



The Planning Inspectorate  
Yr Arolygiaeth Gynllunio

# SCOPING OPINION

## Proposed Tidal Lagoon Development, Cardiff, South Wales



April 2015

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## **EXECUTIVE SUMMARY**

This is the Scoping Opinion ('the Opinion') provided by the Secretary of State in respect of the content of the Environmental Statement for the Proposed Tidal Lagoon Development, Cardiff, South Wales.

This report sets out the Secretary of State's Opinion on the basis of the information provided in Tidal Lagoon Cardiff Ltd's ('the applicant') report entitled Proposed Tidal Lagoon Development, Cardiff, South Wales: Environmental Impact Assessment Scoping Report (March 2015) ('the Scoping Report'). The Opinion can only reflect the proposals as currently described by the applicant.

The Secretary of State has consulted on the Scoping Report and the responses received have been taken into account in adopting this Opinion. The Secretary of State is satisfied that the topic areas identified in the Scoping Report encompass those matters identified in Schedule 4, Part 1, paragraph 19 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended).

The Secretary of State draws attention both to the general points and those made in respect of each of the specialist topic areas in this Opinion. The main potential issues identified are:

- (i) Description of development;
- (ii) Assessment of alternatives;
- (iii) Impact on coastal processes;
- (iv) Marine water quality;
- (v) Impact on navigation; and
- (vi) Impact on designated sites, ecology and ornithology.

Matters are not scoped out unless specifically addressed and justified by the applicant, and confirmed as being scoped out by the Secretary of State.

The Secretary of State notes the requirement to carry out an assessment under the Habitats Regulations<sup>1</sup>.

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<sup>1</sup> The Conservation of Habitats and Species Regulations 2010 (as amended)

# 1 INTRODUCTION

## Background

- 1.1 On 2 March 2015, the Secretary of State received the Scoping Report submitted by Tidal Lagoon Cardiff Ltd under Regulation 8 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (SI 2263) (as amended) (the EIA Regulations) in order to request a scoping opinion for the proposed Tidal Lagoon, Cardiff ('the proposed project'). This Opinion is made in response to this request and should be read in conjunction with the applicant's Scoping Report.
- 1.2 The applicant has formally provided notification under Regulation 6(1)(b) of the EIA Regulations that it proposes to provide an ES in respect of the proposed development. Therefore, in accordance with Regulation 4(2)(a) of the EIA Regulations, the proposed development is determined to be EIA development.
- 1.3 The EIA Regulations enable an applicant, before making an application for an order granting development consent, to ask the Secretary of State to state in writing their formal opinion (a 'scoping opinion') on the information to be provided in the Environmental Statement (ES).
- 1.4 Before adopting a scoping opinion the Secretary of State must take into account:
- (a) the specific characteristics of the particular development;
  - (b) the specific characteristics of the development of the type concerned; and
  - (c) environmental features likely to be affected by the development'.
- (EIA Regulation 8 (9))*
- 1.5 This Opinion sets out what information the Secretary of State considers should be included in the ES for the proposed development. The Opinion has taken account of:
- the EIA Regulations
  - the nature and scale of the proposed development
  - the nature of the receiving environment, and
  - current best practice in the preparation of environmental statements.
- 1.6 The Secretary of State has also taken account of the responses received from the statutory consultees (see Appendix 2 of this Opinion). The matters addressed by the applicant have been carefully considered and use has been made of professional judgement and experience in order to adopt this Opinion. It should be noted that when it comes to consider the ES, the Secretary of State will take account of relevant legislation and guidelines (as



appropriate). The Secretary of State will not be precluded from requiring additional information if it is considered necessary in connection with the ES submitted with that application when considering the application for a Development Consent Order (DCO).

- 1.7 This Opinion should not be construed as implying that the Secretary of State agrees with the information or comments provided by the applicant in their request for an opinion from the Secretary of State. In particular, comments from the Secretary of State in this Opinion are without prejudice to any decision taken by the Secretary of State (on submission of the application) that any development identified by the applicant is necessarily to be treated as part of a nationally significant infrastructure project (NSIP), or associated development, or development that does not require development consent.
- 1.8 Regulation 8(3) of the EIA Regulations states that a request for a scoping opinion must include:
- (a) 'a plan sufficient to identify the land;
  - (b) a brief description of the nature and purpose of the development and of its possible effects on the environment; and
  - (c) such other information or representations as the person making the request may wish to provide or make'.
- (EIA Regulation 8 (3))*
- 1.9 The Secretary of State considers that this has been provided in the applicant's Scoping Report.

### **The Secretary of State's Consultation**

- 1.10 The Secretary of State has a duty under Regulation 8(6) of the EIA Regulations to consult widely before adopting a scoping opinion. A full list of the consultation bodies is provided at Appendix 1. The applicant should note that whilst the Secretary of State's list can inform their consultation, it should not be relied upon for that purpose.
- 1.11 The list of respondents who replied within the statutory timeframe and whose comments have been taken into account in the preparation of this Opinion is provided at Appendix 2 along with copies of their comments, to which the applicant should refer in undertaking the EIA.
- 1.12 The ES submitted by the applicant should demonstrate consideration of the points raised by the consultation bodies. It is recommended that a table is provided in the ES summarising the scoping responses from the consultation bodies and how they are, or are not, addressed in the ES.

- 1.13 Any consultation responses received after the statutory deadline for receipt of comments will not be taken into account within this Opinion. Late responses will be forwarded to the applicant and will be made available on the Planning Inspectorate's website. The applicant should also give due consideration to those comments in carrying out the EIA.

## **Structure of the Document**

- 1.14 This Opinion is structured as follows:

Section 1	Introduction
Section 2	The proposed development
Section 3	EIA approach and topic areas
Section 4	Other information.

- 1.15 This Opinion is accompanied by the following Appendices:

Appendix 1	List of consultees
Appendix 2	Respondents to consultation and copies of replies
Appendix 3	Presentation of the environmental statement

## 2 THE PROPOSED DEVELOPMENT

### Introduction

- 2.1 The following is a summary of the information on the proposed development and its site and surroundings prepared by the applicant and included in their Scoping Report. The information has not been verified and it has been assumed that the information provided reflects the existing knowledge of the proposed development and the potential receptors/resources.

### The Applicant's Information

#### Overview of the proposed development

- 2.2 The proposed Tidal Lagoon Cardiff consists of an energy generating station with an expected generating capacity of 1800 to 2800MW. The proposed lagoon would consist of approximately 60-90 turbines and 20-30 sluice gates, which would be situated in two to three turbine and sluice gate housing structures. The electricity generated would be fed into the National Electricity Transmission System (NETS) via a National Grid substation. The capacity of the export cable for connection to the NETS would be 40kV. The grid connection route has yet to be defined. Section 5.3.0.13 of the Scoping Report confirms that feasibility studies and discussions with National Grid to identify an appropriate grid connection point are on-going.

#### Description of the site and surrounding area

##### *The Application Site*

- 2.3 The proposed lagoon would be located on and near the northern shore of the Severn Estuary. Figure 1.1 of the Scoping Report shows the anticipated location of the project. The western landfall of the lagoon breakwater would be positioned to the south of the Queen Alexandra Dock, within Cardiff Docks, and the eastern landfall would be located approximately 2km from the mouth of the River Usk in the Wentlooge Levels. The project would span the southern edges of the Wentlooge Levels and would encompass an area of approximately 70km<sup>2</sup> of the seabed and foreshore. The Wales Coast Path Public Right of Way (PRoW) follows the shoreline.
- 2.4 The approximately 25km long breakwater would extend in a curve southwards into the Severn Estuary. At its furthest point the breakwater would extend 8km offshore.
- 2.5 Deposits on the seabed across the Project area tend to consist of sand and muddy sand, mud and sandy mud, mixed and coarse sediment and rock (see Figure 12.2 of the Scoping Report).

- 2.6 The footprint of the proposed lagoon encompasses the River Rhymney and existing outfalls owned and operated by Dŵr Cymru - Welsh Water and others. There are a large number of surface water abstractions from these watercourses and discharges into rivers and the proposed lagoon area.

*The Surrounding Area*

- 2.7 The proposed western landfall is located approximately 2km from the entrance to Cardiff Bay, to the south of the Queen Alexandra Dock. The area surrounding the western landfall is a mix of commercial and industrial areas. The proposed eastern landfall is located approximately 2km from the mouth of the River Usk, within the Wentlooge area of Newport. The area comprises agricultural land and areas of tidal marsh designated as the Wentlooge levels Special Landscape Area (SLA). This area comprises settlements of scattered farms with some intermittent linear development. The eastern landfall site also falls within the Gwent Levels Registered Landscape of Outstanding Historic Interest. The Great Western Main Line railway traverses the Wentlooge Levels SLA to the north.
- 2.8 The proposed footprint of the development falls within the Severn Estuary Special area of Conservation (SAC), Special Protection Area (SPA), Ramsar and Site of Special Scientific Interest (SSSI) and Gwent Levels, which are notified within six SSSIs. The River Usk SAC, River Wye SAC and Newport Wetlands National Nature Reserve (NNR) are also located within the vicinity of the project (see Figure 16.1 of the Scoping Report).
- 2.9 The Scoping Report identifies one Marine Conservation Zone (MCZ), Lundy MCZ, within the vicinity of the proposed site. A further candidate MZC (cMCZ), North of Lundy, and a recommended MZC (rMCZ), Bideford to Foreland Point, have also been identified in the Scoping Report. Bideford to Foreland rMCZ is currently being consulted on by Defra in the second tranche of MCZs for designation.
- 2.10 Four main commercial ports operate within the Severn Estuary and Bristol Channel - Port of Bristol (including Avonmouth and Royal Portbury Dock), Cardiff, Newport and Barry. A further eight smaller ports including Bristol City Docks and Port of Bridgwater are present. The ports are a significant regional/national asset, handling approximately 4% of UK cargo. The Severn Estuary also supports pilotage, marine ferry services, maritime search and rescue, commercial aggregate extraction, dredging, some commercial and recreational fishing, recreational boating, military firing and explosives anchorages.
- 2.11 Section 18 of the Scoping Report identifies that within the 'bare-earth' zone of theoretical visibility (ZTV) and 10km study area in Wales there are 53 Scheduled Monuments, 29 Registered Parks

and Gardens and 919 Listed Buildings. In England the ZTV extends over a 15km study area and identifies; 13 Scheduled Monuments, one Registered Park and Garden and 174 Listed Buildings (see Figure 18.1).

- 2.12 Features of archaeological interest dating back as far as the Mesolithic are identified within the Gwent Levels, such as the Caldicot Bronze Age boat, a Romano-British boat and the site Goldcliff. Environmental conditions allow for some exceptional preservation of remains. Wreck sites of mostly 19th and 20th Century origin are present within the estuary itself, with a small number located within the footprint of the proposed lagoon. The Gwent Levels are also designated as a Landscape of Outstanding Historic Interest in Wales.

### **Alternatives**

- 2.13 Chapter 5 of the Scoping Report outlines the background to the project and site selection process.

### **Description of the proposed development**

- 2.14 The proposed tidal lagoon would generate electricity using kinetic energy captured by hydro turbines from the large tidal range of the Severn Estuary. The project has an expected generating capacity of 1800-2800MW, the electricity generated would be transported to the NETS via a National Grid Substation.
- 2.15 Chapter 6 of the Scoping Report identifies the following elements of the proposed development required to generate electricity:
- Breakwater;
  - Concrete turbine and/or sluice gate housings;
  - Turbines and sluice gates located within the housing;
  - Operations and maintenance access upon the structures;
  - Cable works within the breakwater and grid connection to an appropriate substation;
  - Structures located upon the turbine/sluice gate housing; and
  - Potential compensatory habitat.
- 2.16 On the ebb tide the project would generate electricity by holding back water within the tidal lagoon. The water would then be released through the turbines such that this store of energy could be turned into electric power. Electricity would be generated as water flows through bi-directional turbines, located in the turbine and sluice gate housing structures. The process would be repeated on the flood tide with water being prevented from entering the lagoon until sufficient head was created.
- 2.17 The lagoon would consist of approximately 60-90 variable speed, bi-directional bulb turbines and 20-30 sluice gates, contained in two to three turbine and sluice gate housing structures. The

breakwater walls would encompass an area of approximately 70km<sup>2</sup> of the seabed and foreshore. The total length of breakwater is proposed to be approximately 25km and at its furthest point from land is expected to extend 8km offshore. It is expected to be a maximum of 17m above Chart Datum (CD) in height and a maximum of 120m in width at the base. The turbine and sluice gate housing structures are expected to be up to 800m in length and 75m wide. The height of concrete turbine and sluice gate housing structures is expected to be up to 20m above CD at its highest point.

### **Proposed access**

- 2.18 Two access options are proposed for the western landfall - via Rover Way from the east and the A4232 from the west (subject to implementation of the Eastern Bay Link). Section 23.1.0.3 of the Scoping Report states that both routes currently accommodate significant levels of Heavy Goods Vehicle (HGV) movements.
- 2.19 The proposed eastern landfall location would likely be accessed from the B4239 to the east of St Brides Wentlooge. A number of potential locations for the access are noted in Section 23.1.0.6 of the Scoping Report.
- 2.20 The applicant proposes to confirm options for access to the eastern landfall location once feasibility analysis has been undertaken. All routes would require off-carriageway access road improvements.

### **Construction**

- 2.21 Section 6.3 of the Scoping Report states that the proposed construction period for the project is between 4-5 years.
- 2.22 The construction comprises the following elements:

#### **Offshore:**

- turbine and sluice gates and their housing structures;
- gantry cranes, generators and switchgear;
- temporary cofferdams or caissons;
- temporary rock storage areas;
- breakwater and dredging works;
- access road, lighting structures and shelters;
- operation and maintenance facilities;
- emergency facilities; and
- navigation facilities.

#### **Onshore:**

- construction support sites (including access routes);
- land creation works;

- lay-down areas; and
  - temporary rock stockpile areas.
- 2.23 The breakwater would be constructed as a conventional rock-armoured, sand filled and quarry run, gravity structure. The sediment/quarry run core would be held in position, with layers of rock and rock armour placed on the outside of the structure, although concrete caissons may be considered for the deeper sections. Where possible, dredging material from within the footprint of the lagoon (sand and gravel) would be used to fill the core of the breakwater.
- 2.24 The breakwater would be constructed on two fronts: land based equipment would be used where water depth does not allow access for marine based equipment; marine based equipment would be used for the remainder. Land based equipment is likely to consist of bulldozers, rock/sand dump trucks and excavators. Marine based equipment is likely to consist of a combination of barges, hopper barges, dredgers, excavators, cranes and tugs. Depending on foundation requirements, piling methods (vibro or impact) would be either driven or bored piles.
- 2.25 The turbine and sluice gate housings would be large reinforced concrete structures. Maintenance structures, such as cranes, would be located on top of the housing and likely to be up to 30m above CD.
- 2.26 The transportation of construction materials and construction workers to and from the offshore site would be via the landward connection to the breakwater. The Scoping Report states that rock and fill material for the lagoon would likely be delivered by sea. Other materials could be brought in by road and/or rail.

### **Operation and maintenance**

- 2.27 Operational and maintenance facilities are proposed to be included in the project either within the turbine housing, on-land or both. Maintenance dredging would be required in order to maintain the amount of water which is capable of being held in the footprint of the project. The proposed operational life of the project is 120 years. The turbines have a design life of 50 years after which time they would require replacement. An assessment would be undertaken at this time to ensure suitability for continued operation.

### **Decommissioning**

- 2.28 As highlighted above the project would be assessed after 50 years for continued operational suitability. At the end of the 120 year design life, the project would be decommissioned.

- 2.29 Section 6.5 of the Scoping Report confirms that an outline decommissioning scheme will be prepared as part of the DCO application. The applicant considers that wholesale decommissioning is not appropriate for the project and that the breakwater would be retained, whilst the turbines, metals and plastics relating to the energy generating installation would be removed.

## **The Secretary of State's Comments**

### **Description of the application site and surrounding area**

- 2.30 A description of the site and surrounding area has been provided within the Scoping Report. In addition to detailed baseline information to be provided within topic specific chapters of the ES, the Secretary of State would expect the ES to include a section that summarises the site and surroundings. This would identify the context of the proposed development, any relevant designations and sensitive receptors. The ES should include both the distance and direction of receptors from the site and indicate if the distances are taken from the central point of the area within the DCO boundary, or from the nearest part of the site boundary. This section should also identify land that could be directly or indirectly affected by the proposed development and any associated auxiliary facilities, landscaping areas and potential off site mitigation or compensation schemes.

### **Description of the proposed development**

- 2.31 The Scoping Report provides a description of the proposed development and information on some of the elements of the project.
- 2.32 The applicant should ensure that the description of the proposed development that is being applied for is as accurate and firm as possible, as this will form the basis of the EIA. It is understood that at this stage in the evolution of the scheme, the description of the proposals and even the location of the site may not be confirmed. The applicant should be aware, however, that the description of the development in the ES must be sufficiently certain to meet the requirements of paragraph 17 of Schedule 4 Part 1 of the EIA Regulations and there should therefore be more certainty by the time the ES is submitted with the DCO.
- 2.33 The Secretary of State notes that the numbers and location of the turbine and sluice gate housing structures are not yet determined and that these factors will have a bearing on the baseline surveys undertaken and the assessment of effects.
- 2.34 The proposed project would affect land in Wales and is wholly within Welsh waters, but could also give rise to effects in



England and English waters. Under the Planning Act, associated development in Wales is limited to surface works, boreholes, or pipes associated with underground gas storage by a gas transporter in natural porous strata. However, if a draft DCO is to be submitted, the Secretary of State considers that works required for delivery of the NSIP that are to be obtained through alternative consent regimes (whether on or off-site) should also be assessed as part of an integrated approach to EIA.

- 2.35 Any proposed works and/or infrastructure required as associated development, or as an ancillary matter, (whether on or off-site) should be assessed as part of an integrated approach to environmental assessment.
- 2.36 The Secretary of State recommends that the ES should include a clear description of all aspects of the proposed development, at the construction, operation and decommissioning stages, and include:
- Land use requirements, including the areas of the offshore and onshore elements;
  - Site preparation;
  - Construction processes and methods;
  - Transport routes and materials sources;
  - Operational requirements including the main characteristics of the production process and the nature and quantity of materials used, as well as waste arisings and their disposal;
  - Maintenance activities including any potential environmental or navigation impacts and any related structures; and
  - Emissions - water, air and soil pollution, noise, vibration, light, heat, radiation.
- 2.37 The ES should include detailed plans confirming the layout of the proposed development during construction and operation, indicating the location of components including construction compounds, site accesses, landward connection, and grid connection. Figure 6.4 illustrating the sluice gate house includes a note stating that the design is not optimised for the proportion of structural concrete and mass concrete. The figures provided in the ES should include worst case footprints for development, with dimensions clearly stated (where relevant) and these should also be stated in the description of the development. Plans and figures included with the ES should be provided at a suitable size and scale, to clearly present the necessary data.
- 2.38 Table 7.1 lists a number of elements of the project and this includes other associated facilities such as visitor facilities. The Scoping Report does not provide details as to what the visitor facilities would be. The Scoping Report also identifies potential impacts associated with recreational activities that may take place during the operation of the lagoon; however, the Scoping Report does not specify the types of activities that are likely to occur. A

number of other infrastructure elements are mentioned in the Scoping Report, including temporary construction compounds, operation and control infrastructure including a car park, a terrestrial compound of the power export cable route, access routes, lay down areas and temporary rock pile areas. It is important that the applicant provides details of all infrastructure and activities likely to come forward as part of the proposed scheme in order that the worst case scenario may be fully assessed in the ES.

- 2.39 The environmental effects of all wastes to be processed and removed from the site should be addressed. The ES will need to identify and describe the control processes and mitigation procedures for storing and transporting waste off site. All waste types should be quantified and classified.

### **Grid connection**

- 2.40 The connection of a proposal into the relevant electricity network is an important consideration. Therefore, the Secretary of State welcomes the on-going discussions with National Grid to identify an appropriate grid connection point. The ES should identify how the cable within the breakwater will connect to the landfall and onshore cable connections. Table 7.1 to the Scoping Report identifies that the cables within the breakwater will form part of the DCO application, but consent for other grid connection works would be sought through other regimes. The Secretary of State considers that all elements of the grid connection, whether or not part of the proposed DCO, should be assessed as part of an integrated approach to EIA and that potential impacts resulting from alternative connection points/cable routes should also be considered.
- 2.41 The Secretary of State recommends that careful consideration should be given to how the applicant meaningfully consults on, and properly assesses, the likely impacts arising from the proposed on-shore cable route.

### **Programme**

- 2.42 The Secretary of State notes the proposed timetable set out in Paragraph 2.1.0.13 of the Scoping Report, which includes a proposed submission of the DCO application in 2017. The Secretary of State emphasises the need for the applicant to obtain sufficient data to support the assessment of effects (recognising the sequential nature of certain surveys), to develop and agree potentially complex mitigation and compensation measures, and to allow sufficient time between consultations and final submission to ensure that consultee comments can inform the scheme development. The applicant must allow sufficient programme flexibility for a full consideration of these matters.

- 2.43 The Secretary of State notes that EU Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with EU Directive 2014/52/EU by 16 May 2017. Whilst transitional provisions will apply to such new regulations, the applicant may wish to consider the effect of the implementation of the revised Directive in terms of the production and content of the ES.

### **Evidence Plan and Modelling Plan**

- 2.44 The Secretary of State welcomes the proposed development and agreement of Evidence and Modelling Plans with Statutory Nature Conservation Bodies (SNCBs), which allow upfront agreement of the information needed to be supplied with the application. As highlighted above, the plan programmes need to allow sufficient time to agree and obtain the evidence required to fully assess the effects of the proposed scheme. The Plans need to be able to adapt to any changes to impact predictions that emerge as baseline data becomes available and the detailed design for construction and operation develops. Changes to the Plans as they develop should be discussed and agreed with SNCBs.
- 2.45 The applicant's attention is drawn to the comments of Natural Resources Wales (NRW), Natural England and the Environment Agency concerning the Evidence and Modelling Plans (see Appendix 2 to the Scoping Opinion).

### **Ecosystem Enhancement Project (EEP)**

- 2.46 The Secretary of State welcomes the proposed development of an Ecosystem Enhancement Project (EEP) to provide a framework for delivery of compensatory habitats but emphasises that sufficient allowance should be made in the programme for survey, assessment, and consultation in respect of any proposals.
- 2.47 The Secretary of State notes that the EEP is intended to provide integrated mitigation for habitat, conservation and flood defence. The EEP is also intended to form the framework for establishing and agreeing any compensatory measures that may be required in respect of the Habitats Regulations Assessment (HRA).
- 2.48 The Secretary of State notes that, with reference to comments made by NRW and Natural England, the proposed tidal lagoon development could result in significant impacts on the natural environment and could result in a conclusion of adverse effects on the integrity of European sites (Natura 2000 sites). Comments by NRW and Natural England to the effect that it may not be possible to mitigate these effects and the provision of compensation for impacts may be particularly challenging are noted.
- 2.49 Whilst the Secretary of State welcomes an integrated approach to the EEP, the EEP and HRA reports submitted with the DCO

application should make clear precisely what is proposed as compensatory measures in respect of any adverse effects on the integrity of a European site(s).

- 2.50 It is noted that land needed for compensatory measures is likely to have environmental value of its own and that changes to the land necessary to deliver compensation may lead to additional adverse environmental effects whilst delivering compensatory benefits of a different nature. The Secretary of State requires that an assessment of any effects arising from the compensatory land is included within the ES. The applicant is referred to NRW and Natural England's comments in this respect (see Appendix 2).

### **Flexibility**

- 2.51 The Secretary of State notes the intention where the details of the scheme cannot be defined precisely for the EIA to assess the likely worst case scenario. The Secretary of State welcomes the reference to Planning Inspectorate Advice Note 9 'Using the 'Rochdale Envelope'', but also directs attention to the 'Flexibility' section in Appendix 3 of this Opinion which provides additional details on the recommended approach.
- 2.52 The applicant should make every attempt to narrow the range of options and explain clearly in the ES which elements of the scheme have yet to be finalised and provide the reasons. At the time of application, any proposed scheme parameters should not be so wide ranging as to represent effectively different schemes. The scheme parameters will need to be clearly defined in the draft DCO and therefore in the accompanying ES. It is a matter for the applicant, in preparing an ES, to consider whether it is possible to robustly assess a range of impacts resulting from a large number of undecided parameters. The description of the proposed development in the ES must not be so wide that it is insufficiently certain to comply with requirements of paragraph 17 of Schedule 4 Part 1 of the EIA Regulations.
- 2.53 It should be noted that if the proposed development changes substantially during the EIA process, prior to application submission, the applicant may wish to consider the need to request a new scoping opinion.

### **Proposed access**

- 2.54 The Scoping Report provides some details of the access requirements required during the construction phase of the proposal; however, this has not yet been finalised. The Secretary of State would expect to see a full detailed description of all access requirements within the ES and any accompanying figures. The ES should also include details of any proposed road closures or diversions required. The applicant's attention is drawn to

Wentlooge Community Council's comments regarding the proposed eastern landfall access (see Appendix 2).

### **Alternatives**

- 2.55 The EIA Regulations require that the applicant provide 'An outline of the main alternatives studied by the applicant and an indication of the main reasons for the applicant's choice, taking into account the environmental effects' (See Appendix 3). In light of the potential for the scheme to impact on Severn Estuary European sites and also the potential effects of the proposed development on waterbodies, the Secretary of State recommends that a detailed assessment of alternatives is provided within the ES, with appropriate cross referencing to the HRA and Water Framework Directive (WFD) reports.

### **Construction**

- 2.56 Some details of construction activities have been provided within the Scoping Report, although the Secretary of State notes that limited information has been provided regarding the likely construction methodologies, and associated programming. The Secretary of State also notes that limited information has been provided regarding the size and location of construction compounds. Whilst it is appreciated that this information may not be available at this stage in the evolution of the project, applicants are reminded that this information will be required and should be included in the DCO boundary.
- 2.57 The Secretary of State considers that information on construction including: construction working hours; number of workers that would be required during construction; whether workers are full/part time or if shift work would be required; phasing of programme; construction methods and activities associated with each phase, including dredging and disposal of dredgings; siting of construction compounds (including on and off site) and any related buildings/structures/grid connections; lighting equipment/requirements; and number, movements and parking of construction vehicles (both HGVs and staff) should be clearly indicated in the ES. Depending on the mode of transportation of construction materials, it may also be appropriate to assess effects related to vessel movements. Reference is made throughout the Scoping Report to a proposed Construction Environmental Management Plan (CEMP). A draft CEMP should be included within the application.

### **Operation and maintenance**

- 2.58 Information on the operation and maintenance of the proposed development should be included in the ES and should cover, but not be limited to, such matters as the details of the proposed operator; the number of full/part-time jobs; the operational hours

and if appropriate, shift patterns; the anticipated depth and frequency of maintenance dredging and the location of the dredge disposal site; measures incorporated to reduce wildlife impacts from turbine operation; the number and types of vehicle movements generated during the operational stage. This section should also include frequency of maintenance works, the number of workers required, equipment and access arrangements needed.

- 2.59 The Scoping Report refers to potential impacts associated with recreational use of the lagoon. The ES should describe the likely recreational activities and assess the positive and negative effects associated with these activities as part of an integrated approach to the EIA.
- 2.60 Reference is made throughout the Scoping Report to a proposed Operational Environmental Management Plan (OEMP) and Adaptive Environmental Management Plan (AEMP). Draft OEMP and AEMP documents should be developed in consultation with stakeholders and be included within the ES.

### **Decommissioning**

- 2.61 The Scoping Report (paragraph 6.4.0.1) indicates that the operational life of the project is 120 years. The design life of the turbines is 50 years after which time they would be replaced. The Secretary of State recommends that the EIA covers the life span of the proposed development, including construction, operation and decommissioning.
- 2.62 In terms of decommissioning, the Secretary of State acknowledges that the further into the future any assessment is made, the less reliance may be placed on the outcome. However, the purpose of such a long term assessment is to enable the decommissioning of the works to be taken into account in the design and use of materials such that structures can be taken down with the minimum of disruption. The process and methods of decommissioning should be considered and options presented in the ES, including any long term maintenance liabilities. The assessment should include likely changes in bathymetry, climate change and coastal strategies after 120 years.

### **3 EIA APPROACH AND TOPIC AREAS**

#### **Introduction**

- 3.1 This section contains the Secretary of State's specific comments on the approach to the ES and topic areas as set out in the Scoping Report. General advice on the presentation of an ES is provided at Appendix 3 of this Opinion and should be read in conjunction with this Section.
- 3.2 Applicants are advised that the scope of the DCO application should be clearly addressed and assessed consistently within the ES.

#### **National Policy Statements (NPSs)**

- 3.3 Sector specific NPSs are produced by the relevant Government Departments and set out national policy for nationally significant infrastructure projects (NSIPs). They provide the framework within which the Examining Authority will make their recommendations to the Secretary of State and include the Government's objectives for the development of NSIPs.
- 3.4 For energy projects - The most relevant NPSs (EN-1 and EN-3) for the proposed development set out both the generic and technology-specific impacts that should be considered in the EIA for energy developments; however, the NPSs do not contain specific reference to tidal range power. When undertaking the EIA, the applicant must have regard to both the generic and technology-specific impacts and identify how these impacts have been assessed in the ES.

#### **Preliminary Environmental Information (PEI)**

- 3.5 Consultation forms a crucial aspect of environmental impact assessment. As part of their pre-application consultation duties, applicants are required to prepare a Statement of Community Consultation (SoCC). This sets out how the local community will be consulted about the proposed development. The SoCC must state whether the proposed development is EIA development and if it is, how the applicant intends to publicise and consult on PEI. Further information in respect of PEI may be found in Advice Note 7: Environmental Impact Assessment: Screening, Scoping and Preliminary Environmental Information.

#### **Environmental Statement (ES) - approach**

- 3.6 The ES should not be a series of separate reports collated into one document, but rather a comprehensive assessment drawing together the environmental impacts of the proposed development. This is particularly important when considering impacts in terms of

any permutations or parameters to the proposed development. It is also important to avoid or minimise overlap in assessments, which could lead to inconsistencies within the assessment (e.g. between Chapters 8 to 11, where there is potential for overlap in content). The Secretary of State recommends that the applicant ensure clear cross-references to other ES topic chapters and supporting assessments, such as the WFD and HRA reports.

- 3.7 The information provided in the Scoping Report sets out the proposed approach to the preparation of the ES. Whilst early engagement on the scope of the ES is to be welcomed, the Secretary of State notes that the level of information provided at this stage is not always sufficient to allow for detailed comments from either the Secretary of State or the consultees.
- 3.8 The Secretary of State would suggest that the applicant ensures that appropriate consultation is undertaken with the relevant consultees in order to agree, wherever possible, the timing and relevance of survey work, as well as the methodologies to be used. The Secretary of State notes and welcomes the intention to finalise the scope of investigations in conjunction with ongoing stakeholder liaison and consultation with the relevant regulatory authorities and their advisors.
- 3.9 The Secretary of State recommends that the physical scope of the study areas should be identified under all the environmental topics and should be sufficiently robust in order to undertake the assessment. The extent of the study areas should be on the basis of recognised professional guidance, whenever such guidance is available. The study areas should also be agreed with the relevant consultees and, where this is not possible, this should be stated clearly in the ES and a reasoned justification given. The scope should also cover the breadth of the topic area and the temporal scope, and these aspects should be described and justified.
- 3.10 The Scoping Report refers to various locations in and around the Severn Estuary. The Secretary of State recommends that the applicant be as specific as possible when describing locations and where appropriate, ensure that these are clearly identified on figures accompanying the ES.
- 3.11 The Secretary of State recommends that the temporal scope of impacts be specified in the ES. The applicant should clearly define temporary and permanent impacts. When identifying impacts, the applicant should consider the anticipated life of the project.
- 3.12 The Secretary of State recommends that in order to assist the decision making process, the applicant may wish to consider the use of tables:



- (a) to identify and collate the residual impacts after mitigation on the basis of specialist topics, inter-relationships and cumulative impacts;
- (b) to demonstrate how the assessment has taken account of this Opinion and other responses to consultation;
- (c) to set out the mitigation measures proposed, as well as assisting the reader, the Secretary of State considers that this would also enable the applicant to cross refer mitigation to specific provisions proposed to be included within the draft Development Consent Order; and
- (d) to cross reference where details in the HRA, such as descriptions of sites and their locations, together with any mitigation or compensation measures, are to be found in the ES. The Secretary of State advises that the applicant clearly distinguish between 'mitigation' and 'compensation' in light of recent case law such as the Briels ruling<sup>2</sup>, which provides some clarity on the differences between the terms. Similarly the applicant should clearly differentiate the terms cumulative and in-combination effects for the purposes of the EIA and the HRA.

3.13 The Secretary of State draws attention to the advice given in Appendix 3 to this Scoping Opinion in respect of the assessment of potential cumulative impacts with other major developments, as required by the Directive, and the need for offshore developments to also take account of any offshore licensed and consented activities in the area, for the purposes of assessing cumulative effects, through consultation with the relevant licensing/consenting bodies. The projects considered should include, but not be limited to, Tidal Lagoon Swansea Bay and other tidal lagoon projects within the Severn Estuary at a level of detail appropriate to their stage of development (which may include those proposed at Newport, Bridgwater Bay and West Somerset), and minerals extraction, dredging and deposition within the Severn Estuary. Consideration should also be given to coastal plans and strategies that are in place around the Severn Estuary and the compensatory habitat at Steart for Bristol Port's Bristol Deep Sea Container Terminal (DSCT). Further details of other proposed projects, plans and programmes which the Secretary of State recommends the applicant to take into account are contained within the consultation responses received from NRW and Natural England.

3.14 For the purposes of transparency, the Secretary of State considers that magnitude and sensitivity assessments should be undertaken to determine the significance of effects, prior to moderation based on the probability of occurrence. This approach will allow a clear understanding of the potential severity of effects.

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[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/341981/C\\_521\\_12\\_-\\_Briels\\_and\\_Others\\_-\\_UK\\_Written\\_Observations\\_\\_2\\_.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/341981/C_521_12_-_Briels_and_Others_-_UK_Written_Observations__2_.pdf)

### **Matters to be scoped out**

- 3.15 The applicant has not identified any topics within the Scoping Report that it proposes to Scope out of the ES. It is however noted within Chapter 15 Coastal Birds that, given the mobility of coastal birds, fragmentation is not expected to be an effect of more than minor magnitude and it is expected to be scoped out of further assessment. The Secretary of State does not consider that this matter can be scoped out until further assessment has supported this conclusion.
- 3.16 Matters are not scoped out unless specifically addressed and justified by the applicant, and confirmed as being scoped out by the Secretary of State.
- 3.17 In order to demonstrate that topics have not simply been overlooked, where topics are scoped out prior to submission of the DCO application, the ES should still explain the reasoning and justify the approach taken.

### **Environmental Statement - Structure**

- 3.18 Chapter 3 of the Scoping Report provides an overview of the structure of the environmental statement. Section 3.1.0.4 lists the environmental topics that will be considered within the ES.
- Coastal Processes, Sediment Transport and Contamination
  - Water Quality Processes
  - Flooding and Hydrology
  - Land Quality and Hydrogeology
  - Intertidal and Subtidal Benthic Ecology
  - Fish including Recreational and Commercial Fisheries
  - Marine Mammals
  - Coastal Birds
  - Terrestrial Ecology
  - Seascape and Landscape
  - Cultural Heritage: Marine and Terrestrial
  - Navigation and Marine Transport
  - Marine Noise and Vibration
  - Terrestrial Noise and Vibration
  - Air Quality
  - Onshore Transport
  - Socio-economics
  - Tourism and Recreation
  - Interrelationships and Transboundary effects
  - Mitigation, Compensation and Monitoring
- 3.19 Section 3.2.1 includes a general structure for each chapter. The Secretary of State recommends that assumptions or limitations are set out as part of the methodology or as a separate heading within the ES.

- 3.20 The Secretary of State notes that Chapter 26 of the Scoping Report confirms that the ES will be supported by a CEMP, an OEMP and an AEMP. The Secretary of State recommends that a draft version of these documents is submitted with the DCO application.
- 3.21 The Secretary of State welcomes the consideration of transboundary effects. The applicant's attention is drawn to the guidance provided in Section 4 to the opinion with regard to transboundary effects.

## **Topic Areas**

### **Coastal Processes, Sediment Transport and Contamination** (see Scoping Report Chapter 8)

- 3.22 The proposed tidal lagoon would be located in the Severn Estuary between Cardiff and the River Usk. The Scoping Report highlights the potential for the scheme to give rise to changes in water levels, flows and morphology in the Severn Estuary that could in turn give rise to a range of effects on e.g. habitats, navigation, dredging, flood risk, siltation, scour, contaminated sediment mobilisation, fetch and wave climate. The Secretary of State emphasises that due consideration should be given to effects on both the Welsh and English coasts as a result of the proposed scheme, including implications for Shoreline Management Plans (SMPs).
- 3.23 The ES should assess the range of sediment types likely to be affected by the proposed scheme; the behaviour (formation, movement and dispersal) of fluid mud layers over the spring-neap tidal cycle; the behaviour of mobile sand and other geomorphological features over time; sediment processes such as volume, elevation, erosion and accretion, which underpin the functionality of saltmarsh habitats within the Estuary; and the effect on existing dredge disposal and aggregate dredging, including that which may occur as a result of obtaining construction materials for the development locally. Potential changes to natural variations to sediment processes (e.g. during extreme weather events) should also be considered. The applicant's attention is drawn to the comments of NRW, Natural England, the Environment Agency, and the Port and Harbour Authorities' in respect of coastal processes and their implications for habitats, species and navigation, and expects that the scope of the coastal processes issues to be addressed in the ES should be agreed in consultation with these bodies.
- 3.24 The applicant states that the UKCP09 medium emission projection (95%ile) will be used to define potential changes in parameters during the operation of the project. In this regard the Secretary of State draws attention to the consultation responses from NRW and the Environment Agency, and recommends that sensitivity testing should be undertaken using the UKCP09 High Emissions scenario

in addition to the Medium Emissions scenario described in the scoping report. The Secretary of State requires that full justification is provided in the ES for the climate change scenarios adopted and any assumptions or limitations encountered and that sensitivity testing is undertaken.

- 3.25 The applicant states that high level preliminary modelling has been undertaken to provide an indication of the likely extent and magnitude of such effects. The modelling study suggests elevation of Mean High Water Spring (MHWS) levels downstream to approximately between Rhoose Point to Hinkley Point and upstream at least as far as Frampton-on-Severn. Flow speed changes are predicted as far as Lynton downstream and Oldbury-on-Severn upstream. The far field extent of the model extends to the southern coast of Eire, to Caernarfon in the north and to the northern coast of France in the south. Details of the preliminary modelling process are not provided. The Secretary of State requires that the applicant provide full details of modelling and modelling methodologies, including zone of influence and impact pathways, within the ES and should consider the full geographic extent of effect of the proposals, e.g. beyond Frampton-on-Severn. Models should be adequately calibrated, validated and sensitivity tested. Explicit reference should be made to any changes to the tidal prism and the tidal extent of all affected tributaries and indirect effects arising from this during both construction and operation. The applicant's attention is drawn to NRW, Natural England, the Environment Agency, and the Port and Harbour Authorities' comments in this respect. The Secretary of State also expects that the approach to the assessment of the decommissioning period will be agreed with statutory consultees.
- 3.26 The Secretary of State notes that various ES topic chapters will rely upon the modelling undertaken for coastal processes, such as benthic ecology and fish; therefore, it will be important for the Modelling Plan to be agreed with relevant SNCBs and ensure the modelling undertaken is robust and fit for purpose. In this respect, the Secretary of State draws attention to the inter-relationship between the various surveys and modelling assessments highlighted in the response from NRW.
- 3.27 The Secretary of State requires that the modelling include the cumulative assessment of all development proposals and emerging proposals within the Severn Estuary, including planned and reasonably foreseeable tidal lagoon projects which may include those at Swansea, Newport and Bridgwater Bay; and Bristol Deep Sea Container Terminal. The assessment should consider the difference in impacts that may be associated with partially constructed lagoons.
- 3.28 The Secretary of State requires that the effect of changes in coastal processes on the Severn crossings (bridges/tunnels) be considered.

- 3.29 A range of proposed surveys are referenced including hydrographic, geophysical, oceanographic and benthic surveys. No specific methodology is set out for these surveys. The Secretary of State recommends that detailed methodologies, referencing any limitations and assumptions are set out in the ES in respect of each survey and assessment undertaken. The Secretary of State considers that the survey scope should include wave and tidal current data and particle size data for sediment transport modelling and that sampling and analysis should recognise the discrete requirements for benthic surveys as opposed to contaminant sampling. Survey scope and methods should be agreed with the Stakeholder Topic Group. The applicant's attention is drawn to NRW and Natural England's comments in this respect.
- 3.30 The Secretary of State welcomes the applicant's proposal to provide and agree a Modelling Plan with stakeholders. Chapter 8 makes reference to the use of 2D depth-averaged as well as 3D modelling approaches. The Secretary of State recommends that full justification and a detailed methodology is given for the modelling approach adopted within the ES and that this approach is agreed with the proposed Stakeholder Topic Group.
- 3.31 The Scoping Report refers to high-level data review undertaken to inform the Scoping Report and additional data collection to inform the ES. The Secretary of State recommends that data collection to inform the modelling should be agreed with relevant SNCBs and stakeholders. See comments on data collection provided by NRW and the Environment Agency in Appendix 2. In this regard, the applicant should note that surveys and background data which are referenced within the environmental statement or Habitats Regulations Report should be appended or annexed to the respective document, or be published elsewhere. If surveys and data that are relied upon are not provided, or published, then the applicant may be asked to provide them.
- 3.32 Section 8.5 sets out the proposed significance criteria. Reference is made to receptor importance as a criterion in Table 8.4 but no definition of levels of importance is provided. The basis for any evaluation of receptor importance should be clearly set out in the ES. It is noted that Table 8.3 uses the scale 'high, moderate, low, none' in relation to vulnerability but in Table 8.4 the scale 'high, medium, low, negligible' is used instead. The terms used should be consistent in the ES.

### **Water Quality Processes** (see Scoping Report Chapter 9)

- 3.33 The water quality processes chapter identifies waterbodies designated under the WFD and revised Bathing Water Directive (rBWD) that may be affected by the scheme. However, the list of waterbodies at Table 9.1 of the scoping report omits mention of the River Rhymney. The Secretary of State also expects to see the Rivers Taff and Ely taken into consideration in the assessment.

The Secretary of State draws attention to the response from the Environment Agency; as Cardiff Bay is a Sensitive Area (Eutrophic), the Urban Waste Water Directive should be included as a legislative driver for the project.

- 3.34 The chapter acknowledges that tidal currents strongly affect physical, chemical and biological properties of the Estuary. It also identifies the main sources of pollutant discharges into the Severn Estuary including industrial, power station, diffuse agricultural pollution and shipping.
- 3.35 The Secretary of State recommends that the potential impact of the proposed lagoon on contaminants or hazardous pollutants (metals or organics) in the water column, either adsorbed into suspended sediments or in the dissolved phase due to sediment erosion and deposition during the construction and operational phase should be considered, together with potential changes in the dilution and dispersion of sewage and industrial discharges and freshwater outflows, both within and outside of the lagoon. This should include assessment of the effect of the proposals on bathing water quality and ecology relating to retention of discharges from Cardiff Wastewater Treatment Works (WwTW) and Cog Moors WwTW within the lagoon area. Some existing licences also contain provision for the discharge of radioactive waste to the sewerage system. The applicant's attention is drawn to comments made by NRW, the Environment Agency and Dwr Cymru Welsh Water comments in respect of existing discharges which may impact on water quality. The detailed scope of studies in relation to sediment contamination, and target/trigger values for contaminated sediment should be agreed with statutory consultees.
- 3.36 The applicant's attention is also drawn to the comments of Cardiff Harbour Authority, as contained within the response of City of Cardiff Council in Appendix 2, which advises of litter and debris that could be flushed into the proposed lagoon. The Secretary of State recommends the applicant consider and assess the impacts of litter/debris that could be drawn into the lagoon and how this will be addressed.
- 3.37 The proposed assessment comprises marine and river water sampling, followed by modelling of water quality parameters. The proposed study area is subdivided into Near Field, Mid Field and Far Field zones. The Secretary of State considers that the precise boundaries of the zonation should be agreed with the consultees as the study progresses. Appendix 9.1 "Water quality processes data review and gap analysis" provides information regarding the availability of existing survey data and data required to complete the water quality processes assessment. It is noted that modelling runs will be used to determine sampling requirements, the outputs of the modelling runs and the basis for the scope of sampling undertaken should be set out in the ES, alongside the model

validation procedures and any uncertainty within the assessment. The Secretary of State recommends that consideration is given to potential impacts on phytoplankton, microphytobenthos and macroalgal productivity and community structure. The applicant is referred to comments made by Natural England and the Environment Agency in this respect. The applicant's attention is also drawn to the comments of Cardiff Harbour Authority with respect to experience of water quality monitoring in this area.

- 3.38 The Secretary of State recommends that the full survey requirements are agreed with consultees. The applicant is referred to the comments of NRW, Natural England, and the Environment Agency in this respect. The Secretary of State requires that full justification is provided in the ES for the final suite of surveys undertaken, the spatial coverage of samples, the methods of survey and modelling adopted, the climate change scenarios adopted and any assumptions or limitations encountered. The Secretary of State welcomes the proposed production of a modelling work plan to support the study.
- 3.39 The Secretary of State welcomes the proposed consideration of impacts on bathing waters and draws attention to North Somerset's comments regarding the need for consideration of Uphill, Weston Bay, Sand Bay and Clevedon. The assessment should clearly cross reference to Chapter 8 on Coastal Processes. The Secretary of State also draws attention to comments made by the Land Contamination team at City of Cardiff Council with regard to the possible use of the lagoon for recreational purposes such as bathing, and the need to consider potential changes to water quality (see Appendix 2).
- 3.40 The proposed submission of WFD screening and compliance reports is welcomed, although it is noted that these are not directly required under the EIA Regulations and serve other legislative compliance requirements (refer to Section 4).
- 3.41 The water quality processes assessment should provide an assessment of effects in both ES terms and WFD terms setting out the likely significant effects of the project on water quality. The applicant is referred to the Environment Agency's comments in this respect.

### **Flooding and Hydrology** (see Scoping Report Chapter 10)

- 3.42 Chapter 10 highlights that the proposed scheme has potential to give rise to changes in flooding and hydrology within the Severn Estuary. The report highlights the wide range of interested parties with responsibility for flooding and drainage matters, e.g. Local Authorities, NRW, EA, Dwr Cymru Welsh Water (DCWW) and Internal Drainage Boards (IDBs). The applicant's attention is drawn to comments from Wentlooge Community Council, existing Flood Risk Assessment (FRA) models such as the Avonmouth

Severnside Strategic FRA model, IDB hydraulic models and Bristol City Council's Central Area FRA.

- 3.43 The Secretary of State considers that the effect of the proposed scheme on the existing Water Level Management Plan for the Caldicot and Wentlooge Levels should be considered. Noting the change in status of Caldicot and Wentlooge Levels IDB as of the 1<sup>st</sup> April 2015, the applicant's attention is drawn to the IDBs comments in this respect.
- 3.44 The chapter is subdivided between flood issues and 'water resources', which creates some confusion, as the types of issues raised under water resources include groundwater contamination, drainage, surface water and water supplies and overlap with water quality issues raised in other chapters. The Secretary of State recommends that the applicant avoids duplication of content between chapters 8 to 11, where possible.
- 3.45 The applicant proposes to produce separate Flood Consequence (FCA) and Flood Risk (FRA) Assessments in line with Technical Advice Note (TAN) 15 in Wales and the National Planning Policy Framework (NPPF) in England. Reference is made to Planning Policy Statement (PPS) 25 for England, which is now withdrawn (although PPS25 Practice Guide remains in place). The flooding scope includes two key questions that geographically limit the assessment (Section 10.2.1.17). The applicant must ensure that the scope of assessment included within the ES is not fettered by the proposed questions, reflects the geographic area potentially affected by the scheme and is agreed with NRW and the Environment Agency respectively.
- 3.46 The ES should clearly state the study area/zone of influence for the project in respect of flooding and hydrological receptors. The applicant's attention is directed to the comments of NRW in respect of the proposed study area and limit of assessment.
- 3.47 The Scoping Report makes reference to the Project having the potential to enable flood storage improvements. The ES should present an assessment of such improvements, if they are established to be an aspect of the proposed development.
- 3.48 With regard to cumulative effects, the applicant's attention is drawn to the comments of Natural England in Appendix 2. The Secretary of State agrees that cumulative effects with any reasonably foreseeable intertidal habitat creation projects should be considered in the ES.
- 3.49 The significance criteria proposed for flooding is a 0.1m or greater variation in flood levels. The Secretary of State recommends that this criterion is agreed with the relevant statutory authorities.
- 3.50 Section 10.2.2 discusses sources, pathways and receptors with the potential to give rise to effects on water resources. No reference is



made to private water abstractions. The Secretary of State recommends that this information is included within the ES. The applicant's attention is also drawn to the comments of NRW with regards to additional impacts and receptors to be considered (see Appendix 2).

- 3.51 The assessment criteria proposed for water resources are set out in the water environment subobjective of Transport Assessment Guidance (WebTAG). The assessment criteria to be applied to the assessment should be agreed with relevant consultees. The applicant should clearly set out the basis for assigning importance to receptors and the magnitude of impact, to allow a clear understanding of the basis for conclusions drawn in relation to significance.
- 3.52 The Secretary of State draws attention to the comments of NRW in respect of impoundment and transfer licences that may be required for the proposed development. The Secretary of State draws the applicant's attention to advice on other regulatory regimes set out in Section 4 of this Opinion.

**Land Quality and Hydrogeology** (see Scoping Report Chapter 11)

- 3.53 The superficial geology comprises Tidal Flat Deposits, including soft silty clay with layers of sand, gravel and peat. These are designated as a Secondary (Undifferentiated) Aquifer. The bedrock geology comprises mudstones and subordinate siltstones with locally thick, halite bearing units of the Mercia Mudstone Group. These are referred to as 'soils' in Section 11.3.2.2, which is assumed to be a typographic error. The bedrock is designated as a Secondary B Aquifer. No Source Protection Zones are located within 500m of the site. The geological formation of the estuary is not confirmed in the existing maps.
- 3.54 The project would affect land quality and hydrogeology during construction, operation and decommissioning. The applicant proposes to undertake a desk based assessment to inform a Conceptual Site Model, and 2d hydrogeological modelling. The ES should justify the modelling methodology adopted. A small, 250m study area is proposed around the landfall locations. The ES should explain in detail the extent of the study area adopted and justify the reasons for this.
- 3.55 The location of any construction compounds should also be considered, together with any ancillary works. The Secretary of State recommends that the applicant clearly highlights indirect land quality effects that could arise from changes in coastal processes and the existing hydrological regime. The Scoping Report identifies impacts to groundwater resources at the landfall areas. The study area should be sufficiently large to identify all land quality and hydrological receptors, including onshore water

resources, private water supplies, and groundwater abstractions, within the Gwent Levels and area surrounding the proposed development.

- 3.56 The proposed significance criteria are those set out in the Water Environment section of the Design Manual for Roads and Bridges (DMRB) 2009 as well as Mustow et al (2005). Chapter 10 refers to the WebTAG water subobjective and Mustow et al (2005). The Secretary of State recommends that consistent criteria are adopted across the water related chapters. In the light of the works proposed, cross reference should also be made to the section on marine water and sediment quality in order to address the potential impacts of sediment along the foreshore. The Secretary of State directs the applicant to the comments of NRW in Appendix 2 in relation to other guidance and legislation that should be applied to the EIA.
- 3.57 Section 11.3.5 states that consultation will be undertaken with NRW and the Local Authorities. This consultation should be used to agree the scope of any detailed investigations identified as being required during the desk based evaluation. The matters raised in the consultation response from the Contaminated Land team at City of Cardiff Council should be addressed in this respect. This includes the need for the EIA to address the potential for impacts on other contamination/landfill features which are located on the current shoreline and would be enclosed by the lagoon (e.g. the former Frag Tip, the foreshore west of the mouth of the River Rhymney and the Lamby Way site east of the River Rhymney). The applicant is also directed to the comments of NRW in relation to landfill areas that could be affected.

**Intertidal and subtidal benthic ecology** (see Scoping Report Chapter 12)

- 3.58 The Scoping Report includes a figure presenting JNCC intertidal habitat data. The applicant should ensure that any figures included with the ES are provided at a suitable size and scale, to clearly present the necessary data. The ES should also fully reference the data sources used to inform the assessment and also specify the date of the data. The applicant's attention is drawn to the comments of NRW and Natural England in respect of the JNCC mapping data and available data sources.
- 3.59 The chapter includes a list of legislation and policies relevant to the impact assessment. Although acknowledged to not be exhaustive, the Secretary of State also brings to the applicant's attention the Conservation of Habitats and Species Regulations 2010 (as amended) and the Ramsar convention.
- 3.60 The chapter does not specifically discuss SSSIs in respect of intertidal and subtidal benthic ecology. The ES should consider the Severn Estuary SSSI. The ES should also make clear the value of

receptors, with reference made to Annex I habitats of the Habitats Directive and s42 (and s41) NERC Act 2006 species and habitats of principal importance, as appropriate. The Secretary of State recommends that the applicant discuss and agree the intertidal and subtidal benthic ecology receptors with the SNCBs, including NRW, Natural England and the Environment Agency. The high-level grouping of receptors as currently presented in the Scoping Report does not identify in sufficient detail valuable receptors, such as saltmarsh habitat. The applicant's attention is directed to the comments of NRW, Natural England and the Environment Agency in this regard, including the need to clarify the approach to plankton within the EIA (see Appendix 2). The Secretary of State welcomes the approach to consult with relevant authorities regarding any relevant projects to be considered for cumulative effects on intertidal and subtidal benthic ecology. The applicant will need to consider other reasonably foreseeable projects, including future lagoon developments.

- 3.61 The Scoping Report makes reference to lighting plans for the construction, operational, and decommissioning phases of the project, which would be used to inform the assessment of artificial lighting on benthic ecology. The Secretary of State recommends that the lighting plans used to inform the assessment are provided with the ES.
- 3.62 The Secretary of State welcomes the consideration of Invasive Non-Native Species (INNS) as part of the impact assessment. The risk of introducing INNS or causing the spread of such species as a result of the project should be identified, including the potential sources of INNS, such as rock armour/stone derived from marine sources. An INNS risk assessment should be provided with the ES and the ES should include an assessment of INNS and identify how any appropriate biosecurity measures are to be secured. The applicant's attention is drawn to the comments of NRW, the EA, and Natural England in respect of INNS.
- 3.63 The Secretary of State recommends that surveys undertaken to inform the impact assessment should be thorough and up-to-date. The survey methodology, including type, number, frequency, duration and location, should be agreed with the relevant SNCBs, including NRW, Environment Agency and Natural England. The applicant's attention is directed to the detailed comments of NRW and Natural England in respect of proposed surveys (see Appendix 2).
- 3.64 The ES should define the zone of influence for the intertidal and subtidal benthic ecology receptors. The use of terms such as near-field and far-field should be clearly defined. The ES should also make clear the definition of terms such as 'Project area', 'Study area', and 'in the vicinity of the project', where they are used. The Secretary of State recommends the applicant be consistent in their use of terminology.

- 3.65 Section 12.4 describes the impact assessment methodology. The Scoping Report states that proposed methodology would be based on CIEEM's 2010 Guidelines for Ecological Impact Assessment in Britain and Ireland: Marine and Coastal. However, the Secretary of State notes that the tables presented in Section 12.4 do not follow the format of CIEEM guidance. The valuation of ecological receptors, as presented in Table 12.5 to the Scoping Report, should be made relevant to the marine environment.
- 3.66 Table 12.8 includes for impacts that could be 'moderate/minor'. To avoid ambiguity the applicant should clearly set out the basis for assigning significance, particularly where a transitional range of impacts is set out and state whether or not such impacts are considered to be significant under the EIA Regulations. The confidence level in the assessment should also be specified and clearly defined.
- 3.67 The applicant is directed to the detailed comments of NRW, Natural England and the Environment Agency in respect of intertidal and subtidal benthic ecology (see Appendix 2).

**Fish including Commercial and Recreational Fisheries**  
(see Scoping Report Chapter 13)

- 3.68 The applicant should not rely on the use of embedded figures within the text and are encouraged to use appendices for figures. Any figures included with the ES should be provided at a suitable size, scale and resolution.
- 3.69 The Secretary of State notes that Tables 13.2 to 13.4 of the Scoping Report identifies very few impacts associated with commercial and recreational fishing activities. In respect of commercial fishing, the Scoping report focuses predominantly on impacts associated with steaming times for fishing craft. Paragraph 13.4.3.1 of the Scoping Report subsequently identifies a number of potential impacts on commercial fisheries, as taken from NPS EN-3. The Secretary of State requests that full consideration be given to potential impacts on commercial and recreational fisheries in the ES, including potential impacts to non-UK fishing fleets, which would also need to be reflected in the applicant's assessment of transboundary effects on other EEA States. The applicant should also consider private fishing rights, which could be affected by the proposed development. The applicant's attention is drawn to the comments of NRW and Natural England in respect of potential impacts on fish associated with the proposed development during construction, operation and decommissioning.
- 3.70 Table 3.4 presents potential impacts arising from the decommissioning phase of the project. The Secretary of State notes the predicted improved access to the lagoon by fish (increased access to spawning/foraging grounds), which may be

incompatible with the predicted impact of increases in suspended sediment and deposition, given the likely cessation of maintenance dredging following decommissioning. The ES should ensure the temporal scope of predicted impacts is considered and explained in the ES, including likely durations for predicted impacts, in accordance with CIEEM guidance. The ES should include medium and long-term population scale effects.

- 3.71 The Secretary of State recommends that data to inform the impact assessment on commercial fishing should be sought from a variety of sources. The ES should not rely solely on the data contained in the MMO landing database, as this would not include all potential commercial fishing craft that could be affected by the project. The applicant is directed to the comments of Natural England in Appendix 2, which identify the Devon and Severn Inshore Fisheries and Conservation Authority (IFCA) as an appropriate consultation body.
- 3.72 Table 13.5 of the ES identifies priority areas for data collection. The applicant is reminded to ensure that sufficient data has been collected to inform the impact assessment. The Secretary of State directs the applicant's attention to the detailed comments of NRW and Natural England in respect of baseline data.
- 3.73 The Secretary of State welcomes the project-specific surveys proposed to inform the impact assessment. However, it is noted that the Scoping Report does not make clear the objectives for the proposed surveys. The detailed survey methodologies, including type, number, frequency, duration and location, should be agreed with the relevant SNCBs, including NRW, Natural England, and the Environment Agency. The applicant is directed to the detailed comments of NRW and Natural England in respect of the proposed surveys.
- 3.74 The Secretary of State welcomes the proposal to maintain consultations throughout the assessment process. The applicant is advised to agree the detailed scope of the surveys at an early stage of consultation.
- 3.75 In respect of the proposed methodology for the impact assessment, the limitations to certainty should be described and the consequences for confidence in predictions must be clearly stated. The Secretary of State notes that a matrix for determining significance is referred to within the Scoping Report chapter; however, this has not been provided in the chapter. The approach of using a combination of magnitude of impact and sensitivity/value of receptor is, however, considered appropriate. The applicant is directed to the comments of NRW in respect of Table 13.6, the geographic frame of reference used to value receptors.

- 3.76 Table 13.7 identifies likely fish and shellfish Valued Ecological Receptors (VERs) for the project. The Secretary of State notes that a grouped VER has been identified for other demersal and pelagic species, which are considered to be mixed regional and local importance. The ES should make clear what species are being referred to in this grouped VER. It may be more appropriate to separately consider those species of higher value in the impact assessment for clarity, as the impacts on these may be significant and/or specific mitigation may be required. The applicant is also directed to the comments of NRW in respect of fish species that are absent from this table and should be considered in the impact assessment (see Appendix 2).
- 3.77 In respect of ecological receptors, given the impoundment of the River Rhymney by the proposed lagoon, it is recommended that this river be given specific consideration in the ES. See also comments provided by NRW and Natural England in this regard.
- 3.78 Table 13.9 refers to criteria including 'regional fishing fleet which contributes significantly to adjacent countries'. The applicant is advised to define what 'adjacent countries' are being referred to here. It may be that this is a typographical error, as Table 13.11 refers in a similar way to adjacent counties. The ES should make clear the criteria for the assessment of impacts.
- 3.79 The Secretary of State welcomes the applicant's intention to consult on the proposed modelling for the impact assessment. The Secretary of State recommends that the model type, parameters and data collection to inform the modelling be agreed with SNCBs, including NRW and Natural England, at an early stage and also as it continues to be developed. The Secretary of State directs the applicant to the detailed comments of NRW and Natural England with regard to the proposed modelling approach. The modelling used to inform the assessment should clearly state the confidence levels in the results for each species. Detailed information on the models applied to the impact assessment, including methodology, data sources, and parameters will need to be provided with the ES. The Secretary of State recommends that this be submitted as a technical appendix to the ES.
- 3.80 Given the intention to apply a Rochdale Envelope approach to aspects of the proposed development, the applicant is reminded to ensure that the worse-case scenario has been presented and assessed in the ES and HRA. The worse-case scenario for fish receptors should be clearly defined.

### **Marine Mammals** (see Scoping Report Chapter 14)

- 3.81 The applicant is reminded to ensure that any figures included with the ES are provided at a suitable size, scale and resolution. The use of appendices for figures is encouraged.

- 3.82 The Secretary of State welcomes the consultations undertaken to date with SNCBs and advises that the consultations continue throughout the pre-application stage of the project. The applicant's attention is drawn to the comments of Natural England in respect of potential contacts for further information concerning grey seals. The Secretary of State notes that a number of persons/organisations contacted by the applicant for information on grey seals did not provide a response. The Secretary of State recommends that these persons/organisations be contacted again to try to establish a response. The applicant's attention is also drawn to the list of further sources of information provided by NRW in their response (see Appendix 2).
- 3.83 The Secretary of State notes that proposed acoustic monitoring only includes one proposed location for a turbine and sluice gate housing structure. The Secretary of State notes from Chapter 5 and 6 and Figure 1.1 of the Scoping Report that amendments to the layout and arrangement/number of turbine houses may occur as the EIA progresses. The monitoring locations used will therefore need to take account of any changes to the design of the project, including any amendments to the location of the turbine housing, and how this could affect the data collected to inform the impact assessment. The applicant is also drawn to the comments of NRW with regard to monitoring locations.
- 3.84 The Secretary of State welcomes the intention to undertake characterisation surveys for marine mammals to inform the impact assessment. The Secretary of State recommends that the survey methodology, including type, number, frequency, duration and location, be agreed with the relevant SNCBs, including NRW and Natural England. The applicant's attention is directed to the comments of NRW and Natural England in respect of the proposed surveys, including reference to the proposed number and duration of surveys.
- 3.85 The proposal to undertake a baseline noise characteristic survey is welcomed by the Secretary of State.
- 3.86 Section 14.4 describes the impact assessment methodology. The Scoping Report states that the proposed methodology would be based on CIEEM's 2010 Guidelines for Ecological Impact Assessment in Britain and Ireland: Marine and Coastal. However, the Secretary of State notes that the tables presented in Section 14.4 do not follow the format of CIEEM guidance. In addition, the inclusion of probability of occurrence in Table 14.4 to determine exposure to change is not considered to be appropriate. The Secretary of State considers that change to receptor and sensitivity of receptor criteria should be used to determine significance of effect, after which the likelihood of occurrence of the impact should be specified. The limitations to certainty should be described and the consequences for confidence in predictions must be clearly stated. The applicant's attention is also directed to

the comments of Natural England in respect of confidence in the assessment.

- 3.87 The Secretary of State notes that 'major' or 'moderate' impacts would be considered as significant impacts under the EIA Regulations. Table 14.6 includes for impacts that could be 'moderate/minor'. The applicant should qualify the impact assessment to make clear whether impacts are significant or not significant.

**Coastal Birds** (see Scoping Report Chapter 15)

- 3.88 The applicant is reminded to ensure that any figures included with the ES are provided at a suitable size, scale and resolution. The use of appendices for figures is encouraged.
- 3.89 Paragraph 15.3.3.8 states that the extent of the proposed low tide counts are presented on Figure 15.1; however, this figure shows the extent of the European sites. It is unclear whether the surveys are intended to cover the same area as the European sites. The survey area should be informed by the zone of influence of the proposed development, which in turn will be informed through modelling. The applicant is advised to agree the detailed scope of the surveys with the relevant statutory consultees, including NRW and Natural England. The applicant's attention is also directed to the comments of NRW in respect of the potential study area (see Appendix 2) and to that of NRW and Natural England in respect of the proposed surveys, including duration.
- 3.90 The Secretary of State notes from the Scoping Report that the most recent low tide Wetland Bird Survey (WeBS) counts available date from 2008/09. No information is provided concerning the next update of this data. The applicant is advised to use the most up-to-date available information to inform the assessment, including project-specific surveys.
- 3.91 The Secretary of State welcomes the inclusion of Appendix 15.1, which contains a summary of recommended surveys and modelling. The applicant should confirm with the relevant SNCBs, including NRW and Natural England, whether it is intended to follow the recommendations included in Appendix 15.1.
- 3.92 The Secretary of State welcomes the proposal to undertake 'Through the Tidal Cycle' surveys, in addition to low and high tide counts. The extent of these surveys and how they will be used to inform modelling should be agreed with relevant SNCBs, including NRW and Natural England.
- 3.93 The Scoping Report states that no surveys for breeding lesser black-backed gull, herring gull, and great cormorant will be undertaken, as information on these species that are known to breed at Steep Holm and Flat Holm may be available from



stakeholders. The applicant is reminded to ensure sufficient information is obtained to inform the impact assessment and that the level of information required is agreed with stakeholders.

- 3.94 As described in 'Matters to be Scoped Out' above, the Secretary of State does not consider that habitat fragmentation can be scoped out until further assessment has supported this conclusion. The Secretary of State also recommends that collision risk with turbines be considered in the EIA. The applicant's attention is drawn to the comments of NRW and Natural England in this regard.
- 3.95 With regard to potential impacts identified, the Secretary of State recommends that the ES explain in detail the full extent of habitat loss, making clear whether impacts are temporary or permanent, bearing in mind that impacts may only be temporary if they are reversible and will be recovered for all species and habitats previously present. The ES will need to explain the various types of habitat loss, such as those under the breakwater, but also those lost to inundation from the lagoon impounded waters, and changes in habitat type (e.g. mud deposition).
- 3.96 With reference to Table 15.7, Paragraph 15.4.1.13 states that those impacts shaded red or orange are considered to be significant in respect of the EIA Regulations; however, Table 15.7 does not include shading. The applicant is reminded to state whether impacts are deemed to be significant or not significant.
- 3.97 The Secretary of State welcomes the use of a CIEEM EcIA guidance approach to the impact assessment, rather than reliance on a matrix formula.
- 3.98 The Scoping Report refers to embedded mitigation. The applicant is advised to ensure that any embedded mitigation forms part of the project secured by the DCO. Any specific mitigation measures should also be secured appropriately through the DCO. This is particularly important where the mitigation is relied upon for the HRA.
- 3.99 The Secretary of State welcomes the proposals to use modelling to inform the impact assessment on coastal birds. The applicant should agree the detailed modelling with the relevant statutory consultees, including NRW and Natural England. The applicant's attention is directed to the comments of NRW and Natural England in respect of the proposed modelling.

### **Terrestrial Ecology** (see Scoping Report Chapter 16)

- 3.100 The Scoping Report initially considers designated sites within 2.5km of the project. Other coastal SSSIs have been identified within 20km. The ES should justify the study area selected for the terrestrial ecology impact assessment with reference to potential

effect pathways and the zone of influence from the project. The ES should avoid duplication of assessment between the topic chapters, but should also ensure that impacts on designated sites are clearly identified. This is particularly relevant to the Severn Estuary SSSI and saltmarsh, which is currently discussed in both Chapters 12 and 16. Cross-referencing between chapters is recommended. The applicant's attention is drawn to the comments of NRW, Natural England and City of Cardiff Council.

- 3.101 In respect of the potential impacts identified in the Scoping Report, including those to saltmarsh habitats, the applicant's attention is drawn to the detailed comments of NRW.
- 3.102 The Secretary of State welcomes the intention to consult with the relevant SNCBs regarding the ecological surveys to be undertaken. Where the need for surveys is to be identified following modelling of coastal processes, sufficient time should be allowed to undertake the necessary surveys in accordance with recognised guidance. The applicant's attention is drawn to the comments of NRW and Natural England regarding project-specific surveys and sources of baseline data, including the need for National Vegetation Classification (NVC) surveys.
- 3.103 Reference is made to the establishment of over-wintering bird foraging areas through desk-based assessment and the coastal bird surveys. The area of terrestrial habitat that is to be surveyed for wintering birds as part of the coastal bird surveys is not clear from the Scoping Report. The applicant should ensure that the surveys undertaken are specific and fit-for-purpose. The ES should consider the impacts of the ancillary works, grid connection, and accesses on terrestrial ecology.
- 3.104 The proposed impact assessment methodology defines impact significance in accordance with Table 16.7; however, the chapter has not specified what level of significance (for example, a moderate impact and above) is considered to be significant in respect of the EIA Regulations. The ES should clearly state whether impacts are considered to be significant or not significant and avoid ambiguous terminology.

