Department of Agriculture, Environment and Rural Affairs
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Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended 2011), Regulation 22

Offshore Electricity Development (Environmental Impact Assessment) Regulations (Northern Ireland) 2008, Regulation 15

Environmental Impact Assessment Consent Decision

Project: Torr Head Tidal Array (The project)

Applicant: Tidal Ventures Limited (The Company)

Location: Torr Head (The Site)

Date of Environmental Statement: March 2015

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1. Introduction

In reference to the Applications and supplementary Environmental Statement submitted by Tidal Ventures Limited (the Company) dated 25th April 2015 for;

- Marine Licensing consent under section 4 of the Marine and Coastal Access Act 2009 for the construction of a commercial scale 100Mw tidal array (the Development) within the Northern Ireland Inshore waters at Torr Head on the coast of Co Antrim.

- Article 39 consent for the construction and operation of generating stations under Article 39 of the Electricity Northern Ireland Order 1992.

Under the direction detailed in Part 4 of The Marine Act (Northern Ireland) 2013, pertaining to applications for generating stations, special procedures are in place for the applications mentioned above to be considered together. The Department of Agriculture, Environment and Rural Affairs (DAERA), previously the Department of the Environment; and the Department for Economy (DfE), previously the Department of Enterprise, Trade and Investment, entered into a Memorandum of Understanding (MoU). The MOU established a framework within which the two Departments will work closely together to ensure that strategic planning, marine licensing and applications for all energy infrastructure and installations requiring Article 39 consent are brought to the most appropriate decisions as quickly as possible.

Under this MOU, the Marine Licensing Authority and the Electricity Infrastructure and Regulations team undertook a joint Environmental Impact Assessment (EIA) consultation process on the marine component of the project. It should be noted that the conclusions of this document relate solely to the EIA consent and are without prejudice to any decision taken by Marine Licensing Authority, Strategic Planning or the Electricity Infrastructure and Regulations team on the respective applications received. This document should be seen as supporting the considerations of the Environmental Statement submitted relating to the marine aspects of the development up to the Mean High Water Spring Tide (MHWST).

As the development is situated within the UK marine plan area, specifically the Northern Ireland Inshore region, it is subject to permissions under the Marine and Coastal Access Act 2009 (MCAA 2009). The MCAA 2009 identifies DAERA as the devolved Marine Licensing Authority for Northern Ireland.

As the development will generate up to 100MW of electricity it is subject to permissions under the Electricity Northern Ireland Order 1992 which identifies DfE as the Article 39 consenting Authority.

2. Identifying the EIA Requirements

The company identified the whole project, as an EIA project as described by the EU Directive 85/337/EEC (as amended), a project likely to have significant effects on the environment. The Directive requires that a Competent Authority is provided with the necessary information to come to an informed decision when considering consent for a project. The project requires permissions from three devolved regulatory bodies within Northern Ireland, each have EIA legislative requirements tied to specific consents for the project. The Company has adopted the following consenting strategy; the Environmental Statement produced by the Company will be in two linked parts; an offshore marine component to inform the marine licence application and the Article 39 Consent and an onshore terrestrial component to inform the Strategic Planning permissions.

The Consent decision within this document refers solely to the marine component, drafted under the requirements of both **The Marine Works (Environmental Impact Assessment) Regulations 2007** as amended and the **Offshore Electricity Development (Environmental Impact Assessment) Regulations (Northern Ireland) 2008**. The terrestrial component will be drafted under the requirements of the relevant Planning authorities and any other consenting authorities for which EIA consent is required.
The Marine Licensing Authority considers this approach taken by the Company, when working under various consenting authorities and with grid connection uncertainties, as an acceptable approach under the overarching direction of the European Directive. All impacts will have been identified and considered by the appropriate regulators under EIA.

The marine component of the Environmental Statement was produced by the Company following all requirements of both the Marine Works EIA and the Article 39 EIA legislation. A full consultation was conducted, and publicly advertised, as a result of a scoping request by the company. The article 39 and the licensing authority issued a publicly available scoping opinion to the company on 26th February 2014. A final gate check exercise was undertaken the Marine Licensing Authority and Article 39 consenting authority prior to the final drafting of an Environmental Statement by the Company. On receipt of the Environmental Statement and an application for both Article 39 consent and a Marine Licence, a process was undertaken to publicly advertise the application and the marine component of the Environmental Statement, making them publicly available for review and providing details to allow comments and objections to be made. DfE and the Marine Licensing Authority have given consideration to all consultation responses in conjunction with the Environmental Statement.

The Marine Licensing Authority and DfE are satisfied that the Environmental requirements of their respective EIA regulations have been met by the Company within the marine component of the Environmental Statement produced. The decision outlined within this document has taken into consideration the application, the environmental information provided and the representations received during the consultation process.

3. UK Marine Policy Statement

The MCAA 2009, Part 3 Chapter 1, requires the Marine Licensing Authority to make decisions under direction from the **UK Marine Policy Statement** (MPS) when they will or might affect the Marine Area. As part of the MPS, Integrated Coastal Zone Management (ICZM) is a vital consideration for any project of this scale. A development must have a Holistic approach covering both its marine and terrestrial components. As such, although subject to a phased consenting regime the Company has will be identifying both marine and terrestrial considerations which have been cross-referenced ensuring the identification of all the major issues requiring consideration within the EIA process.

The Environmental Statement adequately covers all aspects identified as detailed consideration within the UK Marine Policy Statement which acts as a guide for any development seeking to utilise the resources contained within the UK Marine Licensable Area.

The potential for the utilisation of the resource at the site was highlighted in an Offshore Renewable Energy Strategic Action Plan (ORESAP) which was published in 2012 following approval from the Northern Ireland Executive. This high level plan was subject to Strategic Environmental Assessment (SEA) and Habitat Regulations Assessment (HRA), both received part funding from the European Regional Development Fund (ERDF) as part of the European Sustainable Competitiveness Programme for Northern Ireland.
The Development has the potential to have a positive impact on Northern Ireland. It can help enhance security of electricity supply, associated improvements to grid infrastructure, increase competitiveness and can assist Northern Ireland in achieving 40% of its electricity consumption from renewable sources, as set out by the Northern Ireland Strategy Energy Framework 2010.

4. The Habitats Directive

The Habitats Directive has been transposed in Northern Ireland through the Conservation (Natural Habitats etc) Regulations (Northern Ireland) 1995. To ensure compliance with the legislation all projects or plans undergo a Habitat Regulations Assessment (HRA). This determines the level of assessment required to ensure all

reasonable potential effects of the project on designated sites and species are identified. A HRA was provided with the submission of applications for a marine licence, Article 39 consent and the marine component of the Environmental Statement. The assessment also covers proposed designated European Sites.

As a competent authority under the Habitats Regulations the Marine Licensing Authority reviewed the HRA documentation provided by the Company alongside comments received from Statutory Nature Conservation Bodies. The Marine Licensing Authority concluded that the marine development would not adversely affect the integrity of any designated sites or species and has imposed conditions to ensure this remains the case.

5. Water Framework Directive (Council Directive 2000/60/EC) (WFD)

The projects infrastructure is located within the following water body;

- North Channel, the 2015 WFD classicisation was Good. Through the environmental assessments and consultation process, the licensing authority is content the project will not cause any reduction to the WFD classification.

6. Waste Framework Directive (Council Directive 2008/98/EC)

The Marine Licensing authority is satisfied that the requirements of the Waste Framework Directive have been adequately met by the Developers Environmental Statement for the marine elements of the project. Section 16 of the Environmental Statement detailed the Projects waste management strategy

The consideration of terrestrial waste will be occur at the Environmental Impact Assessment scoping stage through input from DAERA's Waste Management Branch. Any identified terrestrial waste considerations will be processed through the planning application.

7. Project Description

Proposal

The project proposals comprise the following works which may occur in discrete phases:

(a) the construction of an offshore tidal array;
(b) the connection of the tidal array to the shore by sub-sea cables; and
(c) the construction of an onshore electrical substation and integration of the facility with the Northern Ireland distribution network operated by Northern Ireland Electricity Limited (NIE).

Location

The development area is centred off the Co. Antrim coast.

The proposed onshore development:

(a) onshore construction of the tidal turbines (potentially 50-100 devices) at a suitable dockside facility;
(b) construction of the onshore substation; and
(c) connection from substation via underground and/or overhead electrical line to distribution system operated by NIE.

The proposed offshore development:

(a) transportation of the turbines offshore via barge to the proposed development site area;
(b) deployment of the turbines to the seabed using a barge; and
(c) interconnection of the turbines via electrical cabling to an onshore electrical substation.

Operation and Maintenance:

(a) electricity will be transmitted from the tidal array to the onshore substation via the offshore cable; and
(b) electricity will be transmitted from the substation to the NIE network via overhead or underground lines.

Turbines

The exact design of the turbines to be deployed at the site will be determined following detailed site analysis. The turbine technology deployed at the site will be

fully submerged, reducing the visual impact and navigational and collision risks. The development will consist of between 50-100 turbines. The shallowest part of the area within which the turbines will be situated is approximately 35 metres, which should allow for adequate clearance for navigation above the tidal array. The water depths in the area range between 35 and 75 metres. Turbine maintenance is scheduled on a 5-year cycle, with turbine replacement completed as required.

Cabling routes and design will be dependent on final turbine design and landfall location.

On shore Development (Substation and Grid connection)

The connection of the proposed offshore tidal array to an onshore substation and subsequent connection to the electricity network operated by NIE is an important consideration.

The onshore substation will require planning approval under the relevant Planning Authority and consideration under EIA regulations. The connection between the substation and the NIE network will also require planning permission and consideration under EIA Regulations.

DAERA and DfE acknowledge that until the outcome of discussions with NIE, System Operator for Northern Ireland (SONI) and the Utility Regulator, the Applicant will not be in position to determine the nature and route of connection between the substation and the NIE network.

The Marine Licensing Authority, Strategic Planning and DfE have ensured through communication with SONI that every stage of the project will be considered under EIA regulations and any individual consent decision will not prejudice other independent consenting decisions.

For this reason the EIA consent within this document refers specifically to the Marine component of the development. This EIA consent decision was made with regard to the relevant legislations and with the following considerations;

(i) The Application
(ii) The Environmental Statement
(iii) Responses from Public Consultation
(iv) Consultation Bodies Considered Appropriate
(v) EEA States Potentially affected by the Application

All considerations received were taken into account of the direct and indirect effects of the development on:

(i) human beings, fauna and flora;
(ii) soil, water, air, climate and the landscape;
(iii) material assets and the cultural heritage; and
(iv) the interaction between any two or more of the things mentioned in the preceding sub-paragraphs.

8. Project Consultations

A full consultation was undertaken on the applications for the Marine Licence, Article 39 Consent and the supporting Environmental Statement. Two letters of objection were received, both from stakeholders with fisheries interests raising concerns over potential barrier effects on salmon as well as impacts on pot fishing in the area.

The Marine Licensing Authority and DfE consulted with various statutory bodies, NGOs and the public concurrently. In total 28 responses were received from various government bodies, NGOs and the stakeholder organisations, listed below.

1. **Agri-Food and Biosciences Institute**
2. **Causeway Coast & Glens Heritage Trust**
3. **Commissioners of Irish Lights**
4. **Council for Nature Conservation and the Countryside**
5. **DAERA Sea Fisheries (Previously DARD Fisheries)**
6. **Department for Infrastructure – Rivers Agency (Previously DARD - Rivers Agency)**
7. **DAERA Inland Fisheries (Previously DCAL Inland Fisheries)**
8. **Department for Infrastructure – Strategic Planning (previously DoE Strategic Planning**
9. **Loughs Agency**
10. **Marine & Coastguard Agency**
11. **NIEA - Pollution Prevention**
12. **NIEA - Ornithology and Geology**
13. **NIEA - Visual & Landscape**
14. **National Trust**
15. **North Coast Lobster Fishing Association**
16. **Torr Salmon Fishery -** [redacted]
17. **University Of Ulster – Coastal Processes -** [redacted]
18. **Republic of Ireland – The Department of Arts, Heritage and the Gaeltacht**
19. **Royal Society for the Protection of Birds**
20. **Royal Yachting Association NI**
21. **Scotland – Marine Scotland - Licensing**
22. **Scotland – Scottish Natural Heritage**
23. **Ulster Anglers Federation**

24. **Ulster Wildlife Trust**
25. **DAERA - Conservation & Reporting - Marine Mammals**
26. **DAERA - Shellfish & Bathing Waters**
27. **DAERA - Monitoring and Assessment Team**
28. **DAERA – Maritime Archaeology and Cultural Heritage**

All comments received during the consultation, in addition to TVL's responses to the consultation, and the Marine Licensing Authority considerations are detailed in Annex 1

Adaptive Management

Various consultees raised concerns with the project due to its status as an immerging industry and new technology for which extensive data is not available. As a result of this it was considered appropriate for an adaptive management approach to be undertaken by Marine Licensing to enable active management of the project.

Legitimate Uses of the Sea

The Ulster Angling Federation raised concerns over salmon barrier effects and the North Coast Lobster Fishing Association objected to the proposals due to the a potential reduction in area suitable for pot fishing. The commercial fishing industries have indicated a willingness to meet the Developer to discuss their objections to the project. The Developer has agreed to follow the FLOWW (Best Practice Guidance for Offshore Renewables Developments) guidelines on this matter. This sets out a method to assess impacts on fisheries and sets out compensatory measure which can be taken to mitigate any commercial impacts. The Marine Licensing Authority took guidance from DAERA Inland Fisheries who do not believe the project will have significant barrier effects on salmon. The Marine Licensing Authority took guidance from DAERA Sea Fisheries on local fishermen's interests. Local Fishermen have a legitimate but not exclusive, licensed or leased use of the area. This is reflected in the Environmental Statement and has resulted in the inclusion of a licence condition to ensure provision is given to their concerns under the floww guidelines.

The General Consensus

The majority of responses reflected a positive response to the project, whilst highlighting the need for monitoring to ensure Environmental Statement conclusions are sound. A letter of support for renewable projects but voicing concerns for the local AONB was received from the Causeway Coast and Glens Heritage Trust, who expressed a desire to be involved in terrestrial aspects of the project. The Marine Licensing Authority will ensure their concerns are raised with DfI Strategic Planning.

The Ulster Wildlife Trust and the CNCC queried the methods used during the assessments, suggesting alternative methods, and highlighted updated guidance. The Marine Licensing Authority reviewed the proposed methods and guidance, none of which invalidated the methods used. Due to this and as a scoping process was conducted to detail the environmental assessments required, the Marine Licensing Authority did not consider it necessary to request the company revisit the EIA process or rewrite the Environmental Statement produced.

Several consultees focused on the monitoring and mitigation requirements for the project, requesting further details on and suggesting which topics which should be included for consideration. The Marine Licensing Authority considers that the EIA scoping exercise, along with the Environmental Statement conclusions and the consultation responses have enabled monitoring priorities for the project to be identified.

9. Environmental Statement (ES) Considerations

The Environmental Impact Assessment identified the impacts which had the potential to occur because of the project, their assessment by the company was detailed within their Environmental Statement.

The impacts identified within each chapter of the Environmental Statement are listed below; they have been reviewed by the Marine Licensing Authority in association with consultation responses. Each chapter included decommissioning and cumulative or in combination effects of other projects within its impact assessment.

Benthic and Intertidal Ecology

- Direct physical disturbance and habitat loss;
- Release of drill cuttings and fluid;
- Accidental discharges;
- Introduction of MNNS(marine non-native species);
- Modified hydrodynamic regime and sediment dynamics;
- Electro-magnetic field emissions;
- Presence of new hard substrata;
- Antifouling.

The Environmental Statement concluded that with appropriate mitigation, there will be no significant impacts on benthic or intertidal communities as a result of the project. The Marine Licensing Authority acknowledges the Environmental Statement conclusions and considers the mitigation to be appropriate. However, as the project is a relatively new industry and utilises new technology, monitoring will be required as part of the marine licence conditions to ensure Environmental Statement conclusions are accurate. As part of an adaptive management consenting strategy

the Licensing Authority will set up a science advisory group of government regulators to oversee the benthic monitoring. Monitoring will be detailed within a series of controlled documents, primarily the 'Environmental Management Plan' conditioned within the licence for each aspect of the works.

Marine Mammals

- Noise (Disturbance or Injury)
- Physical (Disturbance or Injury)
- Pollution
- Changes to habitat, distribution, abundance and ability to forage for prey species.
- Barrier effects (Physical and EMF)
- Cumulative impacts

The Environmental Statement concluded that there will be no significant impacts to Marine Mammal Management Unit Populations. The Marine Licensing Authority acknowledges the Environmental Statement conclusions. However as the project involves a relatively new industry and utilises new technology, under Environmental Impact Assessment considerations the licensing authority will require mitigation to ensure that disturbance to European Protected Species (EPS) does not occur. As part of the adaptive management consenting strategy the science group will outline the mitigation required. This will be detailed within controlled documents, Construction Method Statements, the Environmental Management Plans and the Vessel Management Plan. A condition within the licence will be that these documents are provided for agreement at least four months prior to any programme of construction.

Ornithology

- Disturbance/displacement
- Pollution
- Collisions
- Indirect impacts on habitats and prey

The Environmental Statement concluded that there will be no significant impacts to bird populations or European designated sites. The Marine Licensing Authority acknowledges the Environmental Statement conclusions. However as the project involves a relatively new industry and utilises new technology monitoring will be required to ensure that the Environmental Statement conclusions are correct. In addition to monitoring, mitigation will be required to ensure no significant impacts will occur. As part of the adaptive management consenting strategy the science group will outline the mitigation required. This will be detailed within controlled documents,

Construction Method Statements and the Environmental Management Plans, as conditioned within the licence.

When considering monitoring for ornithological impacts, the licensing authority have noted that the length of ornithological survey period for the baseline Environmental Assessment at the site was reduced by TVL in agreement with Marine Licensing and under consultation guidance from NIEA. This was due to the low numbers of birds recorded during survey work; the low numbers of birds using the site will be reflected in monitoring effort on ornithological impacts.

Fish and Shellfish Ecology

- Smothering
- Noise
- Collision
- Pollution
- Habitat loss
- Electro Magnetic Fields (EMF)
- Barrier to movement

The Marine Licensing Authority received various consultation responses raising concerns on barrier effects, collisions and EMF impacts on fish and shellfish from the project. The licensing authority believes that the concerns raised have been adequately considered as part of the assessment process and acknowledge the Environmental Statement and HRA assessments and conclusions. A monitoring programme focused on fish and shellfish was not considered warranted by the licensing authority in consultation with Inland Fisheries and Sea Fisheries who did not request monitoring.

Commercial Fisheries

- Reduction of available fishing grounds
- Displacement
- Abundance and distribution of species

The Marine Licensing Authority received Consultee objections to the project from commercial fishermen based on two impacts; it would result in the reduction of fishing grounds available to them and that the development may affect Portaleen Salmon Fishery.

The Environmental Statement considered the availability of fishing grounds as a significant impact. It rightly identified that mitigation is required to reduce the impact on the fishing industry. The Licensing Authority acknowledges the Environmental

Statement conclusions and through liaison with DAERA Sea Fisheries and the Developer agreed that the FLOWW guidelines, as referenced in the Environmental Statement, provide the best tool for mitigation implementation. The licence for the project has been conditioned to ensure an appropriate mitigation strategy is included for the commercial fisheries affected by the area to be used for the array.

The Environmental Statement concluded that impacts to Portaleen Salmon Fishery were not significant, as salmon behaviour would not change in a manner resulting in reductions to the fisheries effectiveness. Fish are not expected to be directed away from the location of the net. This was however followed by a statement of intent to work with the fishery should it become active, monitoring any potential unforeseen impacts. This approach is welcomed by the DAERA.

The Environmental Statement concluded that the project would not have a significant impact on stock abundance or distribution or commercial species. The licensing authority acknowledges and accepts this conclusion.

Coastal Processes and Seabed condition

- Water turbidity
- Cable installation coastal effects
- Hydrodynamic changes
- Wave regime changes
- Sediment dynamics
- Coastline changes

The Environmental Statement concludes that there will be no significant impacts on coastal processes or seabed conditions as a result of the project. The Marine Licensing Authority received several consultation responses raising concerns on potential coastal process impacts, hydrodynamics and sedimentation from drill cuttings. The Marine Licensing Authority acknowledges the Environmental Statement conclusions. However, as the project is a relatively new industry and utilises new technology, monitoring will be required as part of the marine licence conditions to ensure Environmental Statement conclusions are accurate. As part of the adaptive management consenting strategy the science group will outline the mitigation required. This will be detailed within a controlled document, the 'Environmental Management Plans' as conditioned within the licence.

Marine Archaeology and Cultural Heritage

- Potential for submerged landscape physical disturbance
- Shipwreck disturbance

The conclusions from the Environmental Statement highlight potential significant impacts on submerged archaeology and detail a staged mitigation approach to ensure any potential impacts are controlled. The mitigation approach is based on The Crown Estate Protocol for Archaeological Discoveries; this is considered by the Licensing Authority to be adequate to mitigate the impacts identified. The Marine Licensing Authority acknowledges and accepts the Environmental Statement conclusions and mitigation. The requirement for the Protocol will be conditioned in the Marine Licence.

Shipping and navigation

- Collisions with third part ships
- Transiting vessel collision with devices
- Drifting vessels collisions with devices
- Increased risk to vessel avoiding site
- Fishing interactions with devices
- Vessel anchor interaction with devices
- Loss of device or components

The Environmental Statement concluded that potential significant impacts on shipping and navigation could result from the project. The Environmental Statement detailed mitigation to ensure their impacts are not significant. The Marine Licensing Authority received responses during the consultation process which raised concerns for potential collisions, reduced depths and potential avoidance risks for leisure users. The Marine Licensing Authority acknowledges and accepts the Environmental Statement conclusions and mitigation suggested. The Marine Licence reflects the mitigation and consultees concerns. The minimum depth above submerged devices will become a licence condition in addition to a suite of conditions requested by the Maritime and Coastguard Agency. As industry regulations and best practice dictates, shipping and navigation controls for the project will be detailed in control documents, a Vessel Management Plans and a Navigational Safety Plan. This is a condition of the marine licence

Seascape and visual impacts

- Visual impacts during construction
- Visual impacts during maintenance works
- Visual impacts during decommissioning
- Visual impacts of aids to navigation

- Cables landing
- Substation

The Environmental Statement concluded that the impacts to the seascape would be negligible as the devices are sub-sea and visual impacts would be restricted to a temporary presence of vessels and two permanent marker buoys as aids to navigation. The Marine Licensing Authority acknowledges and accepts the Environmental Statement conclusions. The remit of the licensing authority ends at the limit of the Mean High Water Spring Tide; however the project will have terrestrial components with potential significant impacts which will be assessed by the terrestrial component of the Environmental Statement accompanying the planning permission.

Socio-economics, Tourism and Recreation

- Contribution to meeting 40% of energy from renewable
- Increased energy security
- Reduction in fossil fuel dependency
- Grid infrastructure improvements to the Northeast
- Creation of economic opportunities within Northern Ireland
- Negative tourism impacts
- Negative impact on recreational fishing
- Positive tourism impacts

The Environmental Statement concludes that the impacts will be positive with the exception of possible minor negative impacts; to tourism during construction and on recreational fishing. The Marine Licensing Authority acknowledges and accepts the Environmental Statement conclusions and welcomes the intent from the Company to provide community benefits.

