



Cory Decarbonisation Project Case Team
Planning Inspectorate
CoryDP@planninginspectorate.gov.uk
(Email only)

MMO Reference: DCO/2023/00007
Planning Inspectorate Reference: EN010128

13 June 2024

Dear Sir or Madam,

Planning Act 2008, Cory Environmental Holdings Limited Proposed Cory Decarbonisation Project Order

This document comprises the Marine Management Organisation's ("MMO") initial comments in respect of the above Development Consent Order application ("DCO Application") in the form of a relevant representation.

This is without prejudice to any future representation the MMO may make about the DCO Application throughout the examination process. This is also without prejudice to any decision the MMO may make on any associated application for consent, permission, approval or any other type of authorisation submitted to the MMO either for the works in the marine area or for any other authorisation relevant to the proposed development.

The MMO's role in Nationally Significant Infrastructure Projects (NSIPs)

The MMO was established by the Marine and Coastal Access Act 2009 (the "2009 Act") to make a contribution to sustainable development in the marine area and to promote clean, healthy, safe, productive and biologically diverse oceans and seas.

The responsibilities of the MMO include the licensing of construction works, deposits and removals in English inshore and offshore waters and for Northern Ireland offshore waters by way of a marine licence. Inshore waters include any area which is submerged at mean high water spring ("MHWS") tide. They also include the waters of every estuary, river or channel where the tide flows at MHWS tide. Waters in areas which are closed permanently or intermittently by a lock or other artificial means against the regular action of the tide are included, where seawater flows into or out from the area.

In the case of NSIPs, the Planning Act 2008 (the "2008 Act") enables DCOs for projects which affect the marine environment to include provisions which deem marine licences. As a prescribed consultee under the 2008 Act, the MMO advises developers during pre-application on those aspects of a project that may have an impact on the marine area or those who use it. In addition to considering the impacts of any construction, deposit or removal within the marine area, this also includes assessing any risks to human health, other legitimate uses of the sea and any potential impacts on the marine environment from terrestrial works.

Where a marine licence is deemed within a DCO, the MMO is the delivery body responsible for post-consent monitoring, variation, enforcement and revocation of provisions relating to the marine environment. As such, the MMO has a keen interest in ensuring that provisions drafted in a deemed marine licence (“DML”) enable the MMO to fulfil these obligations.

Further information on licensable activities can be found on the MMO’s website [here](#). Further information on the interaction between the Planning Inspectorate and the MMO can be found in our joint advice note 11 Annex B [here](#).

Relevant Representation

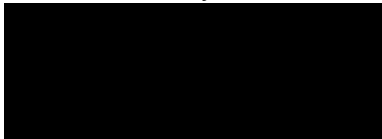
On the 18 April 2024, the MMO received notice under Section 56 of the Planning Act 2008 (the “PA 2008”) that the Planning Inspectorate (“PINS”) had accepted an application made by Cory Environmental Holdings Limited (the “Applicant”) for a DCO Application (MMO ref: DCO/2023/00007; PINS ref: EN010128).

The DCO Application includes a draft Development Consent Order (the “DCO”) and an Environmental Statement (the “ES”). The draft DCO includes, at Schedule 11, a draft Deemed Consent under Part 4 (Marine Licensing) of the Marine and Coastal Access Act 2009 (the “Deemed Marine Licence”)(DML).

The DCO Application seeks authorisation for the construction, operation, maintenance and decommissioning of a carbon capture facility, including supporting plant and ancillary infrastructure.

Please find the MMO comments below.

Yours faithfully



Daniel Fantarrow
Marine Licencing Case Officer

D 
E 

Contents

1. General comments on the application	4
1.1 Marine Plans.....	4
2. Development Consent Order (DCO) and Deemed Marine Licences (DMLs).....	5
2. Environmental Statement (ES)	14
2.1 Coastal Processes	14
2.2 Dredge and Disposal	15
2.3 Benthic ecology	20
2.4 Fish ecology	21
2.5 Shellfish ecology	24
2.6 Underwater Noise.....	26
2.7 Marine Navigation.....	28
2.8 Historic Environment.....	28
3. Summary.....	29
3.1 General Comments	29

1. General comments on the application

1.1 Marine Plans

- 1.1.1 The Environmental Statement (ES) correctly identifies that the proposed development is within the South East Inshore Marine Plan. The MMO requests that all policies within the plan are reviewed within a table to show compliance. This must be produced as the Secretary of State must use the South East Inshore Marine Plan when making planning decisions for the sea, coast, estuaries and tidal waters, as well as developments that impacts these areas, such as infrastructure. The relevant marine plan policies that should be met can be identified using the Explore Marine Plans tool and policy information on the following website: [Explore marine plans - GOV.UK \(www.gov.uk\)](https://www.gov.uk/explore-marine-plans)
- 1.1.2 Although some Marine Plan Policies have been discussed, the MMO requires the Applicant to detail how the proposed project is compliant with the relevant marine plans by producing a marine plan policy assessment in one document.

2. Development Consent Order (DCO) and Deemed Marine Licences (DMLs)

Please see the below table for the MMO's comments on the draft DCO, including the DML:

Main DCO		
	Part 2 Principal Powers	
	9. Consent to transfer benefit of the Order	<p>The MMO objects to the provisions relating to the process of transferring and/or granting the deemed marine licences set out in the draft DCO at Article 9(2)-(11) insofar as these are intended to apply to the MMO and requests paragraphs 9(2)(a)-(b) and (3) be removed in their entirety and all references to the MMO be removed from Article 9, with a clarification added to specifically exclude these provisions from applying to the MMO (with corresponding wording added where appropriate in Schedule 1 (Deemed Marine Licence)).</p> <p>The MMO is concerned that the procedure proposed represents an unnecessary duplication of the existing statutory regime set out in s72 of the Marine and Coastal Access Act 2009 and that it will give rise to significant enforcement difficulties for the MMO. The MMO also considers that it has the potential to prejudice the operation of the system of marine regulatory control in relation to the proposed development. The MMO also regards the proposed procedure as cumbersome, more administratively burdensome, slower and less reliable than the existing statutory regime set out in s72 of the 2009 Act.</p> <p>In short, the MMO considers that little advantage is gained for the Applicant by these provisions and the tangible risks and disadvantages that it poses can be avoided by retaining the existing statutory regime in full.</p>
	Part 4 Interpretation	
	Arbitration 47 (1)-(2)	The MMO should not be subject to arbitration provisions and this should be amended to specifically exclude the MMO, as below:

		<i>“Any matter for which the consent or approval of the Secretary of State or the MMO is required under any provision of this Order is not subject to arbitration”.</i>
	Schedule 1 Authorised development	
	Part 2 Authorised development	
	Numbering	This part seems to be missing numbering, and the MMO suggests including this for ease of reading.
	Schedule 2 Requirements	
	Part 1 The Authorised Development	
	Decommissioning environmental management plan	It is not clear whether this refers to both onshore and offshore decommissioning. This should be made clear and if it also involves offshore decommissioning, this must be consulted on with the MMO.
	Schedule 11 – Deemed Marine Licence	
	Part 1	
	<i>“the licence holder” means Cory Environmental Holdings Limited [...] and any transferee pursuant to article 9 (consent to transfer benefit of the Order) of the Order;</i>	<p>The MMO considers that the latter part of this definition should be removed, see article 9 reasoning above: <i>“the licence holder” means Cory Environmental Holdings Limited [...] and any transferee pursuant to article 9 (consent to transfer benefit of the Order) of the Order;</i></p> <p>Additionally, the MMO has transitioned away from using the term ‘Licence Holder’ to the term ‘Undertaker’. The MMO has noted that this phraseology has been used here and throughout the document and urges the Applicant to amend the term ‘Licence Holder’ to ‘Undertaker’ throughout the DML going forward.</p>
	<i>“outline environmental management plan”</i>	<p>Nowhere in the DML does it state that all activities must be undertaken in accordance with the environmental management plan.</p> <p>The MMO will provide further comments and suggestions, if required, at Deadline 1.</p>