### **Seascape and Landscape** (see Scoping Report Chapter 17)

- 3.105 The applicant proposes to assess seascape, landscape and visual effects based on the Guidelines for Landscape and Visual Impact Assessment: Third Edition, 2013, which is considered to be appropriate. However, the Secretary of State also draws attention to other guidance referred to in the response received from NRW which should also be taken into account, where appropriate, in undertaking the assessment. The Secretary of State expects the ES to contain full details of the project specific methodology adopted for the assessment of landscape, seascape and visual impacts, including clear definitions of significance criteria adopted.

- 3.106 The site is located within Seascope Unit 49 Lavernock Point to Goldcliff in the Seascope Assessment of Wales and is subject to a number of designations including Gwent Levels Registered Landscape of Outstanding Historic Interest and the proposed Wentlooge Levels Special Landscape Area (SLA).
- 3.107 The proposed scheme would be visible from both sides of the Severn Estuary. A Zone of Theoretical Visibility (ZTV) within a 15km study area has been prepared by the applicant and used to inform the selection of an initial 10 viewpoints for visual assessment. The full extent of the potential visibility of the development outside of the assumed study area has not been illustrated. The study area should be agreed with the relevant consultees and justified in the ES, and may need to take account of indirect effects, for example arising as a result of changes to coastal processes, which may give rise to landscape, seascape and visual effects.
- 3.108 It will be appropriate for a wide range of viewpoints to be included within the ES to inform the assessment. A more flexible approach to viewpoint selection should be employed to ensure more than 10 viewpoints are included, given the wide area from which where this project may potentially be visible. Given the relative proximity of the proposed Wentlooge Levels SLA, the wider Mendip Hills Area of Outstanding Natural Beauty (AONB), Wye Valley AONB, Quantock Hills AONB and Exmoor National Park, potentially with key views overlooking the Estuary, it is not considered appropriate to limit the study area as at present shown in the scoping report. Longer distance views of the proposed scheme from elevated areas, including those designated for their landscape and scenic value should therefore also be considered. The final viewpoint locations should be agreed with NRW, Natural England and relevant local authorities. The applicant's attention is also drawn to the comments of Penarth Town Council regarding the effect of the proposals on views from the Esplanade, and comments made by NRW, including reference to potential visibility from the Mendips AONB, Wye Valley AONB and Glamorgan Heritage Coast. If views from areas designated for their landscape and scenic value are scoped out of the assessment, then clear justification should be provided. The assessment should also cross reference effects to the Gwent Levels Registered Landscape of Outstanding Historic Interest and Registered Parks and Gardens, as identified in the cultural heritage assessment.
- 3.109 The Secretary of State requires that the ES include a full description of the methodology used to prepare photographs and photomontages to inform the visual assessment. The applicant suggests that Viewpoint 1 Lavernock Point and Viewpoint 9 Brean Down are representative of views from Flat Holm and Steep Holm. Given that both islands are tourist destinations in their own right, and that Flat Holm is a designated SLA it is considered that a viewpoint from Flat Holm, the closer of the two islands, should at

least be included. The Secretary of State expects that the final photomontage locations should be agreed with NRW, Natural England and relevant local authorities, but that, as for the adopted viewpoints, these should include sufficient locations to show the potential impact from representative viewpoints and areas designated for their landscape and scenic value which may be located outside of the study area proposed in the scoping report. In this regard the applicant's attention is also drawn to the response from NRW at Appendix 2, and the need to produce photomontages which represent the appearance of the proposed development at different states of the tide.

- 3.110 Information is provided within the Scoping Report as to the potential dimensions of various elements of the project, such as the lagoon wall height, the numbers and size of the turbine and sluice gate housings. The assessment text should make clear what assumptions are made in this respect with regards to whether heights are stated as above CD or Ordnance Datum, with consistency in the description of all elements of the scheme. The assessment should also make clear what heights and dimensions of the development have been adopted for the purposes of the ZTV and the production of photomontages. The proposed grid connection and substation are not described at the present time. The Secretary of State requires that all elements of the scheme are assessed and it is important that the applicant assess the worst case scenario in terms of the dimensions of these structures in their assessments. The applicant's attention is drawn to Wentlooge Community Council's comments in respect of landscape and visual amenity.
- 3.111 The Scoping Report states that artificial lighting will be required during construction and operation. The Secretary of State advises that the impact of all artificial lighting, both onshore and offshore, should be included within the landscape and visual assessment.
- 3.112 Section 17.3 lists a range of analysis material that will inform the study. The applicant should confirm with consultees whether other material is available to inform the study.

**Cultural Heritage: Marine and Terrestrial** (see Scoping Report Chapter 18)

- 3.113 A 10km marine study area; 1km terrestrial study area around infrastructure elements and the cable route; and a 10-15km study area for settings effects are proposed. The scoping report acknowledges the potential for the extent of the marine study area to vary dependent on the findings of the coastal processes assessment and Section 18.4.4.5 states that settings effects on heritage assets may need to be considered outside of this study area. The Secretary of State requires that marine geophysical surveys include survey outside the lagoon area in light of the predicted changes in tidal regime. The Secretary of State requires

that full justification is given for the final study areas adopted in the ES that these consider effects in both Wales and England and that the areas are agreed with heritage stakeholders.

- 3.114 The Secretary of States notes that multiple site walkover surveys in respect of the intertidal zone may be required due to the nature of the covering silt deposits in the study area. The intensity of site walkover survey effort should be agreed with heritage stakeholders.
- 3.115 The Secretary of State notes that the heritage chapter focuses on heavily on construction effects. The applicant must also consider the operational effects of dredging and/or other measures to de-silt the lagoon and changes in currents leading to erosion away from the lagoon. The applicant's attention is drawn to CADW's comments in this respect.
- 3.116 The proposed submission of an Assessment of the Significance of Impacts of Development on Historic Landscapes (ASIDOHL) for the Gwent Levels Landscape of Outstanding Historic Interest is also welcomed. The Secretary of State notes that there may be a need for the findings of the seascape, landscape and visual assessment to feed into the ASIDOHL assessment.
- 3.117 The Secretary of State welcomes the use of pre-application engagement with heritage stakeholders and recommends that the scope of works for each tier of survey/assessment and determination of assets with low tolerance to change is confirmed with the heritage stakeholders.
- 3.118 A series of guidance documents are listed as forming the framework for the assessment. The lead guidance highlighted for the scope, methodology and content of the heritage report is 'Historic Environment Guidance for Wave and Tidal Energy' prepared by English Heritage, Cadw, Welsh Government and Historic Scotland in 2013. Paragraph 2.1 of the guidance document states that "This document does not replace existing guidance. It should be read in conjunction with existing policies and guidance." Relevant standards and guidance from the Chartered Institute for Archaeologists (CIfA) should therefore be applied to the assessment of heritage effects as appropriate. The applicant's attention is drawn to relevant studies and guidance identified by Cadw, in particular The Research Framework for the Archaeology of Wales. For settings assessments on assets in England, the applicant should undertake the assessment in line with the Historic England - Historic Environment Good Practice advice in Planning - Note 3 and is referred to English Heritage's comments in this respect.
- 3.119 The proposed assessment of significance is based on a combination of the heritage significance of an asset and the magnitude of effect of the project on that asset. The ES should

clearly set out the basis for both the heritage significance assigned to each asset and the magnitude of effect. The Secretary of State considers that the potential value of sites with access to the sea for boats may be undervalued (paragraph 18.2.3.5 of the scoping report). The applicant should refer to CADW's comments in this respect.

- 3.120 The Secretary of State welcomes the proposed submission of a Heritage Conservation Strategy for construction and operation and recommends that this is extended to cover decommissioning.
- 3.121 The applicant should include clear cross referencing between the Cultural Heritage and Coastal Processes chapters given the interdependency of these topics (Chapter 8).
- 3.122 The Secretary of State considers that the impact of the proposed scheme on views from the Esplanade should be assessed and the applicant's attention is drawn to the comments of Penarth Town Council in this respect. The Secretary of State notes that impacts to Conservation Areas will be taken into account in the assessment as they comprise designated heritage assets.

**Navigation and Marine Transport** (see Scoping Report Chapter 19)

- 3.123 Five port authorities are referenced within the proposed study area highlighted in Figure 19.1, Bristol Port Company (Port of Bristol), Associated British Ports (Barry, Cardiff, and Newport), Gloucester Harbour Trustees, Sedgemoor District Council for Port of Bridgwater and Newport Harbour Commissioners. The final study area should be confirmed by reference to the coastal processes study, to ensure that it captures the full extent of port facilities and vessels affected by the proposed lagoon. The Secretary of State requires that effects on the port of Sharpness, in particular impacts on tidal windows and the ability of vessels to safely navigate to the port. Upstream dredging activities should also be considered. The applicant's attention is drawn to Gloucester Harbour Trustees' comments in this respect.
- 3.124 The proposed lagoon has potential to impact on a number of receptors. Direct effects include changes to tides, tidal heights, transit times (to ports, and to dredge disposal areas), increased navigational difficulty, obscuring of existing lighthouse facilities and impedance of routes north of Monkstone Lighthouse. Indirect effects include changes in currents, tidal range/speed/direction, wave activity, sediment deposition and the requirement for increased/displaced dredging, radar, availability of room for manoeuvring ships, proximity to safe anchorages, changes to buoyage locations and cumulative effects with projects such as Bristol Port's Deep Sea Container Terminal, Swansea Bay Tidal Lagoon and West Somerset Lagoon. The applicant's attention is drawn to the Port and Harbour Authorities responses including

commentary on typical transit patterns for commercial and recreational vessels and the need for accurate representation of routes (e.g. heavily used routes between Cardiff Bay and River Avon/Portishead Marina).

- 3.125 The proposed assessment includes a risk based approach informed by up to date marine traffic data, hazard identification workshops, stakeholder consultation and if required hydrodynamic ship simulation studies. The Secretary of State considers that ship simulation studies will be required. The applicant should clearly justify the methodological approach adopted and the scope of assessment should be agreed with the maritime stakeholders identified, in particular the Maritime and Coastguard Agency (MCA). The Secretary of State considers that radar and manual observations should be provided in addition to Automatic Identification System (AIS) data and the particular consideration that should be given to the implications of the site size and location on Search and Rescue (SAR) resources and operations; access to the lagoon by SAR resources; and in relation to Emergency Response co-operation plans. The applicant's attention is drawn to Bristol Port Company's comment that only 10% of recreational craft in their harbour area transmit AIS.
- 3.126 Significance criteria proposed for assessment are considered to be appropriate, however any moderation of sensitivity and/or magnitude based on expert opinion must be clearly set out within the ES. The ES must also clearly describe any potential transboundary effects that may arise from the proposals e.g. on international shipping or fishing vessels.
- 3.127 Any figures and diagrams representing marine information should be submitted on the appropriate scale Admiralty chart for the area.
- 3.128 The Secretary of State requires that any inter-related effects on ecological receptors arising from changes in navigational patterns are addressed in the relevant topic chapters (e.g. Chapters 12 to 16).

**Marine Noise and Vibration** (see Scoping Report Chapter 20)

- 3.129 The Scoping Report states that baseline noise levels will vary depending on geographic location, time of day and season and that surveys will be carried out during 'benign' conditions. The Secretary of State considers that additional static/moored survey data may be required to supplement boat-based survey data. The need for additional survey data should be agreed with stakeholders. Appropriate conditions and detailed survey methodologies for undertaking survey work should be agreed with NRW, Natural England, the Environment Agency and the MMO and the applicant's attention is drawn to these consultee comments.

- 3.130 The applicant is advised to identify noise and vibration receptors and agree underwater monitoring locations with the local authorities, NRW, Natural England, and other relevant consultees. Baseline noise measurements should support a worst case evaluation of changes in noise levels. Noise data should be referred to the consultees to ensure that it is fit for purpose.
- 3.131 The Scoping Report references a number of advice and guidance documents relating to the process for defining acceptable noise levels. The criteria for assessing the significance of noise impacts, for both terrestrial and underwater impacts, should be agreed with the relevant consultees in order to ensure that the appropriate guidance and advice is followed. The applicant's attention is directed to the comments of NRW and Natural England in respect of appropriate noise measurement guidance.
- 3.132 The Secretary of State welcomes the commitment to applying the results of the noise assessment to the ecology and ornithological assessments. The Secretary of State recommends that the ecological receptors considered in the assessment should be determined by defining the area likely to be impacted by noise and through the noise maps. In assessing potential effects of noise, species sensitivities should be clearly set out in the ES. The Secretary of State considers that the effect of vibration (particle velocity) on sessile invertebrates, fish and marine mammals should be assessed. The comments of NRW and Natural England are highlighted in this respect.
- 3.133 The ES should provide a list of construction machinery and processes that are likely to give rise to noise emissions, indicating the basis for the predicted noise levels provided.
- 3.134 The Scoping Report states that an assessment of noise effects from operational turbines will be undertaken. The ES should clearly indicate how the predicted underwater noise effects are determined, for example from manufacturers' specifications and measurements at existing installations. It should also demonstrate that no other noise impacts could arise from other parts of the machinery either alone or in-combination with the turbine noise. All potential sources of operational noise should be considered, including an assessment of repair and maintenance activities.
- 3.135 The Scoping Report includes reference to recreational activities within the lagoon following construction. The ES should consider the potential for noise impacts associated with changes to recreational use in this area as part of an integrated approach to EIA.
- 3.136 As with all topics, cumulative effects should be considered. In the case of noise and vibration these should include any activities that are ongoing within the Estuary.



- 3.137 No reference is made within the Scoping Report to mitigation measures and monitoring. Where necessary the applicant should identify the need for any mitigation measures and monitoring to ensure that noise and vibration limits are met. The Secretary of State encourages both early and ongoing discussions with relevant statutory authorities, including NRW and Natural England, during the course of the EIA production with regard to appropriate mitigation measures and monitoring. The applicant's attention is drawn to the comments of NRW in this regard. The Secretary of State also draws to the attention of the applicant the objectives of the Marine Strategy Framework Directive to increase the understanding of noise levels in the marine environment. Marine noise and vibration monitoring for the proposed development in the Severn Estuary, during construction and operation, would assist with gaps in knowledge with regard to the noise and vibration effects of tidal lagoons.

**Terrestrial Noise and Vibration** (see Scoping Report Chapter 21)

- 3.138 The Secretary of State welcomes the proposal to consult with City of Cardiff Council and Newport City Council regarding the location of baseline noise surveys and the terrestrial noise and vibration assessment methodology for construction, operation and decommissioning. The applicant recognises the potential for the scheme to impact on both human and ecological receptors and the need for surveys to support the assessment of effects on both groups. The applicant's attention is directed to the comments of City of Cardiff Council's Pollution Control (Noise and Air) team in Appendix 2.
- 3.139 The Secretary of State recommends that the methodology, choice of noise receptors and assessment results should be agreed with the local Environmental Health departments of the relevant councils. Noise impacts on people should be specifically addressed, in particular, any potential noise disturbance at night and other unsocial hours such as weekends and public holidays.
- 3.140 Section 21.4 states that certain policies and guidance have been used to shape the assessment methodology for construction, operation and decommissioning, including road traffic. Section 21.4.3 then appears to conclude on the methodologies to be adopted (BS5228:2009; BS4142:2014; BS8233:2014; and World Health Organisation 1999 Guidance), excluding reference to road traffic noise assessment. The Secretary of State considers that road traffic noise should be assessed using the Calculation of Road Traffic Noise (1998) method discussed at 21.4.2.10, but expects the applicant to agree an appropriate methodology with the relevant local planning authority/authorities. The traffic noise and vibration assessments should take account of the traffic movements along access routes, especially during the construction phase. A worst case "all by road" assessment for Heavy Goods

Vehicle (HGV) movements should be provided in the event that the delivery of construction materials by sea is not feasible. The assessment should be extended to include air quality and noise and vibration effects. Information should be provided on the types of vehicles and plant to be used during the construction phase.

- 3.141 The terrestrial noise and vibration scope discussion focuses largely on the assessment of airborne noise impacts. The Secretary of State requires that the applicant provides an appropriate level of assessment of vibration effects, where these arise e.g. from piling activities, including effects arising from re-radiation of vibration as noise.
- 3.142 The applicant's ES should describe how the assessment methodologies have been applied including a clear articulation of the significance criteria and noise threshold criteria adopted. Receptor sensitivity, the magnitude of change in noise and vibration experienced by receptors and the significance of effect should be set out in an accessible form e.g. tabulated. The Guidelines for Environmental Noise Impact Assessment (IEMA, 2014) could be applied to provide a consistent assessment framework. The Secretary of State recommends that noise contour maps are provided to illustrate the likely changes in noise arising from the scheme.
- 3.143 Consideration should be given to monitoring noise complaints during construction and when the development is operational.
- 3.144 A revised 2014 version of BS5228 is available and should form the basis for the construction noise and vibration assessment.

### **Air Quality** (see Scoping Report Chapter 22)

- 3.145 The Scoping Report has identified a number of Air Quality Management Areas (AQMA), four in City of Cardiff and nine in Newport City Council (shown in Figures 22.1 and 22.2 respectively). The Scoping Report indicates that an AQMA may be designated in the Vale of Glamorgan and the Secretary of State advises that the most up to date information is used within the ES to fully inform any air quality assessments which may be undertaken. The applicant's attention is drawn to the comments of City of Cardiff Council's Noise and Air Pollution team in Appendix 2, which confirm that an AQMA is also present within the Vale of Glamorgan, declared for road traffic emissions on Windsor Road, Penarth.
- 3.146 Information regarding air emissions related to vehicular movements associated with the proposal will also help to inform the ecological assessments. The Secretary of State recommends that appropriate cross-referencing is included between the air quality chapters and those relating to onshore transport and ecology.

- 3.147 The Scoping Report states that consultation will be undertaken with Environmental Health Officers from City of Cardiff, Vale of Glamorgan and Newport City Councils to establish the most up to date air quality information and to agree the air quality assessment methodology. The need for further data collection should be agreed with the relevant Environmental Health Officers. The applicant's attention is drawn to generic advice on air quality matters provided by Public Health England (PHE) and PHEs Centre for Radiation, Chemical and Environmental Hazards (Wales).
- 3.148 The Scoping Report states that shipping numbers will be well below the 5,000 movements per annum which would trigger a need for a detailed assessment of shipping emissions. The Secretary of State advises that the number of shipping movements is clearly stated in the ES, together with an explanation of how the assumed number of movements has been calculated.
- 3.149 The Scoping Report states that the potential effects of emissions from construction traffic will be considered further once information regarding the construction vehicle numbers is known. The Secretary of State recommends that full consideration should be given to the impacts of traffic movements, including any potential cumulative impacts. A worst case assessment for HGV movements should be provided based on the likely availability and feasibility of vessels to deliver materials by sea. Air quality and dust levels should be considered not only on site but also off site, including along access roads, local footpaths and other PROW.
- 3.150 The Scoping Report states that a construction dust assessment would be undertaken following confirmation of construction activities and scheduling. Cumulative dust effects would also be considered as part of the assessment. The Secretary of States advises that consideration should be given to appropriate mitigation measures and to monitoring dust complaints. This information should be contained within the ES.
- 3.151 The applicant should consider whether increased sedimentation within the lagoon area associated with the operation of the proposed scheme has potential to result in anoxic conditions and resultant odour effects.

**Onshore Transport** (see Scoping Report Chapter 23)

- 3.152 The Secretary of State welcomes the proposal to consult with City of Cardiff Council and Newport City Council for the provision of traffic data. The Secretary of State would expect on-going discussions and agreement, where possible, with such bodies regarding the scope of assessment and any mitigation proposed. The applicant states that the Guidelines for the Environmental Assessment of Road Traffic (1993), this should be confirmed with the local highway authorities. The application should be supported

by a Transport Assessment, the scope of which should be agreed with the local highways authorities.

- 3.153 In light of the potential cumulative infrastructure effects with the M4 Corridor and Great Western Electrification around Newport, it is recommended that the Welsh Government and Network Rail are both consulted.
- 3.154 Table 7.1 to the Scoping Report indicates that permission for “access (works to highways associated with project)” would be sought through the Town and Country Planning Act regime. Any proposed works and/or infrastructure required as associated development, or as an ancillary matter, (whether on or off-site) should be assessed as part of an integrated approach to environmental assessment, including the transport assessment.
- 3.155 Section 23.2 assumes that abnormal indivisible loads and the majority of bulk materials will be imported by sea. The applicant should provide a worst case assessment for transport by land, in the event that delivery of materials is not achievable by the sea route. The assumed number of HGV deliveries and the split of vehicle movements between each of the landfall locations should be set out within the ES.
- 3.156 Transport of the waste stored temporarily on site should be addressed in terms of the form and possible route of disposal vehicle movements.
- 3.157 The Secretary of State recommends the chapter include appropriate cross-referencing to the air quality and terrestrial ecology chapters. Any alterations to the highways for the project should consider potential impacts to designated sites, protected species and species of conservation concern, and watercourses/waterbodies. The applicant’s attention is drawn to the comments of NRW in this regard.
- 3.158 Mitigation measures should be considered such as a travel plan and materials sourcing strategy so as to minimise transport.
- 3.159 The Secretary of State recommends that the ES sets out the methodology adopted to survey Public Rights of Way (PROW), in particular the Wales Coast Path. Surveys should be undertaken at representative periods (taking into account seasonal and diurnal variations in usage). It is important to minimise hindrance to PROW where possible. A clear indication should be given as to how the proposed development will affect the existing and future facilities along the estuary and what mitigation would be appropriate in the short, medium and long term.

**Socio-economics** (see Scoping Report Section 24)

- 3.160 The Secretary of State welcomes the proposal to consult with City of Cardiff Council, Newport City Council, Monmouthshire City

Council and other stakeholders in Wales and England regarding the scope of assessment and the collation of data regarding socio-economic activities within the Severn Estuary. The consultees should include all affected Port and Harbour Authorities. The applicant's attention is drawn to the comments of Cardiff Harbour Authority contained within City of Cardiff Council's response (see Appendix 2) concerning the marine leisure industry.

- 3.161 The Secretary of State requires that up to date information regarding economic performance of the ports is set out in the ES. The applicant's attention is drawn to Bristol Port Company's comments in this respect.
- 3.162 In the absence of an industry standard methodology, the final methodology adopted for assessment should be set out within the ES and agreed with the local planning authorities and Port and Harbour authorities. In addition to the issues identified, the potential for the scheme to give rise to effects on amenity for local communities should be considered, as well as the potential for impacts on accommodation within the local area. In considering Gross Value Added (GVA) the Secretary of State recommends that the assessment recognises both South East Wales and the Great Western Cities alliance between Cardiff, Newport and Bristol.
- 3.163 Section 24.2.0.4 suggests that during the operational phase of the proposed scheme, the principal socio-economic effects are likely to relate to employment created as a result of activities such as operational management and maintenance. The Secretary of State considers that the ES must assess the socio-economic effect of the proposals on receptors on the coastal strip enclosed by the lagoon; viability of all port operations; on commercial and recreational fishing; and dredging operations within the Estuary due to potential changes arising from the lagoon operation. The assessment should include, amongst other issues, consideration of the impact of increased/displaced dredging, competitiveness of berths, effects on existing and consented disposal and aggregate dredging activity; change in transit times for shipping and pilotage; availability of tidal windows; and effects on future shipping and port operations e.g. navigation by ultra large shipping. The effect of the proposals on existing socio-economic strategies such as Avonmouth Severnside Outline Development Strategy and Bristol Channel Energy: A Balanced Technology Approach. The applicant's attention is drawn to the Port and Harbour authorities' responses in this respect.
- 3.164 The Secretary of State also considers that the effect of the proposals on the viability of the explosives anchorage for Newport Harbour must be considered. The applicant's attention is drawn to Newport Harbour Commissioners comments in this respect.
- 3.165 The proposed Travel to Work Area used to inform baseline data collection will need to be justified within the ES and Transport

Assessment for the project and agreed with the local highways authorities.

- 3.166 The proposed scope of cumulative socio-economic effects assessment makes reference to West Somerset Tidal Lagoon, Hinkley C Nuclear Power Station, the proposed M4 corridor around Newport and Swansea Bay Tidal Lagoon. The cumulative assessment should not be limited to these projects and should reflect the full range of emerging projects including those highlighted in Chapter 3 of the Scoping Report. It is noted that Figure 24.1 is inconsistent with Table 3.1 including only a small number of the schemes set out and excluding major schemes such as the Deep Sea Container Terminal that should be considered. The Secretary of State recommends that the socio-economic assessment considers potential effect of proposals for Bristol Port's compensatory habitat for the Deep Sea Container Terminal at Steart.

**Tourism and Recreation** (see Scoping Report Section 25)

- 3.167 The Secretary of State welcomes the proposed scope of assessment and consultation in relation to tourism and recreational effects. The applicant should ensure that the sensitivity of each receptor identified and the magnitude of change anticipated is clearly stated in drawing conclusions regarding significant effects.
- 3.168 The Secretary of State draws the applicant's attention to comments made by Penarth Town Council, and recommends that the assessment of effects on tourism should consider access to moorings, locking procedures and future growth; visual impact of the lagoon on the Esplanade; localised water quality issues; noise disturbance; and displacement of sand by stone and silt on local beaches.
- 3.169 The Secretary of State considers that receptors should be categorised by their wider appeal for linked visits and their significance to the wider economy, as well as by visitor numbers. The applicant's attention is drawn to Taunton Deane and West Somerset's comments in this respect.
- 3.170 Receptors for tourism effects should include those AONBs and National Parks (e.g. Mendips, Quantocks and Exmoor) with views of the proposed scheme.
- 3.171 The ES should recognise the revised status of footpaths on the English coast of the Severn Estuary and the designation of the England Coast Path.

**Mitigation, Monitoring and Compensation (see Scoping Report Chapter 26) (see Scoping Report Section 26)**

- 3.172 The proposed submission of a CEMP; OEMP, and AEMP to support the DCO and Marine Licence applications is welcomed. However, the Secretary of State notes that the definition of these three plans varies between chapters. The Scoping Report uses the term 'Management Plans' in Chapters 1, 3, 14, 15, and the glossary, but subsequently uses the term 'Monitoring Plans' in Chapter 26. The Secretary of State requests the applicant be consistent in the description of these plans and their purpose. It is usual to provide Construction and Operational Environmental Management Plans, and an Adaptive Environmental Management Plan was provided with the DCO application for Tidal Lagoon Swansea Bay. The Secretary of State recommends that a draft version of these documents is supplied with the DCO application.
- 3.173 The Scoping Opinion contains limited information as to what this chapter will comprise. As noted in Section 2 to the Scoping Opinion, the Secretary of State recommends the use of a table to clearly set out the mitigation measures proposed. As well as assisting the reader, the Secretary of State considers that this would also enable the applicant to cross refer mitigation to specific provisions proposed to be included within the draft DCO and ensure they have been appropriately secured. This chapter should also identify the legislative and policy drivers behind the mitigation, compensation, and enhancement measures proposed. The applicant's attention is also drawn to the comments of NRW and Natural England in respect of this chapter.

**Other**

- 3.174 The Secretary of State supports PHE's recommendation that the applicant provide an assessment of electric and magnetic field effects arising from the substation and grid connection. PHE's response references relevant standards and guidance for consideration.

## **4 OTHER INFORMATION**

- 4.1 This section does not form part of the Secretary of State's Opinion as to the information to be provided in the environmental statement. However, it does respond to other issues that the Secretary of State has identified which may help to inform the preparation of the application for the DCO.

### **Pre-application Prospectus**

- 4.2 The Planning Inspectorate offers a service for applicants at the pre-application stage of the nationally significant infrastructure planning process. Details are set out in the prospectus 'Pre-application service for NSIPs'. The prospectus explains what the Planning Inspectorate can offer during the pre-application phase and what is expected in return. The Planning Inspectorate can provide advice about the merits of a scheme in respect of national policy; can review certain draft documents; as well as advice about procedural and other planning matters. Where necessary a facilitation role can be provided. The service is optional and free of charge.
- 4.3 The prospectus is available on the planning portal website: [http://infrastructure.planningportal.gov.uk/wp-content/uploads/2014/05/NSIP-prospectus\\_May2014.pdf](http://infrastructure.planningportal.gov.uk/wp-content/uploads/2014/05/NSIP-prospectus_May2014.pdf)
- 4.4 The level of pre-application support provided by the Planning Inspectorate will be agreed between an applicant and the Inspectorate at the beginning of the pre-application stage and will be kept under review.

### **Habitats Regulations Assessment (HRA)**

- 4.5 The Secretary of State notes that European sites are located within and in close proximity to the proposed development. It is the applicant's responsibility to provide sufficient information to the Competent Authority (CA) to enable them to carry out a HRA if required. The applicant should note that the CA is the Secretary of State.
- 4.6 The applicant's attention is drawn to The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended) (The APFP Regulations) and the need to include information identifying European sites to which the Habitats Regulations applies or any Ramsar site or potential SPA which may be affected by a proposal. The submitted information should be sufficient for the CA to make an appropriate assessment (AA) of the implications for the site if required by Regulation 61(1) of the Habitats Regulations.



- 4.7 The report to be submitted under Regulation 5(2)(g) of the APFP Regulations with the application must deal with two issues: the first is to enable a formal assessment by the CA of whether there is a likely significant effect; and the second, should it be required, is to enable the carrying out of an AA by the CA.
- 4.8 When considering aspects of the environment likely to be affected by the proposed development; including flora, fauna, soil, water, air and the inter-relationship between these, consideration should be given to the designated sites in the vicinity of the proposed development.
- 4.9 Further information with regard to the HRA process is contained within Planning Inspectorate's Advice Note 10 available on the National Infrastructure pages on the Planning Portal website.

### **Sites of Special Scientific Interest (SSSIs)**

- 4.10 The Secretary of State notes that a number of SSSIs are located within or close to the proposed development. Where there may be potential impacts on the SSSIs, the Secretary of State has duties under sections 28(G) and 28(I) of the Wildlife and Countryside Act 1981 (as amended) (the W&C Act). These are set out below for information.
- 4.11 Under s28(G), the Secretary of State has a general duty '... to take reasonable steps, consistent with the proper exercise of the authority's functions, to further the conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which the site is of special scientific interest'.
- 4.12 Under s28(I), the Secretary of State must notify the relevant nature conservation body (NCB) before authorising the carrying out of operations likely to damage the special interest features of a SSSI. Under these circumstances 28 days must elapse before deciding whether to grant consent, and the Secretary of State must take account of any advice received from the NCB, including advice on attaching conditions to the consent. The NCB will be notified during the examination period.
- 4.13 If applicants consider it likely that notification may be necessary under s28(I), they are advised to resolve any issues with the NCB before the DCO application is submitted to the Secretary of State. If, following assessment by applicants, it is considered that operations affecting the SSSI will not lead to damage of the special interest features, applicants should make this clear in the ES. The application documents submitted in accordance with Regulation 5(2)(I) could also provide this information. Applicants should seek to agree with the NCB the DCO requirements which will provide protection for the SSSI before the DCO application is submitted.

## European Protected Species (EPS)

- 4.14 Applicants should be aware that the decision maker under the Planning Act 2008 (PA 2008) has, as the CA, a duty to engage with the Habitats Directive. Where a potential risk to an EPS is identified, and before making a decision to grant development consent, the CA must, amongst other things, address the derogation tests<sup>3</sup> in Regulation 53 of the Habitats Regulations. Therefore the applicant may wish to provide information which will assist the decision maker to meet this duty.
- 4.15 If an applicant has concluded that an EPS licence is required the ExA will need to understand whether there is any impediment to the licence being granted. The decision to apply for a licence or not will rest with the applicant as the person responsible for commissioning the proposed activity by taking into account the advice of their consultant ecologist.
- 4.16 Applicants are encouraged to consult with NRW and/or Natural England, as appropriate, and, where required, to agree appropriate requirements to secure necessary mitigation. It would assist the examination if applicants could provide, with the application documents, confirmation from the relevant SNCB whether any issues have been identified which would prevent the EPS licence being granted.
- 4.17 Generally, the SNCBs are unable to grant an EPS licence in respect of any development until all the necessary consents required have been secured in order to proceed. For NSIPs, the SNCBs will assess a draft licence application in order to ensure that all the relevant issues have been addressed. Within 30 working days of receipt, the SNCBs will either issue 'a letter of no impediment' stating that it is satisfied, insofar as it can make a judgement, that the proposals presented comply with the regulations or will issue a letter outlining why they consider the proposals do not meet licensing requirements and what further information is required before a 'letter of no impediment' can be issued. The applicant is responsible for ensure draft licence applications are satisfactory for the purposes of informing formal pre-application assessment by the SCNBs.
- 4.18 Ecological conditions on the site may change over time. It will be the applicant's responsibility to ensure information is satisfactory for the purposes of informing the assessment of no detriment to the maintenance of favourable conservation status (FCS) of the population of EPS affected by the proposals<sup>4</sup>. Applicants are

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<sup>3</sup> Key case law re need to consider Article 16 of the Habitats Directive: Woolley vs East Cheshire County Council 2009 and Morge v Hampshire County Council 2010.

<sup>4</sup> Key case law in respect of the application of the FCS test at a site level: Hafod Quarry Land Tribunal (Mersey Waste (Holdings) Limited v Wrexham County Borough Council) 2012, and Court of Appeal 2012.

advised that current conservation status of populations may or may not be favourable. Demonstration of no detriment to favourable populations may require further survey and/or submission of revised short or long term mitigation or compensation proposals.

In Wales, assistance may be obtained from NRW's Species Teams. These Teams provide advice on a range of issues concerning EPS including advice on compensation site design, measures to mitigate incidental capture/killing, evidencing compliance and post project surveillance. The service is free of charge and entirely voluntary. Species Teams can be contacted via NRW's Enquiry Service. Further information is available from the following link: <http://naturalresourceswales.gov.uk/apply-and-buy/uk-protected-species-licensing/?lang=en>

- 4.19 In England the focus concerns the provision of up to date survey information which is then made available to Natural England (along with any resulting amendments to the draft licence application). In Wales, the focus is on evidencing the demonstration of no detriment to the maintenance of favourable conservation status (FCS) of the population or colony of EPS potentially affected by the proposals. This approach will help to ensure no delay in issuing the licence should the DCO application be successful. Applicants with projects in England or English waters can find further information on Natural England's protected species licensing procedures by clicking on the following links: [http://webarchive.nationalarchives.gov.uk/20140605090108/http://www.naturalengland.org.uk/Images/wml-g36\\_tcm6-28566.pdf](http://webarchive.nationalarchives.gov.uk/20140605090108/http://www.naturalengland.org.uk/Images/wml-g36_tcm6-28566.pdf)
- 4.20 In England or English Waters, assistance may be obtained from the Consents Service Unit. (Please see Section 4.21 below for more information on the work of the Unit).

### **Consents Service Unit**

- 4.21 The Unit works with applicants on a number of key non-planning consents associated with nationally significant infrastructure projects in England and English Waters. The Unit's remit includes 12 non-planning consents, including European Protected Species (EPS) licences, environmental permits and flood defence consents. The consents covered are set out in Annex 1 of the Unit's 'Prospectus for Developers' available on the web. The service is free of charge and entirely voluntary. Further information is available from the following link: <http://infrastructure.planningportal.gov.uk/legislation-and-advice/consents-service-unit/>

### **Other regulatory regimes**

- 4.22 The Secretary of State recommends that the applicant should state clearly what regulatory areas are addressed in the ES and

that the applicant should ensure that all relevant authorisations, licences, permits and consents that are necessary to enable operations to proceed are described in the ES. Also it should be clear that any likely significant effects of the proposed development which may be regulated by other statutory regimes have been properly taken into account in the ES.

- 4.23 It will not necessarily follow that the granting of consent under one regime will ensure consent under another regime. For those consents not capable of being included in an application for consent under the PA 2008, the Secretary of State will require a level of assurance or comfort from the relevant regulatory authorities that the proposal is acceptable and likely to be approved, before they make a recommendation or decision on an application. The applicant is encouraged to make early contact with other regulators. Information from the applicant about progress in obtaining other permits, licences or consents, including any confirmation that there is no obvious reason why these will not subsequently be granted, will be helpful in supporting an application for development consent to the Secretary of State.

## **The Environmental Permit**

- 4.24 The Environmental Permitting Regulations 2010 (EPR 10) require operators of certain facilities, which could harm the environment or human health, to obtain permits from the Environment Agency. Environmental permits can combine several activities into one permit. There are standard permits supported by 'rules' for straightforward situations and bespoke permits for complex situations. For further information, please see: <https://www.gov.uk/environmental-permit-check-if-you-need-one>
- 4.25 The Environment Agency's environmental permits cover:
- industry regulation
  - waste management (waste treatment, recovery or disposal operations)
  - discharges to surface water
  - groundwater activities, and
  - radioactive substances activities.
- 4.26 Characteristics of environmental permits include:
- they are granted to operators (not to land)
  - they can be revoked or varied
  - operators are subject to tests of competence
  - operators may apply to transfer environmental permits to another operator subject to a test of competence
  - conditions may be attached.
- 4.27 Under the Water Resources Act 1991 (as amended), anyone who wishes to abstract more than 20m<sup>3</sup>/day of water from a surface

source such as a river or stream or an underground source, such as an aquifer, will normally require an abstraction licence from the Environment Agency. For example, an abstraction licence may be required to abstract water for use in cooling at a power station. An impoundment licence is usually needed to impede the flow of water, such as in the creation of a reservoir or dam, or construction of a fish pass. Abstraction licences and impoundment licences are commonly referred to as water resources licences. They are required to ensure that there is no detrimental impact on existing abstractors or the environment. For further information on the Environment Agency's role in the infrastructure planning process, please see:

<https://www.gov.uk/government/publications/wr176-applying-for-full-transfer-or-impoundment-licence-form-guidance>

4.28 Characteristics of water resources licences include:

- they are granted to licence holders (not to land)
- they can be revoked or varied
- they can be transferred to another licence holder
- in the case of abstraction licences, they are time limited

It is the responsibility of applicants to identify whether an environmental permit and / or water resource licence is required from the Environment Agency before an NSIP can be constructed or operated. Failure to obtain the appropriate consent is an offence. The Consents Service Unit was established to aid applicants with this:

<http://infrastructure.planningportal.gov.uk/legislation-and-advice/consents-service-unit/>

4.29 The Environment Agency allocates a limited amount of pre-application advice for environmental permits and water resources licences free of charge. Further advice can be provided, but this will be subject to cost recovery.

4.30 The Environment Agency encourages applicants to engage with them early in relation to the requirements of the application process. Where a project is complex or novel, or requires a Habitats Risk Assessment, applicants are encouraged to "parallel track" their applications to the Environment Agency with their DCO applications to the Planning Inspectorate. For further information on the Environment Agency's role in the infrastructure planning process, please see:

<http://infrastructure.planningportal.gov.uk/wp-content/uploads/2013/04/Advice-note-11-Annex-D-EA.pdf>

4.31 When considering the timetable to submit their applications, applicants should bear in mind that the Environment Agency will not be in a position to provide a detailed view on the application until it issues its draft decision for public consultation (for sites of high public interest) or its final decision. Therefore the applicant

should ideally submit its application sufficiently early so that the Environment Agency is at this point in the determination by the time the Development Consent Order reaches examination.

- 4.32 It is also in the interests of an applicant to ensure that any specific requirements arising from their permit or licence are capable of being carried out under the works permitted by the DCO. Otherwise there is a risk that requirements could conflict with the works which have been authorised by the DCO (e.g. a stack of greater height than that authorised by the DCO could be required) and render the DCO impossible to implement.

## **Health Impact Assessment**

- 4.33 The Secretary of State considers that it is a matter for the applicant to decide whether or not to submit a stand-alone Health Impact Assessment (HIA). However, the applicant should have regard to the responses received from the relevant consultees regarding health, and in particular to the comments from the Health and Safety Executive (HSE) and PHE (see Appendix 2).
- 4.34 Although the HSE does not comment on EIA Scoping Reports, their consultation response states that the proposed development site falls within the consultation zone for three major accident hazard sites. The HSE also suggests that Hazardous Substances Consent may be required where the developer is required to store hazardous substances in excess of threshold quantities.
- 4.35 PHE does not have additional comments to make in relation to the application, although it highlights the requirement to consider the effect of electric and magnetic fields produced by the associated substation and grid connection and identifies a range of generic issues with potential to impact on health.
- 4.36 The methodology for the HIA, if prepared, should be agreed with the relevant statutory consultees and take into account mitigation measures for acute risks.

## **Transboundary Impacts**

- 4.37 The Secretary of State has noted that at the current stage of the development of the project, the applicant cannot rule out whether the proposed development is likely to have significant impacts on another European Economic Area (EEA) State.
- 4.38 Regulation 24 of the EIA Regulations, which inter alia require the Secretary of State to publicise a DCO application if the Secretary of State is of the view that the proposal is likely to have significant effects on the environment of another EEA state and where relevant to consult with the EEA state affected. The Secretary of State considers that where Regulation 24 applies, this is likely to have implications for the examination of a DCO application.

- 4.39 The Secretary of State notes that the Scoping Report has acknowledged the potential for transboundary impacts and recommends that the applicant should provide to the Secretary of State as soon as possible any additional available information about potential significant transboundary effects and identify the affected state(s). In order to ensure the efficient and effective examination of applications within the statutory timetable under Section 98 of the PA 2008, it is important that this information is made available at the earliest opportunity to facilitate timely consultations, if required, with other EEA States in accordance with Regulation 24. In respect of HRA, the applicant is directed to the recent guidance published by the Department for Energy and Climate Change (DECC) concerning transboundary impacts on European sites: DECC (2015) Guidelines on the assessment of transboundary impacts of energy developments on Natura 2000 sites outside the UK.  
([https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/408465/transboundary\\_guidelines.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/408465/transboundary_guidelines.pdf)).
- 4.40 The ES will also need to address this matter in each topic area and summarise the position on transboundary effects of the proposed development, taking into account inter-relationships between any impacts in each topic area.





## **APPENDIX 1**

### **LIST OF CONSULTEES**



## APPENDIX 1

### LIST OF BODIES FORMALLY CONSULTED DURING THE SCOPING EXERCISE

CONSULTEE	ORGANISATION
<b>SCHEDULE 1</b>	
The Welsh Ministers	Welsh Government
The Health and Safety Executive	The Health and Safety Executive
Natural England	Natural England
The Historic Buildings and Monuments Commission for England	Historic England
The relevant Fire and Rescue Authority	South Wales Fire and Rescue
	Avon Fire and Rescue
The relevant Police and Crime Commissioner	South Wales Police and Crime Commissioner
	Avon and Somerset Police and Crime Commissioner
	Gwent Police and Crime Commissioner
The relevant Parish Council(s) or relevant Community Council	Penarth Town Council
	Old St Mellons Community Council
	Marshfield Community Council
	Coedkernew Community Council
	Nash Community Council
	Wentlooge Community Council
The Environment Agency	The Environment Agency
The Equality and Human Rights Commission (Wales only)	The Equality and Human Rights Commission
Royal Commission On Ancient and Historic Monuments of Wales	Royal Commission On Ancient and Historical Monuments Of Wales
The Natural Resources Body of Wales	Natural Resources Wales

The Joint Nature Conservation Committee	The Joint Nature Conservation Committee
The Maritime and Coastguard Agency	The Maritime and Coastguard Agency
The Marine Management Organisation	The Marine Management Organisation (MMO)  Natural Resources Wales
The Scottish Fisheries Protection Agency	Marine Scotland Conservation
The Civil Aviation Authority	The Civil Aviation Authority
The Relevant Highways Authority	City of Cardiff Council Highways Department  Newport City Council Highways Department  Vale of Glamorgan Council Highways Department
The Passengers Council	Passenger Focus
The Disabled Persons Transport Advisory Committee	Disabled Persons Transport Advisory Committee
The Office Of Rail Regulation	Office of Rail Regulation
Approved Operator	Network Rail Infrastructure Ltd  Network Rail (High Speed) Ltd
The Gas and Electricity Markets Authority	OFGEM
The Water Services Regulation Authority	OFWAT
The relevant Waste Regulation Authority	Natural Resources Wales
The relevant Internal Drainage Board	Caldicott and Wentlooge Internal Drainage Board  Somerset Drainage Board Consortium  North Somerset Levels Internal Drainage Board
The Canal and River Trust	The Canal and River Trust

Trinity House	Trinity House
Public Health England, an executive agency of the Department of Health	Public Health England
The relevant Local Resilience forum	South Wales Local Resilience Forum
The Crown Estate Commissioners	The Crown Estate
The relevant local health board	Cardiff and Vale University Local Health Board  Aneurin Bevan University Health Board
The National Health Service Trusts	Health Protection Team, Public Health Wales  Welsh Ambulance Services Trust  Velindre NHS Trust
<b>RELEVANT STATUTORY UNDERTAKERS</b>	
Railway	Network Rail Infrastructure Ltd
	Highways Agency Historical Railways Estate
Road Transport	Severn River Crossings plc
Water Transport	The Canal and River Trust
Canal or Inland Navigation Authorities	Association of British Ports Cardiff (Cardiff Canal, Rivers Taff and Ely)
Harbour	Quays Marinas Ltd (Penarth Marina)  Association of British Ports (Cardiff , Barry, and Newport)  Newport Harbour Commissioners (Newport)  Sedgemoor District Council (Port of Bridgwater)  The Bristol Port Company (Port of Avonmouth)  Bristol City Council (Bristol City Docks)

	<p>Gloucester Harbour Trustees (Gloucester)</p> <p>The Victoria Group (Sharpness)</p>
Pier	<p>Vale of Glamorgan Council (Penarth Pier)</p> <p>Clevedon Pier and Heritage Trust Ltd (Clevedon Pier)</p> <p>Grand Pier Ltd (Weston Pier)</p>
Lighthouse	Trinity House
Civil Aviation Authority	Civil Aviation Authority
Licence Holder (Chapter 1 of Part 1 of Transport Act 2000)	NATS En-Route Safeguarding
Universal Service Provider	Royal Mail Group
Relevant Environment Agency	Natural Resources Wales
The relevant water and sewage undertakers	Dwr Cymru Welsh Water
The relevant public gas transporters	<p>Energetics Gas Limited</p> <p>ES Pipelines Ltd</p> <p>ESP Connections Ltd</p> <p>ESP Networks Ltd</p> <p>ESP Pipelines Ltd</p> <p>Fulcrum Pipelines Limited</p> <p>GTC Pipelines Limited</p> <p>Independent Pipelines Limited</p> <p>LNG Portable Pipeline Services Limited</p> <p>National Grid Gas Plc</p> <p>National Grid Plc</p> <p>Quadrant Pipelines Limited</p> <p>SSE Pipelines Ltd</p>

	Scotland Gas Networks Plc Southern Gas Networks Plc Wales and West Utilities Ltd Severn Gas Transportation Limited
The relevant electricity licence holder with CPO Powers (electricity generators)	Severn Power Limited Energetics Electricity Limited ESP Electricity Limited Independent Power Networks Limited The Electricity Network Company Limited Utility Assets Limited Western Power Distribution (South Wales) Plc National Grid Electricity Transmission Plc National Grid Plc
<b>LOCAL AUTHORITIES (SECTION 43)</b>	
Marine Management Organisation (English Waters)	Marine Management Organisation
A county council, or county borough council , in Wales	City of Cardiff Council Newport City Council Vale of Glamorgan Council Rhondda Cynon Taf County Borough Council Caerphilly County Borough Council Monmouthshire County Council Torfaen County Borough Council
<b>NON-PRESCRIBED CONSULTATION BODIES</b>	
Welsh Language Commissioner	Welsh Language Commissioner

Joint Transport Authorities	Transport Management Team South East Wales Directors of Environment and Regeneration (SewDER)
Cadw	Cadw
Royal National Lifeboat Institute	Royal National Lifeboat Institution
Local Authority	Bristol City Council  North Somerset Council  Sedgemoor District Council  Mendip District Council  West Somerset Council  Exmoor National Park Authority
The Secretary of State for Defence	Ministry of Defence



## **APPENDIX 2**

### **RESPONDENTS TO CONSULTATION AND COPIES OF REPLIES**



## **APPENDIX 2**

### **LIST OF BODIES WHO REPLIED BY THE STATUTORY DEADLINE**

Bristol City Council
The Bristol Port Company
Cadw
Caldicot and Wentlooge Levels Internal Drainage Board (IDB)
City of Cardiff Council
The Civil Aviation Authority
The Crown Estate
Defence Infrastructure Organisation (DIO) Safeguarding (Ministry of Defence)
Dwr Cymru Welsh Water
The Environment Agency
The Equality and Human Rights Commission
Gloucester Harbour Trustees
The Health and Safety Executive
Historic England
The Marine Management Organisation (MMO)
The Maritime and Coastguard Agency
National Grid
Natural England
Natural Resources Wales
Newport Harbour Commissioners
North Somerset Council
The Office Of Rail Regulation
Penarth Town Council
Public Health England
Wentlooge Community Council
West Somerset Council





**BRISTOL**  
**2015 EUROPEAN  
GREEN CAPITAL**

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Your ref	150305_EN010073_3030108
Date	1 <sup>st</sup> April 2015

Dear Frances

**Re: Tidal Lagoon Cardiff, EIA Scoping Report**

Thank you for your letter dated 5th March, regarding EIA Scoping Report for the Cardiff Tidal Lagoon proposal. Bristol City Council welcomes the opportunity to comment on the EIA Scoping Report, to contribute to the robust assessment of the impact of the Tidal Lagoon.

The council is supportive of a balanced technology, strategic approach to the development of renewable energy projects in the Severn Estuary and recognises the potential renewable and economic benefits tidal lagoons may bring as part of a mixed portfolio of assets, including wind farms and tidal power. However significant concerns are raised in relation to the content of this EIA Scoping Report.

This large-scale infrastructure proposal must be considered alongside existing and planned environmental and socio-economic assets within and around the Severn Estuary. Additionally the important economic and environmental assets of the foreshore of Bristol and linked tributaries including the River Avon, must be taken into account in the EIA of the Cardiff Tidal Lagoon.

At this stage it is considered that the EIA Scoping Report fails to provide assurance that the impact of the proposal on socio-economic and environmental assets within Bristol's boundary will be robustly assessed.

Changes are recommended to the EIA report including additional assessment and modelling, and queries on the content of the report are raised. A detailed schedule of Bristol City Council representations on the EIA Scoping report are presented in appendix I.

A summary of the main comments on the EIA Scoping Report are set out below:

## **1. Spatial extent of assessment;**

- The spatial extent of the impact assessment of the Cardiff Tidal Lagoon is inadequately defined. All chapters require refinement to ensure any assessments undertaken include consideration of impact on the Bristol foreshore and River Avon. Currently the EIA fails to adequately assess the impact of the proposal on many of Bristol's environmental and socio-economic assets.

## **2. Coastal Processes and Sedimentation Transport;**

- Cumulative impact studies must consider all emerging lagoon proposals in the Severn Estuary.
- The EIA Scoping Report does not explicitly allow for consideration of the impact of the proposal on coastal processes and sedimentation transport along the length Bristol foreshore or River Avon. Bristol City Council considers that this should be allowed for, as the impact on Ireland and France is mentioned.
- Robust, appropriate modelling of the impact on coastal processes and sedimentation transport is required. A thorough understanding of impacts and changes in relation to these key processes is necessary, as they have an impact on nearly all other environmental and socio-economic considerations.
- No mention is made of assessing the impact on the 'Tidal Prism' which is likely to be significantly impacted by the proposal, with subsequent implications for coastal processes and flooding.

## **3. Flooding;**

- No specific flood risk impacts are mentioned, e.g. alteration of water levels in the estuary and the impact on flood defences.
- Need to assess the long term impacts of the Cardiff Tidal Lagoon and consequential effects on hydrology and flood risk.
- No reference is made of existing flood risk data and models; Avonmouth Severnside SFRA model and/or the Inland Drainage Boards own hydraulic model, or the Bristol City Council Central Area Flood Risk Assessment.
- Need to reference and investigate the other proposed and planned lagoons (e.g. Newport and Bridgwater) in terms of cumulative impacts.
- Must reference climate change as this is a significant pressure to the Avonmouth Severnside area. Also clarify that the flood risk referred to here is tidal, and that areas around the estuary have a greater than 0.5%AEP of fluvial and surface water flood risk.

- The effects of altered tide levels could influence the entire tidal prism (i.e. the tidal extent of the tributaries), and this needs to be included within the scope of the assessment.

#### **4. Cultural Heritage: Marine and Transport;**

- Include the Bristol foreshore and River Avon in the assessment of any impact on existing coastal processes, sedimentation and flooding. Then assess the impact of any changes, on the heritage and cultural assets in these locations.

#### **5. Coastal Birds;**

- Likely to be significant effects on internationally designated habitats and species on the Bristol foreshore and River Avon.
- The impact of coastal processes in particular will require modelling to understand effects on coastal birds.
- A shadow Habitat Regulation Assessment will need to be prepared by the developers.

#### **6. Navigation and Marine Transport;**

- Navigation on the River Avon and Floating Harbour, and assessment of any impact due to changes in coastal processes, sediment transport or flooding are not referred to in EIA.
- Bristol Port has responsibilities for this issue in the Estuary and are likely to make comments on the potential impact of the proposal.

#### **7. Socio-economic;**

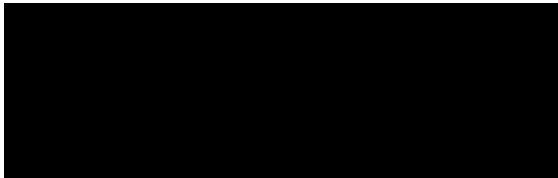
- The EIA Scoping Report fails to reference key strategies underpinning an agreed approach to development in and around the Severn Estuary. Specifically; Avonmouth/Sevenside Outline Development Strategy and 'Bristol Channel Energy: A Balanced Technology Approach (BTA).
- Potential impact on key economic assets such as Bristol Port need to be robustly assessed.
- Consider impact upon other renewable projects emerging in the Severn Estuary.

Within appendix I, a request is made that Tidal Lagoon (Ltd) Cardiff discuss at the earliest opportunity issues relating to Coastal Processes, Sedimentation and Flooding.

We have copied this letter to Natural England, Environment Agency, English Heritage, Bristol Port Company and also colleagues in adjoining authorities of North Somerset District Council, South Gloucestershire, Newport City Council and Cardiff City Council.

We look forward to further continued engagement with Tidal Lagoon (Ltd) Cardiff on the range of assessments necessary to understand the effects of this proposal on land and assets within the Bristol City Council administrative area.

Yours sincerely,



Sarah O'Driscoll

Service Manager  
Strategic City Planning



## APPENDIX I: SCHEDULE OF BRISTOL CITY COUNCIL REPRESENTATIONS

Chapter	Issue	Likely effect on Bristol
<b>Chapter 8</b> Coastal Processes, Sediment Transport and Contamination	<p>The proposal creates potential for a range of impacts on coastal processes and sediment transport, the subsequent repercussions of these impacts create potential for significant effects on Bristol City Councils marine and intertidal land interests. In particular effects on Water Quality, Flooding, Coastal Birds, Marine Transport and Navigation, Historic and Cultural Assets. Therefore, the EIA report needs to be altered to consider the following issues;</p> <ol style="list-style-type: none"> <li>1. Cumulative impact studies must consider all emerging lagoon proposals in the Severn Estuary, where these are likely to be in the pre-application stage in due course. Large-scale combined changes in coastal processes and sediment regimes of the Severn Estuary are likely to arise from the three major lagoon scheme proposals, which would have significant impacts upon key economic and environmental assets in and around Bristol.</li> <li>2. Part of the River Avon is also included within the Severn Estuary European Marine site. The River Avon should be included in the assessment of coastal processes and sediment transport and their subsequent effects.</li> <li>3. The lagoon wall structure is likely to add to the both cumulative and in-combination effects of coastal squeeze (the ability of estuary to naturally respond to rises in sea level as result of artificial defences/barriers possibly resulting in a greater proportion of intertidal land being covered in water at low tide) within the estuary and this could result in net loss on Bristol side of intertidal land.</li> <li>4. The development is likely to result in changes in sedimentation processes</li> </ol>	Potentially Significant

	<p>as result of changes in ebb and flow rates with the effective narrowing of the Severn Estuary channel by constructing the lagoon structure. This could result in net losses of intertidal land on the Bristol side through changes in erosion and deposition of sediments.</p> <p>5. Possible impacts on the tidal prism, which have not been adequately covered in the EIA report;</p> <ul style="list-style-type: none"> <li>• The tidal prism is the volume of water exchanged through a coastal or transitional system typically measured between Mean Low Water Spring (MLWS) and Mean High Water Spring (MHWS). The available tidal prism displays a relationship with the geometry of the water body, the tidal regime and available accommodation space.</li> <li>• The tidal prism of an estuary or tidal inlet is dependent on the geometry of the basin in terms of surface area and mean water depth, the tidal range, and, to a lesser extent, freshwater inflow. The tidal prism is an indicator of the volume of water within a water body while the residence time of water and sediment exchange potential are dependent upon the inlet dimensions and water exchange capacity at varying stages of the tidal cycle. Changes in accommodation space, tidal regime and the geometry of the water body can lead to fundamental alterations to the habitats that the water body can support. As most coastal and transitional systems (geomorphological features and habitats) are in a state of dynamic equilibrium with the tidal prism, any changes to the prism shall manifest as changes to these features at the scale of the entire system, though the impact of these changes on any one feature may vary at a variety of spatial and temporal scales across the system.</li> <li>• The introduction of structures such as the lagoon into the estuary will to create a barrier to natural tidal movements in the Severn estuary. These structures can alter the tidal prism by altering the volume of the tidal prism at various stages through the tidal cycle.</li> </ul> <p>6. It is the developer's responsibility under the Habitats Regulations to</p>	
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	<p>provide the underpinning assessment of coastal processes and sediment transport and to provide a 'shadow' Habitat Regulation Assessment includes a detailed analysis of this potential in-combination effect. Page 8-2 refers to the potential for changes in coastal processes and the alteration of coastal processes / sediment transport is included in Table 1 on page 4 of Appendix 2.1 which refers to the Habitat Regulation Assessment selection of European Sites (Pre-Screening). Page 8-3 indicates that modelling of these marine and coastal processes will need to take into account a large geographic influence as far away as Ireland and France. Page 8-3 also refers to preliminary, high-level modelling of hydrodynamics. It is essential that to inform the in-combination aspects of the Habitat Regulation Assessment that detailed modelling is undertaken which includes an analysis of the potential impacts on the marine environment within Bristol City Council Unitary Authority's area through altered marine and coastal processes and sediment transport. Spatially any modelling should include the extent of the River Avon within the Bristol City Council boundary.</p>	
<b>Chapter 9</b> Water Processes	<ol style="list-style-type: none"> <li>1. The development is likely to have impacts on water quality which could impact on Bristol side.</li> <li>2. Currently it is considered that the scope of the EIA covers the likely impacts which should be considered on the water process, including water quality. However, any assessment of impacts should also include the River Avon tributary.</li> </ol>	Potentially Significant
<b>Chapter 10</b> Flooding and Hydrology	<p><u>General Comments</u></p> <ol style="list-style-type: none"> <li>1. There appears to be no confirmation with the intended approach to derivation of significance for flood risk impacts.</li> <li>2. Need to strengthen the emphasis on assessing the long term impacts and the effect on hydrology and flood risk. For example, reference is made to re-running the various models in and around the Estuary with the post-development tidal curves, but such an exercise needs to be undertaken</li> </ol>	Potentially Significant

	<p>based on the longer term altered tide curve, not the tide curve that would be expected immediately after the work is completed.</p> <ol style="list-style-type: none"> <li>3. The models referenced should make specific mention of the Avonmouth Severnside SFRA model and/or the Inland Drainage Boards own hydraulic model as well as the Bristol City Council Central Area Flood Risk Assessment and, to a lesser extent Surface Water Management Plan (although this is mentioned in para 10.3.1.3).</li> <li>4. Whilst the scoping makes generic reference to assessing impacts of the scheme on flood risk and flood risk assets, there are no specific impacts mentioned, such as the alteration of water levels in the estuary and the impact on flood defences, either man made or natural, through either drying out or saturation. We would welcome early engagement with TLP to discuss these issues.</li> <li>5. Need to clarify and confirm that assessments will fully consider the impact of storm surges, currently the report refers to 'waves'.</li> <li>6. The Severn Estuary Coastal Group has not been included as a stakeholder and should be, given the groups role in co-ordinating SMP and FRMP actions in the Estuary.</li> <li>7. Need to reference and investigate the other proposed and planned lagoons (e.g. Newport and Bridgwater) in terms of cumulative impacts.</li> </ol> <p><u>Specific Comments</u></p> <ol style="list-style-type: none"> <li>8. Para 10.1.1.7 – Must reference climate change as this is a significant pressure to the Avonmouth Severnside area. Also clarify that the flood risk referred to here is tidal, and that areas around the estuary have a greater than 0.5%AEP of fluvial and surface water flood. Also, specific mention of tide locking needs to be referenced here in terms of the impacts that</li> </ol>	
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	<p>altered water levels would have on fluvial/surface water discharges.</p> <p>9. Figure 10.1 – Clarify why the 0.1%AEP flood event is used as the reference event and not the typical 0.5%%AEP event.</p> <p>10. Para 10.2.1.3, bullet i) – specific mention of the Bristol Channel tributaries e.g. the River Avon. The effects of altered tide levels could influence the entire tidal prism, i.e. the tidal extent of the tributaries. This needs to be included within the scope of the assessment.</p> <p>11. Para 10.2.1.5 – Reference the upcoming Flood Risk Management Plans here as these will include SMP actions as well as other Environment Agency /LLFA actions in the estuary, once adopted in late 2015.</p> <p>12. Para 10.2.1.12 – The reduction of extreme tide levels would obviously be a positive impact, but need to clarify whether this refers to reduction in extreme astronomic tide levels and/or storm surges.</p> <p>13. Para 10.2.1.14 - The wave interaction will need robust and careful assessment during the EIA phase, and will need to consider cumulative impacts of the other proposed infrastructure in the Estuary, such as the other lagoons.</p> <p>14. Para 10.2.1.16 – As per previous comments, the other lagoons are crucial in terms of cumulative impacts.</p> <p>15. Table 10.2 – under pathways refer to ‘sewerage undertakers’ or similar to include Wessex Water and potentially Severn Trent Water, not just DCWW.</p> <p>16. Para 10.3.1.5 – For data collection, in many areas such as Bristol and Avonmouth/Severnside, the Local Authorities hold detailed information</p>	
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	<p>and models on flood risk that should be used for the project.</p> <p>17. Para 10.4.1.3 – Specific reference to cumulative impacts needs to be included here, in line with other comments in this section.</p> <p>18. Para 10.4.1.6 – In the para (and others where mitigation measures are mentioned), the document should state that mitigation measure will be implemented, not just identified. Also, in line with earlier comments, assessment of the questions must be based on long-term estuarine processes such as sediment transfers etc.</p> <p>19. Para 10.4.1.7 – The assessment must be based on a Joint Probability Analysis, not just a downstream extreme tide curves</p>	
<b>Chapter 11</b> Land Quality and Hydrogeology	Bristol City Council has no specific comments on this chapter at this time.	n/a
<b>Chapter 12</b> Intertidal and sub tidal Benthic Ecology	1. Currently it is considered that the scope of the EIA covers the likely impacts which should be considered on the intertidal and sub-tidal benthic ecology. However, any assessment of impacts should also include the River Avon tributary.	n/a
<b>Chapter 13</b> Fish including Commercial and Recreational Fisheries	Bristol City Council has no specific comments on this chapter at this time.	n/a
<b>Chapter 14</b> Marine Mammals	Bristol City Council has no specific comments on this chapter at this time.	n/a
<b>Chapter 15</b> Coastal Birds	<p>1. The effect on coastal birds is linked to the impact of issues covered in chapters 8, 9 and 10.</p> <p>2. At this stage there is considered to be potential for a likely significant effect under the Habitats Regulations due to the impact of coastal and marine processes within BCC Unitary Authority area. In respect of the</p>	Potentially significant

	<p>potential impacts discussed in the Bristol City Council response to chapter 8, the impacts need to be assessed by comprehensive modelling.</p> <ol style="list-style-type: none"> <li>3. Coastal processes in particular need to be assessed for a potential in-combination effect on the habitats such as sandbanks, mudflats and saltmarsh which make up the Severn Estuary European Marine Site.</li> <li>4. In addition to the habitats themselves, there is the potential for changes in factors including water quality, the degree of tidal inundation, location, area and quality of habitats such as mudflats to affect species including the qualifying interest feature wading birds and waterfowl which are designated as part of the Special Protection Area and Ramsar site.</li> <li>5. The assessment of impact and effects needs to consider the River Avon.</li> </ol>	
<b>Chapter 16</b> Terrestrial Ecology	Bristol City Council has no specific comments on this chapter at this time.	n/a
<b>Chapter 17</b> Seascape and Landscape	<ol style="list-style-type: none"> <li>1. Preliminary assessment is that the views from Bristol are unlikely to be effected by the proposal. The City Council will comment on this aspect as and when the design, scale, height and massing are progressed, and further details and suitable graphical representations are made available.</li> </ol>	Unlikely to have significant effects on Bristol
<b>Chapter 18</b> Cultural Heritage: Marine and Terrestrial	<ol style="list-style-type: none"> <li>1. The study area has been drawn too tightly (figs 18.1 and 18.2 illustrate the scope for heritage assets, including wrecks and other obstructions) and should be amended to include the foreshore, intertidal area within Bristol City Councils boundary and also the River Avon, which contains a wide range heritage assets.</li> <li>2. The potential impacts upon the flows and tidal range of the Avon need to be considered to understand the potential impact on heritage assets in that area.</li> <li>3. The proposal creates potential for significant effects on assets in both the Severn foreshore and the Avon, particularly if tidal erosion and potential drying out occur as a result of this proposal. Effects include; <ul style="list-style-type: none"> <li>• The degree of erosion of peat and intertidal structures is likely to increase,</li> </ul> </li> </ol>	Potentially significant

	<p>with the potential destruction of heritage assets. This could be potentially greater on the English side in and around Bristol's area.</p> <ul style="list-style-type: none"> <li>• The rate of sedimentation may change.</li> <li>• The risk of flooding may increase – equally the tidal range may be affected with consequent impacts (drying out) of organic artefacts.</li> </ul>	
<b>Chapter 19</b> Navigation and Marine Transport	<ol style="list-style-type: none"> <li>1. The effect on Navigation and Marine Transport is considered to be linked to the impact of issues covered in chapters 8 and 10 of the EIA Scoping Report (Coastal Processes, Sediment Transport and Flooding).</li> <li>2. Bristol Harbour Authority has responsibility for navigation and transport in sections of the River Avon, including the Floating Harbour.</li> <li>3. Bristol Harbour Authority are particularly concerned with the impact of the proposed Tidal Lagoon on the tidal prism. Any changes in tidal movement, and how this will effect tidal operations, flood defences and dredging need to be properly assessed.</li> <li>4. The Bristol Harbour Authority requests that the River Avon, including entrance and exits to Bristol Floating Harbour, is included in the assessment of impacts on Navigation and Marine Transport.</li> </ol>	
<b>Chapter 20</b> Marine Noise and Vibration	Bristol City Council has no specific comments on this chapter at this time.	n/a
<b>Chapter 21</b> Terrestrial Noise and Vibration	Bristol City Council has no specific comments on this chapter at this time.	n/a
<b>Chapter 22</b> Air Quality	Bristol City Council has no specific comments on this chapter at this time.	n/a
<b>Chapter 23</b> Onshore Transport	Bristol City Council has no specific comments on this chapter at this time.	n/a



<p><b>Chapter 24</b> Socio-economic</p>	<p><u>No reference to key strategy's</u></p> <ol style="list-style-type: none"> <li>1. Currently this chapter of EIA fails to make specific reference to the Avonmouth Severnside Outline Development Strategy (ASEA) (Amion and White Young Green, 2012). This strategy underpins current proposals to develop major new infrastructure for the cross-boundary (Bristol City Council and South Gloucestershire Council) Avonmouth Severnside Enterprise Area, including new and improved flood defences, ecology mitigation schemes (wetland habitat reserves) and a new junction of the M49 (to access the northern sector of the ASEA). The interaction and impact of the proposal with these emerging schemes needs to be considered in the EIA.</li> <li>2. No reference has been made to a key strategic discussion document, 'Bristol Channel Energy: A Balanced Technology Approach (BTA)', published by Regen SW in 2012 and endorsed by Bristol City Council, the West of England LEP and the South West Marine Energy Park.</li> </ol> <p><u>General and Potential Impacts</u></p> <ol style="list-style-type: none"> <li>3. Bristol City Council is supportive in backing a 'balanced technology' and strategic planning approach to the Severn Estuary. The potential renewable and economic benefits tidal lagoons may bring as part of mixed portfolio of assets (including wind farms and tidal power) within the Severn Estuary area are welcomed in principle.</li> <li>4. However the potential impacts of the proposal on existing and planned economic and environmental assets within and adjoining Bristol City Councils area must be assessed. Any impacts on key economic and environmental assets must be shown to be avoidable or able to be mitigated to a suitable level.</li> </ol>	<p>Potentially Significant</p>
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	<p>5. The cumulative impact assessment of proposals for lagoons at Newport and Bridgwater needs to be included. There is considered to be increased likelihood of impacts on key economic assets such as Bristol Port, under a scenario where three major lagoon projects are constructed in the Severn Estuary.</p> <p>6. Potential Impacts of principal concern are;</p> <ul style="list-style-type: none"> <li>• The impacts of changes to coastal processes, sediment transport and flooding on the short and long term operation of Bristol Port, including the consented Bristol Deep Sea Container Terminal and the River Avon, including Bristol's floating harbour.</li> <li>• The Bristol Port company are likely to make a separate representation as they have responsibility for operation and running of the port.</li> <li>• In the context of the BTA, and the emerging requirement to research and test the inter-compatibility of different tidal technologies in the Severn, a specific issue for the EIA to address will be the possible impacts of a Cardiff Lagoon on flows and currents in the Severn, and the subsequent impact of these on the viability and delivery of commercial tidal stream turbine array project off the shore of Weston super Mare, proposed by the international company, Tocardo Tidal Turbines.</li> </ul>	
<b>Chapter 25</b> Tourism and Recreation	Bristol City Council has no specific comments on this chapter at this time.	n/a
<b>Chapter 26</b> Mitigation, Compensation and Monitoring	<p>1. The comments on this chapter are linked to possible impacts on issues covered in Chapter 8, Chapter 10 and Chapter 15</p> <p>2. As a regulatory requirement this proposal will require a Habitats Regulations Assessment Habitat Regulation Assessment which it is assumed will be undertaken by the Planning Inspectorate (PINS) as the competent body. The requirement to undertake a Habitat Regulation Assessment has been acknowledged in the scoping report. For example page 26-5 states that a Habitat Regulation Assessment shadow</p>	Potential significant

	<p>assessment) is in its early stages.</p> <p>3. To inform this Habitat Regulation Assessment there needs to be an understanding of what changes this project would be likely to cause to the marine environment within Bristol City Council (BCC) Unitary Authority area including coastal processes, tidal scour and sediment transport. Coastal processes need to be assessed for a potential in-combination effect on the habitats such as sandbanks, mudflats and saltmarsh which make up the Severn Estuary European Marine Site. In addition to the habitats themselves, there is the potential for changes in factors including water quality, the degree of tidal inundation, location, area and quality of habitats such as mudflats to affect species including the qualifying interest feature wading birds and waterfowl which are designated as part of the Special Protection Area and Ramsar site.</p>	
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## THE BRISTOL PORT COMPANY

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31<sup>st</sup> March 2015

Ref: 150305\_EN010073\_303600

Dear Frances,

### **Planning Act 2008 (as amended) and the Infrastructure Planning (EIA) Regulations 2009 (as amended)**

### **Application by Tidal Lagoon Cardiff Ltd for an Order Granting Development Consent for the Tidal Lagoon Cardiff**

#### **Environmental Scoping Consultation**

Thank you for consulting with The Bristol Port Company (BPC) over Tidal Lagoon Power (TLP) Cardiff's environmental scoping report for a tidal lagoon renewable energy generation scheme, near Cardiff (a Cardiff lagoon). The application area is adjacent to BPC's Harbour Area. As a Statutory Harbour Authority and commercial port operator, BPC's principle interests with respect to the project relates to the potential for adverse impacts on safety of navigation and BPC's business.

