has declined by 85% in the last 20 years, which most of this contributed by lower sulphate levels. Although future trends in S emissions and subsequent deposition to terrestrial and aquatic ecosystems will continue to decline, increased N emissions may cancel out any gains produced by reduced S levels.	Gaseous precursors (e.g. SO_2) can cause direct damage to sensitive vegetation, such as lichen, upon deposition. Can affect habitats and species through both wet (acid rain) and dry deposition. The effects of acidification include lowering of soil pH, leaf chlorosis, reduced decomposition rates, and compromised reproduction in birds / plants.

[73] http://www.apis.ac.uk/overview/pollutants/overview_NOx.htm.
[74] Wolseley, P. A.; James, P. W.; Theobald, M. R.; Sutton, M. A. **2006.** Detecting changes in epiphytic lichen communities at sites affected by atmospheric ammonia from agricultural sources. *Lichenologist* **38**: 161-176
[75] Dijk, N. **2011.** Dry deposition of ammonia gas drives species change faster than wet deposition of ammonium ions: Evidence from a long-term field manipulation. *Global Change Biology* **17**: 3589-3607
[76] Information summarised from the Air Pollution Information System (http://www.apis.ac.uk/)

Pollutant	Source	Effects on habitats and species
		Not all sites are equally susceptible to acidification. This varies depending on soil type, bed rock geology, weathering rate and buffering capacity. For example, sites with an underlying geology of granite, gneiss and quartz rich rocks tend to be more susceptible.
Ammonia (NH_3)	Ammonia is a reactive, soluble alkaline gas that is released following decomposition and volatilisation of animal wastes. It is a naturally occurring trace gas, but ammonia concentrations are directly related to the distribution of livestock. Ammonia reacts with acid pollutants such as the products of SO_2 and NO_X emissions to produce fine ammonium (NH_4+) - containing aerosol. Due to its significantly longer lifetime, NH_4+ may be transferred much longer distances (and can therefore be a significant trans-boundary issue). While ammonia deposition may be estimated from its atmospheric concentration, the deposition rates are strongly influenced by meteorology and ecosystem type.	The negative effect of NH_4+ may occur via direct toxicity, when uptake exceeds detoxification capacity and via N accumulation. Its main adverse effect is eutrophication, leading to species assemblages that are dominated by fast-growing and tall species. For example, a shift in dominance from heath species (lichens, mosses) to grasses is often seen. As emissions mostly occur at ground level in the rural environment and NH_3 is rapidly deposited, some of the most acute problems of NH_3 deposition are for small relict nature reserves located in intensive agricultural landscapes.
Nitrogen oxides (NO_x)	Nitrogen oxides are mostly produced in combustion processes. Half of NO_X emissions in the UK derive from motor vehicles, one quarter from power stations and the rest from other industrial and domestic combustion processes. Nitrogen oxides have been consistently falling for decades due to a combination of coal fired power station closures, abatement of other combustion point sources and improved vehicle emissions technology. They are expected to continue to fall over the plan period.	Direct toxicity effects of gaseous nitrates are likely to be important in areas close to the source (e.g. roadside verges). A critical level of NOx for all vegetation types has been set to 30 ug/m3. Deposition of nitrogen compounds (nitrates (NO_3), nitrogen dioxide (NO_2) and nitric acid (HNO_3)) contributes to the total nitrogen deposition and may lead to both soil and freshwater acidification. In addition, NO_x contributes to the eutrophication of soils and water, altering the species composition of plant communities at the expense of sensitive species.
Nitrogen deposition	The pollutants that contribute to the total nitrogen deposition derive mainly from oxidized (e.g. NO_X) or reduced (e.g. NH_3) nitrogen emissions (described separately above). While	All plants require nitrogen compounds to grow, but too much overall N is regarded as the major

Pollutant	Source	Effects on habitats and species
	oxidized nitrogen mainly originates from major conurbations or highways, reduced nitrogen mostly derives from farming practices. The N pollutants together are a large contributor to acidification (see above).	driver of biodiversity change globally. Species-rich plant communities with high proportions of slow-growing perennial species and bryophytes are most at risk from N eutrophication. This is because many semi-natural plants cannot assimilate the surplus N as well as many graminoid (grass) species. N deposition can also increase the risk of damage from abiotic factors, e.g. drought and frost.
Ozone (O_3)	A secondary pollutant generated by photochemical reactions involving NOx, volatile organic compounds (VOCs) and sunlight. These precursors are mainly released by the combustion of fossil fuels (as discussed above). Increasing anthropogenic emissions of ozone precursors in the UK have led to an increased number of days when ozone levels rise above 40ppb ('episodes' or 'smog'). Reducing ozone pollution is believed to require action at international level to reduce levels of the precursors that form ozone.	Concentrations of O_3 above 40 ppb can be toxic to both humans and wildlife, and can affect buildings. High O_3 concentrations are widely documented to cause damage to vegetation, including visible leaf damage, reduction in floral biomass, reduction in crop yield (e.g. cereal grains, tomato, potato), reduction in the number of flowers, decrease in forest production and altered species composition in semi-natural plant communities.

4.48 SO_2 emissions overwhelmingly derive from power stations and industrial processes that require the combustion of coal and oil, as well as shipping (particularly on a local scale)[77]. NH_3 emissions primarily originate from agricultural practices[78], with some chemical processes and some vehicles (notably petrol cars) also making notable contributions.

4.49 In contrast, NOx emissions are dominated by the output of vehicle exhausts (more than half of all emissions). A 'typical' housing development will contribute by far the largest portion to its overall NOx footprint (92%) through its associated road traffic. Other sources, although relevant, are of minor importance (8%) in comparison[79]. Therefore, the emerging Pilning & Severn Beach NP, which will increase the population within the Neighbourhood Area, can be reasonably expected to increase emissions of NOx and NH_3, and thus total nitrogen deposition through an increase in vehicular traffic.

[77] http://www.apis.ac.uk/overview/pollutants/overview_SO2.htm.
[78] Pain, B.F.; Weerden, T.J.; Chambers, B.J.; Phillips, V.R.; Jarvis, S.C. 1998. A new inventory for ammonia emissions from U.K. agriculture. *Atmospheric Environment* **32**: 309-313
[79] Proportions calculated based upon data presented in Dore CJ et al. 2005. UK Emissions of Air Pollutants 1970 – 2003. UK National Atmospheric Emissions Inventory. http://www.airquality.co.uk/archive/index.php

4.50 According to the World Health Organisation, the critical NOx concentration (Critical Level) for the protection of vegetation is 30 μgm^{-3}; the threshold for sulphur dioxide is 20 μgm^{-3}. In addition, ecological studies have determined Critical Loads (CLs) [80] for atmospheric nitrogen deposition (that is, NOx combined with NH_3). Critical Loads (CLs) for nitrogen deposition are habitat-specific and, for the Severn Estuary SAC, focus on Atlantic saltmarsh, which has a CL of 10–20 kg N/ha/yr.

4.51 According to advice provided by Institute of Air Quality Management[81], beyond 200m, the contribution of vehicle emissions from the roadside to local pollution levels is insignificant (Figure 1. Therefore, this is the distance that is used in this HRA to identify major commuter routes along Habitats Sites, which may be significantly affected by development outlined in the Pilning & Severn Beach NP.