3	Details of such licenced marine activity (3)	<p>This provision is very broadly drafted. The MMO considers that exact coordinates should be included to detail where the licensed activities will be carried out.</p> <p>The MMO has concerns regarding this drafting, in particular the general right to alter, modify, remove or replace any work or structure at (3(2)(b)(i)), very broad rights to carry out excavations, scouring and dumping at (3(2)(b)(ii)), dispose of materials (2)(b)(iii) and remove any vessel whether lawfully or not (3(2)(b)(iv)). The MMO requests that these are amended or clarified as to whether these will be addressed further in the method statement. As drafted, these are very vague and the very broad nature of the provisions as they stand, especially given the absence of the other standard plans and statements, the MMO would expect to see references.</p>
	How long is the licence to remain in force?	<p>The MMO would expect to see provisions covering how long the licence will remain in force for, for example:</p> <p><i>“This licence remains in force until the authorised project has been decommissioned in accordance with the programme approved by the Secretary of State under section 106 (approval of decommissioning programmes) of the 2004 Act, including any modification to the programme under section 106 (approval of decommissioning programmes) of the 2004 Act and the completion of such programme has been confirmed by the Secretary of State in writing”.</i></p>
Part 2 Conditions		
	Provisions on variations and approvals	<p>The MMO would expect to see a provision of this nature in the DML:</p> <p><i>“With respect to any condition which requires the licensed activities to be carried out in accordance with the plans, protocols or statements approved under this licence, the approved details, plan or scheme are taken to include any amendments that may subsequently be approved in writing by the MMO. Subsequent to the first approval of those plans, protocols or statements provided it has been demonstrated to the satisfaction of the MMO that the subject matter of the relevant amendments do not give rise to</i></p>

		<i>any materially new or materially different environmental effects to those assessed in the environmental information.”</i>
	Provisions on variations or approvals	<p>The MMO would expect to see a provision of this nature included in the DML:</p> <p><i>“Any amendments to or variations from the approved details, plans or schemes must be in accordance with the principles and assessments set out in the environmental statements. Such agreement may only be given where it has been demonstrated to the satisfaction of the MMO that it will not give rise to any materially new or materially different environmental effects from those assessed in the environmental statement.”</i></p>
	Construction environmental management plan	<p>The MMO would expect to see some provisions along these lines:</p> <p><i>“Construction environmental management plan 8.—(1) No licensed activities may be commenced until a construction environmental management plan for them has been submitted to and approved by the MMO following consultation with the relevant planning authority, the Environment Agency and Natural England on matters related to their function; and the submitted construction environmental management plan must be in accordance with the outline construction environmental management plan, unless otherwise approved by the MMO. (2) Any construction environmental management plan submitted pursuant to sub-paragraph (1) and any construction environmental management plan submitted pursuant to paragraph 6(1) of Schedule 2 (requirements) of the Order may be comprised in the same document or separate documents.”</i></p> <p>And <i>“all licensed activities must be carried out in accordance with the construction environmental management plan for those activities approved pursuant to paragraph [] of this Schedule where applicable, unless otherwise approved by the MMO.”</i></p>
	Marine Noise Registry	As works include piling, the MMO would expect to see a condition regarding the Marine Noise Registry, for example as below:

		<p><i>-(1) Only when impact driven or part-driven pile foundations or detonation of explosives are proposed to be used as part of the foundation installation the undertaker must provide the following information to the Marine Noise Registry (MNR)—</i></p> <p><i>a) prior to the commencement of the licensed activities, information on the expected location, start and end dates of impact pile driving/detonation of explosives to satisfy the Marine Noise Registry’s Forward Look requirements; and</i></p> <p><i>(b) within 12 weeks of completion of impact pile driving/detonation of explosives, information on the exact locations and specific dates of impact pile driving/detonation of explosives to satisfy the Marine Noise Registry’s Close Out requirements.</i></p> <p><i>(2) The undertaker must notify the MMO of the successful submission of Forward Look requirements.</i></p>
10	Method statement	<p>Given the very broad nature of the marine activities licenced in 3, the MMO considers this condition should be updated to specify more details about what the method statement will include.</p> <p>This condition should also include the following: <i>“the licenced activities for the relevant stage must be carried out in accordance with the approved plans, protocols, statements, schemes, schemes and details approved under this condition unless otherwise agreed in writing by the MMO.”</i></p>
11	Sediment Sampling	<p>The MMO considers that this condition is not appropriate as drafted and lacks detail. The MMO will review the condition requirements alongside the rest of the DCO and provide further comments and suggestions, if required, at Deadline 1.</p>
	Agents, contractors and subcontractors	<p>The MMO would expect to see some paragraphs on this, for example:</p> <p><i>“Agents, contractors and sub-contractors 10.—(1) The undertaker must notify the MMO in writing of any agents, contractors or subcontractors that will carry on any licensed activity listed in section [] of this licence on behalf</i></p>

		<p><i>of the undertaker. Such notification must be received by the MMO no less than 24 hours before the commencement of the licensed activity.</i></p> <p><i>(2) The undertaker must ensure that a copy of this licence and any subsequent revisions or amendments has been provided to, read and understood by any agents, contractors or subcontractors that will carry on any licensed activity listed in section 3 of this licence on behalf of the undertaker.”</i></p>
	Marine written scheme of archaeological investigation	<p>The MMO considers that a marine written scheme of archaeological investigation should be included within the DML, and we suggest potential wording for this below:</p> <p><i>“Archaeological method statements, together with a written report on any consultation carried out with Historic England and the relevant planning authority on matters related to their respective functions in their preparation, must be submitted to and approved by the MMO in writing in accordance with the provisions of the outline marine written scheme of investigation and a subsequent update must be provided to the MMO six weeks before commencement of any licensed activity to which the method statement relates.”</i></p>
12	Piling	This is a very spartan provision and should be expanded on in line with other DCOs of similar natures. For example, further information should be provided on the points and mitigation referenced in Section 2.4 of this response.
13	Dredging	The MMO notes that this is a very spartan provision with significant information gaps. This should be updated in line with other DCOs of a similar nature.
14	Concrete and cement 14(2) <i>“Where practicable, the licence holder must site concrete and cement mixing and washing areas at least 10</i>	<p>The MMO considers that this should be amended to the following:</p> <p>14(2) <i>“Where practicable, the The undertaker must site concrete and cement mixing and washing areas at least 10 metres away from the River</i></p>