The Port has been in communication with the applicant and its related companies in the TLP Group over their proposals for a Cardiff lagoon and other tidal lagoons in the Severn Estuary and Bristol Channel. BPC welcomes early consultation with TLP over issues of concern to BPC.

Overall, the Scoping Report provides an adequate overview of the key environmental topics, baseline information and potential impacts to be evaluated in the Environmental Statement (ES) for the Cardiff lagoon. BPC requests that further information on coastal processes and sediment transport, navigation, socio-economics and mitigation, compensation and monitoring is considered for inclusion within the scope of the ES, as outlined overleaf.

However, prior to making comments on the scope of the ES for a Cardiff lagoon, BPC would like to take this opportunity to comment briefly on the overall approach to assessing and determining multiple tidal lagoon applications in the Bristol Channel. Experience over many years of operating and developing in the Severn Estuary has taught that the prediction of changes and impacts in such a dynamic and complex estuary system is fraught with risks and uncertainties. This is particularly true in relation to changes in the estuary's complex sediment transport regimes. Where there is such uncertainty, there will inevitably be a reliance on extensive monitoring of impacts and adaptive mitigation, and possibly compensation, measures during and following the construction of any lagoon in the Estuary. In light of this uncertainty and risk, BPC urges that a precautionary incremental approach to the development of lagoons in the Bristol Channel is adopted and that no decisions are made on individual lagoon proposals, including the Cardiff lagoon, until the Swansea Lagoon, if approved, is built and has been operating for some time, providing a reasonable period to gather monitoring evidence upon which to consider further lagoon applications. This incremental approach would enable lessons to be learned from the Swansea lagoon, before possibly moving on to a larger lagoon, maybe multiple lagoons, in the more environmentally sensitive marine environment of the Severn Estuary and in close proximity to major UK ports.

The Bristol Port Company is an ISO 9001:2000 Registered Company

First Corporate Shipping Limited trading as The Bristol Port Company

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Reg No: 2542406. Reg Office: 4 More London Riverside, London SE1 2AU



## Coastal Processes, Sediment Transport and Contamination

The coastal processes and sediment transport section of the Scoping Report covers the assessment of the main hydrodynamic, sediment and geomorphological changes of concern to BPC, and recognises that these changes are a primary consideration in the assessment of impacts on navigation and ports. BPC supports the proposed modelling work plan and data plan approach. BPC provides the following comments concerning the proposed scope and methodology of the coastal processes and sediment transport assessment that should be given further consideration in the EIA process:

- The modelling methodology outlined in the Scoping Report is broadly as expected, including the proposed approach to identify changes in tidal flows, waves, sediment transport and long-term estuary morphology. Any sediment modelling must include both sand and mud transport regimes. The Report states that consideration will be given to the recommendations of the Severn Tidal Power Strategic Environment Assessment regarding modelling methodology, including the use of 3D flow and 3D sediment modelling. BPC supports the need for 3D modelling, particularly in order to understand the implications of any changes in the behaviour (formation, movement and dispersal) of fluid mud layers over the spring-neap tidal cycle which is an important part of the Severn Estuary's fine sediment regime;
- The proposals for estuary-wide data collection will help further characterise the estuary, providing data to validate the models and inform the evaluation of impacts. The proposed assessment of significance is subjective and relies on a good understanding of existing natural variability in the system. It will be of the utmost importance to define accurately the scale of natural variability for relevant parameters in the estuary, such as suspended sediments. Furthermore, the timing and duration of data collection will need to cover the large variation in tidal range and consequential variation in the estuarine processes at work in the area. Longer-term (i.e. a period of months) measurement of suspended sediment concentration should be undertaken to reduce uncertainty, both in the assessed impacts of the works but also operationally in terms of the rate of sediment ingress into the proposed lagoon. In order to investigate the changes in highly dynamic and mobile sand features in close proximity to the lagoon and navigation channels, such as the Bridge, Middle Ground and Denny Shoal, studies will specifically need to look at past bathymetries and the variation of these features over time. Any new data collected should be compared to the large data set already in existence to ensure quality and consistency of the new data and to provide confidence in the findings of the modelling;
- The detailed modelling assessment must include modelling of the main tributaries of the Severn Estuary, including the Rivers Avon and Severn in order to understand fully the upstream effects;
- The EIA should include consideration of part-constructed lagoon scenarios. During construction the works will be less hydrodynamically sympathetic and so greater impacts may occur. In the dynamic environment of the Severn Estuary these effects, though short-term, may be much larger than those for the completed lagoon, as recognised by the Severn Tidal Power Strategic Environment Assessment studies;
- Changes in coastal processes, sediment transport and estuary geomorphology are likely to have implications on navigation in the approaches to, and shipping operations at, the consented Bristol Deep Sea Container Terminal (BDSCT). For example, increased currents and sand movements around the Cardiff lagoon may cause sandy infill in BDSCT's dredged approach channel. In order to understand these potential impacts fully, specific hydrodynamic and sediment modelling scenarios need to be evaluated with the Cardiff lagoon and BDSCT together;
- The Cardiff lagoon extends close to the capital dredging disposal site in the outer estuary to the north of the Holms. Studies will need to be undertaken by TLP to determine whether changes in currents in this location will affect the mobility of sediments placed at the site, with particular attention to identifying the extent of changes in mudstone mobility which may have adverse impacts on other activities in the estuary, such as aggregate dredging;
- In addition to assessing siltation within the lagoon and the subsequent requirement for maintenance dredging and disposal during its operation, the EIA should also assess the impacts of these ongoing



dredging operations on hydrodynamics, sediment transport and estuary geomorphology and any knock-on effects, for example, on navigation. The scale of dredging required during the long-term operation of the lagoon is likely to be very considerable and sediment management is a key operational issue (and cost) to be addressed by the developers;

- The opportunity for independent verification of modelling work by a leading consultant with modelling expertise in the Severn Estuary, such as HR Wallingford, has been discussed between TLP and BPC. It is BPC's view that independent verification of technical outputs provides confidence in those outputs for stakeholders as well as ensuring that BPC's particular interests are addressed; and
- On a point of detail, the Severn Estuary has the third highest tidal range in the world (NOAA). The second highest tidal range is found in the Bay of Ungava (Quebec), closely followed by the Severn Estuary.

## **Navigation and Marine Transport**

In general, the Scoping Report covers well the existing environment and potential impacts on navigation. However, BPC requests that the following comments are addressed in the ES:

- The assessment of impacts on commercial shipping must include future shipping requirements, including specifically the investigation of impacts on the navigation of Ultra Large Container Ships and the operation of the consented BDSCT. Similarly, in addition to existing navigation dredging, the implications for capital dredging and disposal operations and future maintenance dredging of the consented BDSCT should also be assessed;
- The indirect impacts arising from changes in tidal range need to be assessed, not only in relation to lock operation and risk of grounding but also importantly, with respect to any changes in access for ships bound to and from the Severn Estuary Ports. From a navigation perspective, changes in water depths at specific points cannot be considered in isolation; it is essential to understand how these changes would affect the access windows for ships transiting the approaches to the ports of Avonmouth, Portbury and BDSCT (the implications of which should be assessed in the socio-economic section of the ES);
- The Scoping Report states that the findings of the navigation assessment will inform the assessment of socio-economic impacts on a range of activities, including for example aggregate dredging, but does not mention commercial shipping and port operations. The socio-economic impacts arising from any changes to the navigation of commercial ships and existing and future port operations must be addressed in the ES;
- BPC is content with the proposed approach to the traffic surveys, subject to the inherent limitations of the AIS data, particularly in relation to recreational vessels in the Severn Estuary. It is estimated that less than 10% of recreational craft in BPC's harbour area transmit AIS;
- The proposed study area is insufficient to consider fully impacts on navigation and should be expanded up estuary to cover Sharpness Docks and its approaches which are likely to be negatively affected by the Cardiff lagoon. Sharpness Docks handles around half a million tonnes of cargo a year;
- BPC welcomes the suggestion that ship simulations are undertaken. BPC proposes that the requirement for simulations is kept under review, pending the findings of the coastal process modelling and navigation assessments. Simulations will be necessary in order to understand navigation risks if significant changes in flow speeds and directions are predicted in the approaches to the Ports and BDSCT;
- With respect to points of detail in the "Overview of the existing situation", it should be noted that:
  - Commercial vessels bound for Bristol do not all transit between the Holms, a significant proportion goes to the north of the Holms (estimated at around 30%, but this requires further investigation);
  - There are a number of passenger boat operators in the area in addition to the one company mentioned in the report, including several operating out of Cardiff Bay. There should also be mention of the Balmoral which is seasonally very active in the area; and



- The recreational cruising routes shown in Figure 16.4 require updating and correcting in consultation with Harbour Authorities and recreational interests. For example, heavily used routes between the River Avon, Portishead Marina and Cardiff Bay are missing.

## **Socio-economics**

Overall the Socio-economics Chapter outlines a balanced and sensible approach to assessing the impact of the Cardiff lagoon on both sides of the Estuary. However, BPC has the following comments on the proposed scope of the socio-economic assessment:

- Para 24.1.0.3 states “Whilst there has been a fall in trade as a result of the economic downturn, there are signs of recovery at many of the ports today.” This is out of date. In fact turnover at The Bristol Port Company reached its highest ever level in 2013-2014 and employment has returned to pre-recession levels. The ES will need to consider fully the national and regional socio-economic importance of Bristol Port;
- In addition to the impacts on land uses (24.2.05), the scope of potential impacts to be assessed must importantly include any socio-economic effects on marine activities, including commercial shipping and port operations, aggregate dredging and commercial and recreational fishing. Although inferred in the chapter as a whole, this is not explicitly stated in the scope of impacts to be assessed. The socio-economic analysis should assess impacts on existing port operations in the Severn Estuary, as well as impacts on future port operations at the Bristol Deep Sea Container Terminal (BDSCT);
- The Socio-economics Chapter fails to recognise the need to consider the BDSCT as a consented development in the cumulative impact assessment. The Report outlines the need for a cumulative assessment of the impact on labour force and local business capacity of the Cardiff lagoon and several other major infrastructure schemes. However, the BDSCT is not mentioned in the list of schemes and does not feature in Figure 24.1; and
- The Chapter should not only refer to the GVA of South East Wales but should also recognise the “Great Western Cities” alliance between Cardiff, Newport and Bristol city councils which shows the interconnectivity of South East Wales and South West England with a combined economic output just over £58bn – more than double that of South East Wales at £22bn.

## **Mitigation, Monitoring and Compensation**

BPC note that TLP has started in principle discussions with statutory nature conservation bodies regarding compensation measures for impacts on Natura 2000 sites which must be secured before consent is given. The extent of any compensation requirements is not yet quantified, but would need to include consideration of any adverse impacts on BPC’s approved habitat creation scheme on the Steart Peninsula in Bridgwater Bay. This scheme has been carefully designed, in partnership with the RSPB, to create over 130ha of intertidal habitat, including around 20ha of longer-term mudflat habitat. BPC would be concerned regarding the loss of any intertidal habitat, particularly mudflat, from the site that may jeopardise its ability to meet the required compensation targets to offset impacts of the BDSCT. Investigations will need to be undertaken into the implications of changes in tidal range on the function of BPC’s scheme at Steart, supported by hydrodynamic and sediment modelling as appropriate, including the operation of the Regulated Tidal Exchange area. Mitigation and compensation measures will need to be put in place by TLP to satisfy BPC, RSPB and Natural England that BDSCT’s compensation requirements under the Habitats Regulations have been met.

BPC welcomes that compensation measures proposed by TLP will meet the criteria laid down in the Habitats Regulations Assessment Handbook. BPC would expect to see consistency in approach by conservation agencies and regulators over the compensation requirements for marine developments in the Severn Estuary. For example, in relation to “appropriately phased compensation”, there should be a requirement to have replacement habitats in place and functioning before construction can proceed to a point where adverse impacts on Natura 2000 sites are predicted to occur, as was the case for BDSCT.

The Adaptive Environmental Monitoring Plan process is likely to need to include other key stakeholders adversely affected by the proposals, such as harbour authorities, to ensure that the adaptive approach to the implementing relevant monitoring and mitigation measures is effective.

### **Cumulative Impacts of Tidal Lagoon Proposals in the Bristol Channel**

While BPC recognises that TLP’s Scoping Report only covers proposals for a Cardiff lagoon, it is keen that the cumulative impacts of all of TLP Group’s lagoon proposals in the Bristol Channel are identified and evaluated at an early stage. Large-scale combined changes in coastal processes and sediment regimes of the Severn Estuary are likely to arise from the three major lagoon scheme proposals. For example, based on the Severn Tidal Power Strategic Environment Assessment, the already significant reductions in high water levels as a result of lagoons at Cardiff and Newport may more than double with the addition of a Bridgwater Bay lagoon which would adversely affect access windows for shipping using the Severn Estuary Ports. The Cardiff and Newport lagoons together pose greater risks to navigation, particularly given the close proximity of the Newport lagoon to Bristol Port. Furthermore, the likelihood of adverse socio-economic impacts on Ports occurring is considerable under a scenario where three major lagoon projects are constructed in the Severn Estuary.

We hope the above comments are of assistance. If you have any further queries regarding this response please do not hesitate to contact me.

Yours sincerely,



**Anne Hayes**  
**Environment Manager**





Llywodraeth Cymru  
Welsh Government

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The Planning Inspectorate  
3/18 Eagle Wing  
Temple Quay House  
2 The Square  
Bristol  
BS1 6PN

Eich cyfeirnod Your reference	15035_EN010073_3036108
Ein cyfeirnod Our reference	SW
Dyddiad Date	1 April 2015
Llinell uniongyrchol Direct line	01443 336096
Ebost Email:	Suzanne.whiting@wales.gsi.gov.uk

Dear Sir

**PLANNING ACT 2008 (AS AMENDED) AND THE INFRASTRUCTURE PLANNING  
(ENVIRONMENTAL IMPACT ASSESSMENT) REGULATIONS 2009 (AS AMENDED) –  
REGULATION 8**

**APPLICATION BY TIDAL LAGOON CARDIFF LTD FOR AN ORDER GRANTING  
DEVELOPMENT CONSENT FOR THE TIDAL LAGOON CARDIFF**

**SCOPING CONSULTATION WITH NON PRESCRIBED CONSULTATION BODIES**

Thank you for your letter of 5 March 2015 asking for Cadw's view on the information to be provided in an environmental statement relating to the proposed development described above. These views are provided without prejudice to the Welsh Government's consideration of the matter, should it come before it formally for determination.

This advice is given in response to a scoping opinion for the contents of an Environmental Impact Assessment for a proposed tidal energy lagoon off the Wentloog Level near Cardiff. An Environmental Impact Assessment Scoping Report has been submitted with chapter 18 referring to the studies required to assess the impact of the proposed development on the cultural heritage: marine and terrestrial. This chapter was prepared after a meeting with Cadw held on the 8 December 2014.

In general Cadw agrees that the works outlined in chapter 18 of the scoping report are appropriate; however there are some issues that need to be addressed. These are:

18.2.3.1 This section only deals with the impact of the construction phase of the development, there appears to be no comparable section relating to impact of the operational stage of the lagoon. In particular there is a need to consider the potential impact of dredging or other measures that could be required to de-silt the lagoon. The potential for changes to currents leading to erosion away from the lagoon, but only identified during the operational period of the lagoon, will also need to be considered.

Cadw yw gwasanaeth amgylchedd hanesyddol Llywodraeth Cymru. Ein nod yw hyrwyddo gwaith cadwraeth ar gyfer amgylchedd hanesyddol Cymru a gwerthfawrogiad ohono.

Cadw is the Welsh Government's historic environment service. Our aim is to promote the conservation and appreciation of Wales's historic environment.

Rydym yn croesawu gohebiaeth yn Gymraeg ac yn Saesneg.  
We welcome correspondence in both English and Welsh.



BUDDSODDWR MEWN POBL  
INVESTOR IN PEOPLE



18.2.3.5 There is a “typo” in the third line of this section; it is assumed that “boast” should be read as boats. We do not understand why “sites associated with access to the sea for boats” are likely to be a “lesser issue”. These sites may easily be of national importance, given the potential survival of organic material and the potential for them to be the focus for related settlement and other human activities.

18.3.1.1 We are content for the proposed staged assessment approach to be taken but the key heritage stakeholders should be fully consulted before each stage proceeds.

18.4.2.1 Key guidance should include appropriate standards and guidance for archaeological work set by the Chartered Institute for Archaeologists. The Research Framework for the Archaeology of Wales, especially the section on Maritime and Intertidal Archaeology, should also be included in this list.

18.4.3.3 xi Key studies should also include Glamorgan Gwent Archaeological Trust (GGAT) Coastal Archaeological Survey River Rhymney Cardiff (South Glamorgan) to River Wye Monmouthshire (Gwent) and Bell, Caseldine & Neumann 2000 Prehistoric Intertidal Archaeology in the Welsh Severn Estuary.

18.4.3.9 The nature of the silt deposits covering the assessment area will require a number of visits in order to carry out an appropriate walkover survey.

18.4.4.2 i There is currently no Register of Battlefields for Wales.

18.4.4.8 A part of the process determining the historic assets with a low tolerance to change from the development the key heritage stakeholders should be consulted.

18.4.5.1 We concur that an ASIDOHL (2) assessment is not required for the Lower Wye Valley Landscape of Outstanding Historic Interest.

18.4.5.1 We concur that an ASIDOHL (2) assessment is required for the Gwent Levels Landscape of Outstanding Historic Interest (it should be noted that for this work to be carried out the inter-tidal zone will need to be characterised as this has not yet been done).

Yours sincerely

A solid black rectangular box used to redact the signature of Suzanne Whiting.

Suzanne Whiting  
Diogelu a Pholisi/ Protection and Policy



Frances Russell  
3/18 Eagle Wing  
Temple Quay House  
2 The Square  
Bristol, BS1 6PN

**Date:** 17<sup>th</sup> March 2015

**Your Ref:** 150305\_EN010073\_3036000

**Planning Act 2008 (as amended) and The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended) – Regulations 8 and 9**

**Application by Tidal Lagoon Cardiff Ltd for an Order Granting Development Consent for the Tidal Lagoon Cardiff**

**Scoping consultation and notification of the applicant's contact details and duty to make available information to the applicant if requested**

Dear Frances,

On behalf of the Caldicot and Wentlooge Levels Internal Drainage Board (CWLIDB) I would like to thank you for the receipt of your letter in respect of the above proposal.

The Scoping Report was brought to Board's attention at its final meeting held on 16<sup>th</sup> March 2015. (Please note that functions of CWLIDB are going to be transferred to Natural Resources Wales (NRW) on 1<sup>st</sup> April 2015)

From CWLIDB's perspective it is reassuring to note that the Scoping Report (Section 10: Flooding and Hydrology) acknowledges the importance of the network of man-made channels (reens) across Gwent Levels from flood risk management point of view: over 250km of reens and main rivers controlled by CWLIDB & NRW are used for surface water disposal, draining the area of the Gwent Levels using gravity flows only i.e. without pumping over the sea defences. Therefore all watercourses which currently discharge into the Severn Estuary are subject to 'tide-locked' conditions twice a day and any changes to tidal regime indicated in the Scoping Report would have effects on CWLIDB's (NRW's) ability to fulfil its role as flood risk management authority due to potential changes in storage requirements.

However, I would like to emphasise the importance of the network of reens from water level management perspective: broadly speaking, water levels in reens are not

governed by most recent rainfall, but over 200 water level control structures which enable the CWLIDB to raise water levels during summer months for the benefits of Sites of Special Scientific Interests (SSSI), for agricultural and engineering reasons. Water levels are then dropped during winter months to provide additional attenuation volumes in channels.

In summary, CWLIDB's operations are compliant with an approved Water Level Management Plan (WLMP) which sets exact water depth at each control structure during summer and winter months. Please note that post 1<sup>st</sup> April 2015 CWLIDB staff (including myself) will continue to be involved in Gwent Levels matters as NRW employees and it would be very helpful if our water level management needs would be taken into consideration by the developers in addition to already acknowledged flood risk management needs.

During a brief debate about the proposal at our recent board meeting it was noted that the same environmental restrictions (designation as RAMSAR site) which stopped CWLIDB's campaign to extend the existing sea defences seawards would appear to be applicable in this case, but it was decided to leave this matter for environmental experts to decide.

Thank you very much for consulting with Caldicot and Wentlooge Levels Internal Drainage Board.

Yours sincerely,



**MATT BAJOWSKI** EngTech TMICE  
**Engineer to the Board**

**From:** Dowdall, Lawrence <LDowdall@cardiff.gov.uk>  
**Sent:** 02 April 2015 14:51  
**To:** Environmental Services  
**Cc:** Gilbert, Simon; Williams, Phil  
**Subject:** Scoping consultation for application by Tidal Lagoon Cardiff Ltd  
**Attachments:** IMG00931-20101013-1049.JPG; IMG00933-20101013-1050.JPG;  
IMG00934-20101013-1050.JPG; IMG00936-20101013-1051.JPG;  
IMG00937-20101013-1051.JPG; Response received from Cardiff Harbour  
Authority.docx; Response received from Ecologist.docx; Response received from PC  
(contaminated land).docx; Response received from PC (Noise & Air).docx

Fao: Frances Russell  
EIA and Land Rights Advisor  
On behalf of the Secretary of State

Dear Frances,

Thank you for your letter dated 5.3.15 in which you seek Cardiff Council's views as statutory consultee on the contents of the EIA Scoping Report prepared by Tidal Lagoon Cardiff Ltd for a proposed tidal barrage in the Severn Estuary.

Having consulted with the relevant service areas within the Council I attach the responses received from Pollution Control (Contaminated Land), Pollution Control (Noise & Air), Strategic Planning- Ecology, and the Cardiff Harbour Authority Environment Officer. The attached 5no. photos are to be viewed in conjunction with the response from PC (Contaminated Land).

Due to time constraints I am unable to provide a summary of these responses and draw together the information the Council considers should be provided in the environmental statement, or indeed to make any considered comments on the adequacy of the scoping report. Please also be aware that the following Council service areas were consulted but have not provided any response: Strategic Planning-Countryside; Strategic Planning-Land Use Policy; Traffic & Transportation; Parks Services; and Energy & Sustainability.

Finally I note our duty to make available information in our possession which is considered relevant to the preparation of the environmental statement, if so requested by the applicant.

Please feel free to contact me or my line manager, Simon Gilbert (Tel. 029 2087 3479), in relation to any of the above.

Regards,

Lawrence

Lawrence Dowdall, Senior Planning Officer

Development Control (Strategic Team)

County Hall (Rm. 223), Atlantic Wharf , Cardiff CF10 4UW

Tel. 029 2233 0823

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\*\*\*\*\*

Mae'n bosibl bod gwybodaeth gyfrinachol yn y neges hon. Os na chyfeirir y neges atoch chi'n benodol (neu os nad ydych chi'n gyfrifol am drosglwyddo'r neges i'r person a enwir), yna ni chewch gopio na throsglwyddo'r neges. Mewn achos o'r fath, dylech ddinistrio'r neges a hysbysu'r anfonwr drwy e-bost ar unwaith. Rhwch wybod i'r anfonydd ar unwaith os nad ydych chi neu eich cyflogydd yn caniatu e-bost y Rhynggrwyd am negeseuon fel hon. Rhaid deall nad yw'r safbwyntiau, y casgliadau a'r wybodaeth arall yn y neges hon nad ydynt yn cyfeirio at fusnes swyddogol Cyngor Dinas a Sir Caerdydd yn cynrychioli barn y Cyngor Sir nad yn cael sel ei fendith. Caiff unrhyw negeseuon a anfonir at, neu o'r cyfeiriad e-bost hwn eu prosesu gan system E-bost Gorfforaethol Cyngor Sir Caerdydd a gallant gael eu harchwilio gan rywun heblaw'r person a enwir.

\*\*\*\*\*

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Response received from Pollution Control (Contaminated Land)

Having reviewed the Scoping Report for the Tidal Lagoon, the Contaminated Land Team have the following comments/ observations:

#### **Land Contamination Issues**

In terms of land contamination issues, the report details that the EIA will include contamination assessments which will focus on the western and eastern landfills of the project. At these locations the assessments will be within a 250m buffer of the landfills, which seems reasonable. What is lacking is the extent these assessments will have in terms of undertaking intrusive investigations and Pollution Control would advise that the developer and their consultants undertaking the assessments liaise with Pollution Control from an early stage on the extent of any investigations.

One major concern Pollution Control has in terms of contamination issues which does not seem to have been identified by the developer/ consultant at this stage is whether the Lagoon itself is likely to have an impact on other contamination/ landfill features which are on the current shoreline and will be enclosed within the lagoon. Of particular concern is the former Frag Tip which is located at NGR 321,688, 176,181. This historic landfill, has significant issues in terms of potential erosion of the shoreline boundary. The reprofiling/ surcharging of the landfill undertaken in the 1990s in conjunction of the construction of the DCWW WWTW was initially designed with gabion baskets to offer coastal protection to the shoreline boundary of the landfill. The gabion baskets supposedly had a design life of some 10-15 years as it was initially envisaged that a more permanent boundary design would have been included as part of the design for the Eastern Link Road which was originally earmarked for this area. Images of the poor state of the shoreline boundary of the Frag Tip are attached.

Therefore as part of the EIA the developer will need to demonstrate that the lagoon waters will not expedite the erosion of the Frag Tip and assess whether mitigation measures to ensure further erosion of the Frag Tip does not occur will need to be included. As part of this assessment the developer will also need to demonstrate that there will be no leaching of contaminants into the lagoon waters as this could impact on the water quality within the lagoon and any potential proposed end of use of the lagoon waters. This not only applies to the Frag Tip Area but most of the Cardiff foreshore (west of the mouth of the River Rhymney) which has been predominately been developed on reclaimed/ infilled land. A similar assessment should also be made for the Lamby Way site on east of the River Rhymney.

#### **Water Quality with the Lagoon**

In view of the last sentence above, the developer has not indicated anywhere in the Scoping Report on the proposed end use of the lagoon waters and whether there will be any recreational/ bathing use of the lagoon. If such proposals are to be made then assessment of the likely water quality within the lagoon needs to be made. In doing so the developer needs to fully consider the impact on the lagoon water quality from the point source discharges, DCWW WWTW, River Rhymney. CSOs, etc as well as any non- point sources including the leaching of contamination as detailed previously.

If you wish to discuss anything further please do not hesitate to contact me.

Best regards

Jason

Jason Bale  
Group Leader/Arweinydd Grwp  
Pollution Control Division/Rheoli Llygredd  
Regulatory & Supporting Services /Gwasanaethau Rheoliadal a Chefnogi

Tel/Fon: 02920 871 896  
Fax/Facs: 02920 827 431  
[www.cardiff.gov.uk](http://www.cardiff.gov.uk)













Response received from Pollution Control (Noise & Air)

I refer to the above consultation and make the following observations;

I refer to chapter 21 (Terrestrial Noise & Vibrations) and 22 (Air Quality) of the scoping report (15/00553/MJR). I am satisfied with the general methodology for the EIA however would make the additional points for them to be considered and included within the Environmental Impact Assessment (EIA) for this proposed development:

1. Within "operational" activities it is advised that any proposed associated activities, such as recreational activities, within or on the lagoon, or on the lagoon wall itself, shall be considered as part of any noise impact assessment for the EIA.
2. Within paragraph 21.3.05 of the scoping report it states that "following liaison with the City of Cardiff Council.....it was agreed that the automated noise monitoring should be taken at residential locations near to landfall at either end of the tidal lagoon.....". There has been no agreed approach in relation to methods of monitoring or locations of monitoring and therefore this statement is factually incorrect. City of Cardiff Council would welcome the opportunity to discuss and agree noise and vibration monitoring methods and monitoring locations prior to the drafting of any EIA in relation to this proposed development. Vibration and Noise Monitoring will also need to be considered near noise sensitive commercial premises, such as TV recording studios.
3. The authority are in agreement with the Air Quality proposed methodologies. It is worth noting that the scoping report has omitted to include the existence of an Air Quality Management Area (AQMA) within The Vale of Glamorgan Council which was declared for road traffic emissions on Windsor Road, Penarth.

Regards,

Sian James,  
Group Leader  
Noise & Air Pollution,  
City of Cardiff Council

## **Response received from Ecologist**

### **RE: Tidal Lagoon Cardiff; Request for Information as to Content of Environmental Statement.**

I have not had the opportunity to consider all of the information that has been submitted in respect of this request, but I have some general comments on the ecological content of an Environmental Statement.

#### **Internationally Designated Sites**

The Tidal Lagoon is proposed for the Severn Estuary, which is one of the most important sites for nature conservation in the UK. This importance is reflected in its designation at an international level, that being as a Special Area for Conservation (SAC), a Special Protection Area (SPA) and a Wetland of International Importance (Ramsar Site).

The features for which these sites are designated include habitat features such as Estuaries, Mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadow, Sandbanks which are slightly covered by sea water all the time, and Reefs, together with species features such as Sea lamprey, River lamprey, Assemblage of migratory fish, Twaite shad, internationally important populations of the Annex 1 species Bewick's Swan, internationally important populations of regularly occurring migratory species (Gadwall, Shelduck, Redshank, Dunlin and European White-Fronted Goose), and internationally important assemblage of waterfowl.

The ES should include assessments of impacts upon all of the listed features for these sites, during the construction, operation and decommissioning of the proposed Tidal Lagoon, with reference to Schedule 4 of the EIA Regulations.

This information would then be used to undertake a Habitats Regulations Assessment in accordance with Regulation 61 of the Conservation of Habitats and Species Regulations 2010 (as amended). This regulation states that a competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which—

(a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects), and  
(b) is not directly connected with or necessary to the management of that site,  
must make an appropriate assessment of the implications for that site in view of that site's conservation objectives.

In this instance, as I understand it, Cardiff Council would not be the competent authority, so the responsibility of undertaking the HRA would lie presumably with the Welsh Government.

Consent for the scheme may only be granted if it is ascertained that it will not adversely affect the integrity of the internationally designated sites. Where a plan or project is agreed to, notwithstanding a negative assessment of the implications for a European site, on the

grounds of imperative reasons of overriding public interest, the appropriate authority must secure that any necessary compensatory measures are taken to ensure that the overall coherence of Natura 2000 networks (SACs and SPAs) is protected. In other words, compensation for harm to the SACs and SPAs may be provided anywhere else in the SAC/SPA network throughout Europe.

This raises the possibility that the features of these designated sites in Cardiff may be adversely impacted by the proposed scheme, but that compensation for this harm (loss of habitats, reductions in fish numbers etc), may be provided elsewhere in Wales, the UK, or even Europe. Whilst this compensation would maintain the overall coherence of the SAC/SPA network, Cardiff itself may well see a reduction in these habitats and species within its boundary. If this is the case, the ES and the HRA should make this explicit.

### **Nationally Designated Sites**

At a UK level, the site is also designated as a Site of Special Scientific Interest (SSSI), which underpins all of the international designations above. Furthermore, the land immediately adjacent to the Severn Estuary is also designated as SSSI (The Gwent Levels suite of SSSIs), and is likely to be affected by the onshore features of the proposed scheme. The National Assembly for Wales, and any Government department, has a duty under Section 28G of the Countryside and Rights of Way Act 2000 to take reasonable steps, consistent with the proper exercise of their functions, to further the conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which the site is of special scientific interest. The ES should set out how this can be achieved during construction, operation and decommissioning of the proposed scheme.

### **Conservation of Biological Diversity**

In accordance with Section 42 of the Natural Environment and Rural Communities Act (NERC) 2006, which amends the Wildlife and Countryside Act 1981, the National Assembly for Wales (NAW) has a duty to take, or to promote the taking by others of, such steps as appear to the Assembly to be reasonably practicable to further the conservation of the living organisms and types of habitat included in any list published under this section. That list in this instance is known as the Section 42 list, which contains over 500 species and habitats, although not all of them occur in this part of Cardiff. The ES should provide sufficient information to allow the NAW to fully discharge its NERC Act duty in relation to these habitats and species, be they marine, coastal or terrestrial.

### **Local Biodiversity**

The ES should fully consider the impacts upon species and habitats which are identified locally as priorities for Cardiff, such as those listed in the Cardiff Local Biodiversity Action Plan, or for which Sites of Importance for Nature Conservation (SINCs) are designated.

Aside from the actual Tidal Lagoon itself, the ES should also consider the impacts upon local biodiversity priorities arising from site compounds, access and haul roads, storage areas, ancillary infrastructure, installation of pipes and cables etc. Impacts may arise from the

immediate footprint of these features as well as diffuse effects of dust, aerial emissions of pollutants, contamination of waterbodies and surface-water run-off. All of these effects should be considered in the ES.

### **EclA Methodology**

The ecological element of the EIA (known as the Ecological Impact Assessment or EclA), should use the methodology set out in the IEEM EclA Guidelines 2006, though I am aware that a revision of this document is due soon in 2015.

Matthew Harris  
Ecologist

Response received from Cardiff Harbour Authority

Please find below the comments raised in respect of the proposed tidal lagoon development, Cardiff. Comments on the *Environmental Impact Assessment Scoping Report, March 2015* were made by the Cardiff Harbour Authority (CHA) Environment Team, Barrage Control and Harbour Master.

If you require further information on this subject please contact myself.

Kind regards,

**Steve Ellery**  
**Environment Officer**

Cardiff Harbour Authority  
Queen Alexandra House  
Cargo Road  
Cardiff  
CF10 4LY

Office: 02920 877 943

**Proposed Tidal Lagoon Development,  
Cardiff, South Wales  
Environmental Impact Assessment Scoping Report  
March 2015**

SUBJECT: COMMENTS AS TO THE CONTENT OF THE ENVIRONMENTAL STATEMENT IN RESPECT OF PROPOSED TIDAL LAGOON. LOCATION: TIDAL LAGOON, CARDIFF

The following comments and observations are made by the Cardiff Harbour Authority (CHA). Comments have been made from CHA's Environment Team, Barrage Control and Harbour Master.

**Dredging**

1. *For consideration:* The present disposal ground for dredged material from the outer harbour and approach channel will be affected by the construction of the tidal barrage. Therefore we need to be given another area to dispose of dredged material that is within close proximity to CHA or compensation for the increased time of transit for the dredger.
2. *For consideration:* The amount of siltation build up may well increase, or decrease, due to changing flows and currents. Natural Resources Wales would need to amend our disposal licence to allow dredging as and when required. Compensation would be required to cover the increased requirement to dredge.
3. *For consideration:* Current tidal ranges will alter and further information into the effect of these tidal changes will be required.
4. *For consideration:* Due to changes in the flows and particularly back eddies attraction water for migratory fish may be affected.

**Navigation**

1. *To include:* Several small commercial passenger carrying vessels licenced by Cardiff harbour Authority operate out into the Bristol Channel. Between them they carry approximately 15,000 passengers a year (*Chapter 19.1.1.5*).



2. *To include:* The CHA is the statutory Harbour Authority for the Inland Bay and Outer Harbour (*Chapter 19.1.2.2*).

3. *To include:* Increased transit times for leisure vessels transiting between Cardiff Bay, Newport and Bristol (*Chapter 19.2.02*).

Additional Comments:

1. Potential impact on the numbers of visiting vessels to Cardiff due to the potential perceived increase navigational risks and increased passage times.

2. Impacts of turbines – I would classify this has potentially a DIRECT impact on small leisure vessels and not and in direct one.

**Socio-economics**

1. *To include:* Cardiff Bay, under the CHA, is home to a thriving marine leisure industry and small vessel moorings. Approximately 1300 resident boats moor within the Inland Bay with a target capacity of 2000. The Bay acts as a destination port for Bristol Channel yachting and motor boating. The Inland Bay is also a base for the largest charter fishing fleet in the Bristol Channel (*Chapter 24*).

**Tourism and Recreation**

1. *To include:* Cardiff Marina (different to Penarth Quays Marina) in the list (*Chapter 25.1.06*).

**Pollution and Debris**

1. *For consideration:* CHA is responsible for the Oil Spill Contingency Plan for Cardiff Bay. The plan also covers the River Rhymney and with the proposed tidal lagoon in place, there would be a joint interest in the containment and recovery of pollutants originating from this river.

There does not appear to be mention of potential oil pollution in the scoping report. Dialogue between CHA and Tidal Lagoon Power to discuss counter pollution measures should be considered

2. *For consideration:* CHA has experience dealing with litter and debris being flushed down the catchments to the Inland Cardiff Bay. On average CHA removes 800 tonnes of litter/debris from the Bay which has originated from the Rivers Taff and Ely. Even though not really mentioned in the scoping report, CHA would envisage that some litter/debris would be flushed into the lagoon and would need to be collected and disposed of accordingly.

**Water Quality and Monitoring**

1. *For consideration:* The CHA has been monitoring the water quality of the Inland Cardiff Bay since 2000. It has developed an extensive network of water quality monitors and developed an understanding of local water quality issues pertinent to this modified water body. The River Rhymney, which flows through the City and County of Cardiff land, would enter the lagoon. It would therefore be worth considering utilising the experience and expertise of the CHA's Environment Team for water quality issues and / or future monitoring requirements.

**From:** [Smailes Baggy](#)  
**To:** [Environmental Services](#)  
**Subject:** RE: EN010073 – Tidal Lagoon Cardiff – EIA Scoping Notification and Consultation  
**Date:** 06 March 2015 11:44:38

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Dear Mr Russell,

Thank you for the Planning Inspectorate's recent correspondence which sought Civil Aviation Authority (CAA) scoping comment related to the titled proposed development.

Notwithstanding any consultation requirement related to ODPM/DfT Circular 1/2003, given that it would appear that the Cardiff Tidal Lagoon Project would be a predominantly submerged development involving minimal construction extending only a few meters above the surface (it seems that the breakwater would have a height of 17 meters above chart datum), the CAA would not wish to make any associated observations.

I trust this comment is useful. Please do not hesitate to get in touch should you require further civil aviation regulatory comment.

**Mark Smailes**

Airspace Regulator  
Safety and Airspace Regulation Group  
Civil Aviation Authority  
CAA House  
45-59 Kingsway  
London WC2B 6TE

Tel: 0207 453 6545

---

**From:** Environmental Services [mailto:EnvironmentalServices@infrastructure.gsi.gov.uk]  
**Sent:** 05 March 2015 14:28  
**To:** Smailes Baggy  
**Subject:** EN010073 – Tidal Lagoon Cardiff – EIA Scoping Notification and Consultation

Dear Sir/Madam

Please see the following hyperlink to correspondence on the proposed Tidal Lagoon Cardiff.

<http://infrastructure.planningportal.gov.uk/wp-content/uploads/2015/03/Letter-to-Stat-Cons.pdf>

Please note the deadline for consultation responses is 02 April 2015, and is a statutory requirement that cannot be extended.

Kind regards,

Frances Russell  
EIA and Land Rights Advisor

Major Applications and Plans, The Planning Inspectorate, Temple Quay  
House, Temple Quay, Bristol, BS1 6PN

Twitter: [@PINSgov](#)

Helpline: 0303 444 5000

Email: [EnvironmentalServices@infrastructure.gsi.gov.uk](mailto:EnvironmentalServices@infrastructure.gsi.gov.uk)

Web: [www.planningportal.gov.uk/planninginspectorate](http://www.planningportal.gov.uk/planninginspectorate) (Planning  
Inspectorate casework and appeals)

Web: [www.planningportal.gov.uk/infrastructure](http://www.planningportal.gov.uk/infrastructure) (Planning Inspectorate's  
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Frances Russell  
EIA and Land Rights Advisor  
The Planning Inspectorate  
3/18 Eagle Wing  
Temple Quay House  
2 The Square  
Bristol, BS1 6PN

Jessica Campbell  
Consents Advisor

Tel: 020 7851 5182

Fax: 020 7851 5125

E-mail: [Jessica.Campbell@thecrownestate.co.uk](mailto:Jessica.Campbell@thecrownestate.co.uk)

Your Ref.: 150305\_EN010073\_3036000

1 April 2015

Dear Ms Russell

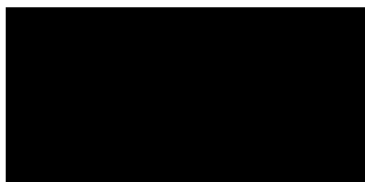
**Application by Tidal Lagoon Cardiff Ltd for an Order Granting Development Consent for the Tidal Lagoon Cardiff  
– Request for Scoping Opinion**

Reference is made to your letter dated 5 March 2015 inviting The Crown Estate to comment on the request for a scoping opinion submitted for the above proposal.

The Crown Estate is the manager of the UK seabed out to 12 nautical miles. The developer will therefore require a lease from The Crown Estate. In addition, the developer may need the agreement of owners of other land on which the proposed development would be located and/or owners of other land affected by the proposed development.

Should you have any queries or require any additional information with regard to this matter, please do not hesitate to contact me on 0207 851 5182.

Yours sincerely,



Jessica Campbell  
Consents Advisor

**From:** [DIO-Safeguarding-Offshore \(MULTIUSER\)](#)  
**To:** [Environmental Services](#)  
**Subject:** 20150313: RE: EN010073 - Tidal Lagoon Cardiff - EIA Scoping Notification and Consultation  
**Date:** 13 March 2015 10:56:33  
**Attachments:** [image002.jpg](#)

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Dear Frances,

[Our ref: D/DIO/OS2015/30](#)

Thank you for consulting the Ministry of Defence on this application. We have already had dialogue with the developer regarding this proposal, and I can confirm that we have no safeguarding objections to the Cardiff Tidal Lagoon.

Regards,

**Dan Barrett** | Asst. Safeguarding Officer - Offshore  
Email: [DIOODC-IPSSG1A3@MOD.UK](mailto:DIOODC-IPSSG1A3@MOD.UK)  
DIO Safeguarding | Defence Infrastructure Organisation, Building 49, Kingston Road, Sutton Coldfield B75 7RL  
Civ: 0121 311 2143 / Mil: 94421 2143



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**From:** Environmental Services [<mailto:EnvironmentalServices@infrastructure.gsi.gov.uk>]  
**Sent:** 05 March 2015 14:25  
**To:** DIO-Safeguarding-Offshore (MULTIUSER)  
**Subject:** EN010073 – Tidal Lagoon Cardiff – EIA Scoping Notification and Consultation

Dear Sir/Madam

Please see the following hyperlink to correspondence on the proposed Tidal Lagoon Cardiff.

<http://infrastructure.planningportal.gov.uk/wp-content/uploads/2015/03/Letter-to-non-stat-cons.pdf>

Please note the deadline for consultation responses is 02 April 2015, and is a statutory requirement that cannot be extended.

Kind regards,

Frances Russell  
EIA and Land Rights Advisor

Major Applications and Plans, The Planning Inspectorate, Temple Quay House, Temple Quay, Bristol, BS1 6PN

Twitter: [@PINSgov](#)  
Helpline: 0303 444 5000  
Email: [EnvironmentalServices@infrastructure.gsi.gov.uk](mailto:EnvironmentalServices@infrastructure.gsi.gov.uk)

Web: [www.planningportal.gov.uk/planninginspectorate](http://www.planningportal.gov.uk/planninginspectorate) (Planning Inspectorate casework and appeals)  
Web: [www.planningportal.gov.uk/infrastructure](http://www.planningportal.gov.uk/infrastructure) (Planning Inspectorate's National Infrastructure Planning portal)

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The Planning Inspectorate  
3/18 Eagle Wing  
Temple Quay House  
2 The Square  
Bristol,  
BS1 6PN

***Issued via email only***

**Date:** 02/04/2015  
**Our Ref:** OG/NSIP/CTidal

Dear Sir / Madam,

**Planning Act 2008 (as amended) and the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended) – Regulation 8**

**EN010073 – Cardiff Tidal Lagoon – EIA Scoping Notification and Consultation**

I refer to your consultation letter received in accordance with the above regulations. We have reviewed the documents available at this stage in the process and specifically the Scoping Request received. We therefore have the following comments to make.

We note the indicative red line boundary of the application site and advise that this encompasses Cardiff Bay Wastewater Treatment Works (WwTW). This treatment facility serves a population equivalent of 870,000 in the Cardiff and valleys urban areas.

The Cardiff WwTW discharge (via a long sea outfall) and a number of combined sewer overflow (CSO) outfalls discharge into the proposed lagoon impounded area. This area has significant protected status (SPA, SAC, RAMSAR), therefore we would advise that the resulting EIA should consider any deterioration in water quality and identify any necessary mitigation measures. It should be noted that the discharge from Cardiff WwTW is currently consented to minimise impacts of ammonia on the Usk River and therefore any change in ammonia concentrations in the Usk due to the lagoon would be a matter for us to consider.

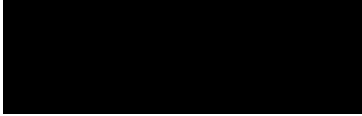
The surrounding urban area is also served by Cog Moors WwTW (population equivalent of 190,000) located in the Vale of Glamorgan. The Lagoon walls and turbines could also affect dispersion of discharges from the Cog Moors and other catchment CSOs along the Penarth and Barry coastline; and subsequently may impact upon water quality at the nearby Barry Bathing Waters. The developer and the Inspectorate should note that The Jackson Bay bathing water is considered at risk of not meeting the Bathing Waters Directive Good class, thus this risk could be increased by the effects of the lagoon. Finally, the class achieved at the Whitmore Bay and Cold Knap bathing waters (currently Excellent) could also be put at risk.

In light of the potential impact upon Dwr Cymru's assets and apparatus and potential environmental harm we would encourage the developer to engage with us directly to discuss matters. Notwithstanding the above, we respectfully reserve the right to comment further on any matters and issues arising from ongoing

and future consultation. However, we trust the above information is helpful at this stage and we look forward to continuing our engagement on the project prior and during the submission of an application to the Planning Inspectorate.

Finally, I would be grateful if all future correspondence relating to the project is directed to me at the above address. For any further information, please do not hesitate to contact me.

Yours faithfully,



**Owain George**  
**Lead Development Control Officer**  
**Developer Services**



Frances Russell  
The Planning Inspectorate  
Temple Quay House  
2 The Square  
Temple Quay  
Bristol  
BS1 6PN

**Our ref:** WX/2015/127596/01-L01  
**Your ref:** EN010073

**Date:** 01 April 2015

Dear Ms Russell

## **EIA SCOPING REPORT MARCH 2015 PROPOSED TIDAL LAGOON CARDIFF BAY**

Thank you for your consultation dated 5 March 2015.

The Environment Agency has reviewed the Scoping Report together with, inter alia, the response submitted by Natural Resources Wales (NRW) in respect of the proposal. The Agency can confirm that it broadly concurs with the issues highlighted within the NRW response, and has therefore largely avoided its duplication or reiteration.

Additionally, as the location of the proposed development is outside of the Agency's geographical area of direct regulatory control, the comments hereunder are, unless otherwise stated, of a generic nature and/or pertinent to potential far-field impacts.

It is anticipated the developer is aware that the Agency has provided information to the Government previously regarding the potential effects of a Severn barrage. Please see link hereunder for more information: <http://www.parliament.uk/business/committees/committees-a-z/commons-select/energy-and-climate-change-committee/inquiries/parliament-2010/a-severn-barrage/>. The Agency would expect the developer to have had regard to this previous advice during the preparation of the Scoping Report.

### **General Observations**

The information contained in the Scoping Report is limited in respect of a number of key elements. Accordingly, it is difficult to provide a detailed assessment of whether all potential impacts and pathways have been identified. Particular aspects, which are only provided in outline, and therefore require more definition in order to assess the potential impacts are:

1. The construction methodologies and sequencing;
2. The design and operation of the tidal lagoon; and
3. The near and far-field effects of the proposed Cardiff Bay lagoon, and other proposed lagoons, on water levels, tidal currents, and sediment transport within the Severn Estuary and Bristol Channel, as these are intimately associated with the potential impacts on water quality and ecology.

It would appear that much of this detail is expected during the production of the EIA as an ongoing process, in conjunction with the development of a proposed Evidence Plan and Modelling Work Plan, which includes a Data Plan.

These Plans are helpful, however it is not clear how potentially significant issues would be managed should these arise during the detailed design of the construction and operation of the proposed lagoon, particularly in the context of the apparently short time scale for the production of the EIA. An example of this, is the lack of definition in the Report on the source of sandy sediment to be used for the core of the breakwater walls. If this is local sediment from the lagoon, which appears to be the preferred option, there is a wide range of aspects which need to be considered in relation to the potential impact of this dredging activity.

A significant part of the work to determine the proposal's potential impact on the Severn Estuary and Bristol Channel will be based on the output of a suite of models. The Agency must be satisfied that all of the modelling being undertaken is appropriate and fit for purpose. The Modelling Work Plan is therefore welcomed, but will need detailed scrutiny, during its development. The Agency would request confirmation that Tidal Lagoon Power has made appropriate provisions for an independent audit of the models.

A significant proportion of the impact assessment methodologies defined appear to be essentially qualitative, and therefore potentially subjective in nature. The Agency would welcome clarification concerning the applicant's intentions to define more quantitative criteria, where these are appropriate and feasible. Details regarding the proposed arrangements for consultation on such quantitative criteria with statutory consultees would be welcomed also.

Water features survey.

The Scoping Report should clearly identify the requirement for a water features survey to support the EIA. The Agency would expect this to include all the tributaries to the Severn and Wye that may be affected by the proposal, in addition to any other relevant water features.

Plans/Figures.

It is noted that a number of the figures in the report, i.e. Figure 8.2 (preliminary estimation of predicated changes to MHWS and MLWS), only show the river Severn itself. It would be beneficial to include the land mass on these maps for context purposes.

Water Resources/Abstraction.

The proposal may potentially impact on the Gloucester and Sharpness canal locks at Sharpness during high tides/peak flood levels, which may be relevant to the public water supply abstraction from the canal. The Canal and Rivers Trust and Bristol Water should therefore be consulted regarding this matter and related issues.

Bathing Waters - Bathing Waters Directive (2006)

The proposals potential impact on bathing waters has been inadequately represented. Changing processes causing variation in sedimentation, tidal prism and sea levels could all impact on the English bathing water sites. Appropriate modelling will therefore be required to establish the potential level of impact as a result of the proposal.

Coastal squeeze

The proposal has the capacity to cause further coastal squeeze, particularly in combination with the other proposed tidal lagoons. Accordingly, clarification is required regarding proposed mitigation measures, which should be appropriately represented in the ES/HRA etc.

Additionally, the Agency would welcome confirmation of any previous designations or identified uses for the proposal area i.e. has the site been previously identified as part of the Severn Estuary Flood Risk Management Plan as being suitable for coastal habitat creation/flood risk management works?

#### Construction impact

It is stated within the report that construction would likely result only in short range impacts, however, there is currently insufficient information to make this assertion. Inappropriate timing of works and disturbance of salmonid migration, for example, could have far-field impacts in the upper Severn tributaries, if salmonid stocks drop as a result of the works. In order to assess the impacts of construction on all anadromous fish populations, sufficient baseline information will be required to map movements of these populations to determine the value/usage of habitat within Cardiff Bay and the adjacent impact area. Determination of potential impact will not be possible until this data is available.

#### Changes to the tidal prism

An assessment of the potential impacts on habitats, due to changes to the tidal prism resulting from the proposed development, will be required. If changes to wave action are expected, there is a significant risk of loss of intertidal habitat (particularly saltmarsh) present along the English coast. This habitat loss could potentially have an impact on sites which have been identified/developed as habitat creation schemes to offset the impact of coastal squeeze.

Loss of saltmarsh habitat is a matter of particular concern due to the expectation that the Severn Estuary will experience a net loss of saltmarsh habitat (predicted loss of 41%) over the next 50 years.

Additionally, it must be noted that the majority of saltmarsh along the Wessex North coast consists of the full range of salt marsh zonations created by variable gradient and degree of tidal inundation. This should be taken into account by the applicant if/when habitat creation to offset the proposed development's potential impact is considered. In order to offset impact through habitat creation, the Agency would expect to see saltmarsh of this high value, not simply a broadly defined intertidal habitat, mud flat or a broad plain of saltmarsh on a single gradient with one or two dominant species. For information, the Agency has a detailed Saltmarsh Management Manual, which should be utilised. In addition, the Agency holds a number of years of monitoring data for saltmarsh habitats, which is available on request.

#### Biosecurity and Invasive Species

This issue will require a more comprehensive assessment, i.e:

- Would the proposed development create habitat which is favoured by invasive species thus increasing the risk of colonisation along the coast? If so, how will this risk be managed?
- How will biosecurity measures be appropriately embedded into the CEMP etc?
- If quarry stone is to be sourced from a marine environment (which it is understood is the case for Swansea Tidal Lagoon), how will this source material be screened for invasive species and what biosecurity measures will be employed to control the spread of these species?

## Internal Drainage Board

It is recommended the Lower Severn Internal Drainage Board (IDB) is consulted regarding this proposal. The IDB has land drainage responsibilities for the ordinary watercourses in the Lower Severn area, which may potentially be impacted.

## Water Companies

The various sewage works around the estuary could be impacted at high tides/flood flows. It is noted that Wessex Water is included as a consultee. This should also include Severn Trent Water as its administrative area includes Frampton-on-Severn and stretches towards Sharpness. Furthermore, Bristol Water should be consulted as it abstracts water at Purton from the Gloucester and Sharpness Canal for public water supply.

## **Chapter 8 - Coastal Processes, Sediment Transport and Contamination**

As previously advised, it is considered that insufficient detail has been provided to determine whether the submitted scope has adequately covered all potential impacts. There is very limited discussion on sediment contamination, accordingly appropriate sediment targets will need to be agreed.

With reference to Section 8.2.0.3, a significant issue for consideration is the modification of flows for drainage outfalls and freshwater inputs (e.g. River Rhymney) within and external to the proposed lagoon.

The spatial extent of the proposed development must include all aspects of its lifecycle, including the impact on the area where the quarry stone is to be sourced and the future dredge disposal areas and areas impacted by dredge disposal, assuming on-going maintenance dredging is required.

The spatial extent of the potential effects of the proposed lagoon on hydrodynamics and flow reported in the Scoping Report is based on high-level preliminary modelling, and 2 figures are provided as model output.

Fig 8.2 and 8.3 both show an abrupt western limit to the modelled change in MHWS and MLWS respectively, with no units on the map scale. As noted by NRW, there is insufficient information supplied to properly assess how meaningful these figures are, and therefore the Agency is not satisfied that the far-field impacts have been properly identified. The analysis has been undertaken for MH/LWS however, some receptors may be vulnerable to extremes not represented in this approach.

Fig 8.3 purports to show changes in flow speed on flood and ebb tides however, no range for the units are shown on the scale. The data appears to indicate a reduced velocity throughout Bridgwater Bay under both tidal states, which may be significant for sedimentation within this existing sediment sink.

Greater clarity on the magnitude of the change in velocity and water level is needed and specific consideration given to how these changes may affect tidal flows and sediment transport in the transitional water body of the River Parrett.

Without any details on the high-level modelling, including what model has been used, the model set-up, model calibration and validation, and the scenarios modelled, it is difficult to assess the significance of the predictions stated in the Scoping Report.

The high-level modelling predictions are also used in other sections of the Scoping Report, eg. the water quality, including appendix 9.1, and benthic ecology sections. Accordingly, this comment applies equally to those sections.

The details of the modelling needed to assess the impact of the proposed lagoon on hydrodynamics, flows, and sediment transport, are yet to be defined, as stated in Point 8.4.0.2. However, to model the estuary evolution by the end of the construction period, as implied in Point 8.4.0.5, 3-D sediment transport modelling with a mobile sea bed is likely to be needed. If this is the case, will it form part of the Modelling Work Plan? The Agency would welcome additional information regarding this matter.

Will a scaled physical model of the proposed lagoon be built to optimise turbine/slucice arrangements and energy production, as well as inform the impact of the lagoon's operation on water level variations inside and outside the lagoon? There is no mention of any proposed physical modelling in the Report.

It is not clear in the sections on additional data collection (Points 8.3.0.2 and 3) exactly what properties of the water column will be collected at the 8 sites. It is also not clear how these 8 sites were defined as strategic sites to complement existing data and to fill data gaps. There is also no mention of any wave data collection. Is it believed that there is sufficient existing wave data? There is reference to a high-level review of coastal processes in Point 8.3.0.1. Have we had sight of this report?

#### Water Framework Directive (WFD) and Assessment of Significance

While section 8.5 attempts to set out a framework for assessing impact significance it should also recognise the linkage with the WFD. The applicant will be expected to demonstrate the development and the in combination effects of this development and others currently planned will not result in deterioration, or prevent future improvement of WFD status on any affected water body, including transitional and fluvial systems. Where this cannot be demonstrated the scheme will need to satisfy the stringent requirements of Article 4.7. Given the wide range of ecological, hydrodynamic and geomorphological impacts from this proposal, it is reasonable to highlight at this stage that the applicant should recognise the need to consider how they can meet the requirements of Article 4.7 from the outset.

It should also be noted that exemption from WFD environmental objectives cannot be used to deviate from objectives and obligations set by other EU legislation (e.g. Habitats Directive).

#### Cumulative/In-combination effects

Insufficient consideration appears to have been provided in respect of the potential cumulative impact of the Bridgwater Bay, Cardiff Bay, Newport and Swansea tidal lagoons, as well as the in-combination effects of these developments and other known developments. This should include a range of possible scenarios where all or any combination of the tidal power schemes being promoted by TLP are constructed, to determine whether the potential level of impact is acceptable. This will be required as part of the WFD assessment, in order to illustrate the development will not cause deterioration in or prevent improvement of WFD status for all impacted water bodies.

## Timescales of geomorphological response

Section 8.2.0.9 refers to timescales of construction, operation and decommissioning. However, it appears that no consideration of the timescales that the geomorphological system as a whole will require to achieve a new equilibrium form following the completion of the proposed structure. The impression given is that an equilibrium form will be achieved soon after completion of the scheme, which does not reflect the complexities of the system. In addition, it must be recognised that the morphological response will need to take into account climate change because the geomorphic system is likely to adjust over timescales within a changing climate.

## Sediment sampling

Particle size data is required for sediment transport modelling. This should be representative of the range of sediments within the inter-tidal and sub-tidal zones.

With reference to Section 8.3.0.2, it is noted that sediment sampling has been included within the benthic sampling programme, which has a stated primary objective related to marine ecology. The Agency is concerned that this focus on the marine ecology may result in an inadequate sampling regime for the broader sediment transport modelling. The sediment sampling regime should be primarily defined by the Geophysical survey.

## Coastal erosion

Changes to patterns of sediment transport have the potential to alter coastal erosion rates and patterns on the south coast of the Bristol Channel. Section 8.2.0.3 vii makes a brief reference to '*coastal erosion, etc*' when listing those coastal processes to be included for consideration. However, no detail is provided in respect of how the impact changes in wave climate and sediment transport will be assessed.

## Climate Change

It is noted that section 8.2.0.10 – 8.2.0.12 refers to the UKCP09 climate change figures. The Agency would strongly recommend that sensitivity testing is undertaken using the UKCP09 High Emissions scenario in addition to the Median emissions scenario described in the scoping study. Since the production of UKCP09 there have been additional IPCC reports and advances in climate modelling that would make it prudent to take a more precautionary approach.

## **Chapter 9 - Water Quality Processes**

It is not clear whether the water quality aspects of the Environmental Quality Standards Directives (2008 and 2013) and the Habitats Directive are being considered under the scope of the Water Framework Directive. If so, this needs to be specifically defined.

There is limited discussion on the potential impact of the proposed lagoon on contaminants or hazardous pollutants (metals and organics) in the water column, either adsorbed onto suspended sediments or in the dissolved phase due to sediment erosion and deposition during the construction and operational phase. This aspect is linked not only to the sediment contamination topic, which is stated to be part of Section 8 Coastal Processes, but also to potential changes in the dilution and dispersion of sewage and industrial discharges and freshwater outflows.

It is not entirely clear in which Section, or how, sediment contamination, whether in bed sediments or on suspended sediments or dissolved is being assessed. This issue must be clarified, to ensure the potential impacts are adequately covered.

In addition, the impact of increased siltation/sedimentation within the lagoon could directly impact on water quality via complex chemical interactions – the interaction between sedimentation and water quality within the lagoon needs to be assessed. Water quality within the lagoon needs to be assessed in terms of suitability for recreation/aquaculture as promoted in other documentation.

All stages of work must ensure that particular reference is made to the Marine Policy Statement.

The Agency would make the following specific comments:

#### 9.1.0.3

Rivers may also be directly impacted.

#### 9.2.0.10

The Agency recommends that the construction assessment scenario is subdivided. The timings and frequency of the modelling scenarios to be reviewed in the light of construction details.

#### 9.2.0.11

Cardiff Bay is a Sensitive Area (Eutrophic) accordingly, the Urban Waste Water Treatment Directive should also be included in this list.

#### 9.3.0.8

It is not clear why information on industrial discharges may be difficult to obtain.

#### 9.3.0.12

The Agency recommends that additional model runs are undertaken for onshore winds. This will show possible worst case conditions for retention of near-shore sourced pollutants. An iterative methodology to define the need for additional sampling is also proposed within this Point. How does this fit into the Modelling Working Plan and the timescales of the Project?

#### 9.3.0.14

It is not clear how the proposed marine water quality survey was defined. Whether one site in the area of the proposed lagoon is sufficient is questionable, given that there are likely to be gradients across the sea area of the proposed lagoon. It is also not clear why there is no tidal depth profile data for the site in the proposed lagoon and the 2 estuarine sites. Vertical structure in suspended sediments is known to occur within the Severn Estuary and its sub-estuaries.

As previously stated, analysis of contaminants in the water column, both adsorbed to suspended sediments and in the dissolved phase, appears to be extremely limited. It is not possible to understand the partitioning behaviour of contaminants without such information.

The partitioning behaviour of contaminants is needed to model the impact of changes in the suspended sediment regime on contaminant distributions in the Severn Estuary and Bristol Channel.

#### 9.3.0.15

Surveys are proposed for the winter (December to February) and spring/summer (March onwards). 2 surveys are not considered to be sufficient to provide information on seasonal growth patterns, particularly when the 2 surveys could be only one month apart.

If samples are considered to be required to define the load of contaminants from a river, it is recommended that the analysis is for the total contaminant concentration (i.e. both adsorbed to suspended sediments and in the dissolved phase), and not just the dissolved phase.

#### 9.4.0.8

The Agency does not agree with the comment that reducing the mesh resolution of the model will not deleteriously impact the quality of the water quality model predictions. The mesh size influences the volume within which constituents being modelled are diluted.

#### 9.4.0.12

Bacteria (E.coli and Intestinal Enterococci) should also be included in this list.

#### 9.4.0.15

Direct continuous and intermittent discharges to Cardiff Bay need to be considered separately to those discharging to rivers, as the impact of direct discharges on water quality within the lagoon could be significant.

#### 9.4.0.24

As previously advised, there does not appear to be any consideration of the modelling requirements for phased construction scenarios. Similarly, it is not clear whether there will be a set of cumulative impact scenarios with the Project proposal, including other existing or proposed developments, or just one cumulative impacts scenario (see Cumulative/In-combination effects).

### **Chapter 12 - Intertidal and Subtidal Benthic Ecology**

It is not clear where phytoplankton are being assessed, as it is covered in both Chapter 9 and Chapter 12. At present, the main form of primary productivity on the Severn Estuary is the microphytobenthos on the intertidal areas. The productivity of phytoplankton may be increased in parts of the proposed lagoon and possibly elsewhere in the Severn Estuary and Bristol Channel, by reductions in the turbidity and therefore increased light climate. This may result in a shift in the primary productivity together with an overall increase. The consequences of this may have implications for both the benthic ecology and water quality. It needs to be clarified how the assessment is being addressed within the 2 sections.

There is virtually no discussion in the Scoping Report on the role of the hyperbenthos in the Severn Estuary, particularly *Crangon crangon* and mysids, and the potential impacts of the proposed lagoon on their distribution and abundance. The hyperbenthos is significant as a prey species and predators in the ecology of the Severn Estuary and Bristol Channel. The Agency would advise that careful consideration is given to the inclusion of all the biological elements of the water column, as well as the intertidal and subtidal benthic ecology, to



ensure that potential impacts on the hyperbenthos, zooplankton, phytoplankton, and the microphytobenthos are adequately covered.

### **Chapter 19 – Navigation and Marine Transport**

It is noted that the Gloucester Harbour Trustees are included as a consultee. The Canal and Rivers Trust may also require consultation, depending on the potential extent of any impacts up the Severn i.e. there are canal interests at Sharpness.

Should you wish to discuss any of the above issues further please contact the undersigned direct.

Yours sincerely

**Dave Pring**  
**Planning Specialist**

Direct dial 01278 484627

Direct fax 01278 452985

Direct e-mail [dave.pring@environment-agency.gov.uk](mailto:dave.pring@environment-agency.gov.uk)

**From:** [Correspondence](#)  
**To:** [Environmental Services](#)  
**Subject:** EHRC-CU03962 Russell 20150306 Your email dated 05 March 2015  
**Date:** 06 March 2015 14:39:00  
**Attachments:** [image001.jpg](#)

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EHRC\_logo\_grey



Frances Russell  
EIA and Land Rights Advisor  
The Planning Inspectorate  
Temple Quay House  
Temple Quay  
Bristol  
BS1 6PN

Your ref: EN010073  
Our ref: EHRC-CU03962  
06 March 2015

Email:  
[EnvironmentalServices@infrastructure.gsi.gov.uk](mailto:EnvironmentalServices@infrastructure.gsi.gov.uk)

Dear Frances

**Subject: 'EN010073 – Tidal Lagoon Cardiff – EIA Scoping Notification and Consultation'**

Thank you for your email dated 05 March 2015 regarding the application by Tidal Lagoon Cardiff Ltd for an Order Granting Development Consent for the Tidal Lagoon Cardiff, for which I am writing to acknowledge receipt.

The Commission receives many requests for our views on, and notices about, planning issues. We do not have the resources to respond to all, and it is not our practice to respond to consultations on major infrastructure projects. Therefore, we would request you do not send us further information on this project, unless there is a clear and specific equality and human rights concern you wish to raise (for example, impact on minority communities such as BME groups, or on accessibility for disabled people), to which we can add value.

Yours sincerely

Oliver Varney  
**Corporate Communications Officer**

Correspondence Unit  
Equality and Human Rights Commission  
Arndale House  
The Arndale Centre  
Manchester  
M4 3AQ

Telephone: 0161 829 8324

Textphone: 020 7832 7880

correspondence@equalityhumanrights.com

---

**From:** Environmental Services [mailto:EnvironmentalServices@infrastructure.gsi.gov.uk]

**Sent:** 05 March 2015 14:28

**To:** Correspondence

**Subject:** EN010073 – Tidal Lagoon Cardiff – EIA Scoping Notification and Consultation

Dear Sir/Madam

Please see the following hyperlink to correspondence on the proposed Tidal Lagoon Cardiff.