Water Environment – Accidental events

- Oil spills from vessels
- Leaks or spills during construction
- HDD inventory loss
- Leaks from turbines

The Environmental Statement classifies the impacts based on likelihood, magnitude, and severity. Small scale leaks or spills are more likely to happen but are unlikely to have a significant impact. Large scale spills or leaks are identified as potentially

significant impacts. However the likelihood is low and mitigation is proposed. The Marine Licensing Authority acknowledges and accepts the Environmental Statement conclusions and considers the mitigation proposed to be adequate. These will be included in licence conditions.

Other Uses of the Sea

- Existing cables and pipelines
- Disposal and aggregate extraction
- Military activity
- Munitions dump & unexploded ordnance
- Oil and gas infrastructure
- Renewable energy projects
- Carbon Capture and Storage

The Environmental Statement classified all but one of the impacts as not significant, the exception being unexploded ordnance. The likelihood of an incident is low but if it did occur the impact could be significant. The Environmental Statement suggests mitigation in the form of detailed geo-physical assessment prior to construction. The Marine Licensing Authority acknowledges and accepts the Environmental Statement conclusions and considers the mitigation proposed to be adequate and will be included in licence conditions.

Overview of Onshore Impacts

Chapter 22 of the Environmental Statement provides summary information on the potential terrestrial impacts of the project. The Chapter enables the Marine Licensing Authority to have an awareness of all stages of the project which will be subject to EIA consideration and provides a link to the terrestrial component of the Environmental Statement to be submitted to the terrestrial consenting authorities.

The Licensing Authority & DfE met with the Strategic Planning Service and SONI. At this meeting it was agreed by all regulators that the whole project will be considered under EIA regulations by each regulator assessing the consents within their remit without prejudice of other regulators decisions to avoid *fait accompli*.

Environmental Consent Decision

The Marine Licensing Authority & DfE consider the Environmental Statement produced by the Company to have sufficiently identified and quantified the marine environmental impacts of the project, detailing any mitigation required. This has been done with sufficient detail to permit an EIA consent decision to be reached.

This approach does not ignore the embryonic state of tidal array projects and the current data gaps faced by the industry and the regulators.

Through reviewing the marine component of the Environmental Statement, the application and all representations from consultations, whilst acknowledging the embryonic state of tidal arrays, the Marine Licensing Authority has identified that an adaptive management approach to the marine licence will ensure appropriate environmental management. This approach requires the Company to submit controlled documents for written agreement by the Marine Licensing Authority four months prior to each phase of marine construction commencing. The finalisation of controlled documents at this stage allows the project and the regulators to take account of up-to-date industry data, scientific knowledge, and advances in monitoring technology.

The control documents identified at the time of writing this document are as follows;

- Construction Method Statements (CMS)
    - Including Cable Installation Plans
    - Including Cable Protection Plans
- Environmental Management Plans (EMP)
    - Including Project Monitoring Plans
- Protocol For Archaeological Discovery
- Vessel Management Plans (VMP)
- Navigational Safety Plan (NSP)

The Marine Licensing Authority is satisfied that sufficient environmental information has been submitted to proceed with the issue of an EIA consent for the project as a result of the following;

- the EIA scoping consultation
- pre-application project steering group meetings with statutory authorities
- EIA gate checks
- Consultation on the submitted marine component of the Environmental Statement

Under the provisions of the Memorandum of Understanding, the Consenting Authority for the Article 39 consent and the Marine Licensing Authority consider it appropriate to grant an EIA Consent to the Torr Head Tidal project.

Signed

[redacted]

DAERA Marine & Fisheries Division

Annex

Marine Licensing Consideration of both the Consultations Received and the Company Response to the Consultations.

1	CNCC	Consultation Comments	TVL Response	Marine Licensing Response
		The environmental reports (i.e. the Habitat Regulation Assessment and the various Environmental Statements) for the Torr Head Tidal Energy Array Project for the Marine Licence and Article 39 Consent applications provided by Xodus Group (the 'Contractors') appear to CNCC to have been professionally and comprehensively completed. The consultants appear to have adequately assessed most of the likely impacts.	Comment noted	Comment noted
2	CNCC	Not unexpectedly, the HRA identified the Harbour Porpoise at Skerries & Causeway SAC as the most likely population of a protected European species to be impacted. Although the HRA mentions the fact that Harbour Porpoise are listed in Annex IV of the HD (in need of strict protection) they appear not to state overtly that all cetaceans are protected wherever they occur in the waters of a Member State. CNCC like to highlight this but assume that the Contractors were aware of this and frequent monitoring of Harbour Porpoises will be included in the Environmental Monitoring Plan (EMP).	The Environmental Statement states that all cetaceans are protected ('All species of cetacean occurring in UK waters are protected under the Bern Convention and are listed in Annex IV (species of community interest in need of strict protection) of the European Union (EU) Habitats Directive as European Protected Species (EPS).' Section 10.2). The separate HRA document is concerned with the assessment of potential impacts on Natura sites (i.e. SPAs and SACs) and therefore focuses on marine mammals associated with SACs only and has not made reference to wider protection legislation. As stated in Chapter 21 of the Environmental Statement, TVL is committed to the development of an appropriate EMP and this will include monitoring of marine mammals. The exact scope of the EMP will be developed post consent; draw on the latest industry and OpenHydro data / information and guidance to ensure that any monitoring is appropriate and relevant to the issues needing to be monitored.	Marine Licensing sought and received feedback from NIEA and Marine Conservation & Reporting on the HRA. We are content that the HRA was specific to designated sites and the Environmental Statement covered wider cetacean concerns.

3	CNCC	CNCC notes the Contractor's conclusion that "as a result of the relatively small project footprint, absence of Priority Marine Features (PMFs), high energy environment and widespread representation of the habitats found in the project area throughout much of the region", all but one (marine non-native species) of the potential impacts have been assessed as not significant (i.e. will not cause deterioration of habitats and species in Habitat Directive terms). However, CNCC notes that the benthic assessment was undertaken by remote video and still cameras. CNCC would be more convinced of a "not significant" conclusion if this had been backed up by a diving survey (where seawater depths allow safe diving), considering the preponderance of boulders and cobbles such that some species may not be picked up by remote devices. CNCC suggest a diving survey, including the cable export corridor, be included in the EMP. Therefore, CNCC does not accept that given the available evidence that benthic and intertidal monitoring is not required and this should be included in the EMP for all phases of the project. This would also enable the possible effects of the release of drill cuttings to be assessed.	The survey methodology was based on standard approaches and guidance for surveying the marine environment and sent to DoE for review prior to commencement of the survey. Although DoE observed that more species may have been identified with more detailed survey e.g. diver, it was agreed (at the meeting on 21/01/2015) that the survey method used was in line with standard practice for offshore marine projects. Due to health and safety issues associated with the use of divers in high tidal environments, a diver conducted survey was not considered appropriate for this project. The survey work was planned using previously obtained geophysical survey information and was based on high quality seabed videos and stills photography. The survey scope also provided for sediment sampling using grabs, but the limited presence of sediment deposits, indicated by the geophysical data and corroborated during fieldwork made this unfeasible. The analysis of all available data, i.e. geophysical, bathymetric; sides can sonar; video and stills allows for the mapping of predicted seabed types and habitats. This was considered sufficient for impact assessment purposes. Overall, there are predicted to be no significant impacts on benthic ecology associated with the project, therefore no monitoring is proposed in the EMP. Diving surveys would not be appropriate due to the health and safety concerns associated with such high tidal environments	Marine Licensing, in liaison with MARINE Conservation & Reporting, believe dive surveys are not required. The survey methodology used was agreed as acceptable by THE MARINE LICENSING AUTHORITY and we believe the assessment to be adequate in terms of the nature of the site and the potential impacts. The Environmental Management Plan (EMP) will identify benthic assessment to validate Environmental Statement conclusions. This is likely to involve the assessment of the benthos at a selected device over several years. Science group will advise.
4	CNCC	The significant potential impact identified is the introduction of marine non-native species (MNNS) as result of installation and maintenance vessels entering the project area on the basis that there is a high degree of uncertainty regarding the locations of the vessels before transiting to the project area. MNNS have the potential to be introduced from those locations and the potential ecological impacts of those MNNS on local	Comments noted. As stated in the Environmental Statement, Once specific vessels have been selected and their locations and ballasting requirements known TVL will undertake a full risk assessment. TVL is committed to upholding the highest possible standards with respect to the control of MNNS and as stated in the Environmental Statement will comply with relevant e.g. IMO guidelines.	Marine Licensing accept the CNCC Comment and are content with the approach adopted by TVL including the safety measures they have identified.

		ecosystems could be significant. As such, it has been recommended that once the vessels have been selected, a full risk assessment of the potential for the introduction of MNNS should be undertaken. CNCC agrees that any mitigation methods that come out of this process should be strictly adhered to. So long as this occurs, CNCC accepts the residual impact is predicted to be of low significance, i.e. should not cause deterioration of features present in the area. However, CNCC notes that the Contractors state that should a marine non-native species (MNNS) be introduced to the marine environment of the project area, there is no guarantee that the species will be tolerant of the conditions and it is, in fact, far more likely that the species will be unable to reproduce and establish a local population. CNCC is prepared to accept this and note that this danger is posed by all vessels entering the location, whether associated with the project or not. However, this still needs monitoring as the contractors cannot absolutely exclude the introduction of MNNS		
5	CNCC	CNCC would recommend that a heavily conditioned approval be issued based on the experience of Marine Current Turbine (MCT) Strangford Narrows project, mitigated along the lines of the Adaptive Management (AM) process. CNCC believe AM is justified in this case as there is very little known in terms of extant scientific evidence about effects from previous installations of an array of tidal turbines in open seawater situations. As the ESA states (Chapter 21.3 Environmental Monitoring Strategy):Through the EIA process for the Torr Head Project, TVL recognise that being one of the first applications for a commercial tidal energy array in Northern Ireland to seek consent to date, means there is some uncertainty with the impact assessment due to the nascent status of the industry. For example	TVL would caution against basing conditions on the experience of MCT in Strangford Narrows only, due to the obvious differences in terms of location, environmental baseline and predicted impacts. TVL expects consent conditions that will allow for an adaptive management process and this is a process TVL is committed to. As stated in the Environmental Statement (Section 21.3), TVL is committed to the development of an EMP that is relevant and appropriate for the project. It also recognises that due to the emerging and evolving nature of the tidal energy industry there are also some potential impacts that have yet to be verified by operational monitoring. Based on this current situation TVL has identified two approaches to	Marine Licensing do not consider the MCT model to be directly transferable. The MCT approval was highly precautionary due its location, directly within a designated site and a narrow channel. This was directly responsible for the precautionary approach. The TVL Marine Licence, EMP and adaptive management approach with reflect the location, Environmental Statement and current knowledge base. It is the opinion of THE MARINE LICENSING AUTHORITY & DfE that the project can be consented based on the

		potential collisions between marine mammal species and tidal turbines represents a significant knowledge gap in the industry. This uncertainty needs to be addressed across the industry and is not regarded as something that individual developers are able to adequately resource.	monitoring: 'Where TVL identifies monitoring requirements for the project, specific issue monitoring protocols will be developed in consultation with the regulators and their advisors'. 'Where uncertainties in the assessment are identified that are considered of strategic importance to the development of the tidal industry, TVL would wish to engage with the wider industry, regulators, their advisors and stakeholders through involvement on working groups or similar forums in order to assist with developing strategic monitoring programmes for the benefit of future projects in Northern Ireland and elsewhere in the UK'.	Environmental data provided by TVL. An EMP will be required prior to the construction commencing which will ensure the limiting of environmental impacts from the construction, operation and eventual decommissioning The TVL Environmental Statement identified several data gaps in our current understanding of tidal arrays and the marine environment. Many of these are considered industry level gaps. Marine Licensing are aware that projects like MCT started to fill the data gaps and through ongoing research streams and the advanced stage Meygen project, industry knowledge gaps are expected to be filled. It is expected that TVL's test array will provided device specific data and the Meygen project will help fill data gaps in relation to collisions risks and EMF impacts which have been identified as not significant within the Environmental Statement Marine Licensing will expect TVL to have in place an agreed EMP prior to any construction taking place.
6	CNCC	The DoE licence required MCT to establish an Environmental Monitoring Plan (EMP) and a number of other mitigation measures. Pre-installation monitoring	TVL is committed to developing an EMP in consultation with the DoE and their advisors. Chapter 21 Environmental Management and Monitoring	CNCC Comments noted. Marine Licensing agree with the TVL response in that not

		data collection formed the basis of an Environmental Baseline Report, against which all future monitoring during installation, commissioning and decommissioning could be compared. The three main receptors considered within the EMP for MCT were Marine Mammals, Benthic Ecology and Tidal flow and energy. A similar set of receptors would seem to be appropriate for this project. To answer the key questions in collection methods. CNCC recommends a similar array of surveys be considered for the Torr Head project, including (subject to agreement with Marine Division):· Benthic ecology monitoring· Shore based surveys including cetacean monitoring; Passive acoustic monitoring (T-PODs);· Aerial surveys;· Underwater noise monitoring.	provides a summary of all receptor specific mitigation, monitoring and management measures identified via the impact assessment process for the project. TVL would caution against direct comparisons between the MCT project and TVL for the reasons highlighted above. Mitigation and monitoring proposed for the TVL EMP needs to be relevant to the impact assessment results identified in the Environmental Statement. Requirement for and scope of pre installation monitoring data to be considered as part of EMP. Not all methodologies proposed here likely to be appropriate. As stated above the EMP will be developed post consent; draw on the latest industry and OpenHydro data / information and guidance to ensure that any monitoring is appropriate and relevant to the issues needing to be monitored.	all survey suggestions are relevant. TVL will be required to provide a draft EMP prior to consent, however the finalised EMP need only be provided a set period prior to construction (most likely four months). This is industry best practice as it allows the EMP to be finalised using the best available technologies and guidance at the time of build out. Marine Division believe the EIA assessment satisfied the requirements for benthic ecology identification and do not believe rigorous benthic monitoring is required within the EMP beyond validation. Shore based surveys are a possible inclusion within the EMP but must be focused on Environmental Statement validation and project impact control. PAM use in the area is debatable due to tidal flow but remains an option if warranted through further discussion. Aerial surveys are not required.

				Hydrophone use is expected to be part of the monitoring program
7	CNCC	Tidal Ventures will be aware of the key findings provided by the MCT EMP1, although this project has a different set of parameters (i.e. open sea conditions rather than being in a narrow channel. Perhaps most relevant was the finding that, given the wide ranging nature of species such as seals and porpoises, it is unlikely that any changes at this spatial scale would have a significant effect at the population level. However, this would need to be established through monitoring in the case of an array of devices.	TVL is aware of the extensive monitoring that was undertaken by MCT in Strangford Lough and where appropriate has used these results to inform the impact assessment for the Torr Head project. We note CNCCs comment that perhaps most relevant was the finding that, given the wide-ranging nature of species such as seals and porpoises, it is unlikely that any changes at this spatial scale would have a significant effect at the population level. However, this would need to be established through monitoring in the case of an array of devices. As stated in the Environmental Statement (Section 21.3), TVL is committed to the development of an EMP that is relevant and appropriate for the project. It also recognises that due to the emerging and evolving nature of the tidal energy industry there are also some potential impacts that have yet to be verified by operational monitoring. Based on this current situation TVL has identified two approaches to monitoring:' 1. Where TVL identifies monitoring requirements for the project, specific issue monitoring protocols will be developed in consultation with the regulators and their advisors'. 2. 'Where uncertainties in the assessment are identified that are considered of strategic importance to the development of the tidal industry, TVL would wish to engage with the wider industry, regulators, their advisors and stakeholders through involvement on	Marine Licensing are aware the project is different from both MCT and the MEYGEN proposals as such the receptors do not have the same risk associated to them by this project. Monitoring must be specific, controlling project impacts and validating the Environmental Statement, as required at the time of build out and operation.

			working groups or similar forums in order to assist with developing strategic monitoring programmes for the benefit of future projects in Northern Ireland and elsewhere in the UK'. As stated above the EMP will be developed post consent; draw on the latest industry and OpenHydro data / information and guidance to ensure that any monitoring is appropriate and relevant to the issues needing to be monitored.	
8	CNCC	The results from each of the continued monitoring strands of the EMP should be evaluated regularly so that any impact could be detected at an early stage. In the case of MCT, using this approach, the accumulated data provided evidence to support a reduction in the mitigation requirements.	TVL expecting consent conditions to allow for an adaptive management process. It is fully committed to regularly reviewing the findings of environmental monitoring and using these to inform the adaptive management process. The frequency of review periods will be confirmed during finalisation of the EMP. As stated in the Environmental Statement (Section 21) TVL is committed to an adaptive monitoring strategy that will be developed in order to confirm that the predicted impacts are not significant, in particular in relation to the potential uncertainty of impacts from the collision of marine mammals (and fish) with tidal turbines.	Marine Licensing agree with CNCC Comments and will be operating an adaptive management approach to the licence.
9	CNCC	CNCC also recommends that a small, dedicated Science Group is set up to advise on the detailed management of the EMP and mitigation measures to advise a wider Steering Group, if this is to be established. These groups should include all relevant stakeholders. The findings and conclusions of the EMP and the reports from the Science/Steering groups should be placed in	TVL is willing to be part of scientific and steering groups who will be consulted with and / or advise on the EMP. TVL will engage with DoE on the format and make-up of such a group.	Marine Licensing will be calling a science group to advise on the EMP. DoE are committed to an open and transparent process within the bounds of commercially sensitive information.

		the public domain.		
14	SNH	1.1.1.1 Advice in relation to Treshnish Isles SAC While we understand why the 200km foraging buffer has been applied to grey seal, we would suggest given the specific life history characteristic of grey seal that this buffer could be reduced. Unlike harbour seals, grey seals aggregate to breed on land above the high-water mark, returning to the same colonies each year. Mothers generally remain with pups on land for the 3-week lactation before mating / returning to sea. Pups stay on to moult before dispersing. After breeding, most seals then disperse away from the SAC making it very difficult to assign an individual to a particular SAC out with the breeding season. Grey seal usage of the SAC is therefore very time and space specific. We have therefore advised with regard to Scottish Marine Renewables developments that all grey seal SACs within a 20km radius are screened in – although this distance should be used as a guide rather than an absolute cut-off. Therefore we are content that the Treshnish Isles SAC is screened out; we agree with the conclusion of No Likely Significant Effect for this site and are satisfied that no further appraisal is required for grey seal as a qualifying feature of this site.	Comment noted and the advice from SNH on suitable parameters for use in the HRA is welcome. The use of the revised parameters doesn't change the overall HRA conclusion.	Comments noted. No impacts identified or further assessment requires.
15	SNH	1.1.1.2 Advice in relation to South-East Islay Skerries SAC With respect to South-East Islay Skerries SAC we agree with the use of the 50km foraging range buffer and highlight that previous tagging work on Islay (carried out by SMRU) shows that individuals from Islay do travel to the Irish coast, this correlates with previous work by Cunningham et al (2008). We have considered the potential impact pathways including collision risk, and note that this	Comment noted. Although there was no quantitative assessment of the collision risk for harbour seal (due in part to the lack of sightings of this species during the site-specific survey and it not being possible to calculate a site specific density of this species) a qualitative assessment of the potential impact in harbour seal was undertaken (page	Comments noted. No impacts identified or further assessment requires.

		has not been assessed through any collision risk modelling. Despite this, with the relative scarcity of harbour seals observed within the development footprint, we agree with the conclusion of no Likely Significant Effect for the harbour seal qualifying interest feature for South-East Islay Skerries SAC and as such no further appraisal is required.	10-64 in Section 10 of the ES). The relative scarcity of this species within the development footprint reduces the likelihood of it encountering the devices.	
16	SNH	1.1.2 Special Protection Areas (SPAs)We have reviewed the assessment approaches used as outlined in the Habitats Regulation Appraisal and Chapter 11 (Ornithology) of the Environmental Statement with respect to impacts to SPAs within Scottish territorial waters. Some of the assessments methods and commentary provided in reaching a view on Likely Significant Effect does diverge from what we would advise and expect from developers in Scotland, particularly with regard to collision risk modelling which we note has not been undertaken. Nevertheless, we have reviewed the information provided and agree with the conclusion of no LSE for Northern fulmar, Manx shearwater and Northern gannet with respect to Scottish SPAs and are satisfied that no further appraisal is required.	Comment noted.ES states (Section 11.7.1) the reasons behind the proposal for no quantitative encounter modelling that was proposed to the DoE (at the EIA scope review meeting in May 2014). This decision was based on the very low numbers of seabirds recorded within the AfL during the baseline surveys and the findings from encounter modelling carried out for Meygen Tidal Array Project which concluded there was a very low likelihood of encounters between diving birds (auk and gannet in particular) and submerged turbines.	Comments noted. Marine Licensing in liaison with NIEA agreed with the TVL methods used, based on the small number of birds present collision risk modelling is not required.
17	SNH	1.1.2.1 Advice in relation to Alisa Craig SPA With regard to the common guillemot feature from Ailsa Craig SPA, we have undertaken our own apportioning assessment to try and understand the likely proportion of birds using the development site from the nearby Rathlin Island SPA colony as well as those from Alisa Craig SPA. We have not apportioned any non-SPA colonies within foraging range of Torr Head for this species. See Table 1 below for the results of this exercise. Table 1: Apportioning results for common guillemot. A= Rathlin Island SPA, B = Alisa Craig SPA We are content that given the short distance between the development and Rathlin Island SPA, compared with the distance to Alisa Craig SPA that in apportioning this, virtually all the birds from the development site are likely to be from Rathlin	Noted	Comments noted.