	<i>metres away from the River and any surface water drain to minimise the risk of run off entering the River.”</i>	<i>and any surface water drain to minimise the risk of run off entering the River.”</i>
16	Pollution and spills	<p>Given the environmental impact and risks here the MMO would expect to see significantly more detail and consider this should be amended to:</p> <p><i>“9.—(1) Bunding and storage facilities must be installed to contain and prevent the release of fuel, oils and chemicals associated with plant, refuelling and construction equipment into the marine environment. Secondary containment must be used with a capacity of no less than 110% of the container’s storage capacity.</i></p> <p><i>(2) Any oil, fuel or chemical spill within the marine environment must be reported to the MMO Marine Pollution Response Team as soon as reasonably practicable, but in any event within 12 hours of being identified in accordance with the following, unless otherwise advised in writing by the MMO— (a) within business hours on any business days: 0300 200 2024; (b) any other time: 07770 977 825; or (c) at all times if other numbers are unavailable: 0845 051 8486 or dispersants@marinemanagement.org.uk.</i></p> <p><i>(3) All wastes must be stored in designated areas that are isolated from surface water drains, open water and contained to prevent any spillage.</i></p> <p><i>(4) The undertaker must comply with the existing marine pollution contingency plan in place as detailed in the construction environmental management plan.”</i></p>
18	Disposal	<p>These are very vague and broadly drafted provisions, the MMO would expect to see further detail of what is being disposed and precise details of where (beyond ‘the disposal site’).</p> <p>The MMO suggests that the Applicant consider the below wording for inclusion within the DML:</p> <p><i>20.—(1) The undertaker must inform the MMO of the location and quantities of material deposited each month under the licence. This information must be submitted to the MMO by 15 February each year for the months August</i></p>

		<p><i>to January inclusive and by 15 August each year for the months February to July inclusive.</i></p> <p><i>(2) The undertaker must ensure that only inert material of natural origin produced during dredging must be deposited in the disposal sites— (a) HU060 (unconsolidated); and (b) HU056 (consolidated), or any other site approved in writing by the MMO.</i></p> <p><i>(3) The material to be disposed of within the disposal sites referred to in subparagraph (2) must be placed evenly within the relevant site’s boundaries.</i></p> <p><i>(4) During the course of disposal at sea, deposited material must be distributed evenly over the disposal site.”</i></p>
	Dropped objects	<p>The MMO would expect to see some provisions covering dropped objects along these lines:</p> <p><i>“21.—(1) The undertaker must report all dropped objects to the MMO using the Dropped Object Procedure Form as soon as reasonably practicable and in any event within 24 hours of becoming aware of an incident.</i></p> <p><i>(2) On receipt of the Dropped Object Procedure Form, the MMO may require, acting reasonably, the undertaker to carry out relevant surveys. The undertaker must carry out surveys in accordance with the MMO’s reasonable requirements and must report the results of such surveys to the MMO.</i></p> <p><i>(3) On receipt of such survey results the MMO may, acting reasonably, require the undertaker to remove specific obstructions from the seabed. The undertaker must carry out removals of the specific obstructions from the seabed in accordance with the MMO’s reasonable requirements and its own expense.”</i></p>
	Notice to Mariners	<p>The MMO would expect to see provisions covering this along these lines:</p> <p><i>Notice to Mariners 22.—(1) Local mariners, fishermen’s organisations and the UK Hydrographic Office must be notified of any licensed activity or phase of licensed activity through a local Notice to Mariners. (2) A Notice to Mariners must be issued at least 5 days before the commencement of each licensed activity or phase of licensed activity. (3) The MMO and Maritime and Coastguard Agency must be sent a copy of the notification within 24</i></p>

		<p><i>hours of issue. The Notice to Mariners must include— (a) the start and end dates of the work; (b) a summary of the works to be undertaken; (c) the location of the works area, including coordinated in accordance with WGS84; and (d) any markings of the works area that will be put in place. (4) A copy of the notice must be provided to the MMO via MCMS within 24 hours of issue of a notice under sub-paragraph (1).</i></p>
--	--	--

2. Environmental Statement (ES)

2.1 Coastal Processes

- 2.1.1 Dredge Disposal has not been considered (though the MMO notes that this was requested by the Environment Agency), which the Applicant explains, but which still represents an omission from the overall impact of this scheme. Scour impacts (i.e., around the jetty piles) has also not been reviewed. The MMO would not expect this to be a major impact and is not a definite cause for concern, but this does not appear to have been explicitly scoped out.
- 2.1.2 The 'affected areas' mentioned in paragraphs 8.8.8 (82,675 m²), 8.8.10 (1470 m², 0.003%) and 8.8.13 (2331 m², 0.02%) are not easily interpreted or consistent. The first is presented as 0.18% of the Thames Middle Transitional Water Body area, the second as a percentage of the total intertidal area, and the latter as a percentage of the total intertidal mudflat of this body. The latter (mudflat) is probably the most reasonable mode of comparison, but the areas given cannot be 0.003% and 0.02% of the same area. The MMO advises that the wording and numerical values should be tidied up and given consistently if possible, to avoid confusion.
- 2.1.3 The MMO considers that the coastal process modelling (Appendix 11-4) appears to be satisfactory and based on sufficient environmental data.
- 2.1.4 Reasonable comparative scenarios are modelled (Appendix 11-4) and interpretation of the results is clearly presented. The scale of implied impacts is also in line with similar developments.
- 2.1.5 There is no significant cumulative impact on coastal processes discussed in Chapter 21. Possibly the most likely source of potential in-combination and cumulative impact would be concurrent presence of multiple barges and associated activities in the nearshore which could plausibly generate combined changes to flows and sediment stability leading to (not necessarily overlapping) damage to the intertidal area affected. The MMO is not aware that this case has been considered (though we do not expect that this would be a significant coastal process impact, based on the individual assessments).
- 2.1.6 There are minor gaps in the potential scenarios (e.g., cumulative impacts of multiple simultaneous activities, and the potential for scour around the jetty piles, which the MMO is unable to determine as having been previously scoped out).
- 2.1.7 Certain assumptions are not explained with evidence for example, paragraph 8.8.173 states that wave wash impacts will not increase because speeds are limited to 3 knots, the MMO cannot confirm that this is a logical inference. Dredge modelling also assumes that the bed will reach 'morphological equilibrium' in the 5.5 hours between assumed phases of dredging, without further explaining or justifying the assumption.
- 2.1.8 The proposed mitigation (paragraph 8.7.2) are relatively minor design and operational measures, to be included in the licence and construction (methods) plan, and operational speed limits. The MMO does not envisage further measures being feasible or necessary for mitigating coastal process impacts.

- 2.1.9 Decommissioning is briefly assessed, and its effects expected to be no more than construction (which is both fair and typical for Environmental Impact Assessment (EIA)), while recognising that the effects of either leaving or removing the redundant jetty may be positive in different ways. Biodiversity net gain is important given that the site (including the jetty construction compound) is located on Erith Marshes Site of Importance for Natural Conservation (SINC) and Belvedere Dykes SINC, the jetty is in the River Thames and Tidal Tributaries SINC, and the proposed Mitigation and Enhancement Area is also within these zones. The MMO notes that long-term management (i.e., assurance) of the mitigation areas is not yet agreed. This should be ensured as soon as possible, along with the decision to remove or leave the redundant jetty, to ensure their robust accounting and preservation as (long-term, uncertain) coastal processes change occurs.
- 2.1.10 The lack of final waste handling/disposal facilities is an important omission since the separation of CO₂ for sequestration effectively requires these additional stages to complete the function of the plant. The MMO considers it an incomplete EIA if such required stages are omitted, but we are unable to comment specifically on coastal process impacts that might arise (though these might be expected to be negligible, or minimal for the proposed geological storage).