<http://infrastructure.planningportal.gov.uk/wp-content/uploads/2015/03/Letter-to-Stat-Cons.pdf>

Please note the deadline for consultation responses is 02 April 2015, and is a statutory requirement that cannot be extended.

Kind regards,

Frances Russell  
EIA and Land Rights Advisor

Major Applications and Plans, The Planning Inspectorate, Temple Quay House, Temple Quay, Bristol, BS1 6PN

Twitter: [@PINSgov](https://twitter.com/PINSgov)

Helpline: 0303 444 5000

Email: [EnvironmentalServices@infrastructure.gsi.gov.uk](mailto:EnvironmentalServices@infrastructure.gsi.gov.uk)

Web: [www.planningportal.gov.uk/planninginspectorate](http://www.planningportal.gov.uk/planninginspectorate) (Planning Inspectorate casework and appeals)

Web: [www.planningportal.gov.uk/infrastructure](http://www.planningportal.gov.uk/infrastructure) (Planning Inspectorate's National Infrastructure Planning portal)

This communication does not constitute legal advice.

Please view our [Information Charter](#) before sending information to the Planning Inspectorate.

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31 March 2015

Frances Russell  
EIA and Land Rights Advisor  
3/18 Eagle Wing  
Temple Quay House  
2 The Square  
Bristol  
BS1 6PN

**Ref: I50305\_EN010073\_303600**

Dear Frances

**Planning Act 2008 (as amended) and the Infrastructure Planning (EIA) Regulations 2009 (as amended)**

**Application by Tidal Lagoon Cardiff Ltd for an Order Granting Development Consent for the Tidal Lagoon Cardiff**

#### **Environmental Scoping Consultation**

Thank you for consulting the Gloucester Harbour Trustees (GHT) in the matter of Tidal Lagoon Power's (TLP) environmental scoping report for a tidal lagoon generation scheme in the Severn Estuary.

GHT is a Statutory Harbour Authority and has concerns regarding the potential for adverse impacts on the safety and continued viability of navigation for commercial shipping from sea to the port of Sharpness upstream of the application area, for vessels trading inter-port and on an established marine aggregate dredging activity upstream of the application area.

The scoping report appears to have considered a significant range of potential impacts upon the environment. However, we would like to see further consideration of matters of sediment transport and navigation in the EIA process. Our observations are as follows:

#### **Coastal Processes, Sediment Transport.**

It is understood that the modelling capability extends as far upstream as Frampton on Severn. We believe it would be helpful if the full geographic range of the modelling results were included rather than the foreshortened versions, some of which appear to cease at the Severn Bridge.

The Scoping Report acknowledges the asymmetric nature of the flood and ebb flows in the estuary, and indicates that flood flows may be increased in some areas whilst ebb flows may be decreased. This suggests the potential for changes in the sediment transport and deposition regime which may, in turn, affect the location and nature of marine aggregate resources, the disposition of mud and sand banks and the deposition of fine silt and fluid mud.

It will thus be necessary for sediment transport modelling to include an assessment of a wide range of mobile sediment types in order to establish the likelihood of any significant change to the regime which operates upstream of the application area.

It is understood that future tidal energy proposals include a lagoon located further upstream (the 'Newport' scheme) and another at Bridgwater. All modelling and assessment of the Cardiff scheme should, we believe, take the in-combination and cumulative effects of these additional tidal energy proposals, together with other major proposed projects such as the Bristol Deep Water Container Terminal into account.

Water Quality. The Scoping Report identifies a number of waste water and effluent discharges into the estuary. We believe that it would be appropriate to assess the potential for increased flood and reduced ebb tidal flows to increase the level of retention of effluent waste in the estuary above the application area.

Near, mid and far-field areas. The Scoping Report also refers to these areas as Zones 1, 2 and 3. A plan indicating the geographical boundaries of these areas/zones would be helpful.

#### **Navigation and Marine Transport.**

We are surprised that data relating to Sharpness Dock has not been included in the Scoping Report. Sharpness handles some 500,000 tonnes of cargo annually, with around 400 ship movements through the upper and mid-estuary thus augmenting traffic generated by the other ports mentioned in the report.

In addition, between 450 and 500 recreational craft movements also take place each year between Sharpness and destinations adjacent to the application area (Portishead, Cardiff and beyond).

The study area should therefore be extended to include Sharpness port and the approaches thereto.

The 'overview of the existing situation' is inaccurate. Many vessels, including some bound to/from Bristol and Sharpness habitually navigate to the north of Flat Holm.

The 'tidal window' for commercial operations at Sharpness is much less than for ports located downstream. It should thus be clear that reductions in tide height may have a significant effect upon arrival and departure prospects for a number of vessels.

Again, the cumulative effect of all the proposed tidal lagoon schemes and other capital projects should be taken into account in the EIA.

We trust that you will find the above observations useful.

Yours sincerely



M Johnson  
Harbourmaster/Marine Officer



HID Policy - Land Use Planning  
NSIP Consultations  
Building 5.S.2, Redgrave Court  
Merton Road, Bootle  
Merseyside, L20 7HS

Your ref: EN010073  
Our ref: 4.2.1.4522

HSE email: [NSIP.applications@hse.gsi.gov.uk](mailto:NSIP.applications@hse.gsi.gov.uk)

PINS RECEIVED

26 MAR 2015

FAO Frances Russell  
The Planning Inspectorate  
3/18 Eagle Wing,  
Temple Quay House  
2 The Square, Bristol  
BS1 6PN

Dear Ms Russell,

25<sup>th</sup> March 2015

**PROPOSED TIDAL LAGOON CARDIFF (the project)  
PROPOSAL BY TIDAL LAGOON CARDIFF LTD (the applicant)  
INFRASTRUCTURE PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT) REGULATIONS 2009 (as amended) – Regulations 8 and 9**

Thank you for your letter on 5<sup>th</sup> March 2015 regarding the information to be provided in an environmental statement relating to the above project.

HSE does not comment on EIA Scoping Reports but the following information is likely to be useful to the applicant.

**HSE's land use planning advice**

Will the proposed development fall within any of HSE's consultation distances?

The redline boundary of the development falls within the consultation zones of three major accident hazard sites, these are: Chevron Texaco/Simon Management, Prax Terminals Ltd, and PX Ltd pka Inver Energy (UK) Ltd.

We would not advise against the development of the breakwater. However if any occupied buildings are to be built as part of the project, for example control buildings, visitor centres, retail parks, and facilities intended for outdoor use by the public (for example a footpath on the breakwater), then we would advise that further consultation be sought from the Health and Safety Executive as these might not be compatible with the major accident hazard sites depending on location.

There are currently no pipelines within the development, if in the intervening period we are notified of a change to this situation you would need to seek advice from us.

Hazardous Substance Consent

The developer is advised to consider whether storage of hazardous substances is involved and, if so, whether Hazardous Substances Consent would be required.

The presence on, over or above land of certain hazardous substances, at or above set threshold quantities (Controlled Quantities), may require Hazardous Substances Consent (HSC) under the Planning (Hazardous



Substances) Act 1990 as amended. The substances, alone or when aggregated with others, for which HSC is required, and the associated Controlled Quantities, are set out in The Planning (Hazardous Substances) Regulations 1992 as amended by The Planning (Hazardous Substances) (Amendment) (England) Regulations 2009 and 2010.

Hazardous Substances Consent would be required if the site is intending to store or use any of the Named Hazardous Substances or Categories of Substances and Preparations at or above the controlled quantities set out in Schedule 1 of these Regulations.

Further information on HSC should be sought from the relevant Hazardous Substances Authority.

#### Explosives sites

As there are no licensed explosive sites in the vicinity of the above scoping request, we have no comment to make in this regard.

#### **Electrical Safety**

The project involves connections to electrical power distribution systems and has an impact on the existing generation, transmission and distribution assets on the UK mainland. In the light of that, HSE offers the following comments:

As well as satisfying general health and safety legislation (ie the Health and Safety at Work etc Act 1974 and supporting regulations), the proposed design and future operations must comply with the Electricity at Work Regulations 1989 and the Electricity, Safety, Continuity and Quality Regulations 2002 as amended. Generators, distributors, their contractors and others have defined duties in order to protect members of the public from the dangers posed by the electrical equipment used. HSE enforces the safety aspects of these regulations. If you have any doubts about the particular application of these regulations in terms of either the operation or construction of generators, substations, overhead lines or underground cables please contact Mr J C Steed, Principle Specialist Electrical Inspector, either at [john.steed@hse.gsi.gov.uk](mailto:john.steed@hse.gsi.gov.uk) or Rose Court GSW, 2 Southwark Bridge Road, London, SE1 9HS.

Please send any further electronic communication on this project directly to the HSE's designated e-mail account for NSIP applications. Alternatively any hard copy correspondence should be sent to:

Mr Dave Adams (MHPD)  
NSIP Consultations  
5.S.2 Redgrave Court  
Merton Road  
[REDACTED]

Yours sincerely  
[REDACTED]

Dave Adams  
HID Policy - Land Use Planning





## ENGLISH HERITAGE

Ms Frances Russell  
The Planning Inspectorate  
3/18 Eagle Wing  
Temple Quay House  
2 The Square  
Bristol  
BS1 6PN

Our ref:  
Your ref: 150305\_EN010073\_3036000  
Telephone 0117 975 0689  
Fax

30 March 2015

Dear Ms Russell,

re: **Tidal lagoon, Cardiff. Scoping consultation**

Thank you for consulting English Heritage on this application.

We think that the scoping proposed is generally appropriate but add the further observations set out below.

1. 18.2.3.1 notes that there is likely to be erosion caused by change to the tidal regime and constriction of the estuary and that this will include possible effects upon deposits and sites along the English coastline. We suggest that these changes may also have an impact upon the sub-tidal historic environment, including ship wrecks.
2. Paragraph 18.4.3.11 (*Geophysical data analysis*) notes that marine geophysical survey data will be assessed in conjunction with a deposit model for the lagoon area. We recommend that such surveys will also be required outside the lagoon footprint in order to assess the potential impact of the changes to the tidal regime.
3. Chapter 8 (*Coastal Processes, Sediment Transport and Contamination*) presents some results of high-level preliminary modelling and also notes the extent of far-field effects. Although there is no specific mention of impacts upon the historic environment, this chapter does recognise that the modelling will relate to other impact assessments within the ES. We would like to see a clear link between the results of this work and the survey and data assessment required to understand any potential impacts on the historic environment.
4. Assessment of non-physical effects (settings assessment). The review of impact on setting should be undertaken in line with the *Historic England - Historic Environment Good Practice advice in Planning – Note 3*. This document represents the most up-to-date advice on setting issues and supersedes *The Setting of Heritage Assets: English Heritage Guidance (2011)*, which has been withdrawn.



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[www.english-heritage.org.uk](http://www.english-heritage.org.uk)

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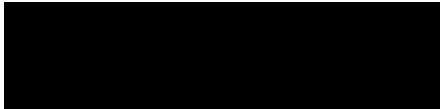
Following an initial review process that may well be undertaken in a tabulated format, we would expect an assessment process akin to that set out within the Advice to be followed – i.e. a clearly expressed and non-technical narrative that sets out ‘what matters and why’. The Advice states:

*“...matrices and scoring systems. Whilst these may assist analysis to some degree, as setting is a matter of qualitative and expert judgement, they cannot provide a systematic answer. English Heritage recommends that, when submitted as part of a Design and Access Statement, Environmental Statement or evidence to a Public Inquiry, technical analyses of this type should be seen primarily as material supporting a clearly expressed and non-technical narrative argument that sets out ‘what matters and why’ in terms of the heritage significance and setting of the assets affected, together with the effects of the development upon them.”*

<http://historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/>

I hope this is helpful; please let me know if further clarification is needed.

Yours sincerely



Vanessa Straker  
Science Advisor (South West), English Heritage  
E-mail: [Vanessa.Straker@english-heritage.org.uk](mailto:Vanessa.Straker@english-heritage.org.uk)

cc. Melanie Barge; Simon Robertshaw



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Frances Russell  
The Planning Inspectorate,  
(By email only)

Our reference: DCO/2014/00022  
Your reference:  
150305\_EN010073\_3036000

1 April 2015

Dear Ms Russell,

**TIDAL LAGOON CARDIFF – EIA SCOPING NOTIFICATION AND CONSULTATION:  
CONSULTATION IN ACCORDANCE WITH THE PLANNING ACT 2008 (AS AMENDED)  
AND THE INFRASTRUCTURE PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT)  
REGULATIONS 2009 (AS AMENDED) REGULATIONS 8 AND 9**

Thank you for your letter dated 05 March 2015 advising that Tidal Lagoon Power Limited plan to construct and operate a new tidal lagoon and associated development on land at Cardiff Bay, Wales (the “proposed development”).

The Marine Management Organisation (MMO) was established by the Marine and Coastal Access Act 2009 (MCAA2009) 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 marine licensing in English inshore and offshore areas and for Welsh and Northern Ireland offshore areas. The inshore area includes any area which is submerged at mean high water spring (MHWS) tide up to the territorial limit. It also includes the waters of every estuary, river or channel where the tide flows at MHWS tide. The offshore area includes waters beyond the territorial limit in so far as they comprise the exclusive economic zone and the UK sector of the continental shelf. It also includes the bed and subsoil of the sea within those areas.

The MMO is an interested party for the examination of Development Consent Order (DCO) applications for Nationally Significant Infrastructure Projects (NSIP's) which propose development which is likely to affect the English marine area.

The MMO welcomes the pre-application consultation for the Tidal Lagoon Cardiff project and the opportunity to comment on the proposed development.

The MMO notes that the proposed development is located entirely within Welsh inshore waters. Natural Resources Wales (NRW) are the appropriate marine licensing authority for



INVESTORS  
IN PEOPLE

the Welsh inshore area. NRW are therefore responsible for consideration of any marine licence application in respect of the marine components of the proposed development and will have with regards to potential impacts arising from both construction and operation, including potential impacts extending beyond the Welsh inshore area. NRW are also an interested party for the examination of the DCO application. With this in mind, and in an effort to minimise duplication of effort with NRW, the MMO proposes to monitor proceedings during the pre-application and examination of this project and commenting as and when it considers necessary and or appropriate and in light of its interests.

The MMO has reviewed the following consultation documents:

- EIA scoping report

The MMO understands from the documents provided that the proposed development is a tidal lagoon renewable energy generation scheme which intends to deliver 1800 to 2800 megawatts of electricity. Consequently, the proposed development is a Nationally Significant Infrastructure Project as defined in the Planning Act 2008 (PA2008) with a generating capacity above the threshold of 100MW, as set out in s15(3)(b) of PA2008.

Whilst the exact details of coastal and marine developments are currently under consideration it is likely that these will include the following works in the marine area:

- A proposed breakwater that will encompass an area of approximately 70km<sup>2</sup> of the seabed and foreshore;
- Concrete turbine and/or sluice gate housings;
- Turbines and sluice gates located within the housings;
- Operations and maintenance access upon the structures;
- Cable works within the breakwater and connection to an appropriate substation; and
- Structures located upon the turbine/sluice gate housing.

The MMO notes that the marine components of the proposed development have the potential to impact the marine environment including the Welsh offshore and English areas.

## **General Comments**

The MMO is currently unsure of the extent which the proposed development will impact on receptors in Welsh offshore or English waters due to the level of detail provided and the uncertainty regarding the nature of the proposed development. Consideration should be given within the Environmental Statement to potential impacts on key marine receptors within English waters. These include impacts to navigation, physical processes, fisheries and fish resource and relevant European marine sites.

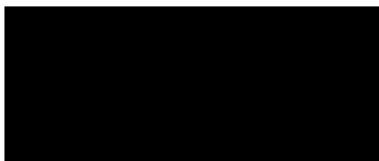
The MMO reserves the right to make further comments on the Project throughout the pre-application process and may modify its present advice or opinion in view of any additional information that may come to our attention.

## Conclusion

This letter sets out the MMO's initial observations with respect to the proposed development and documents provided. The MMO welcomes further pre-application engagement and opportunity to make further comments as it sees necessary throughout the application process.

Please do not hesitate to contact me with regards to any queries you may have in relation to this correspondence.

Yours sincerely



Kathryn Watson

Marine Licensing Case Manager  
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Your ref:  
Our ref:

20 March 2015

### **Scoping Opinion for the Proposed Tidal Lagoon Cardiff, submitted by Tidal Lagoon Cardiff Limited Under the EIA regulations 2009**

We have now had an opportunity to review the scoping report provided by Tidal Lagoon Cardiff Ltd for the proposed Tidal Lagoon Development and would comment as follows:

Any figures and diagrams representing marine information should be submitted on the appropriate scale Admiralty chart for the area.

The Environmental Statement should supply detail on the possible impact on navigational issues for both Commercial and Recreational craft, viz.

Collision Risk  
Navigational Safety  
Visual intrusion and noise  
Risk Management and Emergency response  
Marking and lighting of site and information to mariners  
The risk to drifting craft in adverse weather or tidal conditions  
Impact on fishing activity  
Impact on leisure users

A Navigational Risk Assessment (NRA) will need to be submitted in accordance with MGNs 371 and 372 (or subsequent updates) and the DfT/MCA Methodology for Assessing the Marine Navigational Safety & Emergency Response Risks of Offshore Renewable Energy Installations (OREI).

The shipping and navigation study should include radar and manual observations in addition to AIS data to ensure vessels of less than 300gt are captured.

The offshore human environment should also include recreational and other sport activities.

Particular consideration will need to be given to the implications of the site size, location on SAR resources and operations, access to the lagoon by SAR resources and Emergency Response Co-operation Plans (ERCOP).

Yours sincerely,



Nick Salter  
OREI Advisor  
Navigation Safety Branch

3/18 Eagle Wing  
Temple Quay House  
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Bristol, BS1 6PN

**Land and Development Group**

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SUBMITTED VIA EMAIL TO:  
[environmentalservices@infrastructure.gsi.gov.uk](mailto:environmentalservices@infrastructure.gsi.gov.uk)

01 April 2015

Dear Sir/Madam,

**Application by Tidal Lagoon Cardiff Ltd for an Order Granting Development Consent for the Tidal Lagoon Cardiff - Scoping consultation**

This is a joint response by National Grid Electricity Transmission plc (NGET) and National Grid Gas plc (NGG). Having reviewed the Scoping Report document, National Grid confirms that it has no apparatus located within the current Order limits and therefore has no further comments to make at this stage in relation to the proposals.

Yours sincerely



**Vicky Stirling**



Date: 01 April 2015

Our ref: 147158: EN010073 EIA Scoping - Tidal Lagoon Cardiff

Your ref: 150305\_EN010073\_3036000



Hornbeam House  
Crewe Business Park  
Electra Way  
Crewe  
Cheshire CW1 6GJ

0300 060 3900

Dear Ms Russell

**Application by Tidal Lagoon Cardiff Ltd for an Order Granting Development Consent for the Tidal Lagoon Cardiff**

Thank you for your consultation dated 05 March 2015 requesting our scoping advice on the proposed Tidal Lagoon in Cardiff (the project). This matter relates to an application by Tidal Lagoon Cardiff Ltd. (the applicant) for an Order Granting Development Consent for a Tidal Lagoon in Cardiff. The project qualifies as a Nationally Significant Infrastructure Project (NSIP).

The Environmental Impact Assessment (EIA) Regulations<sup>1</sup> permit the applicant to request an opinion from the Secretary of State on the information to be included in an Environment Statement (a 'scoping opinion.'). Those consultation bodies prescribed in the legislation, must be consulted by the Secretary of State before adopting its scoping opinion.<sup>2</sup>

Natural England has been asked for its opinion (a scoping opinion) as to the information to be provided in an environmental statement relating to the project, or to otherwise confirm that it has no comments to make.

The following constitutes Natural England's formal statutory response.

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<sup>1</sup> Regulation 8(6) of The Environmental Impact Assessment (EIA) Regulations

<sup>2</sup> Regulation 2(1) of The Environmental Impact Assessment (EIA) Regulations

## **Natural England's role**

Natural England is a non-departmental public body. Our statutory purpose is to ensure that the natural environment is conserved, enhanced and managed for the benefit of present and future generations, thereby contributing to sustainable development. We are working towards the delivery of four strategic outcomes:

- A healthy natural environment;
- People are inspired to value and conserve the natural environment;
- Sustainable use of the natural environment;
- A secure environmental future

This advice should be considered without prejudice and any further advice we may give particular with reference to any further information and project details provided.

The advice given by Natural England in this letter is made for the purpose of this present consultation only. Under the relevant legislation Natural England expects to be included as a consultee in relation to any additional matters to be determined by the consulting body that may arise as a result of, or in relation to, the present proposal. Natural England retains its statutory discretion to modify their present advice or opinion in view of any or all such additional matters or any additional information related to this consultation that may come to our attention.

## **Aim of this Scoping Opinion**

The purpose of this scoping opinion is to provide the Planning Inspectorate (PINS) with advice on the suitability of the scoping report submitted by the developer in presenting the range of issues to be considered through their Environmental Impact Assessment (EIA).

This response focuses on the content of the scoping report, following the order of topics presented within the report, with supplementary advice where appropriate. We aim to advise PINS of where we consider the applicant needs to strengthen the EIA in order to produce an Environmental Statement that is fit for purpose.

## **Habitats Regulations Assessment (HRA) and European Protected Species (EPS)**

As part of our scoping advice we include the range of interests and potential impacts that may need to be considered in relation to the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2010. These Regulations protect Natura 2000 (European) sites – a network of

designated sites which are internationally important for threatened habitats and species – encompassing Special Protection Areas (SPAs) designated for a range of important bird species, and Special Areas of Conservation (SACs) which include a variety of marine habitats and species. The Regulations also afford protection to species listed under Annex IV of the Habitats Directive as European Protected Species.

Habitats Regulations Assessment (HRA) is the process whereby potential impacts to Natura 2000 sites – SPAs and SACs – are considered. We provide further advice on the HRA process in Annex B.

### **General approach to EIA**

EIA is a statutory process which should highlight the potential positive and negative impacts of a project, and identify how effects can be prevented, offset or reduced through mitigation, enabling the decision-maker to determine an application

We note that EIA should consider the environment holistically, and not as a discrete set of individually sensitive receptors. We have made a number of suggestions regarding work that could be undertaken to help understand the (ecosystem) linkages between receptors, and to determine how impacts on one receptor may influence others. We consider that inter-relationships, such as impacts to fish which may be important as prey species for birds and marine mammals, are likely to be important in interpreting the environmental impacts the project. We therefore encourage the applicant to assess these linkages as part of the EIA process.

While much of Natural England's advice concerns issues and receptors that we consider should be scoped in to the EIA at the outset, we recognise that many potential impacts may be ruled out as the assessment progresses. Through our involvement in the Evidence Plan process we will help ensure that the EIA focuses effort on the issues that are most important for this project.

### **Summary**

The Severn Estuary is unique, due to its size, physical processes, and associated habitats and communities, and as such is irreplaceable. It is the largest example of a coastal plain estuary in the UK and one of the largest estuaries in Europe. The estuary is important for its immense tidal range, which affects both the physical environment and the diversity and productivity of its biological communities. The tidal range is the second largest in the world and has amplified

tidal currents; these macrotidal characteristics mean it represents one of the most dynamic estuarine systems in the Europe.

The unique processes of the Severn Estuary underpin the habitats and species for which the estuary is designated at national and European level. These processes should be considered as supporting processes for the designated features. Therefore, both the ecological assessment and the study of hydrodynamic environment will need to be intricately related in the Environmental Statement (ES). Specifically, the ES will need to examine linkages between changes in hydrodynamic regime and each of the feature attributes identified in the European Marine Site (EMS) Regulation 33<sup>3</sup> advice package. Interrelationships will vary depending on the feature and likely impact and there needs to be effective cross-referencing between sections in the ES to clearly demonstrate they have been addressed in the scoping document.

## **Compensatory Measures**

It is highly likely that a proposal of this scale within the Severn Estuary will result in significant impacts to the natural environment and potential adverse effects on Natura 2000 sites within the estuary system. Under article 6(4) of the Habitats Directive<sup>4</sup>, projects that may have an “adverse effect on the integrity of a European site” may only be approved provided three tests are met:

- There are no feasible alternative solutions to the plan or project which are less damaging;
- There are “imperative reasons of overriding public interest” (IROPI) for the plan or project to proceed;
- Compensatory measures are secured to ensure that the overall coherence of the network of European sites is maintained.

In light of the scale and nature of the project and the exceptional environmental qualities of the Estuary, Natural England is concerned that it may not be possible to adequately mitigate and compensate the impacts to the natural environment. The capacity to adequately compensate for losses to such a unique environment is a challenge noted in the conclusion of the Severn Tidal Power Feasibility Study (STPFS). STPFS, now led by the Department for Energy and Climate Change (DECC), was initiated to consider the implications of a Severn tidal power

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<sup>3</sup> Natural England and the Countryside Council for Wales' Advice given under Regulation 33(2)(a) of the Conservation (Natural Habitats, &c.) Regulations 1994, as amended.

<sup>4</sup> [http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index\\_en.htm](http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm)

scheme and all tidal range technologies, including lagoons. The Feasibility Study Conclusions and Summary Report of October 2010<sup>5</sup> stated:

*“The scale and impact of a scheme would be unprecedented in an environmentally designated area, and there is significant uncertainty on how the regulatory framework would apply to it. The study has considered ways in which to reduce impacts on the natural environment and also how to provide compensation for remaining impacts on designated features. It is clear that the compensation requirement would be very challenging, however defined, and require land change within the Severn estuary and probably outside it also;*

*a scheme would produce clearer, calmer waters but the extreme tidal nature of the Severn estuary would be fundamentally altered. This means that some habitats including saltmarsh and mudflat would be reduced in area, potentially reducing bird populations of up to 30 species;”*

Natural England advocates the development of The Ecosystem Enhancement Project (EEP) that aims to provide a framework for delivery of any statutory requirement for compensatory habitat. Natural England anticipates that the process of securing effective and deliverable compensatory habitat presents a significant and complex task.

It should be acknowledged that some of the required compensation measures may not be delivered by the provision of habitats. For instance, barriers to migration for Annex II listed<sup>6</sup> fish species are unlikely to be able to be compensated in this way. It should also be made clear that compensation may need to be delivered outside designated sites. The applicant is reminded that the EEP would need to meet requirements of Habitats Directive and recent, relevant case law.

It should be remembered that within HRA, ‘mitigation’ and ‘compensation’ are two distinctly different terms. Recent case law such as the Briels ruling<sup>7</sup> provides some clarity on this issue and should be referred to, in particular for an interpretation of what is meant by the term ‘mitigation’. The Judgment clarifies the distinction between (i) mitigation measures, and (ii) compensatory measures.

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<sup>5</sup> [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/50064/1. Feasibility Study Conclusions and Summary Report - 15 Oct.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/50064/1_Feasibility_Study_Conclusions_and_Summary_Report_-_15_Oct.pdf)

<sup>6</sup> [http://jncc.defra.gov.uk/ProtectedSites/SACselection/SAC\\_species.asp](http://jncc.defra.gov.uk/ProtectedSites/SACselection/SAC_species.asp)

<sup>7</sup> Habitats Directive, Case C-521/12 *Briels* (May 15, 2014)

## **Cumulative Impacts**

The potential cumulative impact of the project with other proposed tidal energy projects in the Bristol Channel will need to be assessed. The scoping report must report how cumulative and in-combination impacts will be assessed during the Environmental Impact Assessment (EIA). Clearly, the cumulative impacts of the Cardiff scheme with other TLP proposals at Newport and Bridgwater Bay need to be assessed. Two other lagoons proposals are mentioned: Swansea Bay and The West Somerset Tidal Lagoon. Natural England understand that there are plans for other lagoons in the Severn Estuary. The potential impact of these projects should feature in any cumulative or in-combination assessment and all impact assessment modelling for the Cardiff Tidal Lagoon proposal. An in-combination assessment should be made in consultation with statutory consultees and other stakeholders in order to ensure that the full range of activities and developments that might need to be considered are captured.

For a project with such a long time scale assessments and modelling should investigate potential changes for the duration of the project and how these changes may lead to in combination effects. Consideration should also be given to the coastal strategies in place around the Severn including shoreline management plans and habitat creation programmes. These plans and programmes will probably affect the morphology of the estuary over the lifetime of the development. The assessment should also consider the impact of the lagoon development of the delivery of these strategic coastal plans and programmes.

More detail is specified below in the relevant chapters.

## **Timescales**

Natural England consider the timeline for the EIA to be ambitious. With regard to the time needed to complete STPFS, the potential need for compensation measures and the data uncertainties concerning the dynamics and environment of the estuary, producing an EIA to a satisfactory standard within the proposed timescale appears very challenging. While assessments progress and an understanding of what may be required develops it would be acknowledge that the timetable could change.

## **Evidence Plan Framework**

Natural England note and welcome the fact that TLP is developing and agreeing an Evidence Plan (EP) with relevant statutory nature conservation bodies. Natural England believes that the development of the EP for Cardiff will facilitate the process of agreeing upfront what

information needs to be supplied to the Planning Inspectorate. This information will be required as part of a Development Consent Order application for the various lagoon proposals and application to help ensure compliance with the relevant legislation.<sup>8</sup>

### **Rochdale envelope**

We agree with the applicant's proposal of utilising the Rochdale envelope approach to impact assessment but we would urge developers not to assume that all possible impacts have been identified and can be potentially mitigated through this approach. Where a favoured technical solution is likely to be adopted it is preferred that a full environmental assessment be made of that solution in preference to any worst case scenario. To ensure the maximum efficiency of this approach we would urge the applicant to maintain discussion with Natural England throughout the development process.

Natural England's detailed comments are provided in the following annex. If you have any questions regarding the above comments or want to discuss further any of the issues we have raised please contact me on the details below.

Yours sincerely



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<sup>8</sup> <https://www.gov.uk/government/publications/habitats-and-wild-birds-directives-evidence-plans-for-nationally-significant-infrastructure-projects>



## ANNEX A

### PARAGRAPH SPECIFIC COMMENTS

#### Chapter 1.0 - Introduction to Scoping Report

Natural England has no comments.

#### Chapter 2.0 - Proposed Approach

**2.1.0.4** Care should be taken to use the correct terminology when discussing Marine Conservation Zones (MCZs). Bideford to Foreland Point is a proposed MCZ (pMCZ) as it is currently being consulted on by Defra in the second tranche of MCZs and is therefore a material planning consideration now. North of Lundy is currently a recommended MCZ (rMCZ). This has been recommended by Finding Sanctuary (the regional project tasked to produce a list of recommended sites within the south west), but not yet included within a consultation tranche by Defra. Although rMCZs are not material planning considerations, it might be prudent to ensure enough work is done on the potential impact on this site and Morte Platform rMCZ to enable all future assessments that could be required at the time of submission.

**2.1.0.11** and **2.3.0.2** Modelling of estuary processes must include sediment processes (volume, elevation, erosion and accretion) as these underpin the functionality of saltmarsh.

**2.3.0.2** Natural England would remind the applicant that flood risk is not just about extreme events. The focus seems to be on extremes in relation to impacts on flood defences.

**2.3.0.6** The modelling work is a vitally important part of the whole assessment process so NE would welcome the setting out of a Modelling Work Plan which engages with statutory consultees at key stages.

**2.4.0.1** It is reassuring to see that TLP recognise the complexity of the environmental challenges raised by the Project in the Severn estuary. Reference is made legislative to requirements. It would be useful for TLP to set out how the HRA will feed into the EEP.

**2.4.0.3.** It is stated that the EEP will provide a framework for delivery of any statutorily required compensatory habitat. It should be recognised that some required compensation measures may not be delivered by the provision of habitats. For instance, barriers to migration or

entrainment in tidal turbines (should they prove to be of concern) are unlikely to be able to be compensated in this way.

**Appendix 2.1** Natural England disagrees with the assessment of the potential impact of hazards on the bird assemblages notified as qualifying features of the Somerset Levels and Moors SPA/Ramsar Site as this European Site is ecologically linked to the Severn Estuary SPA/Ramsar Site. Birds move between the two European Sites, which provide alternative winter feeding grounds for waders and wildfowl depending on prevailing weather conditions.

**Point 9 (Page 14 of Appendix 2.1)** states “At this stage it is anticipated that only in-combination effects on coastal hydrodynamics with other future lagoons may provide a potential impact pathway on the bird features of far-field European sites.” We disagree with this statement being made before a detailed assessment is completed. The scale and nature of the project means that it could have an effect alone on such sites.

**Point 10 (Page 14 of Appendix 2.1)** states “The Somerset Levels and Moors is an inland site and therefore there is no impact pathway between alterations in coastal processes in the Severn Estuary and this site.” The Somerset Levels and Moors floodplain is tidal approximately 12 miles inland. As populations of bird species notified as mobile qualifying features of the move between the inland and coastal European Sites, it is essential that the impacts are considered.

**Appendix 2.1** ‘The Habitats Regulation Assessment Process’: It is important that already allocated/established areas of compensatory habitat for adverse effects on integrity of other projects are considered in the HRA assessment process e.g. compensatory habitat at Steart for impacts resulting from the Bristol Port Deep Sea Container project.

**Appendix 2.1** Natural England would like to highlight that on 16th October 2014, the UK received formal correspondence (Reasoned Opinion) from the European Commission outlining their position regarding the number of Special Areas of Conservation (SACs) for harbour porpoise in the UK under the EU Habitats Directive. The Joint Nature Conservation Committee (JNCC) have undertaken a new analysis of the largest and most comprehensive set of data for harbour porpoise in UK waters, with the aim of identifying possible sites for SAC designation. The JNCC has recently given initial advice to all UK governments, which indicates that there are several potential sites around the UK. There is more work to do before JNCCs final advice to governments will be ready. Together with country agencies, JNCC will be refining the current advice and developing site documentation in line with usual MPA

processes. This will include some informal information gathering from key stakeholders over the next few months and a formal consultation in the summer (subject to clearance).

**Appendix 2.1** Cardigan Bay and Pen Llyn a'r Sarnau SACs – While these SACs are a long distance from the proposed site, further information should be presented to screen the bottlenose dolphin out of the HRA assessment (as suggested in the table), as it is a mobile species and linkages between this population and other populations are not fully understood.

**Appendix 2.1** Natural England question footnote 11 in the table. While we accept there are no haul outs in the region, this area could be important for foraging and the wider area is a known transit route for grey seals between Wales and SW England (and possibly further afield). A key risk for seals will be possible collision or entrainment within the turbines, which could be an issue for a foraging seal.

**Table 1** - Pre-screening selection of sites and features and consideration of potential impact pathways for the Project – construction - does not provide an account of the potential cause-effect relationships between the Project and the over-arching Estuaries Feature. The applicant is referred to the Natural England and the Countryside Council for Wales' advice given under Regulation 33(2)(a) of the Conservation (Natural Habitats, &c.) Regulations 1994, as amended<sup>9</sup>. This document provides detailed policy guidance on the attributes and conservation objectives for each EMS site feature. Reference to this guidance will be fundamental to any assessment that considers impact pathways and identification of the characteristics considered fundamental to the health and integrity of the features.

**Over-arching Estuaries Feature** - It should be noted that the SAC designation includes an overarching “estuaries” feature within which subtidal sandbanks, intertidal mudflats and sandflats, Atlantic salt meadows and reefs (of *Sabellaria alveolata*) and three species of migratory fish are defined as both features in their own right and as sub-features of the estuary feature. All elements of the Estuary Feature should be considered in screening.

Characteristics such as Estuary Extent, Morphology, Tidal regime and flows, Sediment budget, and Toxic contaminants are fundamental to defining the condition of the estuaries feature. Regard should be had to impacts relating to i) loss in estuary extent, in view of the large project footprint ii) The fish assemblage as part of the Estuaries feature in view entrainment, barriers to movement and migration, and changes in supporting habitat extent iii) The notable estuarine Assemblage of Vascular plant species, in view of potential impacts on saltmarsh due

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<sup>9</sup> <http://www.severnestuary.net/asera/docs/Regulation%2033%20Advice.pdf>

to altered sediment budgets and tidal range and iv) The notable estuarine Assemblage of Wildfowl species, in view of altered feeding grounds, tidal regime and range and noise and disturbance. This list is not exhaustive and Natural England welcome further discussion on this matter. For full information on what is protected within the SAC and SPA, please refer to the current Reg 33 package.

**Table 1:** This table does not appear to consider ‘cause-effect pathway’ interactions within the project and externally. It appears only to assess each potential ‘cause-effect pathway’ alone.

**Table 1:** We would suggest that the title of column five should be ‘Noise, vibration and physical disturbance’. We expect the vessel movements associated with the construction phase of this project will have the potential to physically disturb SPA features such as rafting shelduck.

**Appendix 2.3** Natural England welcomes the applicant’s choice to undertake an Evidence Plan (EP) for their HRA and WFD shadow assessments. Stage 2 of the EP process has recently begun and we look forward to working with the developer and other stakeholders to develop a useful and informative initial Evidence Plan (based on the Framework document at Appendix 2.3) by the end of Stage 2.

## **Chapter 3.0 - Structure of the Environmental Statement**

**3.1.0.5 i)** Indicates that several documents will also be produced to support the ES including a “report Identifying any European Site which may be affected.” Natural England would welcome the opportunity to review this report to ensure the report adequately considers all features and how they might be impacted.

**3.2.3.4** The meaning of terms such as ‘minor’ or ‘negligible’ to describe impacts should be clearly agreed and defined at the start of the process so there is no ambiguity.

**3.2.4.1** This paragraph gives an interpretation of what is meant by the term ‘mitigation’. It should be remembered that for HRA, ‘mitigation’ and ‘compensation’ are two distinct terms with different meanings. Recent case law such as the Briels ruling which provides some clarity on this issue should be referred to.

**3.2.5.1** The definition of cumulative impacts versus in-combination impacts in the context of EIA (**3.2.5.1**) is different to the definition of cumulative versus in-combination impacts in the context of HRA (**3.3.0.4**). This is likely to cause confusion and therefore we suggest that the

applicant and all statutory parties seek to agree definitions/terminology at the earliest opportunity.

**Table 3.1** – There are some important omissions from **Table 3.1**, namely Hinkley B, Hinkley A, Steart (managed re-alignment and compensatory habitat), Black Ditch Wind Farm (Sedgemoor, Somerset), Withy End Wind Farm (Sedgemoor, Somerset), SMPs and other relevant plans (mentioned in **Section 7**).

**Table 3.1** outlines key developments and operations that the ES will include as part of the cumulative impact assessment. This needs to include aggregate dredging as there are a number of licenses in operation and proposed in close vicinity to the lagoon. These have been mentioned as other seabed users but there is no mention of their inclusion in the cumulative assessment.

It is not clear how the temporal nature of impacts is going to be considered. Nor is clear whether impacts which are present throughout the life of the lagoon are considered permanent or to have some reversibility due to the fact that the project is proposed to be decommissioned.

### **Data sources**

Aggregate licenses neighbouring the Cardiff tidal lagoon application area hold data that can be used in this EIA.

## **Chapter 4.0 - Introduction to Environmental Statement**

No comments

## **Chapter 5.0 Background to the Project and Site Selection**

**5.3.0.9** Notwithstanding the references made (at paragraphs **6.2.0.9** and **6.4.0.2**) to dredging within the lagoon for construction, the statement in this paragraph that “dredging may be required” is too vague. Regular dredging during operation of the lagoon is likely to limit the biodiversity TLP anticipate will have established on the project associated infrastructure at the time operations cease (as per para **6.5.0.2**). Natural England would welcome more detail on the depth and frequency of dredging that is anticipated during construction and for maintenance during operations. It is also important that information is provided as to the volume of material to be taken and the method and location of disposal.

**5.4.0.2** This paragraph states that “the ES chapter will further discuss the background to the Project, site selection and detail the outcome of the ongoing design iteration process.” We suggest that the chapter also includes references to the other Tidal Lagoon proposals in the Estuary? These proposals are highly relevant in terms of cumulative impacts.

## **Chapter 6.0 - Project Description**

**6.1.0.11 - Onshore works** – paragraph refers to “provision of construction support sites including access routes for construction traffic, land creation works, lay-down areas and temporary rock stockpile areas.” Information should be provided on the number and location of these sites and access routes, and specifics on the land creation works.

**6.2.0.2** A large volume of material will be needed to construct the breakwater. Increases in extraction are anticipated to meet the demands of the project. Some of the sources of the necessary material may be limited, or require additional actions in addition to those under existing permissions (as per Swansea lagoon). The ES should include information about the source of this material. Further detail will be needed to elucidate current references to ‘existing operational sources’ (in para 6.2.0.8) and impacts being addressed under permits relating to those sites require.

**6.2.0.9** States that “if at all practical, the sandy material for the core of the breakwater will be dredged from within the footprint of the lagoon area.” As the volume of materials is significant (10 million m<sup>3</sup> according to paragraph 6.2.0.7), assessments will have to consider both scenarios (with dredging from the footprint and without).

**6.2.0.9** With reference to dredging activity within the lagoon, details should be provided on the dredging practices and consideration given to any indirect impacts such as sediment plumes.

**6.2.0.10** Access routes on land to the construction area need to be indicated, and it should be made clear whether these routes are existing routes, or new roads. (also referred to in **6.2.0.42**) potential impact on terrestrial ecology.

**6.2.0.13** It is not clear if turbine and sluice gate housing structures will be lit at night.

**6.2.0.17** The area around the turbines and sluice gates will be ‘gradually deepened’. It will be important to assess fully the quantity of material removed and give an indication of where it could be disposed. It will also be useful to be clear about whether disposal will be included under this application or under a separate licence.

**6.2.0.34** This says the ability to pump at the end of a tidal cycle may reduce the loss of intertidal area. That may be true but it could potentially result in an increased risk of damage to receptors such as fish. Any management measures such as this would need to be fully assessed across all receptors.

**6.2.0.43** It is stated that several opportunities for grid connections exist in the local area, but it would be useful to confirm these plans as quickly as possible. Our assumption in this response is that the grid connection will be in Wales as the red line boundary given does not enter English waters. Landfall issues for the Cardiff project will be scrutinised to a greater degree by NRW. However with a view to the Cumbria proposal, Natural England would comment that detailed consideration about the details of the tie-in, method of construction etc. and how the construction will affect flood risk along the coast, impacts on existing or proposed defences (or even managed realignments to create habitat) need to be included. These details should be included in the Project Description, rather than in para **5.3.1.10**, where they are currently alluded to.

**6.3.0.1** States that construction will start after grant of development consent, Marine licence, other consents as required and discharge of any relevant requirements or conditions prior to construction. This last point may take some time given the acceptance that compensatory measures may be needed. However, no allowance is given for this prior to construction if first power output is predicted to be 2022. This is similar to the point raised about **para 2.1.0.13**

**6.5.0.2** On decommissioning of the project, the structures may have public amenity value and possibly biodiversity value. Natural England is mindful that a 120 year old asset is going to need considerable maintenance. There are issues of how that would be achieved. This section should give consideration to future maintenance, how it would be achieved and who would have responsibility for it.

## **Chapter 7.0 Planning and Policy Context**

**7.2.0.23** There will be implications for the Shoreline Management Plan policies if the lagoon is built. There needs to be indication from EA/NRW on what the principles for flood risk management policies for the sea walls enclosed by the lagoon should be and some clarity on the lagoon breakwater role in flood risk management, if any, both short, medium and longer term.

## **Chapter 8: Coastal Processes, Sediment Transport, and Contamination**

### **Background**

#### **General Comments**

The detail within this chapter of the scoping report is limited; there is limited information provided on the baseline data, proposed surveys, and the high-level modelling undertaken. It is unclear from this chapter whether all technical and engineering details of the lagoon have been incorporated. It is important that the full range of potential physical impacts have been scoped into the report. For example it should be clear whether dredging and dredge disposal will be a requirement of the construction or operation of the lagoon, or if additional locally sourced aggregate from the estuary be required.

The timescales proposed for the EIA (and development) are challenging. It is important that sufficient time is available to adequately review existing baseline data, and carry out surveys, modelling and assessments in order to deliver a robust EIA. Timescales should enable investigations to be undertaken in sequential order e.g. grab sampling and particle size analysis will be required prior to geomorphological modelling and assessment so that it can inform the work undertaken.

#### **Contaminants**

Reference to contaminated sediments is limited in the chapter, other than that contaminated sediments may be present. No further description of impacts is given or consideration made. See further detailed comments below.

#### **In-combination and Cumulative Impacts**

The entire scope of the coastal processes, sediment transport and contamination assessment (including modelling and data collection) should adequately take all in-combination and cumulative effects into consideration. This should include all phases of the development and may mean larger scale, wider ranging impacts need to be considered. This is discussed further for 8.2.0.8 and 8.4.0.8.



## Paragraph specific comments

### Overview

**8.1** - It is important to stress here the unique nature of the Severn Estuary in a UK, European, and global context. The Severn Estuary's size, physical processes and associated habitats and communities are irreplaceable. (CCW & NE 2009<sup>10</sup>).

### Scope of potential impact to be assessed

Saltmarsh and intertidal habitats are dependent on sedimentary processes and therefore need to be addressed within this section.

**8.1.0.3** Intertidal areas should include the saltmarsh elements, not just muddy sediment. This needs cross referencing to the section on intertidal habitats.

**8.2.0.2** It is important that consideration is given to the levels of contamination within the sediments and risks associated with disturbing such material; Cefas Action Levels are a good tool. However, consideration should also be given to the Water Framework Directive requirements and the risk to habitats and species under the Habitats Regulations and other associated legislation (Langston et al 2010<sup>11</sup>; Murdoch et al 2010<sup>12</sup>).

Where contaminated materials are identified, adequate actions and mitigation should be scoped in. The project may also need to consider sediment contaminants during excavation, dredging or similar activities which may liberate material during construction, operation and decommissioning phases of the project. Adequate methods for removal, treatment, and disposal of this material and potential impacts associated with these activities will need to be considered.

**8.2.0.3** The section provides an indication of the issues to be assessed, but needs expansion to ensure all issues are covered:

- i) Needs to consider potential impacts on all possibly affected habitats and species not just the intertidal.
- ii) Dispersion characteristics need to be linked to the Chapter 9 water quality assessments.

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<sup>10</sup> Countryside Council for Wales (CCW) and Natural England (NE) (2009). The Severn Estuary/ Mor Hafren European Marine Sites, NE and the CCW's advice given under Regulation 33(2)(a) of the Conservation (Natural Habitats, &c.) Regulations 1994, as amended (June 2009)

<sup>11</sup> Langston WJ, Pope ND, Jonas PJC, Nikitic C, Field MDR, Dowell B, Shillabeer N, Swanbrick RH, Brown AR (2010). Contaminants in fine sediments and their consequences for biota of the Severn Estuary. Marine Pollution Bulletin 61 (2010) 68-82.

<sup>12</sup> Murdoch N, Jonas PJC, Falconer RA, Lin B. (2010). A modelling assessment of contaminant distributions in the Severn Estuary. Marine Pollution Bulletin 61 (2010) 124-131

- iii) Alongside affects to the ecology, the potential for large scale morphological change should also assess the potential consequential further changes to the estuary including tidal flows, wave propagation, altering of sedimentary processes. Also, how these may affect industry/sector activities (e.g. marine aggregates, ports) and whether there will be subsequent impacts to the environment, should sectors have to alter their activities e.g. increasing dredging frequency or volumes. Further assessment should also be undertaken for more localised scale effects.
- iv) The assessment should scope in the subsequent location and possible impacts of the material predicted to be mobilised and scoured as a consequence of increased flows.
- v) Changes in flows across of the estuary and implications to changes in siltation should consider environmental impacts, alongside those of associated with the ports and marine aggregates sector.
- vi) The potential requirement for capital and maintenance dredging and sea disposal should also consider the environmental impacts associated with these activities.
- vii) Changes to wave pattern and characteristics should incorporate changes associated with wave reflection on the new lagoon walls, changes to waves on the opposite side of the estuary from the lagoon, and changes up and down estuary from the lagoon.

## **Spatial Extent**

**8.2.0.4** The scoping assessment is based on the high level modelling, the details of which have not been provided in the report. Without these details we cannot confirm the proposed zone of influence of the lagoon. This also has implications for the HRA screening assessment provided.

All models should be of sufficient spatial scale to adequately identify and assess potential changes to physical processes. **Figures 8.2 & 8.3** do currently appear to have spatial limitations associated with them in the upper estuary, up into the rivers and in the outer Bristol Channel, as physical affects appear to continue beyond the mapped spatial extent in these figures.

Given the lack of detail regarding the initial high level modelling outputs, it is important adequate description and annotation of all modelling results are presented in the ES and supporting reports. It is important that any model used is adequately calibrated, validated and sensitivity tested. All model outputs should clearly identify and explain the errors,

assumptions, and limitations of the results.

**8.2.0.5** **Figure 8.2** provides a preliminary indication of the effect of the Project on Mean High Water Spring (MHWS) and Mean Low Water Spring (MLWS), though no details of the model, bathymetry and tide are given. However, preliminary results indicate that there will be a measurable reduction in the height of MHWS, and an increase in the height of MLWS, causing a significant reduction tidal range over a large area of the Severn Estuary and Bristol Channel.

**8.2.0.6** As indicated in **Figure 8.2** the impacts to MHWS go at least as far as Frampton-on-Severn. It is important that any model used for the EIA goes beyond this point to adequately identify impacts and its entire spatial extent; this will also apply to the tributary rivers of the estuary, alone and in-combination.

**Figure 8.2** It is not clear that proposed dredging within the lagoon informs this mapping.

**Figure 8.2** These figures indicate a contraction of the tidal range over the whole estuary. It should be clear what time frame these figures relate to and how the current / anticipated situation may change over time.

**Figure 8.2** It appears likely that there will be less inundation of the upper intertidal and more inundation of the lower intertidal. This could affect the ecology of the estuarine system and the movement of sediment onto upper saltmarsh. The potential impacts on saltmarsh should be reported in more detail in addition to the reference to the reduction of extreme high tide in 10-7 10.2.1.12.

**8.2.0.7 - Figure 8.3** indicates measurable changes in flood and ebb currents, with potential changes to tidal flows going beyond the limits of the figure, particularly in the Bristol Channel. It is important that the model has the capacity to identify the limits of impacts associated with the scheme, alone and in-combination. The figure also does not incorporate the tributaries of the estuary, or provide a numerical scale.

**8.2.0.8** We advise that the preliminary modelling suggests that the far-field extent goes beyond the extent of the present modelling tool. We advise that the model is extended both further up the estuary beyond Frampton-on-Severn and further out into the Bristol Channel to incorporate the entire spatial extent of potential effects of the scheme. The model should also include the tributary rivers of the estuary in order to identify the potential upstream effects of the lagoon.

## **Cumulative and In combination**

From the high-level modelling results presented it appears that this assessment has been undertaken for the operational effects of the project alone. There is no indication that this assessment has taken into consideration potential cumulative and in-combination effects with other plans and projects, including other lagoon proposals. It is important that these are incorporated and considered into the assessment and the model is of a sufficient scale to incorporate these effects, as it is very probable that these will be larger in scale and wider ranging.

## **Timescales**

**8.2.0.9** All coastal processes investigations, assessment and modelling will need to adequately incorporate the timescales of construction, operation and decommissioning identified in this section, including on-going change and estuary response that may occur during the 120 year operational phase of the lagoon (discussed further in 8.4.0.5).

## **Decommissioning Phase**

The proposal for decommissioning of the project involves the removal of the turbines, metals, and plastics relating to energy generation, but retains the breakwater allowing water to flow freely around the structures. It may be appropriate to undertake modelling to ascertain impacts for both the decommissioned lagoon as described, and for the complete removal of the lagoon. The model will need to incorporate the likely changes in bathymetry after 120 years including that associated with climate change (8.2.0.10-12) and coastal strategies and plans (discussed further in 8.4.0.8).

**8.2.0.10** An explanation should be provided as to what constitutes the 'baseline condition of the estuary'. Natural England would like to know whether or not climate change mitigation that may be carried out in the lifetime of the project has been considered against this baseline (such as managed realignment to address coastal squeeze).

## **Climate Change**

**8.2.0.11** It is stated that the UKCP'09 Medium Emission projection 95th percentile will be assessed. We advise that sensitivity testing of the UKCP'09 High Emissions scenario projections is also undertaken as a worst case scenario.

## **Additional Comment**

We advise the assessment should also consider weather patterns, increased storminess, and natural variation in the physical processes of the estuary, in particular extreme natural events and potential consequences associated with the lagoon. For example is it worth considering whether particular winter storm waves might be exacerbated or significantly altered by the proposed development.<sup>13</sup>

## **Existing baseline data, consultation, and need for survey**

**8.3.0.1** The report states that a high level review of coastal processes has been completed. This review has not been referenced or appended to the report: without this it is not possible to provide advice of the robustness of this review. No literature review or details are provided or references made to scientific literature on the area. There is a requirement for a more detailed and substantive baseline information review including data analysis at an early stage of the EIA.

Coastal bathymetry/topography data (e.g. LIDAR) of the intertidal and coastal habitats may also need to be included to ensure adequate join up of data and evidence from land to sea.

**8.3.0.2** Additional survey activities are identified including hydrographic, geophysical, oceanographic and benthic surveys, though the descriptions do not include the scope, extent, and location of the surveys apart from brief details for the oceanographic survey. We have the following comments to make based on the details provided:

The extent and methodology for the hydrographic and geophysical survey have not been clearly enough defined. As mentioned above it is also important to ensure suitable join-up in data from land to sea.

The oceanographic survey appears to be only collecting water column data not wave and tidal current data. It is important to ensure the existing wave and tidal data sources are sufficient if no further data is to be collected.

It is important to be aware of the specific requirement for sediment sampling for contaminants, dredging and dredge disposal (further information can be found [here](#)). Sampling and analysis undertaken as part of the benthic survey may not be suitable. It is important that this survey adequately meets the requirements for coastal processes and contaminant analysis.

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<sup>13</sup> <http://naturalresourceswales.gov.uk/content/docs/pdfs/flooding-and-alerts-pdfs/welsh-coastal-storms-december-2013-and-january-2014-an-assessment-of-environmental-change.pdf?lang=en>

**8.3.0.3** It is important that the survey information is supplemented by existing data to provide greater insight into the oceanographic characteristics of the estuary (Uncles 2010<sup>14</sup>). The proposed surveys alone may not provide adequate spatial and temporal information. It is also important that different data sets are used for model validation from that used for calibration.

### **Proposed Assessment Methodology**

**8.4.0.1** We welcome the use of the outputs from the DECC Strategic Environmental Assessment (SEA) for Severn Tidal Power, 2010.

**8.4.0.2** States that consideration will be given to the use of 3D flow and sediment modelling: we advise that this will probably require additional field data for calibration and validation. Additional bathymetric and near-survey geophysical surveys may be required. We welcome the proposal, which will allow comparison between 2D and 3D outputs, and greater resolution.

**8.4.0.3** As per previous comments we advise that it would be prudent to extend the spatial coverage of the model further up the Severn and out into the Bristol Channel, to ensure the modelling capacity to cover entire spatial extent of impacts, alone and in-combination.

**8.4.0.5** Evaluation of the changes to estuary during the operational phase of the development need to be considered. It is likely that the estuary will continue to respond and change as a result of the new lagoon during the operational phase (120 years). These changes, and associated impacts to the environment need to be considered, alongside those associated with construction and decommissioning.

**8.4.0.6** Interaction with environmental receptors and designated sites should also be included here.

**8.4.0.7** The quantification of change in coastal processes should adequately and clearly explain the limitations of the data, modelling and magnitude of error and range in the data.

**8.4.0.8** The potential for in-combination and cumulative impacts is a critical part of this the work, especially where there is the possibility of multiple lagoons within the Severn Estuary and Bristol Channel. It is important that data collection, analysis and modelling etc. are sufficient in scale to accommodate impacts that may occur from multiple lagoon schemes, and other plans and projects. The assessment should consider all aspects of the project including

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<sup>14</sup> Uncles RJ (2010). Physical properties and processes in the Bristol Channel and Severn Estuary. Marine Pollution Bulletin 61 (201) 5-20.

sources of construction material, dredging, dredge disposal, provision of mitigation measures, and provision of compensatory habitats.

**8.5** It is not clear why this information is detailed here, rather than in Chapter 3. As a result the section is confusing and leaves room for subjectivity.

**Table 8.1** – Reference is made to the judgement of impacts in relation to ‘natural variability’ but it is not clear how this will be defined. It will be necessary to agree criteria for defining the magnitude of impacts and the time scales over which they occur. A definition of what is meant by ‘natural variability’ should also be provided. There also needs to be better recognition of the ‘value’ of receptors.

**8.5.0.10 to 12** – There appears to be contrasting guidance used to inform the assessment of significance in different sections e.g. IEEM guidance, DoE guidance. The Habitats Regulations Assessment will require the use of principles from EC guidance and case law. It should be noted that small amounts of impact, especially permanent loss, can be considered significant (Sweetman case law).<sup>15</sup>.

**8.5.0.13** – Natural England points out that it is the role of the regulator/decision-maker rather than the applicant to determine this issue.

## Chapter 9 – Water Quality Processes

### Generic comments

#### Targets and objectives to protect Natura 2000/Ramsar interest features

As well as Water Framework Directive targets and objectives the water quality assessment also needs to consider the requirements of the relevant International nature conservation sites (SAC, SPA and Ramsar) and migratory fish on Annex II of the Habitats Directive. Natural England is currently in the process of further developing the conservation advice for the Severn Estuary SAC/SPA/Ramsar, which includes water quality. If there are situations where the requirements of affected water bodies are different to the corresponding elements in the conservation advice, the most stringent targets and objectives will need to be applied. Any predicted non-compliance with relevant targets will need to be evaluated in the context of possible impacts on Natura 2000/Ramsar interest features through the provisions of the Habitats Regulations; this assessment will need to take account of temporal and spatial

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<sup>15</sup> Sweetman v An Bord Pleanála [2013]

variation, and the scale of the predicted area of non-compliance.

The target/trigger values that will be applied to assess the contamination of sediment with toxic or radioactive substances is not clear in Chapter 8. We advise that the available options should be reviewed (for example, CEFAS action levels, Sediment Quality Guidelines and OSPAR Assessment Criteria) and agreed with statutory consultees.

### **Modelling methodology and approach**

Currently, few details are provided on the models that will be applied/developed to inform the water quality assessment. We therefore look forward to seeing further detail in the Modelling Work Plan. In our view this should address:

- the models to be applied to inform the assessment of impacts on water quality processes, and how they interact;
- the validation procedures to ensure that these models are fit for purpose (including a review of performance where they have been used previously to assess development proposals)
- the output parameters and their spatial and temporal resolution
- how uncertainty is dealt with and expressed in the outputs.

### **Paragraph specific comments**

9.2.0.2 We support the incorporation of the Severn Tidal Power SEA topic papers on marine water quality into the assessment. It is important that the scope of the water quality assessment has the ability to incorporate in combination and cumulative assessment of the proposed lagoon, with existing developments and discharges, and also the potential effects of the multiple lagoon schemes proposed within the Severn Estuary and Bristol Channel. Such impacts will need to be considered during construction phases and during operation.

9.2.0.3 (ii) We advise that this point is expanded to include freshwater sites, rivers etc. plus protected species associated with the marine, estuarine and freshwater environment. See generic comments above entitled 'targets and objectives to protect Natura 2000/Ramsar interest features'

9.2.0.4 It is important that the water quality assessment is informed by the coastal processes



assessment detailed in Chapter 8 to ensure all impacts within the lagoon and on the wider estuarine environment are adequately addressed. It is also important that this includes adequate assessment of impacts in the tributary rivers and other adjacent water bodies transitional and freshwater, plus designated sites.

(i)-(viii) Again it is important that these informed by the coastal processes assessment in Chapter 8, and that they are considered for Cardiff lagoon and multiple lagoon schemes in the estuary.

(i) Changes to hydrodynamic regime impacts should not be solely focused on discharge of pollutants, but also need to consider wider impacts to water quality, spatially and temporally.

(ii) This assessment should also consider resulting effects to adjacent water bodies e.g. tributary rivers. Flushing time should also be considered for a 'new' water body inside the lagoon.

(iii) This needs to be considered both inside and outside of the lagoon, the lagoon may have a greater tendency for stratification, etc.

(iv) Changes to sediment movement and suspended sediment concentrations should also consider potential changes and impacts to the estuaries 'turbidity maximum', characteristic 'fluid muds' and fronts, plus spatial, and temporal variation and change, including those associated with the spring/neap tidal cycle. This should include consideration of turbidity longitudinally along the estuary and across the estuary characteristics for turbidity, incorporating consideration of the lower estuary turbidity maximum and higher turbidity levels found on the English side of the estuary around Bridgewater Bay (Manning, Langston and Jonas 2010<sup>16</sup>)

(v) The redistribution and remobilisation of sediments contaminated with radioactive substances also needs to be considered, given the proximity to historic nuclear power discharges into the estuary. Appropriate trigger values / action thresholds will need to be agreed to assess the significance of measured and predicted concentrations of pollutants in sediment, where these don't already exist or are ambiguous.

Changes in sediment movement and suspended sediment concentrations may also alter the sediment budget and sediment supply to intertidal areas, affecting their condition and ability to

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<sup>16</sup> Manning AJ, Langston WJ, Jonas PJC (2010) A review of sediment dynamics in the Severn Estuary: Influence of flocculation. *Marine Pollution Bulletin* 61 (2010) p37-51

keep pace with sea level rise. Again this needs to link to the coastal processes assessment in Chapter 8.

(vi) Consideration should be given to potential impacts on phytoplankton, microphytobenthos and macroalgae, including changes in productivity and community structure see relevant information in Underwood ,2010<sup>17</sup> . The linkages between changes in primary productivity and effects on physico-chemical conditions (eg. DO) should also be addressed. Clearly, the mechanism of impact outlined in (vi) is especially important to consider within the lagoon, where it seems highly plausible that increased residence time could lead to a reduction in turbidity, greater light penetration and then severe eutrophication effects, exacerbated by a reduction in the dispersion of existing discharges.

9.2.0.6 The Near field zone needs to provide a distinction between and consider both the waters within the lagoon and those immediately adjacent.

9.2.0.7 & 8 The zones need to consider not only hydraulic effects and pollutant discharges, but the spatial scales associated with changes to turbidity, suspended sediment concentrations and sediment movement.

9.3.0.8 Wastewater flows such as those from power stations and shore-side industry should be included wherever possible, paying particular reference to characteristics of outfalls from power stations and potential effects on habitats and species (e.g. <http://hinkleypoint.edfenergyconsultation.info/Environmental-Permit-applications/Environmental-Permit-applications-ops/HPC-WDA-Permit-Appendix-B.pdf> ).

9.3.0.14 The rationales for the proposed sampling stations to supplement the baseline data (as defined in Figure 3.19 of Appendix 9.1) should be made clearer. For example, figures 3-6, 3-8 and 3-12 in Appendix 9.1 indicate that there are few data available for DAIN, DAIP and chlorophyll within the proposed footprint of the lagoon. With such limited spatial coverage it is unclear how it was decided that a single monitoring station (5) will suffice in providing an adequate baseline dataset. Similarly, there is no sampling point proposed to the west of the site of the proposed lagoon off the south Wales coast to the north of the proposed sampling site 1.

9.4.0.2 Should also include model validation as well as calibration.

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<sup>17</sup> Underwood GJC (2010) Microphytobenthos and phytoplankton in the Severn Estuary, UK: Present situation and possible consequences of a tidal energy barrage. Marine Pollution Bulletin 61 (2010) 83-91

9.4.0.6 (iii) Should consider cumulative impacts with other industries and potential multiple lagoon proposals in the estuary, plus any effects positive and negative associated with possible mitigation or compensation measures which may be incorporated into the proposal package.

9.4.0.8 The assessment will need to clearly state the limitations and errors associated with model outputs.

9.4.0.12 The assessment will need to include data on sediment loading with the modelled loading to accurately assess the potential impact on sediment supply and on potential siltation of the lagoon. The water quality assessment correctly identifies phytoplankton as an important metric. The impact on other primary producers should also be quantitatively estimated (ie. microphytobenthos and macroalgae). The scoping assessment should also be clearer about the specific toxic substances that will be addressed in the model outputs, or least the process that will be applied to screen which ones need to be included in the modelling.

9.4.0.16 The assessment should take into consideration the mobilisation of any heavy metal or organic contaminants resulting from the lagoon as a potential pollution source.

9.4.0.20-23 We support the proposed optimisation assessment, to consider design options for the lagoon and to ensure adequate flushing of the lagoon.

9.4.0.24

(ii) Turbidity, suspended sediment, fluid mud, turbidity maxima should also be incorporated here into the water quality assessment parameters. There will need to be some clarification as to what is covered in chapter 8 for sedimentary processes and what is covered in chapter 9 under water quality and ensure adequate linkages.

(v) Impacts will need to be considered not only at water body scale but also for designated sites, particularly sensitive receptors, and under the Habitats Regulations; with suitable linkages to subsequent chapters including ecology and fish.

(viii) Assessment scenarios should consider the effects of multiple lagoon proposals in the Severn Estuary and Bristol Channel e.g. Swansea Bay Lagoon and Newport Lagoon.

## **Appendix 9.1**

The comments made above on the main body of Chapter 9 should also be considered in relation to Appendix 9.1.

### **Chapter 10.0 Flooding and Hydrology**

**10.2.1.4** - The flood risk management structures and any related natural habitat would need to be assessed. Changes in wave direction could also affect natural habitats in the affected areas and should be considered in the relevant chapters and cross-referenced.

**10.2.1.15** The use of the lagoon for flood storage is indicated very briefly. Presumably this would reduce potential for the generation of power, and it is not clear from the report how integral this is to the proposed operation of the lagoon. If it is an important aspect being promoted, it will have to be fully investigated.

**10.2.1.16** Cumulative effects with projects to create intertidal habitat in the estuary should also be included here. The location of the lagoon may compromise these type of projects, or limit areas that could be used. Intertidal habitat creation may be needed in the lifetime of the project to compensate for coastal squeeze, or even other developments. Question 2 in 10.2.1.17 should include this issue.

**10.4.1.10** Flood risk management (FRM) assets should be considered as not just the engineered structure but the intertidal in front of them and also some of the natural FRM assets such as sand dunes. There needs to be cross reference to the intertidal and other chapters. See also comment under 2.3.0.2 regarding consideration of extreme events against typical conditions.

### **Chapter 11.0 Land Quality and Hydrogeology**

No comments

### **Chapter 12.0 Intertidal and Subtidal Benthic Ecology**

Benthic and intertidal habitats in the English portion of the EMS have the potential to be significantly impacted by the development. Whilst the lagoon development itself is wholly within Welsh waters, there are a number of impact pathways that could result in significant changes across both English and Welsh benthic and intertidal habitats.

## **Hydrodynamics and physical processes**

## General Comments

The main pathway of impact between the lagoon and English benthic and intertidal habitats will be alterations to the hydrodynamic regime and the movement of water and sediment through the estuary. Therefore, both the ecological assessment and the study of hydrodynamic environment will need to be intricately related in the ES. This is needed to fully examine the complex interactions between physical and biological processes. Specifically, the ES will need to draw linkages between changes in hydrodynamic regime to each of the feature attributes identified in the EMS regulation 33 advice package.

Namely, the ES will need to identify, preferably quantifiably, the following:

- i) the predicted change in extent of habitat area from a baseline condition
- ii) the predicted change in distribution of habitats, i.e. their location and overall coherence
- iii) predicted changes in faunal and floral composition of habitats
- iv) predicted changes in the physical and chemical structure and composition of each habitat e.g. the sediment composition and distribution
- v) predicted changes in the supporting process which maintain the habitat and allow it to respond and change to within natural variation (e.g. the flow regime and wave climate)

The scoping report does identify that changes in hydrodynamic regime will have an impact on benthic ecology and intertidal habitats. However, it does not clearly indicate the level of importance or significance that the EIA is planning to assign to such changes, especially in the areas outside of the immediate lagoon footprint. This level of importance needs to be clearly stated and estimated to the full geographic scope (derived from hydrodynamic regime and sediment transport models).

The scoping report does not expand upon how it is expected that hydrodynamic changes will manifest as changes to benthic and intertidal habitats. In order to help focus effort in the EIA process we have outlined what we consider the general impacts to benthos will be.

The 'high level' flow modelling shows in Figure 8.3 that indicates that there will be significant increases and decreases in water velocity at various locations across the estuary. An initial interpretation of these maps could be that areas of increased flow velocity will experience increased seabed shear, sediment mobility and potentially erosion. Conversely areas of flow deceleration may experience an increase sediment deposition and stability. Such changes

could result in morphological changes in addition to changes in local sediment composition and biological assemblage.

In each of these areas of predicted change the ES will need to show how the seabed morphology will respond to the change in flow regime. This will involve modelling the likely bathymetry of the estuary seabed after construction in addition to mapping any change in sediment distribution. Moreover, finer scale models of predicted tidal change will allow the estimation of the area of intertidal habitat that will be lost or modified and to what degree. An increase or decrease in water level will have different impact in the intertidal depending on the shore slope and this will need to be taken into account. These changes in seabed topography, sediment composition, and water flow/sediment disturbance levels will need to be translated into predicted changes in faunal and floral composition to cover the full geographic scope of the project.

