WFD Compliance Assessment Report

Hinkley Point C operational water discharge activity permit variation, EPR/HP3228XT/V005

Date: June 2023

Version: 2

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Contents

Figures

Tables

1. Executive summary

In 2013 the Environment Agency granted permission for NNB Generation Company (HPC) Limited to operate certain water discharge activities as part of the proposed Hinkley Point C nuclear power station (HPC). The original design included three mitigation measures aimed at reducing the environmental impact of the water discharge activity: a cooling water system (CWS) with four low velocity side entry intake heads (LVSEs) located approximately 3.3 km off the Somerset coast, a fish recovery and return system (FRR) and an acoustic fish deterrent (AFD) system integrated into the design of the intakes. The Company is applying to vary its current WDA permit to remove the conditions relating to the Acoustic Fish Deterrent (AFD) system.

A number of documents have been submitted to assess compliance of the HPC project with the Water Framework Directive (WFD). These include documents submitted by the applicant as part of the application process, in addition to information produced by the Environment Agency as part of the application review process. The information provided in these reports is summarised and the assessment considers whether sufficient evidence has been provided to conclude that the HPC project will not jeopardise compliance with WFD.

It was considered that discharge of water from the FRR system had the potential to jeopardise compliance with WFD. This activity was scoped following the EA's Clearing the Waters for All WFD guidance to identify the receptors at risk from this activity which had not previously been assessed for WFD compliance. A number of potential impacts were scoped in for assessment.

The potential for dead fish material exiting through the FRR system was identified as having the potential to impact on benthic invertebrates. Assessment of these impacts concluded that the effects on benthic invertebrate assemblages would be minor and unlikely to jeopardise WFD compliance.

The potential for hazardous compounds to be released as a result of the release of bioaccumulated materials within the tissue of dead fish discharged from the FRR system was also assessed. It was considered that these impacts were unlikely to jeopardise compliance with WFD.

It was concluded that there was minimal risk of the activities assessed of jeopardising compliance with WFD. Impacts on protected sites (including Special Areas of Conservation and Special Protection Areas) also require consideration under WFD. A thorough assessment of potential impacts on protected sites is the focus of a separate Habitats Regulations Assessment document.

2. Introduction to project

2.1. Background

In 2013 the Environment Agency granted Environmental Permit EPR/HP3228XT, permitting NNB Generation Company (HPC) Limited (the applicant) to operate certain water discharge activities at the proposed Hinkley Point C nuclear power station (HPC) near Bridgwater, Somerset. The permit regulates discharges of trade effluent, including cooling water, back into the Bristol Channel. The initial design required three mitigation measures, which would work together to reduce the environmental impact of this water discharge activity. The mitigation included in the original permit were a cooling water system (CWS) with four Low Velocity Side Entry intake heads (LVSEs) situated approximately 3.3 km offshore, a Fish Recovery & Return system (FRR) and an Acoustic Fish Deterrent (AFD) system integrated into the design of the intakes. The Company is applying to vary its current WDA permit to remove the conditions relating to the Acoustic Fish Deterrent (AFD) system.

As part of the review, analysis, and determination of this application, an assessment must be carried out to determine whether this variation affects the project's compliance with the Water Framework Directive (WFD).

2.2. Aim of this report

A number of documents have been submitted to assess the compliance of the HPC project with WFD. This report briefly summarises the evidence provided to date, including information produced by the Environment Agency (EA). An assessment is made as to whether sufficient evidence has been provided to conclude that HPC will comply with the requirements of WFD.

2.3. Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Statutory Instrument 2017 No. 407) (WER)

The Water Framework Directive (WFD) was a European directive (2000/60/EC) which was transposed to UK law in 2003. Its requirements are now encompassed within the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (WER). The WER imposes legal requirements to protect and improve the water environment. Throughout this document, reference is made to the WFD, since these documents were produced prior to the WER being enacted.

Under the WER, all water bodies are classified based on quality elements which encompass a range of physical, biological and chemical parameters. Water body elements may be classed as being at (in descending order) high, good, moderate, poor

or bad status, with the lowest scoring element defining the overall status of the water body (under the 'one out, all out' principle). The target is for all water bodies to achieve a minimum of good status. It is incumbent on the applicant to show that activities will not lead to a deterioration in water body status or prevent water body objectives being put in place. Following the European Court of Justice 'Weser ruling' (European Court of Justice, 1 July 2015, Case C-461/13), a WFD deterioration is considered when a WFD quality element falls by one class, even if that fall does not result in a drop in the overall classification of a water body.

The framework for delivering the WER is through River Basin Management Plans (RBMPs) (https://www.gov.uk/government/collections/river-basin-management-plans-2015) produced for each River Basin District (RBD). These plans cover transitional and coastal (TraC) water, fresh water, and groundwater bodies. The HPC development lies within the South West RBD, approximately 20 km west of the border with the Severn RBD. The West Wales RBD is situated on the opposite side of the Bristol Channel.

2.4. Water bodies in the vicinity of Hinkley Point C (HPC)

The HPC discharge points and the project footprint of the main site lie in the Bridgwater Bay coastal water body (water body ID (WBID) GB670807410000) and close (within 1.3 km) to the border with the heavily modified Parrett transitional water body (WBID GB540805210900) (Figure 1).

Habitats in Bridgwater Bay are dominated by subtidal soft sediments and subtidal gravel and cobble habitats (Appendix 1). Areas of rocky shore and subtidal rocky reef are distributed along the intertidal and near-shore subtidal, respectively. No areas of highly sensitive habitats are recorded in Bridgwater Bay.

Habitats in the Parrett water body are dominated by low sensitivity habitats, with intertidal and subtidal soft sediments covering the majority of the water body area (Appendix 1). Small areas of rocky shore are present in the west of the water body. There are also areas of habitat regarded as highly sensitive to anthropogenic activity, with areas of polychaete reef and saltmarsh in the south of the water body. Both of these areas of high sensitivity habitats lie at least 3 km away from the HPC site (Appendix 1).

Both water bodies have been consistently classified at moderate overall WFD status (Bridgwater Bay) or moderate WFD potential (Parrett[1]). The Ecology element has been consistently moderate across these water bodies (Appendix 2). Chemical classifications

[1] The Parrett water body is classed as a heavily modified water body (HMWB), given the degree of alteration within this water body by human activities. Under WFD, HMWBs are not classified according to their *status*, but rather their *potential*.

have consistently been classified as Good in the Parrett and varying between good and failing to achieve good in Bridgwater Bay.

The drivers behind these water bodies failing to achieve good status/potential have been linked to the benthic invertebrate (IQI), macroalgae and phytoplankton ecological sub-elements, in addition to inorganic nitrogen concentrations (DIN). Chemical failures within the TraC water bodies have been driven by polycyclic aromatic hydrocarbons (PAH) (Appendix 2).