2.2 Dredge and Disposal

- 2.2.1 The ES states the dredging will be undertaken by use of a backhoe dredger, as described in Chapter 2: Site and Proposed Scheme Description. However, in Chapter 2 backhoe dredge methods are only mentioned in relation to capital dredging, and no dredge method is defined in relation to maintenance dredging. Previous advice provided for the preliminary environmental information report (PEIR) noted that several dredge methods were listed including backhoe, water injection (WID) and trailing suction hopper (TSHD). The dredge methods should be clearly stated within the description of the proposed works for all dredge operations.
- 2.2.2 The ES also states (capital and maintenance) dredging will be managed in accordance with relevant legislation and all dredged arisings will be disposed offsite (via vessel and only if dredged arisings are deemed suitable for this disposal method and conform with the permits for the disposal sites). It should be clarified whether the material will be considered for disposal at sea and details should be provided for disposal sites if this is the case.
- 2.2.3 The MMO does not agree with the conclusions reached in relation to changes in water quality and the release of contaminants. This assessment is missing a considerable amount of significant information in regard to the proposed dredge and disposal, and our main concerns in relation to the assessment conclusions are as follows:

Construction Phase (Capital Dredge):

- In the absence of contaminant data at the dredge depth, the ES states; “a *precautionary medium magnitude of impact is currently derived for most receptors*”. There is no justification provided for the use of a medium magnitude of impact – rather than low or high for example – and the use of such a value is unevidenced. This does not provide any consideration of the sensitivities of the

different receptors to different contaminants. Furthermore, a medium magnitude of impact is defined in Table 8-4 (included below for reference) as “*Partial loss or alteration to one or more key elements/features of the baseline conditions*”. The ES should assess the proposed works as worst-case, especially in the absence of sub-surface sediment data to characterise the risk. The MMO disagrees that the proposed dredge volume of 110,000 cubic metres (m³) is small-scale, and subsequently would challenge the “small-scale” argument being used to qualify the risk. It is reasonable to consider, if the dredge material is highly contaminated, that this may have a high magnitude of impact on sensitive receptors. As such, a high magnitude of impact would be considered appropriately precautionary unless a reasonable and evidence-based justification for otherwise can be provided.

Table 8-4: Marine Biodiversity Definitions of Impact Magnitude Classes

Magnitude of Impact	Definition
High	Total loss or large alteration to key elements/features of the baseline conditions. Results in extensive temporary or permanent changes to baseline conditions such as spawning/nursery/feeding grounds and/or migratory routes.
Medium	Partial loss or alteration to one or more key elements/features of the baseline conditions.
Low	Small shift away from baseline conditions. No noticeable effects above the level of natural variation experienced.
Negligible	Very slight change from baseline conditions.

- Additionally, the magnitude of impact is assessed as low for marine plants and macroalgae; and negligible for plankton and marine mammals. However, little evidence has been provided to support these conclusions. For example, the marine plant and macroalgae species present in the vicinity of the dredge area are stated to be of low sensitivity to changes in water quality and the release of contaminants. However, there is no evidence presented to support this statement; and there appears to be no consideration for contaminants other than metals. Similar assertions are made in relation to plankton and marine mammals, again with little to no evidence presented to support these statements. Due to this lack of evidence, the MMO cannot agree with the conclusions in these sections.

Operation Phase (Maintenance Dredging):

- The Applicant has not sufficiently assessed the impacts of changes in water quality and the release of contaminants resulting from the proposed maintenance dredging. Under the assessment for each receptor the ES states:
- *“The potential impacts from changes to water and sediment quality derived from construction activities have been discussed in Paragraph 8.8.52. The reduced volumes of dredged material required for maintenance dredging, is likely to result in reduced impacts to this receptor.”*

Maintenance and capital dredging are different activities and should be assessed as such. Maintenance dredging is typically undertaken (albeit intermittently) over a longer time period and may present a higher risk of chronic effects in marine life, compared to capital dredging which is typically undertaken over a shorter period. The above statement does not appropriately quantify or assess these effects in relation to the

Proposed maintenance dredging, and therefore the MMO does not consider it appropriate to use the assessments made for capital dredging to wholly inform the conclusions for maintenance dredging.

- 2.2.4 The MMO thanks the Applicant for providing the MMO Results Template in the standard excel template via email. We note the Certificate Job Details state the samples provided in a ‘cold – satisfactory’ and ambient – satisfactory’ condition. To maintain their integrity, samples should be frozen and remain in the freezer until they are dispatched in a cool box. As such, it should be clarified whether the samples were frozen as per the sampling guidelines.
- 2.2.5 It should be noted that the Limit of Detection (LOD) for organotins were stated to be 0.001, however any sample below a concentration of 0.005 mg/kg dry weight are stated as ‘<0.005’. It has therefore been assumed the LOD is 0.005, and 0.001 is a transcription error; however, this should be clarified.
- 2.2.6 PBDE results show levels above and below the respective LOD in all samples. In the absence of agreed ALs for PBDEs, Cefas refer to recommendations in Mason et al. (2020), however, it should be noted that as these recommended guidelines are not formally agreed ALs there is no signatory obligation to adhere to them. The results of this analysis show that all BDE congeners are below the respective lower assessment criteria, except for BDE 99. The results for BDE 99 are presented in the table below, with sample results highlighted in yellow being above the lower criterion (0.0003 mg/kg dry weight) and in red being above the upper criterion (0.001 mg/kg dry weight).

Sample site	BDE99 (mg/kg)
Subtidal 7	0.013
Subtidal 8	0.158
Subtidal 9	0.032
Subtidal 10	0.033
Subtidal 11	0.004
Subtidal 12	0.013
Subtidal 13	0.0023
Subtidal 14	0.0004
Subtidal 15	0.0282

- 2.2.7 As shown in the table above, the highest concentration for BDE 99 was observed to be 158x the upper criterion (0.158 mg/kg). The MMO assumes that this is most likely a typographical error given the other sample concentrations, however this should be clarified.
- 2.2.8 Nonetheless, BDE 99 concentrations significantly exceed the upper criterion in seven of the other eight samples, reaching over 28x the upper criterion in three of these. These results raise concern with respect to BDE99 levels, however, Cefas assess PBDEs as a whole contaminant group, rather than based on individual congeners (Dr Jon Barber, pers comm). In practice, this means that if one congener

fails but all others do not, then that one congener is at “bad status”, but generally overall the material is at “good status”. If more than one congener is above the upper criterion then that is when we would say the material overall has “bad status” and recommend exclusions. On this basis, the material is “bad status” for BDE99 in all samples; but “good status” overall. The Applicant may be required to include PBDEs in future monitoring to further investigate the extent of contamination and provide sufficient evidence to support the proposed capital and maintenance dredge activities. This is especially salient considering the results for subtidal site 8 and my respective comments.