		Island SPA as indicated in Table 1 above. We therefore consider a conclusion of no Likely Significant Effect for common guillemot for Alisa Craig SPA is appropriate and are satisfied that no further appraisal is required.		
18	SNH	1.2.2. Fish of Conservation Concern We have reviewed the HRA and Chapter 12 of the Environmental Statement (Fish & Shellfish) in relation to fish of conservation concern i.e. Atlantic Salmon, Sea and River lamprey, Sea trout, European Eel Smelt (sparling), Allis shad and Twaite shad. We are mindful that it is very difficult to assign connectivity from fish at sea to their natal rivers (and or coastline) either when departing or returning and that more strategic research / assessment is required on this aspect. We therefore suggest that these fish species of conservation concern should be considered further as part of the EIA process concentrating on the relevant impact pathways (i.e. construction noise, barrier effects, collision risk, EMF and habitat exclusion etc.) with a view to developing appropriate mitigation and monitoring. This would minimise any residual effects, but also provide greater understanding as to the movement of fish through this part of the North Channel and further understand any interaction they may have with the Torr Head Tidal Turbine Array. We have a number of comments relating to the commentary undertaken in the HRA and Environmental Statement chapter that we feel would be useful to raise:	We welcome SNHs comment on the fact that it is very difficult to assign connectivity from fish at sea with natal rivers (and or coastline) either when departing or returning and that more strategic research / assessment is required on this aspect. Based on the baseline assessment presented in Section 12.4 of the Environmental Statement, TVL identified those fish species to be considered in the EIA. The following were scoped out of the assessment based on the reasons provided in the ES: River lamprey - River lamprey spawn in freshwater and move to coastal waters to feed. The movement of river lamprey within the marine environment is limited to coastal / estuarine waters at the mouth of their spawning rivers. There are no known rivers supporting large populations of river lamprey in the Project study area. The closest river where river lamprey are present is the River Foyle and its tributaries located on the Northern Ireland / Ireland border. It is therefore unlikely that river lamprey from this river will be present in the Project area. Atlantic salmon, sea trout and European eel were carried through to the impact assessment and potential impacts described on these species where relevant. No significant impacts were predicted on these species. Allis shad, Twaite shad and Sea Lamprey were not discussed in the baseline description despite being of	Comments noted. Marine licensing is content that no significant impacts were identified within the EIA as a result of the project. Marine Licensing see the acknowledgement of impact assessments on fish as a data gap in the industry at present. Marine Licensing would expect data to be provided to validate the Environmental Statement. If validating data is not available at the time of build out then monitoring may be required such as camera installation on selected devices as part of the EMP. Details to be finalised within the EMP prior to build out. Current work within the industry is expected to provide validating data prior to construction when the EMP will be finalised.

			conservation concern. These species are not anticipated to occur in the Project area based on the two key sources used to inform the baseline: the National Biodiversity Network (NBN) Gateway and the Marine Life Information Network (MarLin).TVL acknowledge in the Environmental Statement (page 12-33) that there is a lack of monitoring data from tidal arrays confirming the nature of interactions between fish and turbines. However, based on modelling carried out for other tidal energy projects it is believed that fatal collisions with operational turbines are unlikely to occur. This will, however, be confirmed once the results of monitoring studies become available.	
19	SNH	While it is likely that Atlantic salmon may pass through the project area in the northerly direction as post-smolts, they are also likely to pass through in a southerly direction as returning adults. Moreover, reference is made in section 12.4.7 of the Environmental Statement whereby Atlantic salmon regularly travel along the north Antrim coast and so movement in an east-west direction may also require consideration.	We welcome SNHs comment on the fact that it is very difficult to assign connectivity from fish at sea with natal rivers (and or coastline) either when departing or returning and that more strategic research / assessment is required on this aspect. Based on the baseline assessment presented in Section 12.4 of the Environmental Statement, TVL identified those fish species to be considered in the EIA. The following were scoped out of the assessment based on the reasons provided in the ES:River lamprey - River lamprey spawn in freshwater and move to coastal waters to feed. The movement of river lamprey within the marine environment is limited to coastal / estuarine waters at the mouth of their spawning rivers. There are no known rivers supporting large populations of river lamprey in the Project study area. The closest river where river lamprey are present is the River Foyle and its tributaries located on the Northern Ireland / Ireland border. It is therefore	Marine Licensing understand that East - West movement was not specifically identified in the Environmental Statement however it is covered in the generic assessment of salmonids traversing the site. INLAND FISHERIES have informed Marine Licensing that based on the Environmental Statement conclusions they do not have major concerns on the impact on Salmon from the project. Marine Licensing acknowledge the Environmental Statement and INLAND FISHERIES's response. Marine Licensing see the acknowledgement of impact

			unlikely that river lamprey from this river will be present in the Project area. Atlantic salmon, sea trout and European eel were carried through to the impact assessment and potential impacts described on these species where relevant. No significant impacts were predicted on these species. Allis shad, Twaite shad and Sea Lamprey were not discussed in the baseline description despite being of conservation concern. These species are not anticipated to occur in the Project area based on the two key sources used to inform the baseline: the National Biodiversity Network (NBN) Gateway and the Marine Life Information Network (MarLin).TVL acknowledge in the Environmental Statement (page 12-33) that there is a lack of monitoring data from tidal arrays confirming the nature of interactions between fish and turbines. However, based on modelling carried out for other tidal energy projects it is believed that fatal collisions with operational turbines are unlikely to occur. This will however, be confirmed once the results of monitoring studies become available.	assessments on fish as a data gap in the industry at present. Marine Licensing would expect data to be provided to validate the Environmental Statement. If validating data is not available at the time of build out then monitoring may be required such as camera installation on selected devices as part of the EMP.
20	SNH	Atlantic Salmon. There is no attempt to quantify collision risk. We would suggest this is an omission from this application.	With regard to Atlantic salmon and risk of collision with turbines during their migration through the North Channel it is worth noting the following:- The tidal array will occupy only a small proportion of the water column of the North Channel in a section of the channel that is approximately 20 km wide; and- Salmon spend the majority of time in the upper 5 m of the water column and there will be a minimum 8 m clearance between the tidal turbines and sea surface (Godfrey et al. (2014) found that in general, tagged Atlantic salmon were found near the surface during their study on the north coast of Scotland. The median	Comments Noted. Marine Licensing would highlight that the TVL project is sited in a different location and geographical context than the MeyGen array, however we realise the implications of the Meygen modelling. Marine Licensing acknowledge the Environmental

			number of records at 0–5 m depth ranged from 72 to 85%).Despite the above indicating that potential turbine collision risk impacts will not be significant, encounter modelling carried out for the Meygen Tidal Energy Project can be used to inform a more quantitative assessment. This modelling focussed on assessing the risk of encounter between migratory salmon and tidal turbines. The modelling took population estimates, area of the channel occupied by the array and the probability of turbines being operational (percentage of time that turbines will be active opposed to stationary, i.e. during slack water) to determine encounter rates. These rates combined with avoidance rates were then used to determine collision risk. The assumptions made during the modelling and subsequent interpretation were conservative. The results of the modelling indicated that collision risk was much less than 1% in all scenarios modelled, thus it was deemed that collision with turbines would not have a significant impact on salmon populations. These results were rigorously tested by Scottish Natural Heritage (SNH) and Marine Scotland Science (MSS) which drew the same conclusions. Despite the proposed project being located in a different geographical location, the results of this modelling can be considered to provide an indication of the potential scale of impact from the proposed Torr Head Project as many of the Project parameters are similar. It is also worth noting that it is likely considerably lower numbers of Atlantic Salmon will pass through the North Channel compared to the Pentland Firth (comprising fish from NI rivers and small percent of fish from rivers on the west coast of	Statement assessment and INLAND FISHERIES's response that the project is unlikely to have a barrier effect or significant affect. Marine Licensing see the acknowledgement of impact assessments on fish as a data gap in the industry at present. Marine Licensing would expect data to be provided to validate the Environmental Statement. If validating data is not available at the time of build out then monitoring may be required such as camera installation on selected devices as part of the EMP.

			Scotland). It was therefore not deemed necessary to undertake similar modelling for the Torr Head Project. The modelling results for the Meygen project indicated insignificant impacts and the same conclusion can be drawn for the Torr Head Project.	
21	SNH	In reviewing Table 4.2 of the HRA we have noticed a number of aspects within the commentary that we do not agree with, in particular with reference to collision risk. A recent study by Godfrey et al. (2014)2 found that in general, tagged Atlantic salmon were found near the surface during their study on the north coast of Scotland. However, although the median number of records at 0–5 m depth ranged from 72 to 85%, depth use varied among individuals. They also recorded a small, but statistically significant increase in recorded depth at night compared with during the day. The mean maximum dive depth was 64 m (with a range of 13–118 m) which may reflect the likely available water column depth. More importantly, Godfrey et al. (2014) concluded that Atlantic salmon will potentially interact with man-made obstacles, e.g. renewable energy generators, throughout the water column and particularly in surface waters.	TVL appreciate the clarification provided on the swimming depths of Atlantic salmon including the new information that has become available since undertaking the assessment. This recent publication indicates that salmon are not restricted to only the top few metres of the water column. Whilst it is recognised that they may use of deeper areas of the water column within which turbines will be located, it is not considered this significantly alters the impact assessment presented in the Environmental Statement and HRA and the prediction of no significant impacts / LSE still stands.	Comments noted. INLAND FISHERIES have informed Marine Licensing they do not have major concerns from the project on the impact on Salmon as they expect them to swim near the surface waters. Marine Licensing acknowledge the Environmental Statement assessment and INLAND FISHERIES's response are based on this assumption. Marine Licensing concur with the Environmental Statement assessment and INLAND FISHERIES, we do not believe the project will cause a barrier to salmon.
22	SNH	Similar data on post-smolt swimming depths aren't available for Scotland, although in the review of marine migration pathways, Malcolm et al. (2010)3, suggested that, for the few studies where swimming depth was reported, it appears that post-smolts generally utilise shallow depths (typically 1-3m, but up to 6m). They may therefore avoid any collision risk with the turbines, but being mindful of the paucity of studies that are	TVL appreciate the clarification provided on post smolt swimming depths and agree that there is a paucity of studies to fully support the assumption that post smolts are likely to avoid any collision risk.TVL acknowledge in the Environmental Statement (page 12-33) that there is a lack of monitoring data from tidal arrays confirming the nature of interactions between fish and turbines. However, based on modelling carried out for other tidal energy projects it is believed that potential fatal collisions between fish and turbines would	Marine Licensing acknowledge the Environmental Statement assessment and INLAND FISHERIES's response that the project is unlikely to have a barrier effect.

		available to fully support this.	not result in any significant impacts on salmon populations. This assessment was rigorously tested by Marine Scotland Science and SNH, who drew the same conclusion and will be confirmed once the results of monitoring studies become available.	
23	SNH	Table 4.3 of the HRA states that the area occupied by the development will not affect Atlantic salmon because they can move between and above the tidal turbines. It is unclear as to the source of this information at and what evidence has been used. We consider this should be considered further and if necessary mitigation included within the Environmental Management Pan (EMP) as well as being considered as part of the commercial fisheries mitigation.	Section 12.8.4 of the Environmental Statement provides evidence that's suggests Atlantic salmon will not be reliant on the area that will be occupied by the tidal turbines during their migration. What data is available on the migration patterns of both post smolt and adult salmon indicate that the project is unlikely to present a significant barrier to their movement through the North Channel.	Comments Noted. The highlighted statement from the Environmental Statement is clearly an assumption not backed by data. INLAND FISHERIES have informed Marine Licensing they do not have major concerns on the impact on Salmon from the project.
24	SNH	Section 4.2 of the HRA correctly identifies River lamprey as a qualifying species of Solway Firth SAC, it however neglects to mention that Sea lamprey, another anadromous lamprey species, is also a qualifying species of this site. As the HRA outlines, very little is known about the 'at sea' movement patterns and as such we feel it is not possible to conclude that river (or sea) ''lamprey movements are not extensive and probably local in nature''. Similarly, very little is known about their response to noise or EMF.	Sea Lamprey were not discussed as this species is not anticipated to occur in the Project area based on the two key sources used to inform the baseline: the National Biodiversity Network (NBN) Gateway and the Marine Life Information Network (MarLin). With regards to River lamprey the Environmental Statement states 'River lamprey spawn in freshwater and move to coastal waters to feed. The movement of river lamprey within the marine environment is limited to coastal / estuarine waters at the mouth of their spawning rivers. 'The nearest SAC where River lamprey are a qualifying feature is the Solway Firth located 153 km from the Project AfL. It is therefore unlikely that river lamprey from this river will be present in the Project area - for this reason there are not considered	Marine Licensing believe the distance of the Solway Firth from the project removes any likely impacts from the project on the SAC. As the EMF output from the cables is stated as close to background EMF and there is no evidence sea lamprey are expected in the area, Marine Licensing does not expect any impacts to result from the project on any lamprey species.

			to be an LSE on River Lamprey.	
25		European eel is briefly mentioned within the Environmental Statement despite being a species which is under considerable threat and is closely associated with benthic environments (where EMF may be a particular issue). The Environmental Statement (section 12.4.7) states that there is potential for maturing silver European eels associated with these rivers to pass through the Project area as they commence their autumn migration to the Sargasso sea. Then in section 12.9 where it is concluded that they will not be affected by EMF because "Potential impacts on salmon, sea trout and European eel in terms of barriers to movement due to EMF from inter-array and export cables are expected to be negligible and not significant." While we are aware of ongoing tank-based research by Marine Scotland into the impacts of EMF on fish species, the results of this work are not yet available and so we are not in a position to be able to agree with the assessment in the Environmental Statement in this regard.	The conclusion drawn in Environmental Statement Section 12.8.3 is that EMF impacts on even the most sensitive of fish species (elasmobranchs) are not expected to be significant due to the highly localised nature of impacts (due to the rapid attenuation of EMF with distance) together with the small footprint of the project. There is no evidence to indicate that eels are either attracted or repulsed by anthropogenic EMF and they could be assumed to have medium sensitivity (ES page 12-30). Therefore it can be concluded that any potential impacts can be expected to be less than those predicted for the most sensitive species (i.e. elasmobranchs), and therefore not significant. It is recognized that Marine Scotland are undertaking ongoing research into impacts of EMF, however in the absence of new information/data the above conclusion has been drawn based on current available information.	Comments noted. Marine Licensing acknowledge the Environmental Statement assessment. We note INLAND FISHERIES have mentioned the potential for EMF barrier effects on European Eels. Marine Licensing accepts that the Environmental Statement EMF assessment suggested no significant impact. Marine Licensing consider that a Best Environmental Option (BEO) should be adopted. This may involve HDD burial of cables to a point offshore resulting in a corridor with a reduced EMF impact or cable design to reduce EMF output.
26	SNH	We have previously advised in relation to EMF effects that DECC recommends that cables be buried to at least 1.5m, depending on the suitability of the substrates (Department of Energy and Climate Change (DECC), 2011. National Policy Statement for Renewable Energy Infrastructure (EN-3). Cable burial should be to this depth where possible – especially in shallow waters (defined as below 20 m by Gill and Bartlett, 2010). Whilst cable burial would not be expected to reduce the extent of the emission field, it would increase the distance between the cable and the water column.	Cable burial (to the recommended 1.5 m) will be adopted where feasible, but this will be difficult to achieve throughout the majority of the AfL where the seabed is dominated by bedrock. Burial is likely to be more achievable along the cable corridors where sandy sediments are present (as detailed in Section 9 of the ES).	Marine Licensing note of the National Policy Statement. We note that the Meygen cables have been HDD to a hub leaving a reduced EMF corridor between the shore and the projects site. TVL have included HDD as an option for cabling from shore

				to a hub leaving a reduced EMF corridor between the shore and the projects site.
27	MCA	MGN Checklist A completed MGN Checklist has been provided and MCA is content that all recommendations have been addressed.	Comment Noted	Comments noted.
28	MCA	Navigable Depth This development will see the available depth of water be reduced to 8m and will potentially have a significant impact on current and future traffic trends. The UKHO should be consulted to address how this information is promulgated to the mariner, particularly in the early stages of development before information finds its way onto admiralty charts.	TVL will consult with UKHO on communication of depth reduction in this area (prior to it appearing on admiralty charts).	Marine Licensing have a standard UKHO notification licence condition which will be reviewed and amended if required prior to inclusion in the TVL Licence.
29	MCA	When new devices are installed, changed or removed throughout the lifetime of the project, information on device specific details should be promulgated to Kingfisher Information Services and to local vessels using the area.	TVL will ensure this.	Marine Licensing will condition this in the licence.
30	MCA	Safety Zones The requirement and use of safety zones during the construction phase are supported, however it should be noted that a detailed justification would be required for a 50m operational safety zone, with significant	TVL will apply for safety zones as required during the construction phase of the project and fully justify their requirement as part of their application. TVL has no plans to apply for operational safety zones.	Marine Licensing note the MCA and TVL positions.

		evidence from the construction phase in addition to the baseline NRA required supporting the case.		
31	MCA	Cable Routes Export cable routes, cable burial protection index and cable protection, are issues that are yet to be fully developed. However due cognisance needs to address cable burial and protection, particularly close to shore where impacts on navigable water depth may become significant. Any consented cable protection works must ensure existing and future safe navigation is not compromised. The MCA would accept a maximum of 5% reduction in surrounding depth referenced to Chart Datum.	TVL will carry out a cable risk assessment of the final route to ensure adequate cable protection is designed. Where this may result in a > 5% reduction in the existing water depth anywhere along the route then TVL will consult MCA on this issue.	Marine Licensing will condition MCA guidance in the licence. Any variance from the condition would be reliant on agreement from MCA.
32	MCA	Survey Data MGN 371 Annex 2 Paragraph 6 iii requires that hydrographic surveys should fulfil the requirements of the International Hydrographic Organisation (IHO) Order 1a standard, with the final data supplied as a digital full density data set, and survey report to the MCA Hydrography Manager. This information is yet to be submitted and failure to report the survey or conduct it to Order 1a might invalidate the Navigational Risk Assessment if it was deemed not fit for purpose.	The bathymetric survey data used to inform the environmental impact assessment and navigation risk assessment was the Joint Irish Bathymetry Survey. The introduction of the survey report states in section 12 that the area surveyed met IHO Order 1 standards. An independent review of the JIBS data (and another survey of a section of the site area), referred to in this report as the FOSAE survey, this review was undertaken by Intertek. This review finds (see Table 2-4) that the JIBS survey data meets or exceeds IHO Order 1. The JIB survey was commissioned by the Marine Institute of Ireland and the Maritime and Coastguard Agency. TVL obtained processed and raw MBES survey data from the UK Hydrographic Agency. The raw data was reprocessed to provide bathymetry to 1 m and 0.25 m horizontal resolution. We would be happy to liaise with the MCA regarding provision of the required data to confirm compliance with MGN 371 Annex 2 Paragraph 6 iii if still deemed to be required.	Marine Licensing will confirm with MCA they are content prior to licence

33		Construction phase The MCA would like to see continuous construction which is progressive across the development area with no opportunity for two separate areas to be constructed with a gap in the middle.	TVL notes the MCA requirements in this respect and proposes to liaise with the relevant MCA Subject Matter Experts as required to comply with search and rescue requirements to agree the final OREI orientation, layout and spacing of all structures. TVL proposes to discuss and agree the phasing and construction timing with the relevant Subject Matter Experts as part of the same discussion.	Comments noted.
34	MCA	Emergency Response Co-operation Plans It is noted that an ERCoP for the construction and operation phases will be sent to MCA for approval prior to construction being undertaken.	TVL will fulfil its commitments in this regard and a ERCoP will be submitted to MCA for approval prior to construction.	Comments noted.
35	MCA	Aids to Navigation It is noted that an Aids to Navigation plan will be sent to the Commissioner of Irish Lights for approval prior to construction being undertaken.	TVL will fulfil its commitments in this regard and an Aids to Navigation plan will be sent to the Commissioner of Irish Lights for approval prior to construction.	Comments noted.
36	MCA	The comments detailed above are not considered to be blocks to development, but provided to highlight concerns which will need to be addressed prior to any consent conditions being provided. Subject to the developer meeting requirements addressed in this letter, it provides a cautious acceptance of the licence request. In this regard, we would like to request that the following conditions are applied to the marine licence:	TVL Noted	Marine Licensing Accepted All conditions
37	MCA	The Kingfisher Information Service of Seafish, must be informed by email details of the vessel routes, timings and locations relating to the construction of the authorised scheme or relevant	Proposed consent condition acceptable to TVL.	Marine Licensing accept proposed condition

		part to kingfisher@seafish.co.uk: At least two weeks prior to the commencement of offshore activities, for inclusion in the Kingfisher Fortnightly Bulletin and offshore hazard awareness data, and; On completion of all offshore activities		
38	MCA	The licence holder must ensure that a notice to mariners is issued at least 10 working days prior to the commencement of the licensed activities or any part of them advising of the start date and the expected vessel routes from the local construction ports to the relevant location.	Proposed consent condition acceptable to TVL.	Marine Licensing accept proposed condition
39	MCA	The licence holder must ensure that the notices to mariners are updated and reissued at weekly intervals during construction activities and within five days of any planned operations and maintenance works and supplemented with VHF radio broadcasts agreed with the MCA in accordance with the construction program approved under condition <insert>.	Proposed consent condition acceptable to TVL.	Marine Licensing accept proposed condition
40	MCA	The licence holder must immediately notify the UK Hydrographic Office of the commencement of the authorised scheme in order that all necessary amendments to nautical charts and publications are made.	Proposed consent condition acceptable to TVL.	Marine Licensing accept proposed condition
41	MCA	In case of damage to, or destruction or decay of, the authorised development seaward of MHWS or any part thereof the undertaker shall as soon as possible and no later than 24 hours following the identification of damage, destruction or decay, notify MCA, CIL and the UKHO.	Proposed consent condition acceptable to TVL.	Marine Licensing accept proposed condition
42	MCA	No part of the authorised scheme may commence until DOENI, in consultation with the MCA, has given written approval for an Emergency Response Co-operation Plan (ERCoP) which includes full details of the ERCoP for the construction, operation and decommissioning phases of that part of the authorised scheme in accordance with the MCA recommendations contained within MGN371 "Offshore Renewable	TVL will fulfil its commitments in this regard	Marine Licensing accept proposed condition

		Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response Issues". The ERCoP and associated guidance and requirements must be implemented as approved, unless otherwise agreed in writing by DOENI in consultation with the MCA.		
43	MCA	No part of the authorised scheme may commence until DOENI, in consultation with the MCA, has given written approval for a decommissioning plan.	TVL plans to prepare a decommissioning plan ahead of construction of the proposed scheme. As there is currently no legislation in place in NI covering the requirement for a decommissioning plan - the practicalities of the mechanism for approving a decommissioning plan will need to be clarified.	Marine Licensing will have decommissioning conditions leading to a decommissioning licence variation when the time of dimensioning arises.
44	MCA	Any consented cable protection works must ensure existing and future safe navigation is not compromised, accepting a maximum of 5% reduction in surrounding depth referenced to Chart Datum.	TVL will carry out a cable risk assessment of the final route to ensure adequate cable protection is designed. Where this may result in a > 5% reduction in the existing water depth anywhere along the route then TVL will consult MCA on this issue.	Marine Licensing Will condition the licence to mirror MCA request and TVL response.
45	MCA	The licence holder must complete periodic hydrographic surveys of the consented area or subsections thereof, to the IHO Order 1a survey standard. On completion of these surveys the results and a corresponding report of survey must be supplied to the MCA Hydrography Manager.	Proposed consent condition acceptable to TVL.	Marine Licensing accept proposed condition
46		The applicant should be made aware of the following:		
47	MCA	Any jack up barges / vessels utilised during the works/laying of the cable, when jacked up, should exhibit signals in accordance with the UK Standard Marking Schedule for Offshore Installations.	Proposed consent condition acceptable to TVL.	Marine Licensing accept MCA proposal as a licence condition
48	MCA	No radio beacon or radar beacon operating in the Marine frequency bands shall be installed or used on the works without prior written approval by OFCOM.	Proposed consent condition acceptable to TVL.	Marine Licensing accept MCA proposal as a licence condition

49	MCA	If in the opinion of the Secretary of State the assistance of a Government Department, including the broadcast of navigational warnings, is required in connection with the works or to deal with any emergency arising from the failure to mark and light the works as required by the consent or to maintain the works in good order or from the drifting or wreck of the works, the owner of the works shall be liable for any expense incurred in securing such assistance.	Proposed consent condition acceptable to TVL.	Comments noted
50	UAF	Page 12-19 'Species such as salmon with poor sensitivity to sound pressure are only likely to detect the tidal array at a distance of less than 1 m' This statement seems extremely strange when salmon have a lateral line the length of the body and are well known to respond to sound when anglers tread on gravel in rivers. This seems to be a basic factual error.	Appreciate the comment made, however it is perhaps based on anecdotal rather than scientific evidence. Full details of the underwater noise assessment including modelling and assessment criteria is presented in the underwater noise technical report (Xodus 2014). The assessment methodology is based on best available guidance and an extensive literature review (see also response 119) and presents a robust assessment based on information and data available. Based on the scientific evidence presented in the underwater noise report it is worth noting that salmon are approx. 20dB less sensitive to sound pressure than herring (see section 3.3.2 in the underwater noise report).	Marine Licensing note the information provided by UAF and the scientific evidence provided by TVL. We note that the UAF comments on Salmons ability to detect devices at a greater distance. In the absence of science-based evidence on the UAF statement we believe that TVL have taken a scientific based precautionary approach in the Environmental Statement based on available information.
51	UAF	Page 12-27 'Species such as salmon with poor sensitivity to sound pressure are only likely to detect the tidal array at a distance of less than 1 m' This statement is ludicrous .	Appreciate the comment made, however it is perhaps based on anecdotal rather than scientific evidence. Full details of the underwater noise assessment including modelling and assessment criteria is presented in the underwater noise technical report (Xodus 2014). The assessment methodology is based on best available guidance and an extensive literature review (see also response 119) and presents a robust assessment based on information and data available.	Marine Licensing note UAF disagreement with the statement, it does not change the Environmental Statement conclusions. No further action or reassessment required.

