

HPC COMPANY DOCUMENT

HINKLEY POINT C MATERIAL CHANGE APPLICATION - PRELIMINARY ENVIRONMENTAL INFORMATION REPORT – VOLUME 4: CUMULATIVE AND IN-COMBINATION EFFECTS

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1. INTRODUCTION

1.1.1 A preliminary assessment of the potential for cumulative or in-combination effects because of the proposed changes on-site and off-site has been carried out:

- **Cumulative Effects:** Effects that arise from the combined impacts of a number of different projects, in combination with the proposed development, on a receptor (i.e. the proposed changes on-site and off-site with other projects).
- **In-Combination Effects:** Effects that arise from the combined action of multiple effects from the same project (i.e. the proposed changes on-site and off-site) on a single receptor.

1.1.2 **Chapter 2** outlines the potential cumulative effects and **Chapter 3** outlines the potential in-combination effects. A summary, along with the proposed next steps, is then provided in **Chapter 4**.

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2. CUMULATIVE EFFECTS

2.1 Methodology

2.1.1 The Scoping Opinion received on 3 May 2022 confirmed the need to undertake a Cumulative Effects Assessment ('CEA') as part of the updated Environmental Impact Assessment ('EIA') for the proposed material change application.

2.1.2 The CEA methodology proposed for this proposed material change application differs in geographical area and scope from the methodology for the CEA undertaken for the original Development Consent Order ('DCO') application, which covered the Hinkley Point C site and associated developments. The geographic extent of the CEA for this proposed material change application covers the Hinkley Point C site (which can be seen on **Volume 2 Figure 6.1** in **PEIR Figures – Volume 2**) and the proposed compensation sites that will be within the amended DCO Order Limits (refer to **Volume 3 Figures 4, 8, 12, 15 and 18** in **PEIR Figures – Volume 3**).

2.1.3 The original DCO CEA was undertaken in 2011 and it is likely that other projects identified and assessed as part of that CEA either now form part of the current baseline for Hinkley Point C or have not been implemented and therefore no longer need to be included in the CEA. Therefore, a new committed development log ('CDL') and subsequent long-list of other projects has been produced based on the Tier 1-3 criteria set out in Planning Inspectorate Advice Note 17¹, Table 2 (see **Table 2-1**).

Table 2-1: Assigning certainty to 'other existing development and/or approved development' (Planning Inspectorate Advice Note 17)

Tier 1	<ul style="list-style-type: none">• under construction (see Note);• permitted application(s), whether under the Planning Act 2008 or other regimes, but not yet implemented;• submitted application(s) whether under the Planning Act 2008 or other regimes but not yet determined.
Tier 2	<ul style="list-style-type: none">• projects on the Planning Inspectorate's Programme of Projects where a scoping report has been submitted.

¹ The Planning Inspectorate (2019). Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects [[Online](#)] Accessed 28 November 2023.

Tier 3	<ul style="list-style-type: none">• projects on the Planning Inspectorate’s Programme of Projects where a scoping report has not been submitted.• identified in the relevant Development Plan (and emerging Development Plans – with appropriate weight being given as they move closer to adoption) recognising that there will be limited information available on the relevant proposals; and• identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.
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Note: Where other projects are expected to be completed before construction of the proposed NSIP and the effects of those projects are fully determined, effects arising from them should be considered as part of the baseline and may be considered as part of both the construction and operational assessment. The ES should clearly distinguish between projects forming part of the dynamic baseline and those in the CEA.

2.1.4 The Scoping Opinion states, ‘*The Inspectorate considers that the cumulative effects assessment should consider all other projects with zones of influence which overlap with the zones of influence of the Proposed Changes*’ (Planning Inspectorate 2022, comment ID 2.2.1).

2.1.5 The study area for the long list of other projects was based on the Zones of Influence (‘Zol’) for each environmental Aspect scoped into the ES. For the proposed changes on-site, that includes Landscape and Visual and Marine Ecology and Water Quality, in line with the Scoping Opinion. For the proposed

changes off-site, that includes those Aspects proposed to be scoped into the Environmental Statement (‘ES’) (refer to **Volume 3**). The Zols were informed by the respective environmental Aspect assessment study areas outlined in **Volume 2** and **Volume 3**.

2.1.6 The Landscape and Visual Aspect is scoped into both the ES for the proposed changes on-site and off-site but the Zol for the CEA differs between on-site and off-site. This is because the Zol for the proposed changes on-site was based on the 8 km Zone of Theoretical Visibility (‘ZTV’) for the increased size of the Interim Spent Fuel Store (‘ISFS’). The Landscape and Visual study areas for the saltmarsh sites was 2 km and for the weirs was between 1-1.5 km as beyond these distances, there is unlikely to be any perceptible change.