- 2.2.9 Overall, the results raise some concern in terms of risk to the marine environment should the intention to be dispose of the dredged material at sea, particularly in relation to PAHs and PBDEs. It is likely these contaminants will need to be included for analysis during one or more of the proposed pre-dredge surveys, however this should be determined when the relevant sample plans are requested.
- 2.2.10 Regarding the results for the bespoke sediment sampling survey, although SOCOTEC UK Ltd are validated by the MMO to undertake chemical analyses of contaminants in support of marine licences, they are not validated to undertake physical analysis of particle size (PSA). As such the PSA results should be viewed as indicative only. The MMO is aware that SOCOTEC may sometimes sub-contract PSA to validated laboratories, and if this is the case then this should be clarified. Please note for future sampling that all analysis must be undertaken by a laboratory validated by the MMO for the respective analysis. The Applicant is welcome to select any combination of validated laboratories to meet the requirements, and all analyses need not be conducted by the same laboratory. For further guidance please refer to the MMO website: <https://www.gov.uk/guidance/marine-licensing-sediment-analysis-and-sample-plans>
- 2.2.11 As stated in Section 8.7 of Chapter 8 of the ES, further sediment sampling will be undertaken prior to the commencement of works. The MMO would typically expect to see full characterisation of the dredge material to be provided at this stage of application – unless a disposal licence is being sought separately to the ES review. Clarification should be provided as to why this has not been provided during the application stage; and whether this is planned to be undertaken post-consent.
- 2.2.12 Clarification should also be provided as to whether the proposed maintenance dredging will be permitted under the Deemed Marine Licence (DML) or whether this activity will be covered under a separate (new or existing) Marine Licence.
- 2.2.13 There remain considerable information gaps in the ES in relation to the proposed dredge and disposal activities. Although the Applicant has provided the design depth for the dredge pocket (10.5 m BCD), we can find no reference to the current depth of the dredge pocket or of the depth of the material to be removed from the sediment surface. Similarly, there is little to no detail provided in relation to dredge disposal activities (which the MMO notes was requested by the Environment Agency – Paragraph 6, p. 23). It should be clarified whether the material will be considered for disposal at sea, and details for disposal sites if required should be provided.

2.2.14 Potential mitigation measures to reduce impacts from contaminated sediment are provided in Section 8.9 of Chapter 8 of the ES (Paragraph 6). Potential measures include;

- Dredging for a reduced time period each day;
- Dredging on a certain phase of the tide;
- avoidance of very elevated levels at depth; and
- Use of a silt curtain if practical in this location, recognising the influence of tidal flows.

These potential mitigations measures are appropriate and the MMO welcomes the consideration of the use of silt curtains. Given the works propose to use backhoe dredge methods we would recommend the use of an enclosed bucket, to limit the spill of material during dredge operations.

3.3.10 The proposed application includes installation of a sheet pile retaining wall equipped with a capping beam, to reduce the extent of dredging required. This is in line with the Waste Hierarchy; and we would encourage the Applicant to search for beneficial use opportunities in the proposed enhancement area and local area.

2.3 Benthic ecology

- 2.3.1 The MMO broadly agrees with the conclusions reached regarding the sensitivity to and significance of the impacts to subtidal, intertidal and saltmarsh habitats because of the proposed works (discussed in Chapter 8 Sections 8.8.21-23 of the ES). The intertidal and subtidal benthic assemblages are generally capable of rapid colonisation following disturbance and benthic field surveys (and desk-based investigations) do not show evidence of any species of conservation importance in the area. Therefore, the effects of the construction impacts on benthic receptors have been determined as “Negligible (Not significant)” and the MMO agrees with this conclusion.
- 2.3.2 The magnitude of the permanent loss of habitat associated with the construction and operation of the new jetty is low with respect to the wider habitat and we agree with the conclusion regarding the “Negligible (Not significant)” effect on the subtidal benthic assemblage.
- 2.3.3 The ES acknowledges the potential for the introduction and or spread of Invasive Non-Native Species (INNS) created by the installation of new infrastructure and the use of vessels and equipment from other water bodies. The MMO agrees with the Applicant regarding the existing prevalence of INNS within the River Thames and the requirement for appropriate biosecurity measures. A Biosecurity Management Plan will be developed, and we agree that the measures proposed should reduce the risk of introduction of additional INNS within the Thames Water body. The ES has therefore concluded the magnitude of this impact as “Negligible”.
- 2.3.4 The MMO notes that in Section 8.1 of the ES the importance of post-construction monitoring is acknowledged and we agree that suitable monitoring of intertidal and benthic habitats will help “determine whether operational activities [at the site] are contributing to the spread of INNS”.
- 2.3.5 The MMO advocates for suitable post-construction monitoring of the jetty piles (e.g., wall scrapes) to assess the colonisation of project infrastructure by INNS over time. The wall-fouling tanaid shrimp *Sinelobus vanhaareni* has been identified from two sites (one upstream and one downstream of the proposed project works) in 2022 (Ashelby et al, 2022) and the Applicant has identified several other INNS in Section 8.6.69 of the ES) which may colonise project infrastructure post-construction.
- 2.3.6 The MMO considers that appropriate benthic receptors have been scoped into the assessment. The Applicant has carried out a comprehensive desk-based assessment of benthic taxa in the Zone of Influence (Zol) associated with the worst-case scenario of dredging impacts (within 3.5 km of the site boundary) and provided results of site-specific benthic sampling to inform the baseline benthic assemblage at the site. While two species of nationally rare sea mat were identified during the desk-based study, these were not evident in the samples collected from within the Project zone of influence (Zol) and were located 4 km upstream from the site boundary. Similarly, the protected lagoon sea slug *Tenellia adspersa* was recorded approximately 14 km upstream and was absent from samples collected during the site-specific survey.
- 2.3.7 The Applicant has also identified relevant priority habitats (saltmarsh approximately 500 m upstream) and statutory and non-statutory protected areas (Medway Estuary Marine Conservation Zone and The River Thames and its Tidal Tributaries Site of Importance for Nature Conservation) and these have been included in the assessment and ES.

- 2.3.8 The benthic macrofaunal dataset appears to be limited in the level of identification achieved with several taxa reported to genus and family (e.g., *Corophium*, *Corophiidae*, *Polydora*, *Streblospio*, *Gammarus*). Clarification should be sought from the processing laboratory regarding this limitation to ensure these data conform to industry standards. The MMO would expect the reduced level of identification to be accompanied by a reason, such as damage to the specimens or inability to proceed due to unresolved taxonomy of the taxa in question. To enable robust assessment in the future, comparative data may need to be significantly truncated and there is a risk of loss of information should the comparative dataset resolve the taxon identifications to species level and the current dataset remain at this lower resolution.
- 2.3.9 The ES has identified a list of other projects which were assessed to determine any inter-project effects and has concluded that, as the residual effects on benthic receptors were found to be negligible, an inter-project effect is unlikely and therefore Marine Biodiversity has been scoped out of the cumulative impacts assessment. The MMO agrees with the conclusion and note the commitment to monitoring for benthic effects regardless.
- 2.3.10 The Applicant has submitted a comprehensive assessment of benthic receptors and the MMO do not consider there to be further information required to be able to assess the impacts of the Cory Decarbonisation Project.
- 2.3.11 The MMO requests clarification on whether the subtidal benthic dataset will be made available for researchers and the public via upload to a storage database. The MMO would encourage the Applicant to ensure these data are made widely available for example through upload to the OneBenthic sample database (https://rconnect.cefas.co.uk/onebenthic_portal/) so that additional value can be obtained by incorporating the information into subsequent reanalyses.