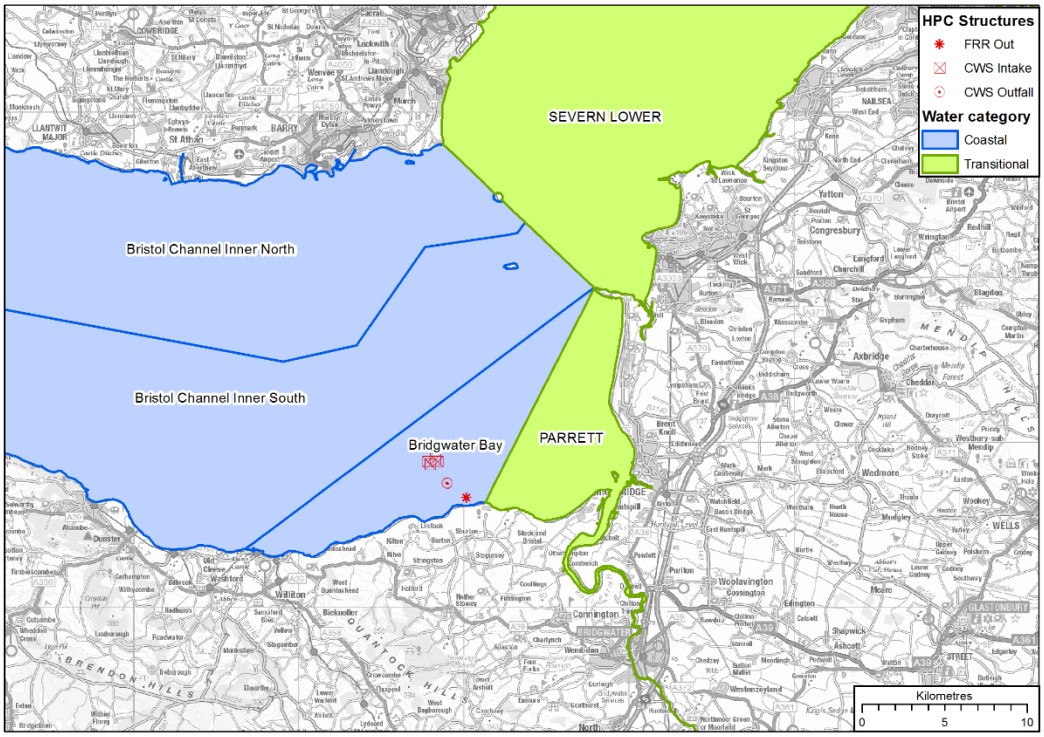

Figure 1. Transitional and coastal water bodies in the vicinity of the HPC development site.

3. Key documents

This section provides an overview of the key documents containing information pertinent to the WFD assessment for HPC. Documents submitted by the applicant are included, as well as technical briefs and reports presenting updated information produced as part of the review and assessment of the application by the Environment Agency (EA). These documents are summarised in Table 1.

It is important to note that a number of these documents were focussed on the potential impacts of fish impingement on fish populations in the vicinity of HPC. Fish losses due to entrainment are outside of the remit of the current document. However, these documents are still summarised in the following sections as they inform aspects including the volume of fish material discharged out of the FRR system, which is part of the current WFD assessment.

Table 1. Summary of key documents considered as part of this WER Assessment.

Document title (version)	Reference	Notes
WFD assessment	EDF (2011)	WFD assessment provided as Appendix 18B of the Environmental Statement.
Revised predictions of impingement effects at Hinkley Point C - 2018. BEEMS technical report TR456 (edition 2, revision 10)	Cefas (2019b)	Predicted impacts of impingement at HPC following application to remove the requirement for an AFD system from the design of HPC. Represents an update to the Environmental Statement (EDF 2011). Incorporates updated information on fish populations and estimates impingement in the absence of mitigation from AFD. The information in this report was used as part of the 2019 application variation assessment (EDF 2019) and the assessment of FRR system impacts on water quality (Cefas 2020).
Application variation – updated WFDA (v1.0)	EDF (2022)	Re-consideration of WFD compliance of HPC in the absence of an AFD system.
Technical report TR515. Hinkley Point C Water quality effects of the fish recovery and return system (v2)	Cefas (2020)	Assessment of the impacts of FRR system discharges on water quality and ecology.
Fish Recovery and Return System Discharge Assessment Report	Environment Agency (2022a)	Review of evidence provided in TR515 (Cefas, 2020). Re-running of calculations and re-consideration of impacts on water quality and WFD status.
TB009 Biomass Weight and Mortality Report	Environment Agency (2022c)	Recalculation of annual biomass of organic fish and invertebrate material predicted to be discharged through the FRR system.

3.1. WFD Assessment – 2011 – Appendix 18B of Volume 2 of the Environmental Statement (Doc. ref. 4.3) (EDF, 2011)

3.1.1. Background

Appendix 18B of the 2011 Environmental Statement submission (EDF, 2011) considered whether activities associated with the HPC project would affect compliance of the project with WFD. Potential impacts of HPC were considered for Bridgwater Bay coastal water body and the Parrett transitional water body.

The assessment followed the then-current *Clearing the Waters* guidance for the completion of WFD assessments. A number of activities across the construction, commissioning and operational phase of HPC were identified as having the potential to affect ecological, physical and/or chemical aspects of these water bodies[1]. Associated potential impacts on protected sites were also highlighted.

3.1.2. Focus of document and conclusions

Three activities associated with HPC were scoped in for further assessment.

3.1.2.1. Dredging for temporary jetty berth (both capital and maintenance) (Construction phase)

This activity was identified as having the potential to impact on both the Bridgwater Bay and Parrett water bodies as a result of direct impact on water quality (specific pollutants, oxygen conditions, water transparency) and associated impact on biological assemblages (fish and benthic invertebrates). Potential for impact on protected sites was also highlighted.

The assessment concluded that the relatively small area to be dredged and the already high concentrations of naturally-occurring suspended solids meant that sediment suspended within the water column would be minor and would be quickly dispersed into existing sediment transport processes. As such, impacts on transparency and oxygen levels were considered unlikely.

Impacts via the re-mobilisation of sediment-bound contaminants were also considered. The predicted concentrations of contaminants released into the water column were predicted to be orders of magnitude below Environmental Quality Standard (EQS) concentrations. Deterioration in chemical water quality status was therefore considered unlikely.

[1] Decommissioning impacts were considered likely to be similar to, or less than, those identified in the construction and operational phases. As such, decommissioning activities were not considered explicitly.

The scale of impact was also predicted to be relatively small in terms of biological receptors. The benthic invertebrate assemblages living in the area were typical of those in muddy sediments. It was predicted that there would be rapid recolonisation of these assemblages following cessation of dredging. It was also considered that migratory fish assemblages would be able to avoid areas of physical disturbance. Impacts on fish were therefore considered unlikely to lead to WFD deterioration.

It was concluded that the dredging for temporary jetty berth activity would not jeopardise compliance with WFD.

3.1.2.2. Dredging at Combwich Wharf (Construction phase)

This activity was identified as having the potential to impact the Parrett water body. Potential impacts on water quality (release of sediment-bound contaminants) and biology were considered along with potential impacts on protected sites.

Deterioration from the release of sediment-bound contaminants was assessed as unlikely due to the low levels of contaminants in local sediments and the significant dilution of any contaminants released into the water column. As such, this activity was considered as unlikely to lead to WFD deterioration on water quality or associated biological elements.

It was concluded that dredging at Combwich Wharf would not jeopardise compliance with WFD.

3.1.2.3. Cooling water intake and discharge (Operational phase)

A number of assessments relating to the intake and discharge of cooling water were considered for the Bridgwater Bay and Parrett water bodies.

Cooling water discharge: Thermal impacts

Under normal operating conditions, water would be discharged from the cooling water system (CWS) at 12.5°C above ambient temperature. The assessment concluded that WFD deterioration with regards to water temperature, or temperature-driven impacts on invertebrate or fish assemblages, were unlikely.

Cooling water discharge: Dissolved oxygen and physical parameters

Elevated water temperatures could potentially impact on dissolved oxygen and un-ionised ammonia (UIA) concentrations. An assessment to quantify these impacts was carried out, based on precautionary values. For both the Bridgwater Bay and Parrett water bodies, impacts on WFD status or potential were not predicted.

Cooling water discharge: Chemical parameters

Some localised elevations of hydrazine and TRO concentrations were predicted with regards to soft sediment habitats in the vicinity of the discharge. However, the water body-scale impacts of these elevated concentrations were considered to be minimal. In addition, impacts on ecology elements were also considered to be minimal and unlikely to jeopardise compliance with WFD.