52	UAF	The acoustic comments in general seem to be based on a series of unsupported assumptions. There are many aspects which can be challenged. It is noticeable that the tip speed is not mentioned – we estimate this at up to 60 miles per hour. The effect of this on migrating salmon has not been sufficiently examined.	Full details of the underwater noise assessment including modelling and assessment criteria is presented in the underwater noise technical report (Xodus 2014). The assessment methodology is based on best available guidance and an extensive literature review (see also response 119) and presents a robust assessment based on information and data available. The modelling carried out to inform the assessment would have considered an acoustic signature generated by turbines and all those components or processes that would contribute to that signature.	Marine Licensing believe that TVL have taken a scientific approach based on available literature and followed through with a precautionary approach in the Environmental Statement. Collision risk modelling was not considered an appropriate assessment method. INLAND FISHERIES have informed Marine Licensing that based on the Environmental Statement conclusions they do not have major concerns on the impact on Salmon from the project. Marine Licensing see the acknowledgement of impact assessments on fish as a data gap in the industry at present. Marine Licensing would expect data to be provided to validate the Environmental Statement. If validating data is not available at the time of build out then monitoring may be required such as camera installation on selected devices as part of the EMP.
53	UAF	Page 12-30 Post-smolts; there is much unsupported content here; 'Studies on the depth distribution of post-smolts migrating to the open sea suggest they tend to stay very close to surface, where they would not be affected by the tidal turbines.' But previously we were told tips would come to within 8m of sea surface. Less at low tide – with tips at 60 mph post smolts must be affected. Again there are many comments in general which seem to be based on a series of	The 8 m clearance between the tips of the turbine and the sea surface is the minimum clearance (at LAT) (see Table 5.2 of ES) for the worst-case project envelope, it is therefore incorrect to assume that this distance between the sea surface and turbines will be less at low tide. See also response to comment from SNH (comment 21), the assessment presented on page 12-30 provides back up references where these are available. Collision risk was assessed	Marine Licensing note the concern of the UAF. The TVL Environmental Statement identified no likely significant impacts on smolts. Collision risk modelling was not considered an appropriate assessment method.

		unsupported assumptions. There are a series of aspects which can be challenged.	by TVL, and the significance was determined to be not significant. This was a qualitative assessment that was partly informed by collision risk modelling that was undertaken for the Meygen project. Rotation speed is a parameter used to inform this type of modelling.	INLAND FISHERIES have informed Marine Licensing that based on the Environmental Statement conclusions they do not have major concerns on the impact on Salmon from the project.
54	UAF	Para. Headed 'EMF' There are two contradictory statements here – either salmon are affected, or they are not. 'the magnetic field from the cables (export and inter-array) will be well below that of the Earth's magnetic field' We simply do not believe that 33 kva cables from an array of this magnitude will have no significant EMF. The cables will be in shallower water near landfall and there must be a risk here, and possibly elsewhere.	The conclusion drawn in the Environmental Statement Section 12.8.4 is based on the available published literature which indicate salmon have a medium sensitivity to EMF. This together with the fact that the project will only occupy a relatively small footprint and incorporate cable protection measures indicates that significant impacts are not expected. It is recognized that Marine Scotland are undertaking ongoing research into impacts of EMF, however in the absence of new information/data the above conclusion has been drawn based on current available information.	Marine Licensing note the concern of the UAF. The TVL Environmental Statement identified no likely significant impacts. INLAND FISHERIES have informed Marine Licensing that based on the Environmental Statement conclusions they do not have major concerns on the impact on Salmon from the project. Marine Licensing accepts that the Environmental Statement EMF assessment suggested no significant impact. The use HDD methods for cables route from the shoreline to a hub creating a cable free corridor between the project and the shore is a licensing preferred option. Alternatively burring cable and cable design can reduce EMF.

55	UAF	In general we feel the combined avoidance effect of the noise, EMF, and tip speed generating water movement, has not been given sufficient weight, particularly at low tides.	See responses to comments 50 to 54 above.	Marine Licensing understand the Environmental Statement used a worst-case scenario with 8m being at Lowest Astronomical tide. Marine Licensing accepts that the Environmental Statement assessment suggested no significant impact. INLAND FISHERIES have informed Marine Licensing that based on the Environmental Statement conclusions they do not have major concerns on the impact on Salmon from the project.
56	UAF	A stipulation of a maximum blade diameter to limit these effects in the upper part of the water is needed.	TVL is committed to ensuring a minimum 8 m clearance between the tips of the turbine and the sea surface (at LAT) (see Table 5.2 of ES), whatever the diameter of the turbine blade. In addition as stated in the project description in the Environmental Statement (see Table 5.2 of ES) the turbine blade diameter will not exceed 23 m. This will limit the potential impacts on salmon / smolts in the upper water column.	Marine Licensing will condition the licence to ensure 8m minimum depth at Lat, ES provided a maximum worst case scenario of 23m blade diameter. Marine Licensing will ensure this is not increased without further environmental consideration.
57	RSPB	ES_ACRONYMS Page 2: DOENI should read Department of the Environment not Department of Energy Northern Ireland.	Comment noted	Noted
58	RSPB	ES 6 CONSULTATION PROCESS Page 6-1: ´For successful stakeholder engagement it is essential that the following is	TVL appreciate the comment made by the RSPB on them not having timely access to the draft HRA prior to the meeting held to discuss the report.	Marine Licensing note RSPB comment and TVL response – We believe that the provision of a timeframe after the meeting allowed for attendees to provide comments,

		undertaken: (...) information is issued at the appropriate time to all interested parties in an accurate and understandable manner'. In this regard, while RSPB appreciated being invited to a consultation meeting (20th January) where the HRA was to be discussed, we nevertheless were disappointed that we had no access to draft HRA timely before the meeting. As a consequence, RSPB had a short deadline to submit comments on the draft HRA.	TVL therefore invited RSPB to submit their detailed comments after the meeting. These were received on 29/01/2015 via DoE and were addressed as appropriate prior to final submission as set out in the Master TVL Stakeholder Comments Matrix document.	consider the document and submit responses.
59	RSPB	ES_11 ORNITHOLOGY Page 11-17: 'Fulmar numbers and distribution around the UK and Ireland have increased considerably since the mid-19th century (Pennington et al., 2004)'.RSPB regards this information/statement as incomplete. While census data does indicate a large increase between 1969-70 and 1985-88 with numbers then stable between up to 1998-2002. Data collected by the SMP suggest the abundance of fulmars breeding in the UK reached a peak in 1996 but appears to have been declining since then although there is some fluctuation around the turn of the century. The indices in 2012 and 2013 are among the lowest values recorded since 1986; only in 2007 was it lower (Mitchell et al., 2004).	The fulmar population started to increase in Britain and Ireland from the Mid-19th century. Further investigation into the Fulmar population in Antrim indicates that it has increased in all three national seabird surveys. The Antrim population in 1969-70 was 1,821 pairs, increasing to 2,792 pairs between 1985 & 1988 and increasing further to 4,706 pairs in Seabird 2000 surveys (1998-2002), per Mitchell et al 2004. There has been no national survey since, therefore this is the most recent data available. Numbers on Rathlin Island itself increased from 1,482 pairs in 1985-1988 to 2,032 pairs in Seabird 2000 (1998-2002) (Mitchell et al 2004).	Marine Licensing in liaison with NIEA note RSPB comment and TVL response – no action or further assessment required.
60	RSPB	Page 11-17: The reference Pennington et al., 2004 is not present on the chapter list of references.	Noted. Relevant reference is Pennington, M., Osborn, K., Harvey, P., Riddington, R., Okill, D., Ellis, P. & Heubeck, M. 2004. Birds of Shetland. Christopher Helm.	Noted
61	RSPB	Page 11-17: 'Seabird 2000 estimated the Great Britain population to be 499,081 pairs, with an estimated all-Ireland breeding population of 38,910 pairs. The Seabird 2000 population estimate for Northern Ireland was 5,992 pairs (Mitchell et al., 2004)'.The term Great Britain should be used with caution as it could be misleading. Great Britain includes England, Scotland and Wales. The value presented in the report (for all species) is not Great	The point raised is understood and fair. However the difference in the population numbers for the different species considered in the EIA will not be significant and not materially affect the overall conclusions of the impact assessment. TVL does therefore not propose to review the numbers for all species.	Marine Licensing in liaison with NIEA note RSPB comment and TVL response – no action or further assessment required.

		Britain population, but instead the total for Great Britain, Isle of Man and Channel Islands. The UK total is 505,073 pairs and Great Britain would be (485,852 + 6,291 + 3,474) 495617 pairs (Mitchell et al., 2004). Review for all species.		
62	RSPB	Page 11-21: 'There are no designated SPAs in the UK for black guillemot as it is not considered migratory in the UK, nor is it listed on Annex 1. The Clyde Sea Sill Marine Protection Area (MPA) has recently been designated as it provides a rich feeding area for black guillemot (SNH, 2014). The AfL area is outside the mean maximum foraging range (12 km) of black guillemots using this MPA (Birdlife International, 2014)'.There is an MCZ proposed by Marine Division DOE in Rathlin Island for the protection of black guillemots, and this should be stated here, as it is inside the mean maximum foraging range for black guillemots (Rathlin is 11 km from the development site). The birds observed in the AfL area probably are connected with Rathlin Island. See http://www.doeni.gov.uk/mcz site summary-rathlin_pmcz-version1.1.pdf	Agree no reference has been made to the Rathlin Islands MCZ for the protection of black guillemots on page 11-21 in the description of this species. However it is referenced in Section 11.4.6 on conservation designations and impacts on this species have been considered in the impact assessment. No significant impacts on this species are identified. Black guillemot at the Rathlin Islands MCZ has not been considered in the HRA as the HRA process focuses on impacts on Natura sites only (i.e. SPAs and SACs).	Marine Licensing in liaison with NIEA note RSPB comment and TVL response – no action or further assessment required.
63	RSPB	Page 11-28: 'Conservation designations' could include a reference to recently proposed SPAs by NIEA (proposed East Coast SPA for foraging terns and rafting Manx shearwaters)	We are not aware of anything in the public domain on the proposed East Coast SPA and there was no advice on this proposal provided during consultation, therefore it was not possible to consider the proposed SPA in the HRA. However the HRA did investigate the potential impacts on Manx shearwater which are a qualifying interest of a number of SPAs within foraging distance of the Project area. This assessment concluded that there were no Likely Significant Impacts (LSE) due to the low number of Manx shearwater recorded in the Project study and AfL areas and that all birds recorded were in flight, so the AfL is not a key foraging area for this species. Also as a typically shallow plunge diver they are also of low susceptibility to collision impacts with, or	Marine Licensing in liaison with NIEA note RSPB comments and TVL response – no action or further assessment required unless proposals are published prior to consent then HRA will require an amendment to consider impacts on new designations.

			displacement due to the presence of submerged turbines.	
64	RSPB	Page 11-28: 'It is acknowledged that there is potential for the waters around the Torr Head Tidal Array Project to be used during passage periods (non-breeding) by birds from more distant SPA breeding populations. However, the degree to which these birds would be impacted is very hard to assess. For the purposes of assessing impacts on SPAs, SNH & JNCC are on record as saying that "the reference population for HRA is the breeding population as there is no agreed method to assign connectivity between Project areas and SPAs in the non-breeding season, when many of the individuals recorded at sea do not breed at SPA colonies within (breeding season) foraging range" (SNH & JNCC, 2014). As the numbers of birds recorded within the Torr Head Project area throughout the year on baseline surveys was low, it can be concluded that any impact on non-breeding populations of birds on passage to / from more distant SPA breeding populations (outside breeding season foraging range) would be very low, and therefore not significant. 'Even if it is more difficult to define regional seabird populations during the non-breeding season, RSPB believes that the developer should have tried to assess the impact of the development in non-breeding birds. There are some recent attempts to deal with this subject - See Biologically Defined Minimum Population size (BDMPS) research project commissioned by the UK statutory nature conservation bodies (Furness et al., 2014) and other information available from ESAS season-specific density surface maps (Kober et al. 2010).	RSPB recognise that the potential impact on nonbreeding birds is very difficult to assess. TVL and their ornithologists agree and based on the very low numbers of birds on site together with the insignificance of impacts predicated, it was not deemed necessary and would not alter the overall findings of the ornithological assessment. This is an issue that has come up in relation to Scottish offshore wind projects, but there is recognition that it is pretty much impossible to know what the nonbreeding population is. In addition, it is worth noting that SNH has not raised any issues with regards to the potential impacts on nonbreeding birds. There is no SPA populations to assess against as the SPAs are only designated for breeding species in the summer months.	Marine Licensing in liaison with NIEA note RSPB comment and TVL response. Marine Licensing wish to take a precautionary approach and would suggest that Standing Advice such as seasonal speed limits can be created based on bird presence. However guard vessels must be cable of moving at speed for health and safety reasons.
65	RSPB	Page 11-42: 'Overall, although the sensitivity of seabirds to disturbance by boat traffic varies between low and high the magnitude of the impact is assessed as negligible or minor for all species. This is based on a combination of the time of year when construction vessels are most likely to be	As presented in Section 11 of the Environmental Statement, very low numbers of birds were recorded on the TVL project site during site specific surveys; the project area is not an important area for birds and the impact assessment has concluded no significant impacts	Marine Licensing in liaison with NIEA note RSPB comment and TVL response – With the highest species value only 0.3% presence in the study area we note the potential for a 1% population likely significant impact is low.

		present (this is most likely to be April to December although they could be present all year weather permitting), overall low importance of the AfL area for foraging, time of year each species has been recorded on site (Table 11.10), limited number of vessels involved in TSS and turbine installation, short term (installation to occur over two years) and localised nature of the predicted impacts. The overall impact for all species is summarised below. No mitigation measures have been identified for this impact as it was concluded that the impact was not significant'. Even if the impact was considered not significant, RSPB would advocate that some mitigation measures are proposed as a precautionary principle for disturbance/displacement due to increased boat traffic. This would include for example a speed limit for vessels during construction and maintenance activities, and trying to avoid big operations (with high disturbance levels associated) during the most critical periods of seabirds breeding season.	on birds from the proposed project. The EIA has demonstrated that mitigation is not required in order to manage impacts on birds, therefore the implementation of any mitigation in this regard would be contrary to overall philosophy of EIA.	Marine Licensing wish to take a precautionary approach and would suggest that Standing Advice such as seasonal speed limits can be created based on bird presence. However guard vessels must be cable of moving at speed for health and safety reasons. This focuses management on groups of birds, Although individual birds could be affected by vessels / noise during turbine installation. It would not be expected to have any significant effects at population level.
66	RSPB	Page 11-47: 'Overall, the sensitivity of seabirds to underwater noise was assessed to be high for diving species and low for more aerial species, based on Leopold and Camphuysen (2009). Although there is likely to be some noise generated during installation, the magnitude of the impact was assessed as negligible for all species. This was based on a combination of the time of year when installation activities are most likely to occur (this is most likely to be from April to December although these could occur throughout the year subject to suitable weather windows), the time of year each species has been recorded on site (Table 11.14), and the short term, localised nature of the predicted impacts. No mitigation measures have been identified for this impact as it was concluded that the impact was not significant'. Even if the impact was considered not significant, RSPB would advocate that some mitigation measures are proposed as a precautionary	As presented in Section 11 of the Environmental Statement, very low numbers of birds were recorded on the TVL project site during site specific surveys; the project area is not an important area for birds and the impact assessment has concluded no significant impacts on birds from the proposed project. The EIA has demonstrated that mitigation is not required in order to manage impacts on birds, therefore the implementation of any mitigation in this regard would be contrary to overall philosophy of EIA.	Marine Licensing in liaison with NIEA note RSPB comment and TVL response – Although not identified as a requirement within the EIA or as mitigation for birds within the HRA Marine Licensing believe that a soft start or ramping up of any high noise generation to be a reasonable licence condition. Marine Licensing expect that hydrophone deployment will provide some validation data on noise levels and the capacity to affect birds.

		principle for underwater noise. This would include for example conducting operations that generate high levels of noise (drilling) in the season when least sensitive birds are present in the area and increase gradually the sound levels when drilling.		
67	RSPB	Page 11-48: 'Disturbance due to maintenance activity during the operational phase is expected to be of a similar nature to that discussed in relation to vessel traffic discussed above (Impact 11.1). However, since maintenance activity will be at a lower intensity and frequency than during the construction period (although it could occur sporadically over a long-term period), the impacts will all be of lower negligible magnitude (Table 11.10). No mitigation measures have been identified for this impact as it was concluded that the impact was not significant'. As with vessel traffic disturbance even if the impact was considered not significant, RSPB would advocate that some mitigation measures proposed as a precautionary principle for disturbance/displacement due to maintenance activity. This would include for example a speed limit for vessels during construction and maintenance activities, and trying to avoid big operations (with high disturbance levels associated) during the most critical periods of seabirds breeding season.	As presented in Section 11 of the Environmental Statement, very low numbers of birds were recorded on the TVL project site during site specific surveys; the project area is not an important area for birds and the impact assessment has concluded no significant impacts on birds from the proposed project. The EIA has demonstrated that mitigation is not required in order to manage impacts on birds, therefore the implementation of any mitigation in this regard would be contrary to overall philosophy of EIA.	Marine Licensing in liaison with NIEA note the comments from RSPB which reflect comments received from NIEA ornithology regarding breeding seasons. TVL suggest that mitigation would be contrary to the EIA philosophy as the EIA concluded no significant impacts based on the survey data recorded. Marine Licensing understand this stance and believe that although mitigation must reflect the Environmental Statement as the construction of a tidal array is a new prospect, validation of the Environmental Statement is warranted. Marine Licensing wish to take a precautionary approach and would suggest that Standing Advice such as seasonal speed limits can be created based on bird presence. However guard vessels must be cable of moving at speed for health and safety reasons.
68	RSPB	Page 11-56: 'Overall, the sensitivity of seabirds to collision impacts from underwater turbines was assessed to be medium for species that regularly dive below 8 m in depth, and negligible for species	Despite EIA work to date for large scale tidal arrays clearly predicting insignificant impacts from potential collision with underwater tidal turbines (and some of this work being based on numerical	Marine Licensing believe that specific monitoring for bird collisions would not be feasible or warranted due to the low number of diving birds which may encounter the

		that feed at or just below the water surface, based on the minimum depth of the turbine blade tips at LAT (8 m) (Table 11.18). The magnitude of the impact was assessed as negligible for all species. This was based on a comparison of peak estimated number of birds within the AfL area against the Regional SPA breeding population within mean maximum foraging range, where possible. Where this was not possible, magnitude was assessed in terms of the numbers and seasonal distribution of seabird species within the AfL area. No mitigation measures have been identified for this impact as it was concluded that the impact was not significant'. Even if the impact from collision risk to diving birds was assessed being not significant the project should include, as a precautionary principle, some mitigation measures such as future monitoring programs to better understand avoidance behaviour and mortality (through cameras on turbines for example).	modelling) as yet there is no in water monitoring evidence to back this up. This is a strategic industry issue, and any such monitoring should be tackled strategically rather than being expected on a project by project basis. There is a strong argument to be made that based on the assessment results we are unlikely to learn anything if we undertook bird monitoring at this specific site due to the very low numbers of birds present on the site.	turbines. Marine Licensing in liaison with NIEA believe that site Monitoring should include two years monitoring for birds presence/behaviour at the site post construction with a review period after one year. This will allow Environmental Statement validation and the assessment of any unexpected changes on interaction or impacts of the array. Marine Licensing would suggest that sea birds are given consideration with the monitoring plan. Section 21.3.1 of the Environmental Statement provides information from test sites which, it could be argued, adds weight to the argument for some ornithological monitoring. <u>Records of fish assemblage around devices at low flow periods</u>. The assemblage of fish is potentially an important behavioural change both for the fish and the animals which prey on them, including mammals and birds. This suggests that diving bird behaviour could change around the devices and thus ornithological concerns should not be completely removed from any monitoring considerations.
69a	RSPB	Page 11-57: 'Overall, the sensitivity of seabirds to indirect effects due to impacts from operational turbines on their prey was assessed to be medium for all species (Table 11.18). The magnitude of the impact was assessed as negligible for all species. This was based on the prey species likely to be present and the significance of collision impact on fish species present in the area being assessed to be minor (Chapter 12: Fish Ecology). No mitigation measures have been identified for this impact as it was concluded that the impact was not significant'. Even if the impact was assessed being not	Despite EIA work to date for large scale tidal arrays clearly predicting insignificant impacts from potential collision with underwater tidal turbines (and some of this work being based on numerical modelling) as yet there is no in water monitoring evidence to back this up. This is a strategic industry issue, and any such monitoring should be tackled strategically rather than being expected on a project-by-project basis. There is a strong argument to be made that based on the assessment results we are unlikely to learn anything if we undertook bird monitoring at this	Marine Licensing understand the wider data gap issues for the industry. We acknowledge the TVL response indicating low value in monitoring at the site due to low numbers present and low impacts predicted.

		significant the project should include, as a precautionary principle, some mitigation measures such as future monitoring programs to better understand fish aggregation and seabirds use of the area to feed (cameras in the infrastructures)	specific site due to the very low numbers of birds present on the site.	Marine Licensing in liaison with NIEA is of the opinion that a two-year monitoring programme, with review after one year, will ensure Environmental Statement predictions can be verified and will ensure any unpredicted effects of the project are identified. Records of fish assemblage around devices at low flow periods. The assemblage of fish is potentially an important behavioural change both for the fish and the animals which prey on them, including mammals and birds. This suggests that diving bird behaviour could change around the devices and thus ornithology should not be completely removed from any monitoring considerations. The EMP and science group will provide guidance on the monitoring.
69b		Page 11-58: ´Interconnector and telecommunication cables were considered very unlikely to have significant impacts on seabirds, and so were ruled out of this cumulative impact assessment´. Interconnector cables operations (e.g. construction) could have an impact on seabirds if not accompanied by appropriate mitigation plans.	The potential for cumulative impacts with interconnectors and telecommunications cables is from vessel disturbance impacts during the construction phases of the projects. This would only be possible if other projects were to be constructed / installed at the same time as the Torr Head. Vessel disturbance impacts from the Torr Head project have not been assessed as significant. The number of vessels associated with other potential projects would be of a similar order of magnitude or less and therefore in themselves would not be expected to result in significant impacts on birds. Based on the large geographical separation of interconnector and telecommunications cables from the Torr Head project (see Environmental Statement Figure 8.2) potential cumulative impacts on birds are not expected.	Marine Licensing in liaison with NIEA note the RSPB Comments and TVL response. We are of the opinion that cumulative impacts are unlikely however cable construction may cause disturbance at the inshore locations and breeding season constraints may be implemented pending works methods..