2.4 Fish ecology

- 2.4.1 The ES states in Section 8.4.3 (Chapter 8. Marine Biodiversity. Revision A) that the following impacts will be scoped out for fish receptors: lighting and INNS for the construction phase and vessel strikes for both the construction and operational phases. However, these impacts are then assessed later in review in Chapter 8. The MMO requests clarification on whether these impacts are actually scoped out or not.
- 2.4.2 In general, the Applicant has provided an informed ES with regards to fish and fish ecology, and has addressed most of the concerns raised in the previous consultation. As with the PEIR, the relevant fish receptors have been identified along with any spawning and nursery grounds within the tidal Thames and its broader estuary.
- 2.4.3 The ES now correctly acknowledges the potential limitations and assumptions associated with the site-specific beam trawl surveys which is appropriate. However, no reference has been made to the limitations and assumptions associated with the Environment Agency (EA) TraC otter trawl survey data which has also been used to support the characterisation of fish receptors in the study area.
- 2.4.4 The Applicant has still not presented the sensitive migratory periods for diadromous Thames fish, apart from European eel (*Anguilla Anguilla*). It was requested in

previous advice that the upstream/downstream migrations of the relevant sensitive species be clearly presented (e.g. in a table) however this has not been provided. It is correctly stated that juvenile glass eels migrate upstream past the site during late March, and adult silver eels return to sea from October. The MMO would have anticipated that the migratory periods of European smelt, salmonids and lamprey also be presented. Smelt congregate near river mouths in winter and usually ascend the river between February and April, returning to the sea soon after spawning takes place (Barnes, 2008). It is understood that smelt spawn in the upper tidal Thames (between Wandsworth Bridge and 600 m upstream of this point, as well as possibly further upstream to Barnes Bridge) in March and April (ZSL, 2016). Following spawning, juvenile smelt drift with the currents until they are large enough to swim independently. They remain in the tidal Thames throughout the summer. Upstream migration of adult salmonids occurs during spring into late summer/autumn months, starting in March with potential to extend into October. The second sensitive period for salmonids is the downstream migration of smolts that typically occurs nocturnally between April to June with the peak being in May (Riley and Moore, 2000; Riley et al., 2002; Riley, 2007; Riley et al., 2012). Lamprey species exhibit a nocturnal migration pattern similar to European eel; with migration occurring in winter and spring for river lamprey and sea lamprey respectively (Maitland, 2000). We note that there has been consultation with the EA to establish a 'suitable' temporal mitigation period (April-September) to avoid the migratory periods of key fish receptors. It would have helped the assessment and the justification of the chosen mitigation period if the Applicant had clearly presented the sensitive migratory periods for the key fish receptors.

2.4.5 The potential impacts to fish identified by the Applicant for the construction and operational phases are appropriate and the same as those identified at the PEIR stage:

- Loss or disturbance of habitat
- Changes in water quality and release of contaminants
- Noise and vibration
- Lighting

2.4.6 The Applicant has now provided a more detailed assessment of the potential impacts to fish receptors which includes underwater noise (UWN) modelling. The Applicant has now stated the number of piles required to form the jetty, 45 in total, and has stated that vibro-piling will be used where possible, and any piling will occur at low tide to reduce noise attenuation. The approach to the UWN modelling seems generally appropriate. Fish receptors have been correctly categorised by acoustic sensitivity according to the Popper et al., (2014) criteria and the relevant sound exposure guidelines have also been provided. The potential impacts from UWN have been assessed for vessels, vibro-piling and impact piling, with noise sources having been categorised as either impulsive or continuous, and the modelling has been based on a stationary receptor which is appropriate. The UWN assessment shows that impact piling will cause mortality to fish with a swim bladder not involved with hearing (smelt and salmonids) at 18m, recoverable injury within 44m and Temporary Threshold Shift (TTS) at 390m. The Applicant has acknowledged that the UWN produced during impact piling has the potential to cause an acoustic barrier to migration and the impact range of TTS will extend across the width of the river. The Applicant notes that one pile will be installed per

12 hours, and it is assumed that this will take 30 minutes to install therefore impact piling will only occur for 4% of each day allowing downtime. It is estimated that piling will occur over a four-month period. We note that the Applicant has not stated when piling activities are to take place, however no impact piling will occur between the 1st April - 31st September inclusive to minimise impacts to key migratory fish receptors.

- 2.4.7 The ES states in Paragraph 8.8.64 that behavioural impacts of UWN from impact piling will extend up to 390m. This is not wholly accurate as it should be noted that TTS does not represent behavioural impacts and is defined by Popper et al., (2014) as short- or long-term changes in hearing sensitivity that may or may not reduce fitness. Sound exposure levels over which behavioural impacts may occur have not been quantified in Popper et al., (2014), and are just stated as low, moderate and high, which represent the 'near' (tens of metres), 'intermediate' (hundreds of metres), and 'far' (thousands of metres) fields, respectively. Behavioural impacts may therefore extend over distances beyond that of TTS and will likely be highly species dependent.
- 2.4.8 All impacts to fish receptors have been assessed as being negligible or minor adverse (not significant) when the appropriate mitigation is implemented. The MMO does not agree entirely with this assessment with respect to impacts of UWN on key migratory fish receptors namely European smelt and European eel. The Applicant acknowledges that there is potential for UWN to cause an acoustic barrier to migration and the mitigation currently suggested does not offer any protection to migrating smelt and eel.
- 2.4.9 The temporal mitigation measure suggested do not provide suitable protection for migrating smelt and eel. Following consultation with the EA, the current proposal is for construction activities such as piling and capital dredging to take place outside migratory periods of sensitive fish species (April – September). However, the month of March has been excluded from the proposed restriction period on the basis that the project site isn't near the smelt spawning ground, which is 30km upstream near Wandsworth bridge, though evidence of smelt spawning 10km upstream near Greenwich is also noted (ZSL, 2020). Whilst the smelt spawning grounds are located further upstream, it should be recognised that to reach their spawning grounds, smelt must migrate upstream past the project site in late February/ early March. This is supported by several studies showing that smelt spawning occurs in early March in the Thames (Maitland, 2003), smelt spawn over an elongated period of five weeks during March and the beginning of April with a one-to-three-week peak spawning period within that window (ZSL, 2016), and that high abundances of several-weeks-old smelt were found at Greenwich in 2018 (ZSL, 2019). Therefore, the MMO has high level of confidence that piling works undertaken below the water line during March will overlap with the upstream migration of adult smelt from February onwards and their spawning season. In addition, works are intending to be carried out 24/7 which has the potential to impact the nocturnal migration of eel. In line with other developments of a similar nature in this part of the Thames, the following mitigation measures are recommended in order to reduce the potential impacts on migratory species:
- Between 1st March and 30th June (inclusive), in any given year, no piling of any type must take place in the water.

Reason: to protect adult European smelt during their upstream migration to their spawning grounds. Additionally, a restriction until end of June will afford protection to juvenile/larvae migration downstream of the site for both smelt and Atlantic salmon.

- No piling of any type is permitted between sunset and sunrise each day.*
Reason: to protect migratory fish species migrating at night such as European eels migrating downstream during the autumn as well as river lamprey migrating into freshwater from October.