Changes to the hydrodynamic regime have the potential to impact each of the EMS's benthic and intertidal habitat features:

### **Subtidal Sandbanks**

Whilst **Figure 8.3** is 'high level' and may not represent the final product, it shows that flow rate will be significantly increased in the central portion of the estuary over the flood and ebb tides. This area of flow acceleration looks to potentially overlap with areas known to support subtidal sandbanks, specifically the areas known as English Grounds and Middle grounds on the admiralty chart (shown on figure 8.1 in the scoping report). The change in flow regime has the potential to increase sediment mobility levels over these banks which could change their position, shape and sediment composition. Changes of this magnitude are likely to have a significant effect on the conservation objectives of the site and will need detailed investigation.

Sub tidal sandbanks are a feature of the SAC but their exact distribution and extent is not fully mapped or understood. Due to the potential for the lagoon to significantly alter the structure and function of nearby sandbanks the ES will need to map the distribution and character of these banks before a full assessment can be undertaken. This will require a combination of bathymetric, sediment composition and faunal data to be analysed in collaboration with the Natural England and Natural Resources Wales.

### **Intertidal mudflats and sand flats**

**Figure 8.3.** also shows areas of flow acceleration over intertidal areas upstream and downstream of the lagoon, for example in northern areas of Bridgewater Bay and in areas adjacent to the channel in the upper reaches of the estuary. Increases in current in these environments may cause a destabilisation of the shore leading to erosion, alterations in slope angle and sediment composition. Such changes are likely to have a significant effect on the conservation objectives of the site and would need detailed investigation. The sensitivity would be increased for areas where existing levels of disturbance and sediment mobility are low such as the areas of intertidal mud found in the Bridgewater Bay.

The European Marine Site advice package<sup>18</sup> for the Severn identifies that sub-tidal sandbanks in the estuary play an important role in storing and supplying sediment to other habitats notably intertidal mud and sandflats. Consequently intertidal habitats in the Severn could be exposed to secondary impacts if there were significant changes in the extent, distribution or composition of the sub-tidal sandbanks. The ES will need to examine how changes in the connectivity and movement of sediment between areas could impact the character and ongoing maintenance of intertidal and benthic habitats.

## **Reef**

Sabellaria reef has been observed in the wider area offshore of Clevedon. The hydrodynamic modelling results (displayed in fig 8.3) indicate that this area is likely to be subject to an altered flow regime. Whilst effects of the lagoon are unlikely to cause direct impacts to Sabellaria reef formations in England, secondary impacts are possible if it caused changes in the extent and distribution of sediment formations or sandbanks. For example the creation of mobile sediment bed forms or significant layers of sediment over areas which support Sabellaria reef will likely cause deterioration of the reef. Moreover, changes to flow regime can affect larval dispersal/settlement and supply of adequate sediment (quantity and type) to elicit tube formation. The deterioration of significant areas of reef over long periods of time would not be compatible with the site's conservation objectives.

## **Saltmarsh**

**12.1.0.2** Indicates that saltmarsh is included within this chapter, but there are few specific references to it. A clear explanation of habitat types covered would be of benefit, and each impact addressed against these individually. Coastal squeeze is an important issue for saltmarsh.

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<sup>18</sup> Natural England and the Countryside Council for Wales' Advice given under Regulation 33(2)(a) of the Conservation (Natural Habitats, &c.) Regulations 1994, as amended.

**12.1.0.4** The JNCC maps do not appear to be dated, or referenced. Natural England would refer the applicant to the Dargie 1998<sup>19</sup> survey of saltmarsh in the Severn. The applicant should note, however, that Natural England considers these data to be outdated and inaccurate when compared to current vegetation/aerial photographs. This survey needs to be updated to enable an accurate estimate to be given as to the extent and type of the saltmarsh feature.

Reference is made to angiosperms (flowering plants) (at **12.2.1.11**). Saltmarsh habitats are dominated by angiosperms, but it is unclear if these are considered to be part of the 'other aquatic flora'. There is a specific WFD saltmarsh classification tool which would be relevant to this section <http://www.wfduk.org/>

It is important to break down the different intertidal elements in **Table 12.2** and show saltmarsh separately from 'intertidal habitats' or provide additional information on this element of the intertidal, as it is an Annex I feature in its own right.

## **Non Natives**

The lagoon structure will represent a large area of subtidal and intertidal rock where in some areas there were previously soft sediments in addition to a number of other niche habitats. Whilst we acknowledge that the outer Severn Estuary has large areas of exposed sub tidal rock the ES will need to consider if this new habitat could support increased numbers of non-native species or species not currently represented in the area. For example the scoping document identifies that *Crepidula*, *Crassostrea gigas* and *Austrominius modestus* are present in the estuary.

## **Construction material**

The scoping document outlines that the project will require a large quantity of sand, gravel and coarse sediment as part of the construction process. We recommend that the ES also considers the likely source of this material and provides information on the potential impacts and risk associated with extraction of this material.

## **Survey work**

It is important that the characterisation survey work is guided by a high level assessment of where impacts are likely to occur. This will ensure that there is sufficient survey data in all areas where a potential change could be observed without dismissing areas of uncertainty.

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<sup>19</sup> Dargie, T. (1999) NVC Survey of saltmarsh habitat in the Severn Estuary 1998 CCW Contract Science Report No.341



This is important due to the complex and far field effects that are likely to occur.

Grab stations are proposed to be located after analysis and interpretation of acoustic data. We support this proposal but would also request that we be consulted before the grab sampling array is finalised.

As above, the sub-tidal sandbanks in the estuary play an important role in storing and supplying sediment to other habitats notably intertidal mud and sandflats. Consequently intertidal habitats in the Severn could be exposed to secondary impacts if there were significant changes in the extent, distribution or composition of the sub-tidal sandbanks. The ES will need to examine how changes in the connectivity and movement of sediment between areas could impact the character and ongoing maintenance of intertidal and benthic habitats.

The use of NVC mapping can help identify zonation in saltmarsh. This is a varied habitat and needs to be considered in terms of the variation resulting from different degrees of tidal inundation. It should be noted that the JNCC Common Standards Monitoring is not suitable for habitat mapping. This is a method for rapid assessment of condition, it only uses sampling, and would also need to be used in tandem with wider habitat mapping and estuary morphology information.

## **Evidence Plan**

The plan proposes separate technical groups for benthic ecology and intertidal and subtidal habitats: we do not think it is worthwhile having these as separate groups as they overlap too much and there is too much linkage. We propose joining sections. Moreover, there are clear links between these and coastal processes and it would be advisable to ensure there was adequate join up between all these groups.

**Paragraph Specific Comments 12.1.1.4** only mentions SSSIs very briefly and no list is given stating what sites and features are being considered. SSSIs are an important element of the protection of the site and should not be left out.

**12.1.2.1.** Lists the NERC Act 2006. It should be remembered that this act also lists habitats and species of importance for both Wales and England which may be relevant to the EIA.

**12.2.1.2** WFD hydromorphology standards will be important to consider in this section

**12.2.1.3** While recognising the value of the Severn Tidal Power studies it will be necessary to obtain further data for the present day.

**12.3.3.3** Data available on saltmarsh includes the 1998 full estuary survey of saltmarsh habitats using the National Vegetation Classification (NVC) Rodwell 2000 and [see JNCC link](#).

**12.3.5.5** EA or NRW may hold archive LIDAR data or other remote sensed data which can be purchased. Some processing of this data will be needed, and understanding of resolution issues, so expert advice on use should be sought as needed.

**12.3.5.6** and **12.4.2.3** NVC mapping gives better detail than Phase I habitat mapping and will allow some comparison with the 1998 Dargie<sup>20</sup> survey. Although it needs to be made clear if this is what is meant by 'Phase II.'

**12.3.5.6** The EA may hold information on saltmarsh if this has been collected for WFD monitoring, but it will only be limited to surveillance water bodies.

**12.4.1.6** There is information on saltmarsh sensitivity in this document <http://jncc.defra.gov.uk/page-2347>. Other work is underway to build on this as part of the marine conservation advice work.

**12.4.1.9** Terminology in tables needs to be agreed as part of the process.

## **Chapter 13.0 Fish including Commercial and Recreational Fisheries**

### **General Comments**

The DECC SEA 2010<sup>21</sup> concluded the likelihood of extinctions for several fish species. We would welcome a clearer explanation as to how the assessment of this project will take account of and build on those conclusions.

It is unclear what the objectives of the current proposed surveys are. i.e. whether they are just characterisation or whether they aim to set a baseline against which future changes can be measured. If the aim is to set a baseline from which to detect future change as a result of the development it would be useful to consider whether the sites selected and replicates are of sufficient resolution for statistical analysis.

It is critical that robust data are collected and research carried out in order to calibrate and validate IBM assessments. There are likely to be substantial logistical constraints in collecting these data.

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<sup>20</sup> Dargie, T. (1999) NVC Survey of saltmarsh habitat in the Severn Estuary 1998 CCW Contract Science Report No.341

<sup>21</sup> [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/50064/1. Feasibility Study Conclusions and Summary Report - 15 Oct.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/50064/1_Feasibility_Study_Conclusions_and_Summary_Report_-_15_Oct.pdf)

Habitat connectivity is expected to be lost over nearly half the width of the estuary. This could result in a significant, if not complete, barrier to migration for some species that use those shallower areas of the estuary. This will be a complex barrier composed not only of the physical impediment of the wall to migration but also changes in hydrology will result in a hydrodynamic barrier for smaller life stages. The southern-most part of the wall will experience an acceleration of the flow meaning that fish will be carried to deeper parts of the estuary. Therefore, it is important to understand: (1) which species use the intertidal, (2) at which stages, (3) when and how they use it in relation to the tides and migration, and (4) the in-combination effects associated with other developments. This information will allow impact predictions at the population level. Moreover, this information can be introduced in the IBM models as part of the behavioural parameters as it will determine, among other things, the distance the animals will travel in a day and the residence time in the estuary.

Further discussion of alternative more 'fish-friendly' lagoon designs should be provided, including the provision of migratory gates at the top of the lagoons and considerations of other means of diverting fish around the turbines.

### **Paragraph specific comments**

Designated sites, **Table 13.1**: the assemblage of fish species feature should be included in the table, although it is mentioned in the text.

**13.1.2.3** should include reference to the Devon and Severn Inshore Fisheries and Conservation Authority. Other commercial fishing activities do occur within the Severn Estuary and should also be considered.

**13.1.3.6** It is not clear if there is any way of estimating the importance of the river Rhymney to sea trout and salmon on its own. There is no information provided regarding rod catches of salmon on the site or specific values for the sea trout. Moreover, valuing the stock for its importance nationally is a little misleading as the river has to be put in context. It is said that the Rhymney has some importance for sea trout catches nationally whilst salmon fishery is evaluated by the importance of the catches in the rivers Sever, Wye, Usk and Taff. If possible specific information about the river Rhymney needs to be presented.

The Rhymey River is the only river impounded by the project and as such deserves a section on its own were a clear description of the migratory species using the river and to what degree is presented.

## Scope of potential impacts to be assessed

**Table 13.2** and **13.2.2.4** It should be explained how *cofferdam – construction of breakwater-habitat modification* offers new spawning and foraging habitat for both estuarine and migratory species.

**13.2.2.5** Natural England agrees that understanding how marine and migratory fish species utilise estuarine habitats during key parts of their life cycle is a critical gap. Many species, particularly juveniles, use selective tidal stream transport including different estuarine habitats during migration. The proposed lagoon location has the potential to effectively reduce this migratory corridor and access to the functional habitat required for migration across nearly 50% of the estuary width. The implications of this for the different species and life stages will need to be appropriately assessed.

**13.2.2.7** Habitat loss: this needs to be assessed like-for-like by receptor. Also “Areas of loss will be assessed in relation to overall habitat areas within the Severn Estuary and Bristol Channel”: this might be misleading and the limitations of this type of comparison needs to be clearly identified.

**Table 13.3** and **13.2.3.4** *Operation and presence of Tidal Lagoon – Habitat modification*, and how can the operation of the tidal lagoon result in increased spawning habitat for estuarine/marine species and foraging habitat for estuarine/marine and migratory species should be explained Also, we believe that the energetic cost to marine/estuarine species of *Operation and presence of Tidal Lagoon- Changes to freshwater exchange and release*, should be a ‘YES’.

**13.2.3.14** EMF: There is no explanation of why the cable should be laid through the seabed rather than be laid through the walls of the barrage to minimize any disturbance.

**Table 13.4** Decommissioning tables - *Habitat modification - increased access to spawning and foraging grounds*. This assessment is incorrect as decommissioning needs to be assessed against baseline. This should read ‘restoration of access to spawning and nursery grounds’. It is worth noting that for some migratory species this restoration of spawning access after the 120 year life of the project is likely to already have resulted in significant declines or extinction of these populations.

**13.2.3.8** Natural England agrees with the DECC STP conclusions that for any elements of modelling undertaken, the uncertainties associated with these techniques and the implications

they have for the robustness of the assessments will need to be clearly presented. Significant levels of research will be required in order to fill the identified knowledge gaps identified by the DECC STP work and inform the scale of impacts and population implications associated with this development.

**13.3.1.1** Fish data - Devon and Severn IFCA should be consulted for data sources that might be relevant Severn Estuary/Bristol Channel as it regulates fisheries in the area. Also here, there is no consideration of academic data. There are several major universities in the area and research data might be available.

**13.3.1.3** The available data will need to be harmonised carefully and analysed to understand seasonal variability and yearly trends.

**13.3.1.4** It is unclear why the Hinkley data only run up to 2006.

**13.3.1.5** Consideration should also be given to importance of <10m vessels and other commercial fisheries around the area and the data those operations might hold.

**Table 13.5** It is unclear why the river Brue is deemed to be a low priority river compared to other rivers in the area such as the river Axe or Parrett.

**13.3.3.1** DECC STP SEA identified knowledge gaps which would prevent a decision being made with any certainty on the potential impacts on protected site features and designations. Information on residence time and specific behaviour of migratory fish in the estuary is not fully understood. This might pose a problem for certain species as there is not enough empirical evidence to be able to inform the IBM models and reduce the uncertainties of the modelling outputs and subsequent impact assessments. The outputs of the model will only be as good as the empirical evidence on the different species and life stages used to inform them. Very detailed information on the validation procedures and data sources utilised for the development of the IBM model will need to be presented in a clear and easy to understand way. This should be presented as a stand-alone document.

**Section 13.3.4** Natural England notes that only characterisation surveys are proposed. Characterisation surveys may not provide a statistically robust baseline from which to assess future change as a result of the development. Further consideration should be given to establishing robust baseline surveys which are of sufficient resolution for meaningful statistical analysis. It is unclear with the proposed intertidal and subtidal survey methodologies and proposed sites whether there are enough replicates and sufficient resolution in order to

undertake statistically robust comparisons. Further evidence is required to demonstrate that the survey design is statistically robust and will present meaningful results. Furthermore, Natural England expects that the baseline will be followed by appropriate and comparable multiyear surveys to assess changes on fish populations within and around the project area.

**13.3.4.10** Smolts are also known to undertake autumn migrations into estuaries.

**13.3.4.19** It is unclear why elvers are only being sampled in the reen ditch system and not in the Rhymey river.

**13.4.5.7** STRIKER 4™ turbine fish injury computer model will be dependent on results from hydrological models. These have, so far, been conducted at a relatively high level. Detailed models would need to be developed where the movement in the vicinity of the turbines is well understood. The types of turbines selected for the development will impact on these model results. If the types of turbines are not yet known, STRIKE 4 models will need to be presented for each of the options considered. To note, it will be important to consider that migratory fish have strong rheotaxis and as a result turbines might act as magnets increasing chances of collision. It is expected that the data utilised for these models are clearly stated and the procedure explained in a simple and easy to understand way.

**13.3.4.2** and **Table 13.6** It is not clear what the term 'keystone species' refers to in the area. This needs to be clearly explained or the use of the term reconsidered. If keystone species are clearly identified, the impact to such species cannot be considered of low VER. By definition, impacts on keystone species will have ecosystem-wide effect and possible knock-on effects to neighbouring areas.

Sand eels might not be well represented with the proposed survey methods and gears used. We advise that TLP consider looking at habitat potential of the area through sediment type and how changes to the project might impact this and other fish habitats throughout the full geographic scope.

## **Chapter 14.0 Marine Mammals**

### **General comments**

Natural England would expect to review an updated survey methodology before any surveys take place, and refer the applicant to previous comments on the survey scope for the Severn Estuary (October 2014) and West Cumbria (December 2014).

## Paragraph specific comments

**6.2.0.21** It is stated that piling may be undertaken, but it is not made clear if a cofferdam will encompass all piling activity.

**Figure 6.3** The risk of a marine mammal entering and getting either stuck or drawn towards the propellers needs to be considered. The ES would need to consider how marine mammals, if they entered the structure, would get out and the possible impact with an operational turbine. It may be the water flow during operation would be faster than normal and mammals might associate this with increased foraging opportunities. This issue need to be assessed.

**14.1.2.1 and Figure 14.3** We are not sure that the density estimate of  $<0.1/10\text{km}$  been corrected for effort or What is the level of confidence is on these estimates. i.e. the lack of sightings could reflect a lack of effort. Less effort would mean less confidence in the output.

**14.1.2.2 and 14.1.2.4** These data (sightings and acoustic records) need to be presented and/or combined with Figure 14.3 to provide an overall 'best available' picture of porpoise distribution and abundance. The Hinkley power station data are potentially very important given it is approximately the opposite side of the estuary to the proposed tidal lagoon site, so is approximately in the same position within the Severn Estuary.

**14.1.3** As above, the effort and confidence in the data for all marine mammal species is important to describe. A lack of sightings does not necessarily mean the animals are not there.

**14.1.3.2** It would be useful to have the Atlantic Array (and Hinkley power station) marked on all marine mammal figures of distribution and abundance.

**14.1.4** It should be noted that the presence of a coastal population of bottlenose dolphins has been described along the south Devon and Cornwall coast, with incidental sightings along the north Devon and Cornwall coast. A lack of survey effort has meant that the northern coast is not included within the proposed Management Unit MU for coastal bottlenose dolphins in the UK, which has been updated to reflect this southern coastal unit. However, there may well be bottlenose dolphin in the area and they will need to form part of any assessment, especially since linkages between different coastal populations are not fully understood.

**14.1.4.4** The Atlantic Array may have been located too far offshore to capture these coastal dolphins.

**14.10.1.7** The Jones *et al.* paper is based on limited data from Wales and there is no data included from Cornwall or Devon. N.B these areas are also not surveyed within the national SMRU surveys for SCOS (Special Committee on Seals) reporting. Therefore the applicant should liaise with NRW and SW seal groups (e.g. Cornwall Seal group) for further information on local/regional grey seal abundances and movements.

**14.1.7.4** Noted, however grey seals do migrate widely and photo ID matches have been recorded between Cornwall and Wales. It is possible the Bristol Channel and Severn Estuary is a foraging area for these animals and therefore they should be scoped in to any assessment and recorded as part of the characterisation surveys (as stated will occur in 14.3.4.3).

**14.3.2.2** Extra data (and possible contacts for the Devon area) should also be sought from Cornwall Wildlife Trust and Cornwall Seal Group – these groups in the south west maintain close working relationships with each other.

**Appendix 14.1** Natural England notes that many organisations *have* been contacted (which should be reflected in the ES). Natural England would recommend those groups who did not respond be re-contacted for the purposes of the ES, to try and fill in data gaps.

**14.3.4.2** Clarification is needed on whether four surveys in total will be undertaken, or four surveys in each season. Natural England would expect multiple surveys per season.

**14.3.4.2** Natural England recommends that a minimum of two years of survey data is required to go some way to allowing for inter-annual variation.

**14.3.4.2** Natural England suggests that SCANS II protocols are followed for survey methodologies.

**14.3.4** Clarification is sought concerning the presence of dedicated MMOs and PAMs operators, i.e. different surveyors for each survey method.

**Table 14.4** Natural England suggests that if the probability of occurrence is high and the magnitude of change is medium (or vice versa), the overall result should be high or high/medium, not medium.

**20.3.0.2** onwards - Natural England commends the undertaking of an ambient noise survey. As noted in Chapter 20, Natural England suggest that the applicant liaise with an organisation that has longstanding expertise in noise measurements and will follow NPL who have longstanding expertise in noise measurements, good practice guide. This will ensure survey



design will be appropriate for the project but may also provide a wider scientific benefit in increasing the understanding of levels of ambient noise around the UK – a key Marine Strategy Framework Directive requirement.

## Chapter 15.0 Coastal Birds

### General comments

From the information presented in the report, Natural England does not have a clear understanding of the predicted state of what is currently intertidal habitat within the proposed lagoon during the operational phase. Natural England would like to know if it will be emptied completely in the tidal cycle, or if will retain a shallow depth of water across its entire area or if there may be a mosaic of exposed mud and shallow pools. Modelling the state of the lagoon will be essential in understanding if any foraging habitat will be available to estuarine birds and for how long compared to the existing situation.

It is also noted that an assessment of collision risk with turbines has not been included within the scoping report.

**15.1.1 “General overview”** Natural England would like to see it recognised at the outset of this chapter that populations of birds notified as mobile qualifying features of the Severn Estuary SPA/Ramsar site interchange with neighbouring SPA/Ramsar Sites and in particular the Somerset Levels and Moors SPA/Ramsar Site. The impression given in the introduction is that the bird populations of the Severn Estuary European Site can be considered in isolation ignoring ecological relationships with neighbouring European Sites. This is contradicted elsewhere in the report, notably in Appendix 2.2.

**15.2.1.1** The scale of the potential impacts must be considered alone and in-combination with other tidal lagoon projects proposed in the Severn Estuary. The displacement of birds is likely to be on a major scale from the impact of this project alone because of the loss of a significant proportion of intertidal habitat that supports SPA/Ramsar birds. However, the impacts will be much greater when considered in combination with other proposed tidal lagoons in the Severn Estuary, including Bridgwater Bay and Newport.

**15.2.1.4** Natural England welcomes the inclusion of Appendix 15.1, as it provides a good summary of the ornithology survey and modelling methodologies required. We would like confirmation that the applicant will implement all the recommendations made for survey and modelling work outlined in the Appendix.

**Table 15.2** References to “fitness” and “mortality” give the impression that impacts will only be experienced by individual birds, whereas the scale of the proposed project has the potential to affect populations. Natural England advises updating the overview of the potential impacts to reflect that they may affect populations and sub-populations.

**15.2.2.5 Temporary and permanent habitat loss** - The area within the proposed lagoon is a significant proportion of intertidal habitat in estuary, which will be lost to foraging waterbirds. Quantification of the extent of the loss of intertidal habitat will be fundamental in assessing the impacts of coastal birds. For instance, if the area within the wall of the lagoon will always retain some water then intertidal habitat will be lost permanently.

**15.2.2.5** This paragraph gives a rationale for when an impact will be considered temporary. It asserts that impacts will be considered temporary where there are clear and deliverable plans for habitat restoration after construction. This will only be correct if all affected features (not just habitats) recover from the impact, which could be considerably longer than the construction phase or habitat restoration plan. It is conceivable that full recovery may not occur in which case aspects of the impact will be permanent not temporary. This is especially true if the temporary impact is over a longer timescale. It should also be remembered that temporary impacts may also require compensation under habitats regulations, if it is deemed that they will result in an adverse impact on the integrity of the site. Proper consideration of what can be considered temporary is crucial.

**15.2.2.6** The report states: *“As well as direct loss of habitat during the construction phase, consideration will be given to the potential effects of habitat fragmentation. Given the mobility of coastal birds, fragmentation is not expected to be an effect of more than minor magnitude and it is expected to be scoped out of further assessment.”* Natural England disagrees strongly with this argument as fragmentation that will be caused by this project alone and in combination with other projects is likely to be significant and therefore should not be scoped out for further assessment.

**15.2.2.8** Natural England agrees that changes in the hydrological regime have the potential to alter ecological communities, and alteration of habitat affecting food chain species such as fish and benthic invertebrates has potential to affect coastal birds. However, this could result in not only reduced condition and fitness of individual birds leading to higher risk of mortality, but may affect SPA/Ramsar bird species at the population level (see comment in relation to Table 15.2).

The commitment to undertake modelling including the use of Habitat Association Modelling (HAM) and Individual Behaviour Modelling (IBM) is welcomed.

**15.2.3.1** Operational phase effects that might impact upon coastal birds (outlined in **Table 15.3**) do not reflect the scale of the proposal's impacts on a population or whole site level. For 'permanent habitat loss' the potential effect is stated as: "*Behavioural disturbance and displacement, effect on fitness and mortality*". This implies that the potential effect is restricted to a small number of individual birds. However, the potential effect is a level of displacement and disturbance that will have an adverse effect on the integrity of the SPA. Therefore, it must be recognised that harmful impacts will be significant for populations of SPA/Ramsar bird species as opposed to individuals. It will be essential to define the type and extent of permanent loss of habitat. For example, it appears that no distinction has been made between habitat being lost under the infrastructure (e.g. the walls of the proposed lagoon) and the intertidal habitat lost due to inundation of the lagoon.

**15.2.3.3** states "*The feeding and roosting opportunities presented by habitats enclosed within the lagoon has the potential to benefit coastal bird species.*" We would like to see further explanation of this. The key consideration here is whether construction of the proposed lagoon will effectively result in the loss of intertidal habitat, and if this will have adverse impacts on species like dunlin and redshank that rely on exposed mudflats for feeding.

**15.2.3.5** states: "*These may include alteration in the extent or distribution of intertidal and subtidal habitats, or changes in tidal phasing compared to areas outside of the lagoon footprint.*" This has to be a key aspect of the assessment and should not state "*may include*" but should be definitive in assessing if all or some of the intertidal habitat within the lagoon will be lost permanently.

**15.2.3.5** Again, this seems to indicate that the only permanent loss will be the footprint of the breakwater. Considerations should be given to loss of habitat within the lagoon from ongoing maintenance dredging and changes to the habitat.

**15.2.3.7** Natural England agrees that in addition to direct loss of habitat caused by creation of the lagoon, there may be collateral effects that permanently reduce the quality of the surrounding habitat, and this may result in changes in the availability of prey species and other impacts on habitats used for feeding or roosting. We therefore would welcome a modelling approaching that fully considers the full range of impacts on habitats used by SPA/Ramsar bird species.

**15.2.3.8** Natural England agrees that maintenance dredging throughout operation of the facility has the potential to release contaminants that may affect coastal birds directly or indirectly through the food chain. It is not clear how often dredging will be required, or the issues that this may raise, and consequently an assessment must be scoped-in.

**15.2.5.1** Natural England is not clear what the following statement is intended to mean: “*The geographical scope of the assessment will be based on the maximum geographical area around the Project where potential for impacts on coastal birds are likely to occur.*” The whole of the Severn Estuary SPA/Ramsar must be scoped-in together with areas with functional habitat used by bird species notified as mobile qualifying features of the European Site. The Somerset Levels and Moors SPA/Ramsar Site (and its component SSSIs) must be included because it is functionally linked to the Severn Estuary SPA/Ramsar Site with birds moving between the two according to prevailing weather conditions. There may also be impacts on a number of other SPAs for species that are likely to have large proportions of their wintering populations displaced.

**15.3.1.6** Natural England notes that bird surveys in line with BTO WeBS methodology for high and low tide counts have been commissioned up until May 2015 in order to cover a complete biological year. However, Natural England recommends that a minimum of two full years’ data is collected to ensure that the abundance of birds using the area throughout the year, is adequately ascertained. Collecting data over two years allows some assessment of consistency between years and reduces the chance that survey results from one year are unrepresentative given that bird densities and behaviours, and thus, the assessment of the risk of impacts, may be highly variable at any one place.

**15.3.3.1** Natural England agrees that it is vital to ensure that adequate baseline information exists on the numbers and distributions of birds across the Severn Estuary as a whole.

**15.3.3.4** Natural England agrees that the most up-to-date WeBS data for High and Low tide counts should be used. Natural England welcomes the approach to commission additional surveys to fill gaps in coverage, although we recommend that data should be collected for a minimum of two complete winter periods (i.e. 1 October to 31 March) for overwintering SPA/Ramsar bird species and two complete spring passage and autumn passage periods for passage SPA/Ramsar bird species.

**15.3.3.9** Natural England agrees that detailed information provided by Through The Tidal Cycle (TTTC) surveys on the variation in numbers and activity of birds using study sites will be

required to help validate modelling approaches, such as IBM.

**15.3.3.12** Natural England recognises that the results of coastal process modelling will help determine the extent of the impacts. However, the proposed project may affect designated sites outside the Severn Estuary, notably the Somerset Levels and Moors SPA/Ramsar Site, which is ecologically linked to the Severn Estuary as bird species notified as qualifying features move between the two European Sites.

**15.3.3.14** Given the potential impacts on the whole of the Severn Estuary, Natural England would welcome discussions on the potential use of tracking studies.

**15.4 Proposed Assessment methodology** Natural England broadly agrees with all the recommendations for monitoring stated in Appendix 15.1.

## Chapter 16.0 Terrestrial Ecology

**Table 16.3** We welcome the recognition of SSSIs; there needs to be cross reference to the intertidal chapter as SSSIs can be intertidal as well. It needs to be clarified where saltmarsh impacts are assessed, and good cross-referencing is needed.

**16.3.4.3** SSSIs on the English side are listed here, and these will need assessment especially those with coastal and intertidal features. An explanation is needed as to why the 20km limit was selected.

**16.5.2.1** The National Vegetation Classification (NVC)<sup>22</sup> is one of the key common standards developed for the country nature conservation agencies. The NVC better than Phase I for mapping and evaluation of habitat types present; more detail is needed on protected sites which can use NVC to describe the notified features.

**Table 16.6** and **16.7** Terms need to be clearly explained and justified to ensure clarity and agreement.

## Chapter 17.0 Seascape and Landscape

### Scope of Natural England's Advice

Natural England's principal interest lies with designated landscapes, their natural beauty and purposes of designation, which may be adversely affected by this proposal. These are:

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<sup>22</sup> <http://jncc.defra.gov.uk/page-4259>

- The Mendip Hills Area of Outstanding Natural Beauty (AONB)
- The Quantocks Area of Outstanding Natural Beauty (AONB)
- Exmoor National Park (NP), including North Devon Heritage Coast

Our interest regarding the latter two designations relates to potential cumulative effects of the Tidal Lagoon Cardiff proposal in combination with proposed the West Somerset Tidal Lagoon<sup>23</sup> (Table 3.1 of the EIA Scoping Document) plus the Tidal Lagoon Newport and Tidal Lagoon Bridgwater (not included in Table 3.1, but listed by the applicant on their website<sup>24</sup>). We understand the first will be submitted in 2018 and the latter two will come forward later this year. Although our advice on the Cardiff Tidal Lagoon proposal will be concentrated on The Mendip Hills AONB, references are made, as needed, to these other designated landscapes throughout this document. The applicant also refers to ‘*other projects*’ at para. **17.4.0.3**.

The purpose of AONBs is to conserve and enhance the natural beauty of these landscapes. Although the proposal is outside of the designation boundary for all three of these areas, Natural England advises that there may be an adverse impact on the setting of these landscapes, and so an assessment of this aspect will need to form part of the Environmental Statement (ES). The role of landscape and seascape setting has been the subject of public examination in previous NSIPs; most recently the Navitus Bay and Rampion offshore wind farms.

In addition, the recent judgment of Mr Justice Ouseley in the case of *Stroud v Secretary of State for Communities and Local Government*<sup>25</sup>, 6<sup>th</sup> February 2015, considered, amongst other matters, the interpretation of paragraph 115 of The National Planning Policy Framework (paragraphs 25 and 26 of the judgment). Paragraph 26 explains that great weight must be given to the conservation of beauty in the AONB and “*of land viewed in conjunction with the AONB from the AONB*”. We would consider that the sea ‘*viewed in conjunction with the AONB from the AONB*’ is covered by this judgement.

As such Natural England requests that the ES encompasses an assessment of effects on both the *landscape and seascape setting* of the designated landscapes, considering both *views towards*, and *views from* these landscapes.

## General Comments

<sup>23</sup> <http://infrastructure.planningportal.gov.uk/projects/south-west/the-west-somerset-tidal-lagoon/>

<sup>24</sup> <http://www.tidallagoonpower.com/h/lagoons/newport/141/> and <http://www.tidallagoonpower.com/h/lagoons/bridgwater-bay/143/>

<sup>25</sup> Neutral Citation Number: [2015] EWHC 488 (Admin) – *In the High Court of Justice Queen’s Bench Division – Before Mr Justice Ouseley – Stroud District Council v Secretary of State for Communities and Local Government.*

Natural England advises that the Seascape and Landscape Visual Impact Assessment SLVIA will need to consider effects on all *landscape, seascape and visual* receptors. Although Chapter 17 deals with visual receptors, little information is available to understand how the assessment will deal with landscape and seascape receptors. Related to this requirement is how the SLVIA will deal with potential effects on designated landscapes; in particular in relation to their documented special qualities, which include their natural beauty, and the purpose for which these places have been designated.

As indicated above this is one of Natural England's principal interests. We are particularly concerned to see that potential effects on the Mendips Hills AONB appear to have been dismissed before the assessment has been undertaken. Sound preliminary assessment and rationale needs to be provided in relation to any areas which are scoped out of the detailed assessments and this should also be agreed with statutory consultees.

### **Specific Commentary by paragraph**

**17.1.0.2** The western portion of The Mendips AONB, at approximately 13.5km from the eastern edge of the lagoon seawall, is therefore well within the proposed Study Area and should therefore be adequately and appropriately considered. The high point at the western most end of Bleadon Hill (at 119m) is approximately 14km from the eastern edge of the lagoon seawall. Views from similar high points enabling distant views should be considered. The applicant acknowledges the importance of this location by including a viewpoint on Bleadon Hill (Table 17.1 Proposed Viewpoints for Visual Assessment, viewpoint 10). Natural England advises that it is too early in the process for the applicant to state that effects would be '*negligible*' (as understood by the definitions outlined at para 3.2.3.4). The likely effect will not be adequately determined until the SLVIA has been advanced. See comments under para 17.3.0.2 below.

**17.2.01** Natural England is unconvinced how the '*principal...effects*' relate to the definitions outlined at para 3.2.3.4. For the purposes of our advice, we consider these to equate to 'most likely' effects, as 'principal' would seem to indicate that a judgement has already been reached, prior to the undertaking of the SLVIA, regarding where the significant effects (as defined at 3.2.3.4) may occur.

Secondly, it is apparent that the applicant does not, as yet, have sufficient information, from relevant experts in coastal geomorphology and dynamics, to inform the SLVIA. A sound understanding and explanation of how changes in coastal processes are likely to alter the

seascape setting of the designated landscapes most likely to be affected by this (and other schemes which may come forward later) needs to be provided, albeit linked to and carefully referenced to the appropriate technical Chapter in the ES. For example, Natural England would like understand how the holding back of the flood tide, in order to create a head for the turbines (as described at para 6.1.0.6), will affect the seascape and the seascape setting of the Mendip Hills AONB.

Further we would like to understand the cumulative effects of this aspect of the scheme and the similar aspects of the West Somerset Tidal Lagoon and Tidal Lagoon Bridgwater proposals (and the potentially the Tidal Lagoon Newport proposal) on the seascape settings of the Quantocks AONB and Exmoor National Park. We note that an adequate Realistic Worse Case Scenario (RWCO), upon which the SLIVA can be based, is not yet available. It will be important to establish this and to convey it very clearly in the ES, so that the SLVIA, and all other assessments are undertaken to the same parameters.

Although Natural England welcomes the commitment to considering the possible impact of the proposal on levels of tranquillity, other landscape elements such as '*views out (of the AONB) across the Severn Estuary to Wales*' (Section 1.4 page 10 Mendip Hills AONB Management Plan 2014 -2019) will also need to be included in the SLVIA in the ES.

**17.3.0.1** The Mendip Hills AONB Management Plan (2014 – 2019)<sup>26</sup> and the Quantock AONB Management Plan (2014 – 2019)<sup>27</sup> are omitted from the documents which will be used by the applicant to develop the seascape and landscape baseline, and we draw your attention to the necessity to include them. Natural England advises that these documents, and the Exmoor National Park Partnership Plan<sup>28</sup>, should be reviewed by the applicant, and referred to in the baseline assessment. In particular we would expect to see the inclusion of consideration of effects on the relevant special qualities of these landscapes, and associated seascapes, by the applicant in their SLVIA.

No information is provided as to how the RWCO will be developed and how this and other information will be used to create this requirement. As noted above, defining this and the appropriate assessment scenarios will be of utmost importance. It would be appropriate to agree these with statutory consultees before commencement of the detailed assessments.

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<sup>26</sup> <http://www.mendiphillsaonb.org.uk/wp-content/uploads/2012/12/Mendip-Hills-AONB-Management-Plan-Nov-2013.pdf>

<sup>27</sup> <https://www.tauntondeane.gov.uk/irj/go/km/docs/CouncilDocuments/TDBC/Documents/Forward%20Planning/Evidence%20Base/QHAONB%20Management%20Plan.pdf>

<sup>28</sup> <http://www.exmoor-nationalpark.gov.uk/?a=260857>



**17.3.0.2.** (also Figure 17.1) - As stated in the attribute data in Figure 17.1, the ZTV model used to inform the selection of viewpoint uses a 50m DTM. This data results in a somewhat crude model, due the coarse resolution of the data. Natural England advises that the 5m DTM model should be used for all ZTVs to be prepared as part of the SLVIA. This should be generated early in the process so as to better inform the viewpoint selection process. As the proposed structures (up to 20m CD ref. para 6.2.0.14) are relatively low lying, the finer data resolution will revealed detail which is missed by the 50m data, which itself has a lower data resolution than the maximum height of the structures. The use of the 5m grid information is therefore essential.

The reference heights (CD, MSL, MHWS, MLWS etc.) also need to be explicitly clear from the outset, and the variances that will result from tidal changes modelled and illustrated. High tide and low tide ZTVs and illustrative material is required, and consideration should be given to the variable effects during Neap and Spring tidal periods. Diagrammatic illustration of this and the various terms used will aid the reader.

We request that the location for viewpoint 10 is re-examined (as set out in Table 17.1). We note the lack of an illustrative image in the suite of images presented under para 17.3.04. Natural England advises that an additional viewpoint be added in the vicinity of 333750, 158000, located on the PROW which transects this point. We would also expect to see users of local PROW being assigned the higher sensitivities when determining significance.

Further, National England has suggestions for viewpoint locations in the Quantocks AONB and Exmoor NP, which we would advise should be considered for inclusion in the SLVIA, particularly to inform the assessment of in-combination and cumulative effects.

**17.4.0.1** Whilst Natural England welcomes reference to the European Landscape Convention, consideration needs to be given to '*the great weight*', given to designated landscapes by the National Planning Policy Framework (NPPF) and the weight given to AONB Management Plans, as a material consideration for the relevant authority, in the judging the planning balance. Natural England advises that the applicant considers these requirements in establishing their SLVIA methodology, and also pulls these considerations through into the ES Chapters considering accordance with planning policy, with clear cross referencing being important.

**17.4.0.2** We welcome the commitment to undertaking the assessment to the requirements of GLVIA 3 and the intention to describe the assessment methodology and how this has been

undertaken in practice. However we are unable to offer further advice on the adequacy of the proposed assessment methodology to date, for example on the interpretation the applicant may have on sensitivity and significance of effect, as the necessary detail is absent from Chapter 17. We therefore expect to be consulted on this in due course. We note that such detail is available in other chapters, for instance Chapter 16 Terrestrial Ecology. The inclusion of this detail within the EIA Scoping Report would have allowed Natural England to provide more complete advice to the Planning Inspectorate.

**17.4.0.3** Please refer to our comments under para 17.1.0.2 in respect of the use of the word '*negligible*'. Natural England welcomes the applicant's commitment '*to identify any other projects, which will then be taken into account in respect of cumulative effects*'. In terms of in-combination and cumulative effects, we would expect inclusion of consideration of an assessment the potential effects on other designated landscapes including the Quantocks AONB and Exmoor National Park.

## **Other Comments**

We also raise the importance of undertaking and illustrating the potential effects of the project on seascape, landscape and views at night, as the effects of lighting will be important.

Careful consideration and explanation of the design, and iterative input by the landscape and seascape expert will be required to help ensure the effects are reduced. Measures may include the height and position of structures, the materials and details used, and the details proposed for lighting.

Explanation will be required as to how the implementation of mitigation measures, to a high standard, will be guaranteed and the process for this.

## **Chapter 18.0 Cultural Heritage: Marine and Terrestrial**

Natural England has no comments.

## **Chapter 19.0 Navigation and Marine Transport**

Natural England has no comments.

## **Chapter 20.0 Marine Noise and Vibration**

Marine noise and vibration has the potential to impact on sensitive wildlife receptors both within and outside of designated sites. Impacts to designated sites features should be

adequately assessed through HRA process for European designated sites and other relevant legislation for European and nationally protected species and nationally designated sites (MCZ, SSSIs). Key features of interest are birds, fish and marine mammals, either those associated with designated sites or as protected species, and there should be sufficient evidence to support an impact assessment on these features.

Natural England welcomes the applicant's efforts in a difficult field and recognise that research about the impacts of marine noise on various receptors and the technologies to assess them are currently underdeveloped. In general, however, survey methodologies lack the required level of detail and some aspect need further consideration. In particular, the spatial extent of the survey area and specific survey locations need to be identified, as well as the assessment criteria for impacts on receptors (e.g. tolerances / impact thresholds). Regard should be had to cumulative exposure impacts in these thresholds.

Natural England agrees that both noise and vibration will arise from the construction, operation and decommissioning of the Project (as per 20.2.01). We are concerned about the impact of particle velocity (vibration), notably on sessile invertebrates, fish and marine mammals. The assessment will only look at the frequency of noise inputs for the construction and operational stages, but not at noise and vibration until decommissioning (para 20.2.02). Natural England is aware that research and survey technologies are undeveloped with respect to particle velocity impacts on marine life. We would welcome, however, a commitment from the applicant that all efforts will be made to understand the impacts of particle velocity and to employ current knowledge and techniques as they become available.

As a final point, Natural England would query the extent of the research undertaken in respect to mitigation measures and welcome the opportunity to explore options as the EIA process proceeds.

### **Paragraph specific comments**

**20.0.01** As above, Natural England commends the undertaking of an ambient noise survey given the identified lack of knowledge in this area.<sup>29</sup> Natural England suggests that the applicant liaise with an organisation that has longstanding expertise in noise measurements and will follow the NPL (who have longstanding expertise in noise measurements) good practice guide. This will ensure survey design will be appropriate for the project but may also

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<sup>29</sup> <sup>29</sup> 29

[www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/50064/1\\_Feasibility\\_Study\\_Conclusions\\_and\\_Summary\\_Report\\_-\\_15\\_Oct.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/50064/1_Feasibility_Study_Conclusions_and_Summary_Report_-_15_Oct.pdf)

provide a wider scientific benefit in increasing the understanding of levels of ambient noise around the UK – a key Marine Strategy Framework Directive requirement.

**20.2.0.2 (ii)** Operational noise should include maintenance and repair activities, alongside maintenance dredging.

**20.2.0.3** Cumulative effects should include effects associated with multiple lagoon schemes in the Severn Estuary and Bristol Channel.

**20.3.0.1** The underwater noise methodology should incorporate and consider the natural variations in underwater noise in the estuary.

**20.3.0.5** It is noted that the underwater noise survey will use “a range of locations in the study area over a period of one to two days.” Natural England considers the proposed duration of this survey insufficient to capture the dynamic and highly varied sources of noise within the estuary. It is noted that the proposed duration is inconsistent with the NPL Good Practice Guide No.133 – Underwater Noise Measurement, that recommends that background noise is determined over the course of “perhaps a few weeks”.<sup>30</sup>

**20.3.0.3-15** We acknowledge the reference to NPL (2014), and the use of boat based survey data. However it is important to recognise the limitation spatially and temporarily of boat based data, as noted in NPL (201) Section 4.1.1, this type of measurement is ‘*not suitable where longer-term deployments are required, for example where the intention is to sample the radiated noise under a variety of operation states, or sample the ambient noise under a wide variety of environmental conditions*’. We would query that one of the main intention of the collection of this data is to provide baseline data of ambient noise in the estuary, therefore the data collection proposed may not be sufficient to achieve the objectives. It may be necessary to supplement this noise data collection with additional static/moored systems collecting data over a longer period to incorporate a range of tidal cycles, weather conditions etc. Hence both spatial and temporal sampling may be required.

**20.4.1.8** There are several recent and up to date papers, reports available to assess the impact of noise on sensitive receptors, these should be considered and incorporated into the assessment (e.g. Hawkins, Pembroke and Popper (2014)<sup>31</sup>).

**20.4.2.4-5** As stated in NPL (2014) Section 6.2.3, it is important to clarify that it is generally not

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<sup>30</sup> <http://www.npl.co.uk/upload/pdf/gpg133-underwater-noise-measurement.pdf>

<sup>31</sup> Hawkins A, Pembroke A, Popper A. (2014) Information gaps in understanding the effects of noise on fishes and invertebrates. *Rev Fish Biol Fisheries*

possible to calculate the source level in in shallow water by the use of a simple spreading law such as  $N \cdot \log(R)$  to extrapolate back to source.

This chapter gives little detail on the proposed assessment of vibration impacts associated with construction, operation and decommissioning of the scheme.

## **Chapter 21.0 Terrestrial Noise and Vibration**

Terrestrial noise and vibration has the potential to impact on sensitive wildlife receptors both within and outside of designated sites. Impacts to designated sites features should be adequately assessed through HRA process for European designated sites and other relevant legislation for European and nationally protected species and nationally designated sites (MCZ, SSSIs). Key features of interest are birds, specifically overwintering waders, and wildfowl, both those within designated sites or outside designated site boundaries where the population can be shown to be functionally linked to the site. There should be sufficient evidence to support an impact assessment on these features.

Generally likely impacts are more focused on Wales, though it is important to be clear on the level of impacts likely alone and in-combination on English coastline and impacts to designated habitats and species interest features of sites (SAC, SPA, Ramsar, MCZ, and SSSI), in particular impacts to coastal birds.

### **Paragraph specific comments**

**21.3.0.6** It is important that surveys and analysis take into consideration timing and seasonality of interest features (coastal birds) and their locations relative to the lagoon proposal.

## **Chapter 22.0 Air Quality**

Natural England has no comments.

## **Chapter 23.0 Onshore Transport**

Natural England has no comments.

## **Chapter 24.0 Socio-economics**

Natural England has no comments.

## Chapter 25.0 Tourism and Recreation

Natural England has no comments.

## Chapter 26.0 Mitigation, Compensation and Monitoring

The HRA for this project is going to be critically important and is likely to have a strong influence on what needs to be included within this chapter. It is not clear from this report how this chapter will clearly show the legislative driver behind each proposed mitigation, monitoring or compensation action.

It is important to recognise that the terms 'mitigation' and 'compensation' have specific meanings within HRA that may not be identical to terms commonly used within some EIAs. It is also important that there is a clear distinction between measures that are required under various legislative drivers and those which are designed to provide additional environmental benefit.

Natural England would also advise considering the recent *Briels* judgment<sup>32</sup> as this has provided further clarity on what should be considered compensation rather than mitigation.

**26.4.03** This gives the steps required for HRA. However, what it does not give is an indication of how challenging some of these steps may be and also the iterative nature of the process. This is especially important given the ambitious timescale that the applicant would like to achieve.

**26.4.06** Natural England welcomes starting a discussion about compensation now, through the evidence plan process. It is important to have early discussions about what sort of compensation is technically possible. As stated in Tyldesley and Chapman, 2013, *'If it is patently obvious after the completion of Stage 2 (appropriate assessment and integrity test) that necessary compensation measures could not be secured in accordance with regulation 66, it will not be open to the competent authority and Government to agree to the proposal in line with the provision of Article 6 of the Directive and there would be no point examining the 'alternative solutions' and 'imperative reasons of overriding public interest' test in detail'*.<sup>33</sup>

**26.4.0.7.** This paragraph gives criteria any compensation measures should meet, stated as taken from Tyldesley and Chapman, 2013. However, there is an important difference from the

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<sup>32</sup> 32 Habitats Directive, Case C-521/12 *Briels* (May 15, 2014)

<sup>33</sup> Tyldesley, D. and Chapman, C. (2013) *the Habitats Regulations Assessment Handbook* (accessed March 2015) UK: DTA Publications Limited.

current criteria given within their Habitats Regulations Assessment Handbook.<sup>34</sup> The first of criteria is that compensation measures are 'agreed with the statutory nature conservation body;'. There is no 'so far as possible' caveat included and this would appear to underplay the importance of seeking agreement with SNCBs. It adds that measures that do not meet the criteria listed should not be considered further.

The evidence requirements to ensure that all the criteria listed would be met should not be understated. It is Natural England's view that compensation will be technically challenging. This reflects the opinion given in STPFS.<sup>35</sup> This must cast some doubt over the aspiration of the applicant to secure consent by 2018 with a view to commissioning in 2022.

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<sup>34</sup> Tyldesley, D. and Chapman, C. (2013) the Habitats Regulations Assessment Handbook (accessed March 2015) UK: DTA Publications Limited.

<sup>35</sup> [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/50064/1. Feasibility Study Conclusions and Summary Report - 15 Oct.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/50064/1_Feasibility_Study_Conclusions_and_Summary_Report_-_15_Oct.pdf)

## **ANNEX B**

### **LEGISLATION: EUROPEAN PROTECTED SPECIES**

### **AND HABITATS REGULATION ASSESSMENT (HRA)**

#### **EUROPEAN PROTECTED SPECIES (EPS)**

Certain species are listed on Annex IV of the Habitats Directive as species of European Community interest and in need of strict protection. The protective measures required are outlined in Articles 12 to 16 of the Directive. The species listed on Annex IV whose natural range includes any area in the UK are called “European protected species”. JNCC is the statutory nature conservation body which provides advice on EPS in respect of the Habitats Regulations for UK waters, outside of 12nm (territorial waters). A summary of the legal requirements for EPS is as follows:

In England, Wales and UK offshore waters (outside 12nm), Regulations 41(1) and 39(1) of the Habitats Regulations and the Offshore Marine Regulations, respectively, provide that a person is guilty of an offence (and would therefore need to be considered for licence) if he:

- (a) deliberately captures, injures, or kills any wild animal of a European protected species;
- (b) deliberately disturbs wild animals of any such species

For the purposes of paragraph (1)(b), disturbance of animals includes in particular any disturbance which is likely—

- (a) to impair their ability—
  - (i) to survive, to breed or reproduce, or to rear or nurture their young; or
  - (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate;or
- (b) to affect significantly the local distribution or abundance of the species to which they belong. JNCC (with Countryside Council for Wales and Natural England) have produced guidance (The protection of marine European Protected Species from injury



and disturbance: Guidance for the marine area in England and Wales and the UK offshore marine area, JNCC, CCW and Natural England, 2010) which is currently in draft form awaiting approval, and outlines how developers, regulators and courts assess: a) the likelihood of an offence being committed; b) how this can be avoided; and c) if it cannot be avoided, the conditions under which the activity could go ahead under licence.

## **1.1 EPS Licences**

If there is a risk of injury or disturbance of EPS that cannot be removed or sufficiently reduced by using alternatives and/or mitigation measures, then the activity may still be able to go ahead under licence, but this should be a last resort. A licence should only be granted if the activity fits certain purposes, if there is no satisfactory alternative and where the activity will not be detrimental to the maintenance of the populations of the species concerned at a FCS in their natural range. The likelihood of an activity resulting in injury or disturbance offence to a marine EPS will very much depend on the characteristics of the activity, of the environment and the species concerned, hence the need for a case-by-case approach when assessing the risk of it occurring. Pursuing mitigation measures, alternative methods, locations and/or times for carrying out proposed activities might in some cases be sufficient to reduce the risk of causing offence to negligible levels. This would then negate the requirement for a licence. It is expected that many activities at sea will not require a licence to exempt them from regulations 41(1)(a) and (b) and 39(1)(a) and (b) of the HR (Habitats Regulations) and OMR (Offshore Marine Regulations), respectively, since their potential for injury and/or disturbance can be effectively mitigated or because the characteristics of the disturbance will fall below the threshold of an offence. Any licence application (under regulation 53(1) of the HR and 49(6) of the OMR) will necessitate a detailed assessment of whether the licence should be granted. The licence assessment will be comprised of three tests to ascertain: 1) whether the activity fits one of the purposes specified in the Regulations; 2) whether there are no satisfactory alternatives to the activity proposed (that would not incur the risk of offence); and 3) that the licensing of the activity will not result in a negative impact on the species, populations Favourable Conservation Status. The licence assessment will be carried out by the appropriate authority with the information provided by the developer and advice from nature conservation agencies.

Consideration of European Protected Species should be included as part of the application process, not as an issue to be dealt with at a later stage. Any consent given without due

consideration to these species is likely to breach European Directives with the possibility of consequential delays or the project being halted by the EC.

## **2. HABITATS & BIRDS DIRECTIVES, & HABITATS REGULATIONS**

The two most influential pieces of European legislation relating to nature conservation are the Habitats and Birds Directives. The “Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora” was adopted in 1992 and is commonly known as the Habitats Directive. It complements and amends Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (this is the codified version of Directive 79/409/EEC as amended), commonly known as the Birds Directive. The Birds Directive protects all wild birds, their nests, eggs and habitats within the European Community. It gives EU member states the power and responsibility to classify Special Protection Areas (SPAs) to protect birds which are rare or vulnerable in Europe as well as all migratory birds which are regular visitors. Please note amendments to The Conservation of Habitats and Species Regulations 2012 Regulation 9a <http://www.legislation.gov.uk/ukxi/2012/1927/regulation/8/made> which highlights a duty of care for wild birds in the UK. We advise the developer to acknowledge the change in the regulations and appropriately reflect their consideration of ornithological impact in their Environmental Statement.

The Habitats Directive builds on the Birds Directive by protecting natural habitats and other species of wild plants and animals. Together with the Birds Directive, it underpins a European network of protected areas known as Natura 2000 comprising SPAs classified under the Birds Directive and Special Areas of Conservation (SACs) designated under the Habitats Directive. The Habitats Directive has been transposed into the law of England, Wales and Scotland by the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) usually called simply the Habitats Regulations). Several amendments have been made to the Habitats Regulations since they came into force.

For areas within UK jurisdiction other than territorial waters, the Habitats Directive has been transposed into UK law by the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended in 2009 and 2010) (the Offshore Marine Regulations).

### **2.1 Habitats Regulations Assessment**

Where a plan or project could affect a Natura site, the Habitats Regulations require the competent authority – the authority with the power to undertake or grant consent, permission

or other authorisation for the plan or project in question – to:

- Determine whether the proposal is directly connected with or necessary to site management for conservation; and, if not,
- Determine whether the proposal is likely to have a significant effect on the site either individually or in combination with other plans or projects; and, if so, then
- Make an appropriate assessment of the implications (of the proposal) for the site in view of that site's conservation objectives. This process is now commonly referred to as Habitats Regulations Assessment (HRA). HRA applies to any plan or project which has the potential to affect the qualifying interests of a Natura site, even when those interests may be at some distance from that site (i.e. mobile species such as migratory or foraging birds or some marine mammals/pinnipeds). The competent authority, with advice from nature conservation agencies, decides whether an appropriate assessment is necessary and carries it out if so. Appropriate assessment focuses exclusively on the qualifying interests of the Natura site affected and must consider any impacts on the conservation objectives of the site. The applicant is usually required to provide the information to inform the assessment. A plan or project can only be consented if it can be ascertained that it will not adversely affect the integrity of a Natura site (subject to regulation 49 considerations).

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Your ref: 150305\_EN010073\_3036000

2<sup>nd</sup> April 2015

Dear Ms Russell,

**INFRASTRUCTURE PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT)  
REGULATIONS 2009 SI 2263 (AS AMENDED) (THE EIA REGULATIONS) REGULATIONS 8  
and 9. APPLICATION BY TIDAL LAGOON CARDIFF LTD (THE APPLICANT) FOR AN  
ORDER GRANTING DEVELOPMENT CONSENT FOR THE TIDAL LAGOON CARDIFF (THE  
PROJECT).**

Thank you for your letter dated 5<sup>th</sup> March 2015 consulting Natural Resources Wales (NRW) on the information we consider should be included in the Environmental Statement for the above project.

*Natural Resources Wales (NRW) is a Welsh Government Sponsored Body. Our purpose is to ensure that the natural resources of Wales are sustainably maintained, sustainably enhanced and sustainably used, now and in the future.*

**NRW Comments on EIA Scoping Consultation**

The advice contained in this letter and the detailed comments provided in the attached Annex I are made in the context of the above purpose and as a prescribed consultee under the INFRASTRUCTURE PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT) REGULATIONS 2009 SI 2263 (AS AMENDED) (THE EIA REGULATIONS). **The applicant should be advised that this consultation response does not constitute a formal EIA Scoping Opinion under Marine Works Regulations (Environmental Impact Assessment) 2007 (as amended) (see section 7 below).**

Please note that the advice contained in this response is without prejudice to any advice that NRW may wish to provide in response to future consultations relating to the project. This is because additional information may subsequently become available that NRW may need to take into account in making any formal response to TLC Ltd or the determining / regulatory authorities. As such we retain statutory discretion to modify our present advice or opinion in view of any or all such additional matters or any additional information related to this consultation.

## **1. Summary of NRW's Scoping Advice**

The assessment of the Tidal Lagoon Cardiff (TLC) project will be complex because it is a large project, the detailed design of which is likely to evolve over time. Also, although the UK Government sponsored Severn Tidal Power Feasibility Study (STPFS, DECC 2010<sup>1</sup>) greatly increased our knowledge of the dynamics of the Severn estuary environment, significant gaps in data and therefore our understanding of the estuary, its habitats and species and the potential impacts of a large tidal power scheme on these sensitive and highly protected receptors remain.

Experience of similarly complex projects, including the Tidal Lagoon Swansea Bay scheme, and the nature of the consenting process has shown that it is important to resolve as many issues as possible before the application is made. Achieving this will be dependent upon:

- Production of a robust EIA, the findings of which are captured in a fully comprehensive Environmental Statement, which also underpins any other environmental assessments required, e.g. Habitats Regulations Appraisal (HRA) and Water Framework Directive (WFD) compliance assessment
- A comprehensive, accurate and realistic plan for engagement between the applicant and consultees
- Establishing project assessment envelopes at the outset (initially by completing comprehensive analysis of physical processes baseline and potential impacts on this receptor )
- Incorporating mitigation into the design of the infrastructure at an early stage

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<sup>1</sup> <https://www.gov.uk/government/collections/severn-tidal-power-feasibility-study-conclusions>

NRW therefore welcomes this opportunity to input to the iterative pre-application process for the proposed project and looks forward to continuing to work with Tidal Lagoon Cardiff Ltd (TLC Ltd) to ensure that the Environmental Statement for the Tidal Lagoon Cardiff project is comprehensive and contains all the evidence necessary to underpin a robust EIA and any other environmental assessments required.

We have provided detailed comments on the scoping report in the attached Annex 1 and summarised issues of key importance in this letter.

NRW acknowledges the comprehensive nature of the overall scoping report. However, there is a lack of detailed information on baseline characterisation, potential impacts and proposed assessment methodology for a number of receptors, including designated habitats and species. **As such, the applicant should be advised that the scoping report for the TLC project currently contains insufficient information to allow assessment of whether the proposed scope of the Environmental Statement is adequate, most notably with respect to coastal processes, sediment transport and contamination.** The lack of detailed information for this topic means that we are unable to assess whether the zone of influence / study area boundaries have been appropriately defined for physical processes and consequently for the wide range of receptors that are influenced by, or dependant on, these processes including: water quality, fish, subtidal and intertidal ecology, landscape and seascape, flood risk and hydrology, and coastal birds.

The applicant indicates that the scoping report is a starting point for early discussions with statutory and non-statutory consultees and NRW note and welcome the proposal for an Evidence Plan (and accompanying data and modelling plans) approach, which will facilitate the process of agreeing upfront what information needs to be supplied as part of the application for Development Consent and any other permits that may be required.

Notwithstanding this, however, given the considerable importance of the outcome of the high level physical processes modelling for the agreement of study area boundaries and impact pathways for the other receptors, NRW would strongly recommend that the issues around this aspect of the EIA are resolved as a matter of urgency.

The STPFS, which was initiated to consider the implications of a Severn tidal power scheme and all tidal range technologies, including lagoons, concluded that “...*many years of further detailed work would be needed to plan, finance and assess the impacts of such a large structure as a Severn power scheme before a case could be put forward for planning consent. Even over a period of 2 years this study has only been able to consider feasibility and impact at a strategic level*”. **NRW’s view is that it will therefore be extremely challenging for TLC Ltd to produce a sufficiently robust EIA within the proposed timescale.** There will be similar challenges for the provision of sufficient information to allow the relevant competent authorities to undertake an ‘Appropriate Assessment’ in compliance with the Habitats Regulations<sup>2</sup>.

The applicant will need to work with NRW and all other relevant consultees, to address these issues as soon as possible in order to inform the ongoing iterative pre-application and Evidence Plan process and reduce the consenting risk for the project.

## **2. Background to NRW’s scoping advice**

NRW is working to support achievement of a reduction of CO<sub>2</sub> emissions by 80% by 2050<sup>3</sup> and the Welsh Government’s ambitions to create a low carbon economy for Wales, as set out in ‘Energy Wales: A Low Carbon Transition’<sup>4</sup>. Welsh Government identifies marine energy as a reliable source of renewable energy that could provide a significant contribution towards a low carbon energy mix of the future and includes a commitment to “unlocking the energy in our seas”. The Welsh Government also recognises the need to carefully plan and manage the relationship between energy development and the natural environment in line with their ambition of ‘Sustaining a Living Wales’<sup>5</sup>. We will continue to work closely with the Welsh Government, UK Government, regulators and renewable technology companies to ensure that green energy developments are designed in such a way that minimises adverse effects on the environment.

With the second highest tidal range in the world, the Severn Estuary offers clear potential for the development of renewable energy. However the Severn Estuary is also a unique natural

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<sup>2</sup> Regulation 61(2) of the Habitats Regulations, Regulation 25(2) of the Offshore Marine Regulations and the Infrastructure Planning (Applications: Prescribed forms and Procedure) Regulations 2009 (APFP) paragraph 5(2)(g)

<sup>3</sup> <https://www.gov.uk/government/policies/reducing-the-uk-s-greenhouse-gas-emissions-by-80-by-2050>

<sup>4</sup> <http://gov.wales/topics/environmentcountryside/energy/energywales/?lang=en>

<sup>5</sup> <http://gov.wales/consultations/environmentandcountryside/sustainingwales/?lang=en>

environment, with some of its habitats and tributary estuaries protected by multiple designations due to their international, European and national nature conservation significance. These habitats support internationally important populations of wintering and passage birds and of migratory fish species including Salmon, Sea Trout, Twaite and Allis Shad, Sea and River Lamprey. These fish pass through the estuary on route to the rivers Wye and Usk, both also designated as Special Areas of Conservation (SACs) in their own right. Given their importance and sensitivity to some development activities, any proposal must be designed and operated to minimise or in some cases avoid impacts on these receptors.

The STPFS provided a detailed assessment of the environmental, economic, engineering, energy generation, social and legislative issues involved with developing a large scale tidal energy scheme in the Severn estuary. The STPFS assessments give a clear picture of the potential environmental consequences of building barrages and lagoons in the Severn Estuary to the environment and landscapes of Wales and its coastal waters, concluding that: *“The scale and impact of a scheme would be unprecedented in an environmentally designated area, and there is significant uncertainty on how the regulatory framework would apply to it.”* In particular the study identified the risks of:

- Local extinction of fish species, including the loss of Twaite Shad as a breeding species in the UK
- Significant loss of inter-tidal habitat, including saltmarsh and mudflat
- A reduction in populations of up to 30 bird species
- An increased flood risk both within the Severn Estuary and further away.

**The conclusions of the STPFS are still valid and it is important that other marine energy schemes draw on the lessons of the study in their design and location. NRW strongly advises the applicant and the Planning Inspectorate to give the findings of the STPFS their full consideration in scoping the EIA for the Tidal Lagoon Cardiff scheme.**

### **3. Habitats Regulations Appraisal (HRA)**

Given their importance and legal requirements, any proposal must be designed to avoid adverse effects on the integrity of sites designated as Special Areas of Conservation (SACs) and Special Protection Areas (SPA) sites. Where adverse effects cannot be avoided, under article 6(4) of the Habitats Directive projects may only be approved provided it is demonstrated that: there are no feasible alternative solutions to the plan or project which are less damaging,



there are “imperative reasons of overriding public interest” (IROPI) for the project to proceed and that compensatory measures are secured to ensure that the overall coherence of the network of European sites is maintained<sup>6</sup>. Conclusions on effects under a HRA are required to be supported by a very high level of certainty as indicated by case law, in particular the Waddenzee<sup>7</sup> ruling.

The STPFS concluded that even after mitigation measures had been applied, all the schemes assessed by the study would have an adverse effect on site integrity (AEOSI) on the Severn estuary / Mor Hafren SAC and SPA, River Wye / Afon Gwy SAC and the River Usk / Afon Wysg SAC<sup>8</sup> and that “..it is highly probable that all schemes would require compensatory measures including for intertidal habitat, birds and fish”. NRW therefore welcome the proposed Ecosystem Enhancement Project (EEP) that aims to provide a framework for delivery of any statutory required compensatory habitat for the TLC project. We must advise, however, that the conclusions of the STPFS also showed that securing an effective and deliverable compensatory measures plan will be an exceptionally complex and challenging task. Identifying areas of land that could be used to create compensatory intertidal habitat will be likely to involve land change outside of the estuary, particularly given the existing requirement for compensatory habitat for other plans and projects within the estuary, e.g. the Severn Estuary Shoreline Management Plan. In addition, the STPFS concluded that there was no convincing way to mitigate or compensate for impacts of a tidal power scheme on migratory fish. **Early consideration of the implications of these findings is considered essential.**

We would also highlight that land needed for compensatory measures is likely to have environmental value of its own and that changes to the land necessary to deliver compensation may lead to additional adverse environmental effects whilst delivering compensatory benefits of different nature. There is potential for large significant adverse environmental effects, which

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<sup>6</sup> [https://ec.europa.eu/environment/nature/legislation/habitatsdirective/index\\_en.htm](https://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm)

<sup>7</sup> The National Association for the Conservation of the Waddenzee and the Netherlands Association for the Protection of Birds v The Secretary of State for Agriculture, Nature Conservation and Fisheries and the Cooperative Producers' Association of Netherlands Cockerle Fisheries, ECJ Case C-127/02, 7<sup>th</sup> September 2004, the Waddenzee ruling

<sup>8</sup> <https://www.gov.uk/government/publications/1-severn-tidal-power-feasibility-study-conclusions-and-summary-report>

should be identified, assessed and considered in a determination on a DCO. These should be incorporated into the EIA process and final ES.

#### **4. Water Framework Directive**

The TLC proposal also has a high potential to adversely affect the status of water bodies and therefore require a derogation under Article 4.7 of the Water Framework Directive (WFD)<sup>9</sup>.

We note the applicant is aware of the requirement for an assessment of compliance of the proposed project with the WFD and we look forward to receiving the screening assessment for this in due course.

#### **5. Cumulative Impacts**

Assessment of the potential cumulative and in-combination effects of the TLC project with other existing or reasonably foreseeable projects (including future tidal lagoon proposals) is likely to be complex, particularly given the interest in further tidal range schemes within the Severn Estuary and wider Bristol Channel. NRW urges as holistic an approach to assessment as possible to ensure that the development opportunity in the Severn is maximised whilst minimising environmental effects. In our view the applicant should be mindful of the value of considering the range of projects collectively to understand individual project risks, and we would welcome further discussion on how this can best be achieved.

We have highlighted a number additional plans and projects that need to be considered in the cumulative impact / in-combination assessment of individual receptors in our detailed comments on the scoping report (Annex 1) but given the proposed lifespan of the project, draw the applicant's attention in particular to the need to consider the coastal strategies in place around the Severn including shoreline management plans and habitat creation programmes, which are likely to affect the morphology of the estuary over the lifetime of the development. The assessment should also consider the impact of the lagoon development of the delivery of these strategic coastal plans and programmes.

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<sup>9</sup> Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy

## 6. Marine Licence

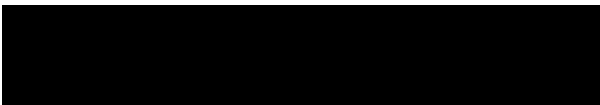
The power vested in Welsh Government to determine applications for Marine Licences has been delegated to NRW under the Marine Licensing (Delegations of Functions) (Wales) Order 2013. As the proposed development involves construction of works in, on, under or over the Mean High Water Springs (MHWS) mark, a marine licence will be required for those 'licensable activities' under the Marine and Coastal Access Act (2009).

As the applicant notes (in section 1.1.0.3) an Environmental Statement must be prepared in accordance with the Marine Works Regulations (Environmental Impact Assessment) 2007 (as amended). **As Appropriate Authority under the Marine Works Regulations (Environmental Impact Assessment) 2007 (as amended) we strongly advise the applicant to contact NRW's Marine Licencing Team for pre application discussions and to submit a screening and scoping opinion request to us ([marinelicensing@naturalresourceswales.gov.uk](mailto:marinelicensing@naturalresourceswales.gov.uk)).**

NRW recognise the considerable issues and complexities identified in our response to this consultation and highlight that if the Planning Inspectorate would like to discuss any of the issues raised within this letter we would be very happy to do so (recognising the need to record such discussions for public presentation).