Cooling water intake

The risk of impingement and entrainment of fish into the CWS was highlighted. However, the WFD assessment was undertaken under the assumption that appropriate mitigation measures would be in place. The CWS was designed with LVSEs to reduce potential impingement losses. The additional installation of an AFD system was also assumed to further reduce impingement as was the installation of an FRR system. On the assumption that the proposed mitigation would be in place, impingement losses at HPC were predicted to be very low. As such, WFD deterioration of biological status in relation to fish was not predicted.

Assessment of impacts on the plankton community concluded that significant proportions of plankters entrained into the HPC system would survive. No significant impact on plankton was predicted. As highlighted in Section 3.2, consideration of impacts on fish assemblages is beyond the scope of the current document. Impacts of entrainment on fish assemblages will be considered as part of the Development Consent Order (DCO).

Cooling water intake and discharge: conclusion

Following the assessments described by EDF (2011), it was concluded that the intake and discharge of water through the CWS would not jeopardise compliance with WFD.

3.1.2.4. Cumulative impact assessments

Assessments were made with regards to the cumulative impacts from different activities.

Suspended solids and chemical concentrations

Potential cumulative impacts were highlighted with regards to suspended solids and contaminant concentrations. Due to the temporary nature of the impact and/or the spatial distance between impacts, no significant impact was predicted.

Marine ecology

Potential cumulative impacts on marine ecology were identified as a result of the proposed cross shore works. The assessment concluded that impacts on marine ecology receptors would not be significant and would not jeopardise WFD compliance.

Potential impacts were highlighted in relation to works in the subtidal zone. Again, given the relatively small scale of the works, impacts were considered insufficient to jeopardise compliance with WFD.

3.1.2.5. Conclusion

The 2011 WFD assessment (EDF, 2011) concluded that the proposal will not cause deterioration in water body status or inhibit the potential for water bodies to achieve their objectives in future.

3.1.3. Common ground and disagreement

Generally, the 2011 WFD assessment (EDF, 2011) highlights the majority of the activities associated with HPC which have the potential to jeopardise WFD compliance. The assessment adopted a precautionary approach for the identification and screening of activities with the potential to lead to WFD deterioration. The 2011 WFD assessment was accepted as part of the ES submission (EDF, 2011).

As part of a general review of submitted documentation (Environment Agency, 2019), some issues and inconsistencies were identified in the 2011 WFDA. These largely relate to changes to the design of HPC following submission of the ES (EDF, 2011) and some assessments which have either been missed, or have not been explicitly screened out of the assessment. Issues identified in the EDF (2011) WFDA are summarised below:

- Assessment of impacts on fish was based on mitigation provided in part by the integration of an AFD system into the design of the CWS. The applicant has since removed this measure from the design and so re-consideration of impacts in lieu of an AFD is required.
    - **Conclusion**: assessment of impacts from a CWS without AFD mitigation is required.
- No consideration was made on the impacts of fish, invertebrates and debris exiting via the FRR system discharge on water quality and surrounding ecology. Even with an AFD system in place, it is unlikely that there would be no impingement and subsequent return of materials via the FRR system.
    - **Conclusion**: assessment of the impacts of discharges from the FRR system on recipient waters and habitats is required.
- Aside from impacts on fish, assessments of biological effects in the ES (EDF, 2011) focussed largely on intertidal and subtidal soft sediment habitats. Although these are the most common benthic habitats in the immediate vicinity of HPC, intertidal and subtidal rocky habitats are also located nearby and consideration of these habitats is necessary.
    - **Conclusion:** consideration of the impacts of the development on intertidal and subtidal rocky habitats is required.

3.1.4. Conclusion

In conclusion, the 2011 WFDA (EDF, 2011) identifies and assesses many of the likely impacts of the HPC project on WFD compliance. However, some aspects were overlooked (or at least, not explicitly scoped out of assessment). Since the release of the assessment in 2011, the project design has been amended and as such, some of the conclusions are based on outdated information. This document therefore cannot be considered a complete assessment of whether the HPC project (in its current state) will comply with the Water Framework Directive.

3.2. Revised predictions of impingement effects at Hinkley Point C – technical report TR456 (Edition 2, revision 10) (Cefas, 2019b)

3.2.1. Background

The applicant has applied to vary the operational WDA permit to remove conditions relating to the incorporation of an AFD system into the design of the CWS. Technical report TR456 (Cefas, 2019b) was submitted in support of the application variation and made predictions for a number of design scenarios. Pertinent to the current proposed design are the predictions of the impacts of fish and invertebrate impingement at HPC in the absence of an AFD system.

Much of the data used to describe the potential fish impingement to HPC were derived from two monitoring programmes run at the nearby Hinkley Point B (HPB) power station: the long-term Routine Impingement Monitoring Programme (RIMP) conducted at HPB between 1981 and 2017 and the BEEMS Comprehensive Impingement Monitoring Programme (CIMP), conducted at HPB in 2009/10. Impacts of the HPC CWS infrastructure on fish impingement was modelled for 21 species, which represented over 98% of fish abundances recorded in the two data sets. These species included representatives of all of the functional and feeding guilds used in the transitional fish classification index (TFCI) for WFD assessment of fish (WFD-UKTAG, 2014).

TR456 (Cefas, 2019b) concluded that impingement effects of the LVSE and FRR systems would have negligible impact on the local fish assemblage. As noted previously, impacts of entrainment, impingement and entrapment of fish and invertebrates within the CWS is beyond the scope of the current WFD Assessment (this will be assessed as part of the Development Consent Order). However, fish, invertebrates and other debris have the potential to impact on receiving water bodies as they are discharged via the FRR system. As the quantity of material discharging through the FRR system is inherently linked to the materials entering the CWS, estimates of fish and invertebrate losses at the CWS are still pertinent to the current assessment.

3.2.2. Common ground and disagreement

TR456 (Cefas, 2019b) provides a considerable amount of information on the predicted effects of impingement at HPC. The general structure of the model used to calculate fish losses was adopted by the Environment Agency. However, a number of issues were highlighted regarding the predictions of impacts on fish assemblages. A substantial body of work has been produced by the Environment Agency to assess the predictions presented in TR456 and to re-parameterise and re-run models where appropriate. The revised (Environment Agency, 2022c) predicted losses for each species are higher than those predicted in TR456 (Cefas, 2019b).

3.2.3. Conclusion

As the amended predictions of fish mortalities presented in TB020 (Environment Agency, 2022b) are substantially higher than those presented in TR456 (Cefas, 2019b), the conclusions presented in TR456 cannot be accepted unconditionally.

3.3. Application variation – updated WFDA (version 1.0)(EDF, 2022)

3.3.1. Background

Following the application to vary the requirement to install an AFD system, an updated WFD assessment (EDF, 2022) was submitted with the aim of assessing whether the project remained compliant with WFD. The assessment followed the updated 'Clearing the Waters for All' guidance for the production of WFD assessments.

3.3.2. Focus of document and conclusions

3.3.2.1. Screening and Scoping

As the AFD was intended as mitigation against fish impingement into the CWS, the only activity considered in the updated WFD assessment (EDF, 2022) was the intake of materials (including biological elements) into the CWS. The focus of the assessment was the potential for the CWS (in the absence of the AFD) to impact on the fish WFD element. Impacts were considered with respect to the Bridgwater Bay and the Parrett water bodies.

The Scoping assessment concluded that the fish WFD biological quality element and the protected areas associated with them should be scoped in for further assessment. Following the conclusions of the 2011 WFD assessment(EDF, 2022), all other quality elements were scoped out.