*The times of sunrise and sunset should be set in accordance with HM Nautical Almanac Office data.

2.4.10 The cumulative impact assessment (Chapter 21: Cumulative Effects. Revision A) is rather brief and lacks detail. As far as we can tell this has identified the other relevant developments that have potential to interact cumulatively. However, fish receptors have not been specifically assessed nor have the impacts of UWN. The assessment broadly assesses whether there will be impacts from each development to marine biodiversity with the results either being not applicable or minor adverse. The MMO does not agree with this assessment, the impacts of UWN to key fish receptors have the potential to be significant with the current inadequate mitigation measures. Therefore, we cannot agree that there will be no significant effects to marine biodiversity (fish) when considering the cumulative impacts of the project and other developments in the vicinity.

2.5 Shellfish ecology

- 2.5.1 The MMO does not wholly agree with the conclusions reached for the proposed project in regards to shellfish ecology.
- 2.5.2 A desk-based study was conducted with historical data from 2015 which identified shellfish species 8km downstream including low densities of crustaceans and molluscs. Additionally, the applicant conducted a recent benthic survey in 2023 which consisted of dredging and beam trawls and identified low densities and diversity of shellfish species such as Brown shrimp *Crangon crangon*, mysid shrimp *Mysid spp* and *Gammarus spp*. Shellfish grounds have been identified as 39.6km downstream from the site.
- 2.5.3 While shellfish population densities are low, the MMO believes the applicant should still consider shellfish species within the ES and the potential impacts towards these populations before scoping them out of the report.
- 2.5.4 Prior to dredging and disposal operations, the MMO would expect to see consideration to the impacts on shellfish species at the disposal site once an appropriate disposal method and site have been determined.
- 2.5.5 The ES notes that the disposal site of dredged material is not yet determined. The MMO would expect to see further consideration towards the impacts on shellfish once a dredge disposal method and site have been identified.
- 2.5.6 The MMO would expect shellfish to be considered in the ES and not scoped out of the proposal prior to assessment. Therefore, while evidence has been provided for

low densities of shellfish species, this suggests that an environmental assessment should still be conducted in relation to shellfish species.

- 2.5.7 The MMO notes that both a desk-based assessment and benthic surveys (dredge and beam trawl) were used. However, no assessment on the impacts to shellfish species were proposed.
- 2.5.8 The baseline data used were from desk-based studies from 2015. While they provide a guideline for species presence in the area, the MMO would recommend for future works to utilise more recent data on shellfish species presence. This can be supported by consulting with local authorities on shellfish species presence for the area.
- 2.5.9 The supporting surveys, dredge and beam trawl were appropriate evidence sources for species such as shrimp species (beam trawl) and cockles (dredge), however the preferred method for determining species such as crab, lobster and whelk presence is through potting surveys using baited traps. The MMO would recommend consideration of potting surveys for future scoping.
- 2.5.10 There were no cumulative or interrelated impacts considered in relation to shellfisheries. The MMO would expect these to be considered in an environmental assessment.
- 2.5.11 The MMO would expect to see considerations towards the effects upon the proposed project upon shellfish species which have been identified through the desk-based study and both the dredge and beam trawl surveys. While they have been identified in low density, there is still species presence and therefore as best practice we would recommend the inclusion of shellfish in the environmental assessment.

2.6 Underwater Noise

- 2.6.1 The ES appropriately recognises that noise and vibration could occur as a result of the following activities: impact piling, vibro-piling, capital dredging, vessel movements and the demolition of the Belvedere Power Station Jetty (disused) if undertaken.
- 2.6.2 An underwater noise assessment is provided within Appendix 6-4 and has been undertaken in support of the marine biodiversity assessment. Both fish and marine mammal receptors (i.e., seals and harbour porpoise) are considered within the assessment. Specific comments on Appendix 6-4 are provided below under 2.6.4-2.6.13.
- 2.6.3 For fish, the ES (see Chapter 8) concludes that in the absence of mitigation, noise and vibration could result in impacts to fish including mortality, injury and disturbance to fish migration. With appropriate embedded mitigation as set out in section 8.7, the potential impacts to fish species can be significantly reduced. There is likely to be a direct, temporary short term Negligible (Not Significant) effect upon fish species within the Thames. The assessment also concludes that for marine mammals, there is likely to be a direct, temporary, short term Negligible (Not Significant) effect on marine mammals from piling activities. The evidence to support the conclusions is somewhat questionable – please see our comments under 2.6.4-2.6.13.
- 2.6.4 The MMO notes the ES states the following:
- (Para 7.2.22): “Assuming a lower worst-case swimming speed of 1.5m/s for all marine mammal species (including both adults and juveniles), the maximum time that a harbour porpoise would take to leave the centre of the SELcum weighted PTS and TTS injury zones during impact piling is estimated to be 7 minutes and 51 minutes respectively. This is less than 4% of the time that would be required for an injury to occur, and therefore, assuming harbour porpoise evade the injury effects zone, they are not considered to be at risk of any PTS or TTS impacts during the proposed impact piling activity.
- (Para 7.2.23): The maximum time that seals would take to leave the PTS and TTS zones is estimated to be 7 minutes and 26 minutes respectively. This is less than 2% of the time that would be required for an injury to occur and, therefore, assuming seals evade the injury effects zone, they are not considered to be at risk of any PTS or TTS impacts during the proposed impact piling activity”.
- 2.6.5 The MMO has the below comments in response to these above statements:
- 2.6.6 It is not clear how the 4% value for harbour porpoise and 2% in the case of seals, mentioned in the statements above, were calculated, or indeed which injury zone (PTS or TTS) they are referring to. We note that the duration of the piling activity (30 minutes per day) is indeed approximately 4% of the 12 hour “working day” duration, but the swim times for harbour porpoise are 7 minutes (for the PTS zone) and 51 minutes (for the TTS zone), and thus would correspond to different percentages of the 12-hour working day.

- 2.6.7 Furthermore, there seems to be a misunderstanding as to the meaning of the injury effect zones, which were calculated for stationary animal receptors exposed to impact piling noise. An animal receptor would accumulate a noise exposure exceeding the injury threshold (PTS or TTS) if it remains inside the respective zone for the duration of activity – which in this case is only 30 minutes. Thus, if one desires to construct an argument based on the potential duration an animal spends inside these effect zones (i.e., the “swim times”), then these durations should be compared to the duration of the noise generating activity (so the total piling duration) and not an arbitrary 12-hour interval. Noting these, we can immediately observe that the 51 minutes needed by a harbour porpoise to leave the TTS injury zone (i.e., to swim across 4559 m with 1.5 m/s) exceeds the 30-minute duration of the piling activity, and thus indicates that in this case, fleeing would not reduce the noise exposure accumulated during piling below the TTS threshold.
- 2.6.8 On a more fundamental level, we need to point out that the logic of comparing the extent of the stationary injury effect zone with the swim times / distances of fleeing animals cannot be used to categorically disprove the risk of injury for fleeing animals. An animal does not have to spend the entire duration of the noise generating activity time inside the zone to be exposed to injury levels, except if it sits in the places where the cumulative exposure is exactly equal to the injury threshold value (e.g., at the edge of the zone); anywhere else (where the cumulative exposure over the activity duration exceeds the threshold, like nearer to the source location) it will clearly reach the threshold before the end of activity.
- 2.6.9 As pointed out above, the essential meaning of an injury effect zone, calculated for stationary receptors, has to be understood as the zone where an animal will accumulate exposure equal or above the threshold if it remains there for the entire duration of the activity (let us call this situation Scenario A). In the event that an animal flees and thus is present inside the zone for a duration less than the entire duration of the activity (we call this Scenario B), its exposure will logically be lower than in Scenario A. However, there is no guarantee that in the fleeing Scenario B the exposure will drop below the threshold (only that it will be less than in Scenario A). Additionally, the comparison is further complicated by the fact that the activity noise footprint extends outside these stationary injury zones, and a fleeing animal will continue to accumulate noise exposure even after crossing the zone boundary, which might thus still take its exposure above the threshold. These observations serve to emphasize that predicting the existence of the cumulative exposure effect zones and their extent for fleeing receptors requires an explicit inclusion of the fleeing behaviour of the animals into the model and cannot be readily and fully inferred from the extent of the corresponding stationary effect zones.