If you have any questions regarding this response please don't hesitate to contact Lucie Skates (03000 653871) in the first instance

Yours Sincerely



**Martyn Evans**

**Ecosystems Planning & Partnerships Manager South**

Cc: Tim Carter (Tidal Lagoon Cardiff Ltd), Lizy Gardener (Natural England), Dave Pring (Environment Agency), Wendy Boddington, Ron Loveland, John Hamer (Welsh Government)

Enclosed:

Annex 1 – Detailed comments on Tidal Lagoon Cardiff EIA Scoping Report

Annex 2 - NRW Advice Note on Using Acoustic Surveys to Inform Benthic Characterisation

## **Annex 1. NRW's Detailed Comments on Tidal Lagoon Cardiff EIA Scoping Report**

### **Chapter 1.0 Introduction to Scoping Report**

1.3.0.4. This section indicates that it is intended that the Environmental Statement (ES), the structure of which is addressed in Chapter 3, will support both the Development Consent (DCO) application and that for a Marine Licence (ML).

We highlight that the advice contained in this Annex and covering letter are made in the context of our role as a prescribed consultee under the INFRASTRUCTURE PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT) REGULATIONS 2009 SI 2263 (AS AMENDED) (THE EIA REGULATIONS). The applicant should be advised that this consultation response does not constitute a formal EIA Scoping Opinion under Marine Works Regulations (Environmental Impact Assessment) 2007 (as amended).

The power vested in Welsh Government to determine applications for Marine Licences has been delegated to NRW under the Marine Licensing (Delegations of Functions) (Wales) Order 2013. As the proposed development involves construction of works in, on, under or over the Mean High Water Springs (MHWS) mark, a marine licence will be required for those 'licensable activities' under the Marine and Coastal Access Act (2009).

As the applicant notes (in section 1.1.0.3) an Environmental Statement must be prepared in accordance with the Marine Works Regulations (Environmental Impact Assessment) 2007 (as amended). As Appropriate Authority under the Marine Works Regulations (Environmental Impact Assessment) 2007 (as amended) we strongly advise the applicant to contact NRW's Marine Licensing Team for pre application discussions and to submit a screening and scoping opinion request to us ([marinelicensing@naturalresourceswales.gov.uk](mailto:marinelicensing@naturalresourceswales.gov.uk)).

### **Chapter 2.0 Proposed Approach**

2.1.0.2. Our comments provided on Section 8.0 of the scoping report onwards provide guidance on the key aspects of:

- i. Proposed zone of influence / project study area;
- ii. Suitability of baseline data;
- iii. Further surveys/investigations/desk studies to gather additional baseline data;
- iv. Scope of impacts to be examined; and
- v. Proposed assessment methodologies

We welcome that it is indicated this scoping report is a starting point for early discussions with statutory and non-statutory consultees. Mindful of the complexities, the development of further detail of the project may lead to the identification of refinements in the evidence that may be needed to support the EIA.

2.1.0.3 & 2.1.0.5 – 2.1.0.9: Whilst the comments provided here on EIA scope may be relevant to evidence necessary to the scope of HRA and WFD assessments, specific comments on HRA and WFD screening will be made at the later stage, following further consideration of available evidence and detail of the project, in liaison with the applicant and other parties including Natural England and the Environment Agency. This will include confirmation on the list of European Sites to be included within the HRA. **We note the initial work in Appendix 2.1 and 2.2 in this respect and have made a limited number of**

**comments on 2.1 at the end of this annex but the applicant should be aware that it is our intention to liaise with them separately on these through the Evidence Plan process.**

2.1.0.10. We welcome the proposal for an Evidence Plan approach to support the HRA and are liaising with the applicant NE and EA on this matter.

We would highlight at this stage our comments made in Sections 8 onwards on the lack of detail on baseline characterisation, potential impacts and proposed assessment methodology for a number of receptors, including designated habitats and species.

**As such, the applicant should be advised that the scoping report for the TLC project currently contains insufficient information to allow assessment of whether the proposed scope of the Environmental Statement is adequate, most notably with respect to coastal processes, sediment transport and contamination.** The lack of detailed information for this topic means that we are unable to assess whether the zone of influence / study area boundaries have been appropriately defined for physical processes and therefore the wide range of receptors that are influenced by, or dependant on, these processes including: water quality, fish, subtidal and intertidal ecology, landscape and seascape, flood risk and hydrology, and coastal birds. This clearly also raises issues of confidence for HRA that are relevant to its scoping.

Planning Inspectorate Advice Note 10 (version 5, August 2013) describes how the Habitats Regulations Assessment (HRA) process should be undertaken for Nationally Significant Infrastructure Projects (NSIPs). This guidance includes that conclusions on effects under a HRA are required to be supported by a very high level of certainty as indicated by case law, in particular the Waddenzee<sup>10</sup> ruling. It is indicated that:

*‘the competent national authorities, taking account of the conclusions of the appropriate assessment....are to authorise such activity only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects’*

And in footnote 10 on page 19 of the NSIP Advice Note 10:

“In the light of the precautionary principle, a risk of significant effects exists if it cannot be excluded on the basis of objective information that the plan or project will have significant effects on the conservation objectives of the site concerned; in case of doubt as to the absence of significant effects an appropriate assessment must be carried out. All aspects of the plan or project which can, either individually or in combination with other plans or projects, affect those objectives must be identified in the light of the best scientific knowledge in the field (paragraph 54 of Waddenzee)”

All relevant caselaw on the Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the "Habitats Directive"), will need to be considered in preparing necessary assessments under the The Conservation of Habitats and Species Regulations 2010 ( the "Habitat Regulations") and a decision on a DCO.

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<sup>10</sup> The National Association for the Conservation of the Waddenzee and the Netherlands Association for the Protection of Birds v The Secretary of State for Agriculture, Nature Conservation and Fisheries and the Cooperative Producers' Association of Netherlands Cockerle Fisheries, ECJ Case C-127/02, 7<sup>th</sup> September 2004, the Waddenzee ruling

It is highly likely that a proposal of this scale within the Severn Estuary will result in significant impacts to the natural environment and potential adverse effects on Natura 2000 sites.

The UK Government's Severn Tidal Power Feasibility Study (STPFS, DECC 2010<sup>11</sup>), provided a detailed assessment of the environmental, economic, engineering, energy generation, social and legislative issues involved with developing large scale tidal energy schemes, including lagoons, in the Severn estuary. The STPFS assessments give a clear picture of the potential environmental consequences of building barrages and lagoons in the Severn Estuary to the environment and landscapes of Wales and its coastal waters, concluding that: *"The scale and impact of a scheme would be unprecedented in an environmentally designated area, and there is significant uncertainty on how the regulatory framework would apply to it."* In particular the study identified the risks of:

- Local extinction of fish species, including the loss of Twaite Shad as a breeding species in the UK
- significant loss of inter-tidal habitat, including saltmarsh and mudflat
- a reduction in populations of up to 30 bird species
- an increased flood risk both within the Severn Estuary and further away.

**The conclusions of the STPFS are still valid and it is important that other marine energy schemes draw on the lessons of the study in their design and location. NRW strongly advise the applicant and the Secretary of State to give the findings of the STPFS their full consideration in scoping the EIA for the Tidal Lagoon Cardiff scheme.**

In relation to any compensatory requirement and progression of the project under Regulation 62 of the Habitats Regulations, it will be necessary to demonstrate:

- There are no feasible alternative solutions and that the project minimises adverse effects on the integrity of Natura 2000 sites;
- There are "imperative reasons of overriding public interest" (IROPI) for the plan or project to proceed;
- Compensatory measures are secured that will ensure that the overall coherence of the Natura 2000 network of European sites is maintained.

## 2.2 – 2.3 Evidence Plan Process / Modelling Work Plan

NRW note and welcome the proposals for a Data Plan, Modelling Work Plan and Evidence Plan. It will be important to ensure that all elements of these plans are presented and discussed in sufficient detail at all stages. For consistency and to ensure appropriate cross referencing between the different plans, we recommend that the Modelling Work Plan and Data Plan are agreed with NRW and other relevant parties as part of the Evidence Plan process.

## 2.4 - Ecosystem Enhancement Project (EEP)

It is stated here that the EEP aims to address all legislative requirements relating to assessment and consenting as a foundation but also to produce proposals that can draw together habitat, conservation and flood defence aspects to enhance the natural

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<sup>11</sup> <https://www.gov.uk/government/collections/severn-tidal-power-feasibility-study-conclusions>

environment and bring economic and social benefits to host areas and the UK as a whole. We would welcome a holistic approach and any win-wins that can be found and will engage with the process.

In particular we would highlight that the STPFS concluded that even after mitigation measures had been applied, all the schemes assessed by the study would have an adverse effect on site integrity (AEOSI) on the Severn estuary / Mor Hafren SAC and SPA, River Wye / Afon Gwy SAC and the River Usk / Afon Wysg SAC<sup>12</sup> and that “*..it is highly probable that all schemes would require compensatory measures including for intertidal habitat, birds and fish*”.

It should be noted that necessary Natura 2000 compensatory measures may not be solely related to habitat creation and that other species related measures may be required.

NRW therefore welcome the proposed Ecosystem Enhancement Project (EEP) that aims to provide a framework for delivery of any statutory required compensatory habitat for the TLC project. We must advise, however, that the conclusions of the STPFS also showed that securing an effective and deliverable compensatory measures plan will be an exceptionally complex and challenging task. Identifying areas of land that could be used to create compensatory intertidal habitat will be likely to involve land change outside as well as inside of the estuary, particularly given the existing requirement for compensatory habitat for other plans and projects within the estuary, e.g. the Severn Estuary Shoreline Management Plan. In addition, the STPFS concluded that there was no convincing way to mitigate or compensate for impacts of a tidal power scheme on migratory fish. **Early consideration of the implications of these findings is considered essential.**

We would also highlight that land needed for compensatory measures is likely to have environmental value of its own and that changes to the land necessary to deliver compensation may lead to additional adverse environmental effects whilst delivering compensatory benefits of different nature. There is potential for large significant adverse environmental effects, which should be identified, assessed and considered in a determination on a DCO. These should be incorporated into the EIA process and final ES.

### **Chapter 3.0 Structure of the Environmental Statement**

3.2.11. This section of the report sets out the structure that each chapter will follow. This structure looks sensible however chapter 12 (and the other topic chapters) does not follow this structure and significant areas covered in this section are not present in chapter 12. (sections v,vi,vii,viii are missing apart from some information on proposed monitoring)

3.2.3.5. Whilst moderate or major impacts are considered significant for the EIA, we seek clarification as to what would be considered to be ‘significant’ for the HRA? We would advise that this assessment needs to be related to the conservation objectives for the site in question.

3.2.4.1 This paragraph gives an interpretation of what is meant by the term ‘mitigation’. There is need for HRA to clearly separate between ‘Mitigation’ (i.e. measures that avoid or reduce effects) and ‘Compensation’. Mitigation measures can be considered within the Assessment of Likely Significant Effects and Appropriate Assessment, whereas

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<sup>12</sup> <https://www.gov.uk/government/publications/1-severn-tidal-power-feasibility-study-conclusions-and-summary-report>

Compensatory measures cannot. The recent Briels judgment<sup>13</sup> provided further clarity on what should be considered compensation rather than mitigation.

3.2.4.2. States that the design of the project will run in parallel with the development of the EIA and that avoidance of impact via design will be the most preferred way of mitigating the effects of the project. NRW's would strongly support this as our experience of the Tidal Lagoon Swansea Bay project and other marine renewable energy schemes has shown the value of incorporating mitigation into the design of the infrastructure at an early stage. We would therefore encourage the applicant to engage with us on this area of work at an early stage.

### 3.2.5 Cumulative/ in-combination effects

Assessment of the potential cumulative and in-combination effects of the TLC project with other existing or reasonably foreseeable projects (including future tidal lagoon proposals) is likely to be complex, particularly given the interest in further tidal range schemes within the Severn Estuary and wider Bristol Channel. NRW would urge as holistic an approach to assessment as possible to ensure that the development opportunity in the Severn is maximised whilst minimising environmental effects. In our view the applicant should be mindful of the value of considering the range of projects collectively to understand individual project risks, and we would welcome further discussion on how this can best be achieved.

We note the initial identified projects within Table 3.1 in relation to cumulative effects with respect to Schedule 4, Part 1 of the EIA Regulations. Further investigation and discussion will be necessary to identify plans and projects for the in-combination and cumulative effects assessment under EIA and HRA regulations. However, we have highlighted a number of additional plans and projects that need to be considered in the cumulative impact / in-combination assessment of individual receptors below and also in our detailed comments on section 8 onwards of the scoping report. Given the proposed lifespan of the project, we would draw the applicant's attention in particular to the need to consider the coastal strategies in place around the Severn including shoreline management plans and habitat creation programmes, which are likely to affect the morphology of the estuary over the lifetime of the development. **The assessment should also consider the impact of the lagoon development on the delivery of these strategic coastal plans and programmes.**

Table 3.1.

- Does not include maintenance dredging and disposal or aggregate extraction licences (Bedwyn Sands, North Middle Grounds – Areas 455/459, North Bristol Deep – Area 470, or Culver Sands & Nobel Bank)
- The effects on thermal plume dispersion from the Hinkley Point nuclear power stations (including Hinkley Point 'C') should also be specifically considered.

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<sup>13</sup> Habitats Directive, Case C-521/12 Briels (May 15, 2014)



3.3.0.4. NSIP Advice Note 10 provides advice on assessment of in-combinations effects with other plans or projects for HRA. With respect to projects it is indicated that they should include:

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

### 3.4 Water Framework Directive

The proposal has a high potential to adversely affect the status of water bodies and therefore require a derogation under Article 4.7 of the Water Framework Directive (WFD)<sup>14</sup>.

We note the applicant is aware of the requirement for an assessment of compliance of the proposed project with the WFD and we look forward to receiving the screening assessment for this in due course.

## Chapter 4.0 Introduction to the Environmental Statement

No comment

## Chapter 5.0 Background to the project and Site Selection

5.3.0.13. Grid connections are an essential part of the project which the EIA assessment and ES should address.

## Chapter 6.0 Project Description

6.1.0.5. Mentions River Rhymney, Welsh water outfalls and 'others' – NRW recommend specific mention of outfalls operated by IDB (soon to be NRW) and NRW for managing water levels on the Gwent Levels.

Fig 6.4. Mentions quarry run or dredged gravel - if dredged gravel is to be used the ES should detail the source of this material and assess any impacts associated with this activity. There are no aggregate extraction sites for gravel in the Severn Estuary & Bristol Channel.

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<sup>14</sup> Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy

6.1.0.11. Onshore works: this paragraph refers to “provision of construction support sites including access routes for construction traffic, land creation works, lay-down areas and temporary rock stockpile areas.” Clear Information on all onshore works will be required.

6.2.0.2. Large volumes of materials will be needed to construct the breakwater. Increases in extraction are likely to be needed to meet the demands of the project. Locational factors could lead quarrying and environmental effects at source sites that would otherwise not occur. The ES should include clear information on the type of materials required and the respective volumes to be sourced from the source locations to allow consideration of effects.

6.2.0.9. Dredging to provide core material for the breakwater is indicated as an option. Details should be provided on dredging methods and both direct and indirect environmental effects of the dredging option should be assessed and presented in the ES.

6.2.0.10. Access routes on land to the construction area need to be indicated, and it should be made clear whether these routes are existing routes, or new roads.

6.2.0.17. It is indicated the areas around the turbines and sluice gates will need to be be ‘gradually deepened’. The quantity of material removed should be indicated and as should the location for disposed.

6.2.0.34. It is indicated here that the ability to pump at the end of a tidal cycle may reduce the loss of intertidal area within the footprint of the lagoon. Clear information on how this would have an effect will need to be provided within the ES to support an assessment of any effect, with all receptors considered.

6.2.0.43. The details of the tie-in, method of construction and how the proposal will affect flood defences and flood risk along the coast, (including any realignment proposals) should be included within the ES.

6.5.0.2. This section should give consideration to future maintenance, how it would be achieved and who would have responsibility for it.

## **Chapter 7.0 Planning and Policy Context**

It is unclear why some elements of the project have been ruled out as requiring a Marine Licence (as shown in Table 7.1 of the scoping Report). This can be addressed by pre-application discussions with the NRW Marine Licensing Team.

7.2.0.12. This refers to biodiversity objectives contained within Planning Policy Wales (PPW) with a cross-reference to paragraph 5.4.5 of PPW. However, this paragraph of PPW is in relation to plan-making. Reference should be made to paras 5.5.1 to 5.5.4, which relate to development management applications.

7.2.0.13. This indicates that the assessment will refer to landscapes including designated landscapes with reference to Chapter 5 of PPW. We welcome this, but given the application site’s proximity to the Gwent Levels registered historic landscape it would also be useful to refer to paragraph 6.5.25 of PPW and carry out assessment of any impacts within the EIA and ES.

7.2.0.26. The applicant should note that under the Flood Risk Regulations 2009, NRW will produce Flood Risk Management Plans (FMP’s) by December 2015 for all of Wales. These will address flooding from main rivers, the sea and reservoirs. Whilst FMP’s will replace the

Catchment Flood Management Plans, the policy units set out in the CFMPs will be taken forward into the FRMPs along with any incomplete actions.

## **Chapter 8.0 Coastal Processes, Sediment Transport and Contamination**

### Main issues:

**8.1 Overall approach** – The scoping report lacks the required detail with respect to the coastal processes topic to assess whether the proposed scope is adequate. For example, no detailed information is provided on available baseline data and proposed surveys; there is limited detail with respect to modelling proposals; high level modelling referred to with regard to the zone of influence of the proposals has not been made available; and the figures provided within the Coastal Processes Chapter (Figs 8.2 and 8.3) are not clearly labelled or adequately explained. However, we do note and welcome the proposals for a data plan, modelling plan and evidence plan (Section 2.3.0.4). It will be important to ensure that all elements of these plans are presented and discussed in sufficient detail at all stages.

**8.2 Technical Feasibility** - it is not clear from the Coastal Processes chapter (or other introductory chapters) whether a technical study has been undertaken regarding construction of the proposed lagoon. There is, for example, a lack of detail regarding source material for the lagoon walls (see comments on source of fill material below). It is fundamental to establish the full range of potential physical modifications that may be necessary as part of this project to ensure that the ES is adequately scoped. This includes, for example, any sources of material which may have an in combination effect, and the potential need for disposal of material arising from construction or operation.

**8.3 Timescales for application-** noting the proposed timescales for submission of the Tidal Lagoon Cardiff DCO application, we are concerned that there is insufficient time available to properly review the existing baseline data, scope and carry out additional surveys, carry out the modelling work and other fundamental assessments, and analyse and interpret the assessments to inform a robust EIA. In addition, given that the benthic surveys will be designed after the geophysical survey has been carried out, this introduces further delays in terms of gathering data for other topic areas. We note that the sediment particle size data, which is needed for both modelling and geomorphological assessment, will be collected as part of this later benthic survey. **We are concerned that the challenging timescale proposed will compromise the quality of the EIA.**

**8.4 Zone of influence/impact pathways** (Section 2.1.0.8 and 8.2.0.5, 8.2.0.6, 8.2.0.7, Figs 8.2, 8.3) - Descriptions/assessments are based on high level modelling which has not been provided for scrutiny as part of the scoping report, therefore we cannot currently confirm whether we agree with the zone of influence and impact pathways described. This also presents implications for advice that can be provided in relation to HRA screening at this stage. See comments on Appendix 2.1 below.

Figures 8.2 and 8.3 provide a preliminary indication of the effect of the Project on MHWS and MLWS, and on “flood and ebb flow speed”, but no details of the model used, bathymetry assumed, or tidal conditions associated with the flow speeds are given. The

preliminary indications of this modelling are that there will be a very measurable reduction in the height of MHWS and an increase in the height of MLWS (i.e. a reduction in tidal range) affecting a large area of the Severn estuary and Inner and Middle Bristol Channel. Measurable changes in flood and ebb flow speeds are also indicated (although no numerical scale is provided on the figures).

According to the limited results presented, the 'High-level preliminary modelling of the potential effects on hydrodynamics (water levels and flows)' appears to have been undertaken in relation to the operation of the project **alone**. There is no indication that this assessment of potential far field effects has taken into consideration potential cumulative and in-combination effects of others plans/projects (including TLSB or other TL projects). Assessment of these potential effects is essential to be undertaken at an early stage so that far field effects and study boundaries can be appropriately defined, otherwise this might present difficulties for data capture and modelling at a later stage.

Following initial review of the modelling outputs provided, it appears that the far field effects may extend further upstream (beyond the boundary) (e.g. see Fig 8.2 where limit of change is at the close of boundary). This requires further consideration.

In addition, further clarification is required as to whether the assessment of the far-field effects of the operational phase will be sufficient in identifying the worst case scenario (WCS) for study boundaries and far field effects, or whether the construction phase present impacts in different locations.

See also the comments on cumulative and in combination effects.

**8.5 Decommissioning Phase** (Sections 3.2.0.1 & 6.5.0.2)- It is expected that decommissioning of the project would involve only the removal of the turbines, metals and plastics relating to energy generation, the breakwater (seawalls) are proposed to be maintained to preserve habitat, with tidal processes flowing freely around the remaining structures. As advised in relation to TLSB, it may be appropriate to recommend model runs to be undertaken for the decommissioning phase, with and without the lagoon walls in place, and for at least two future climate change scenarios which may require several runs using alternative scenario future bathymetries. It may also be necessary to advise further scenarios such as the consequences of withdrawal of lagoon wall maintenance and progressive breakdown after 120 years and the associated potential impacts.

The need to check the DECC guidance on decommissioning is noted, however, given the highly designated nature of this site it would seem appropriate to include assessment of full removal as well as the various other options mentioned above.

**8.6 In combination & Cumulative Assessment** – (Table 3.1) This section does not include maintenance dredging and disposal or aggregate extraction licences (Bedwyn Sands, North Middle Grounds – Areas 455/459, North Bristol Deep – Area 470, or Culver Sands & Nobel Bank), and no Newport Lagoon or TLP Bridgewater Bay lagoon. The effects on thermal plume dispersion from the Hinkley Point nuclear power stations (including Hinkley Point 'C') should also be specifically considered. In addition, there is no reference to the Shoreline Management Plan/ Flood Risk Management Strategy or delivery of NRW's National Habitat Creation Programme or the equivalent Regional Habitat Creation programme for the English side of the Estuary. These plans and programmes should be considered for inclusion as they will affect the morphology of the estuary over the lifetime of the development. The assessment will also need to consider the impacts **on** the delivery of these plans and programmes.

**In addition, regarding in combination effects, this must include all aspects of the project including (but not limited to) sources of material for construction, potential disposal of material and potential provision of compensatory habitat.** These aspects are not specifically referenced within the Coastal processes Chapter for inclusion in the studies and assessment.

**8.7 Source of fill material for breakwater** (Sections 6.2.0.7/ 6.2.0.8/6.2.0.9)– It is stated in paragraph 6.2.07 of the Scoping Report that the construction design of the lagoon breakwater, and the sources of rock armour and core fill material, have not yet been finalised. However, current design plans suggest that approximately  $10 \times 10^6 \text{ m}^3$  of sandy material will be required for the core of the breakwater,  $5.5 \times 10^6 \text{ m}^3$  of quarry run rock will be required for the outer core, and  $2.5 \times 10^6 \text{ m}^3$  of rock armour will be required for the outer layers of the breakwater. It is anticipated that all of the rock required will be brought to the site by sea, road or rail. Paragraph 6.2.0.9 of the Scoping Report states that “if at all practical, the sandy material for the core of the breakwater will be dredged from within the footprint of the lagoon area”.

**At the present time it is unclear if it would be technically feasible or environmentally desirable to construct the core of the lagoon breakwater from locally dredged sedimentary material, and this aspect should be addressed in detail at an early stage. Important questions include the location and depth of required dredging, the suitability of dredged material, and likely requirements for disposal of unsuitable material. It also important that modelling studies undertaken as part of the EIA should consider a sufficient number of alternative construction / dredging scenarios.**

**It is recommended that a detailed review of the stratigraphy, sedimentology, geotechnical properties and sea bed morphology of the proposed construction site and immediately surrounding area is undertaken at an early stage as part of the Baseline data assessment and engineering design studies. This review should include, but not be restricted to, surface and subsurface data held by the British Geological Survey (BGS) and Dwr Cymru / Welsh Water, or contained within archaeological survey reports (see suggested references under comments on ‘Baseline’ below).**

**8.8 Initial scope of coastal processes issues to be assessed-**(Section 8.2.0.3) – This section provides an initial indication of the proposed issues to be assessed but, as noted, requires further expansion to ensure that all issues are adequately covered in relation to all relevant related topics. We support a further detailed iteration of the issues for consideration, as the list included in section 8.2.0.3, i – vii is not comprehensive.

Gaps and issues include, but are not limited to:

- Whether point (i ) would include assessment of water levels for the Rhymney Estuary which is within the impoundment;
- Point (iii) discusses potential for large-scale morphological change but there is no mention of assessing change at a more localised scale. This should be expanded to consider potential impacts on processes, sediments, morphological features and habitats within specific local and meso-scale environments, including the estuaries of rivers, ‘open coast’ saltmarshes and tidal flats, sand dune systems, intertidal rocks

platforms, cliffs and subtidal sand banks in the area within and/ or surrounding the proposed development;

- In addition, point (iii) does not cover morphological change within the impoundment, including the morphological stability of the foreshore and Rhymney estuary for example;
- Points (v) & (vi) refer to changes in flows and changes in siltation – the implications of such changes are of relevance to morphological change and therefore intertidal and subtidal habitats as well as the interests listed;
- Similarly point (vi) – refers to effects on waves but does not include wave reflection, or implications for sediment transport and potential impacts on morphology and therefore intertidal and subtidal habitats;
- There is no mention of assessment of changes to the overall hydrodynamic regime of the estuary- the high tidal range and estuarine conditions are at the extreme end of the range and variation in the UK, as noted within the Regulation 35 advice for the Severn Estuary SAC, SPA and Ramsar.

In addition to the issues and gaps identified above, the EIA coastal processes assessment should give specific consideration to the following:

- Effects of potential changes in water salinity and temperature on flows, patterns of sediment deposition and intertidal / subtidal biota;
- alongshore sediment transport (littoral drift);
- impacts on sea defences (in terms of erosion / breaching risk as well as overtopping risk);
- impacts on local wind regime and potential implications;
- the combined effects of the Project and potential climate change (see below) (including sea level rise) at both broad scale and local scale, including an extreme worst case (H++) climate change / sea level scenario; in addition to effects on extreme water levels (including waves), the impacts on patterns of sediment erosion and deposition, and on associated morphological and habitat change, should be considered (NB the term 'sedimentation' is preferable to 'siltation' since it includes sand and gravel grade material as well as silt / mud).

We would therefore recommend that there is opportunity to discuss the scope of issues in more detail.

**8.9 Climate change-**(section 8.2.0.11) currently it is stated that the UKCP'09 Medium Emission projection 95<sup>th</sup> % ile will be assessed. We recommend that sensitivity testing of the UKCP'09 High Emissions scenario projections is also carried out as a precautionary approach and to ensure a WCS has been considered.

**8.10 Baseline-** (Section 8.3.0.1) The Scoping Report states that a high level review of coastal processes has been completed, including an assessment of baseline data gaps and recommendations for additional data collection. This review, which we assume to be ABPmer 2014, *Preliminary Review: High Level Review and Data Gap Analysis Report* R.2280, provided to NRW in July 2014 is not referenced within, or appended to, the scoping report. However, if this is the review being referred to, it is important to note that it is **very** high level and is intended to relate to a number of different lagoon options within the general Severn Estuary / Inner Bristol Channel area. Section 2.2 provides a very brief (1.5 pages) Local Scale Process Review of the "Severn A" (Peterstone Flats) lagoon area. **No detailed literature review or detailed data for the proposed Cardiff**

lagoon area are presented. No substantive references are made to any of the existing published and unpublished scientific literature on the area. Almost no information about geomorphological features and sediments is provided. The gap analysis is not focused on this area and only limited recommendations are made for further data collection of specific relevance to the proposed Cardiff Lagoon Project area. There is a requirement for a much more detailed and substantive baseline information review, including data analysis, at a very early stage of the EIA. The results of this review should be summarised in a separate report or reports to underpin the ES.

The Severn Estuary / Bristol Channel is one of the most intensively studied estuarine regions in the United Kingdom, if not in the world, and consequently there is a very large published and unpublished literature relating to the area. A thorough review of this information should be undertaken and an appropriately referenced summary provided. Several bibliographic databases exist and it is recommended that these are consulted to identify published sources of potentially relevant information and data.

Examples include:

Atkins (2010): Severn Estuary Shoreline Management Plan Review (SMP2), Appendix K: Bibliographic Database (available online at [http://www.severnestuary.net/secg/docs/public%20consultation/dec10/Appendix%20K\\_Metadata%20and%20Bibliographic%20Database\\_FINAL\\_Dec2010.pdf](http://www.severnestuary.net/secg/docs/public%20consultation/dec10/Appendix%20K_Metadata%20and%20Bibliographic%20Database_FINAL_Dec2010.pdf))

Severn Estuary Levels Research Committee (2007) Bibliography (available online at [http://selrc.org.uk/archaeology\\_bibliography.html](http://selrc.org.uk/archaeology_bibliography.html))

CADW (2015) Historic Landscape Characterisation Sources – Bibliography) (available online at [http://www.ggat.org.uk/cadw/historic\\_landscape/Gwent%20Levels/English/GL\\_Sources](http://www.ggat.org.uk/cadw/historic_landscape/Gwent%20Levels/English/GL_Sources))

Cardiff University and Severn Estuary Partnership (2010) Severn Estuary Climate Change Citations Database, Version 5, October 2010 (available online at [http://www.severnestuary.net/sep/partnership/docs/CitationsDatabase\\_FinalCH\\_Oct2010.pdf](http://www.severnestuary.net/sep/partnership/docs/CitationsDatabase_FinalCH_Oct2010.pdf))

It is also recommended that the results of recent hydrodynamic, sediment transport and water quality modelling, together with associated oceanographic data collection, are reviewed (in addition to the work previously undertaken by ABPmer), including that undertaken for the purposes of the Hinkley Point C EIA (e.g. as part of the BEEMS programme) and Severn barrage studies (e.g. by Professor Roger Falconer and associates in the Low Carbon Research Institute (<http://www.lcri.org.uk>)).

**8.11 Additional data collection (Section 8.3.0.2) –** Four additional types of survey activity are described: Hydrographic, Geophysical, Oceanographic, Benthic surveys) with brief indications of when the work has/will be completed but there is no description of the specification/coverage/spatial extent/location of the surveys, apart from brief details for the oceanographic survey. Despite the lack of detail mentioned above, initial comments on additional data collection proposed are:

- Hydrographic & Geophysical Survey (8.3.0.2 i, ii): the extent and methodology for the hydrographic and geophysical surveys have not been defined- we request the

opportunity to comment on this. Section 3 of the ABPmer (2014) report considers the bathymetric data availability, gaps and requirements, and recommends that appraisals should be undertaken to assess the suitability / availability of existing LiDAR and other bathymetric / topographic data held by organizations such as the Channel Coast Observatory (CCO) and aggregate extraction companies. However, it cannot be assumed that commercially-owned data will be made available to Tidal Lagoon Power and it would in any event be preferable to undertake a consistent, synoptic, area-wide survey for the purposes of constructing the digital terrain model which is to be used in the numerical modelling. This may require bespoke LiDAR surveys and swath bathymetric surveys both upstream and downstream of the proposed Cardiff Lagoon site.

- Oceanographic survey (8.3.0.2, iii) – According to 8.3.0.3, the oceanographic survey is not going to collect additional wave/tidal current data and will be limited to water column data (temp, salinity, suspended sediment). See comments below.

**SUSPENDED SEDIMENT DATA:** ABPmer (2014) recommend that data relating to suspended sediment concentrations should be collected at the same stations where water levels, salinity, temperature and waves are to be recorded, and, wherever possible at locations which will allow comparison with existing historical data. They also propose that vertical profile data should be collected to allow calibration / validation of 3D models. We welcome this approach, **however, it is recommended that data collection at some sites should extend beyond the minimum 30 day period required for model calibration / validation purposes.**

**TIDAL DATA:** The Severn Estuary and Bristol Channel are relatively well-served by tide gauges, maintained either as part of the UK Tide Gauge Network or by the Environment Agency, and a number of sites have reasonably complete records of more than 20 years. However, as noted in the ABPmer (2014) report, the dynamic nature of the Severn environment make it desirable to have a more complete record of water level variations (and also tidal currents) throughout the estuary, particularly within the lagoon sites and the Upper Severn Estuary.

**WAVE DATA:** The Severn estuary and Inner Bristol Channel is not well served by long term wave data, although relatively short recent records (some continuing) are available for Scarweather Sands, Minehead, Hinkley Point, Weston Super Mare and Severn Bridge. No data are available for the nearshore areas on the Welsh side seaward of Severn Bridge, including the area of the proposed Cardiff lagoon. ABPmer (2014) propose (paragraph 3.4.3) that ADCP or AWAC instruments are deployed in the areas of the proposed Cardiff Lagoon (and also off Newport) to provide a more comprehensive overview of wave climate in the estuary. A total of eight oceanographic data acquisition sites is identified in the ABPmer (2014) report. They suggest that some of these sites could be rendered redundant if some of the lagoon development options are not pursued. **However, even if only a single lagoon option is taken forward there will be requirement to obtain data from a sufficient number of sites to make adequate assessment of the development on processes, sediments and features throughout the estuary as a whole. It is recommended that at least four AWACs should be deployed to gather data relevant to the Cardiff**



Lagoon, one outside and to the southwest of the proposed breakwater, one inside the proposed breakwater, one in the lee of the breakwater opposite the Caldicot Levels, and one near the English shore to the southwest of Clevedon. If no contemporary data for the Hinkley area can be obtained, a further AWAC should be deployed by TLC within Bridgwater Bay. It would also be desirable to obtain contemporary data from a site higher up the estuary close to the English shore. The precise number and locations of data collection sites should be agreed through further discussions between NRW, TLC and other interested parties.

- Benthic survey (8.3.0.2 , iv)- we note that the primary aim stated here is to address marine ecology requirements. However it is important to ensure the sediment data also adequately meets the requirements for the coastal processes topic, and therefore we recommend further detailed consideration of these proposals.

The ABPmer (2014) report notes correctly that an understanding of seabed sediment types across the estuary is essential to be able to set up sediment models adequately, to inform conceptual understanding of the sediment dynamics of the estuary, and to provide information about potential siltation within or around the proposed developments. ABPmer recommend that sediment samples should be collected when geophysical surveys are undertaken. However, it will not be sufficient only to take samples only from the footprint of the Cardiff Lagoon, or from a 100 m or 500 m 'buffer zone' surrounding it. **It is recommended that a more systematic sampling campaign is undertaken of the entire estuary upstream and downstream of the proposed Cardiff Lagoon, extending at least as far west as Lavernock Point and upstream to the tidal limit. Surface grab samples should be taken on a grid system with variable sampling density (a maximum of 200 m spacing, with more intensive sampling within and around the proposed Lagoon structure, in the Upper Estuary, and along transects across the intertidal zone throughout the estuary). At selected locations sub-surface samples should be taken by vibro-coring to provide information about variations in sediment properties with depth. All of the samples should be analysed to determine their sediment size distributions, and selected samples should be analysed for chemical and geotechnical properties (e.g. metals and other contaminants). The particle size and geotechnical data obtained should be used to ground-truth interpretations made from the geophysical surveys, as proposed by ABPmer.**

- Additional Gaps: We note that Table 2 in the report by ABPmer (2014), identifies a number of data and information types which they consider are required to meet the requirements of the proposed EIA environmental studies. These include:
  - Bathymetry (intertidal)
  - Bathymetry (subtidal)
  - Water levels
  - Currents
  - River flows
  - Waves

- Seabed sediment
- Suspended sediments
- Salinity and temperature
- Water quality

This list provides no specific mention of intertidal and sub-tidal morphological features (which also related to habitats), including saltmarsh, which warrant individual consideration, rates of shoreline and intertidal morphological change, or littoral sediment transport. **It is recommended that the list of data type requirements is expanded to include these aspects.** Analysis of historical maps, charts, aerial photographs and ground survey data should be undertaken to provide this information. We recommend reference to the Atkins WS (2002) *Gwent levels Foreshore Management Plan*, as one key source of historical analysis.

**It is recommended that the geomorphological and sedimentological character of the entire shoreline on both sides of the estuary should be mapped and characterised by Rapid Geomorphological Assessment (RGA),** supported by appropriate ground and drone (UAV) aerial photography, as part of the EIA. This feature mapping, which should pay particular attention to saltmarshes and muddy tidal flats, should be integrated with assessment of intertidal and supratidal habitats, and with littoral sediment transport modelling.

#### 8.12 **Modelling work Plan & Proposed assessment methodology-** (Sections 2.3 & 8.4 )

The modelling work plan is outlined in Section 2 of EIA scoping report to be developed further (the intention is that this will set the strategy for three key work components- including coastal processes, water quality and flooding, to be developed in consultation with stakeholder group. ABPmer will lead on coastal processes).

We welcome the recognition of the Department of Energy & Climate Change (DECC) Severn Tidal Power (STP) feasibility study Strategic Environmental Assessment (SEA), and the relevance of the 'Hydraulics and Geomorphology' work plan as a framework for the proposed assessment methodology for the project (as noted in paragraph 8.4.0.1).

The STP SEA Hydraulics and Geomorphology (H&G) Topic Paper (April 2010) provided a number of suggestions in relation to data collection requirements and modelling assessment requirements should one of the SEA short-listed schemes be taken forward for further assessment. At present it is difficult to determine if and how these recommendations have been considered.

Section 8.3 outlines recommendations for additional data collection however insufficient detail is provided regarding the scope of the proposals, and it is unclear how some of the recommendations are being taken forward, for example, one of the data collection recommendations was '*The analysis of the long-term record of intertidal morphological change should be extended through further LiDAR monitoring for the foreseeable future and at estuary wide scale*', it is unclear how this is being considered.

A proposal to develop a modelling work programme is also stated in section 8.3.0.4, with a proposed assessment methodology discussed in section 8.4. Whilst some of the recommendations appear to have been taken on board there are some which do not appear to be fully recognised, for example: '*The use of physical models during the design stage, particularly to aid in the development of the construction process, should be considered*'.

NRW strongly advises that full consideration should be given to the DESC STP SEA H&G recommendations, it would be helpful to provide further information on if and how each recommendation has been considered and if not an adequate justification provided for departing from the advice.

In addition, given the lack of detail regarding the initial high level modelling outputs illustrated in Figs 8.2 and 8.3, it is critical that TLC and ABPmer provide adequate description and annotation of all modelling results presented in the EIA and supporting reports, and to make clear all modelling assumptions made. Sensitivity tests should be undertaken to reduce the uncertainty associated with variations which can result from changes in model parameters (bathymetry, bed roughness, boundary conditions, input tidal parameters, assumed sediment size distributions used in sediment transport modelling). This type of detailed information was not provided during the Swansea Bay Tidal Lagoon EIA process, resulting in limited confidence in the reliability of the results.

It is recommended that ABPmer should produce one or more specific reports to underpin the ES which (a) provide justification for selection of the geographical boundaries of the modelling areas and the selection of data used to construct the bathymetric model used for the modelling, (b) provide a detailed description of the individual model modules used, including set-up parameters and sensitivity tests undertaken to define the effect on results of variation in those parameters, and (c) the data used to calibrate and validate the models. A summary of this information should be provided in the ES itself, with references made to the supporting reports.

It is stated in paragraph 8.4.0.2 of the Scoping Report that, building on previous work undertaken by ABPmer for the Severn Tidal Power feasibility study, consideration will be given to the use of 3D flow modelling to support requirements for detailed sediment modelling. This will require acquisition of further field data to allow calibration and validation of 3D modelling, involving the interaction between waves, tides and sediment transport locations. Additional bathymetric and near-surface geophysical surveys will also be required. This approach will allow comparisons between the outputs of 2D and 3D modelling. These proposals for 3D as well as 2D modelling are welcomed.

**Finally, while this integrated modelling approach is welcomed, it will be important to ensure that over-reliance is not placed on modelling results at the expense of other methods of assessment, including detailed analysis of existing environmental data and the acquisition and analysis of new survey data, potentially including field and laboratory experiments. The collection and analysis of data proposed in the Data Plan should not be limited to the perceived requirements for model calibration and validation.**

**8.13 Assessment of significance – (Section 8.5)** We have a number of concerns regarding this section and strongly recommend further detailed discussion regarding the approach proposed. For example

- We need to understand what is meant in practice by the comment ‘the assessment will likely need to be moderated..’ in paragraph 8.5.0.1, and again in paragraph 8.5.0.3;
- Table 8.1 requires further consideration- for example ‘large magnitude’ is defined by far-field spatial extent greater than natural variability, but there is no mention in the table of near-field effects greater than natural variability;

- In addition it is not clear how natural variability will be assessment or defined to inform this assessment (Table 8.1 and paragraph 8.5.0.8).
- Paragraph 8.5.0.4 refers to the Department of Environment 1995 approach to risk assessment, whereas elsewhere in the scoping report IEEM guidance is referred to. It is not clear what the rationale for difference in approach is;
- In addition, we recommend consideration of the approach developed as part of the DECC Severn Tidal Power Feasibility Study SEA - Hydraulics & Geomorphology Topic, where quantitative values were put forward to help determine the assessment of significance rather than relying on qualitative descriptions entirely. Whilst this is a project rather than a feasibility study aimed at *comparing* impacts of possible tidal range schemes, we recommend that this approach should be considered in the context of the coastal processes assessment.

**8.14 Appendix 2.1- HRA Selection of European sites (Pre-screening)** - Impact pathways are based on the high level modelling outputs referred to in sections 2.1.0.8 and 8.2.0.5, 8.2.0.6, 8.2.0.7, Figs 8.2, 8.3 which has not been provided to NRW for scrutiny as part of the scoping consultation (see comments above). Therefore, it is not possible to comment in detail on Appendix 2.1 as part of the response to this consultation. We strongly recommend that appropriate detail to inform and justify this pre-screening assessment is provided. In addition, it is not clear how this assessment has taken account of in-combination or cumulative effects, which will be critical to a meaningful HRA.

In addition, on initial review there do appear to be some anomalies in the assessment which require further consideration. For example, alteration of coastal processes/sediment transport is flagged as 'possible' for all features of the Carmarthen Bay and Estuaries SAC, and yet the column for habitat loss, degradation, fragmentation has not been flagged at all. Conversely habitat loss etc is flagged as 'possible' for the Burry Inlet SPA features. This seems illogical given that the SPA sits within the SAC and if the bird supporting habitats may be affected, then this will also apply to the same habitats from a SAC perspective. This further justifies the need for clarity regarding rationale and justification for this assessment.

Carmarthen Bay Dunes SAC has not been included in this assessment, but should be given it shares a boundary with the Carmarthen Bay and Estuaries SAC.

## **Chapter 9.0 Water Quality Processes**

- 9.1 A significant omission to the proposed Marine Water Quality Assessment study area as indicated in Table 9.1 is the River Rhymney. We also recommend the inclusion of the Rivers Taff and Ely (including Cardiff Bay). The study area should be reviewed to incorporate the zone of influence identified in the results of the Coastal Processes studies.
- 9.2 We recommend early consultation with all discharge consent holders.
- 9.3 One aspect that is not specifically mentioned, but is implied by the consideration of hydrodynamic changes on industrial discharges is the impact of these changes on environmental risk assessment outcomes for major accident scenarios at Control of Major Accident Hazard (COMAH) regulated establishments along the Bristol Channel and Severn Estuary coastal area. We recommend early consultation with relevant operators of these establishments.

- 9.4 The report appears to take account of changes to industrial discharge dilution and dispersion resulting from the proposal – we should point out that the scope of these considerations will need to apply outside of the proposed impoundment area as well as within. There are some key industrial discharges outside of the lagoon in the Severn Estuary near Newport and on the Vale of Glamorgan coast that could be affected by changes in the tidal flow regime either due to reduced dilution and dispersion and/or due to increased transport range of pollutants. We welcome the proposal to consult NRW on industrial discharges.
- 9.5 There does not appear to be any specific mention of radioactive discharge impact changes as a result of tidal current modification, although this may be picked up under consideration of sewerage discharges. It should be noted that a number of licences contain provision for the discharge of radioactive waste to the sewerage system – e.g. some Cardiff Hospitals to Cardiff East STW.
- 9.6 The study needs to include consideration of leachate inputs from landfill sites particularly, Lamby Way.
- 9.7 Discharges need to be considered in terms of the potential for changes to treatment regimes and also the potential for discharge points having to be re-routed; this particularly relates to discharges within the proposed lagoon, but may also include some outside.

## **Chapter 10.0 Flooding and Hydrology**

- 10.1 We would expect the study to demonstrate and clearly identify the impact the lagoon may have on flood risk and erosion from all sources. And the impact of the lagoon and its operation on the conveyance capacity of watercourses must be demonstrated.
- 10.2 There needs to be a clear definition of the study area with regards water resources issues such as surface water abstractions and discharges.
- 10.3 The assessment of impact on the performance of coastal FCERM assets should be broadened to include assets in tidal stretches of rivers.
- 10.4 Though it is stated as being an ‘initial’ limit that may change as informed by physical process modeling, the proposed downstream limit for the flood risk and erosion assessment of Lavernock Point is not considered to be a suitable start point.
- 10.5 We recommend consideration of the potential impacts to channel stability within the lower River Rhymney.
- 10.6 The report does not identify the need to consider whether an impoundment licence and transfer licence are required for the lagoon structure and its operation. We recommend that the potential requirement of both these licences is investigated prior to the EIA.

## **Chapter 11.0 Land Quality and Hydrogeology**

- 11.1 The report states the use of CLR11; we would recommend use of the British Standards and Guiding Principles for Land Contamination (2010, EA and adopted by NRW) should also be considered.
- 11.2 Groundwater resources issues are limited to landfall areas and should consider the impact to water features in these areas.
- 11.3 Dewatering guidance referenced in this section is for quarrying and may not be suitable for the proposed development. Dewatering for engineering purposes is currently exempted, but this exemption will be removed and it is unclear at the moment how dewatering for engineering will be regulated.
- 11.4 Landfills at the landfall locations will need to be considered especially if constructing infrastructure on or through them. A preliminary risk assessment (PRA) should be undertaken to assess the potential for soil and groundwater contamination from previous uses of these areas. Any other land areas, e.g. road, cable runs, pipeline etc. should also be included within the PRA.
- 11.5 The onshore water resources and the use of Private Water Supplies (PWS) by domestic and agricultural dwellings on the Gwent and Wentlooge levels should be investigated further as part of the EIA, especially close to the landfall areas and other infrastructure proposed. There are also groundwater abstraction licences within the study area that will need consideration.
- 11.6 The tidal influence on the groundwater along the shore line needs to be determined within the zone of influence identified by Coastal Processes studies; this is more of a likely to impact on ree levels, but could have knock-on impacts on the shallow groundwater (perched water table) within the Levels.
- 11.7 The change in groundwater levels due to the changes in tidal regime should also consider the potential to mobilise pollutants within the landfills at the landfall areas and landfills within the Gwent and Wentlooge Levels.
- 11.8. There should also be assessment of potential impacts of changes in groundwater levels on basal engineering of low lying landfills such as Lamby Way at Cardiff and Docks Way at Newport
- 11.9 Other relevant guidance and legislation that should be included:
- Groundwater Protection: Principles and Practices (GP3) EA, 2013 and adopted by NRW.
- Part 2A of the Environment Protection Act 1990.

## **Chapter 12.0 Intertidal and Subtidal Benthic Ecology**

### **12.1 Headline comments:**

- We advise that plankton should be covered in a separate chapter to intertidal and subtidal benthic habitats in the EIA

- Interpretation of acoustic data will be very important and it needs to be emphasised that groundtruthing points need to be determined once the interpretation of the acoustic data has been done.
- We would like to be consulted on the benthic survey plans, and will need to be given a detailed rationale for the design of the survey.
- TLC Ltd need to consider the outputs of the comprehensive Severn tidal power feasibility study (STPFS) which outline the potential impacts of a lagoon option. See section below Severn feasibility study – summary of intertidal outputs for further details.
- There appears to be little consideration and assessment in the scoping document of the potential in-combination issues with other future lagoon developments such as Newport & Bridgewater.
- Uncertainty and confidence in assessments – Chapter 12 highlights (e.g. at 12.3.4.6.x) the uncertainty around the actual impacts from the development. In the light of this uncertainty there doesn't seem to be anything in the scoping report (chapter 12) on confidence in the assessments. This needs to be built into the methodology.
- There are several areas (Potential effects during operation section 12.3; Monitoring sample sites and frequency; proposed assessment methodology) in the scoping report where NRW would welcome further consultation before the document can be agreed. We would welcome early consultation on these matters.
- There is nothing in Chapter 12 related to mitigation, compensation or biodiversity enhancement. This is a very important aspect of the ES and clear links should be made between Chapter 12 and Chapter 26 (Compensation, mitigation and monitoring).
- Section 12.4.2.2 Estimation of Changes in intertidal habitat extent. This section is lacking in sufficient detail. There is no mention of far field effects in terms of potential loss of intertidal habitat extent, only localised 'in the vicinity' of the lagoon.
- The applicant should be aware of the need to undertake an Invasive Non-Native Species (INNS) risk assessment as part of the EIA.

**12.2 Study Area:** The Study area for the whole project needs to be defined and clearly differentiated from the Project area. At present, the intended area of search/study area for the project is not clear. It is presented in fig 19.1 but there are no boundaries to suggest the area. The study area needs to be defined based on agreed results of physical process modelling.

**12.3 Impacts:** There are a number of potential operational impacts that have been omitted from the report, for example: there is no assessment of the likelihood of decreases in suspended sediment levels (within the lagoon). This was one of the potential impacts highlighted in the STPFS which could lead to an increase in phytoplankton. The potential displacement of fishing activities has not been discussed in relation to how this might lead to indirect impacts on areas outside the lagoon footprint. At a high level most of the impact pathways seem to have been included but there are several issues in terms of the detail presented in this report (see paragraph specific comments below).

**12.4 Baseline:** JNCC's broadscale habitats 'combined map' would be more up to date than MESH data. The proposals for characterisation survey work are not very detailed. We

would welcome the opportunity to comment on a detailed survey plan which includes a full rationale of the reasons for inclusion of each site.

Further discussion on the intertidal survey objectives is needed before the scoping study is agreed. This section does not contain the detail needed to comment on whether appropriate techniques will be used. Information that needs to be gathered to inform the baseline will include an up to date biotope map of the project area as a minimum. Baseline survey for biotope/habitat extent characterisation should be done using the CCW Phase 1 survey methodology (Wyn et al 2006). Information on structure/function and quality of habitats and species will use other more quantitative techniques. Monitoring techniques to inform consent conditions will have different objectives and will need to be carefully thought through (We refer the applicant to the previous advice on survey/monitoring for Cardiff lagoon submitted to TLP in 2014).

**12.5 Proposed assessment methodology:** The proposed impact assessment methodology appears to be overly complicated using multiple tables. It is not very clear how confidence in the assessment will be evaluated and communicated within the EIA.

The assessment methodology proposed will also tend to down play the impacts on receptors. This is because the three stage assessment (Tables 12.6 – 12.8) underplays the exposure, vulnerability and significance of impacts on the receptors. Due to the uncertainty of the impacts of the development a precautionary approach should be adopted. The three matrices table (12.6 – 12.8) need to be agreed with NRW before the scoping report is agreed. See revised tables in the detailed comments below.

**12.6 General / paragraph specific comments (Subtidal):**

- Criterion 4: qualifies as it is important for the run of migratory fish between sea and river via estuary. Species include Salmon *Salmo salar*, sea trout *S. trutta*, sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, allis shad *Alosa alosa*, twaite shad *A. fallax*, and eel *Anguilla anguilla*.
- Criterion 8: qualifies as the fish assemblage of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded.
- Subtidal *Sabellaria alveolata* distribution is noted as varying over time, but it should also be noted that we have very limited understanding of its extent.
- Interpretation of acoustic data will be very important and it needs to be emphasised that groundtruthing points need to be determined once the interpretation of the acoustic data has been done. See attached advice from NRW on interpretation of geophysical surveys (Annex 2).
- NMBAQC methods need to be followed for PSA
- Possible impacts of displacement of fishing activities need to be considered.
- 12.1.0.4. There is a need to qualify why the habitats are of conservation interest e.g. BAP/OSPAR.
- 12.1.1.1. The Severn estuary is also a SSSI
- Table 12.1. Reefs is the interest feature of the SAC – *Sabellaria* is the subfeature, Ramsar criterion need expanding according to the criteria listed above



- Table 12.2. Potential impacts on benthic ecology during operation of the project:
  - o Plankton should also be listed as impacted by disturbance/displacement due to increases in sediment levels.
  - o Plankton should also be listed as potentially affected by changes in water quality
  - o Subtidal and intertidal habitats should be highlighted as impacted 'changes in local hydrodynamics and sediment accretion' – in terms of all the changes listed.
  - o Change in flushing regime will potentially affect all receptors.
- 12.2.3.6. Barrier to seasonal migration: need to mention that the structure and turbines will be a barrier to general species movement and restrict the movement (or retain species within the lagoon) of organisms that would feed on the plankton etc within the lagoon. This might be better renamed as “barrier to movements of species”, as more than just seasonal migrations will be affected. Connectivity of habitats will also be affected.
- 12.2.3.10. Changes in water quality: Need to highlight plankton induced water quality issues, not just assess the sensitivities of plankton and benthic species to changes in water quality.
- 12.2.3.12. Changes in current speed: Should mention that current speed is not just linked to habitat sensitivity, but also the effects of current speed on sediment deposition/resuspension
- 12.2.3.14. Changes in flushing regime: changes in flushing regime will not just effect plankton, but also the species that feed on the plankton should there be changes.
- 12.2.4.4. Introduction of invasive non-native species: Need to be ensure that any INNS that have established themselves during the operation of the project are not spread through the decommissioning process.
- 12.3. Existing baseline data (12.3.2.1) needs to include the following:
  - ii CCW phase 1 intertidal outputs
  - v. HABMAP and xi MESH. JNCC also hold a broad scale habitat map, which is more recent

It would be sensible to specifically list Marine Recorder data, which can be downloaded from the JNCC website, although this is incorporated within i.

Also WFD monitoring data.
- 12.3.4. Data Gaps, (12.3.4.6)
  - vi we have very limited understanding of the extent of subtidal Sabellaria reef
- Proposed survey techniques, 12.3.5.1 Other sources of guidance include:
 

Ware, S.J., Kenny, A., Curtis, M., Barrio Frojan, C., Cooper, K., Reach, I., Bussell, J., Service, M., Boyd, A., Sotheran, I., Egerton, J., Seiderer, L.J., Pearce, B., 2011. Guidelines for the Conduct of Benthic Studies at Marine Aggregate Extraction Sites (2nd Edition)

Saunders, G., Bedford, G.S., Trendall, J.R., and Sotheran, I. (2011). Guidance on survey and monitoring in relation to marine renewables deployments in Scotland.

Volume 5. Benthic Habitats. Unpublished draft report to Scottish Natural Heritage and Marine Scotland (Chapter 9)

MESH guidelines for Seabed mapping

1. <http://www.emodnet-seabedhabitats.eu/default.aspx?page=1653>
2. <http://www.emodnet-Seabedhabitats.eu/PDF/GMHM3%20How%20do%20I%20collect%20my%20data.pdf>
3. [http://www.emodnet-seabedhabitats.eu/PDF/GMHM3\\_Swath\\_Bathymetry\\_ROG.pdf](http://www.emodnet-seabedhabitats.eu/PDF/GMHM3_Swath_Bathymetry_ROG.pdf)
4. [http://www.emodnet-seabedhabitats.eu/pdf/MeshA\\_ROG\\_Sidescan\\_Sonar\\_v4.0.pdf](http://www.emodnet-seabedhabitats.eu/pdf/MeshA_ROG_Sidescan_Sonar_v4.0.pdf)

Some of these are more recent than the guidance listed and may need to be used in preference.

Please also see the attached guidance from NRW on interpretation of geophysical data (see Annex 2).

Also, relevant NMBAQC guidance should be followed

- 12.3.5.15. Any interpretation of the geophysical acoustic data should refer to NRW guidance note on interpreting acoustic data (see Annex 2).
- 12.3.5.16. We advise that it is not possible to say how many stations will be required until the acoustic data and existing biological survey data have been examined.
- 12.3.5.18. As with the grabs, areas of known Sabellaria reef should be avoided during the epi-faunal trawl surveys.

#### Impact assessment guidance tables

- The tables are overly complicated and also by being so complicated imply a level of confidence in the assessment that we generally do not have. We also need more information concerning the way in which the confidence in the assessment will be assessed and disseminated.
- 12.4.1.9. – there are some scores which give two options (e.g. low/negligible) but it isn't clear how these feed into the next table. For example the exposure score for low probability and medium magnitude is low/negligible, so does this feed into the vulnerability table as low or negligible?
- 12.4.2.3. Need to specify other habitats that are of specific interest: Sabellaria reef, intertidal mudflat and sandflat feature.

#### **12.7 General / paragraph specific comments (Intertidal):**

- 12.1.0.2. More information is needed on what the remit was for the recent condition assessment of the Severn, i.e. who commissioned it, was it for WFD or Habitats Directive? This section also needs to point out that Mudflats and sandflats are an Annex 1 feature.
- 12.1.0.3. There is mention here of some marine non-native species (MNNS). The ES will need to provide a comprehensive and up to date spatial description of what MNNS are present in the study area as well as at the likely home ports of any vessels that might be used during construction.

- 12.1.0.4. Please note that the Intertidal Phase 1 maps of the Severn referred to in the scoping report were derived from survey carried out by the CCW Intertidal Phase 1 survey team on the Welsh shore and by Emu (funded by NE) on the English side. The phase 1 maps on the Welsh side are part of the Phase 1 Intertidal data set which covers the whole of the Welsh Intertidal to biotope level. This overview of the benthic ecology has rather understated the importance some of the habitats, for example the Seagrass bed mentioned is the largest in Wales and unique in that it occurs on mixed sand, mud cobble and boulder substrates and includes both *Zostera* species.

- 12.1.0.5. This paragraph mentions the Project Area however there does not appear to be a supporting map. The applicant needs to clarify if / how the 'Project area' differs from the 'Study area'.

- 12.1.1.3. For information, the Rivers Usk and Wye SACs are designated for Atlantic Salt meadows and Mudflats and sandflats at D grade.

- 12.1.1.4. The last sentence implies that there are SSSIs in the Severn near the proposed development. In fact the proposed lagoon would sit within the Severn Estuary SSSI.

- Table 12.1. The list of features needs to be checked and it would be worth listing all of the features A – D. Sabellaria Reefs is not a feature name, this should read Reefs. This table should be extended to include all of the EMS within the study area. There should also be a table of all of the SSSIs within the study area. A justification then needs to be given as to which EMS/SSSIs are scoped into the ES in terms of impacts and which are not.

Map 12.3. Map of designated sites in the vicinity of the Project. This map has introduced another area called 'the vicinity of the project'. It is different to the Study area and the project area. TLC Ltd needs to be clear about all of these terms and provide justifications for them.

- 12.1.2.1. International Conventions: this needs to include Ramsar. EC legislation: This needs to include the new IAS Regulation that came into force on the 1st January 2015. National Acts, Statutory Instruments and Policy statements: needs to add WG TANs, Electricity Act for any cabling (1989). Growth and Infrastructure Act (2013).

- 12.2.1.1. Scope of Potential Impacts. This paragraph mentions WFD requirements of relevance. It also needs to mention SAC and SSSI elements (i.e. features and Conservation Objectives) too.

- 12.2.1.9. This paragraph seems to be suggesting that there could be different Study Areas for different receptors and different phases of the project. NRW agree with this approach in principle but recommend that the boundaries for each receptor are agreed at each stage.

- Section/Table 12.2. Potential effects during construction phase: the table lists the potential source of impact. This list needs to be standardised and agreed upon, e.g to ascertain whether it is consistent with the impacts identified in the STPFS. We advise that the list of receptors is also split up differently into: Plankton, Intertidal infauna, intertidal epifauna/flora, subtidal infauna, subtidal epifauna/flora. Some of the potential impacts identified are a bit hard to understand such as construction lighting effects on subtidal infauna. Elsewhere effects have been missed such as changes to water quality effects on intertidal habitats.

- 12.2.2.5. Introduction of invasive non-native species (INNS): the ES needs to detail how a biosecurity risk assessment will be carried out including how any Schedule 9 species will be dealt with. The risk assessment will need to consider INNS present in the home ports of vessels and other marine structures used in the development. Consideration will need to be made at the design stage to reduce the risk of INNS colonising the lagoon wall (e.g. bioblocks, local rock, minimise artificial substrata).
- Section/Table 12.2.3/12.3. Potential effects during operation phase: as with table 12.2, we would welcome further discussion on the list of potential sources of impacts and receptors (see comments on Table 12.2). Potential impacts missing include decreases in suspended sediments within the lagoon during the operation phase. Some potential effect pathways have been omitted and the table should be the subject of a discussion before the scoping document is agreed.
- 12.2.3.2 (and 12.2.3.11 and 12.2.3.12). Habitat modification/fragmentation: this section will need to consider the whole study area and not just the project area in terms of habitat loss/gain due to the development. Some of these effects may well be far field and will only be quantified once modelling has identified the coastal process/sea level rise issues related to the development.
- 12.2.3.3. Introduction of INNS (see also comments on section 12.2.2.5): this section of the ES will need to look at the lagoon wall itself as a risk factor for spreading marine INNS.
- 12.2.3.5 (and 12.2.3.13 and 12.4.2.5 &6): this section includes information on bird food. This should be in the coastal birds chapter and does not need to be included here.
- 12.2.4/Table 12.4. See comments on tables 12.2. and 12.3. Reduction in depth of photic zone could also affect intertidal habitats (algae and *Zostera* spp.)
- 12.3.1.1. Existing baseline data: this should also include data to inform the HRA.
- 12.3.2.1. Overview of available data: Point (ii) - this should read CCW Phase 1 intertidal biotope mapping outputs. Point (x) - designated site citations should include also - Regulation 35 and 37 documents, site management plans, SSSI Site management statements.
- 12.3.3.3. Please note that biotope mapping of the Severn estuary was undertaken by CCW (not JNCC) on the Welsh shore in 2000 and by Emu (for Natural England) on the English shore in 2006.
- 12.3.4.6. Climate change scenario to be used: please note that the sea level rise allowances set out in the document: 'Flood and Coastal Defence Appraisal Guidance: FCDPAG3 Economic Appraisal (October 2006) adopted by WG in July 2007 remains the current guidance to be used by NRW for development planning purposes.
- 12.3.5.1. Proposed survey techniques: NRW recommend that TLC Ltd discuss proposed survey techniques with our monitoring specialists in order to ensure that the most appropriate and up to date monitoring techniques are used for each habitat. SAC monitoring in Wales has not been carried out in the Severn due to a lack of funds but techniques for surveying/monitoring Sabellaria reefs, seagrass beds and rocky shores have been developed over several years of monitoring other EMS in Wales such as Pembrokeshire marine and Pen Llyn a'r Sarnau SACs. Baseline survey for biotope/habitat extent characterisation should be done using the CCW Phase 1 survey methodology.

- 12.3.5.6. Intertidal Surveys to inform baseline/monitoring: this section does not contain the detail needed to comment on whether appropriate techniques will be used. Information that needs to be gathered to inform the baseline will include an up to date biotope map of the project area as a minimum. Baseline survey for biotope/habitat extent characterisation should be done using the CCW Phase 1 survey methodology (Wyn et al 2006). Information on structure/function and quality of habitats and species will use other more quantitative techniques. Monitoring techniques to inform consent conditions will have different objectives and will need to be carefully thought through (the applicant is referred to our previous advice on survey/monitoring for Cardiff lagoon which was submitted to them in 2014) Further discussion on the intertidal survey objectives is needed before the scoping study is agreed.
- 12.3.5.9. Seagrass: WFD monitoring does not include an assessment of habitat quality (e.g. associated fauna and flora) and NRW would advise that the WFD data will not be sufficient to characterise the baseline and/or set up a monitoring programme.
- 12.3.5.10. Routine WFD monitoring is unlikely to provide any information about macroalgae within the project area as there are currently no reduced species list sites being monitored on the Welsh side of the Severn.
- 12.3.5.11. Fucoid distribution can be drawn from the Phase 1 intertidal data set although this data is now becoming out of date. Ground truthing of this data before using it for extent/species data is recommended.
- 12.3.5.12. Sample sites and frequency: It is not possible to say whether the proposed sampling plan is adequate without understanding the objectives of the sampling, i.e. is it for baseline characterisation or monitoring? A map of the proposed sites is needed to be able to comment on their adequacy. The sampling proposed will be carried out to inform the EIA and will be completed before submission of the ES. It will therefore be very important in terms of identifying receptors. We need to agree the objectives of the survey plan before the scoping report is agreed.
- 12.4. Proposed assessment methodology: The assessment methodology proposed will tend to down play the impacts on receptors. This is because the three stage assessment (Tables 12.6 – 12.8) underestimates the exposure, vulnerability and significance of impacts on the receptors. Due to the uncertainty of the impacts of the development a precautionary approach should be adopted. The three matrices table (12.6 – 12.8) need to be agreed with NRW before the scoping report is agreed.
- Table 12.5. Potential Importance of ecological receptors: International features: this needs to highlight Priority N2K habitats and species of any size/quality as being of International importance. Clarity is required over what is meant by the sentence 'Internationally significant and viable areas of a habitat type listed in Annex 1 of the Habitats Directive'? National: This section needs to include the JNCC list of marine nationally rare and scarce species. Regional/County: to note - there are no local (or national) red data books for marine species. The parish/local features should be added to the District/Borough features. Neither of these are particularly relevant to marine habitats and species.
- Table 12.6. Exposure to change: Due to the uncertainties surrounding the impacts and the need to take a precautionary approach several of the exposure ratings need to be increased. If this is not done then impacts will tend to be down played.

Probability of occurrence	Magnitude of change			
	<b>Large</b>	<b>Medium</b>	<b>Small</b>	<b>Negligible</b>
<b>High</b>	High	High	Medium	Low
<b>Medium</b>	High	Medium	Low	Negligible
<b>Low</b>	Medium	Low	Negligible	Negligible
<b>Negligible</b>	low	Negligible	Negligible	Negligible

- Table 12.7 - Vulnerability. The bottom row ('none') should be removed as this is unnecessary.

Table 12.8 - Significance of Impact would then look like this:

Importance of feature	Vulnerability of feature to impact			
	<b>High</b>	<b>Moderate</b>	<b>Low</b>	<b>Negligible</b>
<b>Very High</b>	Major	Major	Moderate	Minor
<b>High</b>	Major	Major	moderate	minor
<b>Moderate</b>	Major	Moderate	minor	insignificant
<b>Low</b>	Moderate	Minor	minor	insignificant

Under the existing version of Table 12.8 developed NRW consider that features of high importance would not be mitigated for if they are seen to have low vulnerability e.g. SSSI features.

- 12.4.2.3 and 4. Estimation of changes to intertidal habitat extent: Using updated Intertidal Phase 1 maps would be the easiest way to estimate habitat extent and assess changes.

## 12.8 Severn feasibility study – summary of intertidal outputs

Reference: Severn Tidal Power – Phase 2 HRA Appropriate Assessment Report April 2010 Department of Energy and Climate Change. [www.decc.gov.uk](http://www.decc.gov.uk) Prepared by Parsons Brinckerhoff Ltd

- All the options are predicted to lead to changes in water levels beyond the Severn Estuary/ Môr Hafren Natura 2000 and Ramsar Site. Such changes in water levels would lead to uncertain effects on the designated intertidal and coastal habitats of the Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC.
- Water level changes resulting from all of the options, except the Beachley Barrage (B5) option, could lead to uncertain effects on the designated intertidal and coastal habitats of the Kenfig/ Cynffig SAC.
- Reduction in extent and reduction in tidal range for the SAC estuaries feature for all options.
- Reduced extent of SAC intertidal habitat features for all options: mudflats and sandflats not covered by seawater at low tide; Atlantic salt meadows.
- Potential for the complete loss of the SAC reefs feature for the Cardiff-Weston Barrage (B3).

- Reduced extent of the SAC reefs feature for the Shoots Barrage (B4), Beachley Barrage (B5) and Welsh Grounds Lagoon (L2) options.
- Reduced extent of the hard-substrate habitat communities sub-feature of the SAC estuaries feature for all options, including reduced extent of eel grass beds for the Cardiff-Weston Barrage (B3), Shoots Barrage (B4), and Welsh Grounds Lagoon (L2) options.
- 14 SAC's where it could not be concluded that there would be no adverse effect on site integrity from the L2 (Welsh grounds) lagoon.

## **Chapter 13.0 Fish including Recreational and Commercial Fisheries**

### **13.1 Headline Comments:**

#### DECC Severn Tidal Power Feasibility Study

DECC sponsored an extensive feasibility study into potential Severn tidal range schemes, and this reported in October 2010. Two of the lagoon schemes considered (L2 and L3c) were the 'Welsh Grounds' and the 'Peterstone Flats' lagoons. The former has a very similar potential footprint to that which has been proposed by TLP for a Newport lagoon and the latter is very similar to the current outline proposals for a Cardiff lagoon. The two lagoons are immediately adjacent to the estuary of the River Usk.