3.3.2.2. Further Assessment

Further assessment was made on the potential for the fish WFD biological quality element to be impacted by the CWS in the absence of an AFD. The assessments made by EDF (2022) were primarily based on the information and predictions provided in TR456 (Cefas, 2019b).

Assessment of risk to WFD classification

The assessment(EDF, 2022) highlights that the metrics used to calculate the WFD status of fish (using the TFCI, WFD-UKTAG, 2014) are mostly based on presence-absence data (with the exception of *metric 3*: species relative abundance). As the calculations in TR456 (Cefas, 2019b) did not predict changes to the numbers of species present, then no deterioration in fish WFD status was predicted. The authors commented that only developments with wide scale and large impacts at the scale of the estuary are likely to impact on the calculated index values.

3.3.3. Common ground and disagreement

Overall, the updated assessment (EDF, 2022) provides a reasoned and structured assessment. Based on the information used in the assessment, the assessment reaches logical conclusions. Despite this however, the validity of the conclusions is uncertain, given that much of the information used to assess impacts is based on the

predictions provided in TR456 (Cefas, 2019b). The review of TR456 i(Environment Agency, 2022c) recalculated fish impingement into and through the CWS and predicted considerably higher abundances of fish than those reported in TR456.

3.3.4. Conclusion

The conclusion of no-deterioration reached by EDF (2022) was based on under-estimations of fish intake. As such, the conclusions cannot be accepted in their current state. Re-consideration of the WFDA is therefore required in light of the updated model outputs presented by Environment Agency (2020).

3.4. Hinkley Point C: Water quality effects of the fish recovery and return system – Technical Report TR515 (v. 2) – (Cefas, 2020)

3.4.1. Background

Technical report TR515 (Cefas, 2020) considered the potential effects of dead fish and invertebrate matter discharged from the HPC FRR system on water quality and ecology. The calculations in this report were based on the results of the TR456 HPC impingement assessment (Cefas, 2019b). As in the 2011 assessment (EDF, 2011), two water bodies were considered: Bridgwater Bay coastal water body and the Parrett transitional water body.

3.4.2. Focus of document and conclusions

Impacts of FRR system discharge were considered for a number of water quality parameters. Impacts of the organic enrichment of benthic sediments due to smothering and subsequent habitat loss were also considered.

Calculations were based on conservative estimates and considered to represent ‘worst case’ assumptions. For example, fish biomass calculations were based on annual maximum values. It was also assumed that all dead fish material released from the FRR system would sink immediately. As such, the conservative assumption is that there would be no effective dilution of any pollutants as a result of distribution by local currents following discharge.

The document concluded negligible impacts on dissolved organic nitrogen, phosphate, oxygen conditions and un-ionised ammonia. Impacts of nutrient inputs on phytoplankton were also concluded to be insignificant. This was linked to light being the principal limiting factor to phytoplankton in Bridgwater Bay throughout the year.

In addition to consideration of water quality impacts, impacts of smothering by additional organic matter on local soft sediment and rocky habitats were also considered. The report described the assemblages as being characterised by taxa tolerant of, and resistant to, organic matter input. It was concluded that the impacts of elevated organic matter discharge into these habitats would be negligible.

3.4.3. Conclusion

The approach and methods used in TR515 (Cefas, 2020) were sufficient and the interpretations were in line with the data used. However, as this document was based on the fish impingement predictions presented in TR456 (Cefas, 2019b), it is considered that the conclusions of TR515 were likely to underestimate any impacts. To address this, the calculations in TR515 were re-run with updated values (Environment Agency, 2022a) (Section 3.5).

3.5. Technical Report TR515 critique (v. 5.1) – Environment Agency (2022a)

3.5.1. Background

Environment Agency (2022a) reviewed the assessments presented in Cefas' TR515 technical report (Cefas, 2020). TR515 presents a method to estimate the nutrient and pollutant loads in the marine environment, based on the biomass estimates of dead fish and invertebrates discharged from HPC's FRR system.

The calculations described in TR515 were based on fish losses as predicted in the TR456 technical report (Cefas, 2019b). Review of these data (Environment Agency, 2020) predicted fish losses to be considerably higher than those presented in TR456. As such, reconsideration of the predicted impacts of FRR system discharge was required.

3.5.2. Focus of document and conclusions

Recalculations of the impacts on water quality by Cefas (2020) were presented by Environment Agency (2022a). Without exception, the updated estimates of all re-assessed parameters were larger than those presented by Cefas (2020).

The Environment Agency (2022a) report highlights that a number of inherent uncertainties remain in the calculations. These uncertainties are common to both the Environment Agency (2022a) report and the Cefas (2020) report. However, it is considered that the re-calculations presented by Environment Agency (2020) represent a worst-case and acute impact scenario.

3.5.3. Conclusion

Despite the potential for some localised, relatively small-scale impact, it was concluded that discharge of dead matter from the FRR system will not result in deterioration of WFD status at the water body scale as a result of impacts on water quality.

3.6. Technical Brief TB009 Biomass Weight and Mortality Report – Environment Agency (2022c)

3.6.1. Background

A number of technical review documents were produced to assess the conclusions of the TR456 technical report (Cefas, 2019b). Technical Brief TB009 (Environment Agency, 2022c) reviewed the fish and invertebrate biomass calculations for HPB and predicted estimates for HPC. The document provided estimates of the total biomass of fish and invertebrate organic material predicted to be discharged through the FRR system.

3.6.2. Focus of document and conclusions

As highlighted in Section 3.2.1, impacts of fish mortality are beyond the scope of this document. However, the impacts of fish and invertebrate organic material impacting on the environment as it exits the FRR system does require consideration. The volume of material exiting the FRR system is directly linked to the quantity of fish and invertebrate material entrained through the CWS. As such, consideration of these values is pertinent to the current assessment. The re-calculated assessments detailed in TB009 (Environment Agency, 2022c) predicted substantially elevated fish losses compared to those predicted in TR456 (Cefas, 2019b). This casts uncertainty on the conclusions of the documents which have used the predictions in TR456 as the basis of assessment. In particular, the Cefas (2020) TR515 technical report on the impacts of discharges from the FRR system on WFD water quality relied heavily on the information presented in TR456. Following the information summarised in TB009 (Environment Agency, 2022c), reconsideration of the conclusions of these documents is required.

4. Outstanding issues

It is considered that the WFD assessment submitted as part of the 2011 Environmental Statement (EDF, 2011) highlighted the majority of HPC activities with the potential to jeopardise compliance with WFD. The 2011 assessment was reviewed and accepted by the Agency. It is therefore not considered necessary to re-consider the majority of the activities considered within the 2011 assessment.

The proposed removal of AFD mitigation from the CWS design meant that assessment of the potential for this variation to jeopardise WFD compliance was required. Much work has been carried out to assess WFD compliance of the HPC project in the absence of an AFD system (see Section 0). The activity with the potential to jeopardise WFD compliance is the discharge of water from the FRR system. Outstanding activities have been scoped using the *Clearing the Waters for All* scoping template to identify the potential impacts that require consideration (Appendix 3). The scoping templates identified a number of areas which require consideration (Table 2).

Table 2. Summary of outstanding issues which might affect the compliance of HPC with WFD.