- 2.6.10 Based on sense-checking of the modelling results, we can confirm that the extent of the injury effect zones for stationary receptors, as shown in Table 7-12, are plausible under the scenario assumptions detailed in Table 7-11 and in Section 7.2. Furthermore, using Cefas' in-house modelling tools, we would estimate that for fleeing animals, the extent of the injury zones would be reduced, but not eliminated. More specifically, our PTS range estimate for fleeing harbour porpoise is in the order of 100 m (compared to more than 600 m for stationary receptors), while for the TTS range we estimate a reduction of less than 50%, namely to 2.5 - 3 km, compared to more than 4.5 km for the stationary receptors. Thus, fleeing can indeed have an important role in reducing the risk of injury, especially in the case of PTS, where the extent of stationary effect zones is not very large in the first place, although the relative short duration of piling means that this role is reduced for the effects that extend over a larger zone, such as TTS.
- 2.6.11 It would be helpful if further clarity can be provided regarding the piling scenarios presented in the assessment. For example, for vibro-piling, the assessment considers a total of 15 piles installed per day, with a duration of 20 minutes per pile (see Table 7-9 in the report). However, for the impact piling scenario, the assessment is based on the installation of only a single pile per day (as per Table 7-11). Paragraph 7.2.26 confirms that (impact) piling activity will be taking place for 30 minutes per day.
- 2.6.12 The embedded mitigation is set out in section 8.7 of Chapter 8 Marine Biodiversity. The mitigation proposed for marine mammals appropriately follows the JNCC (2010) guidelines for minimising risk of injury to marine mammals from piling noise, which the MMO supports.
- 2.6.13 There is a risk of a temporary acoustic barrier during pile driving operations. Specifically, paragraph 7.1.14 of Appendix 6-4 acknowledges that "*TTS effects are anticipated to occur across most of the width of the River Thames during low tide. This therefore potentially creates a partial temporary barrier to fish movements*". TTS is different from behaviour (TTS is a temporary hearing impairment). If TTS effects are anticipated across most of the river, then it is reasonable to expect behavioural effects (in terms of disturbance or displacement) which could potentially impact fish movements.

2.7 Marine Navigation

- 2.7.1 The MMO defers to the Maritime and Coastguard Agency and Trinity House on matters of shipping and navigation and supports any comments raised. The MMO will continue to be part of the discussions relating to securing any mitigation, monitoring or other conditions required within the DML.

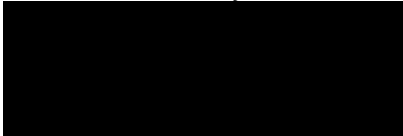
2.8 Historic Environment

- 2.8.1 The MMO defers to Historic England on matters regarding the historic environment and archaeology and supports any comments raised. The MMO will continue to be part of the discussions relating to securing any mitigation, monitoring or other conditions required within the DML.

3. Summary

- 3.1.1 The MMO have multiple concerns in relation to both the details within the ES and the conditions within the DMLs.
- 3.1.2 We strongly recommend that the Applicant engage with the MMO throughout the process in order to ensure the assessment is as smooth as possible and agreements can be reached through a SoCG.


Yours faithfully



Daniel Fantarrow
Marine Licencing Case Officer

D [Redacted]
E [Redacted]

References

- Ashelby, C. W. (2022). Tanaid in The Thames: *Sinelobus vanhaareni* Bamber, 2014 (Crustacea: Tanaididae) arrives in Britain. *CAHIERS DE BIOLOGIE MARINE*, 63(4), 377-383.
- Barnes, M.K.S. (2008). *Petromyzon marinus* Sea lamprey. In Tyler-Walters H. and Hiscock K. (eds) *Marine Life Information Network: Biology and Sensitivity Key Information Reviews*. Plymouth: Marine Biological Association of the United Kingdom. Available online at: 
- JNCC, M.A., House, I. and Street, B., 2010. Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise.
- Maitland, P. S. (2003). The status of smelt *Osmerus eperlanus* in England. *English Nature*.
- Maitland, P.S. (2000). Ecology of the River, Brook and Sea Lamprey. *Conserving Natura 2000 Rivers*. Ecology Series no 5. English Nature
- National Marine Fisheries Service (NMFS). (2021). 'Section 7 Consultation Guidance: Pile Driving Noise Calculator (Excel spreadsheet download)'. Available at: <https://www.fisheries.noaa.gov/southeast/consultations/section-7-consultation-guidance>.
- Popper AN, Hawkins AD, Fay RR, Mann D, Bartol S, Carlson T, Coombs S, Ellison WT, Gentry R, Halvorsen MB, Løkkeborg S, Rogers P, Southall BL, Zeddies D and Tavolga WN (2014). *Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report, ASA S3/SC1.4 TR-2014* prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI. Springer and ASA Press, Cham, Switzerland.
- Riley, W. D., & Moore, A. (2000). Emergence of Atlantic salmon, *Salmo salar* L., fry in a chalk stream. *Fisheries Management and Ecology*, 7(5), 465-468.
- Riley, W. D., Eagle, M. O., & Ives, S. J. (2002). The onset of downstream movement of juvenile Atlantic salmon, *Salmo salar* L., in a chalk stream. *Fisheries Management and Ecology*, 9(2), 87-94.
- Riley, W. D. (2007). Seasonal downstream movements of juvenile Atlantic salmon, *Salmo salar* L., with evidence of solitary migration of smolts. *Aquaculture*, 273(2-3), 194-199.
- Riley, W. D., Bendall, B., Ives, M. J., Edmonds, N. J., & Maxwell, D. L. (2012). Street lighting disrupts the diel migratory pattern of wild Atlantic salmon, *Salmo salar* L., smolts leaving their natal stream. *Aquaculture*, 330, 74-81.
- Willstead, E., Gill, A. B., Birchenough, S. N. R., & Jude, S. (2017). Assessing the cumulative environmental effects of marine renewable energy developments: Establishing common ground. *Science of the Total Environment*, 577, 19–32.
- ZSL, 2016. *Guidance Document Conservation of Tidal Thames Fish through the planning process*.
- ZSL, 2019. *A baseline study of larval and juvenile fish in the Tidal Thames. Summary report, Zoological Society of London, November 2019*.

ZSL Bournemouth University & SC2. (2020). 'Thames Tideway Aquatic Ecology Research – Smelt Surveys on the Thames'.