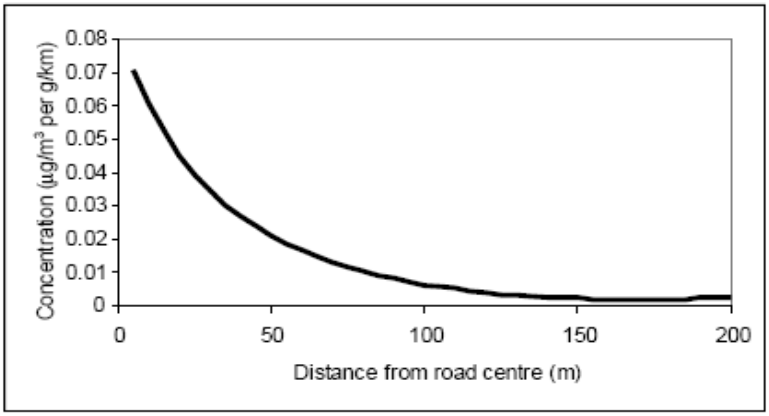

Figure 1: Generalised depiction of traffic contribution to concentrations of pollutants at different distances from a road

4.52 A zone of 10km is typically used to screen in European sites vulnerable to reductions in traffic-related air quality[82].The following Habitats Sites within 10km are sensitive to atmospheric pollution arising from urban growth, primarily due to a significant increase in the number of two-way vehicle trips through or within 200m of these sites:

- **Severn Estuary SAC / SPA / Ramsar**
- **Wye Valley Woodlands SAC**

Background to Coastal Squeeze

4.53 Coastal squeeze is a well-established process that results in the net contraction and eventual disappearance of intertidal habitats, which may be designated features themselves and / or critical supporting habitats for SPA / Ramsar waders and waterfowl. Specifically, this impact pathway is facilitated by brownfield development immediately inland from the coastline, which results in intertidal habitat loss by preventing the landward migration of these habitats in response

[80] The critical load is the rate of deposition beyond which research indicates that adverse effects can reasonably be expected to occur
[81] https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2019.pdf
[82] This is based on the average UK car journey being approximately 10.6km, Reference: GOV.UK (2019). Average number of trips made and distance travelled. https://www.gov.uk/government/statistical-data-sets/nts01-average-number-of-trips-made-and-distance-travelled

to sea level rise. The published literature[83] provides the following definition of coastal squeeze: '*the loss of natural habitats or deterioration of their quality arising from anthropogenic structures or actions, preventing the landward transgression of those habitats that would otherwise naturally occur in response to sea level rise in conjunction with other coastal processes. Coastal squeeze affects habitat on the seaward side of existing structures.*' Several modelling studies on the implications of coastal squeeze have been undertaken. For example, provided that no additional space for accommodating sea level rise is provided (e.g., through nature-based coastal management approaches and Managed Realignment), a global loss of coastal wetland up to 30% is forecast to 2100[84]. A study comparing armoured and unarmoured coastal segments determined that defended coasts lacked dry upper beach zones and comprised narrower mid-beach zones. Furthermore, areas with frontline defences were also characterised by lower abundance, biomass and size of upper intertidal macroinvertebrates, and lower abundance and species richness of shorebirds[85].

4.54 Given the increasing density of urban development along coastlines, which interferes with natural adaptive processes of coastal habitats, coastal squeeze is becoming an increasingly important consideration in the HRA process. The approaches for coastal management are typically set at the strategic level in Shoreline Management Plans (SMPs) and Coastal Management Strategies (CMS). While being bound under the Habitats and Species Regulations 2017 (as amended), Local Planning Authorities are also legally required to protect important human receptors, including homes, businesses and critical infrastructure (e.g., roads and railway lines). These objectives may be conflicting, which means that in many instances protection of coastal assets cannot be achieved without adverse effects on site integrity. The development allocated in the Pilning & Severn Beach NP is located within a defended coastal zone identified in the Severn Estuary SMP (Second Generation), which adopts a 'hold the line' policy to protect existing settlements and infrastructure. While the NP does not introduce new defences, its allocations reinforce the reliance on maintained defences in this area, indirectly contributing to long-term constraints on intertidal habitat migration.

4.55 Given this context, the Severn Estuary SPA/Ramsar is vulnerable to coastal squeeze. While the NP's allocated development does not directly alter existing flood defences or shoreline management, its proximity to defended estuary margins means it forms part of the long-term constraint on intertidal habitat migration inherent in SMP policy.

Summary of Impact Pathways to be Taken Forward

4.56 Having considered the impact pathways identified above, those shown in Table 4 will be taken to the next stage in the HRA process, the LSEs screening.

[83] Environment Agency. (February 2021). Flood and Coastal Erosion Risk Management Research and Development Programme. Available at: https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/what-is-coastal-squeeze#:~:text=Coastal%20squeeze%20is%20now%20defined,conjunction%20with%20other%20coastal%20processes [Accessed on the 01/08/2022]
[84] Schuerch M, Spencer T, Temmerman S, Kirwan ML, Wolff C, Lincke D, McOwen CJ, Pickering MD, Reef R, Vafeidis AT, Hinkel J, Nicholls RJ & Brown S. (2018). Future response of global coastal wetlands to sea-level rise. *Nature* **561**: 231-234.
[85] Dugan JE, Hubbard DM, Rodil IF, Revell DL & Schroeter S. (2008). Ecological effects of coastal armoring on sandy beaches. *Marine Ecology* **29**: 160-170.

Table 4. Impact pathways and relevant Habitat sites.

Impact pathway	Habitat site(s) potentially affected
Recreational pressure	Severn Estuary SPA / Ramsar
Noise and visual disturbance	Severn Estuary SPA / Ramsar
Loss of functionally linked habitat	Severn Estuary SPA / Ramsar, Wye Valley & Forest of Dean Bat Sites SAC
Water quality	Severn Estuary SPA / Ramsar
Urban impacts	Severn Estuary SPA / Ramsar
Atmospheric pollution	Severn Estuary SPA / Ramsar, Wye Valley Woodlands SAC
Coastal Squeeze	Severn Estuary SPA / Ramsar

5. Test of Likely Significant Effects (ToLSE) - Screening

Introduction

5.1 When seeking to identify relevant Habitat sites, consideration has been given primarily to identified impact pathways and the source-pathway-receptor approach, rather than adopting purely a 'zones'-based approach. The source-pathway-receptor approach is a standard tool in environmental assessment. In order for an effect to occur, all three elements of this mechanism must be in place, whereas the absence of one or more of the elements means there is no possibility for an effect. Furthermore, even where an impact is predicted to occur, it may not result in significant effects (i.e., those which undermine the Conservation Objectives of a Habitat site).

5.2 The likely zone of impact (also referred to as the likely Zone of Influence, ZoI) of a plan or project is the geographic extent over which significant ecological effects are likely to occur. The ZoI of a plan or project will vary depending on the specifics of a particular proposal and must be determined on a case-by-case basis with reference to a variety of criteria, including:

- the nature, size / scale and location of the plan;
- the connectivity between the plan and Habitat sites, for example through hydrological connections or because of the natural movement of qualifying species;
- the sensitivity of ecological features under consideration; and,
- the potential for in-combination effects.

Approach to Pilning & Severn Beach Neighbourhood Plan Policy Screening

5.3 There are 26 policies within the Pilning & Severn Beach NP. Policies were screened out of having LSEs on a Habitat site where any of the following reasons applied:

- they are environmentally positive;
- they will not themselves lead to any development or other change;
- they make provision for change but could have no conceivable effect on a Habitat site. This can be because there is no pathway between the policy and the qualifying features or a Habitat site, or because any effect would be positive;
- they make provision for change but could have no significant effect on a Habitat site (i.e., the effect would not undermine the conservation objectives of a Habitat site); or,

- the effects of a policy on any particular Habitat site cannot be ascertained because the policy is too general. For example, a policy may be screened out if, based on absence of detail in the policy, it is not possible to identify where, when, or how the policy may be implemented, where effects may occur, or which sites, if any, may be affected.

5.4 Any 'criteria-based' policy (i.e., those that simply list criteria with which development needs to comply) or other general policy statements that have no spatial element were also screened out. Likewise, policies that simply 'safeguard' an existing resource (e.g., existing green infrastructure or mineral resources) by preventing other incompatible development, were also screened out.

5.5 The appraisal therefore focussed on those policies with a definable spatial component. Having established which policies required scrutiny by virtue of being spatially defined, consideration was given as to whether LSEs could be dismissed due to a lack of connectivity to any Habitat site for one of the following reasons:

- a potentially damaging activity may occur as a result of the policy but there is no pathway connecting it to a Habitat site (due to distance, for example);
- there are no Habitat sites vulnerable to any of the activities that the policy will deliver; or,
- the policy will not result in any damaging activities.

Results of Policy Screening

5.6 The results of the LSEs screening of policies included in the Pilning & Severn Beach NP are presented in Table 8, Appendix B. Where a policy is shaded green, there are no linking impact pathways to Habitat sites and LSEs can be excluded. Where the screening outcome is shaded orange, LSEs cannot be excluded, and the policy is screened in for AA.

5.7 Of the 26 Pilning & Severn Beach NP policies, ten are considered to have the potential to result in LSEs, alone and therefore or in combination with other plans and projects, as such an Appropriate Assessment is required. These are:

- **Policies H1–H9** (Housing site allocations): Nine site-specific housing allocations (including sheltered accommodation) in Pilning and Severn Beach, all of which fall within the recreational catchment of the Severn Estuary SPA/SAC/Ramsar and are linked to impact pathways relating to recreation, wastewater, air quality, and functionally linked land;
- **Policy H10** – Windfall (Infill) Housing Sites: By definition no actual windfall is identified in the Neighbourhood Plan but this policy allows for future housing outside of allocated sites; while it cannot be assessed in detail potential LSE therefore exist due to the unknown location and scale (which accepting windfall development will usually be small quantum). The policy is therefore screened in alongside the housing allocation policies, on a precautionary basis.

5.8 Policy H11 (Sheltered Accommodation for the Elderly) is screened out as it does not allocate a new site and refers only to development already covered under Policy H3. Moreover, sheltered accommodation is much less likely to be

associated with the identified impacts of residential growth on European sites such as recreational pressure and an increase in traffic.

5.9 The test of likely significant effects will focus on the ten screened in policies with regards to the vulnerabilities of the Habitat sites within Table 1. The impact pathways relating to the Habitat sites' vulnerabilities are listed below and will each be discussed:

- Recreational pressure;
- Loss of functionally linked habitat;
- Atmospheric pollution;
- Water pollution and Hydrological changes (noting that nutrient neutrality is not required for the Severn Estuary);

Recreational Pressure

The Severn Estuary SAC/SPA/Ramsar

5.10 Due to the growing population and a trend towards spending an increased amount of time outdoors, recreational pressure is one of the most widely documented impacts in Habitats Sites. The Severn Estuary SAC / SPA / Ramsar is sensitive to recreational pressure as identified in Natural England's Site Improvement Plan (SIP): 'Public access and recreation may have an impact on bird species sensitive to disturbance, causing displacement from feeding, roosting and moulting areas, and if severe could affect long term survival and population numbers and distributions within the Estuary.' This is affirmed in the joint Countryside Council for Wales (CCW) (now Natural Resources Wales (NRW)) and Natural England (NE) advice note on the Severn Estuary European Marine Site (EMS), which states that 'there is intermittent disturbance to the internationally important migratory species and the waterfowl assemblage from both the landward and seaward side of the site which has increased in recent years, due to the estuary becoming more populated and the development of all weather recreational pursuits. All supporting habitats are currently highly vulnerable to noise and visual disturbance.'

5.11 Pressure in the estuary arises from a diverse number of recreational activities, including dog walking, walking, horse-riding, cycling, beach activities, angling, wildfowling and water-based sports. The Site Improvement Plan (SIP) already specifies an action of developing a strategic approach to visitor management, including appropriate zonation to protect currently undisturbed areas and management plans for major recreational beaches.

5.12 The Severn Estuary SAC/SPA/Ramsar occupies approximately 54% of the NP area. At the furthest point, the boundary of the NP area is 4.6km from the Severn Estuary SAC/SPA/Ramsar. As it is estimated that the recreational catchment can be assumed to be 7km, all residential development within the Pilning and Severn NP area is likely to contribute to residential pressures on the Severn Estuary SAC/SPA/Ramsar site. This includes both allocated housing sites (Policies H1–H9) and potential additional windfall during the plan period supported under Policy H10.

5.13 The Site Improvement Plan for the Severn Estuary European sites states that "*Public access and recreation (including third party activities) may have an impact on bird species sensitive to disturbance, causing displacement from feeding, roosting and moulting areas, and if severe could affect long term survival and population numbers and distributions within the Estuary. There are a wide range of recreational activities within the site (walking, dog walking, horse riding, biking, beach activities, angling, wildfowling, other shooting (eg clay pigeon)) that may cause damage to habitats where pressure is high*." Therefore, increasing recreational pressure, without mitigation, is likely to have a significant effect upon the Severn Estuary European sites.

5.14 The Severn Estuary SAC/SPA/Ramsar site is screened in for Appropriate Assessment in relation to recreational pressure.

Noise and Visual Disturbance

The Severn Estuary SAC/SPA/Ramsar

5.15 The SPA and Ramsar are designated for several wintering and breeding species of birds, as well as an internationally important wintering bird assemblage. As discussed above, waterfowl are particularly susceptible to disturbance through construction and potentially operational noise. For the purpose of this assessment, a precautionary buffer of 300m has been used for visual and noise disturbance impacts. **Since the Neighbourhood Area immediately buffers the SPA/SAC/Ramsar likely significant effects cannot be dismissed and it is taken forward to appropriate assessment.**

Loss of Functionally Linked Habitat

Wye Valley & Forest of Dean Bat Sites SAC

5.16 For the Wye Valley & Forest of Dean Bat Sites SAC, issues relating to loss of habitat, disturbance to and deteriorating habitats has been identified as a potential threat to the SAC and its bat species. The SAC is designated for populations of lesser horseshoe bat (*Rhinolophus hipposideros*) and greater horseshoe bat (*Rhinolophus ferrumequinum*).

5.17 The designated bat features use functionally linked land surrounding the SAC to forage, commute and use for seasonal migration into the wider countryside. However, the nearest proposed allocations (H1, H2, H3, H4 and H6) are all located 10–11 km from the SAC and comprise relatively small development parcels (ranging from 0.1ha to 2.29ha, with 3–30 dwellings each plus sheltered units at H3). Given their distance beyond the 8 km core sustenance zone for greater horseshoe bats and modest site sizes, these allocations are scoped out of further assessment for potential loss of functionally linked land. Policy H10, while related to residential provision, is not site-specific and is therefore also excluded on this basis. No direct connectivity or evidence of bat use linked to the SAC was identified in baseline ecological surveys for these sites.

5.18 An 8km buffer is utilised in the analysis to identify an area around the SAC's designated for greater horseshoe bats where loss of bat foraging and commuting habitat would be most likely to affect the ability of the SAC to continue to support its bat population. It should also be applied to important satellite roosts known to

be connected to a bat SAC. Wye Valley & Forest of Dean Bat Sites SAC are located 7.7km from the NP area and ~10km from the nearest proposed development. The nearest allocations are:

- H6 (CfS1 – Adjacent to 19, Vicarage Road, Pilning): 3 dwellings, 0.0979 ha, 10.3km from the SAC.
- H4 (CfS9 & CfS10 – Rear of 21 & 23, Cross Hands Road, Pilning): 18 dwellings, site area 0.4965 ha, ~10.4km from the SAC.
- H3 (SG808/NP15 – Land behind surgery and allotments, Pilning): 30 dwellings + 41 sheltered units, site area 1.59 ha, ~10.6km from the SAC.
- H2 (SG136/NP14 – Land west of St Peter's School, Pilning): 25 dwellings, site area 0.70 ha, ~10.8km from the SAC.
- H1 (SG807/NP13 – Pilning Village Hall): 30 dwellings, site area 2.29 ha, ~11km from the SAC.

5.19 Given that all allocations are beyond the 8 km core sustenance zone for greater horseshoe bats, are beyond the Severn Estuary, and are within a predominantly urban context (Pilning and Severn Beach), the risk of impacting functionally linked land is negligible. No evidence of bat foraging or commuting habitat linked to the SAC has been identified in the ecological surveys submitted for these sites.

5.20 The Wye Valley & Forest of Dean Bat Sites SAC site is screened out for Appropriate Assessment in relation to loss of functionally linked land.

Severn Estuary SPA/Ramsar

5.21 The majority of wintering waterfowl and waders designated at these sites only regularly utilise land outside of the designated sites up to c. 2km (see Table 2). However, the site is also designated for Bewick's swan and white-fronted goose. To identify potential risk of habitat loss around the SPA designated for wintering waterfowl and wader bird assemblages at this screening stage the Natural England document 'Impact Risk Zones Guidance Summary Sites of Special Scientific Interest Notified for Birds Version 1.1' (dated March 2019) has been used. This identifies that for SSSIs designated for wintering waterfowl and waders other than golden plover and lapwing) a maximum of 2km is appropriate for the identification of potential functionally-linked land for development with the exception of wind energy (3km) and airports (10km).

5.22 The Severn Estuary SPA/Ramsar is designated for Bewick's swan, shelduck, gadwall, dunlin, redshank, and greater white-fronted goose. It is also designated for its non-breeding waterfowl assemblage, but the Regulation 33 advice does not mention either golden plover or lapwing in the list of assemblage species. Therefore, it is reasonable (and precautionary) to use 4km as a zone of influence for this impact pathway. The Severn Estuary SAC/SPA/Ramsar occupies approximately 54% of the NP area. At the furthest point, the boundary of the NP area is 4.6km from the Severn Estuary SAC/SPA/Ramsar.

5.23 As a result, the potential for loss of functionally-linked land cannot be dismissed for this SPA/Ramsar and appropriate assessment is required.

Water Quality

Severn Estuary SAC / SPA / Ramsar

5.24 All qualifying habitats and species in the Severn Estuary SAC / SPA / Ramsar have specific water quality requirements and could be negatively impacted by a reduction in water quality. The theme of water quality encompasses a wide range of physico-chemical parameters, including temperature, salinity, oxygen, nutrient concentrations, pH and turbidity. NRW and Natural England advice on the 'estuaries' feature in the Severn Estuary EMS[86] stipulates that '*changes in any of the physico-chemical parameters in the water column can impact on the quality of the estuary habitat and hence could lead to changes in the presence and distribution of species…*' Negative changes in water quality may alter the typical assemblages of freshwater and vascular plant species that is found within the water column and / or saltmarsh habitat. For example, high nutrient concentrations are a well-established consequence of urbanisation, which fuel phytoplankton biomass and diversity, as well as macroalgal cover / density. Eutrophication, the unchecked growth of algae, is associated with a series of knock-on impacts, including high turbidity, low DO concentration and, ultimately, death of invertebrates and fish.

5.25 Changes in water quality, and particularly in nutrient loading, can result in indirect impacts on qualifying SPA / Ramsar birds. As highlighted above, nutrient enrichment can change plant community composition in saltmarsh, which in turn may reduce the ability of certain bird species to forage on the sward. Excessive nutrient loadings on mudflats can lead to excessive algal growth, making it more difficult for waders to access preferred food items and changing invertebrate species composition in the sediment. According to the EMS advice note, the intertidal sand- and mudflats in the estuary are considered to be 'moderately vulnerable' to eutrophication processes. All allocations within the Pilning & Severn Beach NP could contribute to increased pressure on water treatment infrastructure. However, it is noted that nutrient neutrality is not a formal requirement for the Severn Estuary, as local wastewater treatment works (WwTWs) have sufficient capacity and existing permit controls to accommodate planned housing growth without adverse effects. Moreover, the Drainage and Wastewater Management Plan produced by Wessex Water does not identify any water quality issues in terms of ability to manage sewage in works discharging to the Severn Estuary or its tributaties. **The available evidence suggests that Likely Significant Effects of the Pilning & Severn Beach NP on the Severn Estuary SAC / SPA / Ramsar regarding water quality can be screened out.**

Atmospheric Pollution

Severn Estuary SAC / SPA / Ramsar

5.26 By allocating approximately 295 new homes and 41 sheltered units, the Pilning & Severn Beach NP will likely result in a modest increase in population and associated travel demand. While electric vehicle usage is growing, it is likely that a large proportion of the increase in commuter journeys will be undertaken in fossil-fuelled vehicles. Atlantic saltmarsh is the only qualifying habitat within the Severn Estuary SAC that is sensitive to atmospheric nitrogen deposition. APIS

[86] Severn Estuary EMS (naturalengland.org.uk) [accessed 31/08/2023]

identifies a CL of 20-30 kg N/ha/yr for saltmarsh, exceedance of which is likely to result in sward community composition shifts, with characteristic species replaced by nitrogen-tolerant graminoids.

5.27 The Severn Estuary SPA / Ramsar is designated for several species of waders and waterfowl, which all depend on SAC supporting habitats within the site boundary. Birds are not directly sensitive to nitrogen deposition, but potential indirect atmospheric pollution effects could occur through impacts on supporting habitats. While greylag goose, redshank and shelduck all utilise various zones in saltmarsh (the only supporting habitat that is sensitive to atmospheric nitrogen deposition), APIS identifies these species as not being sensitive to atmospheric nitrogen impacts. This is because some species (e.g., redshank) may actually benefit from increased prey abundance under elevated nutrient regimes (notwithstanding a likely reduction in species diversity).

5.28 Main roads within the NP area within 200m of the Severn Estuary site are the M4 which passes over the designated site and the A402 which is adjacent (45m at the closest point). In addition to the M4 and A403, New Passage Road is located approximately 20m from the Severn Estuary SAC/SPA/Ramsar boundary near New Passage. However, no NDP site allocations are accessed via New Passage Road. As such, traffic arising from the NDP allocations is not anticipated to materially affect air quality on New Passage Road. Therefore, the primary roads of concern for atmospheric nitrogen deposition remain the M4 and A403. Since these are strategic highway routes, assessment of impacts due to air quality are a cumulative matter for either the South Gloucestershire Local Plan HRA or other strategic documents in line with guidance from the Joint Nature Conservation Committee (JNCC)[87] which states (pages 20/21) that: '*The trunk road network forms the core of the national transport system. Trunk roads are central to long distance travel and connectivity across the UK and traffic patterns on trunk roads are a consequence of predicted growth across the UK generally. The effects of development on traffic flows on truck roads are more appropriately taken into account as part of national and regional strategic plan level HRAs.'*.

5.29 The South Gloucestershire Regulation 19 Local Plan HRA identifies that an exercise to model and assess traffic related air quality impacts on designated sites arising from growth in South Gloucestershire is due to be undertaken to inform the final HRA for the Submission Local Plan. This will, in line with law, need to consider all growth in South Gloucestershire (including that intended in Neighbourhood Plans) in combination with other plans or projects. As such this issue will be addressed by the South Gloucestershire Local Plan process.

5.30 As such it can be considered that no likely significant effects will result on air quality due to the Pilning & Severn Beach NP. This will need to be reviewed for planning applications, particularly for industrial development.

River Wye SAC

5.31 The Wye Valley Woodlands SAC lies along the A466 and the River Wye, near to the settlement of St Arvans. At its closest, the River Wye SAC is located c. 1.8km from the NP boundary in a straight line or c. 5.6km from the NP boundary on the M48.

[87] Main Report: Guidance on Decision-making Thresholds for Air Pollution (jncc.gov.uk)

5.32 Given the small scale of development (approximately up to 246 new homes and up to 41 sheltered units) proposed in the NP, the separation distance from the SAC (minimum 5.6 km by road), and the low likelihood that roads within 200m of the SAC would constitute regular journey to work route for residents of Pilning and Severn Beach parish, it is considered that the plan would not result in measurable changes in traffic flows affecting the River Wye SAC even in combination with other plans and projects.

5.33 Therefore, this impact pathway is screened out, and no Likely Significant Effects on the River Wye SAC are anticipated, either alone or in combination.

Coastal Squeeze

Severn Estuary SAC / SPA / Ramsar

5.34 The Severn Estuary SAC is designated for intertidal sand- and mudflats, and Atlantic salt meadows. The ecological integrity of these habitats depends on regular inundation by seawater followed by temporary exposure to air. Due to the impacts of climate change, sea levels are predicted to rise considerably in the future, resulting in the prolonged submergence of Atlantic salt meadows. Along undefended and undeveloped stretches of coastline, intertidal habitats would typically 'respond' by retreating inland in line with sea level rise. Furthermore, qualifying birds in the overlapping SPA / Ramsar that rely on intertidal mudflats or saltmarsh for foraging are under considerable risk of loosing essential supporting habitat.

5.35 Natural England's SIP for the English section of the Severn Estuary specifies coastal squeeze as an important pressure / threat to the integrity of the SAC / SPA / Ramsar: '*As sea levels rise, man-made defences are constraining the natural roll back of estuarine habitats, causing squeeze and loss of habitat and having impacts on species dependant upon those habits (birds: feeding / roosting, and fish: feeding / nursery and shelter areas).*' The CCW and Natural England advice note on the Severn Estuary EMS also indirectly refers to the process of coastal squeeze by stating that '*the intertidal mudflats and sandflats and the saltmarsh are highly sensitive to removal by land reclamation and major construction activities.*'

5.36 Within the Pilning & Severn Beach Neighbourhood Area, no new allocations are proposed within or adjacent to the SAC/SPA/Ramsar boundary or on defended estuarine frontage. Housing allocations (H1–H9) are all set back from the SAC boundary, and the plan does not include proposals for new flood defences or shoreline engineering. Existing flood defences in Severn Beach are already in place and are not affected by this plan. Given that:

- No allocations are located within or immediately adjoining the SAC/SPA/Ramsar boundary;
- No policies propose changes to coastal defence infrastructure; and
- The NP does not alter existing shoreline management or introduce reclamation, coastal squeeze is scoped out as a realistic impact pathway for the Pilning & Severn Beach NP.

6. Appropriate Assessment

Introduction

6.1 The law does not prescribe how an AA should be undertaken or presented, but it must consider all impact pathways that have been screened in, whether they arise alone or in combination with other projects and plans. That analysis is the purpose of this section. The law does not require the different effects to be examined separately provided all effects are discussed.

6.2 The HRA screening exercise undertaken in Table 8, Appendix B indicates that eleven NP policies (including all nine housing allocations under H1–H9), were considered to pose LSEs to Habitats sites, either alone or in combination with other projects and plans, due to contributing to one or more of the following impact pathways: recreational pressure, noise and visual disturbance, loss of functionally linked habitat and atmospheric pollution.

Recreational Pressure

6.3 As is discussed in Section 3 a buffer of 12.3km has been identified to encompass any potential effect to European sites from growth within the NP area.

The Severn Estuary SAC/SPA/Ramsar

6.4 The screening stage identified that all housing allocations in the Neighbourhood Plan (and in South Gloucestershire Local Plan) within 12.3km of the SAC/SPA/Ramsar site could result in recreational pressure, in addition to Policy H10 regarding windfall.

6.5 In addition to South Gloucestershire, the following authorities are all within 12.3km of the Severn Estuary European sites.

- Vale of Glamorgan, Wales – A small area (c. 4.5km^2) south of Penarth falls within the 7km buffer. However, as the European site is adjacent to the English side of the with the River Severn and the river being a barrier to access for any resident of this area. To access the European site, it would be a car journey of c. 50km to the nearest boundary (English side of the Severn Bridge). It is unlikely that growth in this area would present in-combination effects.

- Newport City, Wales – A small area (c. 21km^2) south of Uskmouth to the Caldicot Levels falls within the 7km buffer. However, as the European site is adjacent to the English side of the River Severn and the river being a barrier to access for any resident of this area. To access the European site, it would be a car journey of c. 14km to the nearest boundary (English side of the Severn Bridge). It is unlikely that growth in this area would present in-combination effects.

- Monmouthshire, Wales – an area from the Caldicot Levels in the west to Chepstow in the east and up to Tintern in the north is included within the

7km buffer. As the crow flies from the southern end of Caldicot to the nearest accessible boundary (English side of Severn Bridge) is c. 5km and from Chepstow in the east it is less than 1km to the boundary of the European Sites. Therefore, growth in Monmouthshire is likely to present in-combination effects.

- Gloucestershire County, England – Forest of Dean and Stroud Districts are adjacent to the European sites on the north-west and south-east sides of the River Severn respectively. A large area of each district is present within the 7km buffer, although mostly rural except for the small town of Lydney in the Forest of Dean District. However, any growth within these areas are likely to present in-combination effects.
- North Somerset – an area adjacent to the European sites from the Avonmouth in the north to Weston-Super-Mare in the south and Nailsea in the west is covered by the 7km buffer. This is quite a populated area along the coast and any growth in this area is likely to present recreational pressure effects in-combination.
- Sedgemoor District – from the south of Western-Super-Mare in the north to Bridgewater in the South this area is again fairly well populated along the coast with more rural areas further inland. As the site is directly adjacent to the district and within 7km it is likely to present recreational pressure effects in-combination
- West Somerset District – a small rural and coastal area of the district is part of the 7km buffer and growth to these areas are likely to present effects In-combination.

6.6 This is clearly a strategic issue that cannot be addressed by a Neighbourhood Plan. In the case of the Severn Estuary there is already a Recreation & Management Strategy that covers Stroud District and has been published by that authority. This could be used as a broad model for a similar strategy to be produced by South Gloucestershire Council. The HRA of the Regulation 19 South Gloucestershire Local Plan identifies that work will be undertaken at a Local Plan level to develop a strategic mitigation solution for recreational pressure in the Severn Estuary SPA/SAC/Ramsar in South Gloucestershire.

6.7 From work done for other authorities it is clear that such mitigation strategies are feasible and are widely used to manage recreational pressure in coastal sites. Since any planning application in Pilning and Severn Beach Parish will need to be in conformity with Local Plan policies and other planning requirements of South Gloucestershire Council as Local Planning Authority, it can be concluded that the Neighbourhood Plan will not result in adverse effects on the integrity of Severn Estuary SAC/SPA/Ramsar site once the strategic mitigation solution is in place.

Noise and Visual Disturbance

The Severn Estuary SAC/SPA/Ramsar

6.8 Within the identified 300m disturbance buffer, the following allocations from the Pilning & Severn Beach NP are identified:

- H7 (SG778/SG907/NP8) – Station Road/railway sidings, Severn Beach: Located adjacent to the estuary and within the 300m buffer.
- H8 (SG135/NP1) – Land west of Ableton Lane, Severn Beach: The northern part of this allocation lies close to or within 300m of the estuary boundary.

6.9 With regard to in combination effects, any Council within 300m of the Severn Estuary European sites must be considered within the Appropriate Assessment in combination with the potential effects presented by growth within the Combined Authority area. These authorities are as follows:

- South Gloucestershire (Gloucestershire)
- Forest of Dean District (Gloucestershire)
- Stroud District (Gloucestershire)
- North Somerset (Somerset)
- Sedgemoor District (Somerset)
- West Somerset District (Somerset)

6.10 It is not possible to undertake a detailed assessment for the Neighbourhood Plan of the potential noise and visual disturbance impact of these allocations during construction (disturbance during occupation is of a piece with recreational pressure which is considered as a separate impact pathway). However, there are numerous mitigation measures available and which are routinely deployed to protect European sites from noise and visual disturbance. These include:

- Close boarded fencing to reduce noise to acceptable and screen construction staff;
- Inclusion of other noise damping measures on equipment such as baffles and cushions;
- Use of quieter construction techniques such as auger piling rather than impact piling; and
- Seasonal avoidance of particularly disturbing activities i.e. timing those construction activities to take place outside the sensitive period for SPA birds.

6.11 These measures can typically reduce noise levels by 10 to 20 decibels. Establishing the need for these measures, and which measures are most suitable, requires detailed construction programming and design, and noise monitoring and modelling. These cannot be undertaken for a Neighbourhood Plan but would need to be undertaken for a planning application as a matter of course as part of the application Habitats Regulations Assessment. Since viable mitigation measures are available it is not considered that there is an inherent likelihood of an adverse effect on SPA/Ramsar integrity that cannot be addressed at the application stage.

6.12 As such it is considered that the Neighbourhood Plan will not result in an adverse effect on the integrity of Severn Estuary SPA/Ramsar through this impact pathway.

Loss of Functionally Linked Habitat

The Severn Estuary SAC/SPA/Ramsar

6.13 As noted previously Natural England's impact risk zones (IRZ) for waterfowl and waders have been set at a precautionary 4km to cover the core foraging zones of all waterfowl and waders except lapwing and golden plover. The only European site with waterfowl and waders as their qualifying features, impacted by the NP and surrounding growth, are the Severn Estuary European Sites.

6.14 Therefore, any authority within 4km of the Severn Estuary European sites must be considered within the Appropriate Assessment in-combination with the potential effects presented by growth within the Combined Authority area. These authorities are as follows:

- South Gloucestershire (England)
- Monmouthshire (Wales)
- Forest of Dean District (Gloucestershire)
- Stroud District (Gloucestershire)
- North Somerset (Somerset)
- Sedgemore Sedgemoor District (Somerset)
- West Somerset District (Somerset)

6.15 Work was undertaken by Natural England in 2015 to identify wintering wildfowl high tide roosts on the Severn Estuary[88]. The work identified significant areas of the coast which host large numbers of waterfowl and waders during high tide. In Gloucestershire, all key areas were north of the M4 and there were none identified in the vicinity of Pilning & Severn Beach Neighbourhood Area. There is therefore no reason based on current available data to conclude that allocations in the Neighbourhood Area, even when on suitable land such as periodically wet grasslands, will result in a material impact on the SPA/Ramsar bird populations of Severn Estuary due to loss of functionally linked land.

6.16 Moreover, information provided by the Neighbourhood Plan Steering Group indicates that with the exception of the site allocated in Policy H8, all allocated development sites in the Neighbourhood Plan are either overgrown or are currently used for recreational purposes, both of which would render such sites unsuitable as high tide roosting or foraging sites.

6.17 As a precaution it is recommended that wording is included into Policy H8 of the Neighbourhood Plan that requires applicants for that site to undertake botanical survey to determine whether the site is suitable to support wintering waterfowl and waders. If so, it should be subject to non-

[88] Identification of wintering waterfowl high tide roosts on the Severn Estuary SSSI/SPA (Brean Down to Clevedon) 2015 - RP02262 (naturalengland.org.uk) [Accessed 07/11/2023]

breeding bird survey to confirm its significance, followed by any necessary offsetting habitat creation.

7. Conclusions

7.1 The Pilning & Severn Beach NP has a total of 26 policies. Of these policies eleven had the potential to cause a likely significant effect and were discussed with regards to their impacts upon Habitat sites. These were:

7.2 The site allocation policies assessed, with associated dwelling capacities, are as follows (note that this sums to more than 264 dwellings because full capacity on all sites may not be achievable):

- **H1** – Pilning Village Hall and playing field: up to 30 dwellings
- **H2** – Land west of St Peter's School, Pilning: up to 25 dwellings
- **H3** – Land behind surgery & allotments, Pilning: up to 30 dwellings + 41 sheltered units
- **H4** – Rear of 21 & 23 Cross Hands Road, Pilning: up to 18 dwellings
- **H5** – Pilning Forge, Whitehouse Lane: up to 9 dwellings
- **H6** – Adjacent to 19 Vicarage Road, Pilning: up to 3 dwellings
- **H7** – Station Road (railway sidings), Severn Beach: up to 25 dwellings plus apartments over retail
- **H8** – Land west of Ableton Lane, Severn Beach: up to 75 dwellings
- **H9** – Land south of Church Road (Gypsies Plat), Severn Beach: up to 80 dwellings

7.3 In addition to these specific allocation policies, the following policies were screened in due to their potential to result in likely significant effects on Habitats sites:

- **Policy H10 –** Windfall Housing Sites is included in the Neighbourhood Plan to allow for appropriate small-scale infill development in the future. However, as no such sites are currently identified, it has not been subject to site-specific assessment. Any proposals brought forward under this policy will need to be screened for Likely Significant Effects at the project level.

7.4 The test of Likely Significant Effects (LSE) focused on these policies in relation to the vulnerabilities of the Habitats sites identified in Table 1. The impact pathways assessed were:

- Recreational pressure;
- Noise and visual disturbance;
- Loss of functionally linked habitat (FLL);

- Atmospheric pollution (air quality);
- Water quality and hydrological changes (noting no nutrient neutrality requirement);
- Coastal squeeze (strategic SMP-level context).

7.5 These policies were found to present LSEs for recreational pressure, noise and visual disturbance, loss of functionally linked habitat, atmospheric pollution (traffic-N deposition), and water quality/hydrology, alone and in-combination with other plans and projects. These pathways were addressed within the Appropriate Assessment (Section 6).

7.6 For the most part, there are no recommendations for changes to the Neighbourhood Plan. However, regarding potential impacts on functionally linked land for the Severn Estuary SPA/Ramsar, it is recommended that additional wording be included relating specifically to **Site H8 (Land west of Ableton Lane)**. This should require that applicants undertake a botanical assessment to determine whether the site may support wintering waterfowl and waders. If so, it should be subject to non-breeding bird survey to confirm its significance, followed by any necessary offsetting habitat creation. With these recommendations incorporated, it can be concluded that the Pilning & Severn Beach NP would not adversely affect the integrity of any Habitats site, either alone or in-combination with other plans and projects.

Appendix A - European Sites Background

A.1 River Wye / Afon Gwy SAC

Reason for Designation[89]

The site is designated as an SAC for its:

Annex I habitats:

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation; Rivers with floating vegetation often dominated by water-crowfoot
- Transition mires and quaking bogs; Very wet mires often identified by an unstable `quaking` surface

Annex II species:

- White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes*
- Sea lamprey *Petromyzon marinus*
- Brook lamprey *Lampetra planeri*
- River lamprey *Lampetra fluviatilis*
- Allis shad *Alosa alosa*
- Twaite shad *Alosa fallax*
- Atlantic salmon *Salmo salar*
- Bullhead *Cottus gobio*
- Otter *Lutra lutra*

Conservation Objectives[90]

"With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- *The extent and distribution of qualifying natural habitats and habitats of qualifying species*
- *The structure and function (including typical species) of qualifying natural habitats*

[89] http://publications.naturalengland.org.uk/file/5464505186254848 [accessed 21/01/2021]
[90] http://publications.naturalengland.org.uk/file/5099305425960960 [accessed 21/01/2021]

- *The structure and function of the habitats of qualifying species*
- *The supporting processes on which qualifying natural habitats and habitats of qualifying species rely*
- *The populations of qualifying species, and,*
- *The distribution of qualifying species within the site."*

Environmental Vulnerabilities

The Site improvement Plan[91] identifies the following pressures and threats to the SAC:

- Water pollution
- Invasive species
- Hydrological changes
- Public access / disturbance
- Air pollution: impact of atmospheric nitrogen deposition
- Fisheries
- Water abstraction
- Undergrazing

A.2 Severn Estuary Ramsar site

Reason for Designation[92]

The site is designated as a Ramsar site for the following Criteria:

Criterion 1: Due to immense tidal range (second-largest in world), this affects both the physical environment and biological communities.

Habitats Directive Annex I features present on the Ramsar site include: H1110 Sandbanks which are slightly covered by sea water all the time H1130 Estuaries H1140 Mudflats and sandflats not covered by seawater at low tide H1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

Criterion 3: Due to unusual estuarine communities, reduced diversity and high productivity.

Criterion 4: This site is important for the run of migratory fish between sea and river via estuary. Species include Salmon *Salmo salar*, sea trout *Salmo trutta*, sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis,* allis shad *Alosa alosa*, twaite shad *Alosa fallax*, and eel *Anguilla anguilla*.

It is also of particular importance for migratory birds during spring and autumn

Criterion 5: Assemblages of international importance:

Species with peak counts in winter: 70919 waterfowl (5 year peak mean 1998/99-2002/2003)

[91] http://publications.naturalengland.org.uk/file/5550181483282432 [accessed 21/01/2021]
[92] https://jncc.gov.uk/jncc-assets/RIS/UK11081.pdf [accessed 21/01/2021]

Criterion 6: species/populations occurring at levels of international importance:

- Bewick's swan *Cygnus columbianus bewickii*
- Common shelduck *Tadorna tadorna*
- Gadwall *Anas strepera*
- Dunlin *Calidris alpina alpina*
- Common redshank *Tringa totanus*
- Greater white-fronted goose *Anser albifrons albifrons*

Qualifying Species/populations (as identified at designation):

Criterion 8: The fish of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded. Salmon *Salmo salar*, sea trout *Salmo trutta*, sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, allis shad *Alosa alosa*, twaite shad *Alosa fallax*, and eel *Anguilla anguilla* use the Severn Estuary as a key migration route to their spawning grounds in the many tributaries that flow into the estuary.

The site is important as a feeding and nursery ground for many fish species particularly allis shad *Alosa alosa* and twaite shad *Alosa fallax* which feed on mysid shrimps in the salt wedge.

Environmental Vulnerabilities

7.7 The Information Sheet on Ramsar Sites[93] identifies the following pressures and threats to the Ramsar site:

- Dredging
- Erosion
- Recreational / tourism disturbance

A.3 Severn Estuary SAC

Reason for Designation[94]

The site is designated as an SAC for its:

Annex I habitats that are a primary reason for selection of this site:

- Estuaries
- Mudflats and sandflats not covered by seawater at low tide
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:

- Sandbanks which are slightly covered by sea water all the time
- Reefs

[93] Ibid
[94] https://jncc.gov.uk/jncc-assets/SAC-N2K/UK0013030.pdf [accessed 21/01/2021]

Annex II species that are a primary reason for selection of this site:

- Sea lamprey *Petromyzon marinus*
- River lamprey *Lampetra fluviatilis*
- Twaite shad *Alosa fallax*

Conservation Objectives[95]

"*With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;*

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- *The extent and distribution of qualifying natural habitats and habitats of qualifying species*
- *The structure and function (including typical species) of qualifying natural habitats*
- *The structure and function of the habitats of qualifying species*
- *The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely*
- *The populations of qualifying species, and,*
- *The distribution of qualifying species within the site."*

Environmental Vulnerabilities

The Site improvement Plan[96] identifies the following pressures and threats to the SAC:

- Public access/ disturbance. Natural England have also identified issues such as damage from dog fouling (nutrification), habitat erosion, bait digging and fishing activities.
- Physical modification
- Impacts from development in-combination and offsite impacts (drainage, disturbance, runoff, impacts on managed realignment etc.
- Coastal squeeze
- Change in land management
- Changes in species distribution
- Water pollution
- Air pollution: impact of atmospheric nitrogen deposition
- Fisheries: recreational, marine and estuarine
- Invasive species

[95] http://publications.naturalengland.org.uk/file/6377265718099968 [accessed 21/01/2021]
[96] http://publications.naturalengland.org.uk/file/4856107648417792 [accessed 21/01/2021]

A.4 Severn Estuary SPA

Reason for Designation[97]

The site is designated as an SPA for its:

Non breeding:

- Bewick's swan *Cygnus columbianus bewickii*
- Common shelduck *Tadorna tadorna*
- Gadwall *Anas strepera*
- Dunlin *Calidris alpina alpina*
- Common redshank *Tringa totanus*
- Greater white-fronted goose *Anser albifrons albifrons*

Waterbird assemblage: Bewick's swan, greater white-fronted goose, common shelduck, gadwall, dunlin, and common redshank

Conservation Objectives[98]

"*With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;*

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- *The extent and distribution of the habitats of the qualifying features*
- *The structure and function of the habitats of the qualifying features*
- *The supporting processes on which the habitats of the qualifying features rely*
- *The population of each of the qualifying features, and,*
- *The distribution of the qualifying features within the site*."

Environmental Vulnerabilities

The Site improvement Plan[99] identifies the following pressures and threats to the SPA:

- Public access/ disturbance
- Impacts from development in-combination and offsite impacts (drainage, disturbance, runoff, impacts on managed realignment etc.
- Coastal squeeze
- Water pollution
- Air pollution: impact of atmospheric nitrogen deposition

[97] http://publications.naturalengland.org.uk/file/6512584593244160 [accessed 21/01/2021]
[98] http://publications.naturalengland.org.uk/file/6288530213175296 [accessed 21/01/2021]
[99] http://publications.naturalengland.org.uk/file/4856107648417792 [accessed 21/01/2021]

- Fisheries: recreational, marine and estuarine
- Invasive species

It is acknowledged that the Site Improvement Plan is dated 2015. Natural England have identified that increasingly recreational pressure has been recognised as a contributing factor to issues with management such as grazing regimes.

A.5 Wye Valley & Forest of Dean Bat Sites SAC

Reason for Designation[100]

The site is designated as an SAC for its:

Annex II species:

- Lesser horseshoe bat *Rhinolophus hipposideros*
- Greater horseshoe bat *Rhinolophus ferrumequinum*

Conservation Objectives[101]

"With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- *The extent and distribution of the habitats of qualifying species*
- *The structure and function of the habitats of qualifying species*
- *The supporting processes on which the habitats of qualifying species rely*
- *The populations of qualifying species, and*
- *The distribution of qualifying species within the site."*

Environmental Vulnerabilities

The Site improvement Plan[102] identifies the following pressures and threats to the SAC:

- Physical modification
- Public access / disturbance
- Habitat connectivity

A.6 Wye Valley Woodlands SAC

Reason for Designation[103]

7.8 The site is designated as an SAC for its:

[100] http://publications.naturalengland.org.uk/file/5725464458952704 [accessed 21/01/2021]
[101] http://publications.naturalengland.org.uk/file/5128727537385472 [accessed 21/01/2021]
[102] http://publications.naturalengland.org.uk/file/5483403396775936 [accessed 21/01/2021]
[103] http://publications.naturalengland.org.uk/file/4729640186806272 [accessed 21/01/2021]

Annex I habitats:

- Asperulo-Fagetum beech forests. (Beech forests on rich to neutral soils)
- Taxus baccata woods of the British Isles. (Yew-dominated woodland)
- Tilio-Acerion forests of slopes, screes and ravines. (Mixed woodland on base-rich soils associated with rocky slopes)

Annex II species:

- Lesser horseshoe bat *Rhinolophus hipposideros*

Conservation Objectives[104]

"*With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;*

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- *The extent and distribution of qualifying natural habitats and habitats of qualifying species*
- *The structure and function (including typical species) of qualifying natural habitats*
- *The structure and function of the habitats of qualifying species*
- *The supporting processes on which qualifying natural habitats and habitats of qualifying species rely*
- *The populations of qualifying species, and,*
- *The distribution of qualifying species within the site."*

Environmental Vulnerabilities

The Site improvement Plan[105] identifies the following pressures and threats to the SAC:

- Invasive species
- Habitat connectivity
- Air pollution: impact of atmospheric nitrogen deposition
- Public access / disturbance
- Disease

[104] http://publications.naturalengland.org.uk/file/6571286793027584 [accessed 21/01/2021]
[105] http://publications.naturalengland.org.uk/file/4985420184027136
http://publications.naturalengland.org.uk/file/4856107648417792 [accessed 21/01/2021]

Appendix B Policy Screening

Table 8. Pilning and Severn Neighbourhood Plan Policy Screening

Policy Name	Brief Policy Description	Potential Likely Significant Effect?
Housing		
H1 – Pilning Village Hall and playing field	Allocates land for up to 30 dwellings at Pilning Village Hall and playing field.	Potential likely significant effects. The policy involves development that may affect nearby Habitats sites due to its scale, location, and proximity to sensitive ecological features.
H2 – Land west of St Peter's School, Pilning	Allocates land for up to 25 dwellings west of St Peter's School.	Potential likely significant effects. The policy involves development that may affect nearby Habitats sites due to its scale, location, and proximity to sensitive ecological features.
H3 – Land behind surgery & allotments, Pilning	Allocates land for up to 30 dwellings plus 41 sheltered units near Pilning surgery.	Potential likely significant effects. The policy involves development that may affect nearby Habitats sites due to its scale, location, and proximity to sensitive ecological features.
H4 – Rear of 21 & 23 Cross Hands Road, Pilning	Allocates land for up to 18 dwellings in Pilning.	Potential likely significant effects. The policy involves development that may affect nearby Habitats sites due to its scale, location, and proximity to sensitive ecological features.
H5 – Pilning Forge, Whitehouse Lane	Allocates land for up to 9 dwellings at Pilning Forge (brownfield site).	Potential likely significant effects. The policy involves development that may affect nearby Habitats sites due to its scale, location, and proximity to sensitive ecological features.
H6 – Adjacent to 19 Vicarage Road, Pilning	Allocates land for up to 3 dwellings adjacent to Vicarage Road.	Potential likely significant effects. The policy involves development that may affect nearby Habitats sites due to its scale, location, and proximity to sensitive ecological features.
H7 – Station Road (railway sidings), Severn Beach	Allocates land for up to 25 dwellings, retail units with apartments above, public parking and transport hub facilities.	Potential likely significant effects. The policy involves development that may affect nearby Habitats sites due to its scale, location, and proximity to sensitive ecological features.
H8 – Land west of Ableton Lane, Severn Beach	Allocates land for up to 75 dwellings in Severn Beach.	Potential likely significant effects. The policy involves development that may affect nearby Habitats sites due to its scale, location, and proximity to sensitive ecological features.
H9 – Land south of Church Road (Gypsies Plat), Severn Beach	Allocates land for up to 80 dwellings in Severn Beach.	Potential likely significant effects. The policy involves development that may affect nearby Habitats sites due to its scale, location, and proximity to sensitive ecological features.

Policy Name	Brief Policy Description	Potential Likely Significant Effect?
H10 – Windfall (Infill) Housing Sites	Supports appropriate small-scale infill housing development not specifically identified in the plan.	Potential likely significant effects. While no sites are currently identified, the policy enables housing in unspecified locations and therefore a precautionary screening-in is applied due to potential future effects on Habitats sites.
H11 – Sheltered Accommodation for the Elderly	Supports delivery of 30-41 sheltered units for older adults. Linked to Policy H3 but allows flexibility if that site does not come forward.	No likely significant effects. This policy does not allocate a new site, and the identified capacity is already assessed under Policy H3. It is screened out of site-specific assessment.
FR1 – Flood Risk	Requires developments to apply sequential testing and comply with flood mitigation requirements.	No likely significant effects. This policy is protective and ensures resilience against flood risk.
TTP1 – Visitor Parking (Land at Promenade Gardens, Severn Beach)	Seeks to manage and improve parking provision for residents and visitors, including a new 20-space car park at Severn Beach.	No likely significant effects. This policy is not intended to provide opportunities for further recreational opportunities but to alleviate pressure on parking in nearby residential streets from existing recreational visitors. .
TTP2 – Land at the Allotments, Severn Beach	Car parking (up to 100 spaces) for allotments and visitors to the coastal path.	No likely significant effects. This policy is not intended to provide opportunities for further recreational opportunities but to alleviate pressure on parking in nearby residential streets from existing recreational visitors.
TTP3 – Public Transport Improvements (Land at Shaft Road Severn Beach)	Car parking (up to 40 spaces) for visitors to the coastal path.	No likely significant effects. This policy is not intended to provide opportunities for further recreational opportunities but to alleviate pressure on parking in nearby residential streets from existing recreational visitors.
TTP4 (Land at End of Passage Road, New Passage, Pilning)	Car parking (up to 20 spaces) for visitors to the coastal path	No likely significant effects. This policy is not intended to provide opportunities for further recreational opportunities but to alleviate pressure on parking in nearby residential streets from existing recreational visitors.
TTP5 – Improvements to Walking and Cycling Networks	A series of improvements to the walking and cycling networks within and out of the Parish.	No likely significant effects. Active travel measure with no direct link to Habitats sites.
CF1 – Development of Public house/bar	Supports enhancement of community facilities and hubs.	No likely significant effects. Policy is supportive and non-spatial.

Policy Name	Brief Policy Description	Potential Likely Significant Effect?
and a takeaway shop in Severn Beach		
CF2 – Retention of existing community facilities	Protects and enhances provision of community infrastructure.	No likely significant effects. This is an infrastructure support policy with no direct link to Habitats sites.
CF3 - Investments for outdoor and indoor sporting activities	To seek to ensure that investments are made to outdoor and indoor sporting activities for adults and youths at playing fields and village halls.	No likely significant effects. This is an infrastructure support policy with no direct link to Habitats sites.
LCD1 – Separation of Large Commercial Developments from Residential Areas	Supports small-scale commercial development within settlements.	No likely significant effects. Policy is mitigation-focused, seeking green buffers and orientation to reduce impacts of existing and future large commercial developments on residential areas. No direct impact pathways to Habitats sites identified.
LCD2 – Provision of a Truck Stop	Supports the provision of a truck stop near the M49 to serve HGVs associated with Severnside, helping to reduce unmanaged parking, littering, and disturbance within the wider industrial area..	No likely significant effects. The policy is intended to reduce unmanaged truck parking, associated pollution, and habitat disturbance in the wider Severnside Enterprise Area. The policy specifically supports a truck stop only if it is associated with the new M49 junction or is easily accessed from the M49 without affecting local roads. This would place it more than 200m from the Severn Estuary SPA/SAC/Ramsar site and therefore beyond the zone for air quality impact. Given this and the fact the truck stop would be intended to cater to existing commercial traffic it can be screened out. .
ECGB1 – Removal of Land from Green Belt	Supports minor Green Belt boundary adjustments to accommodate allocations.	No likely significant effects. Administrative boundary change without direct Habitats site impact.
ECGB2 – Adding Land to the Green Belt	Protects countryside and landscape character from inappropriate development by adding land to the green belt.	No likely significant effects. Protective policy.
ECGB3 – Settlement Boundary Adjustments	Revises settlement boundaries to incorporate allocated housing sites.	No likely significant effects. Reflects site allocations already assessed individually.

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