NNB GENERATION COMPANY (HPC) LIMTITED

HINKLEY POINT C PROJECT

CASE FOR REMOVAL OF THE REQUIREMENT TO INSTALL AN ACOUSTIC FISH DETERRENT

Updated Report to Inform the Habitats Regulations Assessment

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APPROVAL SIGN-OFF:

Originated by:	**Name: Alexia Chapman** **Title: Principal Consultant**	Date: 26/09/2018
Reviewed by:	**Name: Ian Simms** **Title: Technical Director**	Date: 26/09/2018
Approved by:	**Name: Ross Pettigrew** **Title: Environmental Technical Manager (Non-Radiological)**	Date: 11/02/2019

DOCUMENT CONTROL

Version	Purpose	Amendment	By	Date
1.0	For Review	Draft	Alexia Chapman	26/09/2018
2.0	For Review	Updated with December 2018 issued TR456 and Defra family comments	Sarah Read	15/09/2018
3.0	For Review	Updated with February 2019 issued TR456	Sarah Read	06/02/2019

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CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

ACRONYMS

The following acronyms will be used in the report.

Term / Abbreviation	Definition
AA	Appropriate Assessment
AFD	Acoustic Fish Deterrent
AFD Optioneering Report	Report by NNB GenCo (2019) entitled Summary of Engineering Optioneering Process followed for Hinkley Point C AFD system. NNB-301-REP-000710.
BEEMS	British Energy Estuarine & Marine Studies
CIMP	Comprehensive Impingement Monitoring Programme
CIS	Celtic and Irish Seas
CWS	Cooling Water System
DCO	Development Consent Order
DEFRA Family	Collective term to describe the Environment Agency, Marine Management Organisation, Natural England, Natural Resources Wales and the Devon and Severn Inshore Fisheries Conservation Agency.
DECC	Department of Energy and Climate Change
EA	Environment Agency
EAV	Equivalent Adult Value
EIA	Environmental Impact Assessment
ES	Environmental Statement
FRR	Fish Recovery and Return
HPB	Hinkley Point B
HPC	Hinkley Point C
HRA	Habitats Regulations Assessment
ICES	International Council for the Exploration of the Sea
IPC	Infrastructure Planning Committee
IROPI	Imperative Reasons of Overriding Public Interest
LSE	Likely Significant Effects
LVSE	Low Velocity Side Entry
MHWS	Mean High Water Spring
MMMU	Marine Mammal Management Units
MMO	Marine Management Organisation
NNB GenCo	NNB Generation Company (HPC) Limited
NRW	Natural Resources Wales
NSER	No Significant Effects Report
NSIP	Nationally Significant Infrastructure Project
OCSW	Offshore Channel, Celtic Sea & South West England
PINS	The Planning Inspectorate
RIMP	Routine Impingement Monitoring Programme
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SCI	Site of Community Importance
SNCB	Statutory Nature Conservation Bodies
SoS	Secretary of State
SPA	Special Protection Area

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Term / Abbreviation	Definition
SNCB	Statutory Nature Conservation Bodies
SSB	spawning stock biomass
TR456	Report by CEFAS entitled Revised Predictions of Impingement Effects at Hinkley Point C – 2019 HPC-DEV024-XXX-000-RET-100031 BEEMS Technical Report TR456
Updated HRA Report	Updated Assessment to inform HRA submitted with the WDA Permit Variation Application and Proposed DCO Change Application (NNB-308-REP-000722)
WDA	Water Discharge Activity
ZOI	Zone of Influence

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1 BACKGROUND INFORMATION

1.1.1 On 31 October 2011, NNB Generation Company Limited, part of EDF Energy, made an application to the Secretary of State ('SoS') under Section 37 of the Planning Act 2008 (the 'Planning Act') for a development consent order to build and operate a new nuclear build and associated development at Hinkley Point, Somerset, known as Hinkley Point C (HPC). NNB Generation Company Limited operated from 2009 to 2015, when it was incorporated into NNB Generation Company (HPC) Limited (company no. 06937084), herein referred to as 'NNB GenCo'.

1.1.2 The application was granted by the SoS pursuant to the *Hinkley Point C (Nuclear Generating Station) Order 2013* made on 18 March 2013 (S.I. 2013 No. 648) which came into force on 9 April 2013. Throughout this document, the development consent order is referred to as 'the DCO' and the new nuclear build project at HPC is referred to as 'the Project'.

1.1.3 A number of marine licences have been granted for the Project by the Marine Management Organisation (MMO) on behalf of the Secretary of State and by Natural Resources Wales (NRW) on behalf of the Welsh Government for carrying on activities associated with the Project for which a licence is required under Part 4 of the Marine and Coastal Access Act 2009. Of the marine licences, only L/2013/00178/4 includes reference to installation of cooling water infrastructure and provision of Acoustic Fish Deterrent (AFD) systems at the cooling water intakes and is relevant to this report. This licence is referred to as the 'Marine Licence' throughout this document.

1.1.4 In 2011, NNB GenCo made an application to the Environment Agency (EA) under the Environmental Permitting (England and Wales) Regulations 2010 (as amended) for a permit relating to a Water Discharge Activity (WDA) associated with the operational phase of HPC. This permit was determined on 13 March 2013 referenced EPR/HP3228XT and is referred to as the 'WDA Permit' throughout this document.

1.1.5 A full Environmental Statement (ES) was also prepared to document the findings of the Environmental Impact Assessment (EIA) process, undertaken for the Project, as was required by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (the 'EIA Regulations'). The EIA was carried out to identify the likely significant impacts arising from the Project, and to establish appropriate measures to mitigate adverse impacts. The ES (NNB GenCo, 2011a) is referred to as 'the DCO ES' in this document.

1.1.6 Under the framework established by the Planning Act, the Project was termed a Nationally Significant Infrastructure Project (NSIP). The HPC Project is located adjacent to, and within, the Severn Estuary European Marine Site [Special Area of Conservation (SAC), Severn Estuary Special Protection Area (SPA) and Severn Estuary Ramsar site]. Additional European sites in the wider area fall within the

Zone of Influence (ZOI)[1] in relation to the HPC development site. Given the location, nature and scale of the development it is recognised that the development may have the potential to affect these designated sites and, therefore, the Project must comply with the measures set out in *Council Directive 92/43/EEC on the conservation of natural habitats and wild flora and fauna* (the 'Habitats Directive') and *Council Directive 2009/147/EC on the conservation of wild birds* (the 'Birds Directive'). *The Conservation of Habitats and Species Regulations 2017* (the 'Habitats Regulations') transpose the Habitats Directive and Birds Directive into UK law as far as the limit of territorial waters.

1.1.7 The Hinkley Point C Project Report to Inform Habitats Regulations Assessment (NNB Genco, 2011b) accompanied the DCO application providing for the construction and operation of the new nuclear power station, as well as associated developments. This report is referred to as the 'original HRA report' in this document.

1.1.8 NNB GenCo is proposing to make an application for a change to the DCO (the 'DCO Change Application'). Requirements CW1(2), CW1(3) and CW2(1) of the DCO require the submission of detailed design and installation of an Acoustic Fish Deterrent (AFD) system as one of the mitigation measures introduced to reduce the risk to fish populations as a result of impingement in the Cooling Water System (CWS). An AFD system acts as an acoustic behavioural deterrent intended to provoke an avoidance reaction amongst hearing sensitive fish from entering into the CWS.

1.1.9 An application to vary the Marine Licence to remove the activity to install an AFD system, and associated conditions, is also being prepared. It is proposed that this application is submitted at the same time as the DCO Change Application is made and that the process for determining the Marine Licence will run in parallel to the DCO change process once submitted.

1.1.10 NNB GenCo is also proposing to make an application to vary several conditions associated with provision of an AFD system specified in Environmental Permit EPR/HP3228XT.

1.1.11 Since the DCO was made in 2013, NNB GenCo has progressed the detailed design of the impingement mitigation systems, including the AFD system, through extensive optioneering studies. The planned Low Velocity Side Entry (LVSE) intake heads and Fish Recovery and Return (FRR) systems have been successfully incorporated into the final design. However, the installation, operation and maintenance of the proposed AFD system has caused significant technical, operational and health and safety concerns.

1.1.12 NNB GenCo carried out an extensive optioneering and design programme of the AFD system over a two-year period with the aim to develop a system that was optimised to provide sufficiently robust technology to operate in the challenging

[1] The 'zone of influence' for a project is the area over which ecological features may be subject to significant effects as a result of the proposed project and associated activities (CIEEM, 2016).

environmental conditions offshore of Hinkley Point. This detailed design phase found that the AFD system would be extremely complex to construct and to maintain with offshore maintenance operations restricted to narrow tidal windows and subject to lengthy periods of weather downtime. An assessment of the risks involved with such an operational system has concluded (NNB GenCo, 2018) that the health and safety risks to maintenance staff would be unacceptable.

1.1.13 A detailed literature review to confirm the nature and extent of the use of AFD systems at other water abstraction intakes was undertaken, with a summary of this provided at **Table 3.1** of this report and in the Justification and Evidence Report to support Variation to the Water Discharge Activity Permit (NNB Genco, 2018).

1.1.14 Given the safety and technical challenges associated with installation and maintenance of an AFD system in this location, NNB GenCo has concluded that there is a need to consider what the effects of not fitting the AFD system would be on fish impingement predictions.

1.2 Purpose of this document

1.2.1 This document has been prepared to support the following applications:

- DCO Change Application to be submitted to the SoS (Business, Energy and Industrial Strategy) for determination;
- Marine Licence Variation Application to be submitted to the MMO for determination; and
- WDA Permit Variation application to be submitted to the EA for determination.

1.2.2 This document presents the updated HRA report that has been undertaken by NNB GenCo for applications allowing revision of the design of the CWS to omit installation of an AFD system as mitigation to reduce fish impingement losses, as is currently required by the DCO, the Marine Licence and the WDA Permit. This report provides the information required for appropriate assessment by the competent authorities to determine whether the proposed changes to the development (either alone or in-combination with other plans or projects) would have an adverse effect on the integrity of the relevant designated European and international sites that have been screened into the HRA process.

Context of assessment

1.2.3 The purpose of this assessment is to consider the potential effects which might arise as a result of the change as described in **Section 3**. It outlines the new evidence gathered and reviewed following submission of the DCO, Marine Licence and WDA Permit applications made in 2011 and 2012 and presents the findings of an updated HRA report, to allow these to be considered by the relevant competent authorities, who will establish whether amendments to the original 2013 DCO, variation of the Marine Licence and variation of the WDA Permit can be granted.

1.2.4 It should be noted that this updated assessment focuses only on those elements found to be affected by the proposed change to the design of the CWS, which is the

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removal of the AFD system. This report primarily targets effects on designated sites that contain fish populations as designated interest features and any consequential effects connected to these fish populations on piscivorous birds and marine mammals.

1.2.5 No additional survey work has been undertaken for this updated assessment; therefore, there is no change to the description of the habitat surrounding the Project site. For clarity, the Project is located on a rocky section of the southern shore of the Inner Bristol Channel, and marks the western limit of Bridgwater Bay, itself bound to the north and east by the Brean Down promontory. The Inner Bristol Channel extends from a line between Hurlestone Point and Nash Point to the west, and Brean Down and Lavernock Point to the east, upstream of which lies the Severn Estuary. The Bristol Channel as a whole extends as far seaward as a line running approximately between Hartland Point on the Cornish coast and Old Castle Head on the Pembrokeshire coast.

1.2.6 Full details of the area adjacent to the Project is provided within the DCO ES (NNB GenCo, 2011a).

1.3 Supporting documentation

1.3.1 This report was prepared using a number of documents to support general project understanding. Project-specific documents relevant to this report will be included as part of the DCO, Marine Licence and WDA Permit application packages and are referenced throughout this report as follows:

- NNB GenCo (2017) Hinkley Point C Cooling Water Infrastructure Fish Protection Measures: Report to Discharge DCO Requirement CW1 (Paragraph 1) and Marine Licence Condition 5.2.31, NNB-209-REP-0001030 (the ‘CW1 report’);
- NNB GenCo (2018) Summary of Engineering Optioneering Process Followed for the Hinkley Point C Acoustic Fish Deterrent (AFD) System, NNB-308-REP-000710 (the ‘AFD Optioneering report’); and
- Cefas (2019a) Revised Predictions of Impingement Effects at Hinkley Point C – 2018, HPC-DEV024-XXX-000-RET-100031 BEEMS Technical Report TR456 Revision 9 (the ‘TR456 report’). This is an update to the TR148 used in the original HRA report (Cefas, 2010).

2 THE HABITATS REGULATIONS ASSESSMENT PROCESS

2.1 Introduction

2.1.1 The Habitats Directive protects habitats and species of European nature conservation importance. Together with the Birds Directive, it establishes a network of internationally important sites designated for their ecological status. Special Areas of Conservation (SACs) and Sites of Community Importance (SCIs) are designated under the Habitats Directive and promote the protection of flora, fauna and habitats. Special Protection Areas (SPAs) are designated under the Birds Directive in order to protect rare, vulnerable and migratory birds. These designated sites together create a Europe-wide 'Natura 2000' network of designated sites, which are hereafter referred to as 'European sites'.

2.1.2 The Habitats Directive is transposed into UK law by the Habitats Regulations, which incorporate all SPAs into the definition of European sites and, consequently, the protections afforded to European sites under the Habitats Directive apply equally to SPAs designated under the Birds Directive. The original HPC HRA was carried out under the Habitats Regulations 2010 (as amended). Since then, the Habitats Regulations 2017 have come in to force, which consolidate amendments to the Habitats Regulations 2010 with respect to England and Wales with subsequent further amendments.

2.1.3 In addition to UK Government policy, *Office Deputy Prime Minister (ODPM) Circular 06/2005* states that internationally important wetlands designated under the Ramsar Convention 1971 as 'Ramsar sites' are afforded the same protection as SPAs and SACs for the purpose of considering development proposals that may affect them.

2.2 Procedure and process

2.2.1 The Habitats Regulations provide, *inter alia*, a framework for the protection of European sites on land and within 12 nautical miles of the level of Mean High Water Spring (MHWS).

2.2.2 Amongst other things, the Habitats Regulations define the process for the assessment of the implications of plans or projects on European sites. This process is termed the HRA and advice is outlined, for NSIPs, by the Planning Inspectorate (PINS) in *'Habitats Regulations Assessment relevant to National Infrastructure Projects (Advice Note 10)'* (Version 8). Further guidance on the HRA process is available at both the national and European level.

2.2.3 In exercising the duty as competent authority, the SoS (and any other competent authority) must comply with Regulation 63 of the Habitats Regulations, as set out below:

"63 (1) *A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for a plan or project which:*

a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects), and

b) is not directly connected with or necessary to the management of that site,

must make an appropriate assessment of the implications for that site in view of that site's conservation objectives."

2.2.4 In undertaking an Appropriate Assessment (AA) to determine whether there are likely significant effects on a European site, the competent authority must consult the appropriate nature conservation body (Natural England or Natural Resources Wales) and have regard to any representations that it makes. Natural England and NRW are also commonly consulted in the process of screening projects to establish whether AA is required.

2.2.5 The HRA is a staged process that is described in Advice Note 10 as follows.

- HRA Stage 1: Screening – The scope of the HRA should be defined and justified. The HRA should include screening for Likely Significant Effects (LSE) (alone or in-combination with other plans or projects). If there are no LSE identified for all the European sites considered, the report is likely to take the form of a No Significant Effects Report (NSER) and HRA stages 2-4 will not be required.
- HRA Stage 2: Appropriate Assessment (AA) – If Stage 1 identifies LSE for any of the European sites considered, an assessment of the implications of the Project on the site(s)'s conservation objectives will be required. This will take the form of an HRA Report and should include sufficient information for the AA.
- HRA Stages 3 and 4: Assessment of Alternatives and IROPI – If Stage 2 concludes that the Project will adversely affect the integrity of the site(s), or is inconclusive; consideration of alternatives, compensatory measures and whether the Project is justified by Imperative Reasons of Overriding Public Interest (IROPI) will be required. This will also form part of the HRA Report.

2.2.6 Stages 1 and 2 are covered by Regulation 63 (as stated above) and Stages 3 and 4 are covered by Regulation 64. The Project is not directly connected with or necessary to the management of any European site.

2.2.7 With respect to Stage 2, the integrity of a European site is defined as the coherence of the site's ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or populations of species for which the site has been designated (EC, 2001). An adverse effect on integrity, therefore, is likely to be one which prevents the site from making the same contribution to favourable conservation status for the relevant feature as it required by the conservation objectives.

2.2.8 The HRA screening process uses the threshold of LSE to determine whether effects on European sites should be the subject of further assessment. The Habitats Regulations do not define the term LSE. However, in the Waddenzee case (Case C-127/02) the European Court of Justice found that a LSE exists if it cannot be excluded on the basis of objective information that the plan or Project will have significant effects on the conservation objectives of the site concerned, whether alone or in-combination with any other project. The Advocate General's opinion of the Sweetman case (Case C-258/11) further clarifies the position by noting that for a conclusion of a LSE to be made "*there is no need to **establish** such an effect,...,it is merely necessary to determine that there **may** be such an effect*" (original emphasis).

2.2.9 For the purposes of this assessment, a LSE is defined as any identified effect that is capable of resulting in a change in the conservation status of one or more designated features of a European site after all aspects of the plan or project have been considered alone and in-combination with other plans and projects.

2.2.10 A precautionary approach has been taken to the screening process for the Project. Only those designated features and European sites where it can be demonstrated that there is no likelihood of a significant effect occurring have been screened out.

2.2.11 Within this assessment, each potential effect is considered using information from surveys undertaken to inform the HRA process, published literature (where available), other available baseline data, modelling outputs and professional judgement (informed by CIEEM, 2016). Where a potential effect has been identified but no LSE is predicted, the evidence and reason for reaching this conclusion are provided.

2.2.12 PINS Advice Note 10 describes how an AA should be undertaken and what information should be included in the applicant's HRA report:

- information identifying the qualifying features, conservation objectives and conservation status of each of the qualifying features that might be affected;
- evidence about the Project's effects on the integrity of the protected sites in question;
- a description of any mitigation measures proposed which avoid or reduce each effect, and any remaining residual effects;
- a schedule indicating the timing of mitigation measures in relation to the progress of the development;
- cross-references to the relevant DCO requirements, development consent obligations and any other mechanisms proposed to secure these mitigation measures, and any factors that may affect their implementation;
- a statement as to which (if any) residual effects constitute an adverse effect on the integrity of the protected sites in question, either alone or in-combination with other plans or projects and therefore need to be included within the AA; and
- evidence to demonstrate that the Applicant has fully consulted and had regard to comments received by the relevant Statutory Nature Conservation Bodies (SNCBs) during pre-application consultation.

2.3 Consultation

2.3.1 Full consultation was carried out during the first application for the DCO. Formal consultation included the following:

- a Scoping Opinion was received from the Infrastructure Planning Commission (IPC) In April 2010;
- the second public and statutory consultation exercise on the preferred proposals for HPC was carried out in August 2010;
- in January 2011 the Hinkley Point C Project HRA: Screening Report was submitted to statutory consultees for comment;
- a draft version of the HRA Report, covering all but the cumulative effects of the Project was provided to the regulatory agencies at the end of May 2011; and
- the final version of the HRA Report was provided to the regulatory agencies, statutory consultees and the Royal Society for the Protection of Birds (RSPB) for comment at the end of July 2011.

2.3.2 A record of consultation responses can be found in the original HRA report (EDF Energy, 2011), which is available on the PINS website.

2.3.3 A summary of the consultation on this updated HRA report is detailed in **Appendix A**.

2.4 European sites potentially affected by the Hinkley Point C Project

2.4.1 A screening exercise was carried out during the original HRA process which screened in a number of international designated sites into the HRA process. The original HRA scoped in a number of European and Ramsar sites based on the search area used within the Department of Energy and Climate Change (DECC) HRA for Hinkley Point (DECC, 2013), which extended out to a 20 km radius of HPC. For international sites located further from the Project, direct effects are less likely, while indirect effects could occur due to the ecological and physical linkages between sites, e.g. fish as prey to piscivorous birds and marine mammals. Therefore, additional sites outside the 20 km radius were included if it could be demonstrated that linkages existed between the Project and the site, thus extending the ZOI.

2.4.2 **Table 2.1** below lists the sites and associated interest features included in the original HRA process; details on the screening process can be found in the original HRA report (NNB GenCo, 2011b).

Table 2.1 International and European sites included in the original HRA process

Site	Designation	Distance from the HPC Project	Interest features screened into the original HRA process
Severn Estuary	SAC	Within and adjacent	Primary reasons for site selection: • estuaries • mudflats and sandflats not covered by seawater at low tide • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae)* • sea lamprey (*Petromyzon marinus)* • river lamprey (*Lampetra fluvatilis*) • twaite shad (*Alosa fallax*) Qualifying features but not a primary reason for site selection • sandbanks which are slightly covered by sea water all the time • reefs
Severn Estuary	SPA	Within and adjacent	Supports internationally important populations of regularly occurring Annex I Bewick's swan (*Cygnus columbianus bewickii*). Supports internationally important populations of the following regularly occurring migratory species: • European white-fronted goose (*Anser albifrons albifrons*) • dunlin (*Calidris alpina alpina*) • redshank (*Tringa totanus*0 • shelduck (*Tadorna tadorna*) • gadwall (*Anas strepara*) Used regularly by over 20,000 waterbirds in any one season (supporting 84,317 individual birds over the period of 1991/92 to 1995/96).

Site	Designation	Distance from the HPC Project	Interest features screened into the original HRA process
Severn Estuary	Ramsar	Within and adjacent	The Severn Estuary is designated as a Ramsar site due to the following criteria. • Criterion 1: immense tidal range (second-largest in the world). • Criterion 3: unusual estuarine communities (i.e. reduced diversity). • Criterion 4: migratory fish (Salmon [*Salmo salar*], sea trout [*S. trutta*], sea lamprey [*Petromyzon marinus*], river lamprey [*Lampetra fluvatilis*], allis shad [*A.* alosa], twaite shad [*A. fallax*] and eel [*Anguilla anguilla*]). • Criterion 5: bird assemblages of international importance with peak counts in winter of 70,919 waterfowl. • Criterion 6: regularly supports 1% of the individuals in a population of Bewick's swan (*Cygnus columbianus*), European white-fronted goose (*Anser albifrons albifrons)*, dunlin (*Calidris alpina alpina*), redshank (*Tringa totanus tetanus*), shelduck (*Tadorna tadorna*) and gadwall (*Anas strepera strepera*), as well as ringed plover (*Charadrius hiaticula*), teal (*Anas crecca*), pintail (*Anas acuta*) and lesser black-backed gull (*Larus fuscus*).Criterion 8: its estuarine fish assemblage, which is one of the most diverse in Britain with over 110 species recorded.

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Site	Designation	Distance from the HPC Project	Interest features screened into the original HRA process
Exmoor and Quantocks Oakwoods	SAC	5 km	Primary reasons for site selection • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles • Barbastelle (*Barbastella barbastellus*) Qualifying features but not a primary reason for site selection • Alluvial forests with (*Alnus glutinosa*) and (*Fraxinus excelsior*) (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) • Bechstein's bat (*Myotis bechsteinii)* • Otter (*Lutra lutra*)
Somerset Levels and Moors	SPA/Ramsar	16 km	The Somerset Levels and Moors SPA and Ramsar site qualifies as it supports 17 species of British Red Data Book Invertebrates and a waterfowl assemblage of international importance (1998/99 to 2002/03 five-year peak mean was 97,155 waterfowl). It regularly supports 1% of individuals in a population of Bewick's swan as well as mute swan (*Cygnus olor*), wigeon, pintail and shoveler (*Anas clypeata*).
Mendip Limestone Grasslands	SAC	20 km	Primary reasons for site selection: • Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) Qualifying features but not a primary reason for site selection: • European dry heaths • caves not open to the pubic • *Tilio-Acerion* forests of slopes, screes and ravines • greater horseshoe bat (*Rhinolphus ferrumequinum*)
Hestercombe House	SAC	16 km	Primary reasons for site selection: • lesser horseshoe bat (*Rhinolophus hipposideros*)

Site	Designation	Distance from the HPC Project	Interest features screened into the original HRA process
River Usk	SAC	40 km	Primary reasons for site selection: • sea lamprey (*Petromyzon marinus*) • river lamprey (*Lampetra fluvatilis*) • brook lamprey (*Lampetra planeri* • twaite shad (*Alosa fallax*) • Atlantic salmon (*Salmo salar*) • bullhead (*Cottus gobio*) • otter (*Lutra lutra*) Qualifying features but not a primary reason for site selection: • water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation • allis shad (*Alosa alosa*)

Site	Designation	Distance from the HPC Project	Interest features screened into the original HRA process
River Wye	SAC	60 km	Primary reasons for site selection: • water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation • white-clawed (or Atlantic stream) crayfish (*Austropotamobius pallipes*) • sea lamprey (*Petromyzon marinus*) • river lamprey (*Lampetra fluvatilis*) • brook lamprey (*Lampetra planeri*) • twaite shad (*Alosa fallax*) • Atlantic salmon (*Salmo salar*) • bullhead (*Cottus gobio*) • otter (*Lutra lutra*) Qualifying features but not a primary reason for site selection: • transition mires and quaking bogs • allis shad (*Alosa alosa*)
Afon Tywi	SAC	120 km	Primary reasons for site selection: • twaite shad (*Alosa fallax*) • otter (*Lutra lutra*) Qualifying features but not a primary reason for site selection • sea lamprey (*Petromyzon marinus*) • river lamprey (*Lampetra fluvatilis*) • brook lamprey (*Lampetra planeri*) • allis shad (*Alosa alosa*) • bullhead (*Cottus gobio*)

2.4.3 In addition to the original European sites assessed within the original HRA report a number of new marine sites have been designated (or are in the process of being designated) which have a pathway of effect, or linkages, from the CWS to the sites' qualifying interest features. To determine which additional designated sites should be included in the screening stage, a source-pathway-receptor approach has been adopted. The source of the effect is the change being proposed to the CWS described in **Section 3**. The pathway of effect is the physical interaction between the receptor and the CWS. The receptors are fish, piscivorous birds and marine mammals.

2.4.4 For interest features that contain fish, an exercise was carried out to determine if there were any new sites designated since the original HRA was prepared. The ZOI used was the same for the original HRA, i.e. sites within 120 km of the intake.

2.4.5 For marine mammals the search area, to provide a precautionary approach, reflects the relevant Marine Mammal Management Units (MMMU) as described below.

2.4.6 There are four marine mammal species in the UK for which European sites are designated, namely bottlenose dolphin (*Tursiops truncatus*), harbour porpoise (*Phocoena phocoena*), grey seal (*Halichoerus grypus*) and common seal (*Phoca vitulina*). Out of these four species, bottlenose dolphin, harbour porpoise and grey seal have been identified as frequenting the waters offshore Hinkley Point (Reid *et al*, 2003; Baines and Evans, 2012).

2.4.7 Assessment of connectivity between the CWS and designated sites with marine mammal interest features utilised the MMMU for marine mammals in UK waters, which are designated for each marine mammal species, and provide an indication of the spatial scales at which effects of plans and projects, alone and in-combination, need to be assessed. The relevant MMMUs are as follows:

- harbour porpoise – Celtic and Irish Seas (CIS);
- bottlenose dolphin – Offshore Channel, Celtic Sea & South West England (OCSW);
- grey seal – West England and Wales.

2.4.8 The area over which the proposed change of the CWS design will affect ornithological interest reflects the foraging ranges of piscivorous birds. All SPAs and Ramsar Sites with breeding seabird qualifying features whose maximum mean foraging ranges (Thaxter *et al.*, 2012) overlap with the HPC project area are screened in for further assessment. Species with maximum mean foraging ranges that exceed the 120 km ZOI used in the original HRA report include:

- lesser black-backed gull *Larus fuscus*, (max mean foraging distance 141±50.8 km);
- fulmar *Fulmarus glacialis* (max mean foraging distance 400±245.8 km);
- gannet *Morus bassanus* (max mean foraging distance 229.4±124.3 km);
- storm petrel *Hydrobates pelagicus* (max mean foraging distance unknown);

- Manx shearwater *Puffinus puffinus* (max mean foraging distance 18.3±12.5 & >330 km).

2.4.9 **Table 2.2** below lists the sites and associated interest features of the additional sites not included in the original HRA report that have been taken through to the Screening Stage 1 of the HRA process in this updated HRA report in addition to those listed in **Table 2.1**. **Figures 2.1, 2.2** and **2.3** present spatially all the sites that have been considered in this updated HRA report.

Table 2.2 Additional international and European sites taken through to Screening Stage 1 of the HRA process since the original HRA was carried out.

Site	Designation	Distance from the HPC Project	Interest features
Carmarthen Bay and Estuaries / Bae Caerfyrddin ac Aberoedd	SAC	76 km	Primary reasons for site selection: • sandbanks which are slightly covered by seawater all the time • estuaries • mudflats and sandflats not covered by seawater at low tide • large shallow inlets and bays • *Salicornia* and other annuals colonizing mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • twaite shad (*Alosa fallax*) Qualifying features but not a primary reason for site selection: • sea lamprey (*Petromyzon marinus*) • river lamprey (*Lampetra fluvatilis*) • allis shad (*Alosa alosa*) • otter (Lutra lutra)
Bristol Channel Approaches / Dynesfeydd Môr Hafren	SCI	99 km	Primary reasons for site selection: • harbour porpoise *Phocoena phocoena*
Lundy	SAC	102 km	Primary reasons for site selection: • reefs Qualifying features but not a primary reason for site selection • sandbanks which are slightly covered by seawater all the time • submerged or partially submerged sea caves • grey seal (*Halichoerus grypus*)

Site	Designation	Distance from the HPC Project	Interest features
Pembrokeshire Marine / Sir Benfro Forol	SAC	120 km	Primary reasons for site selection • estuaries • large shallow inlets and bays • reefs • grey seal (*Halichoerus grypus*) • shore dock (*Rumex rupestris*) Qualifying features but not a primary reason for site selection • sandbanks which are slightly covered by seawater all the time • mudlfats and sandflats not covered by seawater at low tide • coastal lagoons • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • submerged or partially submerged sea caves • sea lamprey (*Petromyzon marinus*) • river lamprey (*Lampetra fluvatilis*) • allis shad (*Alosa alosa*) • twaite shad (*Alosa fallax*) • otter (*Lutra lutra*
West Wales Marine / Gorllewin Cymru Forol	SCI	147.5 km	Primary reasons for site selection: • harbour porpoise (*Phocoena phocoena*)
Grassholm	SPA	173 km	This site qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: During the breeding season; • Gannet, 33,000 pairs representing at least 12.5% of the breeding North Atlantic population (Count as at 1994/5)

Skomer, Skokholm and Seas off Pembrokeshire	SPA	181 km	This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: During the breeding season; • Chough *Pyrrhocorax pyrrhocorax*, 4 pairs representing at least 1.2% of the breeding population in Great Britain • Short-eared Owl *Asio flammeus*, 6 pairs representing at least 0.6% of the breeding population in Great Britain (Count as at 1998) • Storm Petrel, 3,500 pairs representing at least 4.1% of the breeding population in Great Britain (Count as at 1995) This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: During the breeding season; • Lesser Black-backed Gull, 20,300 pairs representing at least 16.4% of the breeding Western Europe/Mediterranean/Western Africa population (Mean 1993 to 1997) • Manx Shearwater, 150,968 pairs representing at least 56.9% of the breeding population (Count, as at late 1990s) • Puffin *Fratercula arctica*, 9,500 pairs representing at least 1.1% of the breeding population (Count, as at mid-1980s) Assemblage qualification: A seabird assemblage of international importance The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds • During the breeding season, the area regularly supports 67,278 individual seabirds (Count period ongoing) including: Razorbill *Alca torda*, Guillemot *Uria aalge,* Kittiwake *Rissa tridactyla*, Puffin, Lesser Black-backed Gull, Manx Shearwater, Storm Petrel.

Site	Designation	Distance from the HPC Project	Interest features
Aberdaron Coast and Bardsey Island	SPA	207 km	This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: During the breeding season; • Chough, 12 pairs representing at least 3.5% of the breeding population in Great Britain (Count, as at late 1990s) Over winter; • Chough, 24 pairs representing at least 3.5% of the wintering population in Great Britain (RSPB) This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: During the breeding season; • Manx Shearwater, 6,930 pairs representing at least 2.6% of the breeding population (Count, as at 1996)
Cardigan Bay	SAC	236 km	Primary reasons for site selection: • bottlenose dolphin (*Tursiops truncates*) Qualifying features but not a primary reason for site selection: • sandbanks which are slightly covered by seawater all the time • reefs • submerged or partially submerged sea caves • sea lamprey (*Petromyzon marinus*) • river lamprey (*Lampetra fluvatilis*) • grey seal (*Halichoerus grypus*)

NOT PROTECTIVELY MARKED

Site	Designation	Distance from the HPC Project	Interest features
North Anglesey Marine / Gogledd Môn Forol	SCI	251 km	Primary reasons for site selection • harbour porpoise (*Phocoena phocoena*)
Saltee Islands	SPA	262 km	Breeding: fulmar (525 pairs); gannet (2,446 pairs); and Manx shearwater (250 pairs). Also breeding populations of cormorant *Phalacrocorax carbo*, shag *Phalacrocorax aristotelis*, lesser black-backed gull, Herring Gull *Larus argentatus*, kittiwake, guillemot *Uria aalge*, razorbill *Alca torda* and Puffin
Isles of Scilly Complex	SAC	263 km	Primary reasons for site selection • sandbanks which are slightly covered by seawater all the time • mudflats and sandflats not covered by seawater at low tide • reefs • shore dock (*Rumex rupestris*) Qualifying features but not a primary reason for site selection • grey seal (*Halichoerus grypus*)

NOT PROTECTIVELY MARKED

Site	Designation	Distance from the HPC Project	Interest features
Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau	SAC	290 km	Primary reasons for site selection • sandbanks which are slightly covered by seawater all the time • estuaries • coastal lagoons • large shallow inlets and bays • reefs Qualifying features but not a primary reason for site selection • mudflats and sandflats not covered by seawater at low tide • salicornia and other annuals colonizing mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • submerged or partially submerged sea caves • bottlenose dolphin (*Tursiops truncatus*) • otter (*Lutra lutra*) • grey seal (*Halichoerus grypus*)
Lambay Island	SPA	322 km	Breeding: fulmar (635 pairs); and Manx shearwater (20 pairs).
North Channel	SCI	359 km	Primary reasons for site selection • harbour porpoise *Phocoena phocoena*
Rockabill to Dalkey Island	SAC	300.7 km	Features of interest • reefs • harbour porpoise *Phocoena phocoena*

Site	Designation	Distance from the HPC Project	Interest features
Copeland Islands	SPA	418 km	This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: During the breeding season; • Artic tern, 566 pairs representing at least 22.6% of the Irish breeding population This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: During the breeding season; • Manx Shearwater, 4,800 pairs representing at least 1.7% of the breeding population
Roaring Bay and Islands	SAC	444 km	Features of interest • large shallow inlets and bays • reefs • vegetated sea cliffs of the Atlantic and Baltic coasts • European dry heaths • submerged or partially submerged sea caves • harbour porpoise (*Phocoena phocoena*) • otter (*Lutra lutra*) • grey seal (*Halichoerus grypus*)

Site	Designation	Distance from the HPC Project	Interest features
Cliffs of Moher	SPA	476 km	Breeding: • fulmar • kittiwake • guillemot • razorbill • puffin • chough
Beara Peninsula	SPA	485 km	Breeding: • fulmar • chough
Kerry Head	SPA	486 km	Breeding: • fulmar • chough
Deenish Island and Scariff Island	SPA	499 km	Breeding: • fulmar • Manx shearwater • storm petrel • lesser black-backed gull • Arctic tern

Site	Designation	Distance from the HPC Project	Interest features
Puffin Island	SPA	510 km	Breeding: • fulmar • Manx shearwater • storm petrel • lesser black-backed gull • razorbill • puffin
Iveragh Peninsula	SPA	506 km	Breeding: • fulmar • peregrine • chough • kittiwake • guillemot
Skelligs	SPA	517 km	Breeding: • fulmar • Manx shearwater • storm petrel • gannet • kittiwake • guillemot • puffin

NOT PROTECTIVELY MARKED

Site	Designation	Distance from the HPC Project	Interest features
Dingle Peninsula	SPA	519 km	Breeding: • fulmar • peregrine • chough
Blasket Islands	SAC	522 km	Features of interest • reefs • vegetated sea cliffs of the Atlantic and Baltic coasts • European dry heaths • submerged or partially submerged sea caves • harbour porpoise (*Phocoena phocoena*) • grey seal (*Halichoerus grypus*)
West Donegal Coast	SPA	542 km	Breeding: • fulmar • cormorant • shag • peregrine • herring gull • kittiwake • razorbill • chough

NOT PROTECTIVELY MARKED

Site	Designation	Distance from the HPC Project	Interest features
High Island, Inishshark and Davillaun	SPA	551 km	Breeding • fulmar • Arctic tern Overwintering • barnacle goose
Tory Island	SPA	565 km	Breeding: • fulmar • corncrake • razorbill • puffin
Duvillaun Islands	SPA	574 km	Breeding • fulmar • storm petrel Overwintering • barnacle goose
Clare Island	SPA	548 km	Breeding: • fulmar • shag • common gull • kittiwake • guillemot • razorbill • chough

Site	Designation	Distance from the HPC Project	Interest features
Blasket Islands	SPA	542 km	Breeding: • fulmar • Manx shearwater • storm petrel • shag • lesser black-backed gull • herring gull • kittiwake • Arctic tern • razorbill • puffin • chough
Horn Head to Fanad Head	SPA	552 km	breeding: • fulmar • cormorant • peregrine • shag • kittiwake • guillemot • razorbill • chough overwintering • barnacle goose • Greenland white-fronted goose

NOT PROTECTIVELY MARKED

3 DESCRIPTION OF THE HINKLEY POINT C PROJECT

3.1.1 HPC is a new nuclear power station, comprising two EPR pressurised water reactors and associated infrastructure for the generation of electricity at Hinkley Point, Somerset. The Project refers to the power station itself, along with associated developments which are necessary for the construction and operation of the nuclear power station.

3.1.2 The new nuclear power station will comprise 2 UKEPR™ Units that will operate for 60 years, each with the capacity to produce 1650 MW(e). The new station (the 'C' station) will be the third nuclear power station to be built at Hinkley Point and will be built immediately to the west of the existing 'A' station (which is now being decommissioned), which itself lies to the west of the 'B' station (still in operation).