The DECC study concluded that for all schemes, including L2 and L3c:-

"fish are likely to be severely affected with local extinctions and population collapses predicted for designated fish, including Atlantic salmon and twaite shad. This could mean the loss of twaite shad as a breeding species in the UK as 3 of the 4 rivers where it breeds run into the Severn Estuary."

The position of NRW with respect to the migratory fish resource of the Severn Estuary is that we support the conclusions of the DECC studies until we are supplied with authoritative data that enable us to draw a different conclusion.

**13.2 Study Area:** The Severn SAC estuarine fish assemblage is not currently included within the EIA scoping or HRA pre-screening report, this is important because this will affect Value Ecological Receptor (VER) and impact magnitude assessments.

The Twyi SAC cannot be scoped out at this stage - based on evidence of Twyi Salmon being caught in the Severn, we cannot discount possibility of Twyi Shad being present in the estuary as well.

**13.3 Impacts:** Overall, the scope of impacts identified is adequate but need to ensure that impacts on larval and juvenile fish stages are included as well as the sum of impacts of the project as a whole (not just turbine collisions), negative synergies between different impact pathways and the in-combination effects with other anthropogenic impacts and climate change predictions. Impacts as a result of the artificial wall should also be included.

Evaluation of fishery values: given the predictions of fish stock loss (DECC, 2010) and therefore the effective in perpetuity extinction of fishing rights, NRW recommends that the applicant should commission work to evaluate these private rights.

Fishing rights – extinction thereof: there are other heritage fishing rights, together with some associated archaeological artefacts along this stretch of the coast – these also need to be evaluated

We note that the River Rhymney would be completely impounded by the proposed development. This will need special consideration.

**13.4 Baseline:** It is unclear what the evidence gaps are for estuarine fish. The characterisation work appears adequate in order to inform the EIA (in terms of fish species present) but will need to be re-considered if it were to serve as a baseline data for impact studies. The length of the monitoring programme is not stated; a short duration programme may not provide high confidence biological and behavioural parameters to input into IBM and STRIKERv4 modelling and where literature sources are not found to supplement modelling input information, the level of certainty in modelling should reflect the confidence level of these parameters.

**13.4 Proposed assessment methodology:** The list of species identified as Valued Ecological Receptors is not extensive enough and does not reflect the need to consider the estuarine fish assemblage sub-feature of the SAC and the importance of the estuary as a nursery / spawning and overwintering ground for a wide range of species. The breadth of species modelled needs to be greater, reflecting VER species identified. The criteria defining value is also not extensive enough.

#### **13.5 Detailed / paragraph specific comments:**

- 13.1.1.1. NRW are aware of this classification of functional groups, however there is one important further group not included here. This is the seasonal accumulations of maturing marine fish, some of which support commercial fisheries outside the Bristol Channel. These include cod and whiting, accumulating in the channel and Severn Estuary inland to at least Chepstow in the winter, and rays (mainly thornback) that enter and reside in the same area over the summer and autumn.

- Table 13.1 (and applicable to Appendix 2.1 HRA Pre-Screening). This table omits Allis shad (*Alosa alosa*) from the designations of both the Wye and Usk SACs. Although very rare, and not a primary reason for site selection, there are reports of them each year from the Wye.

The table also omits the assemblage of fish features of the Severn Estuary European Marine Site (the compiled estuary SAC, SPA and Ramsar site). Therefore, this feature should also include “noise and vibration disturbance”, “barrier effects”, entrainment in turbines/sluice gates” and “electromagnetic fields” for the HRA pre-screening. Furthermore, the pathways identified within the HRA are not sufficient to cover potential impacts on the fish assemblage.

- 13.1.2. This description of the estuarine fish community omits the seasonal accumulations of maturing adult fish such as cod and whiting.

- 13.1.2.1. It should be noted that all species of fish migrate at some point in their life cycle. Therefore all species of fish in the estuary/channel should be expected to be mobile, not least through tidal transport.

- 13.1.2.3. This section should also refer to the English interests in the estuary marine fish resource through reference to the IFCAs.



- 13.1.3.3. It should be noted that Allis shad is also present in both the Wye and Usk SAC designations as qualifying features (though not primary reasons for site selection).

This paragraph states that the Usk is a SSSI – but note that all SACs are also SSSIs.

- 13.1.3.5. In the case of salmon, the word “stray” is probably inappropriate. It is more the case that adult fish homing to their natal rivers undertake extensive searching behaviour supported by extensive tidal transport. We know that salmon from the Tywi to the west and the Severn to the east are all represented in net and trap fishing upstream of the M48 crossing for example. This indicates that a natural part of the migratory behaviour of this species means that adults destined for many rivers traverse the estuary past the site of the proposed lagoons.

- 13.1.3.6. We note that the River Rhymney would be completely impounded by the proposed development. This will need special consideration.

- Table 13.2. It may be implicit, but we advise explicit reference to the extensive boat traffic involved with these phases of construction. We know that boat movement alone can affect fish migration.

The suggested gain of spawning and foraging habitats is unlikely, and should be supported by source material that suggests otherwise.

It should be noted that delayed fish migration will inevitably lead to some degree of failed migration as well.

The activity of dredging will have effects beyond simple entrainment, such as noise, disturbance, increase in suspended sediments, potential mobilisation of contaminants etc.

- 13.2.2.1. NRW would wish to know how and when the actions proposed in the final sentence (“sensitivity and tolerance of the fish receptors will be determined”) will occur. This would be needed well in advance on any construction activity.

- 13.2.2.2. NRW would expect this to include consideration of potential mitigation actions. We note that the following section on lighting does include such consideration.

- 13.2.2.4. This should include consideration of the impact of deposition of dredged materials in the estuary.

- 13.2.2.5. The key issues here are the progressive impoundment of the lagoon and the effect of this on tidally-transported diadromous fish that:-

a) are destined to enter the river and re-en network that enters the estuary within the impounded lagoon

b) are entrained as they are transported into the lagoon, but are destined to enter other rivers. These fish may be delayed, they may be successively re-entrained, and they may fail to re-commence their migration and therefore be lost from the breeding population.

c) may have used the pre-development habitats (eg eel) or may make use of the new habitat created.

NRW wishes to see a breakdown of the proposed assessments as early as possible.

NRW notes the importance attached to important migratory fish migrating towards the River Rhymney, however this is no more important than the same species of fish not destined for the Rhymney becoming entrained and delayed.

NRW agrees that assessment of habitat use and residence is important, but this is not the key issue for migratory fish.

- 13.2.2.6. The proposed lagoon will extend to almost half of the width of the estuary and the hydrodynamic outcome of this and the consequent impact on migratory fish is also a key area of assessment that we expect to be covered.

NRW does not agree that knowledge gaps for migratory fish contributed significantly to the DECC conclusions on impacts of STP schemes. The importance of selective tidal transport is well known.

- 13.2.2.7. The Rhymney catchment may be effectively lost as a migratory fish habitat as well

We understand the reference to assessment in the context of the overall habitat areas in the estuary, however local loss is of significance to local biodiversity and designations.

- Table 13.3. Throughout the table there is reference to delay in migration here, but not the inevitable failure to complete migrations and the significance of this.

Medium and long-term population-scale effects of combinations of construction and construction + operation impacts should also be included.

It would be helpful to introduce assessment of combined effects here, e.g. in-combination effects arising from construction and operation on water quality on overall ecology

IT IS DIFFICULT TO CONSIDER THIS WITH NO INFORMATION PROVIDED ON TURBINE AND SLUICE LOCATIONS AND LAYOUT.

- 13.2.3.2. This appears to omit reference to migrating species destined for other rivers or locations but entrained and delayed by the lagoon.

- 13.2.3.3. As above, this is one of the most serious potential effects of the lagoon and NRW will require much more detail and assurance on the assessments proposed together with options to minimise and mitigate this.

- 13.2.3.5. NRW will require thorough assessments of this prior to construction, and we would expect a substantial assessment of the proposed lagoon at Swansea, should it be built, to inform this.

- 13.2.3.7. We note the reference to fish moving along the shoreline. Although this is unlikely to be the case for the whole fish fauna, we generally agree with this. This is why fish migrating to and from rivers to the east will be very vulnerable to entrainment, delay and failed migrations.

- 13.2.3.8. This para recognises the advice arising from the DECC STP work that further studies are required into a range of matters including the number of likely presentations of fish to the turbines. This is crucial and NRW is therefore concerned that this report states that such studies will merely be "considered". In our view they will need to be exhaustive and will prove to be crucial.

NRW agrees that this information must be used in full life cycle models.

NRW notes the mortality rates predicted for the proposed Swansea lagoon, and the sensitivity of these to IBM modelling. Direct mortality is an important consideration however the potentially greater impact on behaviour and failed migration is a very significant concern.

- 13.2.3.10. NRW notes that the sluices “may” be opened. We would wish to see a full description of operating procedures and clarification of this uncertainty.

NRW notes the term “generally” in relation to harm arising from fish passage through the sluices and would wish greater clarification around this and the options to minimise and mitigate. We do not consider comparison to natural passage through rock passages is informative, as this represents an additional threat to fish in a saline environment.

- 13.2.3.13. The potential disruption of migration of diadromous fish is a key concern. This para refers to potential changes in migratory cues and routes. NRW will want to see a complete assessment of hydrodynamics, water quality and mixing together with a robust assessment of the impacts of change on migration.

- 13.2.3.14. The potential impact of EMF should be explored through a literature review and, if necessary, research. Options to avoid impact by routing cables through the lagoon walls should be thoroughly explored.

- 13.2.3.17. Angling for bass from the Cardiff Bay Barrage has become a significant nuisance as fishermen compete to exploit the large accumulations of fish around the barrage and its sluices. This has become a problem due to the large rate of kill and the effect of this on visitors. NRW suggests that the scope to control and regulate fishing in public visitor areas should be explored with a view to banning fishing if this is deemed necessary.

- Table 13.4. NRW has similar points to those expressed for tables 13.2 and 13.3.

NRW would welcome further clarification on whether de-commissioning would re-create the natural functioning of the estuary.

- 13.3. NRW notes and agrees with the proposal to collate baseline data for the estuary fish assemblage. This should include an assessment of long-term change as the environment of the estuary changes, and is predicted to change in future.

However we need to be satisfied about the direct relevance of this material.

We note that the proposed development would profoundly change the assemblage, not least within the impounded area, and we would therefore wish to know precisely how baseline data would be used, other than simply for characterising the pre-scheme situation. This should include an assessment of resource loss and the impact of this on previous beneficiaries – for example the owners of private fishing rights along the south Wales foreshore.

- 13.3.1.1. The English IFCA should also be consulted.

We presume that the power stations and associated monitoring will also be considered.

We note that local universities have been involved in various assessments of the fish fauna of the estuary.

We would suggest that the studies carried out for the Usk barrage public enquiry are included.

NRW is unclear how a disparate set of data can be compiled to give a single authoritative view on the fish assemblage now and in future. A simple list is not sufficient, and we would expect to see an ecosystem assessment of the fauna together with all potential linkages to populations elsewhere (e.g. Irish Sea cod, west Wales bass etc).

- 13.3.1.7. NRW notes the relative paucity of any information for all diadromous fish with the exception of salmon. Thus the evidence for shad in particular, which is restricted to 4 rivers of which 3 are likely to be impacted by any estuary tidal power scheme, is a serious concern.

- 13.3.2.1. NRW notes the highly dynamic nature of the environment and that the fish fauna is highly mobile and therefore transient at any one single estuarine location. The assessments needed are therefore broader than any characterisation of the fauna within the project footprint at any one discrete time.

- Table 13.5. This appears to be influenced largely by data available for salmon which, we would agree, is comparatively good. However we would not agree that data for other diadromous fish is likely to be available for characterisation – depending on precisely what is meant by that.

NRW is unclear about the boundary which appears to be set at the rivers Taff and Ely, and seek clarification as to why rivers further west have been excluded at this stage.

- 13.3.2.4. The footprint of the proposed Cardiff lagoon includes the area previously fished by the public Usk drift net fishery which is now regulated by byelaw. Catches there demonstrated the presence of salmon, shad and various marine species – notably sole, flounder, bass and mullet. It was apparent that environmental conditions resulted in variations in the presence of some of these species.

- 13.3.3.1. NRW believes it is incorrect to say that modelling techniques provided “information”. The models provided predictions only, and we note that the fundamental information on behaviour was largely absent then, and we believe that remains the case.

It is therefore crucial that work is undertaken to clarify some of these key behavioural issues. This is particularly the case for the IBM modelling.

- 13.3.3.2. We note the knowledge gaps listed here, and agree with them all. We also note the substantial logistical constraints to resolving these. No specific knowledge gaps have been identified for marine fish. Further information is needed on many aspects of lifecycles of marine fish in the estuary, including spawning sites, feeding areas etc. Most fish data for the Severn is derived from entrainment work which although useful, may not be enough to provide high confidence on most fish movements, lifecycles and behaviours.

- 13.3.4. NRW seeks clarification on how the data arising for the surveys proposed will be used to inform an overall assessment of the proposal. This currently appears to be absent. NRW advises that the monitoring proposed although potentially useful to characterise fish species with the aims to inform the EIA, may not be suitable for baseline monitoring in terms of detecting any impacts as a result of the lagoon. Such a monitoring programme would need to be devised with appropriate targets, robust scientific and statistical methodology and should be considered reasonably in advance of lagoon operation. This is because for fish, mobile species which are notoriously

difficult to monitor effectively due to high variability, extensive and lengthy pre-operational monitoring is likely to be required in order to create a robust enough baseline (with valid control sites) from which any impacts can be detected once the lagoon is commissioned. The STP SEA recommended a minimum of five years monitoring pre-construction. NRW advises early discussions on baseline monitoring with TLC in order to establish agreed and robust methodology.

- 13.3.4.1. NRW believes this indicates an incomplete understanding of the estuary. The fish fauna is largely mobile and transient as it passes through the footprint area with the prevailing tide.

- 13.3.4.2. NRW seek clarity as to what is meant by “characterise the juvenile lifestages”. If this is simply a list of species caught, then this will not adequately describe the importance, or lack of, of the dynamic life cycle of the species in the estuary as they undertake regular and sometimes large-scale dispersion.

- 13.3.4.4. NRW have not seen any information that justifies the timing or frequency of the surveys proposed and would welcome further clarification / discussion on this issue.

- The proposal for additional surveys when migratory fish is, in our view, unnecessary as we already know:-
- From some power station monitoring that salmon smolts are present in the estuary every month from January – June.
- From simple observation supported by some rod catches that adult shad traverse the area in question in April and May
- Published work demonstrates that juvenile shad enter the estuary during the late summer and early autumn, depending on river flows

The methods proposed are highly unlikely to result in meaningful quantitative data.

Whatever approach is adopted we expect great care to be taken to avoid damage to fish and to fish runs, for example gill or trammel nets in this area in April or May could potentially catch and kill large numbers of twaite shad.

The logistics of some proposed methods (eg micro-mesh seine nets) will prove very difficult.

TLC Ltd should ensure, using available habitat information and examining their acoustic data, that Sabellaria areas will not be impacted by the monitoring as they are found in the project location. NRW would encourage further discussion as the monitoring plan progresses to ensure that sampling work does not occur in sensitive areas such as seagrass beds and is confined as much as possible to low sensitivity and high recoverability habitats in the area, especially in light of SAC habitat features. Further guidance on habitat sensitivity to fishing pressures can be found in the following paper:

Eno NC, Frid C L, Hall K, Ramsey K, Sharp RA, Brazier D P, Hearn S, Dernie KM, Robinson K A, Paramor KA, Robinson L A. 2013. Assessing the sensitivity of habitats to fishing: from seabed maps to sensitivity maps. Journal of Fish Biology. Volume 83, Issue 4, pages 826–846.

- 13.3.4.8. Please note that catches of highly transient fish at the location in question characterises the estuary, rather than this specific and restricted location.

- 13.3.4.1. In our view, the proposed increased sampling to catch salmonid smolts and juvenile shad appears to be unnecessary. There is no suggestion that smolts use habitat in the footprint of the proposed scheme, and little to support the presumption that

juvenile shad do. Both will be components of the highly mobile, tidally-dominated fish assemblage at this location.

- 13.3.4.14/15. It is unclear how this data will be used. Does the proposal imply there is doubt that salmonids, eel and lampreys occupy the appropriate habitats within the Rhymney?

It should be noted that the river is in the process of recovery from industrial pollution, so it would perhaps be more relevant to assess the potential populations of each species in the river.

- 13.3.4.16/21. The ree network is largely inter-connected, so the number of connections to the estuary is not the only factor to be considered.

Again the assumption here could or should be that the rees have the potential to function at high eel productivity. This is not yet the case as elver passes have only recently been deployed. Monitoring now will therefore not give a view on the optimum level of performance of the network.

It is therefore unclear how the data will be used.

- 13.3.4.19/21. As above, demonstrating that devices used to enable passage of elver will contain elver is interesting but not very helpful. The passes are there because we know the elvers are as well.

- 13.3.5.1. Should perhaps add the IFCA to this list.

- 13.4. This section considers ecological receptors, however it appears that less formal but important local descriptors of resource value have not yet been considered. The presence of un-threatened population of fish in local waters will have a value to local people, and this should be investigated.

- Table 13.6. For a project of this scale, the criteria defining value is not extensive enough due to the different degrees of importance of the Severn Estuary to fish:

- National/High = this category should also include primary overwintering and feeding grounds.
- Regional/Medium = this category should also include important fish prey species to other species of conservation value, fish that are key components of the local fish assemblage and Regionally/secondary important overwintering and feeding areas.
- Local/Low = Keystone species are not species which are “considered to enrich the ecological resource within the locality”. The definition of a keystone species is (Encyclopaedia Britannica) “in ecology, a species that has a disproportionately large effect on the communities in which it occurs. Such species help to maintain local biodiversity within a community either by controlling populations of other species that would otherwise dominate the community or by providing critical resources for a wide range of species”. Most keystone species identified should not be in this category as they will likely fall within the estuarine fish assemblage sub feature of Severn Estuary SAC.

- Table 13.7. NRW queries the absence of bass (for which there is a large juvenile recruitment resource), cod and whiting (over-wintering pre-adult stocks) from this assessment.

NRW assumes that outputs of some of the baseline monitoring and assessment will influence some of the criteria and judgements used and would welcome confirmation of this.

- Table 13.8. The VER table is not adequate. The sub feature estuarine fish assemblage of Severn Estuary SAC should be considered. The Conservation Objectives for the site require “the abundance of the notable estuarine species assemblages is maintained or increased” with a target looking at no significant reductions in overall diversity of species or in individual populations against an established baseline. The evaluation of impacts in the EIA should be set against the conservation objectives of the SAC estuarine fish assemblage in order to ensure that Conservation Objectives will be met.

Only three marine species have been listed, sole, sandeel and herring, while all others have been grouped into “others”. NRW advises a full assessment of the baseline data, which is plentiful for fish in the Severn Estuary (Bird, 2008) and to review the VER table in order to adequately reflect the importance of the Severn Estuary to the different life stages of marine species, in particular the importance of the estuary in terms of spawning and nursery areas, over-wintering species as well as ecologically important species, such as the sand goby complex.

The report states that a magnitude of “High” in this table corresponds to “...serious, non-reversible effect...”. The project duration is 120 years; can TLC clarify whether this term refers to non-reversible impacts during the lifetime of the lagoon or following decommissioning? The decommissioning phase does not propose lagoon wall removal, only the turbines and sluices. There should therefore be a separation between the severity and reversibility of impacts following completion of the project depending upon either turbine/sluice or wall presence.

- 13.4.5.2. NRW notes the potential value but also the constraints and risk around reliance on IBM models. The models are clearly only as good as the information used (the hydrodynamic models, and information on fish swimming capacity and the start and end point of migration), and cannot take account of a range of other potentially very important variables. These include various behavioural parameters (eg shoaling, predator impacts, aggregation with structures, dis-inclination to migrate etc), all or some of which cannot currently be modelled. Due to the importance of the Severn Estuary as a nursery and spawning site for various fish species, larval mortality from turbines should also be evaluated as well as turbine injuries on juvenile fish.

Depending on sampling results, parameters modelled will need an evaluation of the confidence in the inputs. For example, if monitoring fails to pick up many sole samples, or irregular/unexpected size classes compared to established literature, there could be a resulting input into the IBM and STRIKERv4 modelling which does not reflect the true situation. In such cases, the confidence levels should take this into account (a low confidence level for low confidence parameter input into the model) unless literature and other baseline data suggests otherwise.

- 13.4.5.2 (and 13.4.5.10 and 13.4.5.11). NRW agrees that impacts on marine fish populations as a whole should be assessed and should also include impacts on populations and fish ecology not just from turbine impacts but also in combination with other potential TLC impacts such as changes in habitats, prey species etc. as well as cumulative impacts from other anthropogenic pressures, fishing and climate change. Different types of impact may affect different life stages of a fish species leading to a negative synergistic interaction and this should be considered as well to establish an

overall impact level on the species. A holistic assessment should be made encompassing all these known factors over the entire duration of the project.

All potential impacts should be looked at in terms of direct effect on fish mortality, injury and decreased fitness but also indirect impacts such as changes to nursery, spawning and foraging habitats, prey availability from phytoplankton to prey species of piscivorous fish, any impacts as a result of the sea wall potentially becoming an artificial reef (increased predation, competition etc.) in an area with few similar types of hard habitat and impacts from other parameters such as noise, contaminant release, salinity changes etc.

The assessment should also be closely linked with other EIA chapters and predicted impacts for coastal processes, water quality, intertidal and subtidal ecology, plankton ecology, underwater noise, marine mammals and birds.

IBMs are a useful tool, however it is important that their constraints are considered and that they are regarded as a part of the overall assessment of turbine encounter.

NRW wishes to consider an independent peer review of the IBM models and their application to tidal lagoons.

- 13.4.5.3. This section states that “as a minimum” whiting, sprat, Dover sole and bass will be modelled with IBM. The species that will be modelled should reflect species within the VER table once finalised in light of the comments above. For each modelled species, NRW expects a full and detailed explanation of how biological and behavioural parameters were chosen, references used in the author’s own words (just naming the sources will not be sufficient to understand the thought process) and how certainty values have been derived on the basis of the available information and subsequent IBM and STRIKERv4 modelling. NRW would like the final EIA to clearly set out, for each impact, the proportion of evidence, assumption and expert knowledge which has been used to reach the conclusion of the assessment to ensure uncertainties are acknowledged.

NRW advise that liaison should be maintained with the applicant during the development of the modelling and EIA in order to ensure that all appropriate species have been included.

- 13.4.5.5. NRW agrees that practical fieldwork is required to reduce the uncertainties around IBM models. NRW notes the very significant logistical constraints to this work, and is anxious to be involved in the design and implementation of the work.

- 13.4.5.6. NRW strongly supports the proposal to trial telemetry methods and experimental design at the proposed Swansea Bay lagoon, if and when permission is granted for the scheme and construction begins.

- 13.4.5.7. The term “fish friendly” has been used to infer that turbine passage is benign. That is not necessarily the case, not least for clupeid species. In this context, fish friendly equates more closely, in our view, to turbine efficiency.

NRW has not yet seen contemporary validation of the STRIKER 4 outputs and would wish to see these as soon as possible.



As for the IBMs, it is unclear how various parameters that are not, as far as we aware, modelled will affect the modelling results:-

- positive 'attraction' of fish to the lagoon structures
- impact of accumulations of predators, birds and fish
- behavioural effects (eg shoaling and shoal integrity)
- multiple passages and the factors affecting this.

- 13.4.5.9. NRW note that there is little detail yet with regards to characteristics of the turbines and other general construction aspects of the project. NRW therefore recommends that careful consideration is given to what constitutes worst case scenario in order to ensure that any subsequent modifications of the scheme would still be appropriate to the worst-case modelling and overall assessment of fish populations. NRW understands that a turbine supplier has been appointed for Swansea Bay and would therefore expect this to be taken account of in future modelling.

- 13.4.5.10. NRW strongly supports the proposal for population modelling and again would wish to influence the specification of this.

## Chapter 14.0 Marine Mammals

- 14.1 **Study Area:** The area of search is adequate in terms of the proposed scope of characterisation monitoring as well as the sources of literature used to inform the current status of marine mammal abundance and distribution in the project area and further afield. There are however some sources of information missing that have been provided in the reference list below which TLC Ltd can use to refine understanding of marine mammal usage of the area and likely issues to be addressed in the EIA.
- 14.2 **Impacts:** Collision risk will be the key impact pathway for marine mammals we would advise the applicant to consider mitigation at the earliest opportunity (e.g. trash screens). Lessons from mitigation and monitoring from Tidal Lagoon Swansea Bay should be used to inform this for TLC.

In Table 14.2 presence of breakwater - the emphasis should be on the absolute loss of foraging habitat in addition to (not "or") change in foraging habitat. Loss of foraging habitat is the most impacting of the two.

NRW agree with the list of potential development impacts but suggest further potential impacts which require consideration:

- The influence of climate change in combination with the operation of the lagoon. For a project with such a long time scale, an assessment should be carried out to investigate potential changes in marine mammals and prey fish species abundance, distribution and movements and how these changes may lead to in combination effects with TLC;
- Attraction of marine mammals to area due to lagoon wall (new food source potential);
- Sluice impact (due to large size 14m x 15m) and possible passage into the lagoon leading to potential entrapment of marine mammals within the lagoon;
- Potential impacts on reproduction and calving.

- Noise disturbance of operational turbines could also have potential effect on fitness due to noise masking marine mammal's vocalisations hence impacting their ability to find food or socialise.

The last point may be covered within the impact tables (14.2.2) by the term "effect on fitness" however, there is not enough detail for both the terms used i.e.: "effect on fitness" and "behavioural disturbance", to ensure that all possible effects on marine mammals will be considered.

- 14.3 **Baseline:** (see also point 14.1). The characterisation survey work aims to investigate the abundance and distribution of marine mammals using a towed acoustic & visual boat based surveys and moored C-PODs.

Only three pairs of C-PODs are proposed for the lagoon area and NRW considers that this is not sufficient to obtain a high confidence resolution of vocalising marine mammal use of the area. Furthermore, the project design suggests that two banks of turbines will be used for TLC, yet the C-POD location map, Fig. 14.12, shows a pair of C-PODs on only one area of turbine housing. NRW advises the use of paired C-PODs at other locations in the vicinity of the other turbine housing and around the project area. It is desirable for characterisation surveys to be created in a way that not only informs the EIA but can be carried on to serve as baseline surveys to detect potential impacts as well. Following the initial data collection a power analysis should be carried out to assess the ability of the PAM survey to detect change in relative abundance of marine mammals such as harbour porpoise.

Visual & towed acoustic boat based surveys will be useful to inform vocalising marine mammal usage of the wider area (both through acoustic & visual observations) to inform the EIA but note that acoustic surveys will not provide useful information for grey seal as they do not vocalise. Line transect surveys should endeavour to record all megafauna.

NRW suggest that four boat based transect surveys will not be sufficient, and that two years of survey will provide more of a handle on inter-annual variation, but understand that the length of survey needs to be assessed proportional to risk. NRW have commissioned a report from SMRU on monitoring marine mammals for marine renewable energy projects and will share it with TLC once finalised (spring 2015) for further guidance to help TLC when considering monitoring options for impact monitoring.

NRW supports the approach taken of continuing to inform the grey seal baseline by contacting relevant organisations (14.3.4.14) and further advise that it would be useful to ascertain whether recording grey seal sightings was a primary objective of any survey which recorded a sighting and therefore whether the lack of reported sightings is indicative of low grey seal use of the area or simply of lack of effort. There is no need to monitor seal haul outs around the area as such surveys are unlikely to tell us much with such minimal haul out numbers (1s to 10s).

We support the proposal to undertake a baseline noise characterisation survey, and recommend the applicant liaise with a suitably experienced organisation with proven expertise in underwater noise measurement to ensure adequate assessment is carried out.

- 14.4 **Assessment methodology:** There is no information on what scale the impacts on marine mammals will be assessed; population scale effects need to be assessed at the scale of the appropriate marine mammal Management Unit.

In terms of specific impact assessments, the potential impacts identified (14.2.2) in conjunction with the proposed scale of impacts outlined in 14.4.1.5 are suitable, although please refer to Point 2 above with regards to other potential impacts and refining the meaning of “behavioural disturbance” and “effects on fitness”.

#### 14.5 Further references for baseline data and to inform EIA:

1 = information on marine mammals in project area

2 = academic studies to inform EIA impacts

3 = guidance on monitoring, best practice etc.

2 Booth C.G., Embling C., Gordon J., Calderan S.V., Hammond P.S. 2013. Habitat preferences and distribution of the harbour porpoise (*Phocoena phocoena*) west of Scotland. *Marine Ecology-Progress Series* 478:273-285

2 Börjesson P, Read AJ (2003) Variation in timing of conception between populations of the harbour porpoise. *Journal of Mammalogy* 84:948-955

2 Bulleri, F., & Chapman, M. G. 2010. The introduction of coastal infrastructure as a driver of change in marine environments. *Journal of Applied Ecology*, 47(1), 26-35

2, 3 Cronin MA (2011). The conservation of seals in Irish waters: how research informs management. *Marine Policy* 35:748-755

2, 3 Dähne M, Gilles A, Lucke K, Peschko V, Adler S, Krügel K, Sundermeyer J, Siebert U (2013) Effects of pile-driving on harbour porpoises (*Phocoena phocoena*) at the first offshore wind farm in Germany. *Environmental Research Letters* 8:025002

1, 3 Evans, P.G.H., Pierce, G.J., Veneruso, G., Weir, C.R., Gibas, D., Anderwald, P. and Begoña Santos, M. (2015). Analysis of long-term effort-related land-based observations to identify whether coastal areas of harbour porpoise and bottlenose dolphin have persistent high occurrence and abundance. *JNCC Report* 543.

2, 3 Gilles A, Scheidat M, Siebert U (2009) Seasonal distribution of harbour porpoises and possible interference of offshore wind farms in the German North Sea. *Marine Ecology Progress Series* 383:295-307

3 Gordon, J. Thompson, D., Leaper, R., Gillespie, D., Pierpoint, C., Calderan, S., Macaulay, J. and Gordon, T. 2011. Assessment of Risk to Marine Mammals from Underwater Marine Renewable Devices in Welsh waters: Phase 2 - Studies of Marine Mammals in Welsh High Tidal Waters. Welsh Assembly Government, 188 p.

2, 3 Gotz T, Janik VM (2013) Acoustic deterrent devices to prevent pinniped depredation: efficiency, conservation concerns and possible solutions. *Marine Ecology Progress Series* 492:285-302

2, 3 Harwood, J. and King, S.L. The Sensitivity of UK Marine Mammal Populations to Marine

Renewables Developments. SMRU Marine Report number SMRUL-NER-2012-027. <http://www.gov.scot/Resource/0046/00461640.pdf>

3 Harwood, J., King, S., Schick, R., Donovan, C. and Booth, C. (2014) A Protocol for Implementing the Interim Population Consequences of Disturbance (PCoD) Approach: Quantifying and Assessing the Effects of UK Offshore Renewable Energy

Developments on Marine Mammal Populations. Scottish Marine and Freshwater Science Vol 5 No 2 <http://www.gov.scot/Resource/0044/00443360.pdf>

3 Hastie, G.D. (2012). Tracking marine mammals around marine renewable energy devices using active sonar. SMRU Ltd report URN:12D/328 to the Department of Energy and Climate Change.

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/232963/OESEA2\\_SMRU\\_tracking\\_marine\\_mammals\\_around\\_renewable\\_devices.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/232963/OESEA2_SMRU_tracking_marine_mammals_around_renewable_devices.pdf)

1 Heinänen, S. & Skov, H. (2015). The identification of discrete and persistent areas of relatively high harbour porpoise density in the wider UK marine area, JNCC Report 544. <http://jncc.defra.gov.uk/page-6991>

1 Jenkins, R and Oakley, J. 2013. Marine Mammal Data Analysis for Swansea Bay. A report to Tidal Lagoon Ltd by Swansea Metropolitan University.

1, 2 Jenkins, R.E. 2007. Aspects of Harbour Porpoise population dynamics in the Bristol Channel and Strategies for conservation management. PhD thesis, Swansea Metropolitan University. 398pp

3 JNCC (2010a) The protection of marine European Protected Species from deliberate injury, killing and disturbance. Guidance for the marine area in England and Wales and the UK offshore marine area. October 2010. JNCC.

3 JNCC (2010b) Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise.

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1 Keily O, Lidgard D, McKibben M, Connolly N, Baines ME (2000) Grey seals: Status and monitoring in the Irish and Celtic Seas. Maritime Ireland/Wales INTERREG Report No. 3.

2 Lockyer C (2007) All creatures great and smaller: a study in cetacean life history energetics. *Journal of the Marine Biological Association of the United Kingdom* 87:1035-1045

2 Lockyer C, Desportes G, Hansen K, Labberte S, Siebert U (2003) Monitoring growth and energy utilisation of the harbour porpoise (*Phocoena phocoena*) in human care. NAMMCO SCIENTIFIC PUBLICATIONS 5:107

2, 3 Lonergan M (2011) Potential biological removal and other currently used management rules for marine mammal populations: A comparison. *Marine Policy* 35:584-589

3 McConnell, B., Gillespie, D., Gordon, J., Hastie, G.D., Johnson, M. & Macaulay J (2013). Methods for tracking fine scale movements of marine mammals around marine tidal devices. Edinburgh: Scottish Government

1, 2 Penrose R, Pierpoint C (1999) The use of Welsh coastal habitats as calving and nursery grounds for the harbour porpoise (*Phocoena phocoena*). Contract Report No. 378. Countryside Council for Wales, Bangor.

- 1 Pierpoint CJL (2001) Harbor Porpoise distribution in the coastal waters of SW Wales. International Fund for Animal Welfare.
- 3 Pierpoint CJL (2008) A two-year pre-construction baseline of harbour porpoise activity at Scarweather Sands Offshore Wind Farm. Report to E.ON Renewables and DONG Energy by RPS Group, 103p.
- 2 Read AJ, Hohn AA (1995) Life in the fast lane: the life history of harbour porpoises from the Gulf of Maine. *Marine Mammal Science* 11:423-440
- 2, 3 SCOS (2013) Scientific Advice on Matters Related to the Management of Seal Populations: 2013. Special Committee on Seals, SMRU, University of St Andrews
- 3 Sparling CE, Coram AJ, McConnell B, Thompson D, Hawkins KR, Northridge SP (2013) Paper Three: Mammals. Wave & Tidal Consenting Position Paper Series, Marine Mammal Impacts. NERC. SMRU Marine & TÜV SÜD PMSS
- 1 Watkins, H and Colley, R., (2004) Harbour Porpoise Occurrence in Carmarthen Bay – Gower Peninsula – Swansea Bay, December 2002 – February 2004. Gower Marine Mammals Project
- 2 Williams TM (2009) Swimming. In: Perrin WF, Wursig B, Thewissen JGM (eds) *Encyclopaedia of Marine Mammals* 2nd Edition. Academic Press, London
- 3 Xodus (2013) Use of deterrent devices and improvements to standard mitigation during piling. Offshore Renewables Joint Industry Programme Project 4, Phase 1.

## **Chapter 15.0 Coastal Birds**

### **15.1 Headline comments:**

- NRW welcomes the fact that BTO will be coordinating this part of the EIA for TLC Ltd, however we recommend that the following advice be taken into account by the applicant and their consultants.
- Two years' worth of contemporaneous data needs to be collected for baseline characterisation of the SPA.
- IBM modelling should be used in preference to the Habitat Association Model (HAM) as HAMS have proved unsuitable for assessment of the quality of intertidal habitat and predict changes in usage by key species within the SPA.
- The STPFS concluded that even after mitigation was considered a large tidal power scheme in the Severn would lead to declines in populations and assemblages of designated migratory and over-wintering bird species due to the predicted reduction in intertidal extent. It should be noted that this referred to the Welsh Grounds lagoon (L2) which was situated in an area of the estuary that is of less importance than the area covered by the proposed TLC project.
- The potential for indirect effects on other SPAs/Natura2000/Ramsar sites from impacts on features of the Severn Estuary SPA need to be considered within the EIA.
- The Study area for assessment on bird features of the SPA needs to be defined by robust coastal process modelling and assessment, and at the very least should cover

the whole of the Severn SPA and functionally related sites until further information is forthcoming.

- The scoping reports lacks clarity on assessment of visual disturbance during construction and operation phases; this needs to be included. NRW disagrees that habitat fragmentation should be scoped out. An assessment of collision risk with turbines has not been included within the scoping report; this needs to be included.

- Impacts should be assessed with and without mitigation and in combination with other projects.

**15.2 Study area:** the Study area for assessment of impacts on bird features of the SPA has not been defined. The study area needs to be defined by robust coastal process modelling and at the very least should cover the whole of the Severn SPA and functionally related sites until further information is forthcoming. Areas and populations outside of the SPA could be affected as well but this will not become apparent until the modelling is complete. The study area is likely to include areas outside of the SPA boundary and should take into account areas likely to be affected by changes in mean high and low water.

**15.3 Impacts:** Given the alteration of the tidal cycle within the lagoon and that the potential effects of the proposal on coastal processes and benthic communities are yet to be assessed, an assessment of the potential impacts of habitat fragmentation on the features of the SPA should be included within the EIA.

The scoping report omits an assessment of collision risk which should be covered at this stage as species utilising and found within the SPA may be susceptible to collision with turbines during the operational phase of the scheme.

Disturbance during operational phase should include assessment of maintenance activities such as dredging.

**15.4 Baseline:** We agree with the recommendations as outlined in Appendix 15.1; however NRW will require a minimum of two years of survey data (i.e. two winter and two passage seasons) for the high tide counts and two years of boat based surveys for the low tide counts. The high and low tide counts should be contemporaneous and cover as minimum the entirety of the SPA.

NRW advise a combination of land and boat based surveys over the use of aerial surveys; there is a lack of seabird aggregations within the Severn and aerial surveys will not allow the identification of more cryptic waders and other species associated with the SPA.

IBM modelling should be used in preference to the Habitat Association Model (HAM) as HAMs have proved unsuitable for assessment of the quality of intertidal habitat and predict changes in usage by key species within the SPA. The IBMs should draw heavily from other topic areas such as data relating to changes in coastal processes and benthic communities. As impacts on fitness and mortality have been identified, data from tracking and ringing studies as outlined in appendix 15.1 should be gathered to inform the EIA.

**15.5 Assessment Methodology:** Impacts should be assessed with and without mitigation and in combination with other projects (particularly within the estuary). We agree with the list of plans and projects proposed for the CIA / in-combination assessment of impacts on coastal birds.

## 15.6 Paragraph specific comments:

- Table 15.2. "Mortality" should be added to "potential effect" under "construction vehicles..."

Effect on fitness should be included under "potential effect" for "Temporary noise disturbance from piling"

- 15.2.2.2. Visual Disturbance: detail is required as to how this will be assessed.
- 15.2.2.4. Light Disturbance: "assessment of the impacts...will be undertaken where relevant", NRW advise that assessment is required for all species listed in table 2.1 and 2.2 within Appendix 15.1.
- 15.2.2.5. Temporary and Permanent loss of habitat: this should include loss or degradation of habitats outwith of the lagoon footprint e.g. will there be a loss of feeding resource in the Welsh Grounds area as result of channel migration due to presence of the breakwater? Habitat should be considered lost when sediment or biotopes that SPA feature species rely on change or are lost.
- 15.2.2.6. Habitat Fragmentation: this impact cannot be scoped out at this point and should be included in the EIA as without results of modelling / assessment of effects on physical processes and intertidal habitat, it is not clear how or if the use or biotopes within the lagoon area will change. If the birds' circadian cycle will not "allow" them to adjust to temporally and spatially different low and high tides within the estuary if the lagoon is built then the Lagoon represents a temporal fragmentation of habitat. SPA feature species may not consider the areas of estuary inside and outside any lagoon as contiguous habitat. Pintail are found almost exclusively within the lagoon footprint at low and high tide and may not consider other areas of the estuary suitable.
- 15.2.2.8. We would like to see the development and use of IBMs over HAMs as in previous studies HAMs have failed to predict usage and number of Pintail – a species likely to be severely impacted by this scheme.
- 15.2.3.2. Doesn't address visual impacts and how/whether these will be addressed. Disturbance from maintenance activities (e.g. dredging) also need to be assessed.
- 15.2.3. Collision risk with turbines not has not been included as a potential effect arising in the operational phase, despite Great Cormorant breeding on Steep Holm SSSI being identified as a receptor (see 15.3.3.11). An assessment of collision risk should be included within the EIA. The species also breeds albeit it in smaller numbers on Denny Island.
- 15.2.3.3. Assessment or more detailed consideration of "the intensity and spatial extent of human use of the lagoon and its enclosing breakwater" is required. NRW seek clarity as to the expectations regarding human use of the lagoon, for recreational activities, for example. A potential mitigation measure for impacts arising from such activities could be restrictions of certain activities at certain times of the year.
- 15.2.3.6. Permanent habitat loss/degradation: assessment needs to include areas out with the lagoon footprint. Also see comments to 15.2.2.5 and 15.2.2.6 regarding habitat fragmentation and habitat loss.
- 15.2.4. Decommissioning: given the predicted life of the scheme, the proposed approach is reasonable

- 15.2.5.1. The geographical scope / study area of the assessment has not yet been defined. We would suggest that this will be the area identified for changes in water levels within chapter 8 (see 8.2.0.4 and figs 8.2 & 8.3). Reduction in water levels could lead to areas of salt marsh no longer being inundated at highwater (fig 8.2). This includes the entirety of the SPA and beyond. However we will not know the area that will need to be considered until robust coastal processes modelling and assessment has taken place.

Effects on other Natura 2000 sites, e.g. arising from displacement (permanent or long term but temporary nature) occurring from the Severn SPA should be considered.

- Figure 15.3. There is no legend for this figure.

- 15.3.1. We note that baseline high tide counts, following WeBs methods, are being carried out in the area covered by the intertidal footprint of the proposed TLC project and extending up to the Second Severn Crossing from Feb 2014 to May 2015. However, NRW need more information regarding these surveys (e.g. is the whole frontage covered at once as per WeBs) before we can comment on whether they are sufficient / acceptable. Additional surveys will need to cover the entirety of the SPA.

- 15.3.1.7. In addition to counts, data have been collected on bird activity “across the study area”. Further clarification is required on this point as the report acknowledges that the study area has not been defined and can only be defined by robust hydrodynamic and sediment process modelling, (see comments above under 15.2.5.1).

- 15.3.3.4. WeBS core (high tide) counts – “minimum of... one WeBS year”: NRW advise that there needs to be a minimum of two WeBS years survey data for the whole estuary for the EIA.

- 15.3.3.8. Two contemporaneous years’ (within the last five years) worth of data for low tide counts will be required for the assessment.

- 15.3.3.11. Breeding Seabird Surveys – we agree that breeding specific surveys aren’t required. Data on important breeding bird colonies should be obtainable from the relevant SNGOs or NGOs that monitor the two islands. Cormorants breeding on Steep Holm may be susceptible to collision risk with the turbines – see comments above under 15.2.3 and below. Most up to date (published) figures for Flat Holm can be found in Ross-Smith et al 2013 Birds in Wales 10(1):7-21.

- 15.3.3.12. Surveys beyond the Severn: NRW agree that is not necessary for project specific WeBS at this stage but would need these for other NK2 sites during construction and operational phases.

- 15.3.3.13. Tracking studies: agree with this but would also like to see details of a ringing study brought forward as potential impacts on fitness and mortality have been identified.

## **Chapter 16.0 Terrestrial Ecology**

**16.1 Headline comments:** There are significant deficiencies with this chapter, most notably, the clear definition of the study area and the consideration of the full range of potential impacts. Intertidal habitats such as saltmarsh are partly covered in both Chapters 12 and 16, but not adequately considered in either; the report needs to make clear which features are being covered in which chapter.



Saltmarsh appears to lie within the Terrestrial Ecology chapter, however there is some confusion with Chapter 12 Intertidal and Subtidal Benthic Ecology where it is also mentioned initially in sections 12.1.0.2 and 12.1.0.4 in the description of intertidal habitats and again in section 12.4.2.3. It needs to be made absolutely clear which features are being covered in which chapters and certainly features need to be covered only in one chapter. Including saltmarsh and transitional habitat with the terrestrial ecology in some respects makes sense, however the fact that it is an intertidal habitat needs to be clearly made.

**16.2 Study area:** The extent of the study area is unclear; it is to be informed by the outputs of the physical processes modelling as saltmarsh and transitional habitats could potentially be affected throughout the area where coastal processes are affected; and consideration of ancillary development (e.g. grid connections) and transport routes. The description of the footprint of the project on terrestrial ecology in Section 16.3.0.2 does not include the saltmarsh and transitional habitats within the lagoon, between landfalls.

**16.3 Potential impacts / receptors:** Not all potential impacts have been considered. Many of the potential sources of impact and potential impacts listed in tables 12.2-12.4 in Chapter 12.0 Intertidal and Subtidal Benthic Ecology also apply to saltmarsh vegetation, transitional vegetation communities and the rare plant species that these habitats support. The potential impacts will relate to all phases of the project both within the enclosed area of the proposed lagoon, and within the zone of influence for coastal processes and that of ancillary development.

- i. Alteration to the tidal range and pattern will lead to the loss, decline in extent, or degradation of saltmarsh within the footprint of the lagoon. This has not been fully considered.
- ii. Alternations to coastal processes also have potential to impact on saltmarsh outside of the lagoon for some considerable distance and effects could potentially be very extensive.
- iii. Potential impacts arising from ancillary development (including construction compounds, access road improvements, grid connections etc.) on habitats and species need to be fully considered.
- iv. The full range of potential impacts upon habitats and species needs to be established upfront and presented in a clear and coherent manner. Tables 16.1 and 16.2 should be more comprehensive, splitting all potential impacts and potential receptors into a matrix similar to Tables 12.2, 12.3 and 12.4 whereby habitat and species interest is listed separately (for construction, operation and decommissioning phases).
- v. We recommend that the potential impacts during the decommissioning phase are considered and displayed within a new table similar to Table 12.4 as discussed in above.
- vi. With respect to the potential impact tables, we recommend the following;
  - Potential impacts in each table are considered for saltmarsh and associated habitats.
  - Table 16.1 needs to consider additional impacts such as physical disturbance from ancillary on-shore development (such as, but not only, work compounds, grid connections, access road improvements) and vehicle movements.
  - Potential impacts on species supported by habitats are considered, e.g. birds and invertebrates.

- Potential impacts should include the loss of, decline in extent, or degradation of transitional habitats, such as inundation grassland, and associated rare plant species.
- Habitat degradation is a key potential impact and should be included in each of the three impact tables. Consideration of saltmarsh degradation should include isolation of marsh from other saltmarsh.
- A decrease in suspended sediments needs to be included as a potential impact on the saltmarsh during operation as does the isolation of the saltmarsh from adjacent seed sources by the breakwater affecting its connectivity.
- The various aspects of terrestrial ecology should be separated in the impact tables. Assessing potential impacts of such a variety of species such as badgers and bats in the same columns as saltmarsh vegetation and transitional vegetation is not recommended.

- vii. The report needs to take into account effects on habitat condition including zonation of the individual saltmarsh habitats. Assessing impacts in relation to the extent and distribution of saltmarsh alone is not adequate where the development has potential to cause habitat degradation.
- viii. The impacts identified in Table 16.1 fails to include the effects on habitat condition in the 'Potential Effects column'. Habitat condition should be considered in the 'Potential Effect' column when habitat degradation is listed as an impact. Following on from this, habitat degradation is not always listed where it should be under a potential impact (Table 16.1):
- ix. Potential source of impact: Construction vehicles etc. The Potential Development Impact should include 'Temporary or permanent habitat loss, degradation, fragmentation and modification and the introduction of non-native species' due to potential compaction of soils and damage to vegetation and transport non-native species on site.
- x. Potential source of Impact: Temporary discharges from construction works to environment, accidental spillages. The Potential Development Impact should include 'Temporary or permanent habitat loss, degradation, fragmentation and modification'.
- xi. Saltmarsh is an intertidal habitat and none of the impacts associated with tidal inundation, water quality or suspended sediments have been related to saltmarsh, transitional habitats such as inundation grassland, nor the associated rare plant species which these habitats support.
- xii. Consideration also should be given to the isolation of the saltmarsh from adjacent seed sources by the breakwater affecting its connectivity.
- xiii. Table 16.3 Designations: This table needs to detail all features of designated sites with the study area (i.e. the zone of influence to be determined by the areas impacted by changes to coastal processes and ancillary development).  
For the Severn Estuary SSSI, individually qualifying plant species and the plant and species assemblage is not mentioned. This is an important issue as the lagoon is likely to impact these species both within the footprint of the lagoon and outside it.

Reference to definition of 'saltmarsh' SSSI feature and 'Atlantic salt meadows' needed to clarify that communities at back end of the marsh are considered part of the Annex 1 feature.

- xiv. Section 16.3.5.3: Saltmarsh, predicts impacts on the habitat inside enclosed lagoon area and under the footprint of the sea wall but saltmarsh could potentially be

affected throughout the area where coastal processes are affected- either from changes to tidal range and regime and alterations to sediments erosion/deposition. What is included as 'Saltmarsh' needs to be explained here in terms of the NVC, to establish whether or not transitional habitats such as inundation grasslands are included with the 'saltmarsh' in this section. If not inundation grassland should be considered for inclusion here.

Coastal grassland is listed as a principle terrestrial habitat. This term needs to be explained if possible in terms of the NVC.

Ephemeral, short perennial and bare ground habitats need to be explained better, if possible in terms of the NVC.

Semi-natural grassland may also be affected by ancillary works, e.g. Construction compounds, grid connections and road improvements.

**16.4 Baseline data:** The summary of existing baseline data does not account for NRW's NVC survey data or other sources of information. Paragraph 16.4.2.2 refers only to the phase 1 data but NRW hold more vegetation data than this including:

- The primary source of information relating to saltmarsh vegetation along the Severn is an NVC Survey carried out in 1998. Dargie, T. (1999) NVC Survey of saltmarsh habitat in the Severn Estuary 1998. CCW Contract Science Report No.341. This data is now somewhat out of date and does not provide an accurate fit with the current vegetation. This survey needs to be updated to enable an accurate estimate to be given as to the extent and type of the saltmarsh feature within the Severn Estuary.
- A condition mapping exercise was carried out in 2010
- WFD data 2008/9
- WFD aerial image assessment.
- Alongside the NVC survey a survey of the nationally scarce vascular plant species was produced for the Welsh sectors of the SAC. Dargie, T. (1999) Scarce plants survey of the saltmarsh on the Welsh side of the Severn Estuary. CCW Contract Science Report No. 367.

**16.5 Assessment methodology:** Phase 1 surveys are not appropriate for the saltmarsh and transitional communities. It is recommended that an NVC survey is carried out for the 'terrestrial habitats' (including saltmarsh and inundation grasslands) throughout the zone of influence on coastal processes.

Section 16.5.2 states that extended phase 1 surveys will be undertaken for specific parts of the project area and NVC surveys within the footprint of the eastern sea wall where it makes landfall; this is not adequate. The changes to the tidal range and regime expected to occur after the construction of the lagoon both within and outside of the enclosed area of the lagoon could have a major impact on the saltmarsh, transitional communities and rare plant species, in addition to the habitat destroyed under the footprint of the sea wall.

The effects of the alterations to the tidal regime and range may well be more subtle than just changes to the extent of the salt marsh which is all that could be illustrated by a phase I survey. The phase 1 mapping category for saltmarsh has only three basic divisions for saltmarsh vegetation which would not properly capture the full

series of saltmarsh zones. Furthermore the phase 1 mapping categories do not distinguish inundation grassland from other types of neutral grassland; it is critical to identify this transitional habitat which would be very vulnerable to a decrease in tidal range and which supports many of the rare plant species.

Changes to the existing zonation pattern and extent of the different saltmarsh zones and associated transitional communities would only be picked up by an NVC survey (the 1998 survey is now out of date). The objectives of the Regulation 33 package require that the zonation and extent of the individual Atlantic salt meadow communities are maintained therefore this is relevant information to the condition of the saltmarsh.

Within this zone of influence for coastal processes, modelling data regarding the effects of the proposed lagoon(s) on the tidal range and pattern should be related to the inundation regime of the saltmarsh and transitional habitats. Within the EIA the impact of the potential changes in the tidal inundation regime needs to be assessed in terms of its effect on the extent and zonation of the saltmarsh, transition habitats (including inundation grassland and swamp communities), and the rare species which they support.

Baseline information should also include condition assessments of the salt marsh. Particularly within the area enclosed by the lagoon and within the vicinity of the sea walls or any works (cabling, storage or transport routes).

- 16.6 **Additional comments:** With regards to European protected species, the proposed surveys and assessments are welcomed, but details of ancillary works / grid connection / access road corridors are required to ensure the extent and nature of the proposed surveys is fit for purpose.

Chapter 12 Figure 1 (at the end of the chapter) the saltmarsh which is mapped on NRW's Phase 2 maps in the vicinity of where the lagoon breakwater makes landfall in the east is not shown on this map.

## Chapter 17.0 Seascape and Landscape

- 17.1 **Study Area:** (17.1.0.2 & 17.4.0.3) The same ZTV, currently 15km radius, is proposed for TLC as for the Swansea Tidal Lagoon. The 15km radius appears to be from all parts of the development, which is preferable, rather than the centre of the project but this needs to be confirmed. A wider ZTV (area of search) should be used to inform the extent of the study area, which would help to explain how the study area has been arrived at and areas that may be scoped out. The landscape assessment and ZTV should be informed by the coastal processes work as there could be effects that are outside the current proposed ZTV caused by changes in coastal processes as a result of the development.

The Wye Valley AONB has been scoped out in the heritage assessment during discussions with Cadw. It is not mentioned in the seascape/landscape chapter. If it is to be scoped out, an explanation/evidence is required. The Mendips AONB is mentioned as being beyond the ZTV. It would be advisable to extend the ZTV to the Mendips AONB as a highly sensitive receptor and if it is to be scoped out, an explanation/evidence is required. FIG. 17.1 does not show the Wye Valley or

Mendips AONBs although AONBs are in the key. The Glamorgan Heritage Coast is not mentioned/scoped out.

- 17.2 **Impacts:** (17.2.0.1, 17.2.0.1 & 17.4.0.2). The main requirements are a Seascape, Landscape and Visual Impact Assessment (SLVIA) and Cumulative Seascape, Landscape and Visual Assessment. The Scoping report identifies these. However the level of detail provided in the report is quite limited and requires considerable development. The study must include assessment of the direct effects from the development, indirect effects on nearby landscape and seascape areas, and consequential effects if the character of the surrounding seascape changes. The indirect effects concerning altered perceptions, uses or valued qualities of the area may relate closely to impacts on tourism and recreation. There is a need for continuing dialogue in selecting and assessing suitable viewpoints and for a full cumulative impact assessment including appropriate visualisations from selected viewpoints. Consideration of potential mitigation must be included in the scoping.

17.4.0.3. An ASIDOHL2 Assessment of impacts on the Gwent Levels Registered Landscape of Outstanding Historic Interest in Wales is required and has been recommended by Cadw and the Gwent Archaeological Trust and referred to in the Cultural Heritage Chapter of the scoping report. There is some overlap and need for the SLVIA to inform ASIDOHL2 and vice versa, which has been picked up in the Cultural Heritage Chapter but not in the Seascape/Landscape Chapter. Full consideration of the historic landscape character needs to be taken in both assessments.

- 17.3 **Baseline:** In general terms NRW are in agreement with the proposed baseline for assessment, but advise that much more detail is needed e.g. on viewpoints, PROWs, identification of sensitivities, cumulative developments that will be taken into account, coastal process changes.

17.4 **Proposed Assessment methodology:**

GLVIA3 is recognised but not the CCW Seascapes Assessment guide and Welsh Seascapes Method Report. The list of appropriate guidance at the end of this section of Annex 1 is recommended to assist the applicants to ensure the assessment methodology is as up to date and thorough as possible.

The SLVIA and cumulative SLVIA should consider and the Scoping Report has recognised:

- 17.1.0.2 & 17.1.0.1. Effects on tranquillity (ref. Wales Tranquil Areas Map 2009 & Special Landscape AREA (Wentlooge Levels)

- 17.2.0.1 & 17.3.0.1. Effects on Seascape and Landscape Character (including mapping and consideration of effects on all 5 layers of LANDMAP, Local Authority (Newport & Cardiff) Landscape Character Assessments and guidance, Wales seascape assessment & new work by NRW

- 17.3.0.2, 17.3.0.3, 17.3.0.4 & 17.3.0.5. Visual effects on Seascape and Landscape

- 17.1.0.2 & 17.4.0.3. Effects on the Gwent Levels Registered Historic Landscape

- 17.1.0.3. Effects on the Wales Coast Path and other long distance routes e.g. National Cycle Route + local PROWs and promoted routes

- 17.2.0.1. Effects on the landscape/seascape of changes to coastal processes as a result of the development
- 17.2.0.1. Cumulative effects with other types of infrastructure
- 17.3.0.5. Dialogue with NRW/Natural England/Local Authorities on selection and assessment of viewpoints and appropriate visualisations.

The scoping report does not include and needs to consider:

- 17.1.0.2 & 17.4.0.3. Explanation of effects on protected landscapes (Potentially Mendips AONB & scoping out of Wye Valley AONB) and Heritage Coasts (Glamorgan)
- 17.1.0.2 & 17.2.0.1. A description of all the landscape and seascape interests within the vicinity of the proposed development, including all Special Landscape Areas and marine/seascape character areas and LANDMAP aspect areas potentially affected by the development. Identification and assessment of local seascape units as a more refined level of detail below regional seascape units and marine character areas. Is recommended.
- 17.4.0.3. Cross-referencing of effects on the Gwent Levels Registered Historic Landscape and Registered Parks & Gardens, including settings and views with the ASIDOHL2 assessment and cultural heritage assessment
- 17.2.0.1. Detailed effects on the landscape/seascape character and visual amenity of changes to coastal processes as a result of the development e.g. de-watering, salination, sediment deposition, erosion
- 17.2.0.1. Inter-relationship between landscape and seascape effects and values/perceptions
- 17.2.0.1. Construction and decommissioning effects including grid connection, access routes, compounds, temporary structures as well as operational effects
- 17.2.0.1. Potential mitigation measures. The potential for coastal landscape regeneration and/or enhancements should be included along with an explanation of how siting and design have been informed by seascape and landscape information.
- 17.2.0.1. Details of cumulative effects of other land infrastructure e.g. M4 re-routing, wind turbines, industrial/residential development, other marine renewable energy or other types of marine development. Existing developments and those with planning permission should be considered, also those that are in the public domain (in planning) and reasonably foreseeable. Developments or activities that have the potential to interact with the proposed development, not only 'major' projects, should be considered.
- 17.2.0.1. Lighting effects, including navigational and buildings/road/maintenance lighting that may form part of the development. The significance of dark skies in the locality should be considered.
- 17.3.0.5. Detailed dialogue on number of viewpoints (10 currently proposed), representativeness and where specific viewpoints needed. The production of wireframes and photomontages for each viewpoint is recommended. Cumulative

visualisations including photomontages that superimpose the proposed development with existing and in planning developments are recommended. Views from the sea to the land e.g. from shipping/leisure routes, including from Flat Holm and Steep Holm islands and the leisure boat routes to and from the islands; as well as from land to sea e.g. from high ground to the north and west of Cardiff, land around Penarth and the Gwent Levels should be considered. The views in photographs and photomontages should be representative of that observed from each viewpoint and not partially obscured by structures such as buildings & pylons. Photographs and photomontages should illustrate the level of detail seen in the field through single frame images as well as context through panoramas. Consideration should be given to views including high and low water tides from coastal viewpoints where the tidal range can make a significant difference to views. NRW recommended photographs taken 2 hours either side of low or high water from low lying/seafront viewpoints for the Swansea tidal lagoon.

Mitigation should be built in to the Seascape and Landscape chapter and cross-referenced to chapter 26.0.

#### **17.5 Appropriate Guidance (not exclusive):**

Guidelines for Landscape and Visual Impact Assessment 3rd Edition (The Landscape Institute & Institute of Environmental Management & Assessment) 2013 (& check LI website for any amendments)

Guide to Best Practice in Seascape Assessment (CCW, Brady, Shipman & Martin, University College Dublin) 2001

Marine Character Areas (new work being undertaken on Welsh Seascapes (due April 2015)) & Seascape Assessment of Wales

LANDMAP Information Guidance Notes 3 & 4 (NRW) 2013; 2012 version of LANDMAP surveys (& new refreshed LANDMAP surveys (due April/May 2015))

Register of Landscapes, Parks & Gardens of Historic Interest in Wales, Parts 1, 2 & 3 (CADW, CCW, ICOMOS UK) 2001

Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process 2nd Edition including revisions to the assessment process (ASIDOHL2) 2007 (& including the Govannon Consultancy's 2012 recommendations to CCW & any emerging NRW guidance)

The Gwent Levels Historic Landscape Study (Stephen Rippon for CADW/CCW) 1996

The Countryside Agency & Scottish Natural Heritage, Landscape Character Assessment Guidance for England and Scotland - Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity 2012 (with caveat that GLVIA3 reflects more recent thinking on sensitivity and provides much clarification)

Natural England NECR105 – An Approach to Seascape Character Assessment, 2012

Landscape Institute Advice Note 01/11 - Photography & photomontage in Landscape & Visual Impact Assessment (& check LI website for any updates)

Briggs J & White S (CCW2009) Welsh Seascapes & their sensitivity to offshore development. Method Report; Appendix; and also relevant regional seascape units, being RSU48, RSU49 and RSU50

Scottish Natural Heritage, Guidelines on the Environmental Impacts of Windfarms and Small Scale Hydro Electric Schemes, 2002

Natural England NE579 – An approach to landscape character assessment

DTI – Guidance on the Assessment of the Impact of Offshore Wind Farms – Seascape and Visual Impact. 2005

European Landscape Convention

Local Authority Landscape Character Assessments and proposed SLA

Newport Local Development Plan & guidance e.g. - Landscapes Working for Newport

Cardiff Local Development Plan & guidance e.g. – Review of Landscape Character Areas 2008

Vale of Glamorgan Local Development Plan & guidance – Landscapes working for Vale of Glamorgan LANDMAP landscape character assessment (original 1999 & any updates)

Rhondda Cynon Taf Local Development Plan & guidance

Caerphilly Local Development Plan & guidance

Monmouthshire Local Development Plan & guidance

## **Chapter 20.0 Marine Noise and Vibration**

**20.1 Impacts:** NRW welcomes proposals set out in paragraphs 20.2.0.1 and 20.2.0.2 to consider the impact of noise and vibration arising from Construction, Operation and Decommissioning activities on Intertidal and Subtidal Benthic Ecology (Chapter 12), Fish, including Recreational and Commercial Fisheries (Chapter 13), Marine Mammals (Chapter 14) and Coastal Birds (Chapter 15). Impacts associated with structure maintenance and repair should also be included in an assessment of operational noise.

Particle velocity may be significant for certain fish and invertebrate species. Whilst we acknowledge that survey techniques and impact knowledge for these topic areas are currently immature, NRW would welcome the consideration of particle velocity as an impact where sufficient information exists.

### **20.2 Existing baseline data and proposals for further baseline survey:**

As per paragraph 20.0.0.1, 'the Severn Tidal Power SEA (DECC, 2010) identified a lack of knowledge of the ambient marine noise within the Severn Estuary and identified that an underwater baseline noise study would be required for any project to take account of the particular and unique environment of the Severn Estuary'. It is therefore paramount that a full characterisation survey of the baseline ambient noise conditions is undertaken. Whilst NRW is in agreement with many aspects of the baseline data survey methodology detailed in Section 20.3, the survey duration proposed may not yield true characterisation of ambient noise and NRW considers that the proposals for a 1-2 day 'snapshot' survey are not sufficient for the reasons outlined below.



The ambient noise environment within the Bristol Channel and Severn Estuary is highly variable, both spatially and temporally, with a number of generic natural and anthropogenic noise sources resulting in a significant dynamic underwater soundscape (paragraphs 20.1.0.2 and 20.1.0.3). The survey duration proposed is highly unlikely to capture the local tidal, diurnal, weather and shipping traffic variance anticipated and could bias measured data.

The Good Practice Guide for Underwater Noise Measurement (NPL, 2014) states that 'Where the objective is to determine the change to the overall background noise caused by the presence of a specific activity (for example, the installation of a marine renewable energy development or oil and gas platform), a medium-term deployment of perhaps a few weeks is more appropriate'. A medium to longer-term baseline acoustic noise characterisation deployment would be more appropriate than the short-term 1-2 day deployment proposed in paragraph 20.3.0.5.

The spatial extent of the survey area has not been defined but NRW welcomes proposals to undertake measurements across a range of depths and at 'multiple measurement locations within and outside of the area of the Project, at varying distances from the shipping routes and also a range of distances from the shoreline out to the main channel (paragraph 20.3.0.7)'. The report would benefit from more survey location specific detail including rationale behind target locations.

It is not clear how TLC intent to present the baseline ambient noise data. NRW supports the NPL (2014) recommendation that 'ambient noise data be displayed at minimum in third-octave bands. This simplifies the data, and is appropriate for most considerations of environmental impact. However, where narrow-band features exist in the data (such as tonal components from specific sources), narrow-band analysis may be required to illustrate these features'. Therefore NRW requests that data be presented in third-octave bands with narrow-band analysis also undertaken to assess the likely contribution of tonal components to the underwater soundscape. Without narrowband analysis, tonal components may not otherwise become apparent.

**20.3 Assessment Methodology:** A generic noise impact assessment methodology has been provided in Section 20.4 of the report. NRW agrees with both the pulsed sound and continuous sound metrics proposed in paragraphs 20.4.1.4 and 20.4.1.5 respectively.

Paragraphs 20.4.2.4 and 20.4.2.5 describe transmission loss as a function of geometric spreading and absorption. As stated in NPL (2014) Section 6.2.3, it is important to note that it is generally not possible to calculate the source level in shallow water by the use of a simple spreading law such as  $N \cdot \log(R)$  to extrapolate back to source. Paragraph 20.4.2.5 goes some way towards acknowledging this and NRW welcomes suggested consultation on suitable values.

Proposed impact assessment methodologies for specialist topic areas is specified within the relevant chapters, however, the report as a whole lacks detailed information on specific criteria and methodology for various impacts assessment elements such as receiver level modelling, predicted zones of influence, noise exposure criteria, injury thresholds (including permanent threshold shift and temporary threshold shift), behavioural response and cumulative exposure threshold.

Little detail has been provided on the proposed assessment of vibration impacts. Vibration can have a localised effect and potentially disturbed benthic habitats in the immediate vicinity of certain high energy activities (paragraph 20.1.0.4). The

assessment should fully consider the effects of vibration from high energy construction activities on benthic ecology and fish.

- 20.4 **General Comments:** NRW encourage early consideration of additional mitigation of potential noise levels generated by percussive/impact piling such as bubble curtains, hydro sound dampers or pile sleeves to increase propagation loss at source where piling activities can't be avoided and alternatives such as vibro piling are technically unfeasible. NRW acknowledge that only a general consideration of measures to reduce or remove likely impacts is possible at scoping stage and we welcome the opportunity to discuss mitigation measures in greater detail as the project proposal progresses.

The Tidal Lagoon Swansea Bay (TLSB) project may, if all the relevant permissions are received and the project progresses, present an opportunity for acoustic data acquisition through construction and operational phase impact monitoring. This additional data could help to address current knowledge gaps, with regard to operational offshore turbine noise for example, by providing activity or equipment specific noise data and reduce the reliance on surrogate comparative datasets. Given that the TLC project will employ similar construction methods and involve the use of similar tidal turbines to that of TLSB, any suitable data obtained should be incorporated into the TLC EIA where timescales allow.

## **Chapter 22.0 Air Quality**

- 22.1 We recommend that the construction dust assessment takes full account of the outputs of both Onshore Transport and Terrestrial Ecology studies to identify ecological receptors and to assess the potential impacts.
- 22.2 The Scoping Report states that the construction dust assessment would be undertaken following confirmation of construction activities. We recommend the construction dust assessment is undertaken to inform the EIA.

## **Chapter 23.0 Onshore Transport**

- 23.1 The proposed Access Route Study is to concentrate on the principal impact areas; that of the two landfall locations. We recommend that the assessment also consider the potential for and effect of, traffic between both landfall locations along the coastal strip along with all potential sites of ancillary works / other consented developments, both permanent and temporary.
- 23.2 In the main, the potential impacts are limited to the likely effects of an increase in traffic volume. We recommend that the assessment also consider the potential for and impact of, road improvements, particularly road widening and new access routes. We recommend that the assessment include the following:
- Potential disturbance and/or damage (both temporary and permanent) to SSSI features through increased traffic volume and the construction of improved and / or new access routes.
  - Potential disturbance of protected species and/or damage to supporting habitat (both temporary and permanent) through increased traffic volume and the construction of improved and / or new access routes.

- Potential impact on watercourses in terms of the effects on drainage and flow conveyance capacity.

## **Chapter 25.0 Tourism and Recreation**

25.1 We recommend that the potential impact on the route of the Wales Coast Path, and the quality of the user experience of both the Path and Newport Wetlands, are fully taken into account.

## **Chapter 26.0 Mitigation, Compensation and Monitoring**

Overall this chapter is lacking in detail, particularly on how this chapter will clearly show the legislative driver behind each proposed mitigation, monitoring or compensation action. More detail is needed in terms of the methods that will be used for identifying suitable mitigation and compensation.