2.1.7 The Zols for the environmental Aspects scoped into the EIA for the purposes of CEA for the proposed changes on-site are as follows:

- Marine Ecology related to the removal of the requirement to install an Acoustic Fish Deterrent (‘AFD’);
 - Direct footprint of the cooling water intakes DCO Order Limits for any potential seabed disturbance (for example, to benthic habitats / species);

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- 500 m from the proposed changes for potential changes to water quality; 10 km from the proposed changes for potential disturbance of sediment, and resultant changes in total sediment loads / risk of smothering;
- For fish, the relevant International Council for the Exploration of the Seas ('ICES') rectangle (31E6) the works are located within;
- 10 km from the proposed changes for marine mammals / seabirds, based on work undertaken to inform the original Habitats Regulations Assessment ('HRA'); and
- Landscape and visual – 8 km from the proposed ISFS.

2.1.8 The Zols for the environmental Aspects scoped into or out of the EIA for the purposes of CEA for the proposed changes off-site are outlined in **Table 2-2**. These have been presented in table format as some Aspects have been scoped out of further assessment for some of the proposed compensation sites, but not all.

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Table 2-2: Cumulative Effects Assessment Zones of Influence for proposed changes off-site

Environmental Aspect	Study Area	
	Saltmarshes	Weirs
Conventional Waste Management	Proposed Order Limits ²	Weirs works boundaries ³
Socio-economics	500 m from the proposed Order Limits	500 m from the weirs works boundaries
Transport	Local road networks utilised as construction traffic routes for Pawlett Hams, The Island and other projects.	Local road networks utilised as construction traffic routes for the weirs and other projects.
Noise and Vibration	500 m for noise, 100 m for vibration from the proposed Order Limits	500 m for noise, 100 m for vibration from the weirs works boundaries
Air Quality	Proposed to be scoped out of the ES and therefore not included in this assessment. Refer to Table 10-1 in Volume 3 Chapter 10 for further information.	Proposed to be scoped out of the ES and therefore not included in this assessment. Refer to Table 10-2 in Volume 3 Chapter 10 for further information.
Soils and Land Use	250 m from the proposed Order Limits	250 m from the weirs works boundaries
Geology and Land Contamination	250 m from the proposed Order Limits	250 m from the weirs works boundaries
Groundwater	1 km from the proposed Order Limits	1 km from the weirs works boundaries
Surface Water	500 m from the proposed Order Limits	500 m from the weirs works boundaries
Coastal Hydrodynamics and Geomorphology	The spatial area of the proposed Order Limits, the Parrett Estuary downstream of the site to the Bristol Channel, and a 1 km buffer zone.	Proposed to be scoped out of the ES and therefore not included in this assessment. Refer to Volume 3 Chapter 3 for further information.

² The proposed Order Limits for Pawlett Hams and The Island are shown on **Volume 3 Figure 5** and **Volume 3 Figure 9** in **PEIR Figures – Volume 3**.

³ The boundary of the Preferred Site Compound and Preferred Access Route shown on **Volume 3 Figure 12**, **Volume 3 Figure 15** and **Volume 3 Figure 18** in **PEIR Figures – Volume 3** are referred to as the weirs works boundaries.

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Environmental Aspect	Study Area	
	Saltmarshes	Weirs
Marine Water and Sediment Quality	The spatial area of the proposed Order Limits, the Parrett Estuary downstream of the site to the Bristol Channel, and a 1 km buffer zone.	Proposed to be scoped out of the ES and therefore not included in this assessment. Refer to Volume 3 Chapter 3 for further information.
Marine Ecology	The spatial area of the proposed Order Limits, the Parrett Estuary downstream of the site to the Bristol Channel, and a 1 km buffer zone.	Proposed to be scoped out of the ES and therefore not included in this assessment. Refer to Volume 3 Chapter 3 for further information.
Ecology (Terrestrial and Freshwater) and Ornithology	2 km terrestrial and ornithology, 200 m aquatic from the proposed Order Limits	2 km terrestrial and ornithology, 200 m aquatic from the weirs works boundaries
Landscape and Visual	2 km from the proposed Order Limits	1.5 km from the weirs works boundaries ⁴ .
Historic Environment	1 km from the proposed Order Limits	Proposed to be scoped out of the ES and therefore not included in this assessment. Refer to Table 10-2 in Volume 3 Chapter 10 for further information.
Offshore and Intertidal Archaeology	1 km from the proposed Order Limits (intertidal study area) The Beach and Tidal Flat Deposits (geological study area)	Proposed to be scoped out of the ES and therefore not included in this assessment. Refer to Volume 3 Chapter 3 for further information.
Amenity and Recreation	500 m from the proposed Order Limits	500 m from the weirs works boundaries
Shipping and Navigation	Minimum 2 nm from the proposed Order Limits.	Proposed to be scoped out of the ES and therefore not included in this assessment. Refer to Volume 3 Chapter 3 for further information.

⁴ This differs from the Zol for the saltmarsh sites as beyond this, there is unlikely to be any perceptible change. For Maisemore Weir and the River Lugg Weirs, it is unlikely that there will be any perceptible change beyond 1 km. But as this increases to 1.5 km for the Upper Lode Weir, 1.5 km was used as the Zol for the CEA as a precautionary approach.

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Environmental Aspect	Study Area	
	Saltmarshes	Weirs
Population and Human Health	Defined by relevant constituent Aspect study areas outlined in this table, the largest being 2 km from the proposed Order Limits.	Defined by relevant constituent Aspect study areas outlined in this table, the largest being 2 km from the weirs works boundaries.
Climate change	The proposed Order Limits.	Weirs works boundaries. Vulnerability to climate change is proposed to be scoped out of the ES and therefore not included in this assessment. Refer to Table 10-2 in Volume 3 Chapter 10 for further information.

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2.1.9 A long list of other projects has been prepared for both the proposed changes on-site and off-site. The long-list includes approved major planning applications and planning allocations (within development plans) hereafter referred to as ‘other projects’). It was then identified which of these other projects were within the Zols for each of the environmental Aspects. The long list can be found in **Appendix B** for proposed changes on-site and off-site.

2.1.10 In accordance with the Town and Country Planning (Development Management Procedure) (England) Order 2015⁵, major planning applications are defined as applications for the following types of development:

- The winning and working of minerals or the use of land for mineral-working deposits;
- Waste development;
- The provision of dwellinghouses where: (i) the number of dwellinghouses to be provided is 10 or more, or (ii) the development is to be carried out on a site having an area of 0.5 ha or more and it is not known whether the development falls within (i);

- The provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or
- Development carried out on a site having an area of 1 ha or more.

2.1.11 An allocation refers to a location for development defined within a local or neighbourhood plan, often found in a local or neighbourhood plans policies map. They refer to housing, employment, community uses, mixed-use, agriculture, environmental, minerals and waste, infrastructure, and all safeguarded sites. Safeguarded sites are also included in the definition of allocations. The long lists included allocations within adopted and emerging development plans (Regulation 19 of the Town and Country Planning (Local Planning) (England) Regulations 2012⁶ onwards).

2.1.12 Using the long lists of other projects, a preliminary assessment of potential cumulative effects has been undertaken for both the proposed changes on-site and off-site, taking into consideration temporal scope, the scale and nature of the other projects and professional judgement. Where potential cumulative effects are identified with other projects on the long list, these

⁵ Town and Country Planning (Development Management Procedure) (England) Order 2015. [\[Online\]](#) Accessed 28 November 2023.

⁶ Town and Country Planning (Local Planning) (England) Regulations 2012. [\[Online\]](#). Accessed 28 November 2023.

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projects will form part of the shortlist for the CEA to be undertaken as part of the EIA and reported in the ES.

- 2.1.13 The proposed approach to the CEA is considered to be proportionate to the nature and scale of the proposed changes on-site and off-site. The proposed approach also aligns with Planning Inspectorate *Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects*¹, which recommends ‘... the CEA should be proportionate and should not be any longer than necessary to identify and assess any likely significant cumulative effects’ (paragraph 3.4.5).

2.2 Potential Cumulative Effects

Proposed changes on-site

- 2.2.1 No other projects were within the Zol for Marine Ecology for the proposed changes on-site. All other projects were within the Zol for landscape and visual for proposed changes on-site.
- 2.2.2 For the other projects within the Landscape and Visual Zol, none were shortlisted for further assessment of significant cumulative effects for proposed changes on-site as no potential for cumulative effects were identified. The justifications for this are outlined for

each project on the longlist in **Appendix B**. In summary, no cumulative effects are anticipated for proposed changes on-site due to:

- Scale of the project relative to the distance from the Hinkley Point C Development Site Boundary (refer to **Volume 2 Figure 6.1** and **Volume 2 Figure 6.2** in **PEIR Figures – Volume 2**);
- No intervisibility between the proposed changes (including the ISFS, Equipment Storage Building and the meteorological mast) and the other project; and
- Small scale of the allocation area, nature of the allocation and/or distance from the Hinkley Point C site.

Proposed changes off-site

- 2.2.3 It is understood that full planning permission (41/23/00001) was granted to a third party for the construction of two agricultural buildings on land that is sited within the proposed Order Limits for Pawlett Hams to the north of White House Road in July 2023. This planning permission involves re-building the two agricultural buildings that were previously damaged by a storm. NNB is also aware of a recent application (41/23/00011) for the Elizabeth Boat Room to be used as a disability centre. It has been assumed that the

agricultural buildings will be built and that the latter application will be approved prior to the start of construction at Pawlett Hams. The assessments in **Volume 3 Chapter 5** have assumed that the two agricultural buildings and the Elizabeth Boat Room will need to be physically removed as part of the proposed compensation measures at Pawlett Hams. **Volume 3** has also considered the loss of the Elizabeth Boat Room as a community facility. The agricultural barns and the Elizabeth Boat Room have not been considered further in this volume of the PEIR to avoid double counting of effects.

- 2.2.4 No other projects were identified within the marine environment Zol for the proposed changes off-site. This included consideration of the list of other projects identified and shared by The Crown Estate. This list will be updated and reviewed within the ES, supported by additional project searches within the Zol.
- 2.2.5 Other projects were identified within the Zol for Aspects including Terrestrial Ecology and Ornithology and Landscape and Visual. For these two Aspects specifically, potential for cumulative effects to arise has been identified.
- 2.2.6 For Terrestrial Ecology and Ornithology, this is in relation to the potential for birds to be disturbed during the construction of Pawlett Hams and/or The Island that

could move to the area of the planning allocations / application. Any cumulative effect is unlikely to be significant due to distance, but this should be assessed further when the timings of the other projects and the proposed compensation measures are confirmed.

- 2.2.7 For Landscape and Visual, potential for cumulative effects is in relation to the potential impacts associated with construction activities at Pawlett Hams and The Island and proposed works at Maisemore Weir.
- 2.2.8 In both instances, if construction / proposed works periods do not coincide, there is no temporal overlap and no potential for a cumulative effect to arise. The shortlisted other projects are summarised in **Table 2-3** and will be assessed further in the ES, unless it is identified that these periods do not coincide.
- 2.2.9 For some of the other projects, potential for operational cumulative Landscape and Visual effects has been identified due to the proximity to Pawlett Hams, and in some cases the open views between Pawlett Hams and the planning allocation area. These are also summarised in **Table 2-3** and will be assessed further in the ES.
- 2.2.10 No other potential cumulative effects with the remaining Aspects were identified with the proposed changes off-site due to:

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- The distance, location and small scale of the other project;
- Lack of pathway to a cumulative effect such as construction of the other project likely to be completed prior to the construction / proposed works phase of the proposed compensation measure; and
- The temporary and short-term nature of construction of the compensation site making it unlikely for a cumulative effect to arise.

Table 2-3: Other projects shortlisted for further assessment in the ES for cumulative terrestrial ecology and ornithology and/or landscape and visual effects

Reference	Local Planning Authority	Description	Distance (km)	Potential cumulative effects
Planning Application 41/21/00012 (Application is Under Consideration)	Somerset Council	Outline application with some matters reserved, for the erection of up to 41 no. dwellings, convenience store and access.	1.35 km from Pawlett Hams 1.84 km from The Island	Terrestrial Ecology and Ornithology and Landscape and Visual effects during construction (if construction periods coincide)
Planning Allocation D33 in Sedgemoor Local Plan 2011 - 2032	Somerset Council	Informal Recreational Outdoor Space	0.11 km from Pawlett Hams	Terrestrial Ecology and Ornithology and Landscape and Visual effects during construction (if construction periods coincide) Landscape and Visual effects during the operation of Pawlett Hams

Reference	Local Planning Authority	Description	Distance (km)	Potential cumulative effects
Planning Allocation D33 in Sedgemoor Local Plan 2011 - 2032	Somerset Council	Informal Recreational Outdoor Space	0.78 km from Pawlett Hams	Terrestrial Ecology and Ornithology and Landscape and Visual effects during construction (if construction periods coincide) Landscape and Visual effects during the operation of Pawlett Hams
Planning Allocation D33 in Sedgemoor Local Plan 2011 - 2032	Somerset Council	Formal Recreational Outdoor Space	0.74 km from Pawlett Hams	Terrestrial Ecology and Ornithology effects during construction (if construction periods coincide)
Planning Allocation S2 in Sedgemoor Local Plan 2011 - 2032	Somerset Council	Settlement Boundary ⁷	0.72 km from Pawlett Hams	Landscape and Visual effects during construction (if construction periods coincide) Landscape and Visual effects during the operation of Pawlett Hams
Planning Allocation D33 in Sedgemoor Local Plan 2011 - 2032	Somerset Council	Formal Recreational Outdoor Space	0.32 km from Pawlett Hams	Terrestrial Ecology and Ornithology and Landscape and Visual effects during construction (if construction periods coincide) Landscape and Visual effects during the operation of Pawlett Hams
Planning Allocation D33 in Sedgemoor Local Plan 2011 - 2032	Somerset Council	Informal Recreational Outdoor Space	0.32 km from Pawlett Hams	Terrestrial Ecology and Ornithology and Landscape and Visual effects during construction (if construction periods coincide) Landscape and Visual effects during the operation of Pawlett Hams

⁷ Local housing development addressing local affordable housing needs.

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Reference	Local Planning Authority	Description	Distance (km)	Potential cumulative effects
Planning Allocation within Somerset Minerals Plan	Somerset Council	Petroleum Exploration and Development License areas under offer 17/12/2015	0.3.7 km from Pawlett Hams 1.76 km from The Island	Terrestrial Ecology and Ornithology effects during construction (if construction periods coincide)
20/00212/OUT	Tewkesbury Borough Council	Development of 8 dwellings together with open space, access, parking, landscaping, drainage and associated works.	0.97 km from Maisemore Weir	Landscape and Visual effects during proposed works to the weir (if proposed works and other project construction periods coincide)
19/00676/OUT	Tewkesbury Borough Council	Erection of up to 33 residential units with associated infrastructure and landscaping.	0.79 km from Maisemore Weir	Landscape and Visual effects during proposed works to the weir (if proposed works and other project construction periods coincide)

2.2.11 In addition to the CDL developed for the CEA of the proposed changes off-site, a list of other projects has been shared by The Crown Estate. These other projects are outside the Zols identified for the CEA, except for one other project; Rhymney Great Wharf saltmarsh project, located 34 km and 32 km from Pawlett Hams and The Island respectively. This other project is within the Zol for marine ecology (fish) but it is not anticipated that there will be any cumulative effects between this other project and the proposed compensation measures at Pawlett Hams or The Island as the proposal relates to the installation of protective fencing around the existing saltmarsh at

Rhymney Great Wharf, with minimal connectivity to the marine environment.

Conventional Waste Management, Transport and Climate Change

2.2.12 As the assessment of potential cumulative effects is more complex for Conventional Waste Management, Transport and Climate Change, further information on these Aspects is provided in the following sections.

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Conventional Waste Management

2.2.13 A review of the other projects in the region indicates that they are likely to generate similar waste streams to the proposed compensation measures. The generation of these waste streams carries the risk of potential interaction between the recycling, treatment, and disposal capacity requirements within the region for the relevant construction wastes. The potential waste volumes and programmes for delivery of these schemes are not known at this stage but there is potential for short term pressures on current waste infrastructure if waste generation phases of multiple projects overlap.

2.2.14 However, waste volumes from the proposed compensation measures are anticipated to be relatively small and it is unlikely that the construction timelines of all the other projects within the region would overlap to the degree required to have a significant impact on the regional waste management infrastructure capacity. In addition, concurrent regional construction projects may in reality provide opportunities for reuse of wastes and materials generated from the proposed compensation measures, thus further reducing any potential capacity impacts on current waste infrastructure.

Transport

2.2.15 For Pawlett Hams and The Island, the following local roads were identified as potential pathways to cumulative effects, should they be utilised as construction routes simultaneously with other projects:

- Pawlett Hams
 - Old Main Road, Manor Road, Gaunts Road (access), Chapel Road (in case HGVs use this route), Ham Lane, Red Lane, Sloway Lane between Red Lane and Stretcholt Lane, and Stretcholt Lane.
 - A38 Bristol Road (S) from Old Main Road to the south to A38 Pawlett Road to the north.
- The Island
 - Red Lane, Church Road, and Sloway Lane (access).
 - Direct routes between Pawlett Hams and The Island.

2.2.16 A potential pathway to cumulative effects has been identified between Pawlett Hams and The Island with two other projects at the A39 spur between Dunball Roundabout and the M5. There is potential for construction traffic to use this spur at the same time. However, as the A38 is a county freight route and the

M5 is part of the Strategic Road Network, a significant cumulative effect is considered unlikely.

- 2.2.17 There are no potential pathways to cumulative effects between the proposed compensation measures at the weirs with other projects. This is because the weirs are located outside of the geography of the local road networks affected by other projects, resulting in no substantial interactions that could result in a cumulative effect.

Climate Change

- 2.2.18 Regarding greenhouse gas ('GHG') emissions, there is no causal link between the location of GHG emissions and the impacts arising from the cumulative aggregation of GHGs in the atmosphere – as recognised in the update to guidance⁸ on the assessment of GHG emissions produced by the Institute of Environmental Management and Assessment ('IEMA').

- 2.2.19 Because of this limitation - and because it is necessary to consider GHGs in the context of a scientifically based trajectory compliant with the planetary limits for GHG emissions - the best available comparison

benchmark are the carbon budgets adopted by the UK within which it must stay in order to remain on track to achieve net zero by 2050. The carbon budgets are inherently cumulative as they consider emissions from all sources and include for future emissions from new developments.

- 2.2.20 Therefore, there are no potential cumulative effects with other projects and no separate cumulative assessment is therefore required for GHG emissions.

- 2.2.21 Regarding vulnerability to climate change, the other projects would not influence the climate events and potential impacts discussed as part of the assessment of vulnerability of the Pawlett Hams and The Island compensation sites to climate change (see **Volume 3 Section 5.20** and **Volume 3 Section 6.20**). Therefore, there are no potential cumulative effects with other applications and no separate cumulative assessment is therefore required.

Crowards Weir

- 2.2.22 NNB Generation Company (HPC) Limited (hereafter referred to as 'NNB') is aware that the Environment Agency is considering works to Crowards Weir on the

⁸ Institute of Environmental Management and Assessment (IEMA), 2022. Guide: Assessing Greenhouse Gas Emissions and Evaluating their Significance, 2nd Edition.

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River Lugg and is maintaining dialogue with the Environment Agency.

- 2.2.23 Depending on the available information about the proposed works to Crowards Weir, the cumulative effect of this with the proposed changes off-site will be assessed in the ES.

Bridgwater Tidal Barrier

- 2.2.24 The Bridgwater Tidal Barrier is a project located on the River Parrett, east of Chilton Trinity, approximately 3.7 km south of the proposed Order Limits for Pawlett Hams. The project is located outside of the Zols identified in **Table 2-2** but has been identified as a key project to consider cumulatively with the proposed compensation measures at Pawlett Hams and The Island.

- 2.2.25 The Bridgwater Tidal Barrier is currently in the early stages of construction (enabling works) and will provide an increased level of flood protection to communities in and around Bridgwater⁹. The project also involves the construction of new and raised flood defences at the margins of the floodplain to prevent flood water bypassing the barrier. The construction of the project

will likely take four to six years, with an approximate completion in 2029.

- 2.2.26 The potential for cumulative impacts between the proposed compensation measures at Pawlett Hams and The Island and the Bridgwater Tidal Barrier will need to be considered with specific regards to: migratory fish / marine ecology; marine water and sediment quality; and alterations to flood defences / flood risk.

- 2.2.27 The cumulative impact of Pawlett Hams, The Island and the Bridgwater Tidal Barrier will be considered further through design and construction programming and will be assessed in the ES.

Proposed changes off-site outwith the amended Order Limits

- 2.2.28 An assessment of the cumulative effects between the proposed changes off-site outwith the amended Order Limits and other projects will be undertaken as part of the assessment of the environmental impact of these compensation measures:

- Trostrey Weir on the River Usk;

⁹ Somerset Council (2023). *Bridgwater Tidal Barrier*. [Online]. Accessed: 28 November 2023.

- Manorafon Weir on the River Towy;
- Seagrass bed;
- Kelp forest; and
- Oyster beds.

2.2.29 In particular, the potential cumulative effects of the seagrass bed, kelp forest and oyster beds will take into consideration any relevant other projects in the marine environment and marine consents within the Zol of the sites once their location is identified.

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3. IN-COMBINATION EFFECTS

3.1 Overview

3.1.1 In-combination effects are identified when receptors are affected by two or more environmental aspects of the construction and operation of the proposed project.

3.1.2 This PEIR has identified potential pathways to in-combination effects because of the proposed changes on-site and off-site.

3.2 Methodology

3.2.1 For each proposed change (both on-site and off-site), where Aspects have been scoped into the EIA, potential for pathways to in-combination effects have been identified.

3.2.2 A pathway to a potential in-combination effect is only possible when two or more effects are anticipated on a receptor at the same time (otherwise known as spatial and temporal overlap).

3.2.3 Potential pathways to in-combination effects have been assessed as a result of the combined impact of:

- the proposed changes on-site on receptors

- the combined impact of the proposed changes off-site on receptors
- the combined impact of both the proposed changes on-site and off-site on receptors..

3.2.4 The study areas for the in-combination assessment are the same as the Zols used in the CEA, which are based on the respective Aspect assessment study areas outlined in **Volume 2** and **Volume 3**. There are two exceptions for the proposed changes off-site:

- Conventional Waste Management: study area considers the interactions with the other environmental Aspects, instead of including the regional waste management infrastructure too.
- Transport: the study area for the saltmarsh sites includes the A38 corridor including Pawlett Road to M5 J22 (A38 Pawlett Road / Main Road / Huntspill Road / Church Street / A38 Bristol Road north between Church Street south and M5 J22 to the north).

3.2.5 In cases where the effects reported in the individual Aspect chapters have already taken account of the interactions with other Aspects, they are not repeated, although references are made back to the relevant, earlier chapters (refer to **paragraph 3.3.5**).

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3.2.6 Where potential pathways to in-combination effects have been identified these will be reviewed in the EIA and if potential in-combination effects are identified, these will be assessed and reported in the ES.

3.3 Potential Pathways to In-Combination Effects

Proposed changes on-site

3.3.1 NNB has agreed with relevant stakeholders (Environment Agency, Somerset Drainage Board and Somerset Council) that Groundwater can be scoped out of further assessment and has provided further information to seek agreement with the relevant stakeholders that Transport can also be scoped out of further assessment. These two Aspects have therefore not been considered in this in-combination assessment.