HPC activities	Issue	Water bodies	WFD elements	Notes	Further consideration required? (Section 4)
Discharge of water and material from FRR system	Potential for fish, invertebrates and other debris to impact on water quality by acting as a source of organic pollution following exit from the FRR system	Parrett transitional and Bridgwater Bay coastal	Water quality parameters and phytoplankton	Following the application to removing the requirement for AFD from the permit, the potential impacts of fish and invertebrate discards from the FRR system on water quality and phytoplankton were reviewed (TR515, Cefas, 2020). It was concluded that there would be no likely impact on WFD water quality parameters or phytoplankton. As part of a review of the TR456 technical report (Cefas, 2019b) these calculations were rerun by the Environment Agency (2022a). Despite differences in the estimated biomass of organic matter potentially discharged at the FRR system, this assessment also concluded that polluting impacts as a result of organic matter discharged from the FRR are unlikely to impact on WFD compliance.	**NO** – following the assessments detailed by Environment Agency (2022a), there is no concern relating to organic matter being released via the FRR system
Discharge of water and material from FRR system	Potential for materials bio-magnified in the tissues of fish act as a source of hazardous material following	Parrett transitional and Bridgwater Bay coastal	Hazardous materials	A number of fish species have been shown to be efficient biomagnifiers of certain hazardous compounds, with metals such as mercury often particularly heavily accumulated in fish the tissues of certain fish species. Fish feeding towards the top of the food chain (such as piscivorous species) are considered particularly prone to biomagnification	**YES** – consideration of the potential for bio-accumulated toxins being released as a result of the breakdown of

	emergence of these materials from the FRR system				fish tissue (Section 5.1.1)
Discharge of water and material from FRR system	Impacts of materials discharged from the FRR system on benthic invertebrate assemblages	Parrett transitional and Bridgwater Bay coastal	Benthic invertebrates	Consideration required of the potential for organic materials discharged from the FRR system to impact on nearshore benthic habitats. The principal issue would be the smothering of these benthic habitats. The majority of habitat in the vicinity of the FRR system is subtidal sediment. Consideration should also be made of impacts on intertidal and subtidal rocky habitats in addition to high sensitivity habitats such as polychaete reefs and saltmarshes (both within the Parrett)	**YES** – consideration of the potential impacts of materials discharged (Section 5.1.2)
Intake and discharge of water/ materials into the CWS and out of the FRR system	Assessment of impacts on protected sites	NA	NA	A Habitats Regulations Assessment is being produced for HPC which will assess the impacts of HPC on protected areas in the vicinity of the proposed works. Aside from Natura 2000 sites, there are no shellfish waters or bathing waters within 2 km of the HPC site which would require consideration as part of a WFD assessment	**YES** (separate HRA by Environment Agency in preparation)
General	Assessment of impacts of development with regards to	Parrett transitional and Bridgwater	NA	Although they were not explicitly considered in the 2011 WFDA (EDF, 2011), there is no pathway via which INNS are likely to be introduced to WFD water bodies as a result of activities	**NO**

	invasive non-native species	Bay coastal		associated with HPC. As such, no further assessment of INNS is required	
All	Assessment of cumulative and in combination impacts			Following updated assessments and conclusions, are there any risks relating to cumulative and/or in-combination effects?	**YES** (Section 5.2)

5. Final assessment

As highlighted in Table 2, some aspects require further consideration as part of the WFD assessment. These are covered in the sections below.

5.1. Discharge of materials through the FRR system

5.1.1. Potential for release of hazardous compounds from organic matter released via FRR system

Both the original TR515 report (Cefas, 2020) and the updated re-parameterised model predictions (Environment Agency, 2022a) predicted no WFD deterioration in water quality in terms of nutrient concentrations, un-ionised ammonia and oxygen concentrations resulting from the breakdown of dead fish and invertebrates.

Impacts of discharges from the FRR system on the concentrations of hazardous compounds also requires consideration. Many fish species show elevated concentrations of hazardous compounds in their body tissues as a result of the bioaccumulation of these compounds from their diets. For example, concentrations of mercury have shown biomagnification within the tissues of certain fish species. Typically, other metals and polycyclic aromatic hydrocarbons do not accumulate efficiently in fish tissues, due to the rapid metabolism and excretion of these compounds (Richardson et al., 2001, Stagg et al., 1995, Tierney et al., 2013). As such, it could be considered that bioaccumulation and subsequent release (via decomposition) of these compounds as a result of release of dead fish material from the FRR system is unlikely to cause substantial impact. This assessment therefore focuses on mercury compounds.

There is no routine monitoring of mercury in the tissues of those fish species predicted to dominate materials discharged from the FRR system. The limited data that do exist for mercury concentrations in local fish fauna are not gathered with the intention of assessing release of bioaccumulated materials. Any estimates are therefore data limited and are reliant on a number of assumptions (see below). As such, there is inherent uncertainty in the interpretation of these data. Data are available on mercury concentrations within the muscle tissues of flounder *Platichthys flesus* within the broader Severn Estuary (Severn Lower water body). Eight samples were collected between October 2002 and February 2006, giving a mean ± standard deviation mercury concentration per unit weight of muscle tissue of 137.6 ± 20.4 µg kg^{-1}.

Daily discharges of fish material from the FRR system are predicted to range from a minimum of 43 kg day^{-1} in October to a maximum discharge of 241 kg day^{-1} in December (Table 3) (Environment Agency, 2022a). Assuming that a number of assumptions are met (see below), this reflects mercury contents ranging from (137.6 x 43) = 5.9 (in October) to (137.6 x 241) = 33.15 mg Hg day^{-1} (in December) being released from the FRR system within the tissues of discharged fish material (Table 3).

Both TR515 (Cefas, 2020) and the subsequent critique of that document (Environment Agency, 2022a) interpreted concentrations in terms of the volume of water and the area of seabed (assuming a 7 m water depth) required to dilute pollutants to their EQS concentrations. Using the same approach for dissolved mercury (given a 0.07 µg l^{-1} EQS), the areas of seabed required to dilute these concentrations to below EQS levels range from 13.9 m^2 in October to 78.1 m^2 in December (Table 3).

The above estimates are indicative only. As they are based on limited data, the estimates are reliant on a number of assumptions. These are highlighted below:

- It is assumed that mercury concentrations for flounder are comparable to those for other taxa discharged from the FRR system
    - This is unlikely to be true, given the tendency for mercury to accumulate further up the food chain. Flounder feed primarily on benthic invertebrates. Piscivores such as whiting feed at higher trophic levels and as such, are likely to have accumulated higher levels of mercury within their body tissues. Conversely, sprat are zooplanktivores, feeding closer to the base of the food chain and so might be expected to have lower mercury concentrations than flounder.
- Mercury concentrations for flounder are based on concentrations per kg of muscle tissue. It is assumed that this is a representative value across the entire biomass of the individual
    - That is, we assume that mercury concentrations per unit weight of tissues such as bone, scales, liver, etc. are the same as those measured for muscle tissue. This is highly unlikely, given that different body tissues have been shown to accumulate heavy metals at different rates (e.g., Durrieu et al., 2005).
- It is assumed that all of the estimated mercury content within fish tissues will be rapidly released as dissolved contaminants into the water column
    - In reality, it is likely that only a proportion of the tissue-bound mercury will be released and it is likely that the release of these compounds will be more gradual.

Such assumptions are necessary if we are to estimate the release of mercury as a result of discharged materials from the FRR system. It is considered however that these assumptions considerably overestimate the potential release of tissue-bound contaminants into the water column.

From the calculations and assumptions outlined above, up to approximately 78 m^2 of seabed in the vicinity of the HPC discharge is predicted to be affected. However, as highlighted in the critique of TR515 (Environment Agency, 2022a), particle tracking predicts that dead biota will be dispersed over a substantial distance following release from the FRR system. As such, even if the predicted inputs of mercury via the FRR system were realistic, it is considered **unlikely that the release of bio-accumulated**

hazardous compounds from the tissues of dead fish will jeopardise compliance with WFD.

Table 3. Information on the predicted daily discharges of fish from the FRR system at HPC. Values are expressed as the maximum (December) and minimum (October) daily biomass of fish leaving the FRR system. Estimates of the mercury content of fish is included in addition to the area of seabed required to dilute mercury concentrations to the EQS concentration of 0.07 µg l^{-1}. Fish discharge data are provided by Environment Agency (2022a).

	Dec biomass (kg)	Dec mercury (mg)	Oct biomass (kg)	Oct mercury (mg)
Daily total	**241**	**33.15**	**43**	**5.92**
Area required to dilute to EQS concentration (m^2)		**78.08**		**13.93**

5.1.2. Potential smothering by materials discharged from the FRR system on benthic habitats

An assessment was included in TR515 (Cefas, 2020) of the potential impacts of fish matter on benthic habitats in the vicinity of the FRR system discharge. These encompass both sedimentary and rocky habitats and are considered to have low sensitivity to organic matter inputs. As such, the discharge of organic matter into these habitats were considered to be of negligible significance.

Reassessment of the impingement of fish and invertebrates into the CWS (and hence the expected release matter through the FRR system) by Environment Agency (2022a) predicted considerably higher discharge of biomass from the FRR system than previous estimates (Cefas, 2019b). As such, reconsideration of the impacts of organic matter release on benthic habitats is required.

A particle tracking model assessment of the dispersal of fish material following discharge from the FRR system was conducted by Cefas (2019a). This assessment predicted that the currents in the vicinity of HPC would distribute material discharged from the FRR system along an approximately 12 km stretch of coastline. The assessment predicted that predation by birds and benthic invertebrate assemblages would rapidly break down the majority of discharged material. Small amounts of material was predicted to be washed into the intertidal area, though these were predicted to be of minimal impact (Cefas, 2019a). This fish material would quickly be consumed by scavengers. Following review of the particle tracking model (Cefas, 2019a), we agree with the conclusion that the predicted discharge of fish material would have minimal

impacts on benthic assemblages in both the Bridgwater Bay and the Parrett water bodies.

As such, it is considered that release of fish material from the HPC FRR system will not jeopardise compliance with WFD.

5.2. Cumulative and in-combination impacts

As the assessed activities do not jeopardise compliance of HPC with WFD, there is no expected potential for cumulative or in-combination impacts beyond those already assessed in the 2011 WFD assessment (EDF, 2011) and the updated WFD assessment (EDF, 2022). As such, there is considered to be no specific risk resulting from multiple sources of any given pressure (i.e., a cumulative impact) and no specific risk of multiple different pressures impacting on a given receptor (i.e., an in-combination impact).

5.3. Impacts on protected sites

There are a number of protected sites in the vicinity of HPC. Of most significance with regards to the impacts of HPC are the Severn Estuary Special Area of Conservation (SAC), the Severn Estuary Special Protection Area (SPA) and the Severn Estuary Ramsar site. The SPA designation affords protection to a number of qualifying bird species. In addition, the SAC is designated for a number of Annex I habitats (estuaries, mudflats and Atlantic salt meadows) and Annex II fish species (sea lamprey, river lamprey and twaite shad). There is potential for a number of activities associated with HPC to impact on these designated features. A Habitats Regulations Assessment (EA, in prep.) will investigate and assess the likelihood of these impacts.

6. Conclusion

This document has reviewed previous work conducted to assess whether activities associated with HPC jeopardise compliance with the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (WFD). The 2011 Environmental Statement (EDF, 2011) screened in many activities which could affect compliance with WFD. That assessment concluded that HPC would not jeopardise compliance with WFD.

Since the submission of the 2011 ES, an application was made to vary the operational water discharge activity (OpWDA) permit, removing the requirement to incorporate an acoustic fish deterrent (AFD) system into the design of HPC's cooling water intake system (CWS). A number of documents were submitted by the applicant with the aim of predicting the impacts of HPC and to update existing assessments in the absence of the AFD. These documents were reviewed by the regulatory body, the Environment Agency. Where appropriate, new predictions of impacts were made.

As part of the EA assessment of the proposed permit variation, a new screening assessment was made following the EA's 'Clearing the Waters for All' guidance, to assess compliance with WFD . It was considered that there were potential pathways for local ecological receptors and water quality parameters to be impacted as a result of the discharge of material from the fish return and release (FRR) system. It was also considered that there was potential for impacts on the designated and qualifying features of protected areas.

Further assessment of these impacts concluded that there was minimal risk of these activities on compliance with WFD.

7. References

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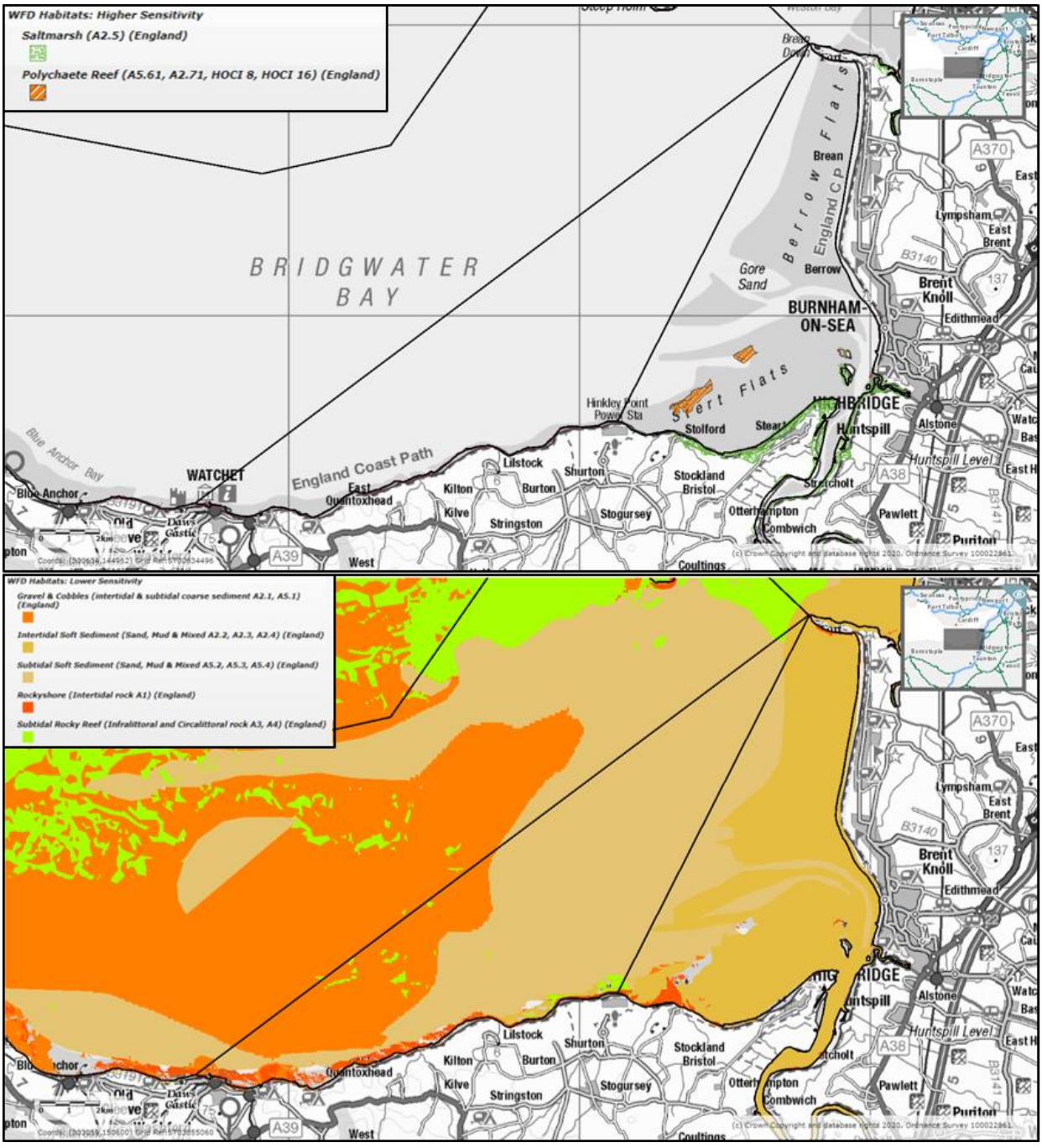
Appendix 1

Habitats in the vicinity of Hinkley Point C

Distribution of habitats in the vicinity of Hinkley Point C. Upper panel: habitats considered as higher sensitivity habitats under the Clearing the Waters for All WFD guidance. Lower panel: habitats considered as lower sensitivity. Information obtained from Magic Map.



Appendix 2

Transitional and Coastal water body WFD summary overview

Overall and element-level WFD classifications for TraC water bodies in the vicinity of the HPC development since 2009. Reasons for not achieving Good (RNAG) status/potential are given.

Bridgwater Bay coastal water body (WBID: GB670807410000)

Year	Overall	Ecology	Chemical	RNAG*
2009	Moderate	Moderate	DNRA	IQI; Macroalgae; Phytoplankton; DIN
2010	Moderate	Moderate	DNRA	IQI; Macroalgae
2011	Moderate	Moderate	DNRA	IQI; Macroalgae; DIN
2012	Moderate	Moderate	DNRA	IQI; Macroalgae
2013	Moderate	Moderate	Fail	IQI; Rocky Shore Macroalgae; DIN; Benzo(a)pyrene; Fluoranthene
2014	Moderate	Moderate	Fail	IQI; Rocky Shore Macroalgae; Benzo(a)pyrene; Fluoranthene
2015	Moderate	Moderate	Good	IQI; Rocky Shore Macroalgae
2016	Moderate	Moderate	Good	IQI; Rocky Shore Macroalgae; Phytoplankton
2019	Moderate	Moderate	Fail	IQI; Rocky Shore Macroalgae; Phytoplankton; DIN; Benzo(b)fluoranthene; Benzo(ghi)perylene); Benzo(k)fluoranthene; Mercury; PBDE

*IQI = Invertebrate Quality Index; DIN = Dissolved inorganic nitrogen; PBDE = Polybrominated diphenyl ethers

Parrett transitional water body (WBID: GB540805210900)

The Parrett is a heavily modified water body and is classified with regards to its 'potential' rather than 'status'.

Year	Overall	Ecology	Chemical	RNAG*
2009	Moderate	Moderate	Good	Expert Judgement; Mitigation Measures
2010	Moderate	Moderate	Good	Expert Judgement; Mitigation Measures
2011	Moderate	Moderate	Good	Expert Judgement; Mitigation Measures
2012	Moderate	Moderate	Good	Expert Judgement; Mitigation Measures
2013	Moderate	Moderate	Good	Mitigation Measures
2014	Moderate	Moderate	Good	Mitigation Measures
2015	Moderate	Moderate	Good	Mitigation Measures
2016	Moderate	Moderate	Good	Mitigation Measures
2019	Moderate	Moderate	Fail	Mitigation Measures; Mercury; PBDE

*IQI = Invertebrate Quality Index; DIN = Dissolved inorganic nitrogen; PBDE = Polybrominated diphenyl ethers

Appendix 3

Discharges from FRR system in lieu of AFD: WFD assessment scoping template

Your activity	Description, notes or more information
Applicant name	
Application reference number (where applicable)	
Name of activity	**Discharges from the Fish Recovery Return system (FRR) of Hinkley Point C (HPC)**
Brief description of activity	A fish recovery return (FRR) system is integrated into the design of the HPC cooling water system (CWS). Fish and other fauna retained on the mesh screens will be discharged from the FRR at an output approximately 600 m offshore. The discharge is located within the Bridgwater Bay water body (WBID GB670807410000) and approximately 1.5 km from the border with the Parrett transitional water body (WBID GB540805210900).

	Bridgwater Bay	**Parrett**
Water body ID	GB670807410000	GB540805210900
River basin district name	South West	South West
Water body type (estuarine or coastal)	Coastal	Transitional
Water body total area	9181.26 ha (91.8 km^2)	7084.51 ha (70.8 km^2)
Overall water body status (2016)	Moderate	Moderate
Ecological status	Moderate	Moderate
Chemical status	Good	Good
Target water body status and deadline	Good by 2027	Good by 2027
Hydromorphology status of water body	High	Supports Good
Heavily modified water body and for what use	No	Yes (Flood protection)
Higher sensitivity habitats present	NA	Polychaete reef; saltmarsh
Lower sensitivity habitats present	Cobbles, shingle and gravel; intertidal soft sediment; rocky shore; subtidal rocky reef; subtidal soft sediment	Cobbles, shingle and gravel; intertidal soft sediment; rocky shore; subtidal soft sediment
Phytoplankton status	Moderate	Not applicable
History of harmful algae	Not monitored	Not monitored
WFD protected areas within 2km	Yes (European designated sites)	Yes (European designated sites)

Specific risk information

Consider the potential risks of your activity to each of these receptors: hydromorphology, biology (habitats and fish), water quality and protected areas. Also consider invasive non-native species (INNS).

Section 1: Hydromorphology

Consider if hydromorphology is at risk from your activity.

Use the water body summary table to find out the hydromorphology status of the water body if it is classed as heavily modified and for what use.

Consider if your activity:	**Yes**	**No**	**Hydromorphology risk issue(s): Bridgwater Bay**	**Hydromorphology risk issue(s): Parrett**
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status	Requires impact assessment	Impact assessment not required	**NO.** Water body at moderate status	**NO.** Water body at moderate status
Could significantly impact the hydromorphology of any water body	Requires impact assessment	Impact assessment not required	**NO.** No pathway through which we can reasonably expect the discharge of fish and other organic material to influence the hydromorphology of the water body.	**NO.** No pathway through which we can reasonably expect the discharge of fish and other organic material to influence the hydromorphology of the water body.
Is in a water body that is heavily modified for the same use as your activity	Requires impact assessment	Impact assessment not required	**NO.** Bridgwater Bay is not a HMWB	**NO.** Water body is designated heavily modified for Flood Protection

Record the findings for hydromorphology and go to section 2: biology.

Section 2: Biology

Habitats

Consider if habitats are at risk from your activity.

Use the water body summary table and Magic maps, or other sources of information if available, to find the location and size of these habitats.

Higher sensitivity habitats which have a low resistance to, and recovery rate from, human pressures:

- Chalk reef
- Clam, cockle and oyster beds
- Intertidal seagrass
- Maerl
- Mussel beds, including blue and horse mussel
- Polychaete reef
- Saltmarsh
- Subtidal kelp beds
- Subtidal seagrass

Lower sensitivity habitats which have medium to high resistance to, and recovery rate from, human pressures:

- Cobbles, gravel and shingle
- Intertidal soft sediments like sand and mud
- Rocky shore
- Subtidal boulder fields
- Subtidal rocky reef
- Subtidal soft sediments like sand and mud

Consider if the footprint[4] of your activity is:	**Yes**	**No**	**Biology habitats risk issue(s): Bridgwater Bay**	**Biology habitats risk issue(s): Parrett**
0.5km^2 or larger	Yes, to one or more – requires impact assessment	No to all – impact assessment not required	**YES.** Quantitative predictions of the footprint of materials exiting the FRR system have not been produced. However, estimated footprints from Figure 3 in TR515 (Cefas 2020) and Figure 6 in TR479 (Cefas 2020b) suggest an area between 0.16 and 6.3 km^2 within Bridgwater Bay	**YES.** As for Bridgwater Bay, no quantitative predictions of the footprint of the discharge within the Parrett have been calculated. Using the modelling outputs presented in TR515 (Cefas 2020 and TR479 (Cefas 2020b), the estimated footprint of discharge from the HPC FRR system within the Parrett are predicted to be in the region of 5 km^2
1% or more of the water body's area	Yes, to one or more – requires impact assessment	No to all – impact assessment not required	**YES.** There is potential that material discharged from the FRR system will cover 6.2 km^2, representing approximately 6.8% of the water body area	**YES.** The predicted 5 km^2 footprint represents approximately 7% of the water body area.
Within 500m of any higher sensitivity habitat	Yes, to one or more – requires impact assessment	No to all – impact assessment not required	**NO.** There are no higher sensitivity habitats recorded within Bridgwater Bay	**YES.** The particulate matter tracking model indicates that there is the potential for material discharged from the FRR system to settle in areas characterised by polychaete reef and saltmarsh

Consider if the footprint[4] of your activity is:	**Yes**	**No**	**Biology habitats risk issue(s): Bridgwater Bay**	**Biology habitats risk issue(s): Parrett**
1% or more of any lower sensitivity habitat			**YES.**	**YES.** It is predicted that material discharged from the FRR system will potentially settle in an area characterised by intertidal soft sediments. Approximately 3.3 km^2 of this habitat is likely to be covered of the 57.3 km^2 available in the water body. This represents approximately 5.8% of that habitat within the Parrett. Approximately 0.73 km^2 of rocky intertidal lies within the predicted settlement area for discharged material. This represents approximately 66% of the 1.10 km^2 of this habitat within the Parrett

[4] Note that a footprint may also be a temperature or sediment plume. For dredging activity, a footprint is 1.5 times the dredge area.

Fish

Consider if fish are at risk from your activity, but only if your activity is in an estuary or could affect fish in or entering an estuary.

Consider if your activity:	**Yes**	**No**	**Biology fish risk issue(s): Bridgwater Bay**	**Biology fish risk issue(s): Parrett**
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary	Continue with questions	Go to next section	**YES.** Bridgwater Bay is not an estuary, but the discharge point is in the vicinity of the Parrett transitional water body. Although fish are not classified in coastal water bodies, there is therefore potential for this activity to impact on fish in the Parrett	**YES.** Bridgwater Bay is not an estuary, but the discharge point is in the vicinity of the Parrett transitional water body. Although fish are not classified in coastal water bodies, there is therefore potential for this activity to impact on fish in the Parrett
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)	Requires impact assessment	Impact assessment not required	**YES.** Potential impacts on behaviour of fish: a large input of organic material into the water body potentially acting as a food source for scavenging fish taxa	**YES.** Potential impacts on behaviour of fish: a large input of organic material into the water body potentially acting as a food source for scavenging fish taxa

Consider if your activity:	**Yes**	**No**	**Biology fish risk issue(s): Bridgwater Bay**	**Biology fish risk issue(s): Parrett**
Could cause entrainment or impingement of fish	Requires impact assessment	Impact assessment not required	**NO.** There is no pathway for the discharge of organic matter into the water body to result in the entrainment of fish	**NO.**

Record the findings for biology habitats and fish and go to section 3: water quality.

Section 3: Water quality

Consider if water quality is at risk from your activity.

Use the water body summary table to find information on phytoplankton status and harmful algae.

Consider if your activity:	**Yes**	**No**	**Water quality risk issue(s): Bridgwater Bay**	**Water quality risk issue(s): Parrett**
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)	Requires impact assessment	Impact assessment not required	**NO.** The potential impacts of dead fish entering the water body have been predicted to be below levels which would trigger a WFD deterioration (Environment Agency & APEM 2020a)	**NO.** The potential impacts of dead fish entering the water body have been predicted to be below levels which would trigger a WFD deterioration (Environment Agency & APEM 2020a)
Is in a water body with a phytoplankton status of moderate, poor or bad	Requires impact assessment	Impact assessment not required	**YES.** Phytoplankton at moderate status	**NO.** No classification for phytoplankton
Is in a water body with a history of harmful algae	Requires impact assessment	Impact assessment not required	**NO.** No monitoring is carried out for harmful algae	**NO.** No monitoring is carried out for harmful algae

Consider if water quality is at risk from your activity through the use, release or disturbance of chemicals.

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	**Yes**	**No**	**Water quality risk issue(s): Bridgwater Bay**	**Water quality risk issue(s): Parrett**
The chemicals are on the Environmental Quality Standards Directive (EQSD) list	Requires impact assessment	Impact assessment not required	Not applicable	Not applicable
It disturbs sediment with contaminants above Cefas Action Level 1	Requires impact assessment	Impact assessment not required	Not applicable	Not applicable

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	**Yes**	**No**	**Water quality risk issue(s): Bridgwater Bay**	**Water quality risk issue(s): Parrett**
The chemicals released are on the Environmental Quality Standards Directive (EQSD) list	Requires impact assessment[5]	Impact assessment not required	**YES.** Potential release of bio-accumulated toxins from the tissues of dead fish released into the water body	**YES.** Should it be considered that there is a significant issue for Bridgwater Bay, then impacts within the Parrett require consideration

[5] Carry out your impact assessment using the Environment Agency's surface water pollution risk assessment guidance, part of Environmental Permitting Regulations guidance.

Record the findings for water quality go on to section 4: WFD protected areas.

Section 4: WFD protected areas

Consider if WFD protected areas are at risk from your activity. These include:

- special areas of conservation (SAC)
- special protection areas (SPA)
- shellfish waters
- bathing waters
- nutrient sensitive areas

Use Magic map to find information on the location of protected areas in your water body (and adjacent water bodies) within 2km of your activity.

Consider if your activity is:	**Yes**	**No**	**Protected areas risk issue(s)**
Within 2km of any WFD protected area[6]	Requires impact assessment	Impact assessment not required	**YES.** There is potential for materials discharged through the FRR system to impact on designated features of European Marine sites in the vicinity of HPC.

[6] Note that a regulator can extend the 2km boundary if your activity has an especially high environmental risk.

Record the findings for WFD protected areas and go to section 5: invasive non-native species.

Section 5: Invasive non-native species (INNS)

Consider if there is a risk your activity could introduce or spread INNS.

Risks of introducing or spreading INNS include:

- materials or equipment that have come from, had use in or travelled through other water bodies
- activities that help spread existing INNS, either within the immediate water body or other water bodies

Consider if your activity could:	**Yes**	**No**	**INNS risk issue(s): Both water bodies**
Introduce or spread INNS	Requires impact assessment	Impact assessment not required	**NO.** As the organic matter discharged from the FRR system will be remains of organisms taken from the intakes within the same water body, there is no pathway for the introduction or spreading of INNS.

Record the findings for INNS and go to the summary section.

Summary

Summarise the results of scoping here.

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	NO	No pathway for impact on water body hydromorphology
Biology: habitats	**YES**	There is the potential for discharged material to smother habitats in the vicinity of the FRR system
Biology: fish	**YES**	Consideration of impacts of input of organic matter into the water body
Water quality	**YES**	Potential input of toxins bio-accumulated in the tissues of fish taxa returned to the water body
Protected areas	**YES**	Potential for water quality impacts to impact on designated features of European Marine Sites in the vicinity of HPC
Invasive non-native species	NO	No pathway for introduction or spread of INNS

If you haven't identified any receptors at risk during scoping, you don't need to continue to the impact assessment stage and your WFD assessment is complete.

If you've identified one or more receptors at risk during scoping, you should continue to the impact assessment stage.

Include your scoping results in the WFD assessment document you send to your activity's regulator as part of your application for permission to carry out the activity.