The HRA for this project is going to be critically important and is likely to have a strong influence on what needs to be included within this chapter.

NRW reminds the applicant of the requirements surrounding compensation as provided under Regulation 66 of the Habitats Regulations;

- Ideally such measures should be agreed with the Statutory Nature Conservation Body (SNCB) at an early stage, along with a package of monitoring measures to check efficacy of compensation provided.
- Compensation measures must be secured before consent can be given. Any doubt or lack of confidence that such measures will be in place to compensate for the adverse effects, will likely mean the project cannot proceed.
- Compensation measures must be additional to any measures that would normally be undertaken under the drivers of Article 6(1) or 6(2) of the Habitats Directive (or Article 4(4) of the Birds Directive). However, compensation measures can coordinate with the provisions of the above Articles, to improve the overall outcome for the Natura 2000 network.
- Any compensation provided should provide for the requirements of the feature in question; for example any compensation habitat provided for bird features of the Severn Estuary SPA should be likely to be used by such birds for the purpose fulfilled by the original SPA habitat (i.e. what has been lost or damaged). Such compensatory habitat should fulfil the requirements of the designation of the original SPA habitat and must be useable, accessible and functional for the bird features before, or at the time of the adverse effects.

NRW advises that considerable effort and assessment will be required in order to try and understand effects to site features, and thus the relative efficacy and suitability of any mitigation/compensation applied as part of the HRA.

**The evidence requirements to ensure that all the criteria listed would be met should not be understated. The conclusions of the STPFS indicate that compensation will be technically challenging for Annex I habitats and potentially unfeasible for Annex II species, e.g. Shad. Compensation should also be delivered 'in time' to fulfil the required ecological function. This will often be well before the projects effects occur to allow time for new habitats to gain sufficient maturity to perform the necessary ecological functions before the existing habit is lost/damaged.**

**Therefore, the aspiration of the developer to secure consent by 2018 with a view to commissioning in 2022 is considered by NRW to be highly ambitious and present a significant consenting risk for the project.**

It is not currently clear for compensation for the TLC project will interact with the National Habitat Creation Programme and the Severn Estuary Shoreline Management Plan.

#### Other comments

26.1.0-3.0.8. NRW note the change in wording from 'Management' to 'Monitoring' in relation to the AEMP for TLC compared to the AEMP associated to the Tidal Lagoon Swansea Bay (TLSB) proposal. While NRW agree that the 'Adaptive Environmental Monitoring Plan' more accurately describes the nature of the document proposed, we consider that there is necessity for a higher level 'Environmental Management Plan' document integrating all elements of the overall project management system (including the CEMP, OEMP and AEMP) and appropriate feedback mechanisms in order to fulfil the adaptive element of the plan (see Marine Space Reports for more detail). Paragraph 26.3.0.8 makes reference to the TLSB AEMP and how the TLC proposal will be 'based on lessons learnt from the implementation of the AEMP that will be established for the Swansea Bay tidal lagoon'. Given the comparison made between the two AEMP documents, there needs to be some explanation of the rationale behind the change in title of the document and whether this has any effect on the documents functionality and purpose. **It is essential that the aims of the AEMP are clearly outlined and the document is fit for purpose in terms of identifying compensation, mitigation, biodiversity enhancement measures and monitoring.**

26.1.0.1 add Landscape and Ecological Management Plan

26.1.0.3 add after 'biodiversity and people': and opportunities for landscape and heritage enhancements and/or interpretation

In section 26.3.0.2 there is a reference to baseline surveys reported on in the ES which is given in the context of monitoring. It is important to note that it generally isn't possible to design a comprehensive monitoring programme prior to assessing the possible impacts and therefore there should not be any assumption that the surveys carried out to inform the ES will be sufficient to act as a monitoring baseline.

Recommendations made at the design stage which can be considered as working with biodiversity are likely to enhance structures. These issues need to be considered on a case-by-case basis and should be discussed with NRW to optimise biodiversity potential without compromising biosecurity.

Airoldi et al. (2005) reported on the DELOS (Environmental Design of Low Crested Coastal Defence Structures) project<sup>15</sup> and indicated a series of design factors that may be applicable in limiting success of Marine Invasive Non-native Species (MINNS). It is therefore recommended that at the final design phase, there should be detailed consultation with relevant experts to assess the risks associated with:

- Substrate;
- Wall design;

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<sup>15</sup> <http://www.delos.unibo.it/Docs/Deliverables/FinalReport.pdf>

- Source of construction heavy plant and associated infrastructure, including jack-up rigs etc;
- Maintenance schedules/disturbance aspects; and
- Linkages with other structures potentially facilitating the ‘stepping stone’ effect.

## **Appendix 2.1 - HRA Selection of European sites (Pre-screening)**

**We have made a limited number of comments on this appendix below, but the applicant should be aware that it is our intention to liaise with them separately on this pre-screening document through the Evidence Plan process.**

### Coastal Processes

The impact pathways identified in Appendix 2.1 are based on the high level modelling outputs referred to in sections 2.1.0.8 and 8.2.0.5, 8.2.0.6, 8.2.0.7, Figs 8.2, 8.3 which has not been provided to NRW for scrutiny as part of the scoping consultation.

Therefore, it is not possible to comment in detail on Appendix 2.1 as part of the response to this consultation. We strongly recommend that appropriate detail to inform and justify this pre-screening assessment is provided. In addition, it is not clear how this assessment has taken account of in-combination or cumulative effects, which will be critical to a meaningful HRA.

In addition, on initial review there do appear to be some anomalies in the assessment which require further consideration. For example, alteration of coastal processes/sediment transport is flagged as ‘possible’ for all features of the Carmarthen Bay and Estuaries SAC, and yet the column for habitat loss, degradation, fragmentation has not been flagged at all. Conversely habitat loss etc is flagged as ‘possible’ for the Burry Inlet SPA features. This seems illogical given that the SPA sits within the SAC and if the bird supporting habitats may be affected, then this will also apply to the same habitats from a SAC perspective. This further justifies the need for clarity regarding rationale and justification for this assessment.

Carmarthen Bay Dunes SAC has not been included in this assessment, but should be given it shares a boundary with the Carmarthen Bay and Estuaries SAC.

### Fish

Table 13.1 of the main report omits Allis shad (*Alosa alosa*) from the designations of both the Wye and Usk SACs. Although very rare, and not a primary reason for site selection, there are reports of them each year from the Wye.

The table also omits the assemblage of fish features of the Severn Estuary European Marine Site (the compiled estuary SAC, SPA and Ramsar site). Therefore, this feature should also include “noise and vibration disturbance”, “barrier effects”, entrainment in turbines/slucice gates” and “electromagnetic fields” for the HRA pre-screening. Furthermore, the pathways identified within the HRA are not sufficient to cover potential impacts on the fish assemblage.

### Marine Mammals

The grey seal feature of Pembrokeshire Marine SAC should be included as “potential impact pathway possible” not “potential impact pathway unlikely” due to the high mobility of the species. This is the same for grey seal feature of Cardigan Bay SAC and Pen Llyn a'r

Sarnau SAC. Note that the bottlenose dolphin feature has been omitted from Pen Llyn a'r Sarnau SAC, and replaced with harbour porpoise which is not a feature of this SAC.

HRA In-combination assessment needs to include projects further afield such as offshore wind farms and tidal energy developments, as seal and cetacean populations in the UK are considered at a Management unit (MU) scale due to their wide ranging nature. Population scale effects need to be assessed at the scale of the appropriate marine mammal MU.

We disagree with footnote 11 of table 1, Appendix 2.1 that a “potential impact pathway between the Project and the grey seal populations of far-field European sites [is] unlikely”. Grey seals are known to travel long distances, and as such there is a potential impact on the grey seal feature of all of the SACs within this MU.

The applicant should be advised that on 16th October 2014, the UK received formal correspondence (Reasoned Opinion) from the European Commission outlining their position regarding the number of Special Areas of Conservation (SACs) for harbour porpoise in the UK under the EU Habitats Directive. The Joint Nature Conservation Committee (JNCC) have undertaken a new analysis of the largest and most comprehensive set of data for harbour porpoise in UK waters, with the aim of identifying possible sites for SAC designation. The JNCC has recently given initial advice to all UK governments, which indicates that there are several potential sites around the UK including one in the Bristol Channel. Please see our website for FAQs and the brochure containing the possible proposed Bristol Channel Approaches recommended draft SAC (<http://naturalresourceswales.gov.uk/marine/information-about-our-marine-work/?lang=en>)

It is Government policy that any candidate SAC / SPA is treated as designated site once the minister has signed off the public consultation on the candidate site and until such time as a decision on whether to designate or not has been reached.

## **Annex 2. NRW Advice Note on Using Acoustic Surveys to Inform Benthic Characterisation**

Note prepared by Kirsten Ramsay, Charlie Lindenbaum, Karen Robinson, Dave Tavner, 15 October 2014.

An EIA for a large marine development will require a benthic survey to be carried out, with the aim of describing the seabed habitats present and identifying any habitats and/or species of conservation importance.

Guidance for the design and execution of these surveys is provided in several documents but we would particularly draw attention to the following:

- Ware, S.J., Kenny, A., Curtis, M., Barrio Frojan, C., Cooper, K., Reach, I., Bussell, J., Service, M., Boyd, A., Sotheran, I., Egerton, J., Seiderer, L.J., Pearce, B., 2011. Guidelines for the Conduct of Benthic Studies at Marine Aggregate Extraction Sites (2nd Edition)
- Saunders, G., Bedford, G.S., Trendall, J.R., and Sotheran, I. (2011). Guidance on survey and monitoring in relation to marine renewables deployments in Scotland. Volume 5. Benthic Habitats. Unpublished draft report to Scottish Natural Heritage and Marine Scotland (Chapter 9)
- MESH guidelines for Seabed mapping
  1. <http://www.emodnet-seabedhabitats.eu/default.aspx?page=1653>
  2. <http://www.emodnet-seabedhabitats.eu/PDF/GMHM3%20How%20do%20I%20collect%20my%20data.pdf>
  3. [http://www.emodnet-seabedhabitats.eu/PDF/GMHM3 Swath Bathymetry ROG.pdf](http://www.emodnet-seabedhabitats.eu/PDF/GMHM3_Swath_Bathymetry_ROG.pdf)
  4. [http://www.emodnet-seabedhabitats.eu/pdf/MeshA ROG Sidescan Sonar v4.0.pdf](http://www.emodnet-seabedhabitats.eu/pdf/MeshA_ROG_Sidescan_Sonar_v4.0.pdf)

However, our past experience suggests that there are sometimes issues with using acoustic (geophysical) data in the most effective way. The following aims to provide some guidance for use and interpretation of acoustic data.

### **1. Use of acoustic data**

Acoustic data can be used both to identify different sediment facies (leading ultimately to a habitat map) and to identify certain habitats of conservation importance, in particular biogenic reefs such as *Modiolus modiolus* reefs and *Sabellaria spinulosa* reefs. Side scan is particularly effective at discriminating features on the surface of the seafloor.

## 2. Collection of acoustic data

For a large development we would generally expect both multibeam and sidescan data to be collected. Ideally this should conform to IHO standards (S44 and S57) and have regard for the guidance provided in the MESH Recommended Operating Guidelines (ROG) for swath bathymetry surveys. Complete coverage of both the development / license area and any associated zone of impact will be necessary. In addition to the standards recommended for this type of data acquisition, some specific guidelines for multibeam and sidescan survey required for benthic ecology purposes are provided below:

- When collecting multibeam data, an appropriate overlap should be maintained to ensure that 100% coverage is achieved without any data gaps or holes. Appropriate statistical analysis of cross line/ main line intersections should be made to assess the quality of the data.
- For sidescan sonar data acquisition, the height of the towfish above the seabed should be between 5 and 10% of the horizontal range setting (this usually allows a good level of seabed feature discrimination, including detection of some biogenic reef features). The overlap between tracks should be at least 50% and include appropriate cross tracks. Where complete seabed coverage is required for detailed feature or habitat mapping,  $\geq 200\%$  coverage is recommended.
- The data processing routines of converting the raw sounding data to the final smooth sounding values are critical in producing quality bathymetric data from which biological habitats can be discriminated. Any methods used to derive final depths such as cleaning filters, sounding suppression/data decimation, binning parameters etc should be done so sensitively, bearing in mind the importance of the sediment surface features.

## 3. Interpretation of acoustic data.

It is important that the multibeam and sidescan data is analysed by someone experienced in interpretation of such data in relation to biological habitats and particular attention needs to be given to the possible presence of biogenic habitats. Useful information regarding acoustic signals from *Modiolus modiolus* reefs and *Sabellaria spinulosa* reefs can be found in Lindenbaum *et al.* (2008) and Pearce *et al.* (2014). However, it is worth noting that the *Modiolus modiolus* reef that is the subject of the paper by Lindenbaum *et al.* (2008) is particularly distinct in terms of its morphology and *Modiolus modiolus* reefs in other areas within Welsh waters (e.g. north and west of Anglesey) have a far less distinct acoustic signature. The scale at which the data is examined appears to be important; if the multibeam bathymetry or sidescan data is viewed at too small a scale then biogenic features may be missed. It is therefore advisable to view the data at a range of scales, for example scales of between 1:4,000 and 1:2,000 have previously been found to be appropriate for delineating biogenic *Modiolus modiolus* reefs from sidescan data depending on their distinctiveness from the surrounding seabed. (A scale of 1:2,000 allows a 300m square to be displayed comfortably on an average computer screen). It is advisable to look at the data at more than one scale, for example to look at a scale of both 1:4,000 and 1:2,000.



As well as detecting biogenic habitats the acoustic data should also be used for creating a map of sediment facies, which should then be appropriately ground-truthed with biological surveys. Guidance on designing a biological survey programme for ground-truthing is provided in:-

- Ware, S.J., Kenny, A., Curtis, M., Barrio Frojan, C., Cooper, K., Reach, I., Bussell, J., Service, M., Boyd, A., Sotheran, I., Egerton, J., Seiderer, L.J., Pearce, B., 2011. Guidelines for the Conduct of Benthic Studies at Marine Aggregate Extraction Sites (2nd Edition) (Section 6)
- Saunders, G., Bedford, G.S., Trendall, J.R., and Sotheran, I. (2011). Guidance on survey and monitoring in relation to marine renewables deployments in Scotland. Volume 5. Benthic Habitats. Unpublished draft report to Scottish Natural Heritage and Marine Scotland (Chapter 9)

It is then important to cross-check the biological survey results with the initial sediment map to see whether the seabed types found in the biological survey are consistent. Further information can be found in Ware *et al.* (2011).

## References

- Lindenbaum, C., Bennell, J., Rees, I., McClean, D., Cook, W., Wheeler, A., Sanderson, W. (2008) Small-scale variation within a *Modiolus modiolus* (Mollusca: Bivalvia) reef in the Irish Sea : I. seabed mapping and reef morphology. Journal of the Marine Biological Association of the United Kingdom, Vol. 88, No. 1, 02.2008, p. 133-141.
- Pearce, B., Fariñas-Franco, J.M., Wilson, C., Pitts, J., deBurgh, A., Somerfield, P.J. 2014. Repeated mapping of reefs constructed by *Sabellaria spinulosa* Leuckart 1849 at an offshore wind farm site. Continental Shelf Research, 83. 3-13.
- Saunders, G., Bedford, G.S., Trendall, J.R., and Sotheran, I. (2011). Guidance on survey and monitoring in relation to marine renewables deployments in Scotland. Volume 5. Benthic Habitats. Unpublished draft report to Scottish Natural Heritage and Marine Scotland (Chapter 9). Online at <http://www.snh.gov.uk/docs/A585079.pdf>
- Ware, S.J., Kenny, A., Curtis, M., Barrio Frojan, C., Cooper, K., Reach, I., Bussell, J., Service, M., Boyd, A., Sotheran, I., Egerton, J., Seiderer, L.J., Pearce, B., 2011. Guidelines for the Conduct of Benthic Studies at Marine Aggregate Extraction Sites (2nd Edition) (Section 6 and Annex A) Online at <http://www.cefas.defra.gov.uk/media/477907/mepf-benthicguidelines.pdf>

Web addresses for MESH ROGs:

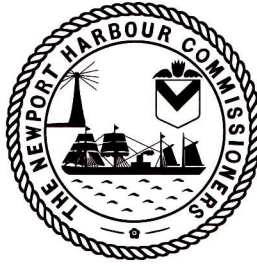
<http://www.emodnet-seabedhabitats.eu/default.aspx?page=1653>

<http://www.emodnet-seabedhabitats.eu/PDF/GMHM3%20How%20do%20I%20collect%20my%20data.pdf>

<http://www.emodnet-seabedhabitats.eu/PDF/GMHM3 Swath Bathymetry ROG.pdf>

<http://www.emodnet-seabedhabitats.eu/pdf/MeshA ROG Sidescan Sonar v4.0.pdf>





# THE NEWPORT HARBOUR COMMISSIONERS

24 Bridge Street, Newport, South Wales. NP20 4SF

Telephone: (01633) 265702

Fax: (01633) 258431

1 April 2015

Frances Russell  
EIA and Land Rights Advisor  
The Planning Inspectorate  
3/18 Eagle Wing  
Temple Quay House  
2 The Square  
BRISTOL BS1 6PN

Dear Sirs

**Re: APPLICATION BY TIDAL LAGOON CARDIFF LIMITED FOR AN ORDER GRANTING DEVELOPMENT  
CONSENT FOR THE TIDAL LAGOON CARDIFF**

**SCOPING CONSULTATION AND NOTIFICATION**

**REFERENCE: 150305\_EN010073\_3036000**

We write, further to your letter of 5 March 2015, to set out on our comments on the document entitled: *"Proposed Tidal Lagoon Development, Cardiff, South Wales: Environmental Impact Assessment Scoping Report" dated March 2015.* Although this document relates to the proposed Cardiff Lagoon it directly affects the Port and Harbour of Newport and, indeed, part of the construction is within our area of jurisdiction.

The Commissioners are keen to assist the proposed project. We would however wish to record the following key concerns at this stage. We would point out that these concerns relate both to Cardiff Lagoon alone and also to the cumulative effect of any other lagoons or similar constructions in the Severn Estuary:

**1. Changes to the regime of the River Usk and approaches to Newport relating to increased siltation and deposition.** There is likely to be a deleterious impact on the dredged channel leading to the Port of Newport and the River generally. Whilst in some cases this may be dealt with by increased dredging, the River Usk berths may be seriously disadvantaged. Increased dredging will adversely affect port dues and thus decrease the competitiveness of the Port unless borne in full by the project in perpetuity.

**2. Changes to the tidal height at Newport.** Our understanding is that the tidal height at high water will be curtailed. If this was the outcome, there would be a serious impediment to ships where the current maximum draft is required for safe passage. Again, additional dredging may assist but this will not assist the River Berths. This could lead to an increased cost/ gross ton for shipping movements and make the Port of Newport less competitive.

**3. Effect on Tidal flows and currents.** As with the two points above, changes to currents and tidal flows can increase costs and make the waters around Newport more difficult to navigate. At the very least, the project must utilise the ship simulator facilities at a Nautical College to model the effects of the proposed lagoons on tidal flows and to fully assess the impact on pilotage.

**4. Effect on the explosives anchorage.** Newport is one of only a few ports with a licence to import and export explosives. Any obstruction to vessels bringing such cargoes could lead to a change or even withdrawal of this licence. This would have an adverse economic effect on the Port and South East Wales.

**5. Effect on Tug provision etc.** Any additional time required for tugs to move between Newport and Cardiff will undoubtedly result in additional costs to ship owners. Increased time for pilotage acts from/to Barry Roads will also lead to increased pilotage costs. Pilot availability must also be considered. There is also a trade where ships traverse between these two docks effectively running the tide. If this ceases to be possible additional costs will accrue also. These are important issues to the economic wellbeing of South East Wales and need careful consideration to accommodate them as far as is practicable

**6. Lighting during and after construction.** It is vitally important that the lighting requirements during construction and the permanent lighting to be utilised afterwards are agreed with the Harbour Master in advance. This cannot be over-emphasised.

The Commissioners would point out at this stage that any additional costs required to ensure safe navigation in the area should be borne by the project. We are concerned that, for example, if the construction was of a certain height such that the East Usk Lighthouse or other navigational aids were obscured, new aids may be needed. Any additional costs of dredging should be covered in perpetuity.

Finally it is with some disappointment that we note that the Cardiff lagoon is not intended to improve the area environmentally and socially (as is trumpeted for the Swansea lagoon). This seems a wasted opportunity – leisure and environmental benefits should be a helpful and beneficial side-product for the scheme.

Yours faithfully

A black rectangular box redacting the signature of the Clerk to the Commissioners.

Clerk to the Commissioners

**From:** [Jessica Harper](#)  
**To:** [Environmental Services](#)  
**Cc:** [Michael Reep](#); [Karuna Tharmananthar](#)  
**Subject:** RE: Application by Tidal Lagoon Cardiff Ltd for an Order Granting Development Consent for the Tidal Lagoon Cardiff  
**Date:** 02 April 2015 12:03:10

---

Dear Sirs

This is a response on behalf of North Somerset Council to the above consultation with non prescribed consultation bodies.

The potential impacts of the proposal are clearly far reaching and anticipate that those specialism's equipped to comment in depth are engaged. Observations to the scoping report are as follows:

- Full consideration must be given to the potential economic implications the Bristol Port and related activities.
- Where North Somerset coastline is identified as particularly affected by sediment transport (Uphill, Weston Bay, Sand Bay and Clevedon) as these areas have existing issues with bathing water quality, what is the likelihood of the scheme contributing to this? Note that there are no water quality surveys proposed in close proximity to the North Somerset coastline (fig 3-19).
- Will the full impact on other potential marine renewable energy schemes within the Severn Estuary be fully considered? With reference to Regen SW Balanced technology Approach.
- Further work on the impacts on flood risk for the North Somerset coastline with mitigation measures proposed will be critical.

Kind regards

Jessica

*Jessica Harper*

**Sustainability Coordinator**

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**From:** [Harrison, Anneli](#)  
**To:** [Environmental Services](#)  
**Subject:** Application by Tidal Lagoon Cardiff Ltd for an Order Granting Development Consent for the Tidal Lagoon Cardiff  
**Date:** 06 March 2015 20:27:40

---

Dear Sir/Madam,

Many thanks for including us in your recent consultation exercise. I can confirm that at this stage we have no comment to make on the proposed Order granting development consent for the

Tidal Lagoon Cardiff. We may however become involved at a later stage if any of the proposed development options have the potential to affect the risk profile of level crossings.

Yours sincerely

A Harrison  
Planning Executive

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\*\*\*\*\*

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recorded for legal purposes.





# PENARTH TOWN COUNCIL CYNGOR TREF PENARTH

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My Ref/Cyf:  
**SEB 13/3/26**

Your Ref/Eich Cyf:

Ms Frances Russell  
EIA and Land Rights Advisor on  
Behalf of Secretary of State  
The Planning Inspectorate  
3/18 Eagle Wing  
Temple Quay House  
2, The Square  
Bristol  
BS1 6PN

30<sup>th</sup> March 2015

Dear Ms Russell,

**Planning Act 2008 (as amended) and the Infrastructure Planning  
(Environmental Impact Assessment) Regulations 2009 (as amended)-  
Regulations 8 and 9**

**Application by Tidal Lagoon Cardiff Ltd for an Order Granting Development  
Consent for the Tidal Lagoon Cardiff.**

**Scoping consultation and notification of the applicant's contact details and  
duty to make available information to the applicant if requested**

I refer to your letter dated 5th March, 2015 and to advice provided by the  
Inspectorate likely to assist the Town Council, specifically Advice Notes 7 and 9.

The Town Council note that :-

1. this is primarily a request for a formal written opinion, the 'scoping opinion'
2. this is an evolving process and the Town Council would expect appropriate involvement as the project develops, in line with the provisions in the legislation and subsequent advice of the Inspectorate
3. the Town Council would expect to be involved in impact reports anticipated to be prepared by the Principal Councils in the area i.e Cardiff County Council and the Vale of Glamorgan Borough Council, in line with advice (Advice Note 1)

With these provisions in mind on a preliminary assessment of the information provided, and recognising the system wide ecosystem impacts which will be

dealt with in detail by the EIA, factors likely to be of concern to the local community in the town are:

- impact on the tourism and water based leisure industry, particularly access to and other impacts on existing moorings, locking procedures and future growth
- sewage outfall and impact on water quality in the sea adjacent to the town
- visual impact of the lagoon from the town especially the Esplanade
- any noise disturbance
- environmental impact on local beaches in respect of sand being displaced by stone and silt
- impact on tidal ranges that could in turn impact on the shape of the Bristol Channel
- the addition of other lagoons in the channel and the overall impact on coastal towns.

The final point would require a detailed examination of cumulative impacts, including a Severn Barrage (potential landfall to the south of the town) which seems on initial examination of the material not to be considered (see paragraph 3.2.5.2 of EIA Scoping Report), in line with other plans in Advice Note 9 - the lack of formal commitment notwithstanding, in view of its National significance.

Yours sincerely

A solid black rectangular box used to redact the signature of the Town Clerk.

Town Clerk

c.c Alex Herbert, Tidal Lagoon Cardiff Ltd, Pillar and Lucy House,  
Merchants Road, Gloucester, GL2 5RG



Public Health  
England

Protecting and improving the nation's health

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Your Ref: 150305\_EN010073\_3036000

Our Ref: ENRNTD 150305 383

23<sup>rd</sup> March 2015

Dear Frances,

**Re: Application by Tidal Lagoon Cardiff Ltd for an Order Granting Development Consent for the Tidal Lagoon Cardiff – Scoping Consultation**

Thank you for including Public Health England (PHE) in the scoping consultation phase of the above application. Our response focuses on health protection issues relating to chemicals and radiation. Advice offered by PHE is impartial and independent.

PHE, including PHE's Centre for Radiation, Chemical and Environmental Hazards (Wales), has reviewed the scoping report (March 2015) and has no additional comments to make at this stage. To ensure that health is fully and comprehensively considered, the Environmental Statement (ES) should provide sufficient information to allow the potential impact of the development on public health to be fully assessed PHE will comment further when the ES becomes available.

In order to assist the applicant in the production of the Environmental Impact Assessment (EIA) report (i.e. subsequent ES) we have included an appendix which outlines the generic considerations that PHE advises should be addressed when preparing the ES. The ES report should include any cumulative impacts upon the local vicinity that may occur during the lifetime of the proposed project. Regarding the electrical connection, the preliminary assessment should also cover the potential health impact associated with the electric and magnetic fields produced by the associated substation and connecting cables or lines.

Should the applicant seek any specific advice prior to the submission of the ES, PHE would of course be pleased to assist.

Yours sincerely



Edwin Huckle  
Principal Environmental Public Health Scientist  
[nsipconsultations@phe.gov.uk](mailto:nsipconsultations@phe.gov.uk)

*Please mark any correspondence for the attention of National Infrastructure Planning Administration.*

*cc: Centre for Radiation, Chemical and Environmental Hazards (Wales)*

## **Appendix: PHE recommendations regarding the scoping document**

### **General approach**

The EIA should give consideration to best practice guidance such as the Government's Good Practice Guide for EIA<sup>1</sup>. It is important that the EIA identifies and assesses the potential public health impacts of the activities at, and emissions from, the installation. Assessment should consider the development, operational, and decommissioning phases.

It is not PHE's role to undertake these assessments on behalf of promoters as this would conflict with PHE's role as an impartial and independent body.

Consideration of alternatives (including alternative sites, choice of process, and the phasing of construction) is widely regarded as good practice. Ideally, EIA should start at the stage of site and process selection, so that the environmental merits of practicable alternatives can be properly considered. Where this is undertaken, the main alternatives considered should be outlined in the ES<sup>2</sup>.

The following text covers a range of issues that PHE would expect to be addressed by the promoter. However this list is not exhaustive and the onus is on the promoter to ensure that the relevant public health issues are identified and addressed. PHE's advice and recommendations carry no statutory weight and constitute non-binding guidance.

### **Receptors**

The ES should clearly identify the development's location and the location and distance from the development of off-site human receptors that may be affected by emissions from, or activities at, the development. Off-site human receptors may include people living in residential premises; people working in commercial, and industrial premises and people using transport infrastructure (such as roads and railways), recreational areas, and publicly-accessible land. Consideration should also be given to environmental receptors such as the surrounding land, watercourses, surface and groundwater, and drinking water supplies such as wells, boreholes and water abstraction points.

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<sup>1</sup> Environmental Impact Assessment: A guide to good practice and procedures - A consultation paper; 2006; Department for Communities and Local Government. Available from:

<http://www.communities.gov.uk/archived/publications/planningandbuilding/environmentalimpactassessment>

<sup>2</sup> DCLG guidance, 1999 <http://www.communities.gov.uk/documents/planningandbuilding/pdf/155958.pdf>

## **Impacts arising from construction and decommissioning**

Any assessment of impacts arising from emissions due to construction and decommissioning should consider potential impacts on all receptors and describe monitoring and mitigation during these phases. Construction and decommissioning will be associated with vehicle movements and cumulative impacts should be accounted for.

We would expect the promoter to follow best practice guidance during all phases from construction to decommissioning to ensure appropriate measures are in place to mitigate any potential impact on health from emissions (point source, fugitive and traffic-related). An effective Construction Environmental Management Plan (CEMP) (and Decommissioning Environmental Management Plan (DEMP)) will help provide reassurance that activities are well managed. The promoter should ensure that there are robust mechanisms in place to respond to any complaints of traffic-related pollution, during construction, operation, and decommissioning of the facility.

## **Emissions to air and water**

Significant impacts are unlikely to arise from installations which employ Best Available Techniques (BAT) and which meet regulatory requirements concerning emission limits and design parameters. However, PHE has a number of comments regarding emissions in order that the EIA provides a comprehensive assessment of potential impacts.

When considering a baseline (of existing environmental quality) and in the assessment and future monitoring of impacts these:

- should include appropriate screening assessments and detailed dispersion modelling where this is screened as necessary
- should encompass all pollutants which may be emitted by the installation in combination with all pollutants arising from associated development and transport, ideally these should be considered in a single holistic assessment
- should consider the construction, operational, and decommissioning phases
- should consider the typical operational emissions and emissions from start-up, shut-down, abnormal operation and accidents when assessing potential impacts and include an assessment of worst-case impacts
- should fully account for fugitive emissions
- should include appropriate estimates of background levels

- should identify cumulative and incremental impacts (i.e. assess cumulative impacts from multiple sources), including those arising from associated development, other existing and proposed development in the local area, and new vehicle movements associated with the proposed development; associated transport emissions should include consideration of non-road impacts (i.e. rail, sea, and air)
- should include consideration of local authority, Natural Resources Wales, Defra national network, and any other local site-specific sources of monitoring data
- should compare predicted environmental concentrations to the applicable standard or guideline value for the affected medium (such as UK Air Quality Standards and Objectives and Environmental Assessment Levels)
  - If no standard or guideline value exists, the predicted exposure to humans should be estimated and compared to an appropriate health-based value (a Tolerable Daily Intake or equivalent). Further guidance is provided in Annex 1
  - This should consider all applicable routes of exposure e.g. include consideration of aspects such as the deposition of chemicals emitted to air and their uptake via ingestion
- should identify and consider impacts on residential areas and sensitive receptors (such as schools, nursing homes and healthcare facilities) in the area(s) which may be affected by emissions, this should include consideration of any new receptors arising from future development

Whilst screening of impacts using qualitative methodologies is common practice (e.g. for impacts arising from fugitive emissions such as dust), where it is possible to undertake a quantitative assessment of impacts then this should be undertaken.

PHE's view is that the EIA should appraise and describe the measures that will be used to control both point source and fugitive emissions and demonstrate that standards, guideline values or health-based values will not be exceeded due to emissions from the installation, as described above. This should include consideration of any emitted pollutants for which there are no set emission limits. When assessing the potential impact of a proposed installation on environmental quality, predicted environmental concentrations should be compared to the permitted concentrations in the affected media; this should include both standards for short and long-term exposure.

#### *Additional points specific to emissions to air*

When considering a baseline (of existing air quality) and in the assessment and future monitoring of impacts these:

- should include consideration of impacts on existing areas of poor air quality e.g. existing or proposed local authority Air Quality Management Areas (AQMAs)
- should include modelling using appropriate meteorological data (i.e. come from the nearest suitable meteorological station and include a range of years and worst case conditions)
- should include modelling taking into account local topography

#### *Additional points specific to emissions to water*

When considering a baseline (of existing water quality) and in the assessment and future monitoring of impacts these:

- should include assessment of potential impacts on human health and not focus solely on ecological impacts
- should identify and consider all routes by which emissions may lead to population exposure (e.g. surface watercourses; recreational waters; sewers; geological routes etc.)
- should assess the potential off-site effects of emissions to groundwater (e.g. on aquifers used for drinking water) and surface water (used for drinking water abstraction) in terms of the potential for population exposure
- should include consideration of potential impacts on recreational users (e.g. from fishing, canoeing etc) alongside assessment of potential exposure via drinking water

### **Land quality**

We would expect the promoter to provide details of any hazardous contamination present on site (including ground gas) as part of the site condition report.

Emissions to and from the ground should be considered in terms of the previous history of the site and the potential of the site, once operational, to give rise to issues. Public health impacts associated with ground contamination and/or the migration of material off-site should be assessed<sup>3</sup> and the potential impact on nearby receptors and control and mitigation measures should be outlined.

Relevant areas outlined in the Government's Good Practice Guide for EIA include:

- effects associated with ground contamination that may already exist

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<sup>3</sup> Following the approach outlined in the section above dealing with emissions to air and water i.e. comparing predicted environmental concentrations to the applicable standard or guideline value for the affected medium (such as Soil Guideline Values)



- effects associated with the potential for polluting substances that are used (during construction / operation) to cause new ground contamination issues on a site, for example introducing / changing the source of contamination
- impacts associated with re-use of soils and waste soils, for example, re-use of site-sourced materials on-site or offsite, disposal of site-sourced materials offsite, importation of materials to the site, etc.

## **Waste**

The EIA should demonstrate compliance with the waste hierarchy (e.g. with respect to re-use, recycling or recovery and disposal).

For wastes arising from the installation the EIA should consider:

- the implications and wider environmental and public health impacts of different waste disposal options
- disposal route(s) and transport method(s) and how potential impacts on public health will be mitigated

## **Other aspects**

Within the EIA PHE would expect to see information about how the promoter would respond to accidents with potential off-site emissions e.g. flooding or fires, spills, leaks or releases off-site. Assessment of accidents should: identify all potential hazards in relation to construction, operation and decommissioning; include an assessment of the risks posed; and identify risk management measures and contingency actions that will be employed in the event of an accident in order to mitigate off-site effects.

The EIA should include consideration of the COMAH Regulations (Control of Major Accident Hazards) and the Major Accident Off-Site Emergency Plan (Management of Waste from Extractive Industries) (England and Wales) Regulations 2009: both in terms of their applicability to the installation itself, and the installation's potential to impact on, or be impacted by, any nearby installations themselves subject to the these Regulations.

There is evidence that, in some cases, perception of risk may have a greater impact on health than the hazard itself. A 2009 report<sup>4</sup>, jointly published by Liverpool John Moores University and the HPA, examined health risk perception and environmental problems using a number of case studies. As a point to consider, the report suggested: "Estimation of community anxiety and stress should be included as part of every risk or impact assessment of proposed plans that involve a potential environmental hazard. This is true even when the

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<sup>4</sup> Available from: <http://www.cph.org.uk/showPublication.aspx?pubid=538>

physical health risks may be negligible.” PHE supports the inclusion of this information within EIAs as good practice.

**Electromagnetic fields (EMF) [include for installations with associated substations and/or power lines]**

There is a potential health impact associated with the electric and magnetic fields around substations and the connecting cables or lines. The following information provides a framework for considering the potential health impact.

In March 2004, the National Radiological Protection Board, NRPB (now part of PHE), published advice on limiting public exposure to electromagnetic fields. The advice was based on an extensive review of the science and a public consultation on its website, and recommended the adoption in the UK of the EMF exposure guidelines published by the International Commission on Non-ionizing Radiation Protection (ICNIRP):-

<http://webarchive.nationalarchives.gov.uk/20140629102627/http://www.hpa.org.uk/Publications/Radiation/NRPBArchive/DocumentsOfTheNRPB/Absd1502/>

The ICNIRP guidelines are based on the avoidance of known adverse effects of exposure to electromagnetic fields (EMF) at frequencies up to 300 GHz (gigahertz), which includes static magnetic fields and 50 Hz electric and magnetic fields associated with electricity transmission.

PHE notes the current Government policy is that the ICNIRP guidelines are implemented in line with the terms of the EU Council Recommendation on limiting exposure of the general public (1999/519/EC):

[http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Publichealth/Healthprotection/DH\\_4089500](http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Publichealth/Healthprotection/DH_4089500)

For static magnetic fields, the latest ICNIRP guidelines (2009) recommend that acute exposure of the general public should not exceed 400 mT (millitesla), for any part of the body, although the previously recommended value of 40 mT is the value used in the Council Recommendation. However, because of potential indirect adverse effects, ICNIRP recognises that practical policies need to be implemented to prevent inadvertent harmful exposure of people with implanted electronic medical devices and implants containing ferromagnetic materials, and injuries due to flying ferromagnetic objects, and these considerations can lead to much lower restrictions, such as 0.5 mT as advised by the International Electrotechnical Commission.

At 50 Hz, the known direct effects include those of induced currents in the body on the central nervous system (CNS) and indirect effects include the risk of painful spark discharge on contact with metal objects exposed to the field. The ICNIRP guidelines give reference levels for public exposure to 50 Hz electric and magnetic fields, and these are respectively 5 kV m<sup>-1</sup> (kilovolts per metre) and 100 µT (microtesla). If people are not exposed to field strengths above these levels, direct effects on the CNS should be avoided and indirect effects such as the risk of painful spark discharge will be small. The reference levels are not in themselves limits but provide guidance for assessing compliance with the basic restrictions and reducing the risk of indirect effects. Further clarification on advice on exposure guidelines for 50 Hz electric and magnetic fields is provided in the following note on the HPA website:

[http://webarchive.nationalarchives.gov.uk/20140714084352/http://www.hpa.org.uk/Topics/Radiation/UnderstandingRadiation/InformationSheets/info\\_IcnirpExpGuidelines/](http://webarchive.nationalarchives.gov.uk/20140714084352/http://www.hpa.org.uk/Topics/Radiation/UnderstandingRadiation/InformationSheets/info_IcnirpExpGuidelines/)

The Department of Energy and Climate Change has also published voluntary code of practices which set out key principles for complying with the ICNIRP guidelines for the industry.

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/37447/1256-code-practice-emf-public-exp-guidelines.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/37447/1256-code-practice-emf-public-exp-guidelines.pdf)

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/48309/1255-code-practice-optimum-phasing-power-lines.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48309/1255-code-practice-optimum-phasing-power-lines.pdf)

There is concern about the possible effects of long-term exposure to electromagnetic fields, including possible carcinogenic effects at levels much lower than those given in the ICNIRP guidelines. In the NRPB advice issued in 2004, it was concluded that the studies that suggest health effects, including those concerning childhood leukaemia, could not be used to derive quantitative guidance on restricting exposure. However, the results of these studies represented uncertainty in the underlying evidence base, and taken together with people's concerns, provided a basis for providing an additional recommendation for Government to consider the need for further precautionary measures, particularly with respect to the exposure of children to power frequency magnetic fields.

The Stakeholder Advisory Group on ELF EMFs (SAGE) was then set up to take this recommendation forward, explore the implications for a precautionary approach to extremely low frequency electric and magnetic fields (ELF EMFs), and to make practical recommendations to Government. In the First Interim Assessment of the Group, consideration was given to mitigation options such as the 'corridor option' near power lines, and optimal phasing to reduce electric and magnetic fields. A Second Interim Assessment

addresses electricity distribution systems up to 66 kV. The SAGE reports can be found at the following link:

<http://sagedialogue.org.uk/> (go to “Document Index” and Scroll to SAGE/Formal reports with recommendations)

The Agency has given advice to Health Ministers on the First Interim Assessment of SAGE regarding precautionary approaches to ELF EMFs and specifically regarding power lines and property, wiring and electrical equipment in homes:

[http://webarchive.nationalarchives.gov.uk/20140629102627/http://www.hpa.org.uk/Publications/Radiation/HPAResponseStatementsOnRadiationTopics/rpdadvice\\_sage/](http://webarchive.nationalarchives.gov.uk/20140629102627/http://www.hpa.org.uk/Publications/Radiation/HPAResponseStatementsOnRadiationTopics/rpdadvice_sage/)

The evidence to date suggests that in general there are no adverse effects on the health of the population of the UK caused by exposure to ELF EMFs below the guideline levels. The scientific evidence, as reviewed by PHE, supports the view that precautionary measures should address solely the possible association with childhood leukaemia and not other more speculative health effects. The measures should be proportionate in that overall benefits outweigh the fiscal and social costs, have a convincing evidence base to show that they will be successful in reducing exposure, and be effective in providing reassurance to the public.

The Government response to the First SAGE Interim Assessment is given in the written Ministerial Statement by Gillian Merron, then Minister of State, Department of Health, published on 16<sup>th</sup> October 2009:

<http://www.publications.parliament.uk/pa/cm200809/cmhansrd/cm091016/wmstext/91016m0001.htm>

[http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_107124](http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_107124)

HPA and Government responses to the Second Interim Assessment of SAGE are available at the following links:

[http://webarchive.nationalarchives.gov.uk/20140629102627/http://www.hpa.org.uk/Publications/Radiation/HPAResponseStatementsOnRadiationTopics/rpdadvice\\_sage2/](http://webarchive.nationalarchives.gov.uk/20140629102627/http://www.hpa.org.uk/Publications/Radiation/HPAResponseStatementsOnRadiationTopics/rpdadvice_sage2/)

[http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_130703](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_130703)

The above information provides a framework for considering the health impact associated with the proposed development, including the direct and indirect effects of the electric and magnetic fields as indicated above.

**Liaison with other stakeholders, comments should be sought from:**

- the local authority for matters relating to noise, odour, vermin and dust nuisance
- the local authority regarding any site investigation and subsequent construction (and remediation) proposals to ensure that the site could not be determined as 'contaminated land' under Part 2A of the Environmental Protection Act
- the local authority regarding any impacts on existing or proposed Air Quality Management Areas
- the Food Standards Agency Wales for matters relating to the impact on human health of pollutants deposited on land used for growing food/ crops
- the Natural Resources Wales for matters relating to flood risk and releases with the potential to impact on surface and groundwaters
- the Environment Agency for matters relating to waste characterisation and acceptance
- the Clinical Commissioning Groups, NHS commissioning Boards and Local Planning Authority for matters relating to wider public health

**Environmental Permitting**

Amongst other permits and consents, the development will require an environmental permit from the Natural Resources Wales to operate (under the Environmental Permitting (England and Wales) Regulations 2010). Therefore the installation will need to comply with the requirements of best available techniques (BAT). PHE is a consultee for bespoke environmental permit applications and will respond separately to any such consultation.

## **Annex 1**

### **Human health risk assessment (chemical pollutants)**

The points below are cross-cutting and should be considered when undertaking a human health risk assessment:

- The promoter should consider including Chemical Abstract Service (CAS) numbers alongside chemical names, where referenced in the ES
- Where available, the most recent United Kingdom standards for the appropriate media (e.g. air, water, and/or soil) and health-based guideline values should be used when quantifying the risk to human health from chemical pollutants. Where UK standards or guideline values are not available, those recommended by the European Union or World Health Organization can be used
- When assessing the human health risk of a chemical emitted from a facility or operation, the background exposure to the chemical from other sources should be taken into account
- When quantitatively assessing the health risk of genotoxic and carcinogenic chemical pollutants PHE does not favour the use of mathematical models to extrapolate from high dose levels used in animal carcinogenicity studies to well below the observed region of a dose-response relationship. When only animal data are available, we recommend that the 'Margin of Exposure' (MOE) approach<sup>5</sup> is used

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<sup>5</sup> Benford D et al. 2010. Application of the margin of exposure approach to substances in food that are genotoxic and carcinogenic. Food Chem Toxicol 48 Suppl 1: S2-24

# Wentlooge Community Council

Frances Russell  
The Planning Inspectorate  
3/18 Eagle Wing  
Temple Quay House  
2 The Square  
Bristol BS1 6PN

Peterstone Village Hall  
Broadstreet Common  
Peterstone  
CF3 2TR

Clerk: Mrs Josie Yeo (wentloogecc@live.co.uk)

1<sup>st</sup> April 2015

Dear Ms Russell,

**PINS REF: 150305\_EN010073\_3036000**

**PROPOSAL : APPLICATION BY TIDAL LAGOON CARDIFF LTD FOR AN ORDER GRANTING  
DEVELOPMENT CONSENT FOR THE TIDAL LAGOON CARDIFF**

**STAGE: EIA SCOPING CONSULTATION**

Wentlooge Community Council (WCC) responds as follows:-

In principle WCC welcomes the concept of the proposed Tidal Lagoon Cardiff, and is generally impressed by the scope /depth of detail with which the applicant is proposing to investigate the project especially from the ecological viewpoint.

Our main concerns are that:

(1) **Flooding** - the issue of flooding on the Levels, hopefully to be ameliorated by the proposed lagoon and its control structures, is **fully** investigated.

Flooding can occur from two sources (a) the 'flow' tide being exceptionally high due to high seasonal tides being exacerbated by high winds brinking the flood defences, or (b) by exceptional rainfall events, either locally or further away, causing 'build up' in the reen 'reservoir' behind the existing seawall such that these reen 'lagoons' overflow or cause water to 'back up' onto/into properties.

A worst case scenario would occur if (a) and (b) occurred simultaneously, and the sluice flaps in the existing seawall were not able to release the excess water on the ebb tide.

We anticipate that the proposed tidal lagoon will, in effect, give the Levels another layer of defence i.e. an 'outer' seawall and another expanse of reservoir beyond the current seawall which needs to be managed locally together with the effective management and regular dredging of the existing reen system.

We imagine that the Applicant will be in close liaison with Natural Resources Wales and be able to draw on the experience of former Caldicot and Wentlooge IDB officers, as it has often been the swift action of the previous IDB that has averted a flooding catastrophe on the Caldicot and Wentlooge Levels (c.f. Somerset Levels flooding winter 2013-14).

(2) **Landfall to the East** - construction traffic and final developed traffic flows are considered and very carefully/ accurately modelled. A full and very detailed TIA should be required of the Applicant.

Construction traffic should be kept to an absolute minimum travelling to this landfall point and should avoid going through the villages of St Brides, Peterstone or Marshfield travelling the absolute minimum distance along the relatively narrow B4239 Coast Road which has no pavements and is relatively weak in constructional makeup in numerous places.

WCC is also concerned that at final development the access traffic flows and traffic management is as fully predicted and understood as possible. We are concerned that there may need to be large areas of car parking and other facilities in this protected landscape, and these should be the subject of separate planning applications.

(3) **Coastal Strip** - impacts are not addressed specifically. WCC is concerned that in the Scoping Report little emphasis/analysis is put on the land, businesses or occupants along the adjoining coastal strip itself. There are for instance a major steel works, landfill site(s), traveller encampment(s), farms, landscape of outstanding historic interest, Wales only Green Belt, SSSI etc.

We hope that the EIA will address this/these apparent omission(s).

(4) **Community Benefit/Process** - although WCC anticipates that there will be Section 106 and/or Community Infrastructure Levy (CIL) benefits accruing from the development these are not discussed as one of the positive environmental 'impacts' in the Scoping Report, neither any of the associated disbenefits e.g. increased road erosion with site traffic, visitor traffic, increased litter from visitors etc.

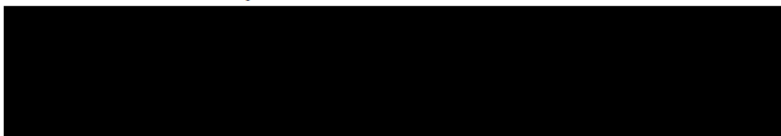
WCC hopes that a proportion of these benefits would come directly into local people/communities rather than be paid into Cardiff CC or Newport CC central budgets.

WCC is also concerned that local communities are kept fully briefed regarding the development as the process proceeds via meetings and/or video presentations

(5) **Infrastructure** - the electricity 'draw off' should not increase but rather reduce the number/ nature of pylons crossing the Levels Special Landscape Area (SLA) - this appears not to be specifically addressed in the EIA Scoping Report.

(6) **Dredging for materials** - WCC is concerned that dredging inside the lagoon may cause problems of erosion to the existing sea defences and that this should be most thoroughly investigated.

Yours sincerely

A large black rectangular box redacting the signature of Richard Spencer Dean.

Richard Spencer Dean  
Chair  
Wentlooge Community Council





**Taunton Deane Borough Council**  
The Deane House, Belvedere Road,  
Taunton, Somerset TA1 1HE

**West Somerset Council**  
West Somerset House, Killick Way,  
Williton, Somerset TA4 4QA

Frances Russell  
EIA and Land Rights Advisor  
The Planning Inspectorate  
3/18 Eagle Wing  
Temple Quay House, 2 The Square  
Bristol, BS1 6PN

Our Ref: Cardiff Lagoon EIA Scoping  
Your Ref: 150305\_EN010073\_3036108  
Date: 16<sup>th</sup> March 2015

Dear Frances

**Planning Act 2008 (as amended) and The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended) – Regulation 8**

**Application by Tidal Lagoon Cardiff Ltd for an Order Granting Development Consent for the Tidal Lagoon Cardiff**

**Scoping Consultation with non prescribed consultation bodies**

Thank you for the opportunity to respond to the scoping consultation for the proposed Tidal Lagoon in Cardiff.

Having reviewed the Scoping Report prepared by the applicant, West Somerset Council has the following comments and observations which it would welcome being taking into account when the Secretary of State prepares the Scoping Opinion:

- The applicant includes reference to both the Hinkley Point C Nuclear Generating Station and the proposed West Somerset Lagoon both of which are located in West Somerset Council's Local Planning Authority Area. The Council welcomes the fact that these projects, albeit at very different stages of the process, will be scoped into the assessment of effects arising from the proposed tidal lagoon in Cardiff;
- West Somerset Council is aware of the applicant's intentions to explore opportunities to deliver tidal lagoon projects in Newport and Bridgwater Bay. Noting the embryonic stage of these projects, West Somerset Council would welcome the applicant scoping these projects into its assessment of environmental effects from the proposed tidal lagoon in Cardiff to reassure interested parties within the Severn Estuary / Bristol Channel, especially with regard to the cumulative and in-combination effects of these projects; and
- West Somerset Council notes and welcomes the applicant's plans to consult and involve the Council in the Socio-Economic assessment and assessment of effects on Tourism as set out in the Scoping Report. With regards to Tourism, West Somerset Council notes the applicant's proposal to categorise receptors based on visitor numbers. Noting that there is no established methodology for categorising such receptors West Somerset Council would welcome the

applicant taking into account the significance of the attraction in terms of its wider appeal for linked visits and their significance to the wider economy as well as visitor numbers.

I would be grateful if you could record me, using the details below, as the main point of contact for West Somerset Council in relation to this project.

Yours Sincerely



Andrew Goodchild  
New Nuclear Programme Manager  
Tel: 01984 635245 / 07825 152813  
Email: [agoodchild@westsomerset.gov.uk](mailto:agoodchild@westsomerset.gov.uk)



## **APPENDIX 3**

### **PRESENTATION OF THE ENVIRONMENTAL STATEMENT**



## **APPENDIX 3**

### **PRESENTATION OF THE ENVIRONMENTAL STATEMENT**

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (SI 2264) (as amended) sets out the information which must be provided for an application for a development consent order (DCO) for nationally significant infrastructure under the Planning Act 2008. Where required, this includes an environmental statement. Applicants may also provide any other documents considered necessary to support the application. Information which is not environmental information need not be replicated or included in the ES.

An environmental statement (ES) is described under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (SI 2263) (as amended) (the EIA Regulations) as a statement:

- (a) 'that includes such of the information referred to in Part 1 of Schedule 4 as is reasonably required to assess the environmental effects of the development and of any associated development and which the applicant can, having regard in particular to current knowledge and methods of assessment, reasonably be required to compile; but
- (b) that includes at least the information required in Part 2 of Schedule 4'.

(EIA Regulations Regulation 2)

The purpose of an ES is to ensure that the environmental effects of a proposed development are fully considered, together with the economic or social benefits of the development, before the development consent application under the Planning Act 2008 is determined. The ES should be an aid to decision making.

The Secretary of State advises that the ES should be laid out clearly with a minimum amount of technical terms and should provide a clear objective and realistic description of the likely significant impacts of the proposed development. The information should be presented so as to be comprehensible to the specialist and non-specialist alike. The Secretary of State recommends that the ES be concise with technical information placed in appendices.

### **ES Indicative Contents**

The Secretary of State emphasises that the ES should be a 'stand alone' document in line with best practice and case law. The EIA Regulations Schedule 4, Parts 1 and 2, set out the information for inclusion in environmental statements.

Schedule 4 Part 1 of the EIA Regulations states this information includes:

- '17. *Description of the development, including in particular—*
- (a) a description of the physical characteristics of the whole development and the land-use requirements during the construction and operational phases;*
  - (b) a description of the main characteristics of the production processes, for instance, nature and quantity of the materials used;*
  - (c) an estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc) resulting from the operation of the proposed development.*
18. *An outline of the main alternatives studied by the applicant and an indication of the main reasons for the applicant's choice, taking into account the environmental effects.*
19. *A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the interrelationship between the above factors.*
20. *A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development, resulting from:*
- (a) the existence of the development;*
  - (b) the use of natural resources;*
  - (c) the emission of pollutants, the creation of nuisances and the elimination of waste,*
- and the description by the applicant of the forecasting methods used to assess the effects on the environment.*
21. *A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.*
22. *A non-technical summary of the information provided under paragraphs 1 to 5 of this Part.*
23. *An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information'.*

## **EIA Regulations Schedule 4 Part 1**

The content of the ES must include as a minimum those matters set out in Schedule 4 Part 2 of the EIA Regulations. This includes the consideration of 'the main alternatives studied by the applicant' which the Secretary of State recommends could be addressed as a separate chapter in the ES. Part 2 is included below for reference:

### **Schedule 4 Part 2**

- A description of the development comprising information on the site, design and size of the development
- A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects
- The data required to identify and assess the main effects which the development is likely to have on the environment
- An outline of the main alternatives studied by the applicant and an indication of the main reasons for the applicant's choice, taking into account the environmental effects, and
- A non-technical summary of the information provided [under the four paragraphs above].

Traffic and transport is not specified as a topic for assessment under Schedule 4; although in line with good practice the Secretary of State considers it is an important consideration *per se*, as well as being the source of further impacts in terms of air quality and noise and vibration.

### **Balance**

The Secretary of State recommends that the ES should be balanced, with matters which give rise to a greater number or more significant impacts being given greater prominence. Where few or no impacts are identified, the technical section may be much shorter, with greater use of information in appendices as appropriate.

The Secretary of State considers that the ES should not be a series of disparate reports and stresses the importance of considering inter-relationships between factors and cumulative impacts.

### **Scheme Proposals**

The scheme parameters will need to be clearly defined in the draft DCO and therefore in the accompanying ES which should support the application as described. The Secretary of State is not able to entertain material changes to a project once an application is submitted. The Secretary of State draws the attention of the applicant to the DCLG and the Planning Inspectorate's published



advice on the preparation of a draft DCO and accompanying application documents.

## **Flexibility**

The Secretary of State acknowledges that the EIA process is iterative, and therefore the proposals may change and evolve. For example, there may be changes to the scheme design in response to consultation. Such changes should be addressed in the ES. However, at the time of the application for a DCO, any proposed scheme parameters should not be so wide ranging as to represent effectively different schemes.

It is a matter for the applicant, in preparing an ES, to consider whether it is possible to assess robustly a range of impacts resulting from a large number of undecided parameters. The description of the proposed development in the ES must not be so wide that it is insufficiently certain to comply with requirements of paragraph 17 of Schedule 4 Part 1 of the EIA Regulations.

The Rochdale Envelope principle (*see R v Rochdale MBC ex parte Tew (1999) and R v Rochdale MBC ex parte Milne (2000)*) is an accepted way of dealing with uncertainty in preparing development applications. The applicant's attention is drawn to the Planning Inspectorate's Advice Note 9 'Rochdale Envelope' which is available on the Advice Note's page of the National Infrastructure Planning website.

The applicant should make every attempt to narrow the range of options and explain clearly in the ES which elements of the scheme have yet to be finalised and provide the reasons. Where some flexibility is sought and the precise details are not known, the applicant should assess the maximum potential adverse impacts the project could have to ensure that the project as it may be constructed has been properly assessed.

The ES should be able to confirm that any changes to the development within any proposed parameters would not result in significant impacts not previously identified and assessed. The maximum and other dimensions of the proposed development should be clearly described in the ES, with appropriate justification. It will also be important to consider choice of materials, colour and the form of the structures and of any buildings. Lighting proposals should also be described.

## **Scope**

The Secretary of State recommends that the physical scope of the study areas should be identified under all the environmental topics and should be sufficiently robust in order to undertake the assessment. The extent of the study areas should be on the basis of recognised professional guidance, whenever such guidance is

available. The study areas should also be agreed with the relevant consultees and local authorities and, where this is not possible, this should be stated clearly in the ES and a reasoned justification given. The scope should also cover the breadth of the topic area and the temporal scope, and these aspects should be described and justified.

### *Physical Scope*

In general the Secretary of State recommends that the physical scope for the EIA should be determined in the light of:

- the nature of the proposal being considered
- the relevance in terms of the specialist topic
- the breadth of the topic
- the physical extent of any surveys or the study area, and
- the potential significant impacts.

The Secretary of State recommends that the physical scope of the study areas should be identified for each of the environmental topics and should be sufficiently robust in order to undertake the assessment. This should include at least the whole of the application site, and include all offsite works. For certain topics, such as landscape and transport, the study area will need to be wider. The extent of the study areas should be on the basis of recognised professional guidance and best practice, whenever this is available, and determined by establishing the physical extent of the likely impacts. The study areas should also be agreed with the relevant consultees and, where this is not possible, this should be stated clearly in the ES and a reasoned justification given.

### *Breadth of the Topic Area*

The ES should explain the range of matters to be considered under each topic and this may respond partly to the type of project being considered. If the range considered is drawn narrowly then a justification for the approach should be provided.

### *Temporal Scope*

The assessment should consider:

- environmental impacts during construction works
- environmental impacts on completion/operation of the proposed development
- where appropriate, environmental impacts a suitable number of years after completion of the proposed development (for example, in order to allow for traffic growth or maturing of any landscape proposals), and
- environmental impacts during decommissioning.

In terms of decommissioning, the Secretary of State acknowledges that the further into the future any assessment is made, the less

reliance may be placed on the outcome. However, the purpose of such a long term assessment, as well as to enable the decommissioning of the works to be taken into account, is to encourage early consideration as to how structures can be taken down. The purpose of this is to seek to minimise disruption, to re-use materials and to restore the site or put it to a suitable new use. The Secretary of State encourages consideration of such matters in the ES.

The Secretary of State recommends that these matters should be set out clearly in the ES and that the suitable time period for the assessment should be agreed with the relevant statutory consultees.

The Secretary of State recommends that throughout the ES a standard terminology for time periods should be defined, such that for example, 'short term' always refers to the same period of time.

## **Baseline**

The Secretary of State recommends that the baseline should describe the position from which the impacts of the proposed development are measured. The baseline should be chosen carefully and, whenever possible, be consistent between topics. The identification of a single baseline is to be welcomed in terms of the approach to the assessment, although it is recognised that this may not always be possible.

The Secretary of State recommends that the baseline environment should be clearly explained in the ES, including any dates of surveys, and care should be taken to ensure that all the baseline data remains relevant and up to date.

For each of the environmental topics, the data source(s) for the baseline should be set out together with any survey work undertaken with the dates. The timing and scope of all surveys should be agreed with the relevant statutory bodies and appropriate consultees, wherever possible.

The baseline situation and the proposed development should be described within the context of the site and any other proposals in the vicinity.

## **Identification of Impacts and Method Statement**

### *Legislation and Guidelines*

In terms of the EIA methodology, the Secretary of State recommends that reference should be made to best practice and any standards, guidelines and legislation that have been used to inform the assessment. This should include guidelines prepared by relevant professional bodies.

In terms of other regulatory regimes, the Secretary of State recommends that relevant legislation and all permit and licences required should be listed in the ES where relevant to each topic. This information should also be submitted with the application in accordance with the APFP Regulations.

In terms of assessing the impacts, the ES should approach all relevant planning and environmental policy – local, regional and national (and where appropriate international) – in a consistent manner.

### **Assessment of Effects and Impact Significance**

The EIA Regulations require the identification of the 'likely significant effects of the development on the environment' (Schedule 4 Part 1 paragraph 20).

As a matter of principle, the Secretary of State applies the precautionary approach to follow the Court's<sup>5</sup> reasoning in judging 'significant effects'. In other words 'likely to affect' will be taken as meaning that there is a probability or risk that the proposed development will have an effect, and not that a development will definitely have an effect.

The Secretary of State considers it is imperative for the ES to define the meaning of 'significant' in the context of each of the specialist topics and for significant impacts to be clearly identified. The Secretary of State recommends that the criteria should be set out fully and that the ES should set out clearly the interpretation of 'significant' in terms of each of the EIA topics. Quantitative criteria should be used where available. The Secretary of State considers that this should also apply to the consideration of cumulative impacts and impact inter-relationships.

The Secretary of State recognises that the way in which each element of the environment may be affected by the proposed development can be approached in a number of ways. However it considers that it would be helpful, in terms of ease of understanding and in terms of clarity of presentation, to consider the impact assessment in a similar manner for each of the specialist topic areas. The Secretary of State recommends that a common format should be applied where possible.

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<sup>5</sup> See Landelijke Vereniging tot Behoud van de Waddenzee and Nederlandse Vereniging tot Bescherming van Vogels v Staatssecretaris van Landbouw (Waddenzee Case No C 127/02/2004)

### *Inter-relationships between environmental factors*

The inter-relationship between aspects of the environments likely to be significantly affected is a requirement of the EIA Regulations (see Schedule 4 Part 1 of the EIA Regulations). These occur where a number of separate impacts, e.g. noise and air quality, affect a single receptor such as fauna.

The Secretary of State considers that the inter-relationships between factors must be assessed in order to address the environmental impacts of the proposal as a whole. This will help to ensure that the ES is not a series of separate reports collated into one document, but rather a comprehensive assessment drawing together the environmental impacts of the proposed development. This is particularly important when considering impacts in terms of any permutations or parameters to the proposed development.

### *Cumulative Impacts*

The potential cumulative impacts with other major developments will need to be identified, as required by the Directive. The significance of such impacts should be shown to have been assessed against the baseline position (which would include built and operational development). In assessing cumulative impacts, other major development should be identified through consultation with the local planning authorities and other relevant authorities on the basis of those that are:

- projects that are under construction
- permitted application(s) not yet implemented
- submitted application(s) not yet determined
- all refusals subject to appeal procedures not yet determined
- projects on the National Infrastructure's programme of projects, and
- projects identified in the relevant development plan (and emerging development plans - with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited.

Details should be provided in the ES, including the types of development, location and key aspects that may affect the EIA and how these have been taken into account as part of the assessment will be crucial in this regard.

The Secretary of State recommends that offshore developments should also take account of any offshore licensed and consented activities in the area, for the purposes of assessing cumulative effects, through consultation with the relevant licensing/consenting bodies.

For the purposes of identifying any cumulative effects with other developments in the area, applicants should also consult

consenting bodies in other EU states to assist in identifying those developments (see commentary on Transboundary Effects below).

#### *Related Development*

The ES should give equal prominence to any development which is related with the proposed development to ensure that all the impacts of the proposal are assessed.

The Secretary of State recommends that the applicant should distinguish between the proposed development for which development consent will be sought and any other development. This distinction should be clear in the ES.

#### *Alternatives*

The ES must set out an outline of the main alternatives studied by the applicant and provide an indication of the main reasons for the applicant's choice, taking account of the environmental effect (Schedule 4 Part 1 paragraph 18).

Matters should be included, such as inter alia alternative design options and alternative mitigation measures. The justification for the final choice and evolution of the scheme development should be made clear. Where other sites have been considered, the reasons for the final choice should be addressed.

The Secretary of State advises that the ES should give sufficient attention to the alternative forms and locations for the off-site proposals, where appropriate, and justify the needs and choices made in terms of the form of the development proposed and the sites chosen.

### **Mitigation Measures**

Mitigation measures may fall into certain categories namely: avoid; reduce; compensate or enhance (see Schedule 4 Part 1 paragraph 21); and should be identified as such in the specialist topics. Mitigation measures should not be developed in isolation as they may relate to more than one topic area. For each topic, the ES should set out any mitigation measures required to prevent, reduce and where possible offset any significant adverse effects, and to identify any residual effects with mitigation in place. Any proposed mitigation should be discussed and agreed with the relevant consultees.

The effectiveness of mitigation should be apparent. Only mitigation measures which are a firm commitment and can be shown to be deliverable should be taken into account as part of the assessment.

It would be helpful if the mitigation measures proposed could be cross referred to specific provisions and/or requirements proposed

within the draft development consent order. This could be achieved by means of describing the mitigation measures proposed either in each of the specialist reports or collating these within a summary section on mitigation.

The Secretary of State advises that it is considered best practice to outline in the ES, the structure of the environmental management and monitoring plan and safety procedures which will be adopted during construction and operation and may be adopted during decommissioning.

## **Cross References and Interactions**

The Secretary of State recommends that all the specialist topics in the ES should cross reference their text to other relevant disciplines. Interactions between the specialist topics is essential to the production of a robust assessment, as the ES should not be a collection of separate specialist topics, but a comprehensive assessment of the environmental impacts of the proposal and how these impacts can be mitigated.

As set out in EIA Regulations Schedule 4 Part 1 paragraph 23, the ES should include an indication of any technical difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.

## **Consultation**

The Secretary of State recommends that any changes to the scheme design in response to consultation should be addressed in the ES.

It is recommended that the applicant provides preliminary environmental information (PEI) (this term is defined in the EIA Regulations under regulation 2 'Interpretation') to the local authorities.

Consultation with the local community should be carried out in accordance with the SoCC which will state how the applicant intends to consult on the preliminary environmental information (PEI). This PEI could include results of detailed surveys and recommended mitigation actions. Where effective consultation is carried out in accordance with Section 47 of the Planning Act, this could usefully assist the applicant in the EIA process – for example the local community may be able to identify possible mitigation measures to address the impacts identified in the PEI. Attention is drawn to the duty upon applicants under Section 50 of the Planning Act to have regard to the guidance on pre-application consultation.

## **Transboundary Effects**

The Secretary of State recommends that consideration should be given in the ES to any likely significant effects on the environment of another Member State of the European Economic Area. In particular, the Secretary of State recommends consideration should be given to discharges to the air and water and to potential impacts on migratory species and to impacts on shipping and fishing areas.

The Applicant's attention is also drawn to the Planning Inspectorate's Advice Note 12 'Development with significant transboundary impacts consultation' which is available on the Advice Notes Page of the National Infrastructure Planning website

## **Summary Tables**

The Secretary of State recommends that in order to assist the decision making process, the applicant may wish to consider the use of tables:

**Table X** to identify and collate the residual impacts after mitigation on the basis of specialist topics, inter-relationships and cumulative impacts.

**Table XX** to demonstrate how the assessment has taken account of this Opinion and other responses to consultation.

**Table XXX** to set out the mitigation measures proposed, as well as assisting the reader, the Secretary of State considers that this would also enable the applicant to cross refer mitigation to specific provisions proposed to be included within the draft Development Consent Order.

**Table XXXX** to cross reference where details in the HRA (where one is provided) such as descriptions of sites and their locations, together with any mitigation or compensation measures, are to be found in the ES.

## **Terminology and Glossary of Technical Terms**

The Secretary of State recommends that a common terminology should be adopted. This will help to ensure consistency and ease of understanding for the decision making process. For example, 'the site' should be defined and used only in terms of this definition so as to avoid confusion with, for example, the wider site area or the surrounding site.

A glossary of technical terms should be included in the ES.



## **Presentation**

The ES should have all of its paragraphs numbered, as this makes referencing easier as well as accurate.

Appendices must be clearly referenced, again with all paragraphs numbered.

All figures and drawings, photographs and photomontages should be clearly referenced. Figures should clearly show the proposed site application boundary.

## **Confidential Information**

In some circumstances it will be appropriate for information to be kept confidential. In particular, this may relate to information about the presence and locations of rare or sensitive species such as badgers, rare birds and plants where disturbance, damage, persecution or commercial exploitation may result from publication of the information. Where documents are intended to remain confidential the applicant should provide these as separate paper and electronic documents with their confidential nature clearly indicated in the title, and watermarked as such on each page. The information should not be incorporated within other documents that are intended for publication or which the Planning Inspectorate would be required to disclose under the Environmental Information Regulations 2014.

## **Bibliography**

A bibliography should be included in the ES. The author, date and publication title should be included for all references. All publications referred to within the technical reports should be included.

## **Non Technical Summary**

The EIA Regulations require a Non Technical Summary (EIA Regulations Schedule 4 Part 1 paragraph 22). This should be a summary of the assessment in simple language. It should be supported by appropriate figures, photographs and photomontages.