71	RSPB	Page 11-60: RSPB considers the cumulative impact assessment to be weak. It always states the same reason, being that each of the projects has found that the development has no significant impact, so all together they will not have any impact. However, on page 11-62 for razorbill and for guillemots the EIA Scoping Report from the Fair Head Project concluded that razorbill densities in the breeding season would be high, but despite this, the final conclusion in the report is the same as for the other species with no mitigation measures necessary.	TVL disagree. At the time the Torr Head Environmental Statement was prepared, there was no baseline data available for the Fair Head project, which limited what we could do in terms of CIA. Also, for the majority of species in the TVL site, where sample size was limited, we couldn't calculate densities and hence estimate numbers of birds within the site, therefore a quantitative assessment was not possible. As a consequence, the CIA was based on a subjective approach using survey results from the TVL site, and the Fair Head Scoping Report. As no significant impacts were identified with regards to displacement or collision from the Torr Head Project alone, and in the absence of baseline data from the Fair Head project, it was concluded that cumulative impacts for these two projects would not be significant. It is also worth noting that TVLs bird and mammal survey strategy incorporated the Fair Head Tidal site into its geographical scope for the entire survey period.	RSPB comments noted along with TVL response. Marine Licensing in liaison with NIEA are content that TVL Environmental Statement assessment was based on survey data which incorporated the FHT site and thus the cumulative impact assessment holds more weight than suggested. In the event of both projects being involved in construction within the same period the EMP for both projects should reflect this. The EMP will seek to validate Environmental Statement conclusions.
72	RSPB	Page 11-63: ´Proposed monitoring: No monitoring programmes are proposed for seabirds on the basis that no significant impacts have been identified as part of this assessment´. RSPB disagrees with this statement. There should be some monitoring programmes planned for construction, operation and decommissioning phases of the project.	Monitoring is only merited where project specific impacts are identified and cannot be mitigated. The EIA has clearly demonstrated that mitigation is not required in order to manage impacts on birds, and therefore no monitoring is deemed necessary. It is also worth noting that it is unlikely that it would be possible to learn anything if undertook bird monitoring at this specific site due to the very low numbers of birds present.	Marine Licensing note the RSPB comments and the TVL response. Whilst acknowledging the Environmental Statement findings it is clear that in some instances, especially with a new technology deployment, monitoring can be required to validate Environmental Statement conclusions. Marine Licensing in liaison with NIEA believe that seabirds

				must be given consideration within the EMP. This will allow Environmental Statement validation and the assessment of any unexpected changes on interaction or impacts of the array.
73	RSPB	ES_21 ENVIRONMENTAL MANAGEMENT & MONITORING Page 21-1: RSPB requests that it be consulted in the development of the Environmental Management Plan (EMP).Page 21-2: As with marine mammals, and because the encounter modelling is still underdeveloped for seabirds, TVL should develop an appropriate and practical adaptive monitoring plan in consultation with regulators and other key stakeholders for the species in order to ensure that potential impacts on seabirds (e.g. guillemot and razorbill) from collision risk remain to be not significant as predicted. Also, besides the boat survey and vantage point observations, the operational monitoring should include surveying seabirds on the cliffs close by to compare over time (breeding population and productivity).	Monitoring is only merited where project specific impacts are identified and cannot be mitigated. The EIA has clearly demonstrated that mitigation is not required in order to manage impacts on birds, and therefore no monitoring is deemed necessary. It is also worth noting that it is unlikely that it would be possible to learn anything if we undertook bird monitoring at this specific site due to the very low numbers of birds present. The membership of the proposed Science Group will be confirmed in consultation with DoE.	Marine Licensing understand RSPB have concerns over perceived risks to birds, we must also acknowledge the EIA study and Environmental Statement findings which identified no risks to bird populations as a result of the development. However as a tidal array is a new type of validation monitoring will be required. Marine Licensing intend to keep RSPB informed of their licensing decisions and discussions. NIEA ornithologists have advised marine licensing they do not consider cliff breeding populations to be a significant therefore not further assessment is required.
74	RSPB	HABITAT REGULATIONS ASSESSMENT (HRA) – Seabirds General Comments; The HRA still lacks seasonal presentation of data. The presentation of combined data masks some seasonal variation which may be important. For example, it is apparent that numbers of guillemot and razorbill peak in the development area in the post breeding period and breeding seasons. We acknowledge that surveys have to be carried out in fair weather, however bird distribution and abundance also may change as a consequence of sea state and nothing can be said about this on	With regards to the HRA the assessment has focused on potential impacts on breeding bird populations only. This is because SPAs are designated for their breeding populations only. This approach is now becoming accepted in Scotland with regards to the assessment of impacts from offshore wind farms.	The assessments focus on breeding populations was considered appropriate by Marine Licensing in liaison with NIEA. Marine Licensing understand the difficulties in surveying the site during adverse weather. The site usage during the surveys was low we would not expect the site usage to increase greatly during adverse weather as it is an exposed

		the basis of the data collected, for example whether birds are more likely to use the area in rough conditions because it´s sheltered, or less likely to do because it is exposed.		are of coast with a strong tidal race.
75	RSPB	Page 19: When discussing the vulnerability index developed by Furness et al., (2012) it should be noted that one of the conservation factors used is the percentage of the biogeographic population in Scotland. This does not represent the percentage of the biogeographic population occurring in Northern Ireland.	TVL agree that the population differences between Scotland and Ireland will influence the vulnerability scores. TVL has therefore undertaken a review of these criteria. Razorbill and gannet are the species of most concern and in relation to these: Razorbill, population size is usually presented in terms of the All-Ireland population e.g. in Seabird 2000 (Mitchell et al 2004). Applying this approach to the Furness et al vulnerability rankings would give a lower ranking in terms of vulnerability for guillemot & razorbill as the all-Ireland breeding population is lower than the Scottish population and so the overall percentages of the biogeographic population in an all-Ireland context for both these species would be lower (e.g. all-Ireland population of Guillemot is 6.5% of biogeographic population, compared to 25% for Scottish pop. All-Ireland breeding population for Razorbill is 6.5% of biogeographic population, compared to 17% for Scotland). Overall, this would reduce the "Total importance Score" calculated in Furness & Wade 2012 from 16 in Scotland to 14 for all-Ireland for Guillemot, and from 16 in Scotland to 15 for all-Ireland for Razorbill. This would result in a slightly lower vulnerability overall for both these species, so using the higher Scottish population has resulted in a conservative assessment.	RSPB Comment noted along with TVL clarification based on revised data example.
76	RSPB	Page 20: Table 2.6 'There are several SPAs in Scotland and Ireland where fulmar is listed as a qualifying interest in the breeding season within mean maximum foraging range (400 km) (Thaxter et al., 2011). The nearest of these (Horn Head to	Agree that Rathlin Island is the closet SPA of which fulmar is a qualifying interest. However based on the low numbers of fulmar recorded on site (Table 2.2 page 12 of the HRA report) the current assessment of no LSE still stands.	Comments noted. Marine licensing, in liaison with NIEA, consider no further action or assessment to be required.

		Fanad Head) is approximately 97 km from the AfL area'. Please note that the closest SPA is Rathlin at approximately 11km. Under Article 4.2, Rathlin SPA regularly supports over 20,000 breeding seabirds (including fulmar).		
77	RSPB	Page 21 Table 2.6: ´Although Rathlin Island SPA regularly supports populations of Manx Shearwater they are not a qualifying interest of this site´. Unfortunately, Rathlin does not regularly support populations of Manx shearwater, as they have now been absent from the island for some years.	Agree with comment that Manx shearwater are no longer present on Rathlin Island (despite being a qualifying feature of this site (Table 2.3 page 13)) and text in Table 2.6 (page 21) should reflect this. Despite this the current assessment of no LSE still stands.	Comments noted. Marine licensing, in liaison with NIEA, consider no further action or assessment to be required.
78	RSPB	Page 21 Table 2.6: 'The mean extrapolated abundance estimate for gannet was calculated at 8 for the Project study area and 0 for the AfL area (NPC, 2014a)'.Mean extrapolated abundance estimate should provide an indication of the associated variation, either by quoting the variance or presenting 95% confidence intervals. This information will enable the assessor to determine whether there is a large or small range of variation around the mean, which makes a considerable difference to interpretation. Without this information, the mean may be misleading.	Review of the numbers used to inform the HRA has highlighted that sample size was too low and although Table 3.10 in the NPC report does give 'extrapolated abundance estimates and confidence limits' these are not reliable. DISTANCE analysis was not possible.TVL therefore suggest that the peak monthly counts of birds within the AfL area (on the boat-based surveys) would be a more appropriate metric to inform the HRA. For gannet this was 16 birds in September (Table 3.4 NPC 2014a). The peak number of 16 birds in the AfL accounts for 0.03 % of the Ailsa Craig SPA breeding population (54,260 birds).Based on the use of the peak monthly count for gannet, rather than the extrapolated abundance estimates, there is no change to the overall findings of the HRA	RSPB comments noted. TVL have explained the methods used in light of the low survey numbers. Comments noted. Comments noted. Marine licensing, in liaison with NIEA, consider no further action or assessment to be required.
79	RSPB	Page 23 Table 2.6: 'The mean extrapolated abundance estimate for puffin was calculated as 0 for the AfL area and 3 for the Project study area'. Mean extrapolated abundance estimate should provide an indication of the associated variation, either by quoting the variance or presenting 95%	Review of the numbers used to inform the HRA has highlighted that sample size was too low and although Table 3.10 in the NPC report does give 'extrapolated abundance estimates and confidence limits' these are not reliable. DISTANCE analysis was not possible.TVL	RSPB comments noted. TVL have explained the methods used in light of the low survey numbers. Marine licensing, in liaison with NIEA, considers no further action or assessment to be required.

		confidence intervals. This information will enable the assessor to determine whether there is a large or small range of variation around the mean, which makes a considerable difference to interpretation. Without this information, the mean may be misleading.	therefore suggest that the peak counts of birds within the AfL area (on the boat-based surveys) would be a more appropriate metric to inform the HRA. For puffin this was 8 birds in July (Table 3.4 NPC 2014a). The peak number of 8 birds in the AfL accounts for 0.6 % of the Rathlin Island SPA breeding population (1,390 birds).Based on the use of the peak monthly count for puffin, rather than the extrapolated abundance estimates, there is no change to the overall findings of the HRA.	
80	RSPB	Page 26 Table 2.6: 'Approximately 0.2 % of the population in the Project study area (based on mean abundance of 234 birds)'.Please note that both the lower and upper confidence levels are missing.	For guillemot it was possible to work out densities, and therefore monthly population estimates for the AFL. These are given in Table 3.9 of the NRP 12-month report. Peak estimated number was 406 birds in July, with minimum of 306 birds and max of 539 birds. 406 birds accounts for 0.3 % of the regional population (138,277 birds).There is no change to the overall findings of the HRA.	RSPB comments noted however as TVL suggest it would not affect the HRA findings. Marine licensing, in liaison with NIEA, considers no further action or assessment to be required.
81	RSPB	References	noted	On file
82	RSPB	ES 22 Onshore Planning (Part 2) The RSPB expect to be contacted at the scoping stage for the onshore component of the Torr Head Tidal Energy Array. We can advise on what the Environmental Statement (ES) should contain along with data sources and advice on bird surveys. We expect the Environmental Statement to provide sufficient information to allow assessment of the impacts of the proposed development on the environment, in accordance with The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2015 (the EIA Regulations).	Scoping consultation for both onshore and offshore elements was carried out in 2014. Scoping Opinion contained feedback from RSPB which was taken into account. All bird surveys offshore/onshore have been submitted to NIEA for approval.	Marine Licensing scoped for the marine EIS; Strategic Planning are the regulator for the planning permissions. Marine Licensing cannot control the planning processes however licensing inform planning of the RSPB request.

83	NCLFA	Our Association would wish to register its objections to the granting of any license to this project. Many of our members fish in the area of the proposed development and have done so for many decades. This is an important area for the inshore pot fishery and indeed is vital to the viability of the businesses operated by our members.	The commercial fisheries impact assessment was undertaken using all information that was made available to the project. This included consultation with fisheries interests and organisations over a two year period (2012 - 2014) and consideration of all available statistical and other data sources that were otherwise obtained. The Environmental Statement has concluded that there is the potential for long term displacement of fisheries from the turbine deployment area to have significant impacts on this local fishery (Sections 13.9.2 and 13.14). TVL is open to ongoing consultation in order to further quantify this potential impact. As stated in the Environmental Statement 'throughout the project TVL will maintain on-going consultation and liaison with the fishing community through the FLO in accordance with the FLOWW Best Practice Guidelines for Offshore Renewables Development: Recommendations for Fisheries Liaison (January 2014)'	Marine Licensing note the objection by the NCLFA. Under the MCAA Marine Licensing have a duty to consider legitimate uses of the sea we expect TVL to address the commercial fisheries concern under the FLOWW Best Practice Guidelines for Offshore Renewables Development. This will require TVL, the commercial fisheries and the fisheries regulator DARD to work closely to arrange a suitable outcome. NCFLA will be required to provide evidence of the importance of the AFL to facilitate any discussions following the FLOWW process.
84	NCLFA	Although we have had various meetings and discussions with the developers they have not made any substantive effort to address the concerns of our members over the potential loss of access to vital fishing grounds. There are potential navigation issues, which could impact significantly on our members' activities, particularly in adverse weather conditions, as well as safety. If this project was allowed to proceed it threatens the viability of numerous other legitimate businesses as a consequence of the inability of these fishermen to access their traditional fishing grounds. The developer has not made any effort to meet with us to address these concerns.	The commercial fisheries impact assessment was undertaken using all information that was made available to the project. This included consultation with fisheries interests and organisations over a two year period (2012 - 2014) and consideration of all available statistical and other data sources that were otherwise obtained. The Environmental Statement has concluded that there is the potential for long term displacement of fisheries from the turbine deployment area to have significant impacts on this local fishery (Sections 13.9.2 and 13.14). TVL is open to ongoing consultation in order to further quantify this potential impact. With regards to the potential safety issues, the navigational risk assessment identified a number of potential risks, such as	TVL have stated their commitments to follow FLOWW guidelines on commercial fisheries impacts. Marine Licensing are content that TVL are going through a proper assessment of the navigational risks with both the MCA, CIL and the UKHO. The aforementioned organisations provide advice to Marine Licensing on navigational risks.

			transiting vessel collision with subsea devices and fishing interaction with subsea equipment. Through the application of standard industry practice and additional, project-specific mitigation (identified during consultation and at the Hazard Review Workshop), all of the residual risks were assessed to be either broadly acceptable or tolerable (As Low As Reasonably Practical (ALARP) with mitigation). Further liaison with regulators (Commissioner of Irish Lights (CIL) and MCA) and stakeholders is planned to ensure the appropriate and effective implementation of proposed mitigation e.g. safety zones. With appropriate mitigation all shipping and navigation impacts are assessed to be not significant. Also as stated in the Environmental Statement 'throughout the project TVL will maintain on-going consultation and liaison with the fishing community through the FLO in accordance with the FLOWW Best Practice Guidelines for Offshore Renewables Development: Recommendations for Fisheries Liaison (January 2014)'.	
85	NCLFA	We would ask that consideration is given to our views. We are, of course, happy to meet with the developer or any other officials to discuss this, but the potential loss of access to grounds for our fishermen threatens their viability. These are all legitimate, established businesses who have been legitimately accessing and fishing this area for many years. Should the development proceed, they will be denied the opportunity to continue with their legitimate, customary and historic use of the area with the consequently inevitable and detrimental effects on these businesses.	The commercial fisheries impact assessment was undertaken using all information that was made available to the project. This included consultation with fisheries interests and organisations over a two year period (2012 - 2014) and consideration of all available statistical and other data sources that were otherwise obtained. The Environmental Statement has concluded that there is the potential for long term displacement of fisheries from the turbine deployment area to have significant impacts on this local fishery (Sections 13.9.2 and 13.14). TVL is open to ongoing consultation in order to further quantify this potential impact. As stated in the Environmental Statement 'throughout the project TVL will maintain on-going consultation and liaison with the fishing	Under the MCAA Marine Licensing have a duty to consider legitimate uses of the sea we expect TVL to address the commercial fisheries concern under the FLOWW Best Practice Guidelines for Offshore Renewables Development. This will require both TVL the commercial fisheries and the fisheries regulator DARD to work closely to arrange a suitable outcome. Marine Licensing aim to facilitate this process.

			community through the FLO in accordance with the FLOWW Best Practice Guidelines for Offshore Renewables Development: Recommendations for Fisheries Liaison (January 2014)'.	
86	Loughs Agency	After considering the Environmental Statement and supporting documents to the application, the Loughs Agency would have some concerns that the potential barrier impact on sea fisheries and on migrating salmonids may not have been as fully assessed.	Section 12 of the Environmental Statement presents the fish ecology impact assessment drawing on the data that was available at the time of assessment to inform its findings. The overall conclusion is that significant effects on Atlantic salmon are not predicted. Also for the reasons presented in Section 12.8.4 of the Environmental Statement, the project is not expected to present a barrier to movement of Atlantis salmon through the North Channel. However TVL does acknowledge (page 12-33) that there is a lack of monitoring data from tidal arrays confirming the nature of interactions between fish (including Atlantis salmon) and turbines. Despite this, based on modelling carried out for other tidal energy projects it is believed that potential fatal collisions between fish and turbines are unlikely to result in significant impacts on Atlantic salmon populations. This will however, be confirmed once the results of monitoring studies become available. Section 13 of the Environmental Statement acknowledges that there is a potential for impact on the Portaleen salmon fishery, but that this is not considered to be significant. Despite this, due to the close proximity of the project to the fishery TVL is committed to maintaining dialogue over this potential issue and undertaken any monitoring that is considered.	INLAND FISHERIES have informed Marine Licensing that based on the Environmental Statement conclusions they do not have major concerns on the impact on Salmon from the project. Marine Licensing acknowledge the Environmental Statement assessment that the project is unlikely to have a barrier effect. However as validation data is not currently available to Marine Licensing, monitoring may be required if data is not available at the time of construction.
87	DoE Maritime Archaeology	I raise no objection to the marine aspect of the Project (AfL area and proposed area of search for the export cable corridor), and I am content with the proposals and the mitigation as proposed in section 15.7 of the Environmental Statement (Torr Head Tidal Energy Environmental Statement – Chp 15: Marine Archaeology and Cultural	Comment noted and welcomed.	Comments noted.

		Heritage, 2015) prepared specifically for the Project by the Archaeological Diving Company (ADCO).		
88	DoE Maritime Archaeology	It is my understanding that any archaeological assessment of the potential landfalls at either Portaleen Bay or Loughan Bay will be dealt with separately and in full consultation with the Historic Environment Division (HED) who have curatorial responsibility for archaeology and cultural heritage to low water mark. It is perhaps worth informing the License applicant that the Centre for Maritime Archaeology (CMA), Ulster University and Historic Environment Division (referred to throughout the Environmental Statement as NIEA: HMU) are not first point-of-contact re: marine archaeology and that the applicant and/or archaeological consultant should contact this office directly re: marine archaeological matters in the future.	TVL note point of contact for archaeological consultation on marine matters in the future. TVL will ensure they consult with the Historic Environment Division (HED) during the onshore EIA.	Comments noted.
89	DoE Maritime Archaeology	It is noted that the final mitigation strategy for marine archaeology will be informed by a Project specific geophysical survey to inform detailed design of the tidal array carried out post consent submission. I would ask that any newly commissioned geophysical and/or geotechnical surveys are cognisant of archaeological survey requirements (as outlined in Plets et al., (2013), Marine Geophysics Data Acquisition, Processing and Interpretation, Guidance Notes. English Heritage 2013).	TVL will ensure that scope of geophysical surveys will take account of marine archaeological requirements and consult with DOE Marine Division.	Comments noted
90	DoE Maritime Archaeology	The production of a written scheme of investigation (WSI) and adoption of a suitable protocol for archaeological discoveries (PAD) should be applied as a condition of any marine license granted, with both documents to be approved by Marine Division prior to the commencement of Licensed activities.	Approval of WSI and PAD will be obtained prior to commencement of licensed activities.	Marine Licensing content with suggested conditions.

91	DoE Maritime Archaeology	The licence holder must prepare a Written Scheme of Investigation (WSI) in consultation with this Office to detail archaeological assessment and mitigation works necessary to inform the detailed delivery of the Project. The WSI must include: • An Archaeological Reporting protocol for the prompt reporting and recording of archaeological remains encountered, or suspected, during all phases of construction, operation and decommissioning. This must be set out in accordance with The Crown Estate Protocol for Archaeological Discoveries Offshore Renewable Projects (2014); • Responsibilities of the Licence Holder and archaeological consultant; • Details of contractors and curators; • Archaeological analysis and reporting of 'Project specific geophysical survey' data; • Delivery of mitigation including use of archaeological exclusion zones (AEZs) in agreement with this Office; and • Conservation, publication and archiving duties for archaeological material. Licensed activities must not commence until Marine Division has provided written approval of the WSI. Reason: To ensure the integrity of archaeologically important items is not compromised.	Approval of WSI (and PAD) will be obtained prior to commencement of licensed activities, including if appropriate the use of archaeological exclusion zones (AEZs).	Marine Licensing content with suggested conditions.
92	DARD – Local Fisherman	I am objecting to the site proposed as it is on lobster and crab fishing grounds so as you can appreciate it will have a big effect on my fishing patterns and earnings.	The commercial fisheries impact assessment was undertaken using all information that was made available to the project. This included consultation with fisheries interests and organisations over a two year period (2012 - 2014) and consideration of all available statistical and other data sources that were otherwise obtained. The Environmental Statement has concluded that there is the potential for long term displacement of fisheries from the turbine deployment area to have significant impacts on this local fishery (Sections 13.9.2 and 13.14). TVL is open to ongoing	Marine Licensing note the objection. Under the MCAA Marine Licensing have a duty to consider legitimate uses of the sea we expect TVL to address the commercial fisheries concerns under the FLOWW Best Practice Guidelines for Offshore Renewables Development. This will require TVL, commercial fisheries and the fisheries regulator DARD to work closely to arrange a suitable

			consultation in order to further quantify this potential impact. As stated in the Environmental Statement 'throughout the project TVL will maintain on-going consultation and liaison with the fishing community through the FLO in accordance with the FLOWW Best Practice Guidelines for Offshore Renewables Development: Recommendations for Fisheries Liaison (January 2014)'.	outcome.
93	UWT	Chapter 9 | Benthic and Intertidal Ecology Spatial coverage and methods of sampling. The baseline studies used in the EIA include geophysical surveys, Acoustic Doppler Current Profile (ADCP), video survey and camera survey. Data was also obtained from desk-based assessments of available geophysical data for the survey area. From these surveys, the EIA concludes that "No rare species, species of conservation interest or PMFs [Priority Marine Features] were identified in the sub tidal footprint of the Project". We are concerned that the sampling methods used, and the spatial coverage of stations have resulted in an underrepresentation of benthic species abundance and diversity within the project area. As a high energy site, many species are likely to occur in sheltered crevices and would not be visible from video and stills images. Diver surveys would allow a more comprehensive assessment of the project area. The camera survey locations shown in Figure 9.1 are restricted to the central zone of the Area for Lease (AfL), leaving large portions of the AfL and the majority of the area of search for the export cable unsurvey. The NIEA Sublittoral Survey of Northern Ireland (Goodwin et al., 2011) states that a number of Northern Ireland Priority Species have previously been recorded in the vicinity of the project area, including the scallop cushion sponge (Spanioplon armaturum), Leach's spider crab	The survey methodology was based on standard approaches and guidance for surveying the marine environment and sent to DoE for review prior to commencement of the survey. Although DoE observed that more species may have been identified with more detailed survey e.g. diver, it was agreed (at the meeting on 21/01/2015) that the survey method used was in line with standard practice for offshore marine projects and appropriate to support EIA. Due to health and safety issues associated with the use of divers in high tidal environments, a diver conducted survey was not considered appropriate for this project. Although the specific PMFs mentioned in this comment were not detected during the project specific survey, it doesn't mean to say that these species are not present. The impact assessment presented in the Environmental Statement assigned a sensitivity of medium (or above) for all receptors. One of the criteria for medium is 'site contains one or more PMF species or habitats' therefore we have already built in the assumption that PMFs may be present.TVL therefore disagree that further sampling is required. The overall conclusions of the benthic impact assessment remains unchanged from that presented in the Environmental Statement.	Marine Licensing note the comments from the UWT and the response from TVL. The drop down camera methodology was based on the risks associated with the area. Drop down camera is a standard methodology for benthic assessment, any forward facing bolder crevice is visible to the camera. This strategy was agreed with the MARINE conservation and reporting team as the appropriate method of sampling. The MARINE conservation and reporting team have confirmed they are content with the sampling and the Environmental Statement assessment of the area. Marine Licensing feel the method was appropriate and the Environmental Statement assessment to be reliable.