3.3.2 Considering this, and the lack of spatial overlap between the landscape and visual and marine ecology Zols, it is not anticipated that the proposed changes on-site alone would give rise to any significant in-combination effects.

Proposed changes off-site

In-combination effects at each compensation site individually

3.3.3 For each compensation site individually, there may be potential for in-combination effects to arise that result from two or more environmental effects on a receptor.

3.3.4 Where receptors have been identified within the study areas of two or more Aspect assessments in each chapter of **Volume 3**, effects on these receptors have the potential to interact and combine.

3.3.5 As outlined in **paragraph 3.2.5**, some environmental Aspect assessments in **Volume 3** assess the combined environmental impact on individual receptors. For example, the assessments of Population and Human Health throughout **Volume 3**, identify the potential for multiple effects from changes associated with constituent Aspects (including Noise and Vibration and Transport). Similarly, the assessments of Ecology (Terrestrial and Freshwater) and Ornithology outlined throughout **Volume 3** consider the potential for multiple effects on habitats and species including changes in surface water hydrology and quality, hydromorphology, noise, and direct impacts from land-take. These combined effects have not been considered further in

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this Volume to avoid double counting of potential effects.

3.3.6 There may be other pathways to potential in-combination effects that have not already been considered in the Aspect assessments. For example, the combined effect on geology and aquifer designations from impacts to groundwater and geology as a result of construction of the saltmarsh sites.

3.3.7 These pathways will be reviewed in the EIA and if any potential in-combination effects are identified, an assessment will be undertaken and reported in the ES.

In-combination effects between compensation sites

Pawlett Hams and The Island

3.3.8 In the case of Transport, any in-combination effects of Pawlett Hams and The Island would be limited to the shared routes through Pawlett to access the A38. These include Gaunts Road, Chapel Road, Old Main Road and Manor Road. The A38 Pawlett/Bristol Road is a designated freight route and the combined impact of the construction traffic from the shared routes is considered negligible.

3.3.9 As Pawlett Hams and The Island are located in close proximity to each other, it is anticipated that there could be other pathways to potential in-combination effects as a result. These may include the combined transport, landscape, and visual and noise impacts of the construction of the two sites on local residents and users of local roads and Public Rights of Way ('PRoW').

3.3.10 The implementation of the proposed compensation measures at Pawlett Hams and The Island will result in beneficial in-combination effects on marine ecology that will be assessed and reported in the ES once the designs are refined, and the individual Aspect assessments are completed.

3.3.11 These pathways will be reviewed in the EIA and if any potential in-combination effects are identified, an assessment will be undertaken and reported in the ES.

The weirs

3.3.12 Implementation of proposed weir easement has the potential to result in beneficial in-combination impacts on migratory fish populations which use the Severn Estuary. Whilst geographically distant, overall improvements to fish movement at the selected weirs will benefit the overall populations at a wider level, i.e., the Severn Estuary and south-west region.

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3.3.13 It is unlikely that adverse in-combination effects between the weirs will arise due to the distance between them. However, should proposals at more than one site on the same river be taken forward (i.e., Maisemore Weir and the Upper Lode Weir on the River Severn), there is a potential pathway to in-combination effects.

3.3.14 As it is not currently known which weirs will be taken forward for delivery, the potential for in-combination effects will be assessed once this is confirmed.

Pawlett Hams and The Island and the weirs

3.3.15 Because of the distance (the distance between the closest weir to one of the saltmarsh sites being approximately 59 km between The Island and Trostrey Weir), it is considered unlikely that an in-combination effect would arise on a receptor because of the proposals at any of the weirs, in-combination with the proposals at the saltmarsh sites.

3.3.16 In the case of Transport, the weirs are considered too remote from the saltmarsh sites to give rise to a pathway to a potential in-combination effect.

3.3.17 An assessment of the in-combination effects on receptors between these sites is therefore proposed to be scoped out of further assessment.

Marine habitat compensation measures

3.3.18 At this stage of assessment, the location of the seagrass beds, kelp forest and native oyster beds are not confirmed, therefore detailed assessment of potential in-combination effects cannot be completed.

3.3.19 When the locations of these marine compensation measures are confirmed, pathways to potential in-combination effects will be reviewed and if any potential in-combination effects are identified, an assessment will be undertaken. There is the potential for beneficial in-combination effects through an increase in habitat diversity within the Severn Estuary, and subsequent benefits to the wider ecosystem.

Proposed changes on-site and off-site

3.3.20 The only identified potential pathway to an in-combination effect because of both the proposed changes on-site and off-site is related to Transport.

3.3.21 There is potential for in-combination effects to occur on the A39 spur from the A38 to M5 Junction 23 from Pawlett Hams, The Island and the proposed changes on-site, however the current Construction Traffic Management Plan ('CTMP') for Hinkley Point C caps the total flow on this link at 450 two-way movements.

3.3.22 In 2022, Department for Transport ('DfT') identified an Average Annual Daily Traffic ('AADT') volume of about 11,700 vehicles was noted in the eastbound direction, whilst an AADT of around 11,300 vehicles was noted in the westbound direction.

3.3.23 As identified in **Volume 2**, the latest Heavy Goods Vehicle ('HGV') profile has a peak of 400 two-way vehicle movements. In line with the assumptions highlighted in the original ES at Annex 7 Transport Assessment – Doc Ref 4.19¹⁰, 60 % of these movements have been allocated to Route 1, which access Hinkley Point C via M5 J23. These could share the A39 corridor with the HGV movements generated by Pawlett Hams and The Island works, which could generate 24 and 8 two-way HGV movements for a short period of time as outlined in **Volume 3**. The impact of this is summarised in **Table 3-1**.

Table 3-1: In-combination HGV impacts at maximum daily numbers for Hinkley Point C and Saltmarsh Compensation Measures

Description	Current HGVs and % (DfT)	Hinkley Point C HGVs Route 1 (revised peak)	Pawlett Hams and The Island HGVs	Total in-comb HGVs	Total HGVs with in-comb and %
A39 Spur east of Dunball (EB, one-way)	1263 (11 %)	120	16	136	1399 (12 %)
A39 Spur east of Dunball (WB, one-way)	1273 (11 %)	120	16	136	1409 (12 %)
A39 Spur east of Dunball (total, two-way)	2536 (11 %)	240	32	272	2808 (12 %)

¹⁰ EDF Energy (2011) Hinkley Point C Development Consent Order Application: Environmental Statement – Annex 7 – Transport Assessment. Document ref: Environmental Statement 4.19, October 2011. [\[Online\]](#). Accessed 12 December 2023.

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- 3.3.24 **Table 3-1** shows that a maximum of 272 two-way HGV movements could occur when Hinkley Point C construction works are considered in combination with the proposed compensation measures where HGV routes intersect. This is equivalent to a 1 percentage point increase in HGV concentrations on the A39 Spur. Whilst these proposed compensation measures were not included in the original DCO caps, the HGV movements which they generate in combination with the Hinkley Point C construction works fall below the volumes outlined in these caps.
- 3.3.25 Therefore, it is not anticipated that a significant in-combination effect would arise.
- 3.3.26 These pathways will be reviewed in the EIA and if any potential in-combination effects are identified, an assessment will be undertaken and reported in the ES.
- 3.3.27 Due to the distance between the Hinkley Point C site and the compensation sites, it is not anticipated that there will be any other pathways to potential in-combination effects because of the combination of the proposed changes off-site and on-site.

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4. SUMMARY AND NEXT STEPS

- 4.1.1 Other projects were identified within the Zol for terrestrial ecology and ornithology in relation to Pawlett Hams and The Island and Landscape and Visual in relation to Pawlett Hams, The Island and Maisemore Weir. There is a potential pathway to cumulative effects with these other projects during the construction of the saltmarsh / proposed works to Maisemore Weir. In both instances, this will be assessed in the ES when the timings of the other projects and the proposed compensation measures are confirmed.
- 4.1.2 For some of the other projects, potential for operational cumulative Landscape and Visual effects has been identified due to the proximity to Pawlett Hams, and in some cases the open views between Pawlett Hams and the planning allocation area. These will be assessed further in the ES.
- 4.1.3 No other potential cumulative effects between the proposed changes on-site or off-site with other projects have been identified. The CEA long-list will be reviewed again at ES stage to identify any new other projects that have been applied for since the time of writing this PEIR. If any new other projects are identified within the Zols of the environmental Aspects, the potential for cumulative effects with other projects will be assessed.

- 4.1.4 Due mainly to a lack of spatial overlap, the only two pathways to potential in-combination effects identified at this stage are between:
- In-combination effects at each compensation site individually, resulting from two or more environmental effects, and
 - In-combination effects between Pawlett Hams and The Island.
- 4.1.5 It is not anticipated that a significant in-combination transport effect would arise because of the proposed changes on-site and off-site. However, these pathways will be reviewed in the EIA and if any potential in-combination effects are identified, an assessment will be undertaken and reported in the ES.
- 4.1.6 As it is not currently known which weirs will be taken forward for delivery or the location of sites for creating seagrass, kelp forest and oyster beds, the potential for in-combination effects will be assessed once this is known. However, in-combination effects are considered unlikely for the reasons set out above.
- 4.1.7 The potential for in-combination effects as a result of the above will be reviewed in the EIA and if any are identified, an in-combination effects assessment will be undertaken and reported in the ES.