3.1.3 Chapters 2, 3 and 4 of Volume Two of the ES, submitted to PINS with the original DCO application, contain a full description of the construction and operation of HPC. The sections below outline the changes proposed to the design of the CWS; from that presented within the DCO, Marine Licence and WDA permit.

3.2 Cooling Water System (CWS)

3.2.1 A brief outline of the design and location of the cooling water intakes can be found below. Full details are found within the CW1 report (NNB GenCo (2017)).

3.2.2 HPC will be 'direct-cooled', that is, it will abstract water from the sea in Bridgwater Bay to cool its steam condensers (and other heat exchangers), before returning that same water back into Bridgwater Bay at an elevated temperature of 11.8°C higher than at the intake. In order to abstract the combined (mean[2]) 132 m^3/s required for both Units for this cooling process, a large system of cooling water tunnels will extend out under the seabed into Bridgwater Bay, before linking to the sea via vertical shafts and associated headworks. The intake head design is a LVSE intake situated approximately 1 m above the sediment level of the seabed.

3.2.3 As part of the design of the CWS, an FRR system will be built, which will include a tunnel approximately 600 m long extending under the foreshore, to return impinged fish back to the sea.

3.2.4 **Figure 3.1** and **Figure 3.2** below provide a schematic design of the CWS proposed at HPC and details of various components. **Figure 3.3** shows the location of the intake headworks and tunnels.

[2] Abstraction rate varies according to tidal state, with abstraction rates fluctuating between 126 – 140 m^3/s.

Figure 3.1 Overall schematic of the CWS and FRR system

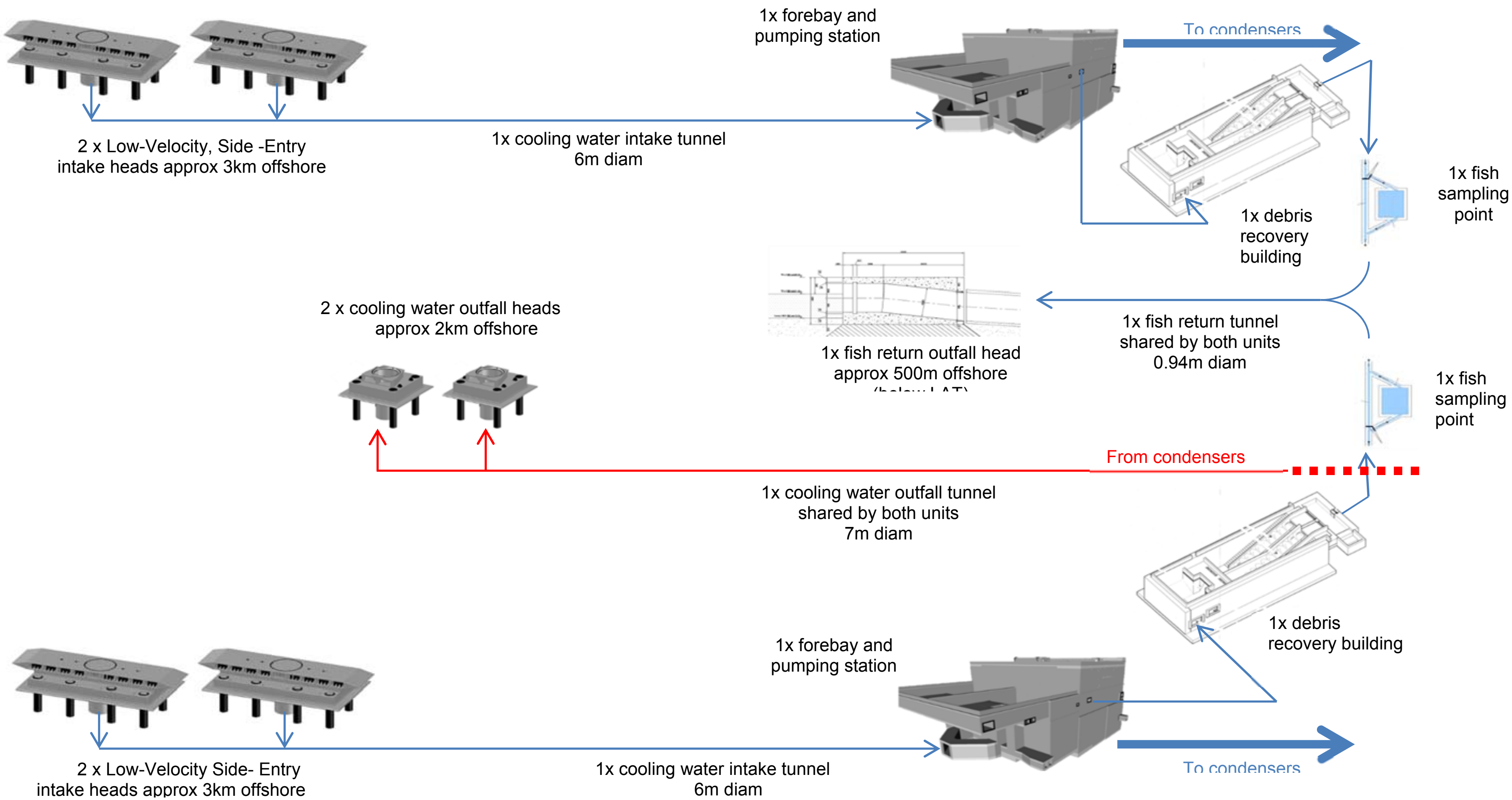


Figure 3.2 Overall schematic of forebay and cooling water pump house

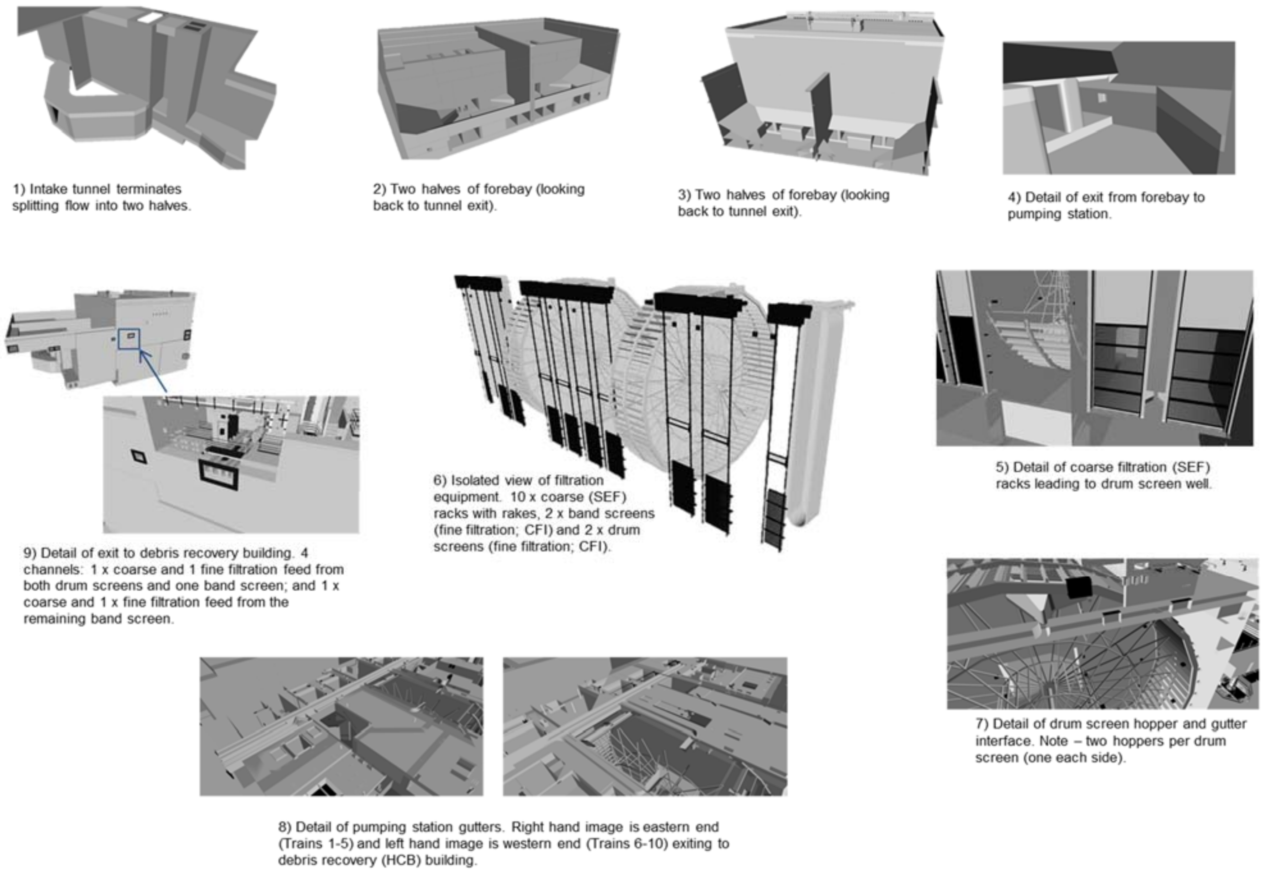
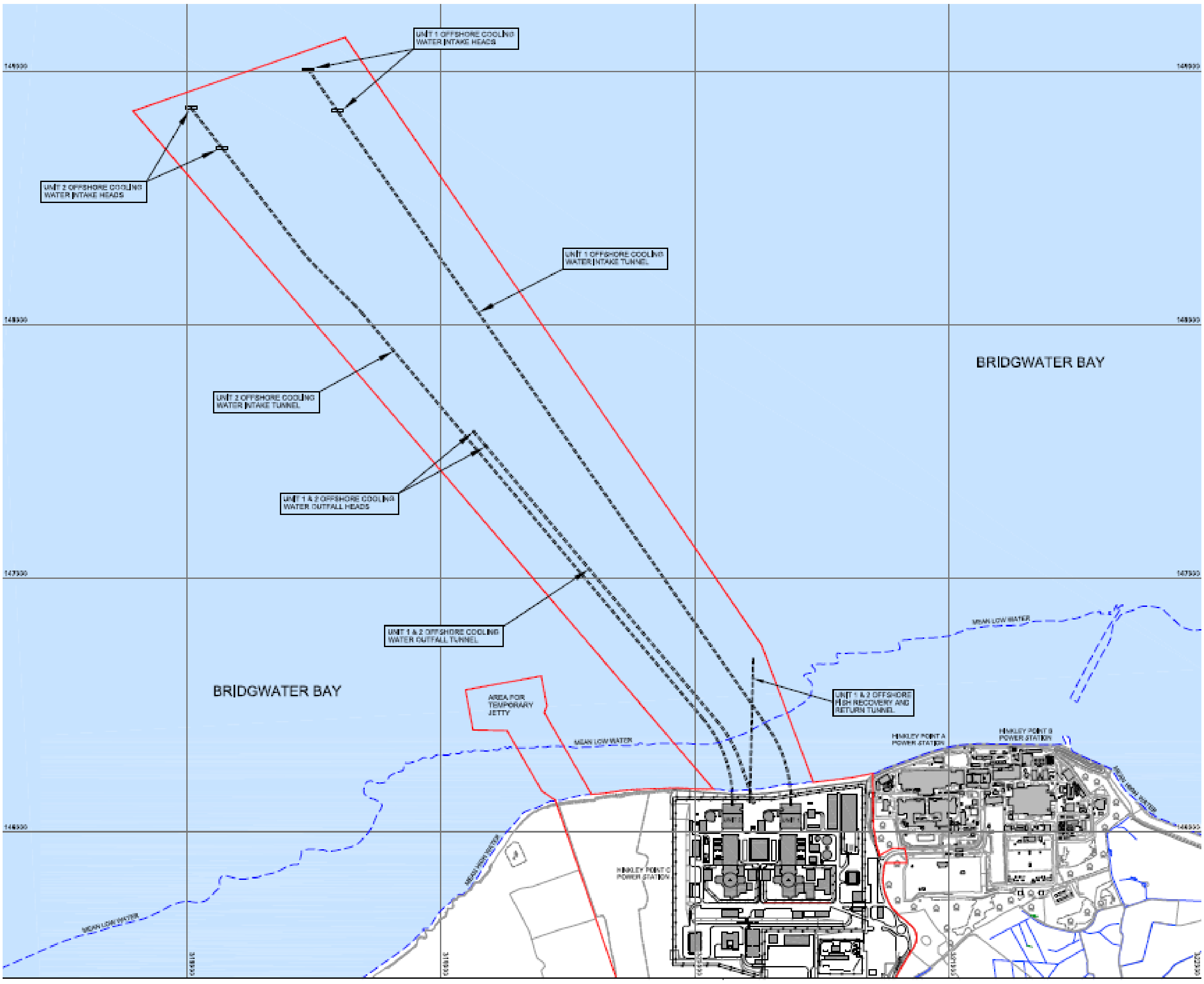


Figure 3.3 Locations of the intake headworks and intake tunnels (also showing outfall headworks and tunnels and FRR system outfall and tunnel)



3.3 Change from the original design

3.3.1 The Project design assessed within the EIA in 2011 included the installation of an AFD system that was intended to deter pelagic and some demersal fish species from being abstracted into the cooling water intakes, thereby reducing the impacts to fish populations as a result of impingement. The change to the original design is the proposed removal of the AFD system.

3.3.2 AFD systems have been installed at several inland and estuarine power stations, for the same purpose of providing mitigation against potential effects on local fish populations of impingement. For the HPC Project, although the principles of an AFD system are well understood, the challenge was to design a system which could be safely installed and maintained over the predicted 60+ year lifecycle of the Project, in what are very difficult environmental conditions.

3.3.3 The AFD system proposed for the Project originally comprised up to 288 projectors to generate and project the acoustic deterrent, located on or around the four seabed-mounted LVSE intake heads, approximately 3.3 km offshore. There are no above-sea structures associated with the intake heads, meaning that all infrastructure would need to be deployed, accessed and maintained via diving and subsea works.

3.3.4 In overview, the marine environment at Hinkley Point is particularly challenging, including:

- a very high tidal range, with a mean spring tidal range of 10.7 m;
- slack water periods of only approximately 30 mins each tide;
- tidal currents of approximately 1.5 m/s;
- high levels of suspended sediment and underwater visibility approaching zero;
- a generally exposed location, therefore subject to high wave heights and frequent winter storms; and
- presence of potentially large volumes of floating and submerged debris, particularly marine weed after storm events.

3.3.5 In addition to the above, the offshore location of the cooling water intakes means that any surface structures would present an added collision risk to local shipping.

3.3.6 A comprehensive review was undertaken of use of AFD systems at intakes elsewhere (see **Table 3.1**) and this showed that the principal application has been at intakes for water supply or hydropower abstractions from inland rivers. Few attempts have been made to apply such systems in tidal waters and such attempts have been confined to sheltered locations within riverine or impounded estuaries. The research undertaken indicates that AFD technology has not been applied to any submerged seabed intakes in exposed locations.

3.3.7 After extensive engineering studies, it was concluded during the detailed design phase that installation of any permanent structures with rails and/or lifting frames to raise the AFD system projectors out of the water would be impractical. The projectors would need to have been fixed to seabed-mounted piled structures and installed/recovered (for maintenance) in clusters, by divers. Such operations would need to be timed to fit narrow tidal windows for safety reasons and would likely be only possible during summer months. As servicing would require near-continuous operations for up to three months of each year, works could not be timed to coincide with reactor outages (due to resourcing conflicts), thereby adding an additional risk, with divers operating when CW intakes were operational.

3.3.8 The conclusion of the AFD Optioneering report (NNB Genco 2019) was that an AFD system for the HPC Project would be extremely complex to construct and maintain and that the associated risks to maintenance staff were unacceptable.

Table 3.1 Water intakes employing AFD systems and comparison with conditions at HPC

Development	Abstraction rate	Intake type	Intake location	Water body	Comments
HPC (proposed)	**130 m^3/s**	**Offshore seabed**	**Open estuary**	**Severn Estuary, UK**	**Intake approximately 3 km offshore, 2 m above seabed and in an area of high water velocity and extremely turbid conditions. 288 SPs were proposed to be located within 0.5 m of intake screens.**
Other power stations					
Doel Nuclear Power Station (3 & 4)	25.1 m^3/s	Estuary bed	Estuary / tidal river	Scheldt Estuary, Doel, Antwerpen, BE	Intake in 5 m of water with intake apertures 2 m above the sea bed. Intake located at 200 m (maximum) from the shore (note HPC proposed cooling water intakes are over 3 km offshore). 20 SPs installed on a rail system for above-water recovery for maintenance.
Hartlepool Nuclear Power Station	34 m^3/s	Bankside	Estuary	Seaton Channel, inside Tees Estuary system, Teesside, UK	Onshore intake, short dredged channel opens into Seaton Channel. Total of eight SPs deployed approximately 40 m upstream from intake.
Oldbury Nuclear Power Station (closed)	25.5 m^3/s	Bankside	Tidal reservoir	Severn Estuary, UK	Trial period of 14 days only. Sub-standard system used with limited results.
Great Yarmouth CCGT Power Station	9.3 m^3/s	Bankside	Estuary	River Yare, Great Yarmouth, UK	8 SPs in total
Marchwood CCGT Power Station	15 m^3/s	Bankside	Estuary	River Test, Marchwood, UK	Onshore intake on the estuarine part of a river, width of river approximately 0.7 km. A total of eight SPs arranged in four columns are deployed.
Pembroke CCGT Power Station	40 m^3/s	Bankside	Estuary	Channel off Pembroke River, inside Milford Haven, Wales, UK	72 SPs are mounted on buttresses that separate inlet gates. The SPs are mounted on sliders and vertical rails for easy access for maintenance from the shore.
Shoreham CCGT Power Station	5.6 m^3/s	Bankside	Estuary	Harbour off River Adur, Shoreham, UK	Intake inside enclosed harbour. 6 SPs in total.

Development	Abstraction rate	Intake type	Intake location	Water body	Comments
Staythorpe CCGT Power Station	1.3 m^3/s	Bankside	Non-tidal river	River Trent, near Newark, UK	River width approximately 100 m
Lambton Power Station coal (closed)	150 m^3/s	Bankside	Non-tidal river	St Clair River, Ontario, Canada	Intake channel off inland river approximately 500 m wide.
Plant Barry (Units 4 & 5) coal and gas generating plant	30 m^3/s	Bankside	Tidal river	Canal off Mobile River, Bucks, Alabama, USA	Trial deployment only at intake on 100m wide canal off major inland river.
Fawley Power Station (oil) (closed)	31 m^3/s	Bankside	Estuary	Channel off Southampton Water, UK	Channel off Southampton Water, which is approximately 3 km wide at this point.
Flood Pumping Stations					
Foss Flood Barrier Pumping Station	32 m^3/s	Bankside	Non-tidal River	River Foss, York, UK	Bankside intake on river channel 16-28 m wide at the intake location, six SPs in total.
Hydro-electric plants					
Backbarrow Hydro-electric Plant	10 m^3/s	Bankside	Non-tidal river	River Leven, Cumbria, UK	Bio-acoustic fish fence (a combination of a bubble curtain and sound projectors) used in headrace channel in spring to deflect salmon smolts into a by-wash.
Beeston Hydro-electric plant	60 m^3/s	On weir	Non-tidal river	River Trent, Nottingham, UK	River a maximum of 80 m wide above weir. Bio-acoustic fish fence (a combination of a bubble curtain and sound projectors) used above intake to deflect fish into a by-wash.
Blantyre Hydro-electric Plant	20 m^3/s	On weir	Non-tidal river	River Clyde, Hamilton, Scotland, UK	River a maximum of 100 m wide above weir. AFD system used to deflect fish towards the fish ladder.
Tummel Bridge Hydro-electric Plant	>100 m^3/s	Bankside	At reservoir dam	Dunalistair water, Perth and Kinross, Scotland, UK	Reservoir approximately 80 m wide at dam. AFD system used to deflect fish towards the fish smolt return by-wash.
Annapolis Royal Generating Station	400 m^3/s	Barrage	Estuary	Annapolis, Bay of Fundy, Nova Scotia, Canada	Trial deployment only.

Development	Abstraction rate	Intake type	Intake location	Water body	Comments
Potable water abstraction locations					
Barcombe potable water intake	0.845 m^3/s	Bankside	Non-tidal river	River Ouse, near Lewes, Sussex, UK	Inland bankside intake on tidal river less than 100 m wide, with sheltered conditions and easy access to AFD system.
Canaston potable water intake	0.7 m^3/s	Bankside	Non-tidal river	Eastern Cleddau, Narberth, Wales, UK	
Farmoor Reservoir potable water intake	2.7 m^3/s	Bankside	Non-tidal river	River Thames, near Oxford, UK	Inland bankside intakes on non-tidal rivers less than 100 m wide, with sheltered conditions and easy access to AFD system.
Datchet potable water intake	24 m^3/s	Bankside	Non-tidal river	River Thames, Datchet, UK	
Hythe End potable water intake	3.2 m^3/s	Bankside	Non-tidal river	River Thames, Staines, UK	
Laleham potable water intake	12 m^3/s	Bankside	Non-tidal river	River Thames, Laleham, UK	
Walton potable water intake	14 m^3/s	Bankside	Non-tidal river	River Thames, Walton-on-Thames, UK	
Hampton potable water intake	5.8 m^3/s	Bankside	Non-tidal river	River Thames, Hampton, UK	
Surbiton potable water intake	2.7 m^3/s	Bankside	Non-tidal river	River Thames, Surbiton, UK	
Kilgram Bridge potable water intake	0.54 m^3/s	Bankside	Non-tidal river	River Ure, Masham, Yorkshire, UK	

4 OVERVIEW OF BASELINE ENVIRONMENT

4.1 Introduction

4.1.1 The following sections provide an overview of the baseline environment relevant to the assessment of the effects of the change being put forward at HPC, i.e. a CWS designed with no AFD system installed, on the 'screened in' European and Ramsar sites and their designated features, as set out in **Section 2.4**. This information is provided here as a basis for the examination of Likely Significant Effect (LSE), presented in **Section 5**.

4.1.2 Further, more detailed baseline information relevant to assessment, following screening, of individual effects of the change at the HPC Project on European and Ramsar sites and features under consideration is provided in **Sections 6** and **Section 7**.

4.2 Marine ecology

4.2.1 The Severn estuary is Britain's second largest estuary, with an area of 557 km^2 including an intertidal area of 100 km^2. When its seaward extension, the Bristol Channel, is included, the intertidal habitat is 200 km^2. It is ecologically appropriate to consider the Severn and the Bristol Channel as one ecological unit. It has an exceptional tidal range of up to 13.2 m, resulting in strong currents of up to 1.5 m/s at mid tide which suspend large quantities of silt through which little light can pass. This great tidal range is also responsible for the large intertidal areas. Periods of slack water are short; typically of 30 minutes duration at high and low water.

4.2.2 Hinkley Point is at the western end of Bridgwater Bay, on the southern shore of the estuary, near the mouth of the River Parrett. Hinkley Point B (HPB) power station intakes are at the western end of the 48 km^2 Stert and Berrow intertidal flats.

4.2.3 Hinkley Point is an area of intercalated shale, slate and limestone. The sublittoral substrate is highly mobile, nearly liquid mud, with some areas of sand waves and reefs of agglomerated *Sabellaria* worm tubes. The intertidal area is firmer sandy mud. The measured salinity at Hinkley Point typically ranges from 22 to a near fully marine value of 33, depending on the freshwater flow from the rivers, and the sea temperature ranges from 2 to 21°C.

4.2.4 Primary production in the Severn Estuary/Inner Channel is largely from dissolved organic matter from riverine sources or from microphytobenthos on the mudflats. There is negligible phytoplankton production due to the very low underwater light levels. Phytoplankton levels are much higher in the deeper waters of the Outer Channel where underwater light levels are higher. The common shrimp (*Crangon crangon*) dominates the bottom of the food web for fish and is available all year round. Sand gobies fulfil a similar trophic role but are much less abundant.

Fish populations

4.2.5 A variety of fish species are foundwithin or migrate through the estuary, including those protected under European Directives and/or national legislation (e.g. Atlantic salmon (*Salmo salar*), twaite shad (*Alosa fallax*), allis shad (*A. alosa*), river lamprey (*Lampetra fluviatilis*), sea lamprey (*Petromyzon marinus*), sea trout (*Salmo trutta*) and eel (*Anguilla anguilla*)). Bridgwater Bay is a nursery area for juvenile fish and a number of fish species utilise the intertidal areas. The estuary is also considered internationally important for eels, supporting 98% of the UK elver run.

4.2.6 The two primary datasets for assessing the fisheries community at Bridgwater Bay are the Routine Impingement Monitoring Programme (RIMP) that has been conducted at HPB since 1981 (Henderson and Holmes 1989) and the British Energy Estuarine and Marine Studies (BEEMS) Comprehensive Impingement Monitoring Programme (CIMP) conducted at HPB in 2009/10 (BEEMS Technical Report TR129 Pisces Conservation Ltd (2001)). There are other short duration impingement records from the Oldbury nuclear power station and there are some trawl survey datasets but the impingement datasets have by far the greatest sampling intensity, the least sampling bias and provide a unique insight into the local fisheries ecology. Compared with trawl surveys, the HPB impingement is considered to have much lower species selectivity, surveys can be done day or night, continuously in any weather and at any state of the tide and at a much lower cost per hour sampled. Due to the sampling efficiency of the intakes and their lack of species selectivity, the HPB impingement records are considered to mirror the changes in local fish community at Hinkley Point. Impingement sampling does not provide a perfect sample of fish in the water column in that the top half of the water column is not sampled until near to low tide but for the overwhelming majority of fish species at Hinkley Point it provides the best possible sampling (Cefas, 2019a). As the HPC intake heads are also seabed mounted, such a vertical sampling profile is also well suited to providing the raw data for HPC impingement estimation.

4.2.7 The fish community in the CIMP dataset is dominated by sprat (*Sprattus sprattus*) with 48.8% of the measured fish numbers; the pelagic species sprat and herring (*Clupea harengus)* provided 50.2% of the total abundance. A total of seven fish species represented 95% of the impingement numbers and 12 species made up 99% of the abundance. Four species sprat, whiting (*Merlangius merlangus*), sole (*Solea solea*), and cod (*Gadus morhua)* represented 88% of the total numbers with mullet, flounder and five-bearded rockling providing the next 7%. Fifty species occurred rarely or in very low numbers, contributing a total of 0.56% of the annual impingement and individually constituting 0.1% to 0.0004% of the annual impingement numbers.

4.2.8 There has been a significant rise in total fish abundance over the 37year period with a 54% increase in fish numbers (excluding sprat) or more than 100% increase if sprat is included.

4.2.9 Some species are reducing in abundance at Hinkley Point but these are changes mirrored elsewhere far beyond the impact zone of HPB, e.g. the international decline in the eel population and the reduction in the abundance of species that are at the southern limit of their natural range which are moving either northwards or into deeper water to mitigate rising sea temperatures due to climate change.

4.2.10 The broader fish population of the Severn Estuary and Bristol Channel is of similar species composition to that of other estuaries and coastal regions in south-west England (Henderson and Holmes, 1989). At Hinkley Point, 92 species have been detected in the impingement datasets; however, most of these species occur infrequently in very low numbers and are not present in sufficient numbers to play an important role in the functioning of the ecosystem. For marine species, the estuary is primarily used as a nursery ground. Most fish species at Hinkley Point are not present for the entire year in significant numbers and the community changes throughout the year as different species migrate in and out of the estuary. The impingement datasets show that for most species impingement is only a risk at Hinkley Point for weeks to a few months per annum.

Marine mammals

4.2.11 A total of 18 species of cetacean have been recorded in the Severn Estuary and Bristol Channel since 1990. Of these, the following five species are present at any time of the year or recorded annually as seasonal visitors within the Bristol Channel: harbour porpoise (*Phocoena phocoena*), Risso's dolphin (*Grampus griseus*), common dolphin (*Delphinus delphis*), bottlenose dolphin (*Tursiops truncatus*) and minke whale (*Balaenoptera acutorostrata*) (Reid *et al.*, 2003; Baines and Evans, 2012). The remaining 13 species have been recorded through occasional sightings and strandings such as the long-finned pilot whale (*Globicephala melas*), fin whale (*Balaenoptera physalus*) and killer whale (*Orcinus orca*) (Reid *et al*., 2003; Baines and Evans, 2012).

4.2.12 The harbour porpoise is the most common cetacean recorded in the Bristol Channel, followed by the common dolphin. Of the pinnipeds, the grey seal (*Halichoerus grypus*) has been recorded in the Bristol Channel area.

Birds

4.2.13 Collectively, the Severn Estuary encompasses a wide range of terrestrial and freshwater habitats and, as described, is an important nature conservation area supporting a number of international, national and local designations for wetland habitats, bird populations, and other habitats and species of conservation interest.

4.2.14 The diverse and extensive habitats of the Severn Estuary, particularly the intertidal mudflats and sandflats, provide feeding habitat for large numbers of waterbirds that move along the west coast of Europe during the spring and autumn migration period, as well as for wintering populations of swans, geese, ducks and waders. Key potential food sources for birds associated with the mudflats reported from core sampling of the littoral fine mud substrate to the east of Hinkley Point, taken during the EIA, are the bivalve *Macoma balthica* and the polychaete worm, *Nepthys hombergii*.

4.2.15 A mean peak number of 66,022 waterbirds was recorded on the Severn Estuary by the Wetland Bird Survey between 2002/03 and 2006/07. For its size, this number of birds is relatively low in comparison with other UK estuaries and reflects the largely impoverished invertebrate fauna of much of the central sandflats of the estuary. Seven species of wader are included as features of the Severn Estuary SPA, five of which predominantly forage intertidally: ringed plover (*Charadrius hiaticula*), grey plover (*Pluvialis squatarola*), dunlin (*Calidris alpina*), curlew (*Numenius arcata*), redshank (*Tringa totanus*), and shelduck (*Tadorna tadorna*). Winter low-tide counts of the estuary indicate that the highest densities of waterbirds are found along the Gwent shore, from Rhymney and Peterstone to the Welsh Grounds, on mudflats adjacent to the New Grounds at Slimbridge, on the Axe Estuary and within Bridgwater Bay. Most species that forage in the intertidal habitats are widely distributed across the estuary, with the exception of the central sandflats, though each species favours different areas and habitats.

4.2.16 At Hinkley Point, survey data collected during the original DCO EIA indicates that the area is regularly used by shelduck, wigeon (*Anas penelope*), pintail (*Anas acuta*), curlew, passage whimbrel (*Numenius phaeopus*), lesser black-backed gull (*Larus fuscus graellsii*) and ringed plover. However, apart from the occasional large flock of shelduck offshore of the site and use of the foreshore by small numbers of ringed plover, wigeon and curlew, only very limited use of the intertidal area fronting the site is made by other species of waterbirds. The diet of the lesser black-baked gull is omnivorous in nature with birds scavenging a wide range of food in marine, inertial and terrestrial habits, which can also include opportunistic scavenging of fish, shellfish and molluscs.

5 STAGE 1: SCREENING STAGE

5.1 Activities with the potential to influence designated sites

5.1.1 The European Commission (2011) Guidance states that, in order to conclude that a plan or project is directly connected or necessary for the management of a European site, it must relate solely to conservation actions and not be a direct or indirect consequence of other actions.

5.1.2 The HPC Project is not connected to, or necessary for, the management of any European site.

5.1.3 As previously noted, this updated HRA report focuses only on the change being proposed to the CWS, i.e. a change to a CWS with no AFD system present, and, consequently, those elements either directly or indirectly affected by this change.

5.1.4 The AFD system was originally proposed as mitigation to deter fish, in particular those sensitive to sound, from being entrapped in the cooling water system. Removal of the AFD system from the original design may potentially increase entrapment and subsequent impingement of particular fish. This assessment, therefore, focuses on the potential effects on fish impinged on intake screens as a receptor.

5.1.5 The change being proposed to the HPC Project may also have secondary or indirect effects on birds and marine mammals via changes to populations of fish which are prey species/food resources for certain waterbirds/seabirds and marine mammals; therefore, any potential LSE on fish may cause potential LSE on piscivorous birds or marine mammals.

5.1.6 Secondary effects on fish populations could also arise as a result of alteration of the balance between predatory fish and their fish prey species, due to species selectivity of direct effects of the abstraction on fish.

5.1.7 On 12 April 2018, the Court of Justice of the European Union (CJEU) issued a judgment on Case C323/178 (People over Wind, Peter Sweetman v Coillte Teoranta) which stated:

"*Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that, in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects [mitigation] of the plan or project on that site*."

5.1.8 This means that any 'embedded' mitigation relating to protected sites under the Habitat Regulations 2017 Regulation 63 (1) will no longer be considered at the screening stage but taken forward and considered at the appropriate assessment stage to inform a decision as whether no adverse effect on site integrity can be ascertained.

5.1.9 The screening assessment provided within this HRA takes into account the CJEU ruling on ‘People over Wind’. It has also adopted a strong precautionary principle; if a pathway of effect is established between the HPC CWS and a designated site, that site is taken through to appropriate assessment. This ensures all effects are captured, including *de minimis* effects.

5.1.10 The original HRA report (NNB GenCo, 2011b) contains details of the other activities of the construction, operation and decommissioning of the HPC Project with the potential to influence the screened-in designated sites. These will be unchanged and are not discussed in this report.

5.2 Sites and qualifying features for which no likely significant effect (LSE) has been determined

5.2.1 The designated interest features listed in **Table 5.1** have been assessed as unlikely to be affected by the change proposed, either alone or in-combination, as there is no pathway of effect to their interest features. For these features, it has been determined that no LSE will arise, and therefore they are screened out of the AA process.

Table 5.1 Designated interest features that have been screened out of the AA

Designated site	Interest features unlikely to be affected by the proposed change
Severn Estuary SAC	Primary reasons for site selection: • mudflats and sandflats not covered by seawater at low tide • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Qualifying features but not a primary reason for site selection: • sandbanks which are slightly covered by sea water all the time • reefs
Severn Estuary Ramsar	• Criterion 1: immense tidal range • Criterion 3: unusual estuarine communities (i.e. reduced diversity). • Criterion 5: bird assemblages of international importance with peak counts in winter of 70,919 waterfowl.

Designated site	Interest features unlikely to be affected by the proposed change
Severn Estuary SPA	Supports internationally important populations of regularly occurring Annex I Bewick's swan (Cygnus columbianus bewickii). Supports internationally important populations of the following regularly occurring migratory species: • European white-fronted goose (Anser albifrons albifrons) • dunlin (Calidris alpina alpina) • redshank (Tringa totanus0 • shelduck (Tadorna tadorna) • gadwall (Anas strepara).
Exmoor and Quantocks Oakwoods SAC	All designated interest features of the site.
Mendip Limestone Grasslands SAC	All designated interest features of the site.
Hestercombe House SAC	All designated interest features of the site.
Somerset Levels and Moors SPA/Ramsar	All designated interest features of the site as none are marine piscivorous foragers.
River Usk SAC	Primary reasons for site selection: • brook lamprey (*Lampetra planeri*) • bullhead (*Cottus gobio*) • otter (*Lutra lutra*) Qualifying features but not a primary reason for site selection: • water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
River Wye SAC	Primary reasons for site selection: • water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation • white-clawed (or Atlantic stream) crayfish (*Austropotamobius pallipes*) • brook lamprey (*Lampetra planeri*) • bullhead (*Cottus gobio*) • otter (*Lutra lutra*) Qualifying features but not a primary reason for site selection: • transition mires and quaking bogs

Designated site	Interest features unlikely to be affected by the proposed change
Afon Tywi SAC	Primary reasons for site selection: • otter (*Lutra lutra*) Qualifying features but not a primary reason for site selection: • brook lamprey (*Lampetra planeri*) • bullhead (*Cottus gobio*)
Carmarthen Bay and Estuaries / Bae Caerfyrddin ac Aberoedd SAC	Primary reasons for site selection: • sandbanks which are slightly covered by seawater all the time • estuaries • mudlfats and sandflats not covered by seawater at low tide • large shallow inlets and bays • *Salicornia* and other annuals colonizing mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Qualifying features but not a primary reason for site selection: • otter (*Lutra lutra*)
Lundy SAC	Primary reasons for site selection: • reefs Qualifying features but not a primary reason for site selection • sandbanks which are slightly covered by seawater all the time • submerged or partially submerged sea caves
Pembrokeshire Marine / Sir Benfro Forol SAC	Primary reasons for site selection: • estuaries • large shallow inlets and bays • reefs • shore dock (*Rumex rupestris*) Qualifying features but not a primary reason for site selection: • sandbanks which are slightly covered by seawater all the time • mudlfats and sandflats not covered by seawater at low tide • coastal lagoons • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • submerged or partially submerged sea caves • otter (*Lutra lutra*)

Designated site	Interest features unlikely to be affected by the proposed change
Cardigan Bay SAC	Qualifying features but not a primary reason for site selection: • sandbanks which are slightly covered by seawater all the time • reefs • submerged or partially submerged sea caves Qualifying features but not a primary reason for site selection; the migratory routes of these fish between rivers and the sea will not pass through the Bristol Channel/Severn Esuary: • sea lamprey (*Petromyzon marinus*) • river lamprey (*Lampetra fluvatilis*)
The Skomer, Skokholm and Seas off Pembrokeshire SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: • chough, 4 pairs representing at least 1.2% of the breeding population in Great Britain • short-eared Owl, 6 pairs representing at least 0.6% of the breeding population in Great Britain (Count as at 1998) • puffin 9,500 pairs representing at least 1.1% of the breeding population (Count, as at mid-1980s) • breeding seabird assemblage supporting 67,278 individual seabirds (Count period ongoing) including: Razorbill, Guillemot, Kittiwake and Puffin
Aberdaron Coast and Bardsey Island SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: During the breeding season; • chough, 12 pairs representing at least 3.5% of the breeding population in Great Britain (Count, as at late 1990s) Over winter; • chough, 24 pairs representing at least 3.5% of the wintering population in Great Britain (RSPB)
Saltee Islands	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: • breeding populations of cormorant, shag, lesser black-backed gull, Herring Gull, kittiwake, guillemot, razorbill

Designated site	Interest features unlikely to be affected by the proposed change
Isles of Scilly Complex SAC	Primary reasons for site selection: • sandbanks which are slightly covered by seawater all the time • mudflats and sandflats not covered by seawater at low tide • reefs • shore dock (*Rumex rupestris*)
Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC	Primary reasons for site selection: • sandbanks which are slightly covered by seawater all the time • estuaries • coastal lagoons • large shallow inlets and bays • reefs Qualifying features but not a primary reason for site selection: • mudflats and sandflats not covered by seawater at low tide • *Salicornia* and other annuals colonizing mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • submerged or partially submerged sea caves • otter (*Lutra lutra*)
Copeland Islands SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: During the breeding season; • Artic tern, 566 pairs representing at least 22.6% of the Irish breeding population
Rockabill to Dalkey Island SAC	Features of interest: • reefs
Roaring Bay and Islands SAC	Features of interest • large shallow inlets and bays • reefs • vegetated sea cliffs of the Atlantic and Baltic coasts • European dry heaths • submerged or partially submerged sea caves • otter (*Lutra lutra*)

Designated site	Interest features unlikely to be affected by the proposed change
Cliffs of Moher SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: Breeding • kittiwake • guillemot • razorbill • puffin • chough
Beara Peninsula SPA	the following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the hpc site falls outwith their maximum mean foraging range: breeding • chough
Kerry Head SPA	the following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the hpc site falls outwith their maximum mean foraging range: breeding • chough
Deenish Island and Scariff Island SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: Breeding: • lesser black-backed gull • Arctic tern
Puffin Island SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: Breeding: • lesser black-backed gull • razorbill • puffin

Designated site	Interest features unlikely to be affected by the proposed change
Iveragh Peninsula SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: Breeding: • peregrine • chough • kittiwake • guillemot
Skelligs SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: Breeding: • gannet • kittiwake • guillemot • puffin
Dingle Peninsula SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: Breeding: • peregrine • chough
Blasket Islands SAC	Features of interest • reefs • vegetated sea cliffs of the Atlantic and Baltic coasts • European dry heaths • submerged or partially submerged sea caves
West Donegal Coast SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: Breeding: • cormorant • shag • peregrine • herring gull • kittiwake • razorbill • chough

Designated site	Interest features unlikely to be affected by the proposed change
High Island, Inishshark and Davillaun SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: Breeding • Arctic tern Overwintering • barnacle goose
Tory Island SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: Breeding: • corncrake • razorbill • puffin
Duvillaun Islands SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: Overwintering • barnacle goose
Clare Island SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: Breeding: • shag • common gull • kittiwake • guillemot • razorbill • chough

NOT PROTECTIVELY MARKED

Designated site	Interest features unlikely to be affected by the proposed change
Blasket Islands SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: Breeding: • shag • lesser black-backed gull • herring gull • kittiwake • Arctic tern • razorbill • puffin • chough
Horn Head to Fanad Head SPA	The following features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range: Breeding: • cormorant • peregrine • shag • kittiwake • guillemot • razorbill • chough Overwintering • barnacle goose • Greenland white-fronted goose

5.2.2 Interest features in **Table 5.1** have been screened out on the basis of the following criteria.

- The status of intertidal and subtidal features such as mudflats and sandbanks are determined by the hydrodynamics of the Severn Estuary and not influenced by any changes in fish populations due to the abstraction of sea water.
- Bird interest features can only be affected if they relate to piscivorous birds and fall within their maximum mean foraging ranges.
- Inland terrestrial features such as grasslands cannot be affected by changes in the marine environment.