		(Inachus leptochirus), squat lobster (Munida rugosa), chiton (Tonicella marmoreal), variegated scallop (Chlamys varia), Northern sunstar (Solaster endeca) and sea squirt (Pyura microcosmus).Further sampling of the AfL and area of search for the export cable is required to ensure adequate assessment of the potential impacts on species of conservation importance.		
94	UWT	Sensitivity Assessments We welcome the consideration of designated Marine Protected Areas (MPA) including the Red Bay, Rathlin Island and Skerries and Causeway Special Areas of Conservation (SAC), in addition to the Rathlin Island proposed Marine Conservation Zone (pMCZ). However, the EIA does not consider the Red Bay pMCZ for seagrass beds (Zostera marina). The EIA states that a maximum amount of 11,760 m3 of drill cuttings may be released into the environment during installation operations. The impact of the release of drill cuttings and fluid is assessed as 'Not significant' due to dispersal into the surrounding environment. Given the close vicinity of the Red Bay pMCZ, we are concerned that the potential impacts on seagrass beds have not been considered. The JNCC sensitivity assessment of seagrass bed biotopes (d'Avack et al. 2014) states that this habitat type has a high sensitivity to changes in suspended solids and siltation rates. The impact of released drill cuttings and fluid should be reassessed with consideration of the Red Bay pMCZ and relevant sensitivity assessment for seagrass beds.	The Red Bay MCZ was proposed in March 2015 following completion of the EIA and during its review by The Crown Estate immediately prior to submission. Consideration of this proposed protected area was therefore not considered in the EIA (although the benthic impact assessment did identify the presence of seagrass bed in Red Bay - page 9-14). The Red Bay pMCZ is located approximately 20km from the Project area. The potential key impact on this habitat is from the release of drill cuttings during the installation of the turbine foundations. The worst case estimate of a total of 11,760 m3 of drill cuttings is from the installation of 100 turbines using a monopile foundation. As installation will take place over a 3 year period, the total discharge will be spread over this period. Each monopile will result in the discharge of only 117 m3 cuttings and this will take place over a number of days rather than instantaneously. A further discussion of the potential impacts is presented here. 1. Likely initial tidal excursion distance is less than the distance to the pMCZ: As a coarse estimate, using an average flood tide current speed of 1 m/s (see Figure 14-8) and an approximate flood tide duration of 5 hours, a very conservative estimate of the tidal excursion for any discharged particulate matter released at the start of the flooding tide would be approximately 18 km. This implies that any drill cuttings in suspension would	Marine Licensing note the comments in relation to the PMCZ. Although it was not considered due to the Environmental Statement completion date being prior to any announcement of the PMCZ Marine Licensing do not believe there would be any impact as a result of the development. The volume of drill cutting is an estimated collective maximum and would be released over a period of several years in smaller quantities. Even if the cuttings where released on mass, due to the distance from the pMCZ and the tidal mixing Marine Licensing in liaison with MARINE Conservation and Reporting do not believe there would not be a significant impact on the sea grass.

			not reach the Red Bay MCZ on the first tide as it is located 20 km to the south east of the AfL, and would instead be dispersed further to the north, to then return on the subsequent flood tide. 2. Net sediment transport is North Channel is northward: Once advected to the North Channel, any suspended particulate matter will tend to follow the net sediment transport direction in the North Channel which is northward (although there are small local reversals of this trend at certain locations dictated by complex interactions between tides, water depth and coastline (See Figure 14.19)). This suggests that any drill cuttings suspended in the water column will not be transported to Red Bay which is located ~20 km to the southeast of the AfL. 3. Any larger fragments of drill cutting are likely to settle out in the vicinity of the drill site: From Impact 14.1 , the drill cuttings are likely to consist of a fluid paste with larger fragments up to pebbled sized 'flakes', and the bentonite may form a very fine sediment suspension. The environment into which the drill cuttings will be released is highly energetic, so they will, for the most part, become widely dispersed into the surrounding waters, bringing about a localised and temporary increase in turbidity and very little in the way of perceptible sediment deposition. The larger debris generated during drilling, such as the pebble-sized flakes, is likely to settle within relatively close proximity to the drilling site. 4. At a radial distance of 20km and covering water depths of between 10 and 100m, any suspended fine drill cuttings are unlikely to contribute significantly above background levels of suspended sediment in the area at Red Bay pMCZ. An inspection of the seabed sediments in the vicinity of the pMCZ shows there to be	

			"gravelly sand" present. This corresponds to a lower energy environment than that at the AfL, and implies that there are likely to be particles in suspension in the water column anyway. 5. Existing assessment of wastewater discharges in Red Bay provide reassurance that the environment is highly dispersive: The pMCZ document produced by DOENI for Red Bay mentions the wastewater outfalls in the vicinity of Red Bay. It states that "Wastewater effluent is discharged from two sewage treatment works (outfalls) in Red Bay. Most waste waters from the Waterfoot area are pumped to Cushendall waste water treatment works. The screened effluent is discharged via a long sea outfall more than 2 km to the north east of the Waterfoot area. Although there is no secondary treatment for the discharge, the open condition of the Bay into the North Channel allows the effluent to disperse and water quality is in good condition."	
95	UWT	When assessing the impact of drill cuttings and fluid, the EIA highlights the presence of two conservation priority habitats requiring Northern Ireland Habitat Action Plans (NI HAP). The NI HAP habitat sublittoral sands and gravels is assessed as 'not sensitive' to increased suspended sediment concentrations or increased turbidity based on a sensitivity assessment of the corresponding EUNIS biotope A5.141 'Pomatoceros triqueter with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles' (Tyler-Walters 2002). This assessment, which used the Marine Life Information Network (MarLIN) methodology, is out of date. The relevant sensitivity assessment for subtidal sedimentary habitats (Tillin and Tyler-Walters 2014) states that this habitat type1 has a 'medium' sensitivity to changes in siltation rates. Sensitivity assessments of relevant habitat types have not been considered when	Thank you for making TVL aware of the 2014 published sensitivity assessment criteria. These were published during the latter stages of the preparation of the EIA. Also there is not any specific guidance which states these criteria should be used in EIA.. However, having reviewed the 2014 publication, we feel that for this and all other impacts the sensitivity / value of receptor rankings assigned during the impact assessment have not been underestimated and the impact assessment presented in the Environmental Statement still stands.	Marine Licensing note the comments from UWT. We do not consider there to be a requirement to re-assess the benthic impact.

		assessing other potential impacts from this development on benthic habitats and species. The significance of impacts resulting from this development should be reassessed using the relevant sensitivity assessments for rock and subtidal sedimentary habitats (Tillin et al. 2010 and Tillin and Tyler-Walters 2014, respectively).		
96	UWT	Monitoring Modelling work on the impact of the proposed development on tidal flow rates predicts that peak tidal flow rates will be reduced by a maximum of 30% in the immediate wake of the turbines, representing a reduction from around 2.1 ms-1 to 1.5 ms-1. The AfL area was found to consist primarily of the NI HAP conservation priority habitat 'Tidal rapids'. This habitat type relates to the EUNIS habitat A4.112 'Turbularia indivisa on tide-swept circalittoral rock' which is found in tidal streams ranging from 1.5 ms-1 to > 3ms-1. Therefore the proposed development is likely to reduce tidal flow to the lowest level known for this habitat type. We acknowledge that the modelling applies to tidal flow at 15m above the seabed and that proportional reductions are likely to be less at the seabed. However, it is unclear why modelling of tidal flow rates at the seabed was not included. Given the potential impact on benthic communities, monitoring of the seabed around the installation must be conducted throughout the duration of the project to assess the impact of reduced tidal flow on benthic species and habitats.	Modelled flow rates 0.5m above the seabed (with and without turbines) are available and were used to inform the Environmental Statement, but were not presented in the Environmental Statement to limit the number of graphics in the chapter. The stated maximum of 30% change to current speeds at hub height (generated by the hydrodynamic model) is likely to be an over-estimate at both hub height and at the seabed primarily due to the horizontal resolution of the model (50 m) being greater than the size of the tidal turbine stricture (23 m). Other factors include the way the turbine structure is represented in the model and the fact that seabed currents are less than those at hub height. Therefore although limited in being able to address near field effects, the hydrodynamic model can be used to provide an indication of the potential scale of impact, and this is what was used to inform the EIA. It should be noted that the change of current referred to is a maximum over the entire site at limited points in the whole area. Examination of the velocities at 0.5 m indicates that, for maximum speed at 0.5 m above the sea bed, there is decrease in velocity in some locations and an increase in velocity in other locations associated with the insertion of the tidal turbine array. The average of all the velocity increases and decreases indicated from the model results is 0.5 %. This suggests that the average difference in maximum tidal velocity between the existing situation and after	Marine Licensing note the comments and TVL response. The TVL clarification on reduced flow rates suggest no impact on the benthos. Marine Licensing consider a technology like drop down cameras a possible tool to validate Environmental Statement conclusions and will require TVL to consider benthic assessment within the EMP.

			insertion of the tidal turbine array at 0.5 m above the seabed is negligible. Therefore it is concluded that the inherent variability in tidal strength these habitats experience as part of baseline conditions will not be unduly effected by the presence of the turbines, the overall conclusion of insignificant impact is therefore unchanged, and monitoring not necessary.	
97	UWT	Due to the relative infancy of tidal array developments as a renewable energy source, there is a lack of previous data relating to the resistance and resilience of benthic habitats to potential impacts from these developments. The EIA concludes that monitoring of the benthic and intertidal environment is unnecessary. We strongly disagree with this conclusion due to the potential impact on species and habitats of conservation importance. Benthic and intertidal habitat monitoring must be conducted throughout the duration of this project.	The Environmental Statement clearly indicates that the majority of impacts on the benthic environment are not considered to be significant, with the exception of the introduction of MNNS which will be managed through a full risk assessment once specific vessel details are available. Monitoring is only merited where project specific impacts are identified and cannot be mitigated. The EIA has clearly demonstrated that mitigation (with the exception of MNNS) is not required in order to manage impacts on benthic habitats and therefore no monitoring is deemed necessary.	Although this represents a new technology the benthic impacts will be related to energy removal from the tidal race, this can and has been modelled to provide the impact assessment within the Environmental Statement. Marine Licensing are content with the benthic assessment within the Environmental Statement and consider that at most benthic validation monitoring could be a requirement on the developers. Marine Licensing do not consider intertidal monitoring for benthic impacts to be warranted.
98	UWT	Chapter 10 | Marine Mammals Baseline Monitoring Our primary concern surrounding the Environmental Statement is whether a single year of baseline data (albeit with three additional months tagged on) is sufficient to provide robust baseline data for the consideration of potential impacts. The provision of a single year of data does not provide a robust baseline and does not allow for assessment of inter-annual variability in density or distribution.	The survey methodology was agreed with the DOE in June 2013 through extensive consultation and as detailed in the Environmental Statement it is considered, together with other available data, to provide the data required to support a robust impact assessment. Section 10.4 of the Environmental Statement presents the marine mammal baseline which is a combination of site specific survey, analysis of IWDG data and a wider literature review and describes how this is considered appropriate to inform the impact assessment. With regards to site specific density estimates: Section 10.4.9 states 'Density estimates are important in	The survey method was agreed in liaison with DoE's marine Mammal expert at the scoping stage. The study was required to identify presence/absence, interannual variability and a density estimate for harbour porpoise. After 9 months TVL informed marine Licensing their counts may not provide a density estimates and suggested alternative methods. Marine Licensing accepted the use of extant data from the area as an indicator of presence/absence and interannual variability as it covered

			assessing the potential impact on marine mammals, since they allow a calculation of the actual number of animals that might be affected by an impact mechanism to be calculated. Calculation of density estimates for a site is possible only where sufficient sightings have been made to satisfy the assumptions of the statistical modelling exercise. This manifests itself in the requirement for a minimum of 60 – 80 sightings to be made before a density estimate for a species can be calculated. Through the fifteen months of survey effort, which included additional transects in the final three months to record additional animals, sufficient sightings to calculate density estimates were only collected for harbour porpoise. For the less commonly sighted species, where sufficient sightings from the site surveys were not collected and where multiple years of site-specific survey are unlikely provide sufficient data to determine densities (since there are so few animals of these species using the site), it has been necessary to derive density estimates from regional survey work and this was considered appropriate to inform the impact assessment. IWDG data was used to inform inter annual variability (see Section 10.4.1 of ES)	more the two years. This method however did not provide an acceptable density estimate for harbour porpoise, the main focus of the survey, thus TVL where instructed to continue the survey until this was achieved or the two years was completed, whichever came first. By continuing to survey TVL where able to provide a density estimate for harbour porpoise. This provided the information requested in the scoping document which stated if this was the case the survey effort could be reduced.
99	UWT	Population Estimate It is unclear as to whether the approach adopted to collect additional sightings data for a population estimate is a valid one. The tacking on of additional transects for the last 3 months of the survey may introduce confounding bias related to area and to season. The more appropriate method may have been to additionally sample within the existing survey area to gain additional sightings. There is some question as to the validity of the method used to calculate the population estimate for the study area.	The approach adopted to collect additional sightings data for harbour porpoise was designed to inform the detectability function for Distance software. An abundance estimate would then be derived using this detectability function, but only based on the data from within the initial survey area. The method suggested, to additionally sample within the existing survey area, would not have produced statistically independent data. This is because the same animals are likely to have been surveyed twice, or else disturbed (and thus influenced) by the increased presence of the vessel. This is why we added on the additional transects adjacent to the existing survey area.	Marine Licensing are content with the methods used. As part of our decision process the marine licensing consulted with SNH for a secondary opinion to ensure the approach was reasonable. We note the density observed is similar to other studies in the vicinity.

100	UWT	Appropriateness of survey approach The Environmental Statement is based heavily on land and boat based visual surveys. The data presented give little or no information on how marine mammals use the site on a long or short term temporal scale, nor do they indicate what the animals are using the site for. These are critical data required for understanding collision risk (Sparling et al., 2015) We suggest that additional behavioural and fine scale temporal data (such as provided by static acoustic monitoring) is required for assessment of potential impacts on marine mammals within the proposed development area.	Data summary provided on page 10-33 states that the extensive baseline review, including site specific survey data, is considered appropriate to inform the EIA. Additional behavioural and fine scale data (such as could be provided by static acoustic monitoring) would not have changed the overall predictions of the impact assessment. It is also worth noting that there is currently no data available on how marine mammals behaviour around tidal turbines, however this is being addressed via monitoring of the early arrays e.g. Meygen and is likely to form part of the monitoring strategy for the TVL project	We note the comments from UWT and TVL. As stated by TVL early arrays such as Meygen are expected to provide direct evidence of marine mammal interactions with tidal turbines. If early arrays do not provide the expected evidence this will be reflected in the EMP finalised prior to build out and operation.
101	UWT	Survey Protocol We acknowledge the responses provided to our previous queries on visual survey method, however we regard the visual survey method as having some issues related to lack of adequate rest periods for surveyors and possible duplication of sightings during dual surveyor surveys. We note in relation to the stated experience of the surveyors that JNCC MMO qualifications are not an indicator of surveyor experience and may be obtained with no survey experience whatsoever. Typically site surveys for cetaceans are conducted using a minimum of two surveyors plus a data logger, with surveyors swapping between roles on a regular basis to avoid fatigue. We would question why this approach was not adopted in this case.	Each of the 15 transects was short, approximately 4km in length, and usually took less than 25 mins to complete. Surveyors were able to take short breaks at the end of each transect while the vessel was re-positioned before starting the next transect. Comfort breaks could be taken at this time. Effort data were always recorded. The breaks ranged from 2-26 minutes. Average break length was 5 min 40 sec. When 1 observer was on watch they scanned an area of sea 180 degrees ahead of the vessel. This detail was included in the Environmental Statement. When 2 observers were on watch, they were positioned on either side of the vessel and scanned an area of sea of 90 degrees each. There were no duplicate sightings when 2 marine mammal surveyors were on watch because the areas scanned by the surveyors did not overlap. Effort data were always recorded. The analysis in the 12 month report was based on either the number of sightings per km transect covered (i.e. based on distance only, not number of observers) or the number of sightings per hour of observer effort (i.e. taking number of observers on watch into account). For subsequent density estimation work, transects were divided up into segments according to	Marine Licensing are content with the survey methods used and the resultant Environmental Statement We consider TVL to have provided a satisfactory answer to this query.

			factors including the number of observers on watch and sea state during the initial stages of the analytical process. Analysing data with varying amounts of effort by different observers is considered standard as long as effort has been recorded by each observer which, in this case, it was. In relation to the stated experience of surveyors, while JNCC MMO qualification is not an indicator of surveyor experience, all experience stems from this qualification. All marine mammal surveyors, both Natural Power and subcontracted staff, were highly experienced in marine mammal observation and identification. Subcontracted staff were selected based on their experience, rather than only their MMO qualification. In addition, the Lead Surveyor on every survey was always a Natural Power employee with considerable survey experience (hundreds of hours of experience).	
102	UWT	Acoustic Surveys The report states that a towed acoustic array was used to detect porpoises, these data were presented only in summary and in a single line of the report. Typically harbour porpoise acoustic detections will far exceed visual detections, particularly in areas of disturbed water as may be expected in high current areas such as Torr Head. The brief results of the acoustic survey presented indicate that acoustic detections were up to five times higher (0.51 detections/km) at Torr Head, than found 'in areas considered to demonstrate some importance to harbour porpoise' (reported maximum 0.19 detections per km). Yet no further mention is made in the entire document of these results. We would like to see a full and considered assessment of the acoustic data gathered during this survey, particularly in the light of some of the concerns we have already raised regarding the visual survey method.	TVL is unsure what report UW referring to - Environmental Statement or 12 month report. The statistics NPC provided in the 12 month report were, as follows:- Total acoustic detections, by effort (on/off), by month and by category (track/event/click);- Acoustic detection rate (by km).NPC has previously stated that other studies generally present effort-related statistical rates, such as detections per km or detections per hour. Therefore the 12 Month Technical Report is more easily comparable with other papers.	Marine Licensing are content with the Environmental Statement assessment. The science group will consider the need for validating or monitoring acoustic assessment.
103	UWT	The lack of use of static acoustic monitoring (SAM) during the baseline study is disappointing as SAM has been successfully used in baseline studies of marine	The survey methodology was agreed with the DOE in June 2013 through extensive consultation. NPC previously provided details on the limited use of	Marine licensing believe the use of SAM as best practice for renewable sites relates to wind turbines and other

		renewable sites for many years and is now industry best practice for such developments. SAM would have offered a number of advantages to this study, including: • The collection of high resolution temporal cetacean activity data, which would help interpret how the animals use the site on short and long temporal scales, on a diurnal scale and on a tidal scale. This data would have been of high value in estimating the likelihood of encounters with the array • SAM data has previously shown that harbour porpoise use of an area can be high, even where sightings of harbour porpoise are low (O'Brien et al., 2013) and that visual surveys alone offer poor resolution data to assess habitat use by harbour porpoise (O'Brien et al., 2013).	CPODs to study marine mammals in tidal sites due to problems associated with background flow noise. During a multi-year survey programme for the Scottish Government at inshore tidal-stream sites in Scottish waters, C-PODs were moored in several locations and a number of problems became apparent. Most notably, during peak tidal flow, broad spectrum noise levels increased massively, regularly overloading the click detection capabilities of the detector and also potentially masking the porpoise calls themselves (Wilson et al. 2012). TVL therefore proposed not to introduce C-PODs into the survey programme as the towed hydrophone technique was likely to better represent use of the site than a fixed PAM device, such as a C-POD. Unlike visual boat-based surveys, it is not possible to derive absolute abundance estimates for porpoises using data from C-PODs.	locations where a tidal race is not present which masks and reduces SAM functionality. Due to the tidal nature of the site it was decided during the scoping state that SAM would not be required, instead towed hydrophones was considered a better alternative. The EMP and science group will consider SAM use for project monitoring.
104	UWT	Marine Mammal Sensitivity and Risk Assessments Bottlenose dolphins Bottlenose dolphins have been assigned a low sensitivity ranking. This should be re-assessed in light of the fact that the estimated abundance for the coastal population, calculated for this Environmental Statement, may be fewer than 450 animals (NPC 2014) and the population assessment for the survey area is up to 9.5% of the coastal population. Use of the wider SCANS North Atlantic population for sensitivity assessment does not appear valid in the light of genetic data which indicate the presence of three populations of bottlenose dolphins in Ireland (Mirimin et al., 2011) - a resident Shannon Estuary population (numbering c150 animals), a population ranging around the entire Irish Coast and adjacent UK coast (numbering c450 animals) and an offshore population, possibly accounting for the bulk of the SCANS NE Atlantic population assessment but largely separate from the population concerned in this Environmental Statement. The loss of even a small number of animals from the	We are not sure what point is being made here with regards to population numbers. We present the bottlenose dolphin population in assessment sections (e.g. 10.6.1) as 443, which is the coastal population that UWT refer to (note that this is slightly larger than the MMMU for the bottlenose dolphin), and this is considered within the sensitivity rankings presented. It is however worth noting that an increase to medium sensitivity would not change the significance rankings.	Marine Licensing do not consider the assessment to require reconsideration.

		small Irish coastal bottlenose dolphin population, on an ongoing basis, may have a significant impact on this population. It is our opinion that a higher sensitivity should be assigned to bottlenose dolphins for the purposes of this Environmental Statement.		
105	UWT	Harbour porpoise The Environmental Statement risk and sensitivity assessment assumes that the harbour porpoise in the study area are wide ranging, however there are no data from UK waters to indicate the degree of site fidelity in local harbour porpoise populations. If, as a precautionary approach, some degree of site fidelity is assumed, then according to the data presented in the Environmental Statement almost 20% of the Northern Irish porpoise population (n= c400, Goodwin & Speedie, 2008) may be exposed to turbine collision risk, within tens of km of Northern Ireland's only harbour porpoise SAC, each year... even when assuming a 95% avoidance rate.	Inevitably using a population of 400 instead of, for example, 21,462 for the West Scotland would increase the percentage of population potentially affected. However, in the absence of photo ID or tag data for the populations, we have followed SNCB advice to use the management unit population to consider population level effects for this species. In recognition that there could be some site fidelity (although it is far from confirmed for harbour porpoise as a general rule) and that the site sits close to a harbour porpoise SAC, the sensitivity ranking has been defined as medium for this species.	Marine Licensing note the UWT comment but also consider the assessment to follow current guidance. NO reassessment required.
106	UWT	Killer whales Killer whales should be considered in the assessment. Even though they are rarely sighted in the development area they are known to regularly transit around the entire Irish coast, with most sightings occurring close to shore or offshore islands and regular but infrequent sightings off the Antrim Coast. The vast majority of sightings of photo-identified killer whales in Ireland are of the 9 animals in the Scottish 'West Coast Community' (IWDG 2015). The loss or injury of even a single animal due to collision would have a major impact on that group and therefore they are deserving of inclusion in this Environmental Statement.	The information we present in the Environmental Statement also makes use of the IWDG database, covering 2000 – 2013. We present 11 sightings of killer whale that were reported in Antrim between 2000 and 2013, with repeat observations made at only two locations on the Antrim coast - Rathlin Island and White Park Bay. Averaging less than one animal per year from the IWDG database, the site surveys did not record killer whales, reflecting the apparent low importance of the site. Assuming one animal per year passing through the swept area of the turbines (and remember occurrence in the area does not necessarily equate to passing through the swept area of the devices), and assuming 95% avoidance, there would be one encounter in every 95 years. The encounter	Marine Licensing concur with the TVL. No further assessment required.

			does not necessarily equate to a death or removal from the breeding population. It is worth noting the study on the OpenHydro OCT device presented in the Environmental Statement that showed such a device would not exert sufficient force to kill or severely injure an adult killer whale, in part because it does not have the exposed tips commonly present in tidal turbine designs. As such, we hold that there is no realistic route for impact on this population and that it does not warrant further assessment in the Environmental Statement.	
107	UWT	Basking Shark Basking Sharks should also be considered in the assessment. Even though they are rarely sighted in the development area they are known to regularly transit through the Irish Sea and may do so at depth and beyond visual detection. Tagged animals have been tracked moving south through the Irish Sea animals have been by caught at depth by trawlers in the Irish Sea. Considering their protected status in UK waters, a recent history of population collapse (IBSP, 2015), the presence of a known high density area for basking sharks at Malin Head (to the northwest of the project area) and the likely high susceptibility of a large slow swimming species to collision risk, it is appropriate that this species be included in any risk assessment.	The following information on basking shark is presented in the fish ecology section of the Environmental Statement (Section 12):'There was one sighting of a basking shark during the Torr Head bird and marine mammal surveys. The sighting, which was in October 2013, was approximately 4 km north west of the AfL area (NPC, 2014).....No basking sharks have been observed within either the AfL area or the area of search for the export cable corridor between 2000 – 2014 (Figure 12.3) (IWDG, 2014). Basking sharks are the second most frequently sighted large marine species off Rathlin Island with sightings peaking in summer months from July to August (IWDG, 2013), when mating is thought to occur (Fowler, 2005). Despite this frequency of sighting outside the Project area, numbers are still low: Figure 12.3 illustrates one-off sightings in the past 14 years'. These data indicate that basking sharks are not expected to be present in the AfL area. As such, we hold that there is no realistic route for impact on this population and that it does not warrant further assessment in the Environmental Statement.	Marine Licensing are aware of the perceived risks to basking sharks, we cannot however ignore the evidence which shows the species were not recorded in the AFL. It is considered that the potential for significant impacts is not a feasible conclusion. No reassessment required.
108	UWT	Noise Impacts – Drilling While the Environmental Statement states that the threshold assumed injury threshold levels are precautionary, they are based on levels for Permanent Threshold Shift. As all cetaceans are protected under	TVL is a little unclear as to the specific point being made here with regards to the underwater noise assessment. Injury and disturbance impacts have been assessed separately. The thresholds that have been used to assess potential disturbance impacts are much lower than TTS criteria and therefore we consider our	Marine Licensing will as a standard licence condition request MMO presence and soft starts to any piling operations. No reassessment required.

		EU law not only from injury but also from disturbance, it may be more appropriate, taking a precautionary approach, that injury thresholds should be based on the levels for Temporary Threshold Shift and the impacts should be re-assessed accordingly. Such an approach is recommended by NOAA Fisheries under Interim Sound Threshold Guidance (NOAA 2015) and should be considered, especially as there is no proposal in the Environmental Statement to implement standard JNCC mitigation for piling operations.	assessment to be precautionary in this regard. See also response to comment 119. The assessment undertaken was in line with current recommended guidance and practices (see also response to comment 119 on the overall approach to the assessment and how precautionary it is). The NOAA 2015 guidance were at the time of undertaking the assessment (and is still are) only draft. The assessment of potential impacts from the drilling of the foundation piles does not predict any significant impacts therefore no mitigation is proposed. No impact piling is proposed.	
109	UWT	Operational Noise When considering the disturbance and displacement impacts from operational noise, the Environmental Statement has failed to consider data from Teilmann & Carstensen showing long-term displacement of harbour porpoise from a wind farm in Denmark. This research showed the value in Static Acoustic Monitoring in monitoring the long-term impacts of offshore renewable developments on harbour porpoise.	Not sure which specific studies are being referred to here. The only ones we are aware of investigate the effects of impact pile driving not operational noise. No impact piling (only drilled piles) proposed for the TVL project.	Marine Licensing are aware of the Teilmann & Carstensen study. We note it relates to different habitat types and the use of steel mono-pile as a construction method. We do not consider the study to be directly applicable to the TVL project in either construction method or potential habitat displacement impact on harbour Porpoise. Marine Licensing note the value of SAM for the specify research by Teilmann & Carstensen on an identified risk of piling.
110	UWT	Recommendations We do not accept the Environmental Statement conclusion that are no significant impacts within the proposed development. Some of the Environmental Statement risk assessment is based on modelling that is not tested and assumptions that are not proven.		Comments noted. Marine Licensing have reviewed the Environmental Statement and do not consider the further assessment to be required. Where Marine Licensing consider validation of the assessment is warranted TVL will be expected to provide such validation through provision of scientific reports or

				monitoring as will be detailed within the PEMP.
111	UWT	Given the uncertainties, the risk of fatal impacts on individuals of EU and UK protected species from blade collision and the risk of population scale impacts (e.g. for bottlenose dolphin and killer whale) we recommend a robustly precautionary approach be adopted in licensing the proposed development.	TVL has noted such uncertainties in the Environmental Statement and built them into the assessment as well as informing the approach to monitoring	Marine Licensing have reviewed all the comments from UWT. We believe the Environmental Statement to be a sound assessment of the risks associated with the project. It is clear the Environmental Statement acknowledges many of the industry uncertainties. Marine Licensing believe that careful consideration within the project monitoring must be given to the validation of the Environmental Statement conclusions where an impact has been identified.
112	UWT	Consideration should be given as to the validity of the approach taken to calculate the population density in the study area.	Following the collection of 15 months of site specific survey it was possible for Natural Power Consultants Ltd to calculate an absolute density estimate using Distance analysis. This is a preferred approach / methodology for calculating density estimates for the purpose of informing impact assessments and was agreed with the DoE during consultation on the EIA	Marine Licensing are content with the validity of the study.
113	UWT	Further consideration of the high porpoise detections recorded in the towed acoustic data need to be assessed in this Environmental Statement.	The marine mammal assessment presented in the Environmental Statement recognises that the proposed Project area is an important area for harbour porpoise and this judgement is influenced by the acoustic detections of harbour porpoise during the survey. Text on page 10-17 of the Environmental Statement states 'A total of 229 acoustic detections of harbour porpoise were reported during the first 12 months, including 167 on-effort detections. Harbour porpoise were regularly detected acoustically throughout the whole of the boat-based survey area. Acoustic detections per km during the first 12 months reached a maximum of 0.509 in February 2014 and a	The Environmental Statement recognises the importance of the area for HP which is reflected in the approach taken during the Environmental Statement considerations. With the acceptance that the area is used by HP the further assessment of the towed acoustic data will not change the assessment.

			minimum of 0.033 in July 2013. Harbour porpoise acoustic detection rates at this site (0.033 - 0.509 detections per km for the first 12 months) are consistent with those from surveys conducted in other areas considered to demonstrate some importance to harbour porpoise, such as the Western Baltic Sea (which reported a maximum acoustic detection rate of 0.168 detections per km; Gillespie et al., 2005) and the Skagerrak, Kattegat and the Danish Straits (0.072 - 0.189 acoustic detections per km; Sveegaard et al., 2011)'The recognition of the importance of the area for harbour porpoise is reflected in the ranking of harbour porpoise at a higher sensitivity (compared to other cetacean species) in the impact assessment. It is also worth noting that the statistics NPC provided in the 12 month report were, as follows:- Total acoustic detections, by effort (on/off), by month and by category (track/event/click);- Acoustic detection rate (by km).NPC has previously stated that other studies generally present effort-related statistical rates, such as detections per km or detections per hour. Therefore the 12 Month Technical Report is more easily comparable with other papers.	Harbour Porpoise are a main species of concern within the EMP and as a result will act as an umbrella species for other marine mammals.
114	UWT	A more robust pre-construction baseline data set should be collected including use of Static Acoustic Monitoring, assessment of porpoise behaviour within the development area and assessment of fine scale temporal and spatial use of the development area by marine mammals.	Requirement for and scope of pre installation monitoring data to be considered as part of EMP. As stated above the EMP will be developed post consent; draw on the latest industry and OpenHydro data / information and guidance to ensure that any monitoring is appropriate and relevant to the issues needing to be monitored. This will include consideration of the most appropriate monitoring methodologies.	Marine Licensing consider the site characterisation for the Environmental Statement to have been fit for purpose. We are also mindful that the EMP will be an important tool in controlling the impacts of the project and also providing any securities considered necessary at the time of build out.
115	UWT	The assessed sensitivity and risk for all species should be reconsidered in the light of guidance contained in Sparling et al., 2015.	The paper being referred to here was recently (July 2015) published by the Welsh government (it was not available at the time of undertaking our assessment). In addition to this Welsh publication a Scottish consultation has just been issued on the potential approaches to collision risk assessment. There is as yet no standard widely accepted approach to the	Marine Licence reject this suggestion as the EIA process was scoped based on the available data and guidance at the time. As the process continued it was reviewed prior to closing out of the Environmental Statement The final Environmental Statement was drafted prior to the

			assessment of potential impacts on marine mammals from tidal arrays. TVL is confident that the approach to the assessment of impacts on marine mammals (and other receptors) is robust and based on the best available data to TVL at the time of undertaking the EIA.	publication of the Sparling guidance.
116	UWT	The sensitivity and risk assessment for bottlenose dolphins should take into account the strong evidence for a small, genetically distinct coastal population of bottlenose dolphins on the Irish coast.	We are not sure what point is being made here with regards to population numbers. We present the bottlenose dolphin population in assessment sections (e.g. 10.6.1) as 443, which is the coastal population that UWT refer to (note that this is slightly larger than the MMMU for the bottlenose dolphin), and this is considered within the sensitivity rankings presented. It is however worth noting that an increase to medium sensitivity would not change the significance rankings.	The sensitivity assessment did cover the population as described a project cannot assume all perceived risks to be viable. Marine Licensing are confident the Environmental Statement assessment is sound.
117	UWT	The sensitivity and risk assessment for harbour porpoises should be considered in light of the absence of site fidelity data for harbour porpoise in UK waters and the adjacent SAC.	Inevitably using a population of 400 instead of, for example, 21,462 for the West Scotland would increase the percentage of population potentially affected. However, in the absence of photo ID or tag data for the populations, we have followed SNCB advice to use the management unit population to consider population level effects for this species. In recognition that there could be some site fidelity (although it is far from confirmed for harbour porpoise as a general rule) and that the site sits close to a harbour porpoise SAC, the sensitivity ranking has been defined as medium for this species.	The Environmental Statement assessment was based on the Management unit as agreed. Marine Licensing are content the assessment does not need revised.
118	UWT	The sensitivity and risk assessment for killer whales and basking sharks should be considered in this Environmental Statement.	The information we present in the Environmental Statement also makes use of the IWDG database, covering 2000 – 2013. We present 11 sightings of killer whale that were reported in Antrim between 2000 and 2013, with repeat observations made at only two	Killer whales and basking sharks were included in EIA considerations but from excluded detailed risk assessments based on the evidence.

			locations on the Antrim coast - Rathlin Island and White Park Bay. Averaging less than one animal per year from the IWDG database, the site surveys did not record killer whales, reflecting the apparent low importance of the site. Assuming one animal per year passing through the swept area of the turbines (and remember occurrence in the area does not necessarily equate to passing through the swept area of the devices), and assuming 95% avoidance, there would be one encounter in every 95 years. The encounter does not necessarily equate to a death or removal from the breeding population. It is worth noting the study on the OpenHydro OCT device presented in the Environmental Statement that showed such a device would not exert sufficient force to kill or severely injure an adult killer whale, in part because it does not have the exposed tips commonly present in tidal turbine designs. As such, we hold that there is no realistic route for impact on this population and that it does not warrant further assessment in the Environmental Statement. The following information on basking shark is presented in the fish ecology section of the Environmental Statement (Section 12):'There was one sighting of a basking shark during the Torr Head bird and marine mammal surveys. The sighting, which was in October 2013, was approximately 4 km north west of the AfL area (NPC, 2014).....No basking sharks have been observed within either the AfL area or the area of search for the export cable corridor between 2000 – 2014 (Figure 12.3) (IWDG, 2014). Basking sharks are the second most frequently sighted large marine species off Rathlin Island with sightings peaking in summer months from July to August (IWDG, 2013), when mating is thought to occur (Fowler, 2005). Despite this frequency of sighting outside the Project area, numbers are still low: Figure 12.3 illustrates one-off sightings in the past 14 years'. These data indicate that basking sharks are not expected to be present in the	

			AfL area. As such, we hold that there is no realistic route for impact on this population and that it does not warrant further assessment in the Environmental Statement.	
		A more precautionary approach to the impact of noise on marine mammals, in line with NOAA proposals, during the development should be considered in the absence of proposed noise mitigation measures and considering the highly protected nature of the species involved under EU and UK law	The current Xodus approach follows established guidance and practices including consideration of Southall and Lucke thresholds (as advised by the JNCC) and is summarised below: In the absence of specific numerical thresholds for disturbance being set by relevant guidance (for example, JNCC describe instead a qualitative assessment based on Southall et al.¸2007), we have undertaken an extensive literature review to allow us to determine such a criteria. This literature review demonstrated that there is a high degree of variability in terms of non-injurious responses to noise. This is true to the extent that different responses between different animals within a species group may be greater than average differences between different species. We have therefore taken what we believe to be a very conservative approach to determine a highly precautionary threshold, ensuring we capture all the potential impacts observed from the literature. In terms of the sources of criteria included in Table 10-11, these are based on Southall et al. (2007) for low, mid and high frequency mammals and for pinnipeds. This is the approach recommended in the relevant guidance from JNCC. For harbour porpoise, we agree that the Southall et al. (2007) values represent levels that may be too high, as a result of advances in understanding since publication of their study. We have therefore extrapolated values from Lucke et al. (2008) and Kastelein et al. (2012) that provide lower thresholds in recognition that harbour porpoise may be more sensitive to noise emissions than the other species groups considered. With regards to the NOAA guidelines, which we understand are still in draft format, these present a very different way of assessing the impacts to that described in the relevant UK	Marine Licensing are content the approach taken by TVL to utilise JNCC guidance opposed to NOAA. Marine licensing do not consider the assessment to need revision.

			guidance. In previous non-project-specific discussions with JNCC, we have been advised not to incorporate the NOAA at this time. However, we are reviewing the situation as the guidelines develop and expect to consider their results in the future. In terms of the Tougaard et al. 2014 reference (which we think is actually Tougaard et al, 2015), this was published following the noise modelling and assessment work being completed. We have since reviewed that paper against the assessment we have undertaken and believe that the criteria we have used are more conservative than those in the latest paper. Incorporating the latest values would reduce the impact ranges we present. In any case, this paper relates to impulsive sounds, which are less of a concern for this Project that continuous noise. On the basis that we have attempted to generate a worst-case scenario for the modelling, we do not anticipate updating the assessment. The NOAA proposals are still only draft guidance and as such not considered to be yet an accepted standard approach to underwater noise impact assessment.	
	UWT	Evidence of long-term displacement of harbour porpoise from offshore renewable energy developments should be considered within the Environmental Statement.	It is assumed that the long term displacement referred to here is related to offshore wind farms which have much more prolonged installation periods and much larger sound sources e.g. impact piling than will be associated with the proposed Project. No impact piling is proposed for the Torr Head project. Also see response to comment 129.	Marine Licensing are away of the references to the offshore wind farm displacement. We do not consider the Environmental Statement to need reassessed.
	UWT	There needs to be clear information in the Environmental Statement on how potential impacts are going to be detected and assessed (e.g. active sonar).	As stated in Chapter 21 of the Environmental Statement, TVL is committed to the development of an appropriate EMP and this will include monitoring of marine mammals. The exact scope of the EMP will be developed post consent; draw on the latest industry and OpenHydro data / information and guidance to ensure that any monitoring is appropriate and	The Environmental Statement did assess the impacts. Project monitoring will validate Environmental Statement conclusions as required. Marine Licensing are aware that as an emerging industry it

			relevant to the issues needing to be monitored. It is usual practice for the detail of the EMP to be developed post consent and in consultation with relevant consultees / stakeholders.	would not have been possible for the Environmental Statement to fully detail the requirements or methods used to validate the impacts as identified. Marine Licensing believe such detail is best confirmed closer to the time of build out consideration. Marine Licensing have requested a draft EMP from TVL which will detail the knowledge gaps that need to be considered and the potential impacts which will need monitored. The decision to finalise the EMP and consider monitoring post licensing is aligned with the adaptive management approach an industry standard for marine renewable energy projects. This approach accounts for; • the continuing growth of the scientific knowledge base from demonstration projects, test arrays, and early stage projects such as Meygen • The creation, refinement and adaptation of new technology to assist in monitoring and assessing marine renewable impacts.
	UWT	A robust and adaptive monitoring and mitigation programme should be agreed beforehand with DOE and relevant experts.	As stated in Chapter 21 of the Environmental Statement, TVL is committed to the development of an appropriate EMP and this will include monitoring of marine mammals. The exact scope of the EMP will be developed post consent; draw on the latest industry and OpenHydro data / information and guidance to ensure that any monitoring is appropriate and relevant to the issues needing to be monitored.TVL is willing to be part of a Science Group that will be consulted with and / or advise on the EMP. TVL will	Marine Licensing have requested a draft EMP from TVL which will detail the knowledge gaps that need to be considered and the potential impacts which will need monitored. This document will be finalised with methods and technologies to be used closer to the time of build out. The decision to finalise the EMP and monitoring post licensing is aligned with the adaptive management approach an industry standard for marine renewable

			engage with DoE on the format and make up of such a group.	energy projects. This approach accounts for; • the continuing growth of the scientific knowledge base from demonstration projects, test arrays, and early stage projects such as Meygen • The creation, refinement and adaptation of new technology to assist in monitoring and assessing marine renewable impacts.
123	UWT	Considering the high degree of uncertainty regarding collision risk between turbines and marine mammals, and in the absence of impact data from any similar development elsewhere, a test development of no more than five turbines should be considered to gather impact risk data, prior to licensing of any larger development.	TVL does not consider there is a need for a limit to be placed on the number of turbines to be licensed initially . The assessments presented in the Environmental Statement have considered the full proposed 100 MW and with the proposed mitigation / monitoring it is not considered that the Project would result in any significant environmental impacts. The proposed adaptive management process will be used to manage the Project and manage any potentially significant environmental impacts.	Marine Licensing are aware of the limitations due to existing projects and test arrays being limited in number. We note the Meygen project, which has been heavily quoted as a reference by TVL has received a limited licence of initially 5 devices. This was due to the location and the Environmental Statement identifying a local harbour seal SPA population at risk and a potentially significant proportion of Scottish Salmon traversing the narrow channel. The TVL site is not situated within a narrow channel nor did the Environmental Statement identify a potential significant impact on any designated sites. As a result Marine Licensing does not consider the requirement for a small test array to be warranted.
124	UWT	The Environmental Statement should take into account cumulative impacts from adjacent proposed developments of tidal turbines and windfarms.	Section 8.6.6 of the Environmental Statement states the approach to the cumulative impact assessment. TVL in consultation with DoE Marine Division and DETI identified a list of projects which together with the TVL project may result in potential cumulative or in combination impacts. This list is presented in Table 8.4	Marine Licensing consider the Environmental Statement to have covered cumulative impacts and do not consider reassessment to be required.

			and illustrated in Figure 8.2. it includes the adjacent proposed tidal project, Fair Head and offshore wind farms, amongst other projects. The cumulative impact of all such projects identified, together with the proposed TVL project, was considered as appropriate.	
125	UWTY	To follow a precautionary approach, a high risk of fatal impacts on EU protected species from blade collision should be assumed and the necessary licensing for deliberate killing, injuring or disturbance of marine mammals should apply.	TVL will ensure all appropriate licences are applied for and in place as required and advised by the regulators.	DoE Conservation and Reporting will advise on wildlife licence requirements.
126	UWT	References List	Appreciate the list of additional references identified. It should however be noted that some have only been published since submission of the application (and therefore not available in time to feed into the impact assessment).	
127	Patrick McNeil	I wish to register my objection to the proposal put forward by Tidal Ventures ltd. My objection relates primarily to the proposed location of this venture and its proximity to my wild salmon fishery. I am concerned about this, as the location is in the direct migratory path of wild Atlantic salmon , these salmon being on course not only to my fishery but also to their native rivers in the immediate vicinity. I have been involved in many projects and discussions regarding the conservation of wild salmon stocks , with both local government, scientists and local interest groups where concern has been raised regarding wild salmon. To date there has been a decided neglect on the part of Tidal Ventures ltd to address the environmental impacts of their proposed venture on wild salmon, indeed their impact reports fail to adequately address this species at all. It appears there has been no scientific experiments or studies undertaken that conclusively prove that this venture will have no	While TVL do not anticipate any significant impacts from the Project as identified above, considering the proximity of the salmon fishery to the Project area and the gaps in knowledge with regard collision risk and EMF impacts on migratory fish, TVL is committed to remaining in dialogue with the owner of Portaleen Salmon Fishery post consent submission. TVL will consult and agree a proposed monitoring plan with the owner should the fishery become operational again during the lifetime of the tidal array operation. This will be with a view to confirm that findings of the impact assessment outlined above. Where genuine financial loss can be demonstrated as a result of the project activities compensation will be considered on the basis of factually accurate and justifiable claims.	INLAND FISHERIES have informed Marine Licensing that based on the Environmental Statement conclusions they do not have major concerns on the impact on Salmon from the project. Marine Licensing acknowledge the Environmental Statement and INLAND FISHERIES's response, however as general fish impact validation data is not currently available to Marine Licensing monitoring may be required in the EMP if not data is not available at the time of construction. Marine Licensing are content with the approach adopted by TVL in relation to impacts on the salmon fishery and

		adverse affects. I believe further scientific proof needs to be submitted dealing specifically with this issue prior to any final decisions on this application.		expect the use of FLOWW guidelines where appropriate.
128	DOE Conservation & Reporting	Goodwin and Speedie (2008) estimated that the porpoise population off Northern Ireland numbered 387. The total of 79 for the Torr Head survey area is significant in this context (20%) and would make it a relatively important local area.	Inevitably using a population of under 400 instead of, for example, 21,462 for the West Scotland would increase the percentage of population potentially affected. However, in the absence of photo ID or tag data for the populations, we have followed SNCB advice to use the management unit population to consider population level effects for this species. In recognition that there could be some site fidelity (although it is far from confirmed for harbour porpoise as a general rule) and that the site sits close to a harbour porpoise SAC, the sensitivity ranking has been defined as medium for this species.	Marine Licensing agreed the EIA assessment methods should be based on the accepted MMU scale. The conclusions of the Environmental Statement relating to the MMU population are sound. The EMP may be required pick up on more localised impacts on Mega Fauna through validation of Environmental Statement impacts.
129	DOE Conservation & Reporting	Discussion on the impacts of noise focus on high levels of noise that could cause immediate injury in close proximity and more moderate noise that could cause injury over a period of 24 hours. Are there any potential injury consequences if some semi-resident mammals are tolerant of noise and frequent the area for a number of days?	Injury from operating turbines - as stated in Section 10.7.1 of the Environmental Statement, based on the modelling undertaken no cetaceans are predicted to be injured due to the operation of the turbines, including any cetaceans that were exposed to the continuous noise for a 24 hour period. Pinnipeds could experience injury if they remained within 3 m of the operating turbines for 24 hours continuously. This is an unrealistic scenario both since turbines are unlikely to operate for 24 hours and since the requirement to breathe and haul out would render such a situation improbable. With regards to vessel noise - potential zones of injury from the largest vessels are predicted to be 180 m (assuming continuous exposure within that radius for 24 hours) (ES Table 10.14). With regard to how this zone might increase over longer periods of time, it is not unrealistic to assume that the injury zone will be no greater than a few 100's m (assuming continuous exposure within that radius for say 2-3 days). It is very	Comment noted and TVL response accepted by Marine Licensing.