5.2.3 On this basis the following designated sites have been completely screened out of this assessment due to the lack of any LSE pathways for any of their qualifying features:

- Exmoor and Quantocks Oakwoods SAC;
- Mendip Limestone Grasslands SAC;
- Hestercombe House SAC; and
- Somerset Levels and Moors SPA/Ramsar sites.

5.2.4 The rest of the sites listed in **Table 5.1** contain at least one interest feature that is/are unable to be screened out for potential LSE and, therefore, these sites are taken through to HRA Stage 2: Appropriate Assessment. **Section 5.3** below lists these sites and the interest features for which LSE may occur.

5.2.5 **Appendix B** contains the HRA Stage 1: Screening Matrices which summarise the screening exercise for LSE of the HPC Project on the European and Ramsar sites and qualifying features considered.

5.3 Features and sites for which potential for likely significant effects (LSE) have been determined

5.3.1 The designated interest features listed in **Table 5.2** have been assessed as having a pathway of effect from the change proposed, either alone or in-combination with other plans or projects. For these features, it has been determined that LSE cannot be discounted and there is the potential for the change proposed to the CWS to adversely affect the integrity of the site in view of its conservation objectives. These sites have been taken through to HRA Stage 2: Appropriate Assessment.

Table 5.2 Designated sites and relevant interest features screened into the AA

Designated site	Interest feature likely to be affected by the proposed change
Severn Estuary SAC	Primary reasons for site selection • estuaries • sea lamprey (*Petromyzon marinus*) • river lamprey (Lampetra fluvatilis) • twaite shad (*Alosa fallax*)
Severn Estuary SPA	• waterbird assemblage (specifically lesser black-backed gull) (Used regularly by over 20,000 waterbirds in any one season supporting 84,317 individual birds over the period of 1991/92 to 1995/96.
Severn Estuary Ramsar site	• Criterion 4: migratory fish (Salmon [*Salmo salar*], sea trout [*S. trutta*], sea lamprey [*Petromyzon marinus*], river lamprey [*Lampetra fluvatilis*], allis shad [*A. alosa*], twaite shad [*A. fallax*] and eel [*Anguilla anguilla*]). • Criterion 6: regularly supports 1% of the individuals in a population of lesser black-backed gull. • Criterion 8: its estuarine fish assemblage, which is one of the most diverse in Britain with over 110 species recorded.

Designated site	Interest feature likely to be affected by the proposed change
River Usk SAC	Primary reasons for site selection • sea lamprey (*Petromyzon marinus*) • river lamprey (*Lampetra fluvatilis*) • twaite shad (*Alosa fallax*) • Atlantic salmon (*Salmo salar*) Qualifying features but not a primary reason for site selection • allis shad (*Alosa alosa*)
River Wye SAC	Primary reasons for site selection • sea lamprey (*Petromyzon marinus*) • river lamprey (*Lampetra fluvatilis*) • twaite shad (*Alosa fallax*) • Atlantic salmon (*Salmo salar*) Qualifying features but not a primary reason for site selection • allis shad (*Alosa alosa*)
Afon Tywi SAC	Primary reasons for site selection • twaite shad (*Alosa fallax*) Qualifying features but not a primary reason for site selection • sea lamprey (*Petromyzon marinus*) • river lamprey (*Lampetra fluvatilis*) • allis shad (*Alosa alosa*)
Carmarthen Bay and Estuaries / Bae Caerfyrddin ac Aberoedd SAC	Primary reasons for site selection • twaite shad (*Alosa fallax*) Qualifying features but not a primary reason for site selection • sea lamprey (*Petromyzon marinus*) • river lamprey (*Lampetra fluvatilis*) • allis shad (*Alosa alosa*)
Bristol Channel Approaches / Dynesfeydd Môr Hafren SCI	Primary reasons for site selection • harbour porpoise (*Phocoena phocoena*)
Lundy SAC	Qualifying features but not a primary reason for site selection • grey seal (*Halichoerus grypus*)
Pembrokeshire Marine / Sir Benfro Forol SAC	Primary reasons for site selection • grey seal (*Halichoerus grypus*) Qualifying features but not a primary reason for site selection • sea lamprey (*Petromyzon marinus*) • river lamprey (*Lampetra fluvatilis*) • allis shad (*Alosa alosa*) • twaite shad (*Alosa fallax*)

Designated site	Interest feature likely to be affected by the proposed change
West Wales Marine / Gorllewin Cymru Forol SCI	Primary reasons for site selection • harbour porpoise (*Phocoena phocoena*)
Cardigan Bay SAC	Primary reasons for site selection • bottlenose dolphin (*Tursiops truncatus*) Qualifying features but not a primary reason for site selection • grey seal (*Halichoerus grypus*)
Grassholm SPA	This site qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: During the breeding season; • gannet, 33,000 pairs representing at least 12.5% of the breeding North Atlantic population (Count as at 1994/5)
Skomer, Skokholm and Seas off Pembrokeshire SPA	During the breeding season; • Manx shearwater, 150,968 pairs representing at least 56.9% of the breeding population (Count, as at late 1990s) • lesser black-backed gull, 20,300 pairs representing at least 16.4% of the breeding Western Europe/Mediterranean/Western Africa population • storm petrel as part of the breeding seabird assemblage
Aberdaron Coast and Bardsey Island SPA	Qualification under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: During the breeding season; • Manx shearwater, 6,930 pairs representing at least 2.6% of the breeding population (Count, as at 1996)
Saltee Islands SPA	Breeding: fulmar (525 pairs); gannet (2,446 pairs); and Manx shearwater (250 pairs).
North Anglesey Marine / Gogledd Môn Forol SCI	Primary reasons for site selection • harbour porpoise (*Phocoena phocoena*)
Isles of Scilly Complex SAC	Qualifying features but not a primary reason for site selection • grey seal (*Halichoerus grypus*)
Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC	Qualifying features but not a primary reason for site selection • bottlenose dolphin (*Tursiops truncatus*) • grey seal (*Halichoerus grypus*)
Lambay Island SPA	Breeding: fulmar (635 pairs); and Manx shearwater (20 pairs).

Designated site	Interest feature likely to be affected by the proposed change
North Channel SCI	Primary reasons for site selection • harbour porpoise (*Phocoena phocoena*)
Rockabill to Dalkey Island SAC	Features of interest • harbour porpoise (*Phocoena phocoena*)
Copeland Islands SPA	Qualification under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species During the breeding season; Manx shearwater, 4,800 pairs representing at least 1.7% of the breeding population
Roaring Bay and Islands SAC	Features of interest • harbour porpoise (*Phocoena phocoena*) • grey seal (*Halichoerus grypus*)
Cliffs of Moher SPA	Breeding fulmar
Beara Peninsula SPA	Breeding fulmar
Kerry Head SPA	Breeding fulmar
Deenish Island and Scariff Island SPA	Breeding fulmar, Manx shearwater and storm petrel
Puffin Island SPA	Breeding fulmar, Manx shearwater and storm petrel
Iveragh Peninsula SPA	Breeding fulmar
Skelligs SPA	Breeding fulmar, Manx shearwater and storm petrel
Dingle Peninsula SPA	Breeding fulmar
West Donegal Coast SPA	Breeding fulmar
High Island, Inishshark and Davillaun SPA	Breeding fulmar
Tory Island SPA	Breeding fulmar
Duvillaun Islands SPA	Breeding fulmar
Clare Island SPA	Breeding fulmar
Blasket Islands SPA	Breeding fulmar, Manx shearwater and storm petrel
Horn Head to Fanad Head SPA	Breeding fulmar

Designated site	Interest feature likely to be affected by the proposed change
Blasket Islands SAC	Features of interest • harbour porpoise (*Phocoena phocoena*) • grey seal (*Halichoerus grypus*)

5.4 Screening of other plans and projects for in-combination effects

5.4.1 The screening exercise carried out during the DCO application also considered the potential for the Project to have a significant effect on a designated site in-combination with other plans or projects. Whilst there is no legal definition of what constitutes a plan or project for the purpose of the Habitats Regulations, PINS Advice Note 10 (PINS, 2017) advises that the following plans/projects should be taken into account:

- projects that are under construction;
- permitted application(s) not yet implemented;
- submitted application(s) not yet determined;
- projects on the National Infrastructure's (PINS') programme of projects; and
- projects identified in the relevant development plan (and emerging development plans – with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited and the degree of uncertainty which may be present.

5.4.2 The original HRA report (NNB GenCo, 2011b) contains a list of plans and projects that were selected for further assessment due to their potential to cause adverse effects on the integrity of protected sites in combination with the Project. These plans and projects have also been brought into this updated screening assessment.

5.4.3 An exercise was also carried out to identify any plans or projects that have been brought into the planning process since the original HRA was carried out and that have been identified as having a potential pathway of effect to the designated sites listed in **Table 5.2**. Applications to the following organisations were used to determine this additional list of plans and projects:

- MMO public register marine licence applications/licences granted;
- National Infrastructure Planning applications;
- Northern Ireland Department of Agriculture, Environment and Rural Affairs Marine Licensing public register; and
- NRW public register marine licence applications/licences granted.

5.4.4 **Table 5.3** below contains a list of plans or projects considered within this screening process. If the plan/project was assessed in the original HRA, this has been stated. The table also identifies those plans/projects that are taken through to the appropriate assessment stage and the justification behind the decision. The in-combination assessment can be found in **Section 7**.

Table 5.3 Screening outcome of the plans/projects for the in-combination assessment

Plan/Project	Stage	Assessed in 2011 HRA?	Screened in to AA?	Justification for screening decision
Afon Dysynni outfall gravel removal and relocation	Licenced	No	No	Localised gravel management within estuary mouth over 300 km by sea from HPC. Potential disturbance and effects of change in water quality on marine mammals at Pen Llyn a'r Sarnau SAC but extremely localised, readily avoidable by marine mammals and of very limited duration.
Aggregate extraction areas within the Bristol Channel: • **Bedwyn Sands (until 2024);** • **476 - Nobel Bank (until 2031);** • **526 - Culver Extension (until 2033)**	 Licenced Licenced Licenced	Yes (former area 472 - Culver)	Yes	Potential effects on habitat and disturbance of fish migration in the Severn Estuary SAC/Ramsar site.
Orthios Eco Park, Holyhead, Anglesey	Part authorised	No	No	No potential disturbance to harbour porpoise at North Anglesey Marine SCI, as project (including prawn farm) is entirely inland, based on former aluminium smelter site.
Black Ditch Wind Farm	N/a	Yes	No	No longer a project
Bridgwater Barrier	Applications for Transport & Works Act Order and marine licence expected spring 2019	No	Yes	Potential disturbance and disruption of migration of anadromous fish interest features of Severn Estuary SAC/Ramsar site
Bridgwater-Seabank 400 kV Transmission Infrastructure upgrade ('Hinkley Point C Connection')	DCO in place	Yes	No	Terrestrial project. No pathway of effect to marine designated sites

Plan/Project	Stage	Assessed in 2011 HRA?	Screened in to AA?	Justification for screening decision
Bristol Deep Sea Container Terminal (BDSCT) and compensatory habitat creation at Stert Point	Harbour Revision Order in place	Yes	Yes	Project includes creation of compensatory habitat at Stert Point under IROPI arrangements relating to the Severn Estuary SAC/Ramsar site. Potential changes to habitat close to HPC
Continued operation of HPB	Existing authorisations	Yes	No	HPB is not expected to be operational whilst HPC is operational
Decommissioning of HPA	Authorised and almost complete	Yes	No	No changes to marine infrastructure outstanding, so no pathway of effect to designated sites
Decommissioning of HPB	Authorised	Yes	Yes	Potential disturbance to birds at Severn Estuary Ramsar site. Reduction in effect on the fish assemblage of the Severn Estuary SAC/Ramsar site due to cessation of abstraction.
Decommissioning of Oldbury	Authorised and almost complete	Yes	No	No changes to marine infrastructure outstanding, so no pathway of effect to designated sites
Hinkley Point A: **Intermediate Level Waste Store**	Authorised	No	No	No impingement on the marine environment, so no pathway of effect to designated sites
Hinkley Point A: **Waste Encapsulation Centre**	Authorised	No	No	No impingement on the marine environment, so no pathway of effect to designated sites
Holyhead Deep tidal turbine trial	CE lease for 10MW only	No	Yes	Potential effects on marine mammals at North Anglesey Marine SCI.

Plan/Project	Stage	Assessed in 2011 HRA?	Screened in to AA?	Justification for screening decision
Dredgings disposal grounds within the Bristol Channel for disposal of arisings from port maintenance dredging:		No	Yes	Disturbance to seals and sea lamprey at: • West Wales Marine SCI • Pembrokeshire Marine SAC Effects on fish at: • Severn Estuary SAC/Ramsar site
• **Milford Haven (Sites 2 & 3)**	Licenced (NRW)			
• **Watchet Harbour**	Licenced (MMO)			
• **Swansea Bay Outer**	Licenced (NRW)			
• **Cardiff Grounds**	Licenced (NRW)			
• **Bristol Holm Deep**	Licenced (MMO) but now recorded by MMO as closed			
• **Portishead**	Licenced (MMO)			
• **Royal Portbury Pier & Entrance)**	Licenced (MMO)			
• **Avonmouth (Inner and Royal Edward Entrance)**	Licenced (MMO)			
• **Newport**	Licenced (NRW)			
North Devon – Somerset Shoreline Management Plan	Plan in place	Yes	No	No pathway of effect from proposed flood defence works to fish populations
Oldbury proposed new nuclear power station	Site identified in national policy statement EN-6	Yes	No	The development of the Oldbury new nuclear power station is still in the very early stages, so the potential for effects on the estuary environment cannot be predicted yet. Therefore, it has been screened out.
Parrett Estuary Flood Management Strategy	Strategy in place	Yes	No	No pathway of effect from proposed flood defence works to fish populations (except see separate entry for Bridgwater Barrier)
Severn Barrage Project	No applications	Yes	No	Not currently being pursued and no longer considered a viable project by the government
Severn Estuary Flood Risk Management Strategy	Strategy in place	Yes	No	No pathway of effect from proposed flood defence works to fish populations.

Plan/Project	Stage	Assessed in 2011 HRA?	Screened in to AA?	Justification for screening decision
Severn Estuary Shoreline Management Plan	Plan in place	Yes	No	No pathway of effect from proposed flood defence works to fish populations.
South West Marine Pan	Plan in place	No	No	Contains policy relevant to the Project (all sites within English waters). Relevant projects are listed separately in this table.
Swansea Tidal Lagoon Power (TLP)	DCO in place. Marine Licence applied for.	Yes	Yes	Potential effects on the Severn Estuary SAC/Ramsar site due to entrainment of fish interest features through turbines
Tidal lagoons (other) • **Cardiff** • **Newport** • **West Somerset**	PINS advised of expected application dates but no applications yet made	No	Yes	Potential effects on the Severn Estuary SAC/Ramsar site due to entrainment of fish interest features through turbines
Watersports centre, Ilfracombe Harbour	Harbour Revision Order application submitted	No	Yes	Potential disturbance to the marine mammals at: • Bristol Channel Approaches / Dynesfeydd Môr Hafren SCI • Lundy SAC
Welsh National Marine Plan (WNMP)	Draft published December 2017	No	No	Contains policy relevant to the Project (all sites within Welsh waters). Relevant projects are listed separately in this table.
West Anglesey Demonstration Zone			N/A	See Holyhead Deep tidal turbine trial
Withy End Wind Farm	N/a	Yes	No	No longer a project
Wylfa Newydd NNB	DCO at examination	No	Yes	Potential changes to water quality and disturbance of harbour porpoise at North Anglesey Marine SCI

Plan/Project	Stage	Assessed in 2011 HRA?	Screened in to AA?	Justification for screening decision
Pembrokeshire Wave Demonstrations Zone	No application made yet for the zone	No	No	Effects cannot be assessed until the zone is approved and developers then come forward with proposals for trials of devices.
Commercial fisheries (including salmon netting)	Ongoing	No	No	No specific proposals for changes in commercial fisheries that could constitute a plan or project have been identified, so commercial fisheries are considered to form part of the baseline against which the changes to the HPC CWS intake arrangements have been assessed.

Within Project in-combination assessment

5.4.5 There is the potential for within Project in-combination effects to arise from the operation of HPC itself. Considering the removal of the AFD system in this revised assessment the activities that have been identified as potentially having a within Project in-combination effect with the effects of impingement of fish on intake screens are:

a) the abstraction of seawater by the intake and potential entrainment of fish juvenile stages (eggs and larvae);

b) discharges of process effluents and treated sewage to the sea mixed with the cooling water;

c) behavioural thermoregulation of fish associated with the thermal plume;

d) decommissioning, dismantling and removal of the temporary jetty, resulting in potential effects on fish through underwater noise generation; and

e) the operation or Combwich Wharf.

5.4.6 The removal of the AFD system from the proposed design of the HPC CWS will not change the level of entrainment of juvenile stages of fish and other organisms (eggs and larvae) because they are not sensitive to sound and, in many cases, have no means of active avoidance. Therefore, the conclusions of the original HRA remain valid and this potential in-combination effect can be screened out of this assessment.

5.4.7 Based on detailed hydrodynamic modelling, the intake locations have been selected to avoid recirculation of thermal load and contaminants discharged from the CWS outfalls. The discharge is also regulated under the Environmental Permitting

Regulations 2016 to ensure no adverse effect on the marine environment. The combination of physical separation and control of discharges will minimise any possibility that a fish that has experienced any minor effects of raised temperatures or exposure to contaminants from passing through the mixing zone of the discharge plume will then enter the cooling water intakes within a short time period while still affected. Therefore, this potential in-combination effect can be screened out of this assessment.

5.4.8 During the operation of HPC the jetty will be decommissioned, dismantled and removed, therefore the potential for within Project in-combination effects of the impingement of fish on intake screens and noise disturbance to fish from jetty decommissioning requires consideration. The principal noise-generating activities associated with dismantling the temporary jetty (for example removal of cargo handling equipment followed by cutting up the reinforced concrete deck for removal in sections by barge) will take place above water level and will, therefore, generate minimal underwater noise. Piles will be cut off at rock head/sea bed level, again generating minimal underwater noise. Therefore, there will be no mechanism by which the jetty dismantling activity will cause a significant adverse effect on fish in-combination with effects on fish of impingement on the cooling water intake screens.

5.4.9 Combwich Wharf refurbishment will be complete before abstraction of cooling water for operation of HPC commences, therefore there will be no within Project in-combination effect during the construction phase at Combwich. The operation of Combwich Wharf will coincide with the operation of the CWS; however, as potential operational effects of the Wharf will relate largely to disturbance to wading birds and potential effects of operation of the CWS will be on diving birds there will be no significant in-combination effects.

6 STAGE 2: APPROPRIATE ASSESSMENT

6.1 Introduction

6.1.1 The following sections set out the potential effects of the change in CWS design proposed at HPC with regard to each of the designated sites and their interest features that have been screened into the assessment process (see **Table 5.2**). **Appendix C** contains the HRA Stage 2: Appropriate Assessment matrices as required by PINS Advice Note 10 (PINS, 2017).

6.1.2 The change proposed at HPC (see **Section 3**) involves operation of the cooling water intake without the use of an AFD system as mitigation. This has the potential to have a direct effect only on fish as AFD systems are acoustic systems installed specifically to deter fish, in this case to mitigate the risk of fish impingement. Effects on fish populations could then cause secondary or indirect effect on piscivorous birds and marine mammals. **Sections 6.2** and **6.3** below detail the impingement assessment methodology and results that are used to help determine the effects of impingement on fish.

6.1.3 The assessment will first focus on any potential effects on fish as a receptor/interest feature (**Sections 6.4** to **6.9**) by considering the sites which have fish interest features. **Sections 6.10** and **6.11** then consider those sites for which piscivorous birds or marine mammals are an interest feature. Sites that have both fish and bird/marine mammal interest features (Severn Estuary Ramsar) are therefore assessed separately for fish and bird/marine mammal interest features.

6.1.4 For each of the designated sites being assessed, a section is provided summarising the baseline environment relevant to the specific designated feature. Impacts from the operation of the cooling water intake are then assessed on the features listed. The assessed impacts are grouped, as far as possible, in relation to the conservation objectives that apply to the specific attribute of the designated feature under consideration.

6.2 Impingement Assessment Methodology

6.2.1 In the original DCO submission a methodology was adopted for the impingement assessment process which was used to help determine the magnitude of effects on fish.

6.2.2 The impingement predictions presented in the original HRA report and considered in the SoS HRA (DECC, 2013) were based upon the best available evidence at that time. Where ecological uncertainties were present, worst-case assumptions were used for the assessment. In the time since the DCO was granted, the impingement estimates have been refined as new information became available. In this section the updated methodology used is outlined and the differences between this and that used in the DCO ES and original HRA report are summarised, however this information is found in full in the TR456 report (Cefas, 2019a).

6.2.3 While the principles of the assessment process remain, the methodology has now been refined to take into consideration newly-available data, information, and analysis techniques. Changes in the assessment process since the DCO submission are summarised in **Table 6.1** and fully detailed in TR456 (Cefas, 2019a).

Table 6.1 Changes to HPC impingement assessment since the DCO submission

Description of change	Impact on assessment compared with the DCO assessment
Revised impingement indicators based upon the latest scientific advice (Adult population sizes, international catch and HPB RIMP impingement time series extended to 2017)	Uses the most up to date scientific evidence. For some species the adult population size estimates have increased, whilst others have decreased.
Use of site specific Equivalent Adult Value (EAVs) derived from measurements made at Hinkley Point during the CIMP survey programme in 2009/10.	Uses the most biologically relevant data rather than non-site specific data from different years of uncertain accuracy. Causes the predicted impingement impact to increase for some species and to decrease for others.
Incorporates the detailed design for the HPC cooling water system. HPC CW flow rate is now confirmed to be 131.86 cumecs (at Mean Sea Level) with a worst case of 9% water flow through the band screens. Band screens to be fitted with an FRR system and HPC forebay to be fitted with trash racks of 50mm vertical bar spacing fitted with fish friendly buckets for fish recovery.	More accurate impingement assessment. Results in increases in predicted impingement impact.
Added assessments for six species not included at the time of DCO (bass, thornback ray, flounder, thin lipped grey mullet, five bearded rockling and sand goby).	Provides confidence that the assessment is fully representative of the effects of HPC impingement on the fish assemblage
Quantitative analysis of the expected impact of the HPC LVSE intake heads on impingement. This was not addressed in the original HRA.	By not taking account of the design of the HPC intake heads the previous impingement estimates were unrealistically conservative. The revised estimates are considered more reliable but still conservative as they do not take into account the full impact of the HPC intake design and location.

Description of change	Impact on assessment compared with the DCO assessment
Revised impingement numbers from the CIMP programme and use of a statistically more robust bootstrapping procedure to calculate the mean and confidence limits on the impingement estimates. A comprehensive uncertainty analysis using Monte Carlo simulation process has been undertaken. A significantly expanded analysis on the effects of interannual variability in impingement numbers has been included. A more robust statistical analysis of trends has been undertaken on the RIMP data. The CIMP data have been subject to enhanced quality assurance which has resulted in increased numbers for 16 fish species in the raw CIMP impingement dataset.	Provides substantially more confidence in the reliability of the impingement predictions.
Revised mean weights used to convert the number of equivalent adult fish into impingement weight.	More reliable impingement predictions. Results in increases in predicted impingement impacts for some species
Provision of assessments for species that were not detected during the CIMP survey (salmon and sea trout) using the RIMP dataset.	Substantially increased confidence in the DCO assessment that the impingement effect on these designated species is negligible.

6.2.4 Following these changes, a summary of the impingement assessment process is provided below with full details in the TR456 report (Cefas, 2019a).

6.2.5 To estimate the unmitigated impingement at HPC the assessment approach adopted in this report is to scale the measured impingement at HPB by the ratio of the cooling water volumes extracted by the two stations. The accuracy of the assessment depends upon whether:

- the fish community is the same at the location of the HPC intakes (3.3 km offshore) as at the HPB intakes (640 m offshore); and
- the HPC intakes will abstract the same amount of fish per cumec as HPB.

6.2.6 The results of subtidal fishing surveys in the wider Bridgwater Bay area are described in BEEMS Technical Report TR083 (Cefas, 2010b). The surveys, over 3 years and consisting of 104 fishing stations, found a very low density of predominantly juvenile fish. Only 21 taxa were sampled with individuals from all but 2 taxa (2 thornback ray and 1 conger eel) being less than 30 cm total length. The fishing surveys found no significant spatial differences in the fish community between the locations of the HPC and HPB intakes.

6.2.7 As described in the TR456 (Cefas, 2019a) an assumption that HPC will abstract the same amount of fish per cumec as HPB is unreasonably conservative, as the design of the HPC intakes is expected to result in a ratio of fish impingement per cumec at HPC compared with HPB of:

- 64.6% for all species due to the reduced intercept cross sectional area of the HPC intakes; and
- an additional 38% for pelagic species (sprat, herring, twaite and allis shad) due to the use of capped intakes at HPC.

6.2.8 These estimates are also supported by impingement data collected at Sizewell Power Station in Suffolk, where comparison between the Sizewell B (SZB) intake (600 m offshore and capped) and the Sizewell A (SZA) intake (300 m offshore and uncapped) showed significantly lower impingement per cumec at SZB compared with SZA.

6.2.9 The two primary datasets for assessing the fish community at Bridgwater Bay are the RIMP, which has been conducted at HPB since 1981, and the BEEMS CIMP, conducted at HPB in 2009/10. There are other short duration impingement records from the Oldbury nuclear power station and there are a few trawl survey datasets, but the impingement datasets have by far the greatest sampling intensity, the least sampling bias and provide a unique insight into the local fisheries ecology. Compared with trawl surveys, the HPB impingement is considered to have much lower species selectivity, surveys can be done day or night, continuously in any weather and at any state of the tide and at a much lower cost per hour sampled. Due to the sampling efficiency of the intakes and their lack of species selectivity the HPB impingement records are considered to mirror the changes in local fish community at Hinkley Point. Impingement sampling does not provide a perfect sample of fish in the water column in that the top half of the water column is not sampled until near to low tide but for the majority of fish species at Hinkley Point it provides the best possible sampling tool. As the HPC intake heads are also seabed mounted, such a vertical sampling profile is also well suited to providing the raw data for HPC impingement estimation.

6.2.10 In order to undertake an impingement assessment for HPC the CIMP dataset was used as the primary evidence base. For interannual comparisons the RIMP dataset has been used as a secondary evidence source.

6.2.11 The CIMP impingement assessment process' stages used in the impingement analysis are illustrated in **Figure 6.1**. For interannual comparisons the equivalent RIMP assessment process is used as shown in the TR456 report (Cefas, 2019a).

Calculation of Equivalent Adult Value (EAV) factors

6.2.12 The fish community at Hinkley point is predominantly made up of immature juveniles. To undertake an effects assessment it is necessary to convert the number of juveniles into the number of adults that would survive to maturity ('equivalent adults value, EAV').

6.2.13 To perform this calculation it is necessary to have:

a. The species annual length distribution

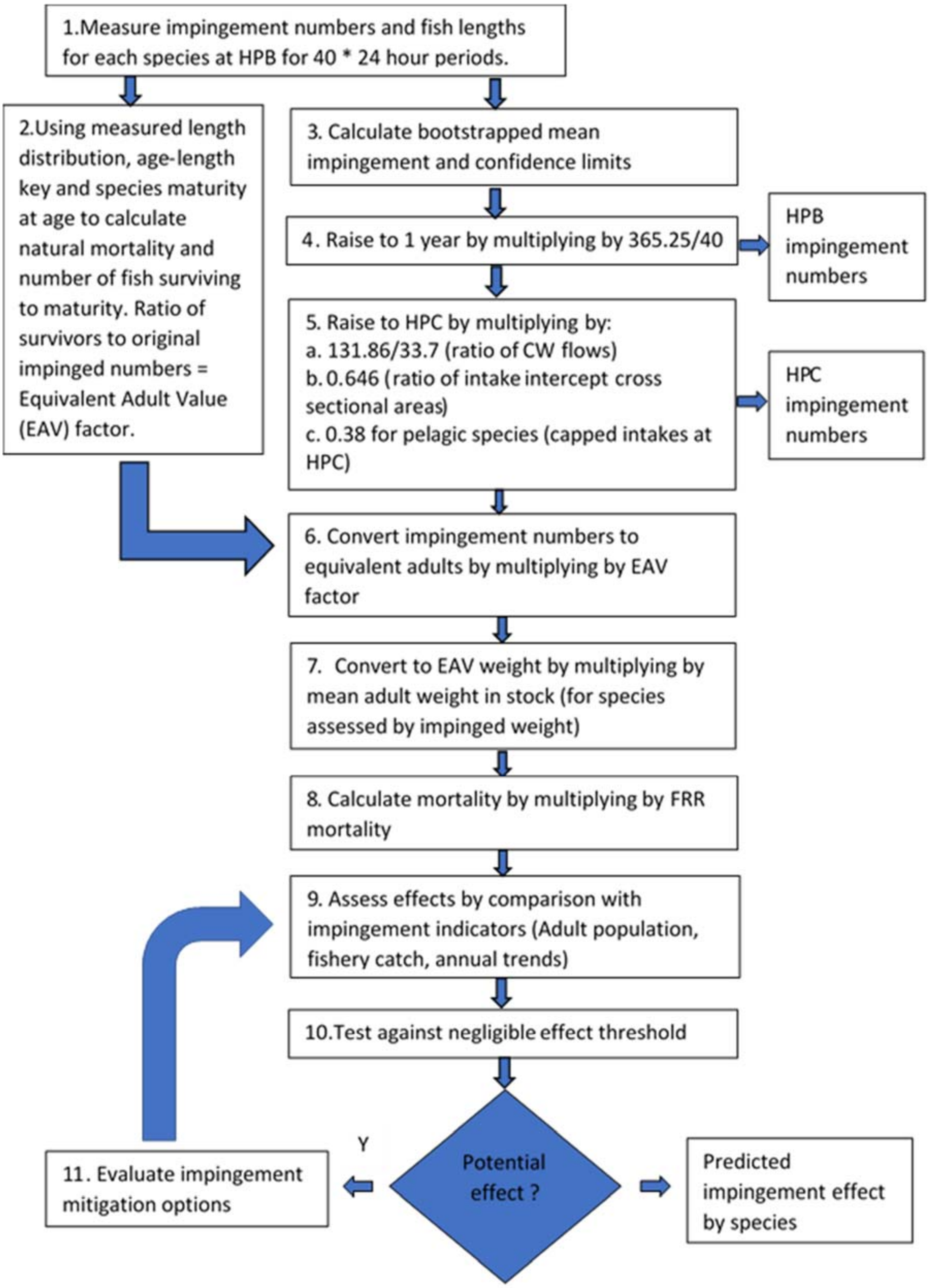
b. Length at age estimates

c. Maturity at age estimates

d. Natural mortality (M) at length estimates

6.2.14 Items a-c are routine biological measurements which are relatively easy to perform but it is very difficult to directly measure M which involves following the different year classes of a species and determining the number of survivors in each year over several years until maturity. For assessment purposes the worst case EAVs have been used which will generate a precautionary estimate of impingement effects. The methods used to estimate and validate M at length for each species assessed in this report together with the computed EAVs are described in Section 5.3 and Appendix F of the TR456 (Cefas, 2019a) which also shows how these have changed from the original DCO submission.

Figure 6.1 The CIMP impingement assessment process



Indicators for the assessment of impingement effects

6.2.15 To assess the effect of impingement it is necessary to compare the predictions against an objective measure of the status of each population.

6.2.16 As described in section 5.2 of the TR456 report (Cefas, 2019a), ecosystem modelling to assess the effect of the predicted levels of HPC impingement is impractical and instead a variety of indicators have been used:

- Comparison with the adult spawning stock biomass (SSB) in the assessment year as published by ICES.
- Comparison with the international catch on a fish stock in the assessment year (ICES).
- Analysis of the 37 year impingement trend data to draw conclusions about the stock status and the impact of the station (from the HPB RIMP programme).

6.2.17 The preferred measure is comparison with ICES estimates of SSB as this is how the much larger environmental impact of fishing is internationally managed.

6.2.18 For some species estimates of SSB are not available and the total international landings (or more accurately total international catch if discard data are available) can be used as a surrogate indicator. In the DCO ES and original HRA report local UK landings was used as a simplistic assessment indicator but it is recognised that this measure had limitations as UK landings generally have little relation with overall fish biomass size (e.g. for some species a large part of the catch in UK waters is not landed into the UK due to quota ownership or marketing reasons). For this reason, this indicator has been replaced in this updated HRA report by the total international landings for a stock which provides a much more realistic indication of the fishing pressure on the stock. Clearly if the total catch approaches the adult stock size the population will rapidly collapse and fish stocks are managed under the EU Common Fisheries Policy with the objective of preventing such an outcome and maintaining the stock within safe biological limits. For a heavily exploited stock the total international fish catch can be used as a worst-case estimate of the fish population size. In cases where the population is not rapidly collapsing, this estimate will be an underestimate of the population size and will therefore produce an overestimate (normally a considerable overestimate) of the impingement effect (Cefas, 2019a).

6.2.19 For species that are not commercially exploited there are frequently no SSB estimates nor landings data. For conservation species such as shad, eel and lampreys, independent estimates are available for the adult population (Cefas, 2019a); however, for many other common species no such data exist. The HPB impingement trend data can then be used to provide an indication of the state of the stock.

6.2.20 The key parameter of the SSB is the definition of the relevant stock unit and its geographical area. In the DCO ES the 2010 ICES stock units were used but two SSB estimates were transformed by Cefas into tentative and highly precautionary estimates of 'local SSBs' to reflect the possibility that the stock identity for some species might have been smaller than the 2010 ICES stock identities. The stock units that have been used in this assessment are the ICES 2017 definitions which are the outcome of the best available international science. These are the basis for all management decisions in Europe on fishing impacts, and are, therefore, most relevant to this assessment. This is because for most marine fish species, stock areas are very large with widescale temporal and seasonal migrations and often considerable inter mixing between stocks. A local stock i.e. Bridgwater Bay fish stock and a Severn Estuary fish stock has no biological meaning for such species and thus local stocks have not been used in the updated impingement calculations. Further analysis of the stock assessment units is given in TR456 (Cefas, 2019a) and the ICES fish stock assessment units relevant to HPC are given in **Figure 6.2** and **Table 6.2**.

Figure 6.2 Map of ICES Divisions

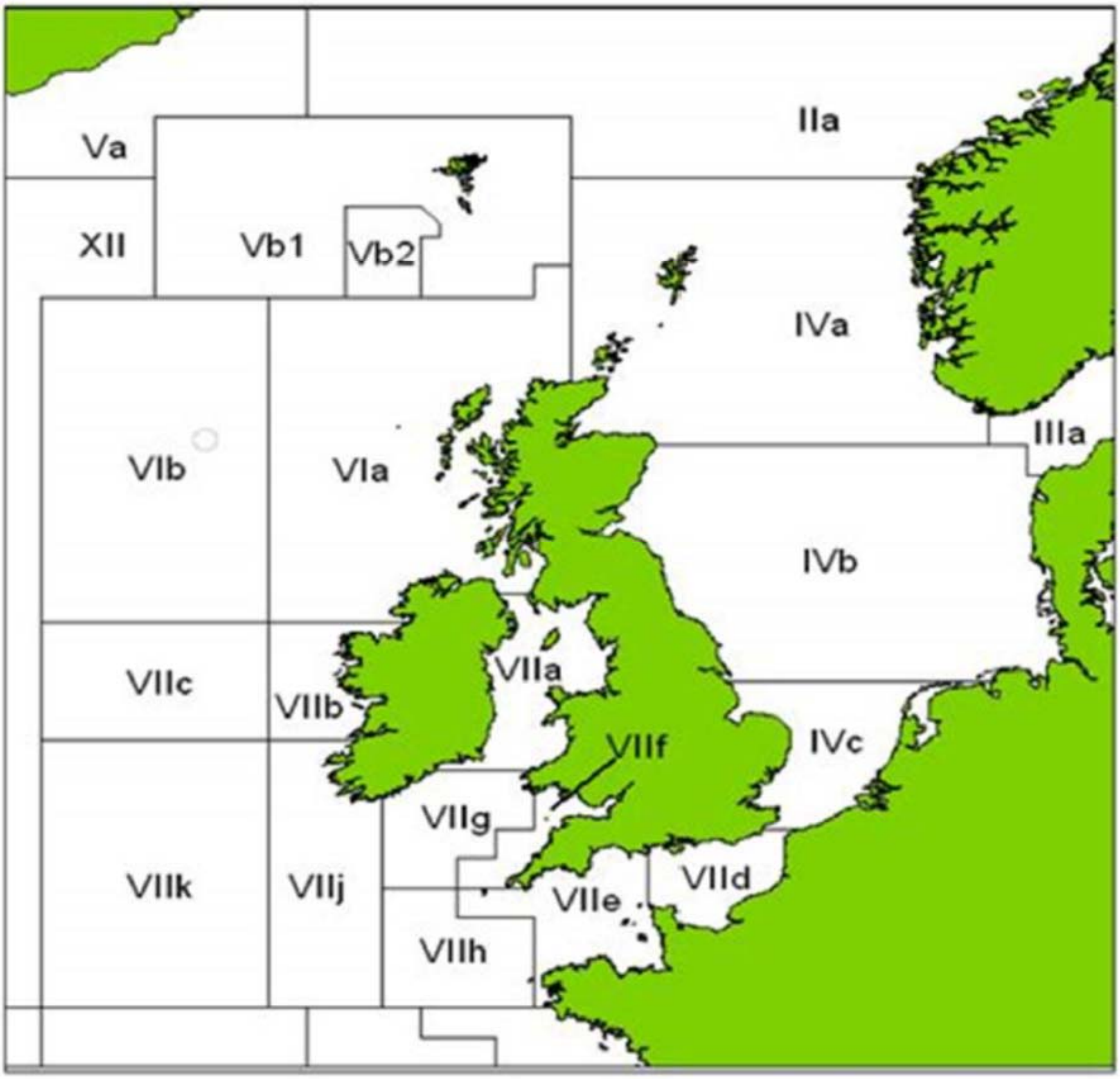


Table 6.2 ICES fish stock assessment units relevant to Hinkley Point (ICES 2017)

Fish species	Stock unit	ICES Working Group Report
Whiting	V11bc, e-k	WGCSE, Celtic Sea Ecoregion
Sole	VIIfg	
Cod	VIIe-k	

Fish species	Stock unit	ICES Working Group Report
Herring	VIIef (no SSB estimate)	HAWG Herring Assessment for area to south of 62N, stocks with limited data
Bass	IVbc, VIIa, VIId-h	Celtic Sea, and Greater North Sea Ecoregions
Plaice	VIIfg	WGCSE, Celtic Sea Ecoregion
Ray, Thornback	VIIafg (no SSB estimate)	
Whiting, Blue	1-6, 12 and 14	North East Atlantic

Selection of the significant effect threshold

6.2.21 There are no formal UK regulatory guidelines for assessing the significance of fish mortality levels caused by impingement in coastal power stations (nor were there any such guidelines at the time of the HPC DCO submission and examination) and therefore any assessment must be based on expert judgment.

6.2.22 At the time of the DCO application, the screening test that was applied and accepted for potentially significant environmental effects was whether the predicted impingement of any of the assessed species was >1% of the SSB or fishery landings for the stock. This allowed predictions against an objective measure of the status of each population to be made.

6.2.23 The 1% level was established as the threshold for negligible effects as this level is much lower than the measured natural variability of the Hinkley Point fish populations. Effects above this threshold would require further investigations to determine whether significant effects were, in fact, present.

6.2.24 Following re-examination and further analysis (detail provided in TR456, Cefas, 2019a (Section 5.1)) this 1% threshold is also used in this updated HRA report and considered precautionary as summarised below.

6.2.25 To have a negligible impact on a fish stock the predicted total anthropogenic harvest rate must be less than the value whereby the stock can replace itself on a year to year basis. For data poor species a precautionary level of 10%-20% SSB is considered sustainable in international fisheries management practice. ICES advises in the context of current management policy, which is to manage all species within sustainable limits by 2020, and policy measures have been recommended to the European Commission, which is responsible for managing marine fisheries in Europe, and are now being implemented in order to meet this objective as soon as possible in relation to the 2020 target.

6.2.26 For species which are heavily exploited by fishing a lower effect threshold for impingement is considered appropriate and 1% negligible effect screening threshold for annual impingement for all species provides a precautionary level which is negligible compared with fishing mortality on exploited stocks and would have no effect on their sustainability. For non-exploited stocks such a level is highly precautionary on the basis of fish population dynamics and any observed decline in stock numbers would be due to other factors well beyond the influence of HPC impingement.

6.2.27 The use of a negligible effect threshold of 1% of SSB is, therefore, considered to be precautionary as demonstrated in TR456 (Cefas, 2019a). A precautionary level of 1% is much less than the natural variability of any species at Hinkley Point to which the ecosystem is adapted and hence would have no significant effects on predator prey relationships.

Selection of key taxa for HPC impingement assessment

6.2.28 It is necessary to assess the effects of HPC on the fish assemblage. Bird (2008) highlights that most of our knowledge of the Severn Estuary’s fish communities comes from individuals impinged on the cooling water-intake screens used at power stations sited along the English and Welsh shores, with more than 100 species of fish being identified from the Severn Estuary and its seaward extension, the Bristol Channel. This is in line with the analysis of Hinkley Point data (RIMP and CIMP data) in TR456 where a total of 92 species have been detected at Hinkley Point. However most of these species occur infrequently in very low numbers and are not present in sufficient numbers to play an important role in the functioning of the ecosystem. Taking a functional approach considering energy flows in the ecosystem only species that represented more than 1% of the assemblage numbers would be a selected. However, this would exclude assessment of the important protected species which are present in much lower numbers.

6.2.29 For the purposes of the HPC impingement assessment, taxa were therefore considered to be important if they met at least one of the following criteria:

6.2.30 Socio-economic value: Species that contribute to the first 95% of the first sale value of commercially landed finfish in the area off Hinkley Point and contribute to the first 95 % of total impingement abundance. Socio-economic value was calculated using data supplied by the MMO and presented in BEEMS Technical Report TR071 (Cefas, 2011b). As a result, four taxa were selected (sole, cod, bass and thornback ray). Note: Bass and thornback ray were added post grant of DCO due to the locally important recreational fisheries for both species and the recent international decline in the bass population.

6.2.31 Conservation importance: The "S41 Priority Species" (based on the legislation in Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006) was used in the selection of 13 taxa (allis shad, twaite shad, European eel, herring, Atlantic cod, whiting, blue whiting, plaice, sole, salmon, sea trout, river lamprey, sea lamprey). Note that this list of 13 conservation species contains two taxa which were not detected in the CIMP impingement sampling and only rarely during the RIMP programme (Section 4.1 of the TR456 report, Cefas, 2019a): sea trout (one fish in 37 years) and Atlantic salmon (nine fish in 37 years). Due to their migratory behaviour, neither of these species would be expected to be impinged in any significant numbers at HPC (Section 4.6 of the TR456 report, Cefas, 2019a). Similarly, the numbers of allis shad and river lamprey caught at Hinkley Point (two individuals of each species in the one-year CIMP programme and zero allis shad and nine river lampreys in 37 years in the RIMP programme) were so low that they can be discounted as being part of the fish community vulnerable to impingement at Hinkley Point. However, as these species are all HRA designated species an assessment is provided in Section 7.2.2 of the TR456 report (Cefas, 2019a) to put these rare impingement events into a population context using the available data from the CIMP or RIMP datasets.

6.2.32 Ecological importance: Abundant species that play a key trophic role within the ecosystem. From the HPB CIMP impingement data the four most abundant fish species at HPB were sprat (*Sprattus sprattus*), whiting (*Merlangius merlangus*), Dover sole (*Solea solea*) and cod (*Gadus morhua*). These four species accounted for 88% of the measured annual fish impingement numbers. Three additional species were included to ensure that the assessment included those species which constituted 95% of the measured impingement (thin lipped grey mullet, flounder, five bearded rockling). Sand Goby was also added to the list due to its importance as a prey species for many piscivorous fish and its high abundance in many years. Finally, the brown shrimp (*Crangon crangon*) was added to the list due to its importance in the Bridgwater Bay foodweb. This results in nine taxa (sprat, whiting, sole, cod, thin lipped grey mullet, flounder, five-bearded rockling, sand goby and the brown shrimp).

6.2.33 Overall these criteria produced the list of 20 fish species plus brown shrimp shown in **Table 6.3.** These species are representative of the fish assemblage at Hinkley Point (and the Severn Estuary SAC and Ramsar ‘estuary’ interest feature) because:

- these species represent 98.3% of the total fish impingement numbers during the CIMP programme;
- they contain all of the conservation species listed as HRA interest features;
- they contain examples from all functional guilds with the exception of freshwater species which, as would be expected, are rarely found at Hinkley Point;
- they contain examples from all feeding guilds and habitat groups; and
- they contain all of the indicator species found at Hinkley Point that are assessed in the WFD "fish" biological quality element in transitional waters.

6.2.34 The list contains six additional species that were not assessed in the HPC original ES, WFD and HRA report (bass, thornback ray, mullet, flounder, five bearded rockling and sand goby).

Table 6.3 Species are representative of the fish assemblage at Hinkley Point

Species are representative of the fish assemblage at Hinkley Point			
Sprat	Plaice	Marine lamprey	Five-bearded rockling
Whiting	Thornback ray	River lamprey	Brown shrimp
Dover sole	Blue whiting	Salmon	Sand Goby
Cod	Eel	Sea trout	
Herring	Twaite shad	Thin-lipped grey mullet	
Bass	Allis shad	Flounder	

6.3 Impingement Assessment Results

6.3.1 Revised unmitigated impingement predictions (from the CIMP dataset) are presented below in **Table 6.4**. Results apply uncertainty analysis (Section **Error! Reference source not found.** of theTR456, Cefas 2019a) and corrected by results of interannual variability analyses (Section 9, Cefas, 2019a) for whiting, sole, cod and herring.

Table 6.4 Revised HPC unmitigated impingement predictions

Common Name	*Species*	Mean effect	Upper 95%ile effect	Impingement indicator
Sprat	*Sprattus sprattus*	0.065% (Using RIMP data)	0.175%	PELTIC SSB for 2013- 2016
Whiting[4]	*Merlangius merlangus*	0.108%	0.205%	SSB for 2009
Sole, Dover[4]	*Solea solea*	0.524%	1.062%	SSB for 2009
Cod[4]	*Gadus morhua*	0.151%	0.333%	SSB for 2009
Mullet, thin lipped grey	*Liza ramada*	3 * HPA impact. Further investigation required to determine any effect		RIMP trend analysis
Flounder	*Platichthys flesus*	3 * HPA impact. Further investigation required to determine any effect		RIMP trend analysis
Five-bearded rockling	*Ciliata mustela*	3 * HPA impact. Further investigation required to determine any effect		RIMP trend analysis
Herring[4]	*Clupea harengus*	0.204%	0.330%	International catch for 2009

Common Name	*Species*	Mean effect	Upper 95%ile effect	Impingement indicator
Sand Goby	*Pomatoschistus minutus*	3 * HPA impact. Further investigation required to determine any effect		RIMP trend analysis
Bass	*Dicentrarchus labrax*	0.024%	0.029%	SSB for 2009
Plaice	*Pleuronectes platessa*	0.007%	0.018%	SSB for 2009
Ray, Thornback	*Raja clavata*	0.451%	0.742%	International catch for 2009 + Cefas discard estimate.
Whiting, Blue	*Micromesistius poutassou*	0.000%	0.000%	SSB for 2009
Eel	*Anguilla anguilla*	0.333%	0.650%	Independent stock estimate[1]
Shad, Twaite	*Alosa fallax*	0.011% (Using RIMP data)[3]	0.018%	Independent stock estimate[1]
Shad, Allis	*Alosa alosa*	0.069%	0.216%	Independent stock estimate[2]
Lamprey, Marine	*Petromyzon marinus*	0.604%	1.285%	Independent stock estimate[1,5]
Lamprey, River	*Lampetra fluviatalis*	0.062%	0.163%	Independent stock estimate[1]
Salmon	*Salmo salar*	Less than 0.013%. (Using RIMP data).	Less than 0.031%	EA/NRW estimates
Sea trout	*Salmo trutta*	Less than 0.008%. (Using RIMP data)	Less than 0.062%	Extrapolated from rod catch for 2012-2016
Brown shrimp	*Crangon crangon*	3 * HPA impact. Further investigation required to determine any effect		RIMP trend analysis

Notes

1. Appendix G (Cefas, 2019a).
2. BEEMS SPP071 edition 3. (Cefas 2019b)
3. 50th percentile impingement effect from SPP071 edition 3 (Cefas 2019b).
4. Corrected by results of interannual variability analyses
5. Marine lamprey effect is number of impinged adults assessed against adult population of the Wye/Usk.

6.3.2 For the majority of species in **Table 6.4** the predicted unmitigated HPC impingement as a percentage of SSB or the fishery landings/catch is less than the 1% negligible effects threshold. A number of species do exceed this value but this is considered precautionary (Cefas, 2019a).

6.3.3 **Table 6.5** shows the predicted impingement levels with HPC fitted with LVSE intakes and a Fish Recovery and Return (FRR) system.

6.3.4 LVSE intakes are designed to limit the exposure of the intake surfaces to the tidal stream and in so doing reduce the risk of impingement for fish swimming with the tidal stream.

6.3.5 The FRR system is designed to recover fish from the band and drum screens and return them to sea via a dedicated FRR discharge tunnel. The FRR is designed to account for a full range of species and behaviour and the derivation of the FRR mortality/survivability considered within the impingement calculations is described in the TR456 report (Cefas, 2019a). This highlights that given the inevitable uncertainty on the performance of the specific design of the FRR system conservative FRR recovery rates for HPC are used, taken from the EA science report (Turnpenny & O'Keeffe, 2005). It is also noted that the FRR system is designed to minimise the risk or predation during passage within the system, for instance there are no significant resting places, and in terms of predation at the outfall the location and depth of the outfall minimises predation from birds. Further, the capacity and performance of the FRR system would not be hindered with the removal of the AFD system as described in TR493 (Cefas, 2019c). The performance of the FRR system would be monitored during operation.

Table 6.5 Revised HPC impingement assessment assuming that LVSE intakes and FRR systems are fitted to HPC (from the CIMP dataset)

Species	Number impinged	EAV	EAV Number	FRR mortality	EAV number after mitigation	EAV wt (t)	Fishery (t)	SSB (t or number)	% of fishery	% of SSB
Sprat	932,129	0.556	518,264	100%	518264	8.0	-	N/A	-	N/A
Whiting	1,369,835	0.142	194,517	55%	106012	31.6	6572	34,918	0.481%	**0.090%**
Sole, Dover	363,976	0.236	85,898	20%	17523	6.2	805	2,857	0.768%	**0.217%**
Cod	240,909	0.012	2,819	55%	1559	7.4	3292	5,092	0.225%	**0.145%**
Herring	26,393	0.113	2,982	100%	2982	0.2	627	-	**0.031%**	-
Bass	20,704	0.121	2,505	70%	1747	2.0	5657	18,317	0.035%	**0.011%**
Plaice	3,266	0.192	627	43%	266	0.09	1089	4,707	0.008%	**0.002%**
Ray, Thornback	1,973	0.339	669	41%	271	0.9	755	-	**0.118%**	-
Whiting, Blue	728	0.142	103	55%	56	0.008	635000	2,781,230	0.000%	**0.000%**
Eel	782	1	782	20%	156	0.05	-	133	-	**0.039%**
Shad, Twaite	528	0.035	19	100%	19	-	-	165,788	-	**0.011%**
Shad, Allis	18	0.262	5	100%	5	-	-	27,397	-	**0.017%**
Lamprey, Marine	117	1	117	20%	23	-	-	15,269	-	**0.077%**
Lamprey, River	46	1	46	20%	9	-	-	116,109	-	**0.008%**
Salmon	-	0	-	55%	0	-	-	0	-	-
Sea trout	-	0	-	55%	0	-	-	0	-	-
Crangon Crangon	11,437,723	1	11,437,723	20%	2,287,545	3.41	-	0	-	-

1. Predictions based upon HPC CW flow of 131.86 cumecs

2. EAVs are calculated as described in Appendix F (Cefas, 2019). Worst case EAVs have been used.
3. There is no survey estimate of sprat SSB for 2009. The evidenced assessments provided in Section **Error! Reference source not found.** provide HPC impingement predictions for the 4-year period 2013-2016 inclusive.
4. This table provides an assessment of 2 species not included in the DCO submission; bass and thornback ray.
5. The shad SSB excludes the River Tywi population.
6. The Thornback ray fishery is landings of 671T+25% discards at 50% survival = 755 T (unwanted catch estimate is from Cefas, Dr J. Ellis *pers. comm.* November 2018).
7. The marine lamprey impingement consisted of 50% adults and 50% parasitic juveniles. These proportions of the impingement numbers shown above have been assessed against the respective population estimates from **Error! Reference source not found.** and the EAV factor has not, therefore, been used. I.e. juveniles =11.7/11.183M =0.0001% juvenile population, adults =11.7/15269 =0.077% SSB.
8. Salmon and sea trout were not detected in the CIMP survey but have been detected rarely in the RIMP survey. An assessment for both species is provided in Section **Error! Reference source not found.** of Tr456, Cefas, 2019a).

6.3.6 With the LVSE intakes and FRR system installed the predicted impingement for all fish species shown in **Table 6.5** is less than 1% SSB or 1% of landings/catch in the commercial fishery for herring and thornback ray respectively. The predicted impingement effects ranged from a maximum of 0.217% SSB for sole to less than 0.001% SSB for blue whiting. At such levels HPC would not have an effect on the sustainability of any of the species.

6.3.7 For the thin-lipped grey mullet, flounder, five bearded rockling, sand goby and the brown shrimp, *Crangon crangon*) trend analysis of the RIMP data has been undertaken, as currently no EAV estimates are available, which is presented in Section 7.3 of the TR456 report (Cefas, 2019a). The trend analysis indicates that HPC would have no significant impact on the population trends, concluding:

6.3.8 Salmon and sea trout were not detected in the high sampling intensity CIMP survey at HPB but both have been detected rarely in the HPB RIMP programme. Scaling up annual RIMP estimates to estimates of impingement at HPC is statistically invalid for such low probability events. The reasons for this conclusion are explained and an alternative more robust assessment is presented in section 7.3 of the TR456 report (Cefas, 2019a). The results of the alternative assessment for both salmon and sea trout show a worst case HPC impingement well below 1% of the SSB.

6.3.9 It is concluded in the TR456 (Cefas, 2019a) that HPC would have negligible effect on fish populations.

Interannual Analysis

6.3.10 The quantitative impingement assessments presented above are based upon the results of the one-year CIMP programme at HPB. Annual impingement numbers fluctuate annually in line with the natural variabilities of the local fish populations. To assess if annual fluctuations have any material effect on the predicted HPC impingement effects further analysis has been undertaken (Section 9 in the TR456 report, Cefas, 2019a). In particular, for the five species with the highest predicted impingement effects as a percentage of SSB impingement inter-annual calculations have been completed. Further the pelagic species of herring, sprat and twaite shad were selected for multiyear impingement analysis using the RIMP dataset.

6.3.11 The study of the effect of interannual variations in fish populations for the five assessed species does not change the HPC impingement assessment conclusion of negligible effects as summarised below.

- For all of the eight species and all of the years analysed the variation in annual impingement numbers did not change the overall conclusion that predicted impingement effects remained much less than the 1% negligible effect threshold.
- The worst-case potential underestimate of impingement effects that could have resulted from the use of the 1-year CIMP programme was a factor of 6.0 for herring (in 2014/15) i.e. if the CIMP had been undertaken in that year the predicted mean impingement effect would have been expected to be a factor of approximately 6 below the multiyear mean from the RIMP. The predicted impingement effects from HPC from the CIMP are so low that the application of that factor to any of the species in **Table 6.5** that were not analysed for interannual variability, could not change the overall conclusion of negligible impingement effect from HPC.
- The CIMP derived predictions of impingement effect for sole, cod and whiting were overestimated by factors of 3.5, 3.0 and 2.65 respectively. The herring prediction was underestimated by a factor of 1.63. These factors have been applied to produce the finalised HPC impingement effect predictions in **Table 6.6**.

Uncertainty Analysis

6.3.12 The HPC impingement estimates presented in this updated HRA report are subject to uncertainty which is a function of:

- the measurement of impingement at HPB via the CIMP programme;
- scaling HPB impingement to HPC using the ratio of cooling water flows at the two stations and the ratio of intake cross sectional intercept areas;
- the predicted EAVs for each species;
- the estimated mean weight of adult fish used to convert impingement EAV numbers in to EAV weights;
- the FRR mortality; and
- the SSB or international catch estimates used as impingement indicators.

6.3.13 A comprehensive analysis of the uncertainty is presented in Section 8 of the TR456 (Cefas, 2019a) which concludes that uncertainty analyses undertaken is considered precautionary but did not identify any species where the negligible effects threshold of 1% of the SSB or international catch was exceeded. The conclusion of the HPC impingement effects analysis remains one of negligible effect (Cefas, 2019a).

6.3.14 **Table 6.6** presents the revised impingements effects from the interannual and uncertainty analysis described above and further in TR456. The effects are all less than the negligible effects threshold of 1% of the relevant SSB or international landings. The largest predicted impingement effect of HPC on any species is a mean of 0.118% fishery catch for thornback ray or 0.194% fishery catch as a 95th percentile.

Table 6.6 Predicted HPC Impingement effects (LVSE intakes and FRR fitted) – from uncertainty analysis and corrected by results of interannual variability

Common Name	*Species*	Mean effect	Upper 95%ile effect	Impingement indicator
Sprat	*Sprattus sprattus*	0.016% (from RIMP data)	0.043%	PELTIC SSB for 2013- 2016
Whiting[4]	*Merlangius merlangus*	0.038%	0.072%	SSB for 2009
Sole, Dover[4]	*Solea solea*	0.069%	0.140%	SSB for 2009
Cod[4]	*Gadus morhua*	0.054%	0.119%	SSB for 2009
Mullet, thin lipped grey	*Liza ramada*	Population trend increasing. Negligible effect predicted.		RIMP trend analysis
Flounder	*Platichthys flesus*	Population trend increasing. Negligible effect predicted		RIMP trend analysis
Five-bearded rockling	*Ciliata mustela*	Population trend increasing. Negligible effect predicted.		RIMP trend analysis
Herring[4]	*Clupea harengus*	0.050%	0.081%	International catch for 2009
Sand Goby	*Pomatoschistus minutus*	Population trend increasing. Negligible effect predicted.		RIMP trend analysis
Bass	*Dicentrarchus labrax*	0.011%	0.013%	SSB for 2009
Plaice	*Pleuronectes platessa*	0.002%	0.005%	SSB for 2009
Ray, Thornback	*Raja clavata*	0.118%	0.194%	International catch for 2009 + Cefas discard estimate.
Whiting, Blue	*Micromesistius poutassou*	0.000%	0.000%	SSB for 2009
Eel	*Anguilla anguilla*	0.043%	0.084%	Independent stock estimate[1]
Shad, Twaite	*Alosa fallax*	0.0026% (from RIMP data)[3]	0.0043%	Independent stock estimate[1]
Shad, Allis	*Alosa alosa*	0.017%	0.053%	Independent stock estimate[2]
Lamprey, Marine	*Petromyzon marinus*	0.078%	0.166%	Independent stock estimate[1]
Lamprey, River	*Lampetra fluviatalis*	0.008%	0.021%	Independent stock estimate[1]
Salmon	*Salmo salar*	Less than 0.0086%. From RIMP data.	Less than 0.020%	EA/NRW estimates
Sea trout	*Salmo trutta*	Less than 0.0054%. From RIMP data.	Less than 0.04%	Extrapolated from rod catch for 2012-2016

Common Name	*Species*	Mean effect	Upper 95%ile effect	Impingement indicator
Brown shrimp	*Crangon crangon*	Population trend increasing. Negligible effect predicted.		RIMP trend analysis

Notes:

6. TR456 (Cefas, 2019a).
7. BEEMS SPP071 edition 3. (Cefas 2019b)
8. 50th percentile impingement effect from SPP071 edition 3. (Cefas 2019b)
9. Corrected by results of interannual variability analyses (Section 9, TR456 (Cefas 2019a)

6.3.15 The predicted HPC effects on the seven HRA designated fish species are summarised in **and** range from 0.078% SSB for marine lamprey to less than 0.0026% SSB for twaite shad.

6.3.16 International best practice in fisheries management is that a harvesting rate of 1% would have a negligible effect on the sustainability of a fish stock. The worst-case predicted impingement effect for the HRA designated species is for marine lamprey at 0.078% SSB i.e. approximately 13 times lower than the 1% threshold. At this level there is high confidence that HPC impingement will not affect the sustainability of the population.

6.3.17 **6.7** and range from 0.078% SSB for marine lamprey to less than 0.0026% SSB for twaite shad.

6.3.18 International best practice in fisheries management is that a harvesting rate of 1% would have a negligible effect on the sustainability of a fish stock. The worst-case predicted impingement effect for the HRA designated species is for marine lamprey at 0.078% SSB i.e. approximately 13 times lower than the 1% threshold. At this level there is high confidence that HPC impingement will not affect the sustainability of the population.

Table 6.7 predicted effects of HPC with FRR systems fitted on HRA designated species and comparison with the original HRA report

Species	% SSB (mean)	% SSB (upper 95th percentile)	Predicted annual mean adult losses (number of fish) per annum at HPC	
			This report	HRA report at DCO
Eel	0.043%	0.084%	156	261
Shad, twaite	0.0026%	0.0043%	4.3	8
Shad, allis	0.017%	0.053%	4.6	2
Lamprey, marine	0.078%	0.166%	11.7	41
Lamprey, river	0.008%	0.020%	9	16
Salmon	<0.0086%	<0.021%	<1.36	Not assessed
Sea trout[1]	<0.0054%	<0.040%	<0.45	Not assessed

6.3.19 As shown in detail in TR456 (Cefas, 2019a) and in the table above in all cases, with the exception of allis shad, the predicted impingement numbers at HPC are lower than those predicted during the Appropriate Assessment of HPC. The allis shad impingement prediction differs by a negligible 2.6 fish per year between the two assessments, with the revised assessment being a negligible 0.017% SSB. Considering each species in turn as detailed in TR456 (Cefas, 2019a):

Eel

6.3.20 The predicted effect is considered precautionary as it assumes that all of the eels caught at HPB were mature silver eels with an EAV of 1. However, the sampled population would have included immature yellow eels which would have a lower EAV. An AFD system would have no effect on impingement rates for this species at HPC.

Twaite shad

6.3.21 The impingement effects have been based upon a multi-year RIMP assessment due the potential uncertainties of using the 1- year CIMP dataset for a species with a low impingement rate in the CIMP, high year to year variability in numbers and where the predicted results are highly sensitive to the number of rarely impinged adult fish. (SPP071 edition 3, Cefas 2019b).

Allis shad

6.3.22 The HPC impingement effect is considered highly precautionary as it was based upon only 2 fish caught at HPB (one fish in two separate months) and assuming a statistically unlikely scaling factor to arrive at HPC predictions. No allis shad were detected during the 37-year RIMP programme. The two fish caught in the CIMP programme were not migrating in the Severn and were stray, immature sub adults that were part of the widely dispersed juvenile population that feeds at sea. They were most likely part of the French breeding population. The location of the HPC intakes in deeper water means that the impingement rate for this pelagic species is expected to be lower than the predictions in Table 6.7.

Marine lamprey

6.3.23 The HPC impingement effect is considered precautionary as it was based upon only 4 fish caught at HPB in the assessment year and a precautionary SSB. Marine lamprey do not home to natal rivers. They are dispersed over a wide spatial area up to at least the continental shelf by their parasitic feeding strategy and the returning adult fish sampled at Hinkley Point are likely to originate from a much wider stock than the Wye/Usk. There are no available data on the hearing ability of lampreys and given they are considered to be the most primitive of the extant vertebrate and that their ear is accordingly unique in its structure, there is no evidence to suggest how the ear responds to sound or even if sound is relevant to them at all (Dong Energy 2013, Popper 2005, referenced in Cefas, 2019a). There is, therefore, no evidence that marine lamprey (and river lamprey) would respond to the sound fields generated AFDs and an AFD system would, therefore, offer no impingement mitigation for this species.

River lamprey

6.3.24 There is no evidence that an AFD system would have any effect on impingement rates of this species. The predicted impingement losses are conservatively estimated at a mean of 6 fish per annum The EAV for this species has not been evaluated and has assumed to have a precautionary value of 1.

Salmon

6.3.25 The HPC impingement losses for this species are predicted to be less than 1.36 fish per annum (and that is without considering the benefits of the HPC FRR systems). The design and location of the HPC intakes means that salmon are not expected to be impinged a HPC.

Sea trout

6.3.26 The HPC impingement losses for this species are predicted to be less than 0.45 fish per annum (and that is without considering the benefits of the HPC FRR systems). The design and location of the HPC intakes means that sea trout are not expected to be impinged at HPC.

Ecological impact of removing juvenile fish

6.3.27 As stated in TR456 (Cefas, 2019a) the impingement assessment described in this report is based upon comparison of the weight or number of equivalent adults with the adult population of each species. However, the juveniles that are removed represent a portion of the prey for many species either locally or at other times of the year in different locations. It is therefore necessary to consider the impact of extracting juvenile fish that form the prey for other species. The impact is best illustrated by sprat.

6.3.28 Sprat is a small pelagic species that is the most abundant species at Hinkley Point (at nearly 50% of the impingement numbers) and it is predated on by many species in the estuary including harbour porpoise. The impingement numbers in 2014 were the highest in the 18-year period between 2000 and 2017.

6.3.29 In October 2014 the biomass of the sprat population in the Bristol Channel Approaches (that migrates in and out of the Bristol Channel in November – January) was 57,236 t (from the Cefas PELTIC survey described in BEEMS SPP089). The 50th percentile weight of those fish was approximately 2.3g per fish (from Cefas PELTIC survey biological data); i.e. the local population comprised approximately 24.9 billion fish. Impingement at HPC would have taken an estimated 0.744 million fish (Table 37) i.e. 0.003% of the number of fish in the population in the Bristol Channel Approaches.

6.3.30 The ecological effect of such impingement levels would be completely negligible given, for example, the natural variability in sprat numbers of 560% between 2013 and 2015 (BEEMS SPP089) to which predators are already adapted. Due to their abundance sprat are a major source of prey for local piscivorous fish and for harbour porpoise. To put the annual HPC sprat catch into context it is equivalent to the annual dietary requirement of between 1.4 and 6.3 harbour porpoise based upon the measured dietary requirements of 750 – 3250g fish per day from Kastelein *et al.,* 1997.

6.3.31 The same principle applies to other potential prey fish at Hinkley Point. If the impingement effect on the adult population is negligible then the corresponding effect on the number of juveniles will be also negligible because of the reciprocal manner in which the EAV calculation works; i.e. the number of juveniles in the population is vastly greater than the number of adults.

Potential effects of climate change on HPC impingement predictions

6.3.32 Sea temperatures around the UK and Ireland have been warming at between 0.2 and 0.6 °C decade-1 over the past 30 years. Projected future changes in the temperature and chemistry of marine waters around the UK and Ireland are having, and will have, effects on the phenology (timing of lifecycle events), productivity and distribution of marine fish and shellfish

6.3.33 From the RIMP survey at HPB it is possible to observe changes in the Bristol Channel fish community (that are predominantly immature juveniles) in the 37-year period 1981-2017:

6.3.34 There has been an increase in overall fish abundance (comparing 5 y means of 1981-1985 with 2013-2017, there was a 204% increase in fish numbers for all species, or 154% increase excluding sprat).

6.3.35 In terms of absence – presence, the fish community has been relatively stable. A number of warm water species have started to appear in small numbers, but species that are near their southern latitudinal boundary have generally not disappeared. Over the period there has been no trend in the number of species sampled per year; i.e. fish biodiversity in terms of number of species has remained stable but some of the species in the annual list have changed.

6.3.36 The 13 most abundant species have remained largely unchanged over the period (with the notable exception of eel) but their relative abundance has changed.

6.3.37 There have been relative changes in abundance for some species but disentangling the causes, which include the effects of climate change, changes in fishing pressure and the outcomes of management actions to conserve specific species and ecosystems, is complex especially for commercial species. There have been exponential increases in the numbers of herring, sole, sprat, five-bearded rockling, grey mullet and the important prey species *Crangon crangon*, accompanied by declines in the number of eel, dab, poor cod and pout. Over the 37 -year period of the RIMP survey 29 out of the 87 fish species show a statistically significant population trend (19 increasing, 10 declining).

6.3.38 The RIMP dataset shows that the fish assemblage in the Bristol Channel/ Severn Estuary is changing. This is probably due to a combination of climate change, changes in fishing pressure and other anthropogenic causes (e.g. changes in accessibility of freshwater spawning sites for diadromous species). HPC will efficiently sample the fish community at Hinkley Point. If a local population increases in abundance then impingement numbers will increase, if a local population declines in abundance then impingement numbers will reduce. In either case the impingement effect of HPC as a percentage of the adult population will be unchanged subject to the effects of assessment uncertainties and interannual variability as described in Sections **Error! Reference source not found.** and **Error! Reference source not found.** of TR456 (Cefas, 2019a) respectively. In such circumstances, climate change will have no effect on the predicted negligible effect of HPC impingement on the fish assemblage.

6.4 Severn Estuary/Môr Hafren SAC

6.4.1 Severn Estuary SAC site was designated in 2010 and covers an area of approximately 73,715 km^2. The site extends along the River Severn up to Frampton on Severn and covers the estuary out into Bridgwater Bay. The tidal range in the Severn Estuary is one of the highest in the world and the scouring of the seabed and strong tidal streams result in natural erosion of the habitats and the presence of high sediment loads. Two thirds of the site is composed of subtidal habitats and one third of intertidal habitats.

6.4.2 Potential LSE were identified in **Table 5.2** on the following SAC interest features:

- estuaries*
- sea lamprey;
- river lamprey;
- twaite shad.

*Note that the ‘estuaries’ interest feature has been included as the interest feature supports an ecosystem with a wide range of fish species.

Baseline environment

6.4.3 This section is intended to provide an overview of the Bridgwater Bay fish community in order to put the HPC impingement predictions into context. The information contained within this baseline is derived from the original baseline and updated with the latest data available. Given the estuaries interest feature all species considered in the TR456 report (Cefas, 2019a) are included in the baseline information below.

Analysis of the impingement monitoring programmes

6.4.4 The RIMP sampling method has not changed during its entire 37 year period and consists of six hours of sampling (in one day) off two of HPB’s four drum screens every month i.e. 72 hours sampling per annum off two pumps. Sampling is conducted during daylight, midway between springs and neaps, from high water on the ebb tide. Note that the RIMP was designed to assess long term changes in fish populations at Hinkley Point not to provide an unbiased estimate of HPB impingement. The design of the HPB intake described in **Section 3** means that HPB will impinge more fish on the ebb tide than on the flood. Previous studies at HPB have shown that 80% of the impingement occurs on the ebb tide (Turnpenny et al 1994). By sampling only on the ebb tide, 24 h impingement estimates scaled up from the RIMP samples have an ebb tidal bias of a factor of 1.6. To scale up the RIMP numbers to calculate HPB or HPC impingement it is therefore necessary to reduce the RIMP numbers by this factor of 1.6. (The CIMP programme took 24 h samples and did not suffer from tidal bias and CIMP data do not need to be corrected in this manner). It is noted that the relatively low sampling intensity (six hours per month) does lack resolution for studying high frequency events e.g. recruitment events and produces high variances on the impingement estimates for rare species.

6.4.5 The programme has detected 87 fish species at HPB in 37 years, with typically about 38 species sampled in each year. **Table 6.8**, **Table 6.9** and **Tables 6.10** present the most abundant species from the HPB RIMP surveys over the three periods, 2008-2012, 1981-1985 and 2013- 2017; within these tables, those species with cells shaded orange make up to top 95% by annual abundance, and the ‘total’ number of fish is the total annual RIMP impingement for all species in the given year.

6.4.6 Over the 37 year period the following conclusions can be drawn (as stated in TR456, Cefas 2019a):

- There is a wealth of evidence that fish assemblages are changing significantly at all latitudes in response to fishing and climatic change. The assemblage at Hinkley Point is no exception and over the past 37 years it has changed with time. As would be expected, as the population of some species has declined, the populations of other species have grown in number to fill vacated ecological niches, i.e. the assemblage is a dynamic system in which predator-prey relationships adjust on a seasonal and annual basis to maintain energy balances.
- There has been a significant rise in total fish abundance over the 37 year period with a 54% increase in fish numbers (excluding sprat) or more than 100% increase if sprat is included.
- With a few exceptions, the same group of 13 species has dominated the fish community (top 95% by numbers) for the entire period, but the relative rankings of each species have changed due to a combination of climate change, changes in fishing pressure and management action to conserve ecosystems. These pressures have been exerted over a much larger spatial area than the Severn Estuary and the changes seen at Hinkley Point reflect these broad scale changes.
- Twenty nine species display a statistically significant trend in abundance over the period, with 19 showing an increasing and 10 a decreasing trend. Of these there has been an exponential increase in numbers of herring, sole, sprat, five bearded rockling and grey mullet with declines in the number of eel, dab, poor cod and pout. These relative changes are sufficient to explain the changes in the species ranking for those species that make up the top 95% of abundance in the 37 year survey period (**Table 6.8, 6.9 and 6.10**).
- Considerable year to year variability in species abundance; e.g. for species that made up the top 95% of the RIMP numbers, Coefficients of Variation

varied from 49% for whiting to 180% for herring. For many species this variation was driven by variable year to year recruitment (as evidenced by the numbers of 0 group fish per annum in the RIMP impingement record).

- Length data show that the community is dominated by immature juvenile fish, with only a few mature adults present (Section **Error! Reference source not found.** of the TR456, Cefas 2019a).
- In terms of the designated migratory species, the well documented international decline in eel numbers is clearly shown in the RIMP impingement record. The numbers of twaite shad have also reduced since the large recruitment events that occurred in 1989 and 1990. The 37-year record shows a decline in impingement numbers compared with those 2 high recruitment years but there is no trend from 2000 onwards (and probably earlier from visual inspection of the dataset). The reduction in twaite shad numbers has been ascribed particularly to the construction of barriers to shad migration in spawning rivers (Aprahamian et al., 2003). More recently the twaite shad 2010 recruitment was the third largest in the 37-year data series.
- River and marine lampreys, allis shad, salmon and sea trout were rare and for many years not present in the RIMP impingement record. No trend analysis is possible for these species because of the low numbers impinged. The 37-year impingement dataset for these five species consists of:
  - 9 salmon - 2 fish in 2004, 1 in 2002, 1 in 2000, 1 in 1998, 1 in 1989, 1 in 1987, 1 in 1983 and 1 in 1981
  - 9 river lampreys - 1 in 2010, 1 in 2005, 1 in 1999, 2 in 1998, 1 in 1997, 1 in 1995, 1 in 1992 and 1 in 1981
  - 2 marine lampreys - 1 in 2008 and 1 in 1999. Both fish were parasitic juveniles.
  - 1 sea trout in 2017.
  - No allis shad.

Table 6.8 Most abundant species from the HPB RIMP surveys 2008 – 2012

Rank	2008	2009	2010	2011	2012
1	Whiting	Whiting	Sprat	Sprat	Sprat
2	Sprat	Sprat	Herring	Whiting	Whiting
3	Goby, sand	Cod	Sole	Sole	Goby, sand
4	Sole	Sole	Whiting	Five-bearded rockling	Sole
5	Snake pipefish	Five-bearded rockling	Flounder	Goby, sand	Herring
6	Poor cod	Flounder	Goby, sand	Mullet, grey	Sea snail
7	Herring	Goby, sand	Cod	Sea snail	Poor cod

Rank	2008	2009	2010	2011	2012
8	Five-bearded rockling	Herring	Fiver-bearded rockling	Flounder	Pout
9	Flounder	Snake pipefish	Mullet, grey	Dab	Flounder
10	Pout	Mullet, grey	Sea snail	Herring	Five-bearded rockling
11	Sea snail	Bass	Shad, twaite	Goby, common	Dab
12	Bass	Sea snail	Snake pipefish	Hooknose	Mullet, grey
13	Dab	Poor cod	Bass	Pout	Bass
Total	**5,612**	**5,300**	**5,559**	**3,120**	**5,990**

Notes:
1. Species shaded orange make up the top 95% by annual abundance
2. Total number of fish is total annual RIMP impingement for all species
3. Rank ordering is from the calendar year RIMP dataset and is approximate due to the low sampling frequency of the RIMP

Table 6.9 Most abundant species from the HPB RIMP surveys 1981 - 1985

Rank	1981	1982	1983	1984	1985
1	Sprat	Poor cod	Whiting	Sprat	Whiting
2	Whiting	Sprat	Poor cod	Whiting	Sea snail
3	Poor cod	Whiting	Sprat	Goby, sand	Sprat
4	Goby, sand	Goby, transparent	Goby, sand	Poor cod	Sole
5	Sea snail	Pout	Sea snail	Sea snail	Flounder
6	Sole	Sea snail	Dab	Dab	Goby, sand
7	Pout	Sole	Pout	Sole	Poor cod
8	Dab	Goby, transparent	Flounder	Lumpsucker	Dab
9	Flounder	Dab	Hake	Flounder	Shad, twaite
10	Eel	Eel	Sole	Goby, transparent	Goby, transparent
11	Bass	Bass	Bass	Norway pout	Bass
12	Mullet, grey	Five-bearded rockling	Goby, transparent	Shad, twaite	Eel
13	Conger eel	Norway pout	Shad, twaite	Eel	Pout
Total	**2,457**	**4,561**	**2,493**	**3,497**	**1,940**

Notes:
1. Species shaded orange make up the top 95% by annual abundance
2. Total number of fish is total annual RIMP impingement for all species
3. Rank ordering is from the calendar year RIMP dataset and is approximate due to the low sampling frequency of the RIMP

Table 6.10 Most abundant species from the HPB RIMP surveys 2013 – 2017

Rank	2013	2014	2015	2016	2017
1	Whiting	Sprat	Sprat	Sprat	Whiting
2	Sprat	Whiting	Whiting	Whiting	Sole
3	Herring	Goby, sand	Herring	Sole	Sprat
4	Poor cod	Bass	Goby, sand	five bearded rockling	Goby, sand
5	Sole	Poor cod	Sole	Goby, sand	five bearded rockling
6	Cod	Sole	Bass	Herring	Mullet, grey
7	Goby, sand	five bearded rockling	Flounder	Poor cod	Bass
8	Flounder	Flounder	5 bearded rockling	Gurnard, grey	Gurnard, grey
9	Sea snail	Herring	Poor cod	Sea snail	Sea snail
10	Gurnard, grey	Cod	Sea snail	Bass	Flounder
11	five bearded rockling	Mullet, grey	Cod	Flounder	Goby, transparent
12	Pout, Norway	Gurnard, grey	Gurnard, grey	Dab	Cod
13	Mullet, grey	Pollack	Mullet, grey	Cod	Herring
Total	**5959**	**8310**	**6793**	**7005**	**3625**

Notes:

1. Species shaded orange make up the top 95% by annual abundance
2. Total number of fish is total annual RIMP impingement for all species
3. Rank ordering is from the calendar year RIMP dataset and is approximate due to the low sampling frequency of the RIMP

6.4.7 Whilst the RIMP programme has provided a useful dataset for interannual trend analysis, the CIMP survey was designed to provide an unbiased, high resolution dataset which would enable the seasonal fish community to be analysed in detail even for the rare species.

6.4.8 The one year 2009/10 CIMP survey consisted of 40 x 24 hour samples conducted on pseudo randomly selected sampling dates stratified into 10 samples per quarter i.e. 960 hours sampling per annum, and analysis as presented in TR456 (Cefas, 2019a) is summarised below.

6.4.9 In the CIMP 2009/10 survey, 64 fish species were detected in 40 * 24-hour samples. From these data the bootstrapped annual mean impingement for HPB and HPC together 95% confidence limits were calculated (Appendix D, Cefas 2019a). The raw data for the CIMP assessment consists of 24-hour daily totals of fish impinged with all 4 cooling water pumps operational. These data comprise a total of more 217,000 fish with numbers ranging from 106,000 for sprat to three species with only one individual. The high number of sampling hours means that much more realistic estimates of the density of protected species can be made than from the RIMP survey data. For example, a total of one fish caught in one 6-hour sample in one month of the RIMP would scale up to an HPC maximum impingement prediction of 385 fish (non pelagic species) or 146 fish (pelagic species) after making the unlikely assumption that the same fish density would occur for each 6-hour period of every day of the month. This is not to say that an impingement of one fish in a year in the RIMP would equate to an HPC impingement of 385 (or 146) fish in reality, rather that the prediction is a high variance artefact of the low sampling frequency in the RIMP and the consequential large scaling factor required to arrive at HPC predictions. In contrast one fish caught during one 24-hour sample in the CIMP annual survey would scale up to a predicted maximum HPC impingement of 23 fish (or 9 fish for pelagic species). In the absence of evidence to the contrary, an impingement record of one fish in 1 month of an annual RIMP data record, is more likely to represent a likelihood of much less than 385 fish and possibly only one stray fish at HPC; i.e. impingement predictions of rare species from the RIMP dataset need to be treated with caution.

6.4.10 Of the protected migratory species sufficient numbers of twaite shad and eel were impinged in the CIMP programme to allow a reasonable assessment of impingement effects. The numbers of marine lamprey were very small (four in the year) but sufficient to make a precautionary assessment of effect. However, the numbers of allis shad and river lamprey (both at only two fish in the whole year) were so low that they are both considered to be species that are not vulnerable to impingement effects at Hinkley Point. No salmon or sea trout were detected.

6.4.11 The fish community was dominated by sprat with 48.8% of the measured fish numbers; the pelagic species (sprat and herring) provided 50.2% of the total abundance. A total of seven fish species represented 95% of the impingement numbers and 12 species made up 99% of the abundance. Four species (sprat, whiting, sole and cod) represented 88% of the total numbers with mullet, flounder and five-bearded rockling providing the next 7%. Fifty species occurred rarely or in very low numbers, contributing a total of 0.56% of the annual impingement and individually constituting 0.1% to 0.0004% of the annual impingement numbers.

Annual impingement seasonality

6.4.12 Most fish species at Hinkley Point are not present for the entire year in significant numbers, and the community changes throughout the year as different species migrate in and out of Bridgwater Bay. Of the 64 fish species in the CIMP dataset only whiting, five-bearded rockling and conger eel were recorded all year round at broadly similar densities, but even these species have periods of higher density e.g.

August - December for five-bearded rockling. A number of species such as sprat, sole, cod and flounder are present for all, or nearly all, of the year but they display very distinct seasonality with their peak numbers concentrated in a few months and very low numbers in other months. For example, 48% of cod were associated with the arrival of new recruits in June, 99% of sprat are present from November - January as they migrate into and then out of the Bristol Channel. This means that HPC impingement will not exert a constant mortality pressure for 365 days a year on each species. In fact, the majority of the effect on many species is frequently only for weeks to a few months per annum, as presented in **Table 6.11**.

Table 6.11 Measured seasonality for the fish species assessed in this report showing percentage of annual impingement numbers for each species

Species	HPB annual impingement	% of annual total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sprat	970,458	48.8%	26%										32%	41%
Whiting	541,942	27.2%	8%	10%	5%	4%	3%	14%	4%	8%	7%	4%	13%	18%
Sole, Dover	143,998	7.2%				3%	12%	7%	27%	37%	9%	3%	2%	
Cod	95,310	4.8%	7%				4%	48%	7%	8%	7%	5%	8%	6%
Mullet, Thin-lipped grey	56,189	2.8%	45%	3%	2%						3%	1%	3%	42%
Flounder	54,971	2.8%		3%	2%	16%	19%	27%	16%	8%	6%	2%		
Rockling, Five-bearded	34,846	1.8%	4%	3%	3%	5%	7%	5%	3%	11%	12%	11%	14%	23%
Herring	27,478	1.4%	19%	50%	7%			3%	2%	2%	2%	3%	6%	5%
Goby, Sand	18,706	0.9%		5%	3%	6%	2%			33%	11%	12%	19%	7%
Bass	8,191	0.4%	9%	14%	9%	12%	3%	12%	6%	4%	8%	11%	6%	7%
Plaice	1,292	0.06%	3%	2%			12%	50%	6%	12%	2%	4%	5%	2%
Ray, Thornback (Roker)	780	0.04%			1%	9%	23%	11%	26%	6%	6%	3%	13%	1%
Whiting, Blue	288	0.01%	68%											32%
Shad, Twaite	550	0.03%		11%	1%	3%	18%				17%	27%	10%	14%
Eel	309	0.02%	15%	14%	8%	5%	3%	7%	15%	9%	10%	13%		3%
Lamprey, Marine	46	0.002%	27%	28%		30%	16%							
Shad, Allis	18	0.001%		64%	36%									
Lamprey, River	18	0.001%	100%											
Salmon	0	0.0%												
Sea Trout	0	0.0%												

Key:

% of annual impingement	Colour
>20%	Pink
5% to 20%	Yellow
1% to <5%	Green
Not present or< 1%	White

Notes:

1. Orange cells in first column = fish species that made up the first 95% of total impingement.
2. Salmon and sea trout were not detected during the CIMP programme.
3. Annual impingement number is based upon bootstrapped means.

6.4.13 As described in TR456 (Cefas, 2019a) species not detected in the HPB CIMP impingement programme include migrating adult salmon, sea trout and twaite shad, migrating salmon and sea trout smolts and glass eels and thus are considered below.

6.4.14 *Adult salmon, sea trout and twaite shad*

6.4.15 Adult salmon and sea trout migrate up the estuary using selective tidal stream transport on the flood tide, close to the sea surface and in mid channel following an olfactory trail to their natal rivers (Defra 2004). Adult twaite shad migrating up estuary to freshwater are considered to use the same energy efficient migratory pattern as other diadromous species; i.e. migration on the flood tide, near to the surface and in mid channel where current speeds are highest (Dr A Moore, Fisheries Ecologist. Cefas, pers. comm., Aprahamian *et al.,* 2003, referenced in Cefas, 2019a).

6.4.16 The deep-water channel is more than 10 km to the north of either HPB or the planned HPC intakes. On the flood tide the HPB and HPC intakes will abstract from a tidal stream that approximates to the size of the intake surface; i.e. they will only abstract from a layer near to the seabed (Turnpenny *et al,* 1994, referenced in Cefas, 2019a).

6.4.17 The distance from the main channel and the surface migratory pattern means that none of these species would be expected to be impinged in any significant numbers at either HPB or HPC.

Salmon and sea trout smolts

6.4.18 Tagging studies in estuaries have shown that seaward migrating salmon and sea trout smolts migrate on the ebb tide using selective tidal stream transport at or near to the surface and in the main channel where the current speed is highest. (Thorstad *et al.,* 2012, Moore *et al.,* 1998, referenced in Cefas, 2019a). Kelts (post spawning adults) of both species also migrate seawards in the same manner (Dr A Moore, Cefas, pers.comm.). The HPB and the future HPC intakes are more than 10 km from the deep-water channel and when combined with their near surface migratory behaviour, neither salmon nor sea trout smolts or kelts would be expected to be impinged in any significant numbers at either station.

Glass eels

6.4.19 All European eels belong to a single panmictic stock that is widely distributed in marine, coastal and freshwater habitats of Europe; it also occurs from the Atlantic coast of North Africa, through Europe, the Baltic Sea and in the Mediterranean (OSPAR 2010, referenced in Cefas, 2019a). Eels spawn in the Sargasso Sea. Their larvae (leptocephali) drift with the Gulf Stream across the Atlantic Ocean for one to three years until they reach the coasts of Europe by which time they have metamorphosed into glass eels (juvenile translucent eels). Once glass eels locate an estuary they migrate up the estuary to freshwater using selective tidal stream transport on the flood tide. Glass eels of approximately 70-80 mm total length enter the Bristol Channel in the approximate period February to April. Virtually all of any glass eels abstracted by HPC would be entrained as they will be small enough to pass through the 5 mm drum screen mesh (BEEMS Scientific Position Paper SPP063, Cefas, 2013)

6.4.20 In 2012 and 2013 targeted fishing surveys were undertaken to determine the spatial distribution of glass eels across the Bristol Channel at three depths; the surface (0 m), at 4 m and at 7 m. The results of the surveys (BEEMS Technical Report TR274, referenced in Cefas, 2019a) confirmed that:

- glass eels migrated up estuary on the flood tide by day and night;
- they were not found in the water column on the ebb tide;
- glass eels used the full width of the Severn Estuary to migrate up estuary to freshwater;
- glass eel densities were consistently highest in shallow, inshore zones close to the Welsh and English coasts;
- there was evidence that eel densities are greater at the surface than at deeper depths; particularly than at depths of 7 m; and
- the density of eels at the location of the proposed HPC intakes was significantly less than at further inshore sites.

6.4.21 As the maximum glass eel densities occur near the sea surface on the flood tide, they are largely invulnerable to abstraction at HPB which abstracts from the bottom 6 m of the water column on the flood tide. They would be even less at risk at HPC due to the deeper water at the intake locations and the reduced height of the intake surfaces (from 1m to 3m off the seabed). Any glass eels that may be abstracted at HPC would pass through the drum screen mesh and be entrained. As would be expected there are no records of glass eel impingement at HPB as they will also pass through the screens and be entrained instead. A few glass eels have been found in zooplankton samples taken from the HPB forebay in February and March (BEEMS SPP063, Cefas 2013). Entrainment simulation experiments have shown that glass eels will have a high rate of entrainment survival in HPC in the range 72% to 92% (BEEMS Technical Report TR273, Cefas, 2013b). The predicted effect of HPC entrainment on the eel population was reported in the DCO submission to be negligible (BEEMS SPP063, Cefas 2013).

Discussion of impacts

6.4.22 As discussed in **Section 1** only impacts relating to the changes to the CWS, removal of the AFD system, are included in this updated HRA report. The impact therefore considered is the impingement of fish with other impacts on the Severn Eutuary SAC remaining the same as the original HRA report and conclusions as per the SoS HRA.

6.4.23 The impingement assessment method and results are summarised in **Section 6.2** and **6.3** (which also describes effects on each designated migratory species) and fully detailed in the TR456 report (Cefas, 2019a). In this section this quantitate assessment is related to the Severn Estuary SAC to fully consider the potential impacts.

6.4.24 Section 5.1.4 of the TR456 (Cefas, 2019a) discusses the context surrounding the sustainability of the SAC estuarine assemblage and states:

- The relative abundance of the species in the assemblage at Hinkley Point is changing with time. Species composition is also changing but more slowly with an increasing prevalence of warm water species and a gradual reduction in the abundance of a number of species at the southern limit of their distribution due to climate change.
- There are very large diel, seasonal and interannual fluctuations in the population density of individual species at Hinkley Point. Estuaries are amongst the most fluctuating aquatic environments on earth, with the boundaries of natural variability, even for individual systems, seldom defined or recorded (Whitfield and Elliot 2002, referenced in Cefas, 2019a). The Severn is no exception and given its exceptionally dynamic nature, it is not surprising that no population baseline has been established for the assemblage.
- Individual species migrate into and out of the estuary in succession and the overwhelming majority spend most of their lifecycles outside of the SAC; there are very few truly estuarine resident species and these are not common at Hinkley Point (black goby, common goby, sand smelt, 3 spined stickleback) and all of these show either a statistically significant positive trend in abundance or no trend at the site.
- For most species only the juvenile life stage is exposed to impacts in the estuary and for most species the exposure to impingement risk at Hinkley Point is measured in weeks or a few months. Even within the estuary species are mobile moving into and out of the regions of inner estuary whilst following prey or retreating from predators, seeking overwintering areas etc.
- The main influences on fish populations are outside the estuary either in reproductive success or survival against predation and fishing in coastal or oceanic waters in the case of marine species whose juveniles use the estuary (Whitfield and Elliott 2002, referenced in Cefas, 2019a).

6.4.25 As such, the concept of estuarine populations of the assemblage species has no biological meaning and the community reflects the state of each stock on a much broader spatial scale which is predominantly outside of the SAC. In just the same manner that the much larger effects of fishing are assessed against the spawning stock biomass of recognised fish stocks, there is no scientific rationale for assessing the species at Hinkley Point in any other manner where such information exists.

6.4.26 The fish assemblage at Hinkley Point is diverse and contains all of the characteristic species from all the functional guilds, habitat groups and feeding guilds that would be expected of a European Atlantic seaboard estuary at this latitude. The 21 species assessed in the TR456 report are representative of the fish assemblage at Hinkley Point. **Section 6.2** describes justification for the selection of key taxa that represent the estuarine fish assemblage.

6.4.27 It is noted that impacts are assessed at a larger scale than the Severn Estuary SAC (and all other designated sites assessed below) despite impingement occurring within the SAC. Justification of the spatial scales used is detailed in TR456 (Cefas, 2019a).

Mitigation measures (and residual impacts)

6.4.28 In this section the proposed mitigation measures for fish are described and the residual impacts presented.

6.4.29 There is no formal, mandatory guidance for mitigation of abstraction impacts at nuclear new build sites; however, for large, direct-cooled plant, best practice guidance and evidence from the EA (EA 2005, 2010) recommends the following cooling water intake design features:

- location of the cooling water intake away from fish spawning grounds;
- maintenance of low velocities at all tidal states, via LVSE intake design;
- a cap (velocity cap) across the top of the intake to prevent vertical intake currents, which fish find it difficult to avoid;
- installation of an FRR system to intercept and return any fish which are entrained to the sea; and
- installation of a fish deterrent system to the intake structure to provide avoidance cues.

6.4.30 Below is a brief description of the mitigation measures incorporated in the HPC Project in relation to the CWS and how the location of the intake heads, structure of the intake heads (LVSE) and the FRR system comply with the recommendations made by the EA.

Location / Intake water velocity

6.4.31 The location of the four HPC cooling water intake structures are not in the proximity of any known fish spawning grounds.

6.4.32 The intake design has been developed along the principles outlined within the EA's best practice, referenced there as the 'low-velocity side-entry (LVSE)' intake design. The LVSE intake is designed to reduce impingement due the reduced cross-sectional area presented to fish being transported in the tidal stream and maintenance of low intake velocities across the side entries, which potentially allows the 'escape' of certain fish species that are swimming within the influence of the intake head.

6.4.33 This design provides substantially lower velocities around the tidal cycle than the open-all-round cooling water intake structures as installed at HPA and HPB.

6.4.34 Full details of the system, and associated analysis of mitigation success, can be found in the CW1 report.

Fish recovery and return system

6.4.35 Drum screens within the onshore cooling water pumphouse area are designed primarily to exclude debris that might clog the steam condensers within the turbine hall. The drum screen system selected for HPC is suitable for FRR, and will follow or improve upon the detailed EA guidance on FRR system design. In particular, it will include the following features:

- smooth-finish drum screen of up to 5 mm spacing;
- fish bucket design suitable for retention of eel, lamprey and other fish and crustacean species;
- continuous screen rotation at an elevation rate at least 1.5 m per minute;
- low (<1 bar) followed by high (usually >3 bar) backwash sprays;
- hopper geometry to minimise the risk of fish recycling within the screen well; and
- smooth-finish gutters with horizontal and vertical bend radius ≥3 m.

6.4.36 On review of various options, the chosen route for fish return to the subtidal estuary will be via a dedicated bored tunnel driven from landward, under the seawall and intertidal shore, to a specific point on the tidally-scoured rock exposure below Lowest Astronomical Tide (LAT) but above the subtidal muddy plain. In selecting this location there has been a need to balance a series of requirements, not least that the relatively small outfall structure does not become clogged due to progressive siltation with relative sea level rise over the design life of HPC.

6.4.37 Revised assessment of the potential impacts arising from impingement via the cooling water intakes (**Section 6.3**) has identified that there is no significant impact arising from the operation of the CWS, taking into account the installation of an FRR system, and the LVSE intakes (as detailed in the TR456 report, Cefas, 2019a).

6.4.38 **Table 6.5** shows the predicted impingement levels with HPC fitted with LVSE intakes and FRR system (to recover fish from the band and drum screens and return them to sea via a dedicated FRR discharge tunnel). For all species the predicted effects are less than the 1% threshold for negligible effects. It is concluded that the effects of HPC with FRR systems fitted on impingement of each of the 21 species assessed in this report would be negligible. These species are considered representative of the assemblage and include all of the HRA designated fish species at the site which are also considered in more detail in **Section 6.3**. Further the uncertainty and interannual analysis conducted in TR456 as summarised in **Table 6.6** does not alter the conclusions made.

6.4.39 For all species in **Table 6.6**, which includes the SAC interest features (species that represents the estuaries fish assemblage as well as sea lamprey, river lamprey and twaite shad) the predicted mitigated HPC impingement as a % of SSB or the fishery landings/catch is less than 1%. In all cases the predicted HPC impingement was much less than the 1% negligible effect threshold and the populations of each of the species shows either a positive rising trend or no trend. It is therefore concluded that impingement at HPC with LVSE intakes and FRR systems fitted will have no effect on the sustainability of the populations that make up the assemblage. In particular, as stated in TR456 (Cefas, 2019a) there will be no significant effect on:

- the conservation species listed as HRA interest features;
- the number of functional guilds, feeding guilds and habitat groups present at Hinkley Point;
- the abundance of the species present in these guilds and groups; and
- the key prey species that supports the fish food web at Hinkley Point.

6.4.40 The predicted HPC effects on the individually designated fish species are summarised in **Table 6.7**, with the highest prediction of 0.078% SSB for marine lamprey.

6.4.41 International best practice in fisheries management is that a harvesting rate of 1% would have a negligible effect on the sustainability of a fish stock. The worst-case predicted impingement effect for the HRA designated species is for marine lamprey at 0.078% SSB i.e. approximately 13 times lower than the 1% threshold. At this level there is high confidence that HPC impingement will not affect the sustainability of the population.

6.4.42 Impingement predictions also are at the level where the ecological effect of the loss of juveniles (**Section 6.3**) is considered negligible and no significant indirect effects on fish (when considering predator prey relationships within the fish assemblage) are predicted.

6.4.43 Given this outcome, and the safety / project risks associated with the installation of an AFD system, this is no longer being considered as a mitigation measure for the impingement of fish and other species at HPC. All other mitigation measures listed above will be installed as outlined in the CW1 report.

Assessment against conservation objectives

6.4.44 The conservation objective for the designated migratory fish species and estuarine fish assemblage of the Severn Estuary SAC is to maintain the feature in favourable condition (Natural England & the Countryside Council for Wales, 2009). The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met.

SAC interest feature 1: Estuaries

- The abundance of the notable estuarine species assemblages is maintained or increased;
  - Notable estuarine fish species assemblage includes migratory fish species, marine species occurring in large numbers in estuaries, predominantly marine species occurring infrequently in the Severn, estuarine species typically occurring and breeding in estuaries and freshwater species typically occurring and breeding in freshwater and recorded within the Severn cSAC.

6.4.45 The CWS with the removal of the AFD system is not predicted to affect the estuarine assemblage at a level that the sustainability of the population would be compromised and given the negligible effects predicted the assemblages will be maintained.

SAC interest feature 6: river lamprey

- The size of the river lamprey population in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term;
  - The river lamprey population of the Severn depends on habitat in the adjacent River Usk SAC, River Wye SAC and River Severn. The habitats in these rivers, including spawning and nursery areas, are essential for the fulfilment of the species' lifecycle and therefore the Severn Estuary river lamprey feature can only be in favourable condition if the conservation objectives pertaining to the River Usk SAC and River Wye SAC river lamprey feature are also met in full and there is a continued recorded presence of this species in the River Severn.
- The abundance of prey species forming the river lamprey's food resource within the estuary is maintained;
  - Sea trout, shad, herring, sprat, flounder and small gadoids such as whiting and pout are all potential prey species for the river lamprey found within the Severn Estuary.

6.4.46 The predicted impingement losses are conservatively estimated at a mean of 6 fish per annum. Thus the CWS with the removal of the AFD system is not predicted to affect River Lamprey at a level that the sustainability of the population would be compromised and given the negligible effects predicted and the fact that there are no separate effects identified on the their dependant habitats the population will be maintained. Further many of the river lamprey prey species have been assessed and for these species and the whole fish assemblage the negligible indirect effects predicted suggest that the food resource will be maintained.

6.4.47 There is no evidence that an AFD system would have any effect on impingement rates of this species. There are no available data on the hearing ability of lampreys and given they are considered to be the most primitive of the extant vertebrate and that their ear is accordingly unique in its structure, there is no evidence to suggest how the ear responds to sound or even if sound is relevant to them at all (Dong Energy 2013, Popper 2005, referenced in TR456, Cefas, 2019a). There is, therefore, no evidence that river lamprey would respond to the sound fields generated AFDs and an AFD would, therefore, offer no impingement mitigation for this species.

6.4.48 The CWS with the removal of the AFD system does not change the impacts to water quality or present a barrier to migratory fish and thus the following objectives would be met.

- The migratory passage of both adult and juvenile river lamprey through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows, or poor water quality.
- Toxic contaminants in the water column and sediment are below levels which would pose a risk to the ecological objectives described above.

SAC interest feature 7: sea lamprey

- The size of the sea lamprey population in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term;
  - the sea lamprey population of the Severn depends on habitat in the adjacent River Usk SAC, River Wye SAC and River Severn. The habitats in these rivers, including spawning and nursery areas, are essential for the fulfilment of the species' lifecycle and therefore the Severn Estuary sea lamprey feature can only be in favourable condition if the conservation objectives pertaining to the River Usk SAC and River Wye SAC sea lamprey feature are also met in full and there is a continued recorded presence of this species in the River Severn.
- The abundance of prey species forming the sea lamprey's food resource within the estuary is maintained;
  - eel, cod, and haddock are all potential prey species for the sea lamprey found within the Severn Estuary.

6.4.49 The CWS with the removal of the AFD system is not predicted to effect sea lamprey at a level that the sustainability of the population would be compromised and given the negligible effects predicted and the fact that there are no separate effects identified on their dependant habitats the population will be maintained. Further many of the sea lamprey prey species have been assessed and for these species and the whole fish assemblage the negligible indirect effects predicted suggest that the food resource will be maintained.

6.4.50 As above for the river lamprey there is no evidence that marine lamprey (and river lamprey) would respond to the sound fields generated AFDs and an AFD would, therefore, offer no impingement mitigation for this species.

6.4.51 The HPC impingement effect is considered precautionary as it was based upon only 4 fish caught at HPB in the assessment year and a precautionary SSB. Marine lamprey do not home to natal rivers. They are dispersed over a wide spatial area up to at least the continental shelf by their parasitic feeding strategy.

SAC interest feature 8: twaite shad

- The size of the twaite shad population within the Severn Estuary and the rivers draining into it is at least maintained and is at a level that is sustainable in the long term;
  - the twaite shad population of the Severn depends on habitat in the adjacent River Usk SAC, River Wye SAC and River Severn. The

habitats in these rivers, including spawning and nursery areas, are essential for the fulfilment of the species' lifecycle and, therefore, the Severn Estuary twaite shad feature can only be in favourable condition if the conservation objectives pertaining to the River Usk SAC and River Wye SAC twaite shad feature are also met in full and there is a continued recorded presence of this species in the River Severn.

- The abundance of prey species forming the twaite shad's food resource within the estuary, in particular at the salt wedge, is maintained.
  - small custaceans, especially mysids and copepods, small fish, especially sprats and anchovies, and fish eggs

6.4.52 The CWS with the removal of the AFD system is not predicted to effect twaite shad at a level that the sustainability of the population would be compromised and given the negligible effects predicted and the fact that there are no separate effects identified on their dependant habitats the population will be maintained. Further the effects on entrainment of larvae and eggs is not altered with the removal of the AFD (as they are not able to undertake active avoidance) and other twaite shad prey species have been assessed, and for these species and the whole fish assemblage the negligible indirect effects predicted suggest that the food resource will be maintained.

6.4.53 Adult twaite shad migrating up estuary to freshwater are considered to use the same energy efficient migratory pattern as other diadromous species; i.e. migration on the flood tide, near to the surface and in mid channel where current speeds are highest (Dr A Moore, Fisheries Ecologist. Cefas, pers. comm., Aprahamian et al 2003). The deep-water channel is more than 10 km to the north of either HPB or the planned HPC intakes. On the flood tide the HPB and HPC intakes will abstract from a tidal stream that approximates to the size of the intake surface; i.e. they will only abstract from a layer near to the seabed. (Turnpenny et al., 1994). The distance from the main channel and the surface migratory pattern means that this species would not be expected to be impinged in any significant numbers at HPC.

6.4.54 The CWS with the removal of the AFD system does not change the impacts to water quality or present a barrier to migratory fish and thus the following objectives would be met.

- The migratory passage of both adult and juvenile twaite shad through the Severn Estuary between the Bristol Channel and their spawning rivers is not obstructed or impeded by physical barriers, changes in flows or poor water quality.
- Toxic contaminants in the water column and sediment are below levels which would pose a risk to the ecological objectives described above.

Conclusion on integrity

6.4.55 A precautionary approach to the calculation of mortality of designated fish populations via impingement in the CWS and the consequences of these predicted losses at the population level has been adopted.

6.4.56 As stated above, losses via impingement for the key species are likely to be negligible. The design of the HPC intakes (described in the CW1 report (NNB GenCo (2017)) is expected to reduce impingement levels compared with those at HPB. The losses have been calculated taking into account the performance of the FRR system and the benefit of the LVSE intakes has been quantified.

6.4.57 It is recognised that data on the population levels of the species of conservation interest in the estuary is limited; therefore, a precautionary and conservative approach has been adopted.

6.4.58 The original HRA report concluded that the HPC Project would not compromise any of the targets that underpin the conservation objectives for the designated Annex II fish populations or the fish assemblage of the Severn Estuary SAC such that an adverse effect on the integrity of the Severn Estuary SAC would arise.

6.4.59 The conclusion of this updated HRA report concludes that the operation of the HPC intakes will not adversely affect the integrity of the Severn Estuary SAC in view of its conservation objectives.

6.5 Severn Estuary/Môr Hafren Ramsar site (fish interest features)

6.5.1 The Severn Estuary was classified as a Ramsar Site on 13 July 1995 and updated in 2005. The qualifying interest features of the Severn Estuary Ramsar Site overlap with those of the Severn Estuary SPA and SAC.

6.5.2 Potential LSE were identified in **Table 5.2** on the following Ramsar criteria.

- Criterion 4: migratory fish (Salmon, sea trout, sea lamprey, river lamprey, allis shad, twaite shad and eel); and
- Criterion 8: its estuarine fish assemblage, which is one of the most diverse in Britain with over 110 species recorded.

Baseline environment

6.5.3 The baseline environment associated with the designated fish species that are common to both the Severn Estuary SAC and the Severn Estuary Ramsar site have been described in **Section 6.4**.

Discussion of impacts

6.5.4 Potential operational impacts of the proposed change to be made at HPC are discussed in **Sections 6.2, 6.3** and **6.4** and the conclusions reached therein on the populations that are common to both the Severn Estuary SAC and the Severn Estuary Ramsar.

Mitigation measures (and residual impacts)

6.5.5 No further mitigation is anticipated for migratory fish of the Severn Estuary Ramsar other than those described in **Section 6.4** and residual impacts are also as per **Section 6.4**.

6.5.6 For all species in **Table 6.6**, which includes the interest features (species that represents the estuaries fish assemblage as well as sea lamprey, river lamprey, allis shad, twaite shad and eel) the predicted mitigated HPC impingement as a % of SSB or the fishery landings/catch is less than 1%. Salmon and sea trout were also assessed via alternative methods as described in **Section 6.3** and are also well below 1% of the SSB.

Assessment against conservation objectives

6.5.7 The conservation objective for the 'estuaries' feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SAC 'estuaries" feature' in so far as these objectives are applicable to the area designated as Ramsar Site.

6.5.8 The conservation objectives for the assemblage of migratory fish species of the Severn Estuary Ramsar site is to maintain the feature in favourable condition. The conditions are the same as that for the Severn Estuary SAC.

6.5.9 The CWS with the removal of the AFD system is not predicted to effect the estuarine assemblage or migratory species at a level that the sustainability of the population would be compromised and given the negligible effects predicted the assemblages will be maintained.

Conclusion on integrity

6.5.10 The assessment applied in **Section 6.4** for the Severn Estuary SAC estuarine fish assemblage and designated migratory populations of sea and river lamprey, allis and twaite shad, and Atlantic salmon are also directly applicable to the Severn Estuary Ramsar site.

6.5.11 With regards to Ramsar Criteria 4 and 8, the assessment concludes that there is 'negligible' effect on the fish assemblages of the Ramsar site and no effect on the migratory fish species of the Ramsar site.

6.6 River Usk / Afon Wsyg SAC

6.6.1 The River Usk / Afon Wsyg SAC flows through the city of Newport and exits out into the Severn Estuary. It is considered to be one of the best areas in the UK for sea lamprey, river lamprey and salmon. It is also considered to support a significant presence of shad.

6.6.2 Potential LSE were identified in **Table 5.2** on the following SAC interest features:

- sea lamprey;
- river lamprey;
- twaite shad;
- Atlantic salmon;
- allis shad.

Baseline environment

6.6.3 The baseline environment associated with the designated fish species that are common to both the Severn Estuary SAC and the River Usk SAC have been described in **Section 6.4**.

Discussion of impacts

6.6.4 Potential operational impacts of the proposed change to be made at HPC are discussed in **Sections 6.2, 6.3** and **6.4** and the conclusions reached therein on the populations that are common to both the Severn Estuary SAC and the River Usk SAC also apply with respect to the River Usk SAC.

Mitigation measures (and residual impacts)

6.6.5 No further mitigation is anticipated for migratory fish of the River Usk SAC other than those described in **Section 6.4** and residual impacts are also as per **Section 6.4**.

6.6.6 For all species in **Table 6.6**, which includes the SAC interest features (sea lamprey, river lamprey, twaite shad, Atlantic salmon and allis shad) the predicted mitigated HPC impingement as a % of SSB or the fishery landings/catch is less than 1%. Salmon was also assessed via alternative methods as described in **Section 6.3** and are also well below 1% of the SSB.

Assessment against conservation objectives

6.6.7 The conservation objectives for the designated migratory fish species of the River Usk SAC is to maintain the features in favourable condition. The features will be considered to be in favourable condition when, subject to natural processes, each of the following conditions is met.

- The population of the feature (migratory fish) in the SAC is stable or increasing over the long term.

6.6.8 The CWS with the removal of the AFD system is not predicted to effect migratory species at a level that the sustainability of the population would be compromised and given the negligible effects predicted the population will be maintained.

Conclusion on integrity

6.6.9 The assessment applied above for the Severn Estuary SAC and Ramsar site designated migratory populations of sea and river lamprey, allis and twaite shad, and Atlantic salmon are also directly applicable to the River Usk / Afon Wsyg SAC.

6.6.10 In conclusion, this updated HRA report concludes that the operation of the HPC intakes will not adversely affect the integrity of the River Usk SAC in view of its conservation objectives.

6.7 River Wye / Afon Gwy SAC

6.7.1 The River Wye / Afon Gwy flows into the upper reaches of the Severn Estuary near the northern Severn Road Bridge. It is considered to be one of the best areas in the

UK for sea lamprey, river lamprey and salmon. It is also considered to support a significant presence of shad.

6.7.2 Potential LSE were identified in **Table 5.2** on the following SAC interest features:

- sea lamprey;
- river lamprey;
- twaite shad;
- Atlantic salmon; and
- allis shad.

Baseline environment

6.7.3 The baseline environment associated with the designated fish species that are common to both the Severn Estuary SAC and the River Wye SAC has been described in **Section 6.4**.

Discussion of impacts

6.7.4 Potential operational impacts of the proposed change to be made at HPC are discussed in **Section 6.4** and the conclusions reached therein on the populations that are common to both the Severn Estuary SAC and the River Wye SAC also apply with respect to the River Wye SAC.

Mitigation measures (and residual impacts)

6.7.5 No further mitigation is anticipated for migratory fish of the River Wye SAC other than those described in **Section 6.4** and residual impacts are also as per **Section 6.4**.

6.7.6 For all species in **Table 6.6**, which includes the SAC interest features (sea lamprey, river lamprey, twaite shad and allis shad) the predicted mitigated HPC impingement as a % of SSB or the fishery landings/catch is less than 1%. Salmon was also assessed via alternative methods as described in **Section 6.3** and are also well below 1% of the SSB.

Assessment against conservation objectives

6.7.7 The conservation objectives for the designated migratory fish species of the River Wye SAC is to maintain the features in favourable condition. The features will be considered to be in favourable condition when, subject to natural processes, each of the following conditions is met.

- The population of the feature (migratory fish) in the SAC is stable or increasing over the long term.

6.7.8 The CWS with the removal of the AFD system is not predicted to effect migratory species at a level that the sustainability of the population would be compromised and given the negligible effects predicted the population will be maintained.

Conclusion on integrity

6.7.9 The assessment applied above for the Severn Estuary SAC and Ramsar site designated migratory populations of sea and river lamprey, allis and twaite shad, and Atlantic salmon are also directly applicable to the River Wye / Afon Gwy SAC.

6.7.10 In conclusion, this updated HRA report concludes that the operation of the HPC intakes will not adversely affect the integrity of the River Wye SAC in view of its conservation objectives.

6.8 Afon Tywi / River Tywi SAC

6.8.1 The Afon Tywi /River Tywi is the longest river flowing through Wales and discharges into Carmarthen Bay. The SAC is considered to be one of the best areas in the UK for twaite shad. It is also considered to support a significant present of allis shad, river and sea lamprey.

6.8.2 Potential LSE were identified in **Table 5.2** on the following SAC interest features:

- sea lamprey;
- river lamprey;
- twaite shad; and
- allis shad.

Baseline environment

6.8.3 The baseline environment associated with the designated fish species that are common to both the Severn Estuary SAC and the River Tywi SAC has been described in **Section 6.4**.

Discussion of impacts

6.8.4 Potential operational impacts of the proposed change to be made at HPC are discussed in **Sections 6.2, 6.3** and **6.4** and the conclusions reached therein on the populations that are common to both the Severn Estuary SAC and the Afon Tywi SAC also apply with respect to the Afon Tywi SAC.

6.8.5 Specific to this River, Twaite shad woujld not be effected because the river is too far to the west for migrating fish to fall within the HPC impingement risk zone (TR456, Cefas, 2019a)

Mitigation measures (and residual impacts)

6.8.6 No further mitigation is anticipated for migratory fish of the Afon Tywi SAC other than those described in **Section 6.4** and residual impacts are also as per **Section 6.4**.

6.8.7 For all species in **Table 6.6**, which includes the SAC interest features (sea lamprey, river lamprey, twaite shad and allis shad) the predicted mitigated HPC impingement as a % of SSB or the fishery landings/catch is less than 1%.

Assessment against conservation objectives

6.8.8 The conservation objective for the designated migratory fish species of the Afon Tywi SAC is to maintain the features in favourable condition. The features will be considered to be in favourable condition when, subject to natural processes, each of the following conditions is met.

- The population of the feature (migratory fish) in the SAC is stable or increasing over the long term.

6.8.9 The CWS with the removal of the AFD system is not predicted to effect migratory species at a level that the sustainability of the population would be compromised and given the negligible effects predicted the population will be maintained.

Conclusion on integrity

6.8.10 The assessment applied above for the Severn Estuary SAC and Ramsar site designated migratory populations of sea and river lamprey, allis and twaite shad, and Atlantic salmon are also directly applicable to the Afon Tywi / River Tywi SAC.

6.8.11 In conclusion, this updated HRA report concludes that the operation of the HPC intakes will not adversely affect the integrity of the River Tywi SAC in view of its conservation objectives.

6.9 Carmarthen Bay and Estuaries / Bae Caerfyrddin ac Aberoedd SAC

6.9.1 The Carmarthen Bay and Estuaries SAC is a large site encompassing the estuaries of the Rivers Loughor, Tâf and Tywi (coastal plain estuaries) and the Gwendraeth (a bar-built estuary). There are extensive areas of intertidal mudflats and sandflats with large areas of these flats dominated by bivalves.

6.9.2 Carmarthen Bay is an extensive shallow bay with a wide variety of seabed types, including mud, sand and rock, although the majority of the seabed is sandy. The SAC includes Helwick Bank, a linear shallow subtidal sandbank that is unusual in being highly exposed to wave and tidal action. The Burry Inlet and Three Rivers system provides a migratory route for salmonids, lampreys and shad.

6.9.3 Potential LSE were identified in **Table 5.2** on the following SAC interest features:

- twaite shad
- sea lamprey
- river lamprey
- allis shad

Baseline environment

6.9.4 The baseline environment associated with the designated fish species that are common to both the Severn Estuary SAC and the Carmarthen Bay and Estuaries SAC has been described in **Section 6.4**.

Discussion of impacts

6.9.5 Potential operational impacts of the proposed change to be made at HPC are discussed in **Sections 6.2, 6.3** and **6.4** and the conclusions reached therein on the populations that are common to the Severn Estuary SAC and the Carmarthen Bay and Estuaries SAC also apply with respect to the Carmarthen Bay and Estuaries SAC.

6.9.6 Specific to this SAC twaite shad would not be in the impact zone of HPC impingement.

Mitigation measures (and residual impacts)

6.9.7 No further mitigation is anticipated for migratory fish of the Carmarthen Bay and Estuaries SAC other than those described in **Section 6.4** and residual impacts are also as per **Section 6.4**.

6.9.8 For all species in **Table 6.6**, which includes the SAC interest features (sea lamprey, river lamprey, twaite shad and allis shad) the predicted mitigated HPC impingement as a % of SSB or the fishery landings/catch is less than 1%.

Assessment against conservation objectives

6.9.9 The conservation objective for the designated migratory fish species of the Carmarthen Bay and Estuaries SAC is to maintain the features in favourable condition. The features will be considered to be in favourable condition when, subject to natural processes, each of the following conditions is met.

- The population of the feature (migratory fish) in the SAC is stable or increasing over the long term.

6.9.10 The CWS with the removal of the AFD system is not predicted to effect migratory species at a level that the sustainability of the population would be compromised and given the negligible effects predicted the population will be maintained.

Conclusion on integrity

6.9.11 The assessment applied above for the Severn Estuary SAC designated migratory populations of sea and river lamprey, allis and twaite shad are also directly applicable to the Carmarthen Bay and Estuaries SAC.

6.9.12 In conclusion, this updated HRA report concludes that the operation of the HPC intakes with an FRR system fitted will not adversely affect the integrity of the Carmarthen Bay and Estuaries SAC in view of its conservation objectives.

6.10 Pembrokeshire Marine / Sir Benfro Forol SAC

6.10.1 Habitat and biological diversity is of great importance throughout the site, particularly the well-documented Reefs habitat and the Milford Haven ria-estuary. The site’s location at a biogeographical boundary between northern and southern species distributions contributes to the biological diversity.

6.10.2 Potential LSE were identified in **Table 5.2** on the following SAC interest features:

- grey seal;

- sea lamprey;
- river lamprey; and
- allis shad.

Baseline environment

6.10.3 The baseline environment associated with the designated fish species that are common to both the Severn Estuary SAC and Pembrokeshire Marine SAC has been described in **Section 6.4**.

Discussion of impacts

6.10.4 Potential operational impacts of the proposed change to be made at HPC are discussed in **Sections 6.2, 6.3** and **6.4** and the conclusions reached therein on the populations that are common to both the Severn Estuary SAC and Pembrokeshire Marine SAC also apply with respect to Pembrokeshire Marine SAC.

6.10.5 Specific to this SAC twaite shad would not be in the impact zone of HPC impingement.

6.10.6 The pathway of effect from the change proposed to the HPC Project on grey seals is as a secondary or indirect effect from the primary effect on fish which are prey to the seals.

Mitigation measures (and residual impacts)

6.10.7 No further mitigation is anticipated for migratory fish of Pembrokeshire Marine SAC other than those described in **Section 6.4** and residual impacts are also as per **Section 6.4**.

6.10.8 For all species in **Table 6.6**, which includes the SAC interest features (sea lamprey, river lamprey and allis shad) the predicted mitigated HPC impingement as a % of SSB or the fishery landings/catch is less than 1%.

6.10.9 As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect diet related effect on the grey seals of Pembrokeshire Marine SAC.

Assessment against conservation objectives

6.10.10 The conservation objectives for the designated migratory fish species of Pembrokeshire Marine SAC is to maintain the features in favourable condition. The features will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- The population is maintaining itself on a long-term basis as a viable component of its natural habitat. Important elements include:
  - population size;
  - structure, production; and
  - condition of the species within the site.

6.10.11 The CWS with the removal of the AFD system is not predicted to effect migratory species at a level that the sustainability of the population would be compromised and given the negligible effects predicted the population size, structure and condition will be maintained.

Conclusion on integrity

6.10.12 In conclusion, this updated HRA report concludes that the operation of the HPC intakes will not adversely affect the integrity of Pembrokeshire Marine SAC in view of its conservation objectives.

6.11 Sites screened-in for piscivorous bird interest features

Severn Estuary SPA

6.11.1 Potential LSE were identified in **Table 5.2** on the following SPA qualifying feature:

- waterbird assemblage (specifically lesser black-backed gull) (Used regularly by over 20,000 waterbirds in any one season supporting 84,317 individual birds over the period of 1991/92 to 1995/96.

6.11.2 The pathway of effect from the change proposed to the HPC Project on birds is as a secondary or indirect effect from changes to prey (fish) resources and associated foraging success. Within the Severn Estuary SPA, lesser black-backed gull, as part of the water bird assemblage has a potential pathway for this secondary or indirect effect. Lesser black-backed gulls are terrestrial and marine surface feeders with an omnivorous diet predominantly consisting of opportunistic scavenging. As part of their scavenging and foraging activity they will take fish from the water surface and close below it.

6.11.3 As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect diet-related effect on the lesser black-backed gull as an interest feature of the Severn Estuary SPA. Further, as described in **Section 6.3** the juveniles that are removed through impingement represent a portion of the prey for many bird species (the impingement assessment described in this updated HRA report is based upon comparison of the weight or number of equivalent adults with the adult population of each species). However, the impact of extracting juvenile fish that form the prey for other species is negligible.

6.11.4 The conclusion of this updated HRA report concludes that the operation of the HPC intakes will not adversely affect the integrity of Severn Estuary SPA in view of its conservation objectives as there is no pathway of effect to the piscivorous bird interest features of this site

Severn Estuary Ramsar site (bird interest feature)

6.11.5 Potential LSE were identified in **Table 5.2** on the following Ramsar criterion:

- Criterion 6: regularly supports 1% of the individuals in a population of lesser black-backed gull.

6.11.6 The pathway of effect from the change proposed to the HPC Project on birds is as a secondary or indirect effect from changes to prey (fish) resources and associated foraging success. Within the Severn Estuary Ramsar site, only one bird species has a potential pathway for this secondary or indirect effect, lesser black-backed gull. Lesser black-backed gulls are terrestrial and marine surface feeders with an omnivorous diet predominantly consisting of opportunistic scavenging. As part of their scavenging and foraging activity they will take fish from the water surface and close below it.

6.11.7 As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect diet-related effect on the lesser black-backed gull as an interest feature of the Severn Estuary Ramsar site.

6.11.8 The conclusion of this updated HRA report concludes that the operation of the HPC intakes will not adversely affect the integrity of Severn Estuary Ramsar site in view of its conservation objectives as there is no pathway of effect to the piscivorous bird interest features of this site. Further, as described in **Section 6.3** the juveniles that are removed through impingement represent a portion of the prey for many bird species (the impingement assessment described in this updated HRA report is based upon comparison of the weight or number of equivalent adults with the adult population of each species). However, the impact of extracting juvenile fish that form the prey for other species is negligible.

6.12 SPAs screened in for maximum mean foraging ranges of marine piscivorous bird qualifying features

6.12.1 Potential LSE were identified in **Table 5.2** on 21 SPAs ranging from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species; lesser black-backed gull (with a maximum mean foraging distance 141+/-50.8 km); fulmar (with a max mean foraging distance 400+/-245.8 km); gannet (with a maximum mean foraging distance of 229.4+/-124.3 km); storm petrel (with an unknown but assumed large maximum mean foraging distance); and Manx shearwater (with a maximum mean foraging distance of 18.3+/-12.5 & >330 km).

6.12.2 The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on piscivorous birds. Further, as described in **Section 6.3** the juveniles that are removed through impingement represent a portion of the prey for many bird species (the impingement assessment described in this updated HRA report is based upon comparison of the weight or number of equivalent adults with the adult population of each species). However, the impact of extracting juvenile fish that form the prey for other species is negligible.

6.12.3 Therefore, the conclusion of this updated HRA report is that the operation of the HPC intakes will not adversely affect the integrity of the designated sites and the associated conservation objectives for their piscivorous bird qualifying features as there is no pathway of effect to the identified bird interest features of these sites. These sites and associated qualifying features include the following:

- Grassholm SPA
  - Breeding gannet
- Skomer, Skokholm and Seas off Pembrokeshire SPA
  - Breeding Manx shearwater
  - Breeding storm petrel
  - Breeding lesser black-backed gull
- Aberdaron Coast and Bardsey Island SPA
  - Breeding Manx shearwater
- Saltee Islands SPA
  - Breeding fulmar
  - Breeding gannet
  - Breeding Manx shearwater
- Lambay Island SPA
  - Breeding fulmar
  - Breeding Manx shearwater
- Copeland Islands SPA
  - Breeding Manx shearwater
- Cliffs of Moher SPA
  - Breeding fulmar
- Beara Peninsula SPA
  - Breeding fulmar
- Kerry Head SPA
  - Breeding fulmar
- Deenish Island and Scariff Island SPA
  - Breeding fulmar
  - Breeding Manx shearwater
  - Breeding gannet
- Puffin Island SPA
  - Breeding fulmar
  - Breeding Manx shearwater

NOT PROTECTIVELY MARKED

  - Breeding storm petrel
- Iveragh Peninsula SPA
  - Breeding fulmar
- Skelligs SPA
  - Breeding fulmar
  - Breeding Manx shearwater
  - Breeding storm petrel
- Dingle Peninsula SPA
  - Breeding fulmar
- West Donegal Coast SPA
  - Breeding fulmar
- High Island, Inishshark and Davillaun SPA
  - Breeding fulmar
- Tory Island SPA
  - Breeding fumar
- Duvillaun Islands SPA
  - Breeding fulmar
- Clare Island SPA
  - Breeding fulmar
- Blasket Islands SPA
  - Breeding fulmar
  - Breeding manx shearwater
  - Breeding storm petrel
- Horn Head to Fanad Head SPA,
  - Breeding fulmar

6.13 Sites screened-in for marine mammal interest features

6.13.1 The pathway of effect from the change proposed to the HPC Project on marine mammals is as a secondary or indirect effect from the primary effect on fish which are prey to the marine mammals. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine mammals. Further, as described in **Section 6.3** the juveniles that are removed through impingement represent a portion of the prey for marine mammals (the impingement assessment described in this updated HRA report is based upon comparison of the weight or number of equivalent adults with the adult population of each species). However, the impact of extracting juvenile fish that form the prey for other species is negligible. Additionally, there is geographical and seasonal variation in marine mammal diets that reflected the local availability of fish species.

6.13.2 The conservation objectives would therefore be achieved by maintaining the fish assemblage.

6.13.3 The conclusion of this updated HRA report concludes that the operation of the HPC intakes with an FRR system fitted will not adversely affect the integrity of the designated sites with marine mammals as interest features in view of their conservation objectives as there is no pathway of effect to the marine mammal interest features of these sites. These sites include the following:

- Bristol Channel Approaches / Dynesfeydd Môr Hafren SCI;
- Lundy SAC;
- West Wales Marine / Gorllewin Cymru Forol SCI;
- Cardigan Bay SAC;
- North Anglesey Marine / Gogledd Môn Forol SCI;
- Isles of Scilly Complex SAC;
- Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC;
- North Channel SCI;
- Rockabill to Dalkey Island SAC;
- Roaring Bay and Islands SAC; and
- Blasket Islands SAC.

7 IN-COMBINATION ASSESSMENT

7.1.1 **Section 5.4** contains the screening results for identifying which plans or projects should be included in the in-combination assessment. The list of plans and projects taken through to the in-combination assessment are listed in **Table 7.1**, along with the designated site(s) that may be affected.

Table 7.1 List of plans and projects taken through to the in-combination assessment

Plan/Project	Potentially affected designated site
Aggregate extraction areas	Severn Estuary SAC / Ramsar site
Bridgwater Barrier	Severn Estuary SAC / Ramsar site
Bristol Deep Sea Container Terminal	Severn Estuary SAC / Ramsar site
Decommissioning of HPB	Severn Estuary SAC / Ramsar site
Holyhead Deep 10 MW tidal turbine trial	North Anglesey Marine SCI
Dredgings disposal from port maintenance dredging	Severn Estuary SAC / Ramsar site West Wales Marine SCI Pembrokeshire Marine SAC
Swansea tidal power lagoon	Severn Estuary SAC / Ramsar site
Other tidal lagoons	Severn Estuary SAC / Ramsar site
Watersports centre, Ilfracombe Harbour	Bristol Channel Approaches / Dynesfeydd Môr Hafren SCI Lundy SAC
Wylfa Newydd NNB	North Anglesey Marine SCI

7.1.2 The ‘alone’ assessment concluded that because there was no significant effect identified on fish interest features, i.e. the integrity of the site in view of its conservation objectives was not adversely affected by the proposed change to the CWS, there was no indirect diet-related effect on piscivorous birds and marine mammals.

7.1.3 The approach to Stage 1: Screening was deliberately precautionary, whereby LSE was concluded if there was any conceivable negative effect on an interest feature, or even a pathway of effect to that designated site, even if the effect was *de minimis*. The ‘alone’ appropriate assessment captured all effects, including minor, non-significant effects. In view of this, the Severn Estuary SPA and Ramsar site is the only site with a piscivorous bird interest feature that has been put through the below detailed in-combination assessment.

7.1.4 The same principle applies for assessing designated sites that were not captured by the 'alone' appropriate assessment and thus do not have the potential to be affected by the change to the CWS, either alone or in-combination.

7.2 Severn Estuary SAC / SPA/ Ramsar site

7.2.1 Potential for in-combination effects have been identified on the following SAC / SPA interest features and Ramsar criteria:

- estuaries*;
- sea lamprey;
- river lamprey;
- twaite shad;
- waterbird assemblage (specifically lesser black-backed gull) (Used regularly by over 20,000 waterbirds in any one season supporting 84,317 individual birds over the period of 1991/92 to 1995/96;
- Criterion 4: migratory fish (Salmon, sea trout, sea lamprey, river lamprey, allis shad, twaite shad, and eel);
- Criterion 6: regularly supports 1% of the individuals in a population of Bewick's swan, European white-fronted goose, dunlin, redshank, shelduck and gadwall, as well as ringed plover, teal, pintail and lesser black-backed gull (*Larus fuscus*); and
- Criterion 8: its estuarine fish assemblage, which is one of the most diverse in Britain with over 110 species recorded.

Aggregates extraction

7.2.2 Marine aggregate extraction is currently licenced in the Severn Estuary/Bristol Channel at Bedwyn Sands (until 2024), Nobel Bank (until 2031) and the Culver Extension (until 2033). These sites are all within or partly within the Severn Estuary SAC/Ramsar site.

Assessment

7.2.3 Aggregates dredging may temporarily remove food resources for marine demersal fish, over a limited area at any one time, but is unlikely to affect movement of migratory fish, as the proportion of the cross-section of the Severn Estuary affected by increased turbidity at any one time will be small, allowing fish easily to avoid the plume rather than experience it as a barrier.

7.2.4 There is thus potential for removal of the AFD system from the HPC design and the aggregates dredging to result in an adverse in-combination effect on fish populations.

7.2.5 However, as it has been determined that there will be no significant effect on fish interest features as a result of removing the AFD system from the HPC proposals, and as the area affected by aggregates dredging at any one time will represent a very small proportion of the benthic food resource for fish interest features of the Severn Estuary SAC/SPA/Ramsar site, it is concluded that there will be no significant in-combination effect of these two developments, taking account of the conservation objectives set out earlier.

Bridgwater Barrier

7.2.6 Following on from the storms of the Somerset Levels and Moors in 2012 and between December 2013 and March 2014, the EA and Sedgemoor District Council are working together to deliver a scheme for the long-term management of flood risk around the Parrett Estuary.

7.2.7 This would include a tidal barrier be located on the River Parrett adjacent to Express Park in Bridgwater. The proposed tidal surge barrier will have two 15 m wide, 10 m high gates that lift vertically in and out of the river. The gates will be suspended from a high level bridge supported by three towers.

7.2.8 The gates will normally be open in the raised position, but when a tidal surge that could cause flooding in Bridgwater is forecast, the gates will be closed about two hours before high tide and will remain closed until the high tide has passed. River flows will build up slowly behind the barrier and will be released downstream once the high tide has passed and the gates can be re-opened. The barrier operation will operate in the same manner as Thames Barrier in London. It is expected that the barrier will be operated one to five times a year for flood protection and up to 30 times a year to include routine maintenance operations.

7.2.9 Construction on the barrier is expected to be carried out between the years 2022 and 2024.

Assessment

7.2.10 The location of the tidal barrier is located approximately 10 km upriver from the limits of the Severn Estuary SAC, SPA and Ramsar site on the River Parrett. However, any restriction on migration of salmonid fish, shad, eels or lampreys in the Parrett system could reduce the overall breeding success of these interest features of the Severn Estuary SAC/SPA/Ramsar site.

7.2.11 As the use of the barrier will be occasional (mainly in winter outside the migratory seasons of the fish involved and limited on each occasion to a few hours only within a tidal cycle), it is unlikely that fish will be discouraged from migrating in the River Parrett by minor delays occurring infrequently. Therefore, it is expected that there will be no significant effect on the fish assemblage of the Severn Estuary. Similarly, as it has been determined that there will be no significant effect on fish interest features as a result of removing the AFD system from the HPC proposals. Thus, no in-combination effect is predicted.

7.2.12 In conclusion, the in-combination effect of the construction and operation of Bridgwater Barrier with the operation of the HPC intakes without an AFD system will not adversely affect the integrity of the Severn Estuary SAC and Ramsar site in view of its conservation objectives.

Bristol Deep Sea Container Terminal (BDSCT)

7.2.13 The BDSCT has approval, although it is understood that it is unlikely to be commenced imminently. As part of the justification of the project on the basis of imperative reasons of overriding public interest, it was agreed that compensation for the loss of foreshore habitat would be achieved by habitat creation at Stert Point, at the mouth of the Parrett Estuary.

7.2.14 Both the loss of habitat in the Avonmouth area and habitat creation in the Bridgwater area relate to habitat important for non-piscivorous birds included in the classification of the Severn Estuary SPA and wading birds included under Criterion 6 of the Severn Estuary Ramsar site listing.

Assessment

7.2.15 The only potential for in-combination effects on interest features of the Severn Estuary SAC/SPA/Ramsar site that could arise from the proposed BDSCT development in-combination with the proposed removal of AFD system from the HPC Project would be through direct effects on fish, which not will arise from the BDSCT development or effects on piscivorous birds.

7.2.16 The only piscivorous bird included in the Severn Estuary designations is the lesser black-backed gull (*Larus fuscus*), which is an omnivore but does include fish in its diet. As it has been determined that there will be no significant effect on fish interest features as a result of removing the AFD system from the HPC proposals, it has been concluded above that there will be no secondary/indirect diet-related effect on the lesser black-backed gull as an interest feature of the Severn Estuary Ramsar site.

7.2.17 Additionally, direct effects of the BDSCT on the lesser black-backed gull will be minor, as the species is not dependent on intertidal habitat.

7.2.18 The conclusion of the in-combination assessment is, therefore, that there will be no significant adverse effect on the Severn Estuary SAC/SPA and Ramsar site, in view of its conservation objectives, as a result of the development of the BDSCT and removal of AFD system from the HPC proposals acting in-combination.

Decommissioning of HPB

7.2.19 HPB is anticipated to stop operating in 2023 therefore, it is unlikely that it will be in operation at the same time as HPC. If the operational life of HPB were to be extended further, a further assessment of potential effects from concurrent operation of HPB and HPC would be undertaken to satisfy the Habitats Regulations.

Assessment

7.2.20 There is the potential for disturbance of birds during the decommissioning of the various buildings at HPB. However, the magnitude of disturbance to lesser black-backed gulls is anticipated to be minimal and restricted to a small zone of effect and considered to be negligible.

7.2.21 The cessation of abstraction of cooling water at HPB is anticipated to diminish effects on the fish assemblage of the Severn Estuary.

7.2.22 In conclusion, the in-combination effect of the decommissioning of HPB with the operation of the HPC intakes will not adversely affect the integrity of the Severn Estuary SAC, SPA and Ramsar site in view of its conservation objectives.

Tidal lagoon projects in the Severn Estuary/Bristol Channel

7.2.23 Tidal lagoon development for electricity generation is proposed off Swansea and at three other locations within the Severn Estuary/Bristol Channel. The Swansea proposal has permission granted through a DCO although negotiations are ongoing regarding a marine licence. Advance notice has been given to PINS of likely applications for the other projects but no applications have yet been submitted.

Assessment

7.2.24 Tidal lagoons may affect fish populations through entrainment of fish through the turbines. Particular concern has been raised in relation to entrainment of migratory salmonid fish through the turbines at the proposed Swansea Tidal Lagoon.

7.2.25 Nevertheless, the HRA undertaken by the Department of Energy and Climate Change in relation to the DCO application for the proposed Swansea Tidal Lagoon concluded that, with proposed mitigation in place, there will be no adverse effect on integrity at the sites examined.

7.2.26 As it has been determined that there will be no significant effect on fish interest features as a result of removing the AFD system from the HPC proposals and salmonid fish, of particular concern in relation to Swansea Tidal Lagoon, have been shown to be impinged very rarely on existing screens at HPB, it is concluded that there will be no significant in-combination effect of these two developments, taking account of the conservation objectives set out earlier.

7.3 Severn Estuary SAC/Ramsar site and Pembrokeshire Marine SAC

Disposal of arisings from port maintenance dredging

7.3.1 Disposal of material arising from maintenance dredging at the ports of Milford Haven, Watchet, Swansea, Cardiff, Portishead, Bristol (Avonmouth and Royal Portbury) and Newport. In each case the disposal site is near to the port.

7.3.2 A cross-boundary site was also designated at Holm Deep for disposal of capital dredgings from the BDSCT project.

Assessment

7.3.3 Disposal of dredged material is controlled under the marine licencing regime and disposal of material with high levels of contaminants is not permitted. Therefore, the principal effects of disposal are smothering of existing benthic communities within the licenced disposal area with material that typically supported a more impoverished benthic invertebrate community before dredging. This has potential to reduce diversity of prey for demersal fish, although productivity of the dredged material may have been high.

7.3.4 There is thus the potential to affect fish interest features in the Severn Estuary SAC/Ramsar site and in the Pembrokeshire Marine SAC. However, for both sites, the licenced disposal areas represent only a small proportion of the total site area.

7.3.5 It has been determined that there will be no significant effect on fish interest features as a result of removing the AFD system from the HPC proposals. As effects of dredging disposal will also be minor, no in-combination effect is predicted with disposal of dredged material from ports.

7.3.6 In conclusion, the in-combination effect of the disposal of dredged material from ports with the operation of the HPC intakes without an AFD system will not adversely affect the integrity of the Severn Estuary SAC and Ramsar site in view of its conservation objectives.

7.4 Sites designated for marine mammal interest features

7.4.1 A number of the projects being assessed have the potential to affect sites designated for marine mammals within the same marine mammal management unit as the location of HPC. Sites involved and relevant interest features are

- North Anglesey Marine SCI
  - harbour porpoise (*Phocoena phocoena*);
- West Wales Marine SCI
  - harbour porpoise (*Phocoena phocoena*);
- Pembrokeshire Marine SAC
  - grey seal (Halichoerus grypus);
- Bristol Channel Approaches SCI
  - harbour porpoise (*Phocoena phocoena*);
- Lundy SAC
  - grey seal (Halichoerus grypus).

Holyhead Deep Tidal Turbine

7.4.2 The Crown Estate has agreed a lease for deployment of a 10MW demonstration ‘Deep Green’ tidal turbine in the West Anglesey Demonstration Zone. Deployment and initial testing is currently in progress. The test site is within the North Anglesey Marine SCI.

7.4.3 The site falls within the same MMMU for harbour porpoise as HPC.

Assessment

7.4.4 The turbine is mounted on a tethered underwater kite structure that moves through the water driven by the tide. There is therefore potential for interaction of marine mammals with the turbine blades and resultant injury.

7.4.5 In-combination effects with removal of the AFD system from the proposed design for HPC would be possible if any effects ion harbour porpoise were predicted at HPC.

7.4.6 The assessment for AFD system removal alone concludes that there will be no significant effect on fish. As the only mechanism for indirect consequential effects on marine mammals would be through changes in prey availability, it can be concluded that there will be no effects on marine mammals arising from removal of the AFD system from the HPC design.

7.4.7 On this basis there will be no in-combination effects arising from the AFD system removal in combination with deployment of the demonstrator turbine at Holyhead Deep.

Watersports Centre, Ilfracombe Harbour

7.4.8 Proposals for a watersports centre incorporating a new slipway at Ilfracombe are the subject of an application for a Harbour Revision Order. Ilfracombe is approximately 30 km east of the boundary of the Bristol Channel Approaches SCI and 36 km from the Lundy SAC.

7.4.9 The site falls within the same MMMU for harbour porpoise and grey seals as HPC.

Assessment

7.4.10 The proposed development at Ilfracombe has potential to cause disturbance and possible damage to marine mammals from the designated sites due to underwater noise generation during construction. Details of construction methods are not yet available, so the likelihood of a significant effects cannot yet be determined.

7.4.11 The assessment for AFD system removal alone concludes that there will be no significant effect on fish. As the only mechanism for indirect consequential effects on marine mammals would be through changes in prey availability, it can be concluded that there will be no effects on marine mammals arising from removal of the AFD system from the HPC design.

7.4.12 On this basis there will be no in-combination effects arising from the AFD system removal in combination with construction of a new slipway at Ilfracombe.

Wylfa Newydd new build nuclear power station

7.4.13 Proposals for the Wylfa Newydd nuclear power station on Anglesey include creation of a harbour, as well as installation of cooling water intakes and outfalls and abstraction and discharge of cooling water. The DCO for the project is currently at examination stage.

7.4.14 The site falls within the same MMMU for harbour porpoise as HPC.

Assessment

7.4.15 Construction of the harbour facilities at Wylfa Newydd could cause disturbance and possible damage to marine mammals from the designated sites due to underwater noise generation during construction. A report to support HRA has been prepared by the developer and concluded that there was no LSE on the North Anglesey Marine SCI or any other site designated for marine mammals.

7.4.16 The assessment for AFD system removal alone concludes that there will be no significant effect on fish. As the only mechanism for indirect consequential effects on marine mammals would be through changes in prey availability, it can be concluded that there will be no effects on marine mammals arising from removal of the AFD system from the HPC design.

7.4.17 On the basis that there is no effect predicted for either site alone, it can be concluded that there will be no in-combination effects arising from the AFD system removal in combination with construction and operation of Wylfa Newydd Power Station.

8 SUMMARY AND CONCLUSIONS

8.1 Introduction and approach

8.1.1 This report considers the implications on the conservation objectives of the operation of a cooling water system designed with no AFD system installed, on the 'screened in' European and Ramsar sites and their designated features. This report will sit alongside the updated Environmental Statement (ES) for the application for a material amendment to the HPC DCO, the application for a variation to the HPC Marine Licence and the application for a variation to the HPC WDA Permit. The HRA information has been produced from the data and assessment provided in the ES and a range of technical reports, in particular the latest assessment carried out by Cefas (TR456 report, Cefas, 2019a).

8.1.2 This updated HRA report was prepared based on a two-stage process, which included screening for LSE, followed by appropriate assessment. For the purposes of the appropriate assessment, proposed mitigation measures have been identified where appropriate. The potentially significant effects of the Project have been assessed alone as well as in-combination with other relevant plans or projects. The approach for dealing with in-combination effects was to determine the environmental parameters that could be affected by the interaction of effects between projects.

8.2 Likely significant effect

8.2.1 On the basis of the known presence and distribution of designated interests relevant to the study area and the likely effects of the changes proposed to the cooling water intake design (see **Section 3.2**), an LSE screening was undertaken to determine the potential for the change to influence the designated features of the relevant European sites.

8.2.2 The result of the LSE screening identified those interest features where the potential for either spatial or temporal interaction with the proposed Project activities exists. Features for which there is no potential for interactions were screened out from further assessment. The removal of features from further consideration was based on whether there was a pathway of effect arising from the revised design to the interest features. As the pathway of effect from the revised design only directly targets fish; all other interest features except for those containing or dependent on fish were screened out.

8.2.3 For those interest features identified where potential interaction with the planned activities of the Project could occur then, it was assumed, unless available evidence was readily available, that the potential for LSE existed. This was also in keeping with the screening outcome of the original HRA.

8.2.4 **Table 5.2** provides the outcome of the HRA Stage 1: Screening, whereby it has been determined that LSE on these sites cannot be ruled out and, therefore, they proceed into HRA Stage 2: Appropriate Assessment.

8.3 Appropriate assessment of the CWS at Hinkley Point C

8.3.1 The only pathway of effect from the change proposed is from the cooling water intake leading to potential impingement of fish. If likely significant effects on fish are determined, this may have potential secondary or indirect effects on those species that feed on fish, namely birds and marine mammals. If it is determined that there are no likely significant effects on fish, then there is no secondary or indirect effect on birds and marine mammals.

8.3.2 BEEMS Technical Report TR456 (Cefas, 2019a) carried out the assessment of impingement effects of the HPC intake on the following scenarios:

- no mitigation associated with the HPC intakes; and
- LVSE intakes and a FRR system installed as mitigation.

8.3.3 The SoS HRA concluded that impingement of fish at HPC CWS will have no adverse effects on the integrity of the site in view of its conservation objectives if a FRR system and AFD system were installed.

8.3.4 This updated assessment presented in the TR456 report (Cefas, 2019a) is based upon more up to date information on the design of HPC CWS (original impingement predictions were based upon a simplified, schematic design with an assumed 125 cumec cooling water flow through the drum screens), a much more robust evidence base of the fish community at Hinkley Point and includes an in depth analyses of the impacts of interannual variations of fish populations, assessment uncertainties and of climate change. The differences in the assessment approach to that in the original 2011 assessment are described in **Table 6.1**.

8.3.5 The conclusion of the updated HRA report Stage 2: Appropriate Assessment is that the proposed change to the HPC development, (i.e. use of a CWS with an FRR system and LVSE intake head but no AFD system installed) will not adversely affect the integrity of the designated sites in question in view of their conservation objectives, either alone or in-combination with other plans or projects.

8.4 Examination of alternatives

8.4.1 As the conclusions reached in this report are that the proposed change to the CWS, both alone and in-combination with other plans or projects, would not have an adverse effect upon the integrity of the designated features of the European sites, further examination of alternative designs, activities and processes is not required.

8.5 Test for Imperative Reasons of Overriding Public Interest (IROPI)

8.5.1 As it has been determined that the operation of HPC would not have an adverse effect upon the integrity of any of the relevant designated European sites, there is no requirement for testing for IROPI.

8.6 The need for compensatory measures

8.6.1 The original HRA report concluded that there was no need for compensatory measures to be undertaken, neither was this requirement made in the SoS Appropriate Assessment. Upon re-evaluation, the need for habitat creation to compensate for identified adverse effects on the designated features of the identified European and international sites has not been identified within this updated assessment.

8.6.2 It is, therefore, also the conclusion of this updated HRA report that there is no requirement for compensatory measures.

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NOT PROTECTIVELY MARKED

APPENDIX A CONSULTATION

Summary of HPC Marine Technical Forums (MTFs) held since the reopening of Acoustic Fish Deterrent (AFD) workstream in November 2017

Date	Location	Summary
06/11/ 2017 & 07/11/ 2017	DAY 1: Bridgewater House, Bristol	**Purpose**: To provide an introduction to, and opportunity to discuss, the design development of the AFD system and the proposed change to the HPC DCO. **Discussions included:** – General regulatory issues – AFD design development – CEFAS Environmental Review of AFD Removal – AFD Maintenance and Safety Analysis – Proposed DCO Change Process – Open Discussion/Questions
	DAY 2: HPC Site	**Purpose**: To provide an opportunity to see the HPC site and provide an introduction to, and discuss, the HPC marine works. **Discussions included**: – Introduction to marine works (including 6 offshore shafts, associated dredging activities, 6 associated headworks, 3 cooling water tunnels and 1 fish return tunnel) – Site tour
26/01/ 2018	Bridgewater House, Bristol	**Purpose:** To discuss and agree a way forward in addressing technical comments on the AFD removal supporting studies. **Discussions included**: – Scene Setting - Fisheries communities of the Bristol Channel and implications for HPC impingement predictions – Open Discussion of Defra Family Priority 1 Comments – Open Discussion of some Defra Family Priority 2 Comments – Confirmation of next steps
20/04/ 2018	Bridgewater House, Bristol	**Purpose:** To aid technical understanding and alignment between MTF members and NNB GenCo prior to applications for DCO change and WDA permit and Marine Licence variation. To review and discuss schedule and associated project management processes. **Discussions included**: – Schedule – Overview of Engineering Report and Approach to BAT

		Justification – Presentation and discussion of CEFAS revised approach to environmental assessment – HRA discussion
09/08/ 2018	Skype Conference Call	**Purpose**: To aid technical understanding and alignment between MTF members and NNB GenCo prior to applications for DCO change and WDA permit and Marine Licence variation. **Discussions included**: – Presentation of NNB GenCo shadow HRA process – Projects/plans to be included in the cumulative and in-combination impact assessment – Discussion of WFD process – WDA Permit application – Schedule – DCO Consultation Strategy – Next steps
12/07/ 2018	Skype Conference Call	**Purpose:** To discuss the schedule for removal of the AFD from HPC regulatory permissions. **Discussions included**: – Discussion on schedule and key dates – Overview of DCO consultation strategy – Kick off discussion on agreeing Statement of Common Ground for DCO submission – Planning for next MTF meeting (content and expectations)
13/12/2018	Skype Conference CAll	**Purpose: a. For the** EA to provide context behind some of the technical concerns raised on the assessments to date in order to give NNB/CEFAS an opportunity to comment on these concerns. b.To align expectations prior to the permit application being submitted. **Discussions included**: – EA presentation on technical issues and Cefas response. - Update on progress on TR456 and sHRA

APPENDIX B PINS ADVICE NOTE 10 – APPENDIX 1: SCREENING MATRICES

APPENDIX C PINS ADVICE NOTE 10 – APPENDIX 2: INTEGRITY MATRICES

Planning Inspectorate

Advice Note 10

Habitats Regulations Assessment

Appendix 1: Template for Screening Matrices

Potential Effects

Potential effects upon the European sites* which are considered within the submitted HRA report for the Project are provided in the table below.

* As defined in Advice Note 10.

Effects considered within the screening matrices

Designation	Effects described in submission information	Presented in screening matrices as
Severn Estuary SAC	• Impingement of fish	• Impingement
Severn Estuary SPA	• Change to fish populations, affecting predators	• Loss of prey species
Severn Estuary Ramsar	• Impingement of fish • Change to fish populations, affecting predators	• Impingement • Loss of prey species
Exmoor and Quantocks Oakwoods SAC	No pathway of effect to the designated site from the proposed change to the development	Not applicable
Somerset Levels and Moors SPA	• Change to fish populations, affecting predators	• Loss of prey species
Somerset Levels and Moors Ramsar	• Change to fish populations, affecting predators	• Loss of prey species
Mendip Limestone Grasslands SAC	No pathway of effect to the designated site from the proposed change to the development	Not applicable
Hestercombe House SAC	No pathway of effect to the designated site from the proposed change to the development	Not applicable
River Usk / Afon Wsyg SAC	• Impingement of fish	• Impingement
River Wye / Afon Gwy SAC	• Impingement of fish	• Impingement
Afon Tywi / River Tywi SAC	• Impingement of fish	• Impingement
Carmarthen Bay and Estuaries / Bae Caerfyrddin ac Aberoedd SAC	• Impingement of fish	• Impingement
Bristol Channel Approaches / Dynesfeydd Môr Hafren SCI	• Change to fish populations, affecting predators	• Loss of prey species
Lundy SAC	• Change to fish populations,	• Loss of prey species

	affecting predators	
Pembrokeshire Marine / Sir Benfro Forol SAC	• Impingement of fish • Change to fish populations, affecting predators	• Impingement • Loss of prey species
West Wales Marine / Gorllewin Cymru Forol SCI	• Change to fish populations, affecting predators	• Loss of prey species
Cardigan Bay SAC	• Change to fish populations, affecting predators	• Loss of prey species
North Anglesey Marine / Gogledd Môn Forol SCI	• Change to fish populations, affecting predators	• Loss of prey species
Isles of Scilly Complex SAC	• Change to fish populations, affecting predators	• Loss of prey species
Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC	• Change to fish populations, affecting predators	• Loss of prey species
North Channel SCI	• Change to fish populations, affecting predators	• Loss of prey species
Rockabill to Dalkey Island SAC	• Change to fish populations, affecting predators	• Loss of prey species
Roaring Bay and Islands SAC	• Change to fish populations, affecting predators	• Loss of prey species
Blasket Islands SAC	• Change to fish populations, affecting predators	• Loss of prey species
Grassholm SPA	• Change to fish populations, affecting predators	• Loss of prey species
Skomer, Skokholm and Seas off Pembrokeshire SPA	• Change to fish populations, affecting predators	• Loss of prey species
Aberdaron Coast and Bardsey Island SPA	• Change to fish populations, affecting predators	• Loss of prey species
Saltee Islands SPA	• Change to fish populations, affecting predators	• Loss of prey species
Lambay Island SPA	• Change to fish populations, affecting predators	• Loss of prey species

Copeland Islands SPA	• Change to fish populations, affecting predators	• Loss of prey species
Cliffs of Moher SPA	• Change to fish populations, affecting predators	• Loss of prey species
Beara Peninsula SPA	• Change to fish populations, affecting predators	• Loss of prey species
Kerry Head SPA	• Change to fish populations, affecting predators	• Loss of prey species
Deenish Island and Scarrif Island SPA	• Change to fish populations, affecting predators	• Loss of prey species
Puffin Island SPA	• Change to fish populations, affecting predators	• Loss of prey species
Iveragh Peninsula SPA	• Change to fish populations, affecting predators	• Loss of prey species
Skelligs SPA	• Change to fish populations, affecting predators	• Loss of prey species
Dingle Peninsula SPA	• Change to fish populations, affecting predators	• Loss of prey species
West Donegal Coast SPA	• Change to fish populations, affecting predators	• Loss of prey species
High Island, Inishshark and Davillaun SPA	• Change to fish populations, affecting predators	• Loss of prey species
Tory Island SPA	• Change to fish populations, affecting predators	• Loss of prey species
Duvillaun Islands SPA	• Change to fish populations, affecting predators	• Loss of prey species
Clare Island SPA	• Change to fish populations, affecting predators	• Loss of prey species
Blasket Islands SPA	• Change to fish populations, affecting predators	• Loss of prey species
Horn Head to Fanad Head SPA	• Change to fish populations, affecting predators	• Loss of prey species

STAGE 1: SCREENING MATRICES

The European sites included within the screening assessment are:

- Severn Estuary SAC
- Severn Estuary SPA
- Severn Estuary Ramsar site
- Exmoor and Quantocks Oakwoods SAC
- Somerset Levels and Moors SPA
- Somerset Levels and Moors Ramsar site
- Mendip Limestone Grasslands SAC
- Hestercombe House SAC
- River Usk / Afon Wsyg SAC
- River Wye / Afon Gwy SAC
- Afon Tywi / River Tywi SAC
- Carmarthen Bay and Estuaries / Bae Caerfyrddin ac Aberoedd SAC
- Bristol Channel Approaches / Dynesfeydd Môr Hafren SCI
- Lundy SAC

- Pembrokeshire Marine / Sir Benfro Forol SAC
- West Wales Marine / Gorllewin Cymru Forol SCI
- Cardigan Bay SAC
- North Anglesey Marine / Gogledd Môn Forol SCI
- Isles of Scilly Complex SAC
- Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC
- North Channel SCI
- Rockabill to Dalkey Island SAC
- Roaring Bay and Islands SAC
- Blasket Islands SAC
- Grassholm SPA
- Skomer, Skokholm and Seas off Pembrokeshire SPA
- Aberdaron Coast and Bardsey Island SPA
- Saltee Islands SPA
- Lambay Island SPA
- Copeland Islands SPA
- Cliffs of Moher SPA

- Beara Peninsula SPA
- Kerry Head SPA
- Deenish Island and Scarrif Island SPA
- Puffin Island SPA
- Iveragh Peninsula SPA
- Skelligs SPA
- Dingle Peninsula SPA
- West Donegal Coast SPA
- High Island, Inishshark and Davillaun SPA
- Tory Island SPA
- Duvillaun Islands SPA
- Clare Island SPA
- Blasket Islands SPA
- Horn Head to Fanad Head SPA

Evidence for, or against, likely significant effects on the European sites and their qualifying features is detailed within the footnotes to the screening matrices below.

Matrix Key:

✓ = Likely significant effect **cannot** be excluded
✗ = Likely significant effect **can** be excluded

C = construction
O = operation
D = decommissioning

HRA Screening Matrix 01 Severn Estuary SAC

Name of European site and designation: Severn Estuary SAC									
EU Code: UK0013030									
Distance to NSIP: 0 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Estuaries		✓a						✓c	
Mudflats and sandflats not covered by seawater at low tide									
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)									
Sea lamprey (Petromyzon marinus)		✓b						✓c	
River lamprey (Lampetra fluvatilis)		✓b						✓c	
Twaite shad (Alosa fallax)		✓b						✓c	
Sandbanks which are slightly covered by seawater at all times									
Reefs									

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The fish assemblage classified under the 'estuaries' interest feature has the potential to be affected by the abstraction of seawater from the cooling water system leading to impingement. Therefore, LSE could not be excluded (section 5.3).

b. Sea lamprey, river lamprey and twaite shad interest features have the potential to be affected by the abstraction of seawater from the cooling water system leading to impingement. Therefore, LSE could not be excluded (section 5.3).

c. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 02 Severn Estuary SPA

Name of European site and designation: Severn Estuary SPA									
EU Code: UK9015022									
Distance to NSIP: 0 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Bewick's swan Cygnus columbianus bewickii									
European white-fronted goose Anser albifrons albifrons									
Dunlin Calidris alpina alpina									
Redshank Tringa totanus									
Shelduck Tadorna tadorna									
Gadwall Anas strepara									
Waterbird Assemblage: Used regularly by over 20,000 waterbirds in any one season (supporting 84,317 individual birds period of 1991/92 to 1995/96).					✓a			✓b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Lesser black-backed gulls (as part of the waterbird Assemblage) have the potential to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this single feature of the European designated site (Table 5.3)

HRA Screening Matrix 03 Severn Estuary Ramsar Site

Name of European site and designation: Severn Estuary Ramsar Site									
EU Code: UK11081									
Distance to NSIP: 0 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Criterion 1: immense tidal range (second-largest in the world)									
Criterion 3: unusual estuarine communities (i.e. reduced diversity).		✓a						✓d	
Criterion 4: migratory fish (Salmon Salmo salar, sea trout S. trutta, sea lamprey Petromyzon marinus, river lamprey Lampetra fluvatilis, allis shad Alosa alosa, twaite shad Alosa fallax, and eel Anguilla Anguilla).		✓b						✓d	
Criterion 5: bird assemblages of					✗e				

international importance with peak counts in winter of 70,919 waterfowl.									
Criterion 6: regularly supports 1% of the individuals in a population of Bewick’s swan, European white-fronted goose, dunlin, redshank, shelduck and gadwall, as well as ringed plover, teal, pintail and lesser black-backed gull (Larus fuscus).					✓c			✓d	
Criterion 8: its estuarine fish assemblage, which is one of the most diverse in Britain with over 110 species recorded.		✓a						✓d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The fish assemblage classified under the designated site has the potential to be affected by the abstraction of seawater from the cooling water system leading to impingement. Therefore, LSE could not be excluded (section 5.3).
b. Migratory fish interest features have the potential to be affected by the abstraction of seawater from the cooling water system leading to impingement. Therefore, LSE could not be excluded (section 5.3).
c. Lesser black-backed gulls (Criterion 6) have the potential to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).
d. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).
e. These features are unlikely to be affected by the proposed change as they are either not marine piscivorous foragers (Table 5.1).

f. HRA Screening Matrix 04 Exmoor and Quantocks Oakwoods SAC

Name of European site and designation: Exmoor and Quantocks Oakwoods SAC									
EU Code: UK0030148									
Distance to NSIP: 5 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Old sessile oak woods with Ilex and Bechnum									
Barbastelle Barbastella barbastellus									
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*									
Bechstein's bat *Myotis bechsteinii*									
Otter *Lutra lutra*									

Evidence supporting conclusions
For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).
There are no pathways of effect from the proposed material change to the CWS to the designated site. Therefore, Exmoor and Quantocks Oakwoods SAC has been screened out of the HRA process.

HRA Screening Matrix 05 Somerset Levels and Moors SPA

Name of European site and designation: Somerset Levels and Moors SPA									
EU Code: UK9010031									
Distance to NSIP: km (from the main site)									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Eurasian teal *Anas Crecca*					×a				
Bewick's swan *Cygnus columbianus bewickii*					×a				
European golden plover *Pluvialis apricaria*					×a				
Northern lapwing *Vanellus vanellus*					×a				
Over winter the area regularly supports 73014 waterfowl (5 year peak mean 1991/92-1995/96)					×a				

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. It has been determined that there is no LSE from the proposed material change from the CWS to the bird interest features of the Somerset Levels and Moors SPA because this designated site does not have marine foraging piscivorous birds as an interest feature (section 5.2). Therefore, the designated site has been screened out of the HRA process.

HRA Screening Matrix 06 Somerset Levels and Moors Ramsar Site

Name of European site and designation: Somerset Levels and Moors Ramsar Site									
EU Code: UK11064									
Distance to NSIP: 16 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Ramsar criterion 2 Supports 17 species of British Red Data Book invertebrates.									
Ramsar criterion 5 Assemblages of international importance: Species with peak counts in winter: 97155 waterfowl (5 year peak mean 1998/99-2002/2003)					×a				
Ramsar criterion 6 Tundra swan Cyugnus columbianus bewickii, Eurasian teal Anas crecca, northern					×a				

lapwing, Vanellus vanellus, mute swan Cygnus olor, Eurasian wigeon Anas Penelope, northern pintail Anas acuta, northern shoveler Anas clypeata									

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. It has been determined that there is no LSE from the proposed material change from the CWS to the bird interest features of the Somerset Levels and Moors Ramsar because this designated site does not have marine foraging piscivorous birds as an interest feature (section 5.2). Therefore, the designated site has been screened out of the HRA process.

HRA Screening Matrix 07 Mendip Limestone Grasslands SAC

Name of European site and designation: Mendip Limestone Grasslands SAC									
EU Code: UK0030203									
Distance to NSIP: 20 km (from the main site)									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)									
European dry heaths									
Caves not open to the pubic									
Tilio-Acerion forests of slopes, screes and ravines									
Greater horseshoe bat Rhinolphus ferrumequinum									

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

There are no pathways of effect from the proposed material change to the CWS to the designated site. Therefore, Mendip Limestone Grasslands SAC has been screened out of the HRA process.

HRA Screening Matrix 08 Hestercombe House SAC

Name of European site and designation: Hestercombe House SAC									
EU Code: UK0030168									
Distance to NSIP: 16 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Lesser horseshoe bat Rhinolophus hipposideros									

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

There are no pathways of effect from the proposed material change to the CWS to the designated site. Therefore, Hestercombe House SAC has been screened out of the HRA process.

HRA Screening Matrix 09 River Usk SAC

Name of European site and designation: River Usk SAC									
EU Code:									
Distance to NSIP: 40 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Sea lamprey Petromyzon marinus		✓a						✓b	
River lamprey Lampetra fluvatilis		✓a						✓b	
Brook lamprey Lampetra planeri									
Twaite shad Alosa fallax		✓a						✓b	
Atlantic salmon Salmo salar		✓a						✓b	
Bullhead Cottus gobio									
Otter Lutra lutra									
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation									
Allis shad Alosa alosa		✓a						✓b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Migratory fish interest features have the potential to be affected by the abstraction of seawater from the cooling water system leading to impingement. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 10 River Wye SAC

Name of European site and designation: River Wye SAC									
EU Code: UK001642									
Distance to NSIP: 60 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation									
White-clawed (or Atlantic stream) crayfish Austropotamobius pallipes									
Sea lamprey Petromyzon marinus		✓a						✓b	
River lamprey Lampetra fluvatilis		✓a						✓b	
Brook lamprey Lampetra planeri									
Twaite shad Alosa fallax		✓a						✓b	
Atlantic salmon Salmo salar		✓a						✓b	
Bullhead Cottus gobio									

Otter Lutra lutra									
Transition mires and quaking bogs									
Allis shad Alosa alosa		✓a						✓,b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Migratory fish interest features have the potential to be affected by the abstraction of seawater from the cooling water system leading to impingement. Therefore, LSE could not be excluded (section 5.3).
b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 11 Afon Tywi SAC

Name of European site and designation: Afon Tywi SAC									
EU Code: UK0013010									
Distance to NSIP: 120 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Twaite shad Alosa fallax		✓a						✓b	
Otter Lutra lutra									
Sea lamprey Petromyzon marinus		✓a						✓b	
River lamprey Lampetra fluvatilis		✓a						✓b	
Brook lamprey Lampetra planeri									
Allis shad Alosa alosa		✓a						✓b	
Bullhead Cottus gobio									

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Migratory fish interest features have the potential to be affected by the abstraction of seawater from the cooling water system leading to impingement. Therefore, LSE could not be excluded (section 5.3).
b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 12 Carmarthen Bay and Estuaries / Bae Caerfyrddin ac Aberoedd SAC

Name of European site and designation: Carmarthen Bay and Estuaries / Bae Caerfyrddin ac Aberoedd SAC									
EU Code: UK0020020									
Distance to NSIP: 76 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Sandbanks which are slightly covered by seawater all the time									
Estuaries									
Mudlfats and sandflats not covered by seawater at low tide									
Large shallow inlets and bays									
Salicornia and other annuals colonizing mud and sand									
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)									
Twaite shad *Alosa fallax*		✓a						✓b	
Sea lamprey		✓a						✓b	

Petromyzon marinus									
River lamprey *Lampetra fluvatilis*		✓a						✓b	
Allis shad *Alosa alosa*		✓a						✓b	
Otter *Lutra lutra*									

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Migratory fish interest features have the potential to be affected by the abstraction of seawater from the cooling water system leading to impingement. Therefore, LSE could not be excluded (section 5.3).
b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 13 Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC

Name of European site and designation: Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC									
EU Code: UK0030396									
Distance to NSIP: 99 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Harbour porpoise Phocoena phocoena					✓a			✓b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Marine mammals have the potential to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).
b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 14 Lundy SAC

Name of European site and designation: Lundy SAC									
EU Code: UK0013114									
Distance to NSIP: 102 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Reefs									
Sandbanks which are slightly covered by seawater all the time									
Submerged or partially submerged sea caves									
Grey seal Halichoerus grypus					✓a			✓b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Marine mammals have the potential to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 15 Pembrokeshire Marine / Sir Benfro Forol SAC

Name of European site and designation: Pembrokeshire Marine / Sir Benfro Forol SAC									
EU Code: UK0013116									
Distance to NSIP: 120 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Estuaries									
Large shallow inlets and bays									
Reefs									
Grey seal Halichoerus grypus					✓a			✓c	
Shore dock Rumex rupestris									
Sandbanks which are slightly covered by seawater all the time									
Mudlfats and sandflats not covered by seawater at low tide									
Coastal lagoons									
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)									

Submerged or partially submerged sea caves									
Sea lamprey Petromyzon marinus		✓b						✓c	
River lamprey Lampetra fluvatilis		✓b						✓c	
Allis shad Alosa alosa		✓b						✓c	
Otter Lutra lutra									

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Marine mammals have the potential to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. Migratory fish interest features have the potential to be affected by the abstraction of seawater from the cooling water system leading to impingement. Therefore, LSE could not be excluded (section 5.3).

c. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 16 West Wales Marine / Gorllewin Cymru Forol SCI

Name of European site and designation: West Wales Marine / Gorllewin Cymru Forol SCI									
EU Code: UK0030397									
Distance to NSIP: 147.5 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Harbour porpoise Phocoena phocoena					✓a			✓b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Marine mammals have the potential to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 17 Grassholm SPA

Name of European site and designation: Grassholm SPA									
EU Code: UK9014041									
Distance to NSIP: 173 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Gannet					✓a			✓b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of this species which consequently has the potential to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).
b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 18 Skomer, Skokholm and Seas off Pembrokeshire SPA

Name of European site and designation: Skomer, Skokholm and Seas off Pembrokeshire SPA									
EU Code: UK9014051									
Distance to NSIP: 181 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Chough Pyrrhocorax pyrrhocorax									
Short-eared Owl *Asio flammeus*									
Storm Petrel					✓a			✓b	
Lesser black-backed gull					✓a			✓b	
Manx shearwater					✓a			✓b	
Puffin					✗c				

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of these species and there is the potential for these species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

c. These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

HRA Screening Matrix 19 Aberdaron Coast and Bardsey Island SPA

Name of European site and designation: Aberdaron Coast and Bardsey Island SPA									
EU Code: UK9013121									
Distance to NSIP: 207 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Chough Pyrrhocorax pyrrhocorax									
Manx shearwater					✓a			✓b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of this species and there is the potential for this species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).
b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 20 Cardigan Bay SAC

Name of European site and designation: Cardigan Bay SAC									
EU Code: UK0012712									
Distance to NSIP: 236 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Bottlenose dolphin Tursiops truncatus					✓a			✓b	
Sandbanks which are slightly covered by seawater all the time									
Reefs									
Submerged or partially submerged sea caves									
Sea lamprey Petromyzon marinus									
River lamprey Lampetra fluvatilis									
Grey seal Halichoerus grypus					✓a			✓b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Marine mammals have the potential to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).
b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 21 Saltee Islands SPA

Name of European site and designation: Saltee Islands SPA									
EU Code: 004002									
Distance to NSIP: 262 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Gannet					✓a			✓b	
Manx shearwater					✓a			✓b	
Cormorant					✕c				
Shag					✕c				
Lesser black-backed gull					✕c				
Herring gull					✕c				
Kittiwake					✕c				
Guillemot					✕c				
Razorbill					✕c				
Puffin					✕c				

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of these species and there is the potential for these species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

c. These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

HRA Screening Matrix 22 North Anglesey Marine / Gogledd Môn Forol SCI

Name of European site and designation: North Anglesey Marine / Gogledd Môn Forol SCI									
EU Code: UK0030398									
Distance to NSIP: 251 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Harbour porpoise Phocoena phocoena					✓a			✓b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Marine mammals have the potential to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).
b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 23 Isles of Scilly Complex SAC

Name of European site and designation: Isles of Scilly Complex SAC									
EU Code: UK0013694									
Distance to NSIP: 263 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Sandbanks which are slightly covered by seawater all the time									
Mudlfats and sandflats not covered by seawater at low tide									
Reefs									
Shore dock Rumex rupestris									
Grey seal Halichoerus grypus					✓a			✓b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Marine mammals have the potential to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 24 Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC

Name of European site and designation: Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC									
EU Code: UK0013117									
Distance to NSIP: 290 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Bottlenose dolphin Tursiops truncatus					✓a			✓b	
Grey seal Halichoerus grypus					✓a			✓b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Marine mammals have the potential to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).
b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 25 Lambay Island SPA

Name of European site and designation: Lambay Island SPA									
EU Code: 004069									
Distance to NSIP: 322 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Manx shearwater					✓a			✓b	

Evidence supporting conclusions
For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of these species and there is the potential for these species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).
b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 26 North Channel SCI

Name of European site and designation: North Channel SCI									
EU Code: UK0030399									
Distance to NSIP: 359 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Harbour porpoise Phocoena phocoena					✓a			✓b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Marine mammals have the potential to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).
b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 27 Rockabill to Dalkey Island SAC

Name of European site and designation: Rockabill to Dalkey Island SAC									
EU Code: NI003000									
Distance to NSIP: 300.7 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Harbour porpoise Phocoena phocoena					✓a			✓b	
Reefs									

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Marine mammals have the potential to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 28 Copeland Islands SPA

Name of European site and designation: Copeland Islands SPA									
EU Code: UK9020291									
Distance to NSIP: 418 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Arctic tern					✕c				
Manx shearwater					✓a			✓b	

Evidence supporting conclusions
For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

- **a.** The site falls within the max/mean foraging range of this species and there is the potential for this species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).
- **b.** The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).
- **c.** These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

HRA Screening Matrix 29 Roaring Bay and Islands SAC

Name of European site and designation: Roaring Bay and Islands SAC									
EU Code: NI000101									
Distance to NSIP: 444 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Large shallow inlets and bays									
Reefs									
Vegetated sea cliffs of the Atlantic and Baltic coasts									
European dry heaths									
Submerged or partially submerged sea caves									
Harbour porpoise Phocoena phocoena					✓a			✓b	
Otter Lutra lutra									
Grey seal Halichoerus grypus					✓a			✓b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Marine mammals have the potential to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 30 Cliffs of Moher SPA

Name of European site and designation: Cliffs of Moher SPA									
EU Code: 004005									
Distance to NSIP: 476 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Kittiwake					✕c				
Guillemot					✕c				
Razorbill					✕c				
Puffin					✕c				
Chough									

Evidence supporting conclusions
For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of these species and there is the potential for these species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).
b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).
c. These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

HRA Screening Matrix 31 Beara Peninsula SPA

Name of European site and designation: Beara Peninsula SPA									
EU Code: 004155									
Distance to NSIP: 485 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Chough									

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of this species and there is the potential for this species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 32 Kerry Head SPA

Name of European site and designation: Kerry Head SPA									
EU Code: 004189									
Distance to NSIP: 486 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Chough									

Evidence supporting conclusions
For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of this species and there is the potential for this species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).
b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 33 Deenish Island and Scarriff Island SPA

Name of European site and designation: Deenish Island and Scarriff Island SPA									
EU Code: 004175									
Distance to NSIP: 499 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Manx shearwater					✓a			✓b	
Storm petrel					✓a			✓b	
Lesser black-backed gull					✗c				
Arctic tern					✗c				

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of these species and there is the potential for these species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).
b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).
c. These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

HRA Screening Matrix 34 Puffin Island SPA

Name of European site and designation: Puffin Island SPA									
EU Code: UK9020285									
Distance to NSIP: 510 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Manx shearwater					✓a			✓b	
Storm petrel					✓a			✓b	
Lesser black-backed gull					✕c				
Razorbill					✕c				
Puffin					✕c				

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of these species and there is the potential for these species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

c. These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

HRA Screening Matrix 35 Iveragh Peninsula SPA

Name of European site and designation: Iveragh Peninsula SPA									
EU Code: 004154									
Distance to NSIP: 506 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Peregrine					✗c				
Chough					✗c				
Kittiwake					✗c				
Guillemot					✗c				

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of this species and there is the potential for this species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

c. These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

HRA Screening Matrix 36 Skelligs SPA

Name of European site and designation: Skelligs SPA									
EU Code: 004007									
Distance to NSIP: 517 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Manx shearwater					✓a			✓b	
Storm petrel					✓a			✓b	
Gannet					✕c				
Kittiwake					✕c				
Guillemot					✕c				
Puffin					✕c				

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of this species and there is the potential for this species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

c. These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

HRA Screening Matrix 37 Dingle Peninsula SPA

Name of European site and designation: Dingle Peninsula SPA									
EU Code: 004153									
Distance to NSIP: 519 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Peregrine					✗c				
Chough					✗c				

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of this species and there is the potential for this species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

c. These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

HRA Screening Matrix 38 Blasket Islands SAC

Name of European site and designation: Blasket Islands SAC									
EU Code: NI002172									
Distance to NSIP: 522 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Reefs									
Vegetated sea cliffs of the Atlantic and Baltic coasts									
European dry heaths									
Submerged or partially submerged sea caves									
Harbour porpoise Phocoena phocoena					✓a			✓b	
Grey seal Halichoerus grypus					✓a			✓b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. Marine mammals have the potential to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

HRA Screening Matrix 39 West Donegal Coast SPA

Name of European site and designation: West Donegal Coast SPA									
EU Code: 004150									
Distance to NSIP: 542 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Cormorant					✕c				
Shag					✕c				
Peregrine					✕c				
Herring gull					✕c				
Kittiwake					✕c				
Razorbill					✕c				
Chough					✕c				

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of this species and there is the potential for this species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

c. These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

HRA Screening Matrix 40 High Island, Inishshark and Davillaun SPA

Name of European site and designation: High Island, Inishshark an Davillaun SPA									
EU Code: 004144									
Distance to NSIP: 551 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Arctic tern					✕c				
Barnacle goose					✕c				

Evidence supporting conclusions
For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of this species and there is the potential for this species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).
b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).
c. These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

HRA Screening Matrix 41 Tory Island SPA

Name of European site and designation: Tory Island SPA									
EU Code: 004073									
Distance to NSIP: 565 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Corncrake									
Razorbill					✗c				
Puffin					✗c				

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of this species and there is the potential for this species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

c. These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

HRA Screening Matrix 42 Duvillaun Islands SPA

Name of European site and designation: Duvillaun Islands SPA									
EU Code: 004111									
Distance to NSIP: 574 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Storm petrel					✗c				
Barnacle goose					✗c				

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of this species and there is the potential for this species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

c. These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

HRA Screening Matrix 43 Clare Island SPA

Name of European site and designation: Clare Island SPA									
EU Code: 004136									
Distance to NSIP: 548 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Shag					✕c				
Common gull					✕c				
Kittiwake					✕c				
Guillemot					✕c				
Razorbill					✕c				
Chough					✕c				

Evidence supporting conclusions
For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of this species and there is the potential for this species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

c. These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

HRA Screening Matrix 44 Blasket Islands SPA

Name of European site and designation: Blasket Islands SPA									
EU Code: 004008									
Distance to NSIP: 522 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Manx shearwater					✓a			✓b	
Storm petrel					✓a			✓b	
Shag					✕c				
Lesser black-backed gull					✕c				
Herring gull					✕c				
Kittiwake					✕c				
Arctic tern					✕c				
Razorbill					✕c				
Puffin					✕c				
Chough									

Evidence supporting conclusions
For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of this species and there is the potential for this species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

c. These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

HRA Screening Matrix 45 Horn Head to Fanad Head SPA

Name of European site and designation: Horn Head to Fanad Head SPA									
EU Code: 004194									
Distance to NSIP: 552 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					✓a			✓b	
Cormorant					✕c				
Peregrine					✕c				
Shag					✕c				
Kittiwake					✕c				
Guillemot					✕c				
Razorbill					✕c				
Chough					✕c				
Barnacle goose					✕c				
Greenland white-fronted goose					✕c				

Evidence supporting conclusions
For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The site falls within the max/mean foraging range of this species and there is the potential for this species to be affected by the potential loss of fish as prey. Therefore, LSE could not be excluded (section 5.3).

b. The potential for likely significant in-combination effects with other plans and projects has been identified for this European designated site (Table 5.3).

c. These features have no connectivity and therefore unlikely to be affected by the proposed change as they are either not marine piscivorous foragers or the HPC site falls outwith their maximum mean foraging range (Table 5.1).

Planning Inspectorate

Advice Note 10

Habitats Regulations Assessment

Appendix 2: Integrity Matrices

STAGE 2: EFFECTS ON INTEGRITY

Likely significant effects have been identified for the following sites:

- Severn Estuary SAC
- Severn Estuary SPA
- Severn Estuary Ramsar site
- River Usk / Afon Wsyg SAC
- River Wye / Afon Gwy SAC
- Afon Tywi / River Tywi SAC
- Carmarthen Bay and Estuaries / Bae Caerfyrddin ac Aberoedd SAC
- Bristol Channel Approaches / Dynesfeydd Môr Hafren SCI
- Lundy SAC
- Pembrokeshire Marine / Sir Benfro Forol SAC
- West Wales Marine / Gorllewin Cymru Forol SCI
- Cardigan Bay SAC
- North Anglesey Marine / Gogledd Môn Forol SCI
- Isles of Scilly Complex SAC
- Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC

- North Channel SCI
- Rockabill to Dalkey Island SAC
- Roaring Bay and Islands SAC
- Blasket Islands SAC
- Grassholm SPA
- Skomer, Skokholm and Seas off Pembrokeshire SPA
- Aberdaron Coast and Bardsey Island SPA
- Saltee Islands SPA
- Lambay Island SPA
- Cliffs of Moher SPA
- Beara Peninsula SPA
- Kerry Head SPA
- Deenish Island and Scariff Island SPA
- Puffin Island SPA
- Iveragh Peninsula SPA
- Skelligs SPA
- Dingle Peninsula SPA

- West Donegal Coast SPA
- High Island, Inishshark and Davillaun SPA
- Tory Island SPA
- Duvillaun Islands SPA
- Clare Island SPA
- Blasket Islands SPA
- Horn Head to Fanad Head SPA,

These sites have been subject to further assessment in order to establish if the NSIP could have an adverse effect on their integrity. Evidence for the conclusions reached on integrity is detailed within the footnotes to the matrices below.

Matrix Key

✓ **=** Adverse effect on integrity **cannot** be excluded
✕ **=** Adverse effect on integrity **can** be excluded

C = construction
O = operation
D = decommissioning

HRA Integrity Matrix 01 Severn Estuary SAC

Name of European site and designation: Severn Estuary SAC									
EU Code: UK0013030									
Distance to NSIP: 0 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Estuaries		×a						×b	
Sea lamprey (Petromyzon marinus)		×a,c						×b	
River lamprey (Lampetra fluvatilis)		×a,d						×b	
Twaite shad (Alosa fallax)		×a,e						×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The assessment concluded that because there was no significant effect identified on fish interest features, i.e. the integrity of the site in view of its conservation objectives was not adversely affected by the proposed change to the CWS.

Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-6.3.16). Assessment against the relevant conservation objectives is detailed in Paragraphs 6.4.47-6.4.60

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

c. For sea lamprey, an AFD system would have no effect on impingement rates of this species at HPC. The predicted impingement losses are conservatively estimated at a mean of 15 fish per annum. The EAV for this species has been assumed to have a precautionary value of 1.

d. For river lamprey, an AFD system would have no effect on impingement rates of this species at HPC. The predicted impingement losses are conservatively estimated at a mean of 6 fish per annum The EAV for this species has been assumed to have a precautionary value of 1.

e. For twaite shad, the impingement effects have been based upon scaling up HPB impingement numbers. The location of the HPC intakes in deeper water and with capped intake heads means that the impingement rate for this pelagic species is expected to be lower than the predictions in Table 6.6

HRA Integrity Matrix 03 Severn Estuary Ramsar Site

Name of European site and designation: Severn Estuary Ramsar Site									
EU Code: UK11081									
Distance to NSIP: 0 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Criterion 1: immense tidal range (second-largest in the world)									
Criterion 3: unusual estuarine communities (i.e. reduced diversity).		×a						×b	
Criterion 4: migratory fish (Salmon Salmo salar, sea trout S. trutta, sea lamprey Petromyzon marinus, river lamprey Lampetra fluvatilis, allis shad Alosa alosa, twaite shad Alosa fallax, and eel Anguilla Anguilla).		×a,b,c,d,e,f,g,h,i						×b	
Criterion 5: bird assemblages of									

international importance with peak counts in winter of 70,919 waterfowl.									
Criterion 6: regularly supports 1% of the individuals in a population of Bewick's swan, European white-fronted goose, dunlin, redshank, shelduck and gadwall, as well as ringed plover, teal, pintail and lesser black-backed gull (Larus fuscus).					×j,k			×l	
Criterion 8: its estuarine fish assemblage, which is one of the most diverse in Britain with over 110 species recorded.		×a						×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The assessment concluded that because there was no significant effect identified on fish interest features, i.e. the integrity of the site in view of its conservation objectives was not adversely affected by the proposed change to the CWS. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-6.3.16). Assessment against the relevant conservation objectives is detailed in Paragraphs 6.4.47-6.4.60

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

c. For salmon, the HPC impingement losses for this species are predicted to be less than 0.083 fish per annum (and that is without considering the benefits of the HPC FRR systems). The design and location of the HPC intakes means that salmon are not expected to be impinged at HPC.

d. For sea trout, the HPC impingement losses for this species are predicted to be less than 0.028 fish per annum (and that is without considering the benefits of the HPC FRR systems). The design and location of the HPC intakes means that sea trout are not expected to be impinged at HPC.

e. For sea lamprey, an AFD system would have no effect on impingement rates of this species at HPC. The predicted impingement losses are conservatively estimated at a mean of 15 fish per annum. The EAV for this species has been assumed to have a precautionary value of 1.

f. For river lamprey, an AFD system would have no effect on impingement rates of this species at HPC. The predicted impingement losses are conservatively estimated at a mean of 6 fish per annum The EAV for this species has been assumed to have a precautionary value of 1.

g. For Allis shad the HPC impingement effect is considered highly precautionary as it was based upon only 2 fish caught at HPB (1 fish in each of 2 months). These 2 fish were not migrating in the Severn and were stray, immature sub adults that were part of the widely dispersed juvenile population that feeds at sea. They were most likely part of the French breeding population. The predicted impingement losses are conservatively estimated at a mean of 8 juvenile fish per annum. The location of the HPC intakes in deeper water and with capped intake heads means that the impingement rate for this pelagic species is expected to be lower than the predictions in Table 6.6.

h. For twaite shad, the impingement effects have been based upon scaling up HPB impingement numbers. The location of the HPC intakes in deeper water and with capped intake heads means that the impingement rate for this pelagic species is expected to be lower than the predictions in Table 6.6

i. For Eel, The predicted effect is considered precautionary as it assumes that all of the eels caught at HPB were mature silver eels with an EAV of 1 but many of the eels were yellow eels which would have a lower EAV. An AFD system would have no effect on impingement rates for this species at HPC

j. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

k. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

l. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 09 River Usk SAC

Name of European site and designation: River Usk SAC									
EU Code:									
Distance to NSIP: 40 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Sea lamprey Petromyzon marinus		×a,c						×b	
River lamprey Lampetra fluvatilis		×a,d						×b	
Twaite shad Alosa fallax		×a.e						×b	
Atlantic salmon Salmo salar		×a,f						×b	
Allis shad Alosa alosa		×a,g						×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The assessment concluded that because there was no significant effect identified on fish interest features, i.e. the integrity of the site in view of its conservation objectives was not adversely affected by the proposed change to the CWS. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-6.3.16). Assessment against the relevant conservation objectives is detailed in Paragraphs 6.5.1-6.5.13.

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

c. For sea lamprey, an AFD system would have no effect on impingement rates of this species at HPC. The predicted impingement losses are conservatively estimated at a mean of 15 fish per annum. The EAV for this species has been assumed to have a precautionary value of 1.

d. For river lamprey, an AFD system would have no effect on impingement rates of this species at HPC. The predicted impingement losses are conservatively estimated at a mean of 6 fish per annum The EAV for this species has been assumed to have a precautionary value of 1.

e. For Twaite shad, the impingement effects have been based upon scaling up HPB impingement numbers. The location of the HPC intakes in deeper water and with capped intake heads means that the impingement rate for this pelagic species is expected to be lower than the predictions in Table 6.6.

f. For salmon, the HPC impingement losses for this species are predicted to be less than 0.083 fish per annum (and that is without considering the benefits of the HPC FRR systems). The design and location of the HPC intakes means that salmon are not expected to be impinged at HPC.

g. For Allis shad the HPC impingement effect is considered highly precautionary as it was based upon only 2 fish caught at HPB (1 fish in each of 2 months). These 2 fish were not migrating in the Severn and were stray, immature sub adults that were part of the widely dispersed juvenile population that feeds at sea. They were most likely part of the French breeding population. The predicted impingement losses are conservatively estimated at a mean of 8 juvenile fish per annum. The location of the HPC intakes in deeper water and with capped intake heads means that the impingement rate for this pelagic species is expected to be lower than the predictions in Table 6.6.

HRA Integrity Matrix 10 River Wye SAC

Name of European site and designation: River Wye SAC									
EU Code: UK001642									
Distance to NSIP: 60 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Sea lamprey Petromyzon marinus		×a,c						×b	
River lamprey Lampetra fluvatilis		×a,d						×b	
Twaite shad Alosa fallax		×a,e						×b	
Atlantic salmon Salmo salar		×a,f						×b	
Allis shad Alosa alosa		×a,g						×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The assessment concluded that because there was no significant effect identified on fish interest features, i.e. the integrity of the site in view of its conservation objectives was not adversely affected by the proposed change to the CWS. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16). Assessment against the relevant conservation objectives is detailed in Paragraphs 6.6.1-6.6.13

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

c. For sea lamprey, an AFD system would have no effect on impingement rates of this species at HPC. The predicted impingement losses are conservatively estimated at a mean of 15 fish per annum. The EAV for this species has been assumed to have a precautionary value of 1.

d. For river lamprey, an AFD system would have no effect on impingement rates of this species at HPC. The predicted impingement losses are conservatively estimated at a mean of 6 fish per annum The EAV for this species has been assumed to have a precautionary value of 1.

e. For Twaite shad, the impingement effects have been based upon scaling up HPB impingement numbers. The location of the HPC intakes in deeper water and with capped intake heads means that the impingement rate for this pelagic species is expected to be lower than the predictions in Table 6.6.

f. For salmon, the HPC impingement losses for this species are predicted to be less than 0.083 fish per annum (and that is without considering the benefits of the HPC FRR systems). The design and location of the HPC intakes means that salmon are not expected to be impinged at HPC.

g. For Allis shad the HPC impingement effect is considered highly precautionary as it was based upon only 2 fish caught at HPB (1 fish in each of 2 months). These 2 fish were not migrating in the Severn and were stray, immature sub adults that were part of the widely dispersed juvenile population that feeds at sea. They were most likely part of the French breeding population. The predicted impingement losses are conservatively estimated at a mean of 8 juvenile fish per annum. The location of the HPC intakes in deeper water and with capped intake heads means that the impingement rate for this pelagic species is expected to be lower than the predictions in Table 6.6.

HRA Integrity Matrix 11 Afon Tywi SAC

Name of European site and designation: Afon Tywi SAC									
EU Code: UK0013010									
Distance to NSIP: 120 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Twaite shad Alosa fallax		×a,c						×b	
Sea lamprey Petromyzon marinus		×a,d						×b	
River lamprey Lampetra fluvatilis		×a,e						×b	
Allis shad Alosa alosa		×a,f						×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The assessment concluded that because there was no significant effect identified on fish interest features, i.e. the integrity of the site in view of its conservation objectives was not adversely affected by the proposed change to the CWS. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in

Section 6.3 (Paragraphs 6.3.1-3.3.16). Assessment against the relevant conservation objectives is detailed in Paragraphs 6.7.1-6.7.13

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

c. For Twaite shad, the impingement effects have been based upon scaling up HPB impingement numbers. The location of the HPC intakes in deeper water and with capped intake heads means that the impingement rate for this pelagic species is expected to be lower than the predictions in Table 6.6.

d. For sea lamprey, an AFD system would have no effect on impingement rates of this species at HPC. The predicted impingement losses are conservatively estimated at a mean of 15 fish per annum. The EAV for this species has been assumed to have a precautionary value of 1.

e. For river lamprey, an AFD system would have no effect on impingement rates of this species at HPC. The predicted impingement losses are conservatively estimated at a mean of 6 fish per annum The EAV for this species has been assumed to have a precautionary value of 1.

f. For Allis shad the HPC impingement effect is considered highly precautionary as it was based upon only 2 fish caught at HPB (1 fish in each of 2 months). These 2 fish were not migrating in the Severn and were stray, immature sub adults that were part of the widely dispersed juvenile population that feeds at sea. They were most likely part of the French breeding population. The predicted impingement losses are conservatively estimated at a mean of 8 juvenile fish per annum. The location of the HPC intakes in deeper water and with capped intake heads means that the impingement rate for this pelagic species is expected to be lower than the predictions in Table 6.6.

HRA Integrity Matrix 12 Carmarthen Bay and Estuaries / Bae Caerfyrddin ac Aberoedd SAC

Name of European site and designation: Carmarthen Bay and Estuaries / Bae Caerfyrddin ac Aberoedd SAC									
EU Code: UK0020020									
Distance to NSIP: 76 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Twaite shad *Alosa fallax*		×a,c						×b	
Sea lamprey *Petromyzon marinus*		×a,d						×b	
River lamprey *Lampetra fluvatilis*		×a,e						×b	
Allis shad *Alosa alosa*		×a,f						×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The assessment concluded that because there was no significant effect identified on fish interest features, i.e. the integrity of the site in view of its conservation objectives was not adversely affected by the proposed change to the CWS. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

c. For Twaite shad, the impingement effects have been based upon scaling up HPB impingement numbers. The location of the HPC intakes in deeper water and with capped intake heads means that the impingement rate for this pelagic species is expected to be lower than the predictions in Table 6.6.

d. For sea lamprey, an AFD system would have no effect on impingement rates of this species at HPC. The predicted impingement losses are conservatively estimated at a mean of 15 fish per annum. The EAV for this species has been assumed to have a precautionary value of 1.

e. For river lamprey, an AFD system would have no effect on impingement rates of this species at HPC. The predicted impingement losses are conservatively estimated at a mean of 6 fish per annum The EAV for this species has been assumed to have a precautionary value of 1.

f. For Allis shad the HPC impingement effect is considered highly precautionary as it was based upon only 2 fish caught at HPB (1 fish in each of 2 months). These 2 fish were not migrating in the Severn and were stray, immature sub adults that were part of the widely dispersed juvenile population that feeds at sea. They were most likely part of the French breeding population. The predicted impingement losses are conservatively estimated at a mean of 8 juvenile fish per annum. The location of the HPC intakes in deeper water and with capped intake heads means that the impingement rate for this pelagic species is expected to be lower than the predictions in Table 6.6.

HRA Integrity Matrix 13 Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC

Name of European site and designation: Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC									
EU Code: UK0030396									
Distance to NSIP: 99 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Harbour porpoise Phocoena phocoena					×a			×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine mammals is as a secondary or indirect effect from the primary effect on fish which are prey to the marine mammals. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16). As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine mammals.

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

HRA Integrity Matrix 14 Lundy SAC

Name of European site and designation: Lundy SAC									
EU Code: UK0013114									
Distance to NSIP: 102 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	C	O	D	C	O	D	C	O	D
Grey seal Halichoerus grypus					×a			×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine mammals is as a secondary or indirect effect from the primary effect on fish which are prey to the marine mammals. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16). As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine mammals.

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

HRA Integrity Matrix 15 Pembrokeshire Marine / Sir Benfro Forol SAC

Name of European site and designation: Pembrokeshire Marine / Sir Benfro Forol SAC									
EU Code: UK0013116									
Distance to NSIP: 120 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Grey seal Halichoerus grypus					×a			×b	
Sea lamprey Petromyzon marinus		×a,c						×b	
River lamprey Lampetra fluvatilis		×a,d						×b	
Allis shad Alosa alosa		×a,e						×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine mammals is as a secondary or indirect effect from the primary effect on fish which are prey to the marine mammals. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16). As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine mammals. Assessment against the relevant conservation objectives for the fish qualifying features is detailed in Paragraphs 6.8.1-6.8.13.

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

c. For sea lamprey, an AFD system would have no effect on impingement rates of this species at HPC. The predicted impingement losses are conservatively estimated at a mean of 15 fish per annum. The EAV for this species has been assumed to have a precautionary value of 1.

d. For river lamprey, an AFD system would have no effect on impingement rates of this species at HPC. The predicted impingement losses are conservatively estimated at a mean of 6 fish per annum The EAV for this species has been assumed to have a precautionary value of 1.

e. For Allis shad the HPC impingement effect is considered highly precautionary as it was based upon only 2 fish caught at HPB (1 fish in each of 2 months). These 2 fish were not migrating in the Severn and were stray, immature sub adults that were part of the widely dispersed juvenile population that feeds at sea. They were most likely part of the French breeding population. The predicted impingement losses are conservatively estimated at a mean of 8 juvenile fish per annum. The location of the HPC intakes in deeper water and with capped intake heads means that the impingement rate for this pelagic species is expected to be lower than the predictions in Table 6.6.

HRA Integrity Matrix 16 West Wales Marine / Gorllewin Cymru Forol SCI

Name of European site and designation: West Wales Marine / Gorllewin Cymru Forol SCI									
EU Code: UK0030397									
Distance to NSIP: 147.5 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Harbour porpoise Phocoena phocoena					×a			×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine mammals is as a secondary or indirect effect from the primary effect on fish which are prey to the marine mammals. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16). As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine mammals.

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

HRA Integrity Matrix Matrix 17 Grassholm SPA

Name of European site and designation: Grassholm SPA									
EU Code: UK9014041									
Distance to NSIP: 173 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Gannet					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species. The HPC site lies within the potential foraging ranges for SPA site feature Gannet(with a maximum mean foraging distance of 229.4+/-124.3 km) However at over 170 km from the breeding colonies and in suboptimal foraging habitat/areas, the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 18 Skomer, Skokholm and Seas off Pembrokeshire SPA

Name of European site and designation: Skomer, Skokholm and Seas off Pembrokeshire SPA									
EU Code: UK9014051									
Distance to NSIP: 181 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Storm Petrel					×a,b,c			×d	
Lesser black-backed gull					×a,b,c			×d	
Manx shearwater					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird

species. The HPC site falls within the farthest extent of the foraging range for lesser black-backed gull (with a maximum mean foraging distance 141+/-50.8 km); and within the max mean foraging range for storm petrel (with an unknown but assumed large maximum mean foraging distance); and Manx shearwater (with a maximum mean foraging distance of 18.3+/-12.5 & >330 km). However at over 180 km from the breeding colonies and in suboptimal foraging habitat/areas, the area around HPC would be of negligible foraging value to the SPA breeding populations of these site features.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 19 Aberdaron Coast and Bardsey Island SPA

Name of European site and designation: Aberdaron Coast and Bardsey Island SPA									
EU Code: UK9013121									
Distance to NSIP: 207 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Manx shearwater					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species. The HPC site lies within the potential foraging range for SPA site feature Manx shearwater (with a maximum mean foraging distance of 18.3+/-12.5 & >330 km). However at over 200 km from the breeding colonies and in suboptimal foraging habitat/areas, the area around HPC would be of negligible foraging value to the SPA breeding population.

d.

e. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 20 Cardigan Bay SAC

Name of European site and designation: Cardigan Bay SAC									
EU Code: UK0012712									
Distance to NSIP: 236 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Bottlenose dolphin Tursiops truncatus					×a			×b	
Grey seal Halichoerus grypus					×a			×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine mammals is as a secondary or indirect effect from the primary effect on fish which are prey to the marine mammals. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16). As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine mammals.

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

HRA Integrity Matrix 21 Saltee Islands SPA

Name of European site and designation: Saltee Islands SPA									
EU Code: 004002									
Distance to NSIP: 262 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a,b,c			×d	
Gannet					×a,b,c			×d	
Manx shearwater					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

e. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

f. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

g. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species. The HPC site lies within the potential foraging ranges for SPA site features fulmar (with a max mean foraging distance 400+/-245.8 km); Gannet(with a maximum mean foraging distance of 229.4+/-124.3 km) and Manx shearwater (with a maximum mean foraging distance of 18.3+/-12.5 & >330 km). However at over 250 km from the breeding colonies and in suboptimal foraging habitat/areas, the area around HPC would be of negligible foraging value to the SPA breeding population.

h. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 22 North Anglesey Marine / Gogledd Môn Forol SCI

Name of European site and designation: North Anglesey Marine / Gogledd Môn Forol SCI									
EU Code: UK0030398									
Distance to NSIP: 251 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Harbour porpoise Phocoena phocoena					×a			×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine mammals is as a secondary or indirect effect from the primary effect on fish which are prey to the marine mammals. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16). As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine mammals.

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

HRA Integrity Matrix 23 Isles of Scilly Complex SAC

Name of European site and designation: Isles of Scilly Complex SAC									
EU Code: UK0013694									
Distance to NSIP: 263 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Grey seal Halichoerus grypus					×a			×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine mammals is as a secondary or indirect effect from the primary effect on fish which are prey to the marine mammals. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16). As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine mammals.

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

HRA Integrity Matrix 24 Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC

Name of European site and designation: Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC									
EU Code: UK0013117									
Distance to NSIP: 290 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Bottlenose dolphin Tursiops truncatus					×a			×b	
Grey seal Halichoerus grypus					×a			×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine mammals is as a secondary or indirect effect from the primary effect on fish which are prey to the marine mammals. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16). As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine mammals.

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

HRA Integrity Matrix 25 Lambay Island SPA

Name of European site and designation: Lambay Island SPA									
EU Code: 004069									
Distance to NSIP: 322 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a,b,c			×d	
Manx shearwater					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird

species. The HPC site lies at the edge of the extent of the foraging range for fulmar (with a max mean foraging distance 400+/-245.8 km) and Manx shearwater (with a maximum mean foraging distance of 18.3+/-12.5 & >330 km), and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 26 North Channel SCI

Name of European site and designation: North Channel SCI									
EU Code: UK0030399									
Distance to NSIP: 359 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Harbour porpoise Phocoena phocoena					×a			×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine mammals is as a secondary or indirect effect from the primary effect on fish which are prey to the marine mammals. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16). As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine mammals.

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

HRA Integrity Matrix 27 Rockabill to Dalkey Island SAC

Name of European site and designation: Rockabill to Dalkey Island SAC									
EU Code: NI003000									
Distance to NSIP: 300.7 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Harbour porpoise Phocoena phocoena					×a			×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine mammals is as a secondary or indirect effect from the primary effect on fish which are prey to the marine mammals. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16). As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine mammals.

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

HRA Integrity Matrix 28 Copeland Islands SPA

Name of European site and designation: Copeland Islands SPA									
EU Code: UK9020291									
Distance to NSIP: 418 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	C	O	D	C	O	D	C	O	D
Manx shearwater					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species. The site falls with the farthest extent of the foraging range Manx shearwater (with a maximum mean foraging distance of 18.3+/-12.5 & >330 km) and as such the area around HPC would be of negligible foraging value to the SPA breeding population and.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 29 Roaring Bay and Islands SAC

Name of European site and designation: Roaring Bay and Islands SAC									
EU Code: NI000101									
Distance to NSIP: 444 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Harbour porpoise Phocoena phocoena					×a			×b	
Grey seal Halichoerus grypus					×a			×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine mammals is as a secondary or indirect effect from the primary effect on fish which are prey to the marine mammals. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16). As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine mammals.

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

HRA Integrity Matrix 30 Cliffs of Moher SPA

Name of European site and designation: Cliffs of Moher SPA									
EU Code: 004005									
Distance to NSIP: 476 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species. The HPC site lies at the edge of the foraging range for SPA site feature fulmar (with a max mean foraging distance 400+/-245.8 km) and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence and the absence of adverse effects of the “alone” assessment on any fish interest features. (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 31 Beara Peninsula SPA

Name of European site and designation: Beara Peninsula SPA									
EU Code: 004155									
Distance to NSIP: 485 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species. The HPC site falls at the edge of the extent of the foraging range for SPA site feature fulmar (with a max mean foraging distance 400+/-245.8 km) and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence and the absence of adverse effects of the "alone" assessment on any fish interest features. (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 32 Kerry Head SPA

Name of European site and designation: Kerry Head SPA									
EU Code: 004189									
Distance to NSIP: 486 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species. The HPC site lies close to the edge of the extent of the foraging range for fulmar (with a max mean foraging distance 400+/-245.8 km) and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence and the absence of adverse effects of the “alone” assessment on any fish interest features. (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 33 Deenish Island and Scarriff Island SPA

Name of European site and designation: Deenish Island and Scarriff Island SPA									
EU Code: 004175									
Distance to NSIP: 499 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a,b,c			×d	
Manx shearwater					×a,b,c			×d	
Storm petrel					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird

species. The HPC site lies at the edge of the foraging range for fulmar (with a max mean foraging distance 400+/-245.8 km); Manx shearwater (with a maximum mean foraging distance of 18.3+/-12.5 & >330 km) and storm petrel (with an unknown but assumed large maximum mean foraging distance) and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 34 Puffin Island SPA

Name of European site and designation: Puffin Island SPA									
EU Code: UK9020285									
Distance to NSIP: 510 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a,b,c			×a,b,c	
Manx shearwater					×a,b,c			×a,b,c	
Storm petrel					×a,b,c			×a,b,c	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird

species. The HPC site falls at the edge of the extent of the foraging range for SPA site features fulmar (with a max mean foraging distance 400+/-245.8 km); Manx shearwater (with a maximum mean foraging distance of 18.3+/-12.5 & >330 km) and storm petrel (with an unknown but assumed large maximum mean foraging distance) and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 35 Iveragh Peninsula SPA

Name of European site and designation: Iveragh Peninsula SPA									
EU Code: 004154									
Distance to NSIP: 506 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a,b,c			×a,b,c	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species. The HPC site falls within the farthest extent of the foraging range for SPA site feature fulmar (with a max mean foraging distance 400+/-245.8 km) and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence and the absence of adverse effects of the “alone” assessment on any fish interest features. (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 36 Skelligs SPA

Name of European site and designation: Skelligs SPA									
EU Code: 004007									
Distance to NSIP: 517 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a,b,c			×d	
Manx shearwater					×a,b,c			×d	
Storm petrel					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird

species. The HPC site falls within the farthest extent of the foraging range for SPA site features fulmar (with a max mean foraging distance 400+/-245.8 km); Manx shearwater (with a maximum mean foraging distance of 18.3+/-12.5 & >330 km) and storm petrel (with an unknown but assumed large maximum mean foraging distance) and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 37 Dingle Peninsula SPA

Name of European site and designation: Dingle Peninsula SPA									
EU Code: 004153									
Distance to NSIP: 519 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species. The HPC site falls within the farthest extent of the foraging range for the SPA site feature fulmar (with a max

mean foraging distance 400+/-245.8 km) and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence and the absence of adverse effects of the “alone” assessment on any fish interest features. (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 38 Blasket Islands SAC

Name of European site and designation: Blasket Islands SAC									
EU Code: NI002172									
Distance to NSIP: 522 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Harbour porpoise Phocoena phocoena					×a			×b	
Grey seal Halichoerus grypus					×a			×b	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine mammals is as a secondary or indirect effect from the primary effect on fish which are prey to the marine mammals. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16). As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine mammals.

b. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.2 Paragraphs 7.2.1-7.2.35).

HRA Integrity Matrix 39 West Donegal Coast SPA

Name of European site and designation: West Donegal Coast SPA									
EU Code: 004150									
Distance to NSIP: 542 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a			×a,b,c	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species. The HPC site falls within the farthest extent of the foraging range for the SPA qualifying feature fulmar (with a max mean foraging distance 400+/-245.8 km) and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence and the absence of adverse effects of the "alone" assessment on any fish interest features. (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 40 High Island, Inishshark and Davillaun SPA

Name of European site and designation: High Island, Inishshark an Davillaun SPA									
EU Code: 004144									
Distance to NSIP: 551 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species. The HPC site falls within the farthest extent of the foraging range for SPA qualifying feature fulmar (with a max

mean foraging distance 400+/-245.8 km) and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence and the absence of adverse effects of the “alone” assessment on any fish interest features. (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 41 Tory Island SPA

Name of European site and designation: Tory Island SPA									
EU Code: 004073									
Distance to NSIP: 565 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species. The HPC site falls within the farthest extent of the foraging range for SPA qualifying feature fulmar (with a max

mean foraging distance 400+/-245.8 km) and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence and the absence of adverse effects of the “alone” assessment on any fish interest features. (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 42 Duvillaun Islands SPA

Name of European site and designation: Duvillaun Islands SPA									
EU Code: 004111									
Distance to NSIP: 574 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species. The HPC site falls within the farthest extent of the foraging range for the SPA qualifying feature fulmar (with a max mean foraging distance 400+/-245.8 km) and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence and the absence of adverse effects of the “alone” assessment on any fish interest features. (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 43 Clare Island SPA

Name of European site and designation: Clare Island SPA									
EU Code: 004136									
Distance to NSIP: 548 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species. The HPC site falls within the farthest extent of the foraging range for fulmar (with a max mean foraging distance

400+/-245.8 km) associated with this SPA and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence and the absence of adverse effects of the “alone” assessment on any fish interest features. (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 44 Blasket Islands SPA

Name of European site and designation: Blasket Islands SPA									
EU Code: 004008									
Distance to NSIP: 522 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×*a,b,c*			×d	
Manx shearwater					×*a,b,c*			×d	
Storm petrel					×a,b,c			×d	

Evidence supporting conclusions

For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether 'alone' or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

a. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

b. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

c. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species; lesser black-backed gull (with a maximum mean foraging distance 141+/-50.8 km); fulmar (with a max mean foraging distance 400+/-245.8 km); gannet (with a maximum mean foraging distance of 229.4+/-124.3 km); storm petrel (with an unknown but assumed large maximum mean foraging distance); and Manx shearwater (with a maximum mean foraging distance of 18.3+/-12.5 & >330 km). The HPC site falls within the farthest extent of the foraging range for fulmar associated with this SPA and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

d. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence and the absence of adverse effects of the “alone” assessment on any fish interest features. (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).

HRA Integrity Matrix 45 Horn Head to Fanad Head SPA

Name of European site and designation: Horn Head to Fanad Head SPA									
EU Code: 004194									
Distance to NSIP: 552 km									
European site features	**Likely effects of NSIP**								
Effect	*Impingement*			*Loss of prey species (fish)*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Fulmar					×a,b,c			×d	

Evidence supporting conclusions

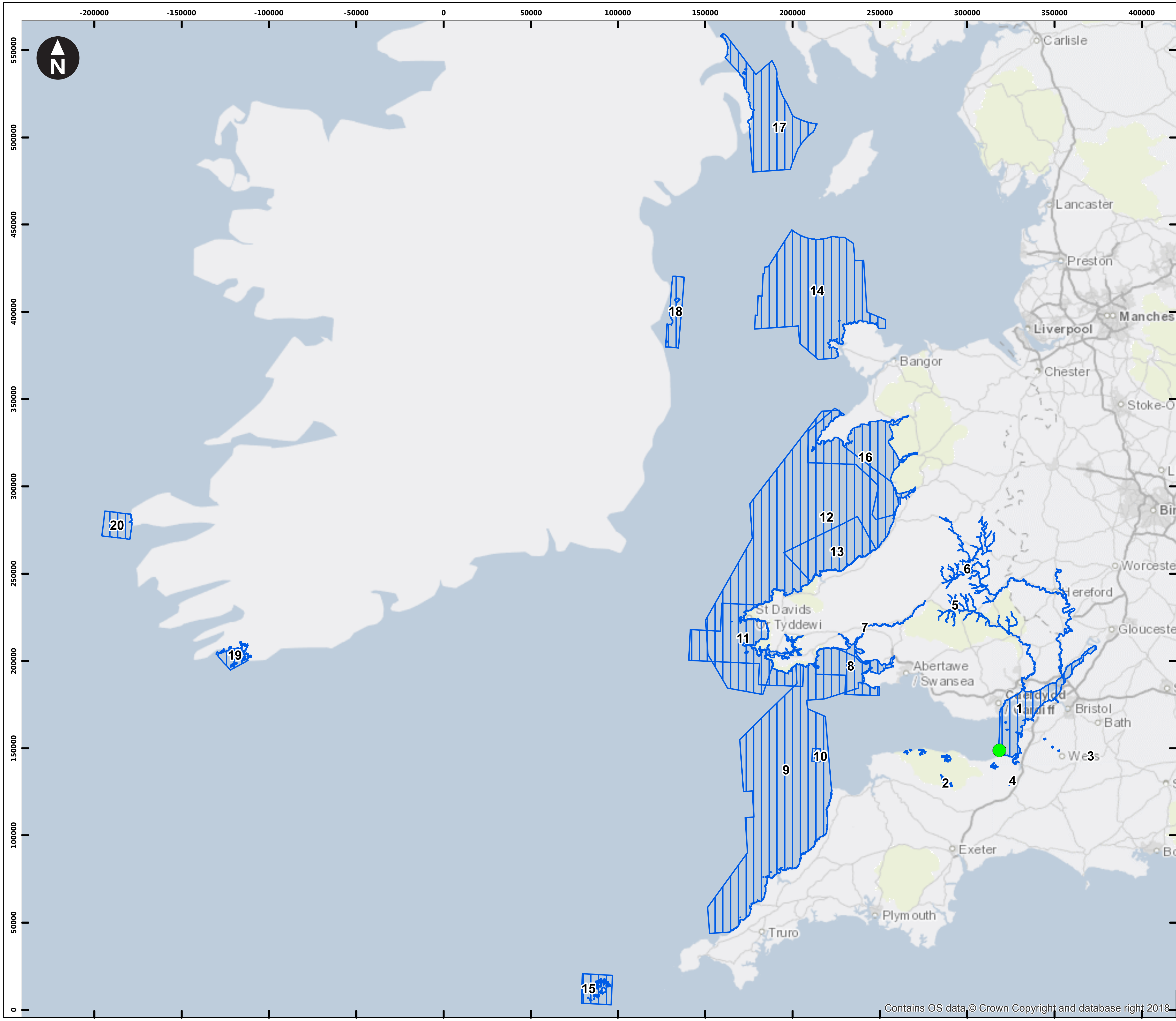
For all interest features and corresponding likely effect with a greyed out box, it has been determined that there are no pathways of effect from the proposed material change at the cooling water system to the interest features of the designated site, whether ‘alone’ or in-combination. Therefore, no LSE was determined and these interest features have been screened out of the HRA process (Table 5.1).

e. The pathway of effect from the change proposed to the HPC Project on marine foraging piscivorous birds is as a secondary or indirect effect from the primary effect on fish which are prey to the birds. Impingements assessment methodology is described in Section 6.2 (Paragraphs 6.2.1-6.2.34), with the results detailed in Section 6.3 (Paragraphs 6.3.1-3.3.16).

f. As it has been determined that there is no significant effect on fish and that the change proposed will not adversely affect the integrity of the designated sites with fish as interest features, it can be concluded that there will be no secondary/indirect effect on marine foraging piscivorous birds.

g. The potential LSE identified in Table 5.2 were associated with SPAs that ranged from 173 km to 565 km away from the HPC site, these sites were screened in based on maximum mean foraging ranges one or more of five breeding seabird species; lesser black-backed gull (with a maximum mean foraging distance 141+/-50.8 km); fulmar (with a max mean foraging distance 400+/-245.8 km); gannet (with a maximum mean foraging distance of 229.4+/-124.3 km); storm petrel (with an unknown but assumed large maximum mean foraging distance); and Manx shearwater (with a maximum mean foraging distance of 18.3+/-12.5 & >330 km). The HPC site falls within the farthest extent of the foraging range for fulmar associated with this SPA and as such the area around HPC would be of negligible foraging value to the SPA breeding population.

h. The HRA report concluded that there will be no significant in-combination effect of any developments, taking account of the conservation objectives supporting evidence (Section 7.1 and Section 7.2 Paragraphs 7.12-7.1.4 and 7.2.1-7.2.35).



Key

Cooling water intake location

SAC/SCI

1. Severn Estuary / Môr Hafren SAC
2. Exmoor and Quantocks Oakwoods SAC
3. Mendip Limestone Grasslands SAC
4. Hestercombe House SAC
5. River Usk / Afon Wysg SAC
6. River Wye / Afon Gwy SAC
7. Afon Tywi / River Tywi SAC
8. Carmarthen Bay and Estuaries / Bae Caefyrddin ac Aberoedd SAC
9. Bristol Channel Approaches / Dynesfeydd Môr Hafren SCI
10. Lundy SAC
11. Pembrokeshire Marine / Sir Benfro Forol SAC
12. West Wales Marine / Gorllewin Cymru Forol
13. Cardigan Bay
14. North Anglesey Marine / Gogledd Môn Forol
15. Isles of Scilly Complex
16. Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau
17. North Channel
18. Rockabill to Dalkey Island
19. Roaring Bay and Islands
20. Blasket Islands

0 20 40 60 80 100 120 km

Scale at A3: 1:2,100,000

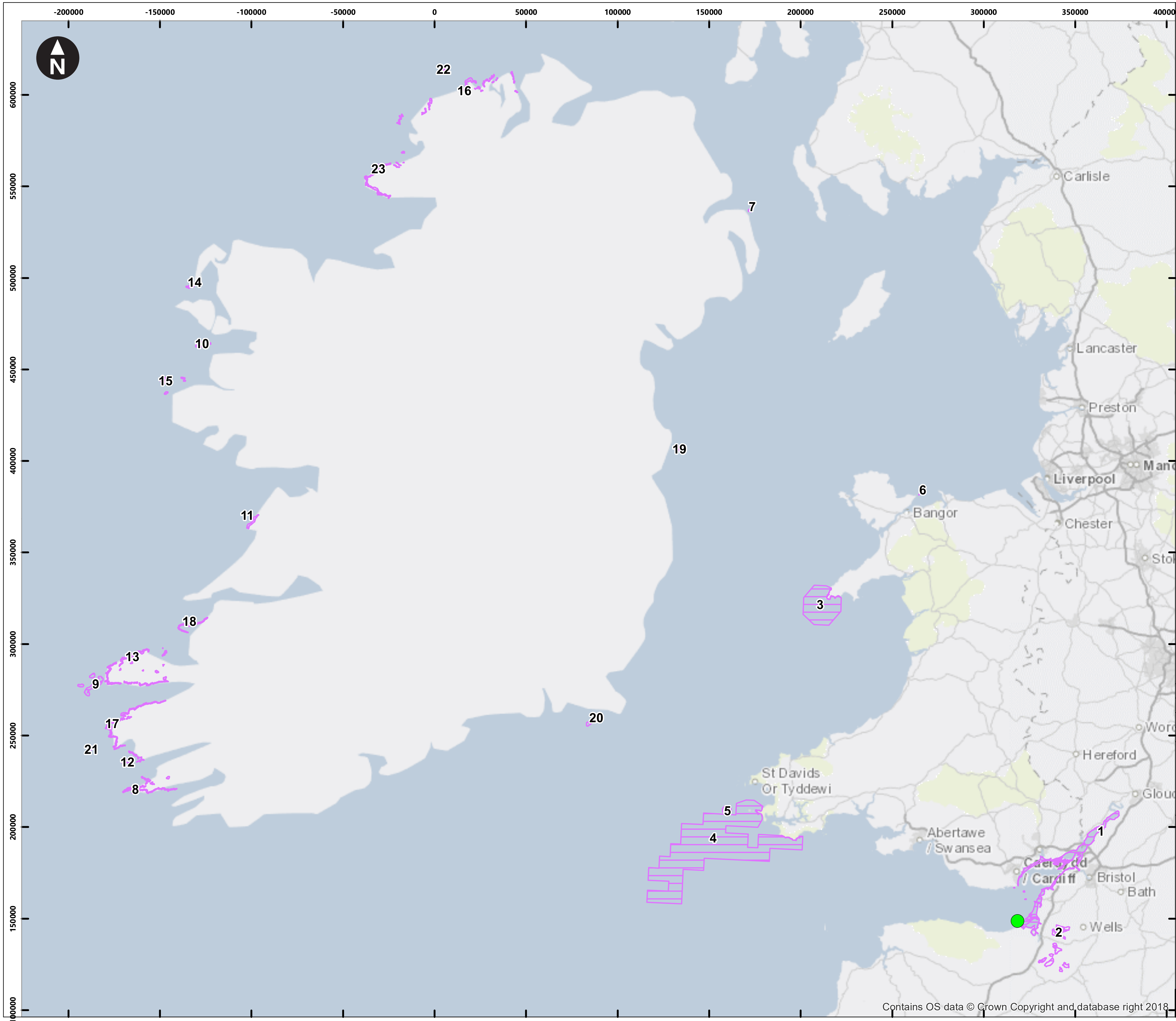
REV.	DATE	AUTHOR	COMPANY
001	October 2018	Simon Green	Wood

Hinkley Point C Project
Case for Removal of the Requirement to Install an Acoustic Fish Deterrent
Revised Habitats Regulations Assessment Report

Figure 2.1
SACs and SCIs screened into the HRA process

NNB-308-REP-000722

NOT PROTECTIVELY MARKED



Key

Cooling water intake location

SPA

1. Severn Estuary / Môr Hafren SPA
2. Somerset Levels and Moors SPA
3. Aberdaron Coast and Bardsey Island SPA
4. Skomer, Skokholm and the Seas off Pembrokeshire SPA
5. Grassholm SPA
6. Puffin Island SPA
7. Copeland Islands SPA
8. Beara Peninsula SPA
9. Blasket Island SPA
10. Clare Island SPA
11. Cliffs of Moher SPA
12. Deenish Island and Scariff Island SPA
13. Dingle Peninsula SPA
14. Duvilaun Island SPA
15. High Island, Inishshark and Davillaun SPA
16. Horn Head to Fanad Head SPA
17. Iveragh Peninsula SPA
18. Kerry Head SPA
19. Lambay Island SPA
20. Saltee Islands SPA
21. Skellings SPA
22. Tory Island SPA
23. West Donegal Coast SPA

0 10 20 30 40 50 60 70 80 90 100 110 km

Scale at A3: 1:2,000,573

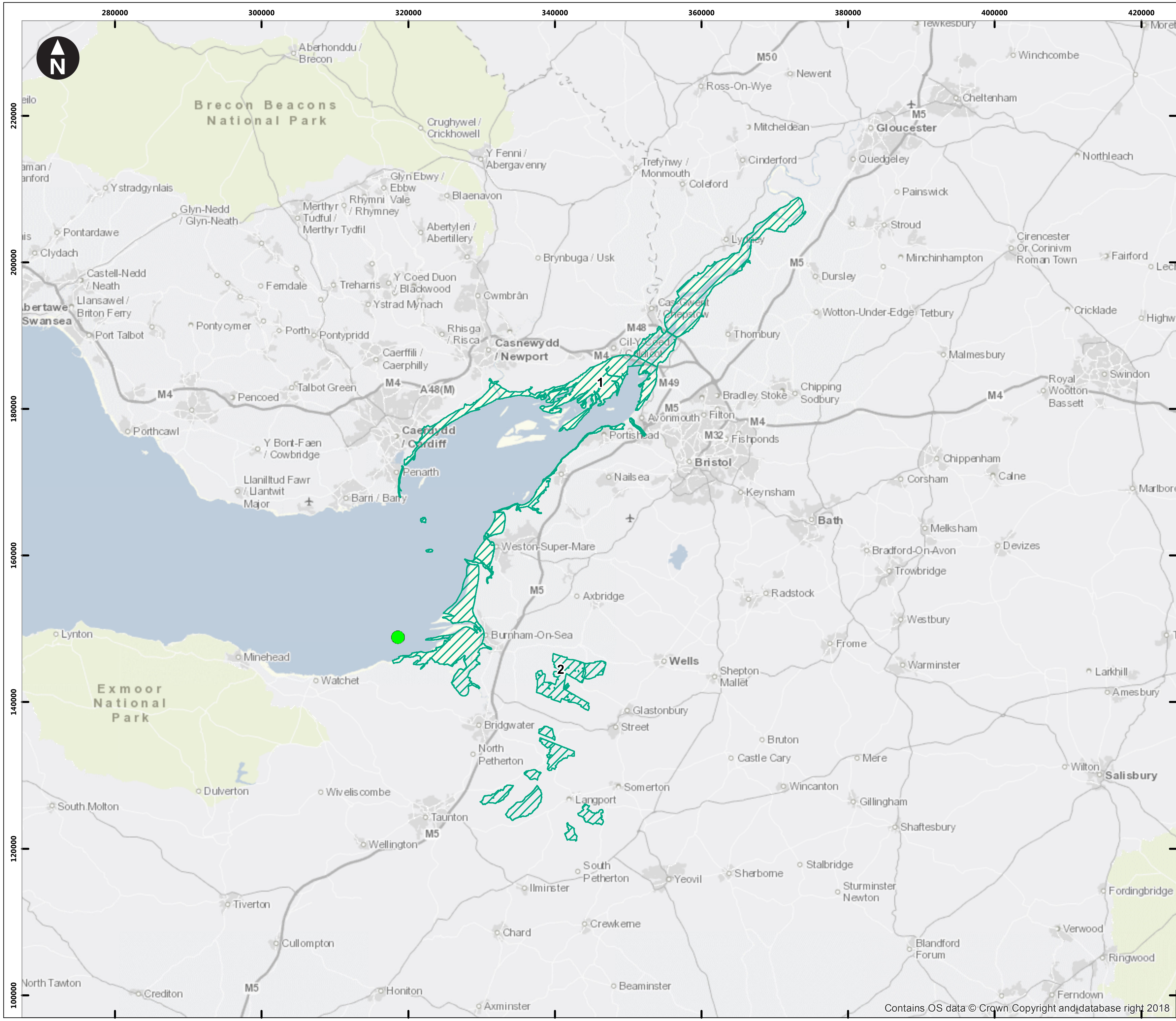
REV.	DATE	AUTHOR	COMPANY
001	October 2018	Simon Green	Wood
002	January 2019	Simon Green	Wood

Hinkley Point C Project
Case for Removal of the Requirement to Install an Acoustic Fish Deterrent
Revised Habitats Regulations Assessment Report

Figure 2.2
SPAs screened into the HRA process

NNB-308-REP-000722

NOT PROTECTIVELY MARKED



Key

Cooling water intake location

Ramsar Site

1. Severn Estuary / Môr Hafren Ramsar
2. Somerset Levels and Moors Ramsar

0 10 20 30 km

Scale at A3: 1:500,000

REV.	DATE	AUTHOR	COMPANY
001	October 2018	Simon Green	Wood

EDF HPC CGN

Hinkley Point C Project
Case for Removal of the Requirement to Install an Acoustic Fish Deterrent
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Figure 2.3
Ramsar sites screened into the HRA process

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NOT PROTECTIVELY MARKED