			improbable that an animal would remain in such a confined area for such a period of time. Any potentially semi resident cetaceans e.g. harbour porpoise and bottlenose dolphin will be resident over a wider (regional) area rather than within 100's m of the vessel operations, i.e. area of disturbance. It is also worth noting that vessels will not be stationary and for the majority of time not be present in a single location for continuous days (perhaps with the exception of the construction vessel); this further reduces the possibility of cetaceans being exposed to noise that may cause injury for extended periods of time.	
130	DOE Conservation & Reporting	10.7.4 The text refers to high and medium sensitivities but the diagram shows medium and low….just a minor correction.	TVL note the typo in the text. The sensitivity / value ranking provided in the Table is correct.	Comment noted and TVL response accepted by Marine Licensing.
131	DOE Conservation & Reporting	10.7.8 In relation to the cross-sectional area of the North Channel the area swept by a line of 20 turbines is 0.37%. However as much of the channel is over 100m deep, it is likely that for many marine mammals their travel will be relatively close to the surface so the actual barrier effect will be greater than this. The 0.37% value is the best case scenario.	The calculation presented in the Environmental Statement was intended to give a broad indication of the potential magnitude of any barrier to animals swimming through the North Channel by demonstrating the area of the channel occupied by the tidal turbines in the entire water column is extremely small. This comment from DoE suggests that since the water depth of the channel is greater than 100 m in places, the total vertical area available to species of interest is an overestimate and therefore the percentage calculated a best guess estimate, considering that species may make disproportionately greater use of the upper water column. The following presents the potential barrier effect considering the use of the water column by the key species: Harbour porpoise - although harbour porpoise does spend some time in the upper water column, dive profiles	Comment noted and TVL response accepted by Marine Licensing.

			suggest they make extensive use of the mid-water column and also that they will dive to the seabed (e.g. Gordon et al., 2011, Gordon et al., 2014). For this species it can be concluded that the turbines could present a barrier to their movement through the North Channel. However, even if it is assumed that when travelling through the North Channel all harbour porpoise are swimming at the same depth as the turbines, the maximum width of the barrier (assuming a maximum of 20 turbines in a row) is 23m (turbine blade diameter) x 20 turbines = 460 m. In a 20 km wide channel, this represents 2% of the channel width. Minke whale - few quantitative data are available regarding depth distribution of minke whale, but given their ability to undertake temporally long dives (e.g. Stockin et al, 2001), distribution throughout the water column can be assumed and the tidal turbines could present a barrier to movement, but again as for the harbour porpoise even if it was assumed that all minke whale travelling through the North Channel did so at the depth of the turbines, their movement would only be restricted from 2% of the width of the channel. Bottlenose dolphin - available data for bottlenose dolphin suggest this species spends limited time outwith the upper 10 m of the water column, although dives to many hundreds of metres are possible (e.g. Hastie et al., 2006, Cockeran & Martin, 2004), thus in excess of 50% of the time the species will be outwith the depth range of the turbines. Bottlenose dolphin can use the entire water column, but will spend only a limited time within the depth range at which the turbines are present. The potential for the turbines to present a barrier to movement through the North	

			Channel will therefore be less than that predicted for the harbour porpoise. Seals - seals may spend approximately 25% of their time in the upper 10 m of the water column and approximately 50% at the seabed, in line with Band (2014) and Batty et al. (2012) who assume a dive profile based on a U shaped dive. Since the upper water column will not be occupied by the turbines (minimum clearance of 8 m) and the seabed will be occupied only by the foundations, these species are likely to be outwith the depth range of the turbines for 75% of their time in the water. Seals can use the entire water column, but will spend only a limited time within the depth range at which the turbines are present. The potential for the turbines to present a barrier to movement through the North Channel will therefore be less than that predicted for the harbour porpoise. The overall conclusion remains unchanged - the turbines will not present a significant risk to wide scale movements of the above cetacean species through the North Channel. Batty, R.S., Benjamins, S. & Wilson, B. (2012). Meygen tidal-stream turbine array environmental impact assessment: modelling encounter rate between turbines and animals. SRSL. Commercial in confidence Band, B. (2014). EMEC Fall of Warness Test site Environmental Appraisal. Annex 3 Detailed Collision Risk Assessment: Marine mammals, Basking Shark, and Diving Birds. September 2014Corkeron, P. J., & Martin, A. R. (2004). Ranging and diving behaviour of two 'offshore 'bottlenose dolphins, Tursiops sp., off eastern Australia. Journal of the Marine Biological Association of the UK, 84(02), 465-468 Gordon, J., Thompson, D., Leaper, R., Gillespie, D.,	

			Pierpoint, C., Calderan, S., Macaulay, J. & 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. On Behalf of Welsh Assembly Government Gordon, J., Macaulay, J. & Northridge, S. (2014). Tracking porpoise underwater movements in Tidal Rapids using drifting Hydrophone Arrays. Filling a Key Information Gap for Assessing Collision Risk. Proceedings of the 2nd International Conference on Environmental Interactions of Marine Renewable Energy Technologies Hastie, G. D., Wilson, B., & Thompson, P. M. (2006). Diving deep in a foraging hotspot: acoustic insights into bottlenose dolphin dive depths and feeding behaviour. Marine Biology, 148(5), 1181-1188Stockin, K.A., Fairbairns, R.S., Parsons, E.C.M. & Sims, D.W. (2001). Effects of diel and seasonal cycles on the dive duration of the minke whale (Balaenoptera acutorostrata). Journal of the Marine Biological Association of the UK, 81, 189 – 190	
132	DOE Conservation & Reporting	The small number of Bottlenose Dolphins recorded in the area is noted. However, as their population for the management unit is estimated at only 443 then any losses could be important. Tables 10-15 and 10-17 indicate that vessel and turbine noise will impact approximately twice the percentage of reference population in the case of Bottlenose Dolphin compared to Harbour Porpoise. Can some calculations be done for Bottlenose Dolphin with regard to encounters with turbines?	The reasons that no quantitative collision risk assessment was undertaken for species other than harbour porpoise were:- It was not possible, based on the very low numbers of mammal sightings to generate site specific densities for species other than harbour porpoise; and - Based on the fact that orders of magnitude fewer animals were observed for species other than harbour porpoise, it can be expected that the potential for collision impact would also be orders of magnitude less. It would in theory be possible to undertake a quantitative assessment of collision risk on bottlenose dolphin, however there would be a large degree of uncertainty around some of the input data, in particular with regards to site specific density and appropriate reference population data. Based on	Comment noted and TVL response accepted by Marine Licensing.

			these uncertainties, the meaningfulness of the results could be questioned and inevitably we would revert to the overall conclusion that monitoring is required in order to confirm or otherwise the real potential for marine mammal collision with tidal turbines.	
133	DOE Conservation & Reporting	MONITORING The uncertainty around the potential impacts from collision with operating turbines is acknowledged. The commitment by TVL to work with the regulator and key stakeholders to develop an appropriate and practical adaptive marine mammal monitoring programme with regard to collision risk impacts is welcome. Is there any requirement for the methodology to be provided at this stage?	As stated in Chapter 21 of the Environmental Statement, TVL is committed to the development of an appropriate EMP. As the project will not be constructed for a number of years, the exact scope of the EMP will be developed post consent and closer to the time of construction in order to be able to reference the latest industry data / information and guidance to ensure that any monitoring is appropriate and relevant to the issues needing to be monitored.	Marine Licensing are committed to ensure any data gaps around collision risk and validation of Environmental Statement conclusions will be dealt with through. Marine Licensing acknowledges the significant potential for continuing research by the wider industry and advance stage projects such as Meygen to provide validating data between the draft licence being issued and any build out occurring. In its initial draft form the EMP must identify the data gaps and validation data required. The methods to be used will be finalised prior to the build out to account for any new evidence and methods/technology available at the time..
134	AFBI	1. 10.4.2 How was the MMO effort quantified for further analysis? Could the slightly lower density estimate of 0.190 (in comparison to SCANS-II and Benjamins et al., 2014) be due to the lower MMO number? This should be discussed/acknowledged, as this survey has the lowest reported density of porpoises for the area, and it would not follow the precautionary approach to use these (lowest) estimates without considering potential weaknesses.	Effort data were always recorded. The analysis in the 12 month report was based on either the number of sightings per km transect covered (i.e. based on distance only, not number of observers) or the number of sightings per hour of observer effort (i.e. taking number of observers on watch into account). For subsequent density estimation work, transects were divided up into segments according to factors including the number of observers on watch and sea state during the initial stages of the analytical process. Analysing data with varying amounts of effort by different observers is considered standard as long as effort has been recorded by each observer which, in this case, it was. During consultation with the DoE during the EIA, it was determined that a site specific	Marine Licensing are content that observer effort was recorded and the analysis is sound.

			density estimate was the most appropriate to inform the collision risk impact assessment.	
135	AFBI	2. 10.4.3 Were the incidental sightings from the vantage point surveys used in abundance and density estimates?	Any marine mammal sightings made during the coastal VP surveys were recorded as incidental sightings due to the methodology used (no dedicated marine mammal scans). It is considered that this data complements the boat survey data but cannot be used or analysed in the same way because they cannot be effort-corrected. These data have not been used to assess variability in use of the site by harbour porpoises. However, by increasing the amount of survey time, the chances of detecting the occurrence of less common marine mammal species was increased. Furthermore, information on e.g. presence of calves in groups is not compromised by data collection method and contributes to site-specific baseline information.	TVL clarification noted.
136	AFBI	3. 10.4.5 How was the Caloo (2014) density estimate calculated?	The Marine Mammals EIA data requirements report was submitted on 1st September 2014. Caloo Ecological Services (CES) was contracted to provide a working estimate of harbour porpoise density and abundance for inclusion in the report by combining the site specific data with published correction factors. The density estimate derived by CES was 2.06 animals per km2. It was not possible to derive site specific density estimates using Distance analysis due to the low number of sightings during the 12 month survey period. The approach outlined in the September 2014 report was adopted as an alternative method for deriving a density estimate for harbour porpoise. It was noted in the report that the density estimates derived using this approach, although statistically robust, tend to be overly cautious due to reliance on published correction functions and limited site data. Hence this figure being much higher than the figure derived using Distance analysis (see below). However,	Marine Licensing are content that the Caloo estimate was superseded and no longer forms part of the assessment.

			in absence of sufficient sightings from 12 months of survey it was necessary to adopt this approach to enable Xodus to progress with the impact assessment.TVL continued with bird and mammal surveys post submission of the September 2014 report which resulted in an increased number of sightings of harbour porpoise. Having obtained additional site specific data it became possible for Natural Power Consultants Ltd to calculate an absolute density estimate based purely on site specific data using Distance analysis. Given that this is a preferred approach / methodology for calculating density estimates for the purpose of informing impact assessments, and that the resulting density estimate of 0.19 animals per km2 is more in line with other density estimates calculated for the area, the decision was taken to take this forward to inform the impact assessment chapter which was submitted in draft format to the DoE Marine Division in December 2014.The impact assessment which will underpin the final consent application is therefore based on the density estimate of 0.19 animals per km2. The workings of which can be found in Harbour porpoise abundance at Torr Head tidal development site (NPC, 2014f). All other approaches to calculation of density and abundance have been superseded. Reference to Caloo was removed from the final Environmental Statement to eliminate confusion.	
137	AFBI	4. 10.4.5 What sightings did the NPC (2014f) analysis use – effort/incidental/off effort/vantage point? The description in the Environmental Statement chapter is inadequate and needs revision – the technical report may address this.	Density and abundance estimates were calculated by NPC using on-effort boat-based sightings only. Further information is provided in NPC (2014f). Environmental Statement Chapter 10, Section 10.4.1 was updated prior to Environmental Statement finalisation to include a statement to this effect.	Marine Licensing are content TVL have sufficiently answered the query.
138	AFBI	5. 10.4.5 Are there enough (60-80) effort based harbour porpoise sightings to run a reliable Distance analysis?	Yes, and this was part of the analysis in the generation of a site specific density estimate (see section 10.4.6 of the ES). Also refer to report NPC, 2014f.	Marine Licensing are content TVL have sufficiently answered the query.

139	AFBI	6. 10.4.5 How was sea state accounted for during analysis? Palka (1996), Teilmann (2003) and Evans and Hammond (2004) have all reported significant differences in sighting rates in sea states 0-3 for which the boat based surveys have been conducted. Why has the survey methodology reported sea states in 0.5 increments? This is not the standard practice under JNCC guidelines for MMO environmental data recording. Can you provide an explanation/description of sea states using the 0.5 increment method?	We recorded sea state to a resolution of 0.5 because we considered this to be accurate, and also appropriate for the site, the questions to be answered, and the nature of the development. We were able to accurately record sea state to a resolution of 0.5 because the Beaufort scale categories are quite broad (http://en.wikipedia.org/wiki/Beaufort_scale). For example, sea state 0 is defined as 'flat' and sea state 1 is defined as 'ripples without crests'. Within the intervals of logging weather conditions therefore, we were confident that we could accurately ascribe a sea state to 0.5 if a short period of 'flat' was interspersed with/followed by some 'ripples without crests'. We considered a resolution of 0.5 to be appropriate for the heterogeneous nature of the Torr Head site. The sea conditions here are complex and influenced by both wind and powerful tidal currents. So where one patch of sea could be sea state 2 ('small wavelets, crests of glass appearance, not breaking'), an adjacent patch of sea could be in the path of a tidal rip and easily be sea state 3 ('large wavelets, crests begin to break, scattered white caps').We decided that given the questions to be answered by the survey, for example explaining bird species/abundance by tidal state, a resolution of 0.5 would provide finer scale data to do this. Explaining bird species/abundance with only five categories of sea state data (0-4), is less useful than explaining bird species/abundance with 9 categories of sea state data (0, 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4). In addition is the fact that harbour porpoise visual detection is extremely sensitive to sea state (harbour porpoises have a small above-water profile and are difficult to sea in choppy conditions). Therefore as for bird species/abundance, harbour porpoise visual detection is much better analysed using finer scale sea state data. Also, given the nature	Marine Licensing are content TVL have sufficiently answered the query.

			of the development as a tidal array (as opposed to an offshore wind farm), sea state is an important variable to investigate. This is because sea state will be correlated with tidal state (because the tidal currents affect sea state), and so sea state can be a useful indicator of bird and marine mammal species presence, abundance and behaviour, especially underwater behaviour. Finally, while you can always lump fine-scale data into fewer categories, you cannot do the opposite. So if TVL wish to use sea state data to a resolution of 1.0 for analysis, then a rounding exercise will do this. But if Natural Power had gathered sea state to a resolution of 1.0 and a resolution of 0.5 was found to be more useful, then it would be too late to do this. So collecting finer scale data is always a safe option.	
140	AFBI	7. 10.4.5 Will the data be tested to look for the power to detect change and is it fit for this purpose? Whilst a density estimate may have been generated (subject to a satisfactory technical report on both data generation and distance analysis procedures) – will it be adequate to be used in a pre-post development analysis to see if impacts can be detected? This approach has been advocated in the guidance document published by SMRU in 2010 for monitoring at marine renewable energy developments.	TVL has committed to engaging with DOE to determine what might be required post-consent. Should such a pre/post installation analysis be required then TVL would ensure that the necessary data were available to inform such analysis.	Marine Licensing to decide on pre-post installation analysis requirements through the science group.
141	AFBI	8. 10.6.1 Why has disturbance criteria combined all cetaceans? Assuming values presented in Table 10-11 and 10-12 are taken from Southall et al. 2007 – Values should be updated according to most recent literature- NOAA have released draft guidelines in Dec 2013 which are an update on Southall et al., (2007). Tougaard et al., (2014) have also revised exposure limits specifically for harbour porpoises.	In the absence of specific numerical thresholds for disturbance being set by relevant guidance (for example, JNCC describe instead a qualitative assessment based on Southall et al.,2007), we have undertaken an extensive literature review to allow us to determine such a criteria. This literature review demonstrated that there is a high degree of variability in terms of non-injurious responses to noise. This is true to the extent that different responses between different animals within a species group may be	AFBI comments noted with TVL response. Marine Licensing are content that as the TVL approach provides a more conservative criteria than the new draft guidance from NOAA the Environmental Statement assessment does not need revision.

			greater than average differences between different species. We have therefore taken what we believe to be a very conservative approach to determine a highly precautionary threshold, ensuring we capture all the potential impacts observed from the literature. In terms of the sources of criteria included in Table 10-11, these are based on Southall et al. (2007) for low, mid and high frequency mammals and for pinnipeds. This is the approach recommended in the relevant guidance from JNCC. For harbour porpoise, we agree that the Southall et al. (2007) values represent levels that may be too high, as a result of advances in understanding since publication of their study. We have therefore extrapolated values from Lucke et al. (2008) and Kastelein et al. (2012) that provide lower thresholds in recognition that harbour porpoise may be more sensitive to noise emissions than the other species groups considered. With regards to the NOAA guidelines, which we understand are still in draft format, these present a very different way of assessing the impacts to that described in the relevant UK guidance. In previous non-project-specific discussions with JNCC, we have been advised not to incorporate the NOAA at this time. However, we are reviewing the situation as the guidelines develop and expect to consider their results in the future. In terms of the Tougaard et al. 2014 reference (which we think is actually Tougaard et al, 2015), this was published following the noise modelling and assessment work being completed. We have since reviewed that paper against the assessment we have undertaken and believe that the criteria we have used are more conservative than those in the latest paper. Incorporating the latest values would reduce the impact ranges we present. In any case, this paper relates to impulsive sounds, which are less of a concern for this Project that continuous noise. On the basis that we have attempted to generate a worst-case scenario for the modelling, we do not anticipate	

			updating the assessment.	
142	AFBI	9. 10.6.1 Assuming TTS is not included in table 10-11, as would seem to be the case given the injury criteria, TTS should be mentioned in table 10-12 and values reported.	As per the existing JNCC guidance, we have taken the onset of injury to be the onset of permanent threshold shift (PTS). We consider TTS for inclusion in the disturbance assessment, since the thresholds we have derived for disturbance include the consideration of changes in hearing abilities of cetaceans.	AFBI comments noted with TVL response. Whilst it is always desirable to broaden the scope of considerations as the TVL stance follows the JNCC guidance. Marine Licensing are content with the assessment methods.
143	AFBI	10. 10.6.1 There is no mention of auditory masking. Although methods to identify and quantify masking are not well developed it should be acknowledged that auditory masking is a potential impact. Methods to determine reduction in communication range could be used.	We consider auditory masking for inclusion in the disturbance assessment, since the thresholds we have derived for disturbance include the consideration of changes in vocal behaviour of cetaceans. We recognise also that there is a paucity of scientific understanding regarding how various species distinguish anthropogenic sound relative to masking noise. An animal's perception of sound is likely to depend on numerous factors including the hearing integration time, the character of the sound and hearing sensitivity. It is not known, for example, to what extent marine mammals and fish can detect tones of lower magnitude than the masking noise. The final Environmental Statement chapter makes it clear that auditory masking by anthropogenic noise is considered within the disturbance definition.	Comment and response noted.
144	AFBI	11. 10.6.1 Given that harbour porpoise has been the most commonly sighted marine mammal it would be beneficial to see some species specific analysis on impacts of noise using up to date literature regarding auditory capabilities, weighting functions and exposure limits - Tougaard et al., (2014), Wensveen et al., (2014).	We have derived harbour porpoise specific thresholds from a number of recent publications. We have reviewed the additional references provided and believe that Wensveen et al 2014 does not provide additional information to suggest a requirement to update the criteria. The Tougaard publication, as described above, would result in reduced impact ranges, reducing how conservative our assessment is (i.e. any repeat of assessment would come up with smaller ranges).	Marine Licensing note the conservative nature of the Environmental Statement assessment and do not believe any revisiting of the assessment is required.
145	AFBI	12. 10.6.1 Pile driving was mentioned as a possibility for installation yet impacts of pile driving haven't been addressed. There are a number of studies reporting	TVL is unclear on the specific references in the Environmental Statement that state pile driving is a possible installation process for the Torr Head project.	Marine Licensing are aware of the potential for drill piling and do not consider it to have the percussive impact of

		reactions of harbour porpoises to pile driving operations.	There is no percussive (e.g. hammer) piling proposed, but drilled piling may be required. Such a scenario has been modelled (Table 10-16) and assessed in Section 10.6.1. Further information on the derivation of source data for pile drilling is given in Xodus (2014b).	hammer blow piling. The Environmental Statement identified and assessed the impacts. The adaptive management approach of the marine licence process will consider the construction methods to be used and reflect their potential impacts through the EMP and science group.
146		13. 10.6.1 No mention of cumulative impacts of noise? Perhaps this has been covered in the Noise Technical Report but inclusion in this chapter would be beneficial.	The potential for cumulative impacts from underwater noise have been assessed and are reported in Section 10.10 of the Environmental Statement.	AFBI comment and TVL response noted. No reassessment required
147	AFBI	14. 10.7.6 The figures in the impact chapters reference density estimates of 1.42 and state there is no impact. At the meeting we were led to understand that collision modelling was undertaken on a density estimate of 0.19 so this is incorrect.	In the final Environmental Statement, there is no reference to a harbour porpoise density estimate of 1.42. The value of 1.42 animals per km2 was erroneously included in the draft Environmental Statement that was circulated for review prior to final submission. The site specific density estimate of 0.19 was generated as a result of the site specific survey work (taking account of the additional 3 months survey work over) and considered to be the appropriate density for use in the EIA.	Marine Licensing accept the AFBI comment was related to an earlier assessment figure and acknowledge the final Environmental Statement assessment clarification by TVL. No action required.
148	NIEA Ornithologist	**NOTES ON THE POTENTIAL IMPACT ON REGIONAL BIRD POPULATIONS**		Marine Licensing remain in liaison with NIEA and expect bilateral discussions between TVL and NIEA to help finalise EMP and monitoring requirements.
149	NIEA Ornithologist	The Area for Lease (AfL) is located in proximity (7 - 12km) to the Rathlin Island Special Protection Area (SPA), which is designated under the EU Birds Directive for breeding seabirds and Peregrine Falcon. Foraging		

		seabirds originating from the Rathlin colony could potentially be adversely affected by the project, particularly through loss of habitat, displacement from the array footprint, collision with the turbines and pollution. There is also potential for an effect on wide-ranging seabirds from several other SPA breeding colonies in Northern Ireland, Scotland, Wales and the Republic of Ireland		
		The impact of this project upon seabirds has been assessed by analysis of data collected by both boat-based and land-based surveys over the course of 12 months. Monthly boat-based surveys were carried out using the recommended COWRIE / ESAS methodology (Camphuysen *et al* 2004). These comprised 15 transects of total length 76.3km covering the AfL and a buffer zone extending 1km seaward, 75km to the north-west (towards Rathlin) and 3km to the south-east. Density estimates were calculated for species with sufficient data using DISTANCE software. Land-based surveys were undertaken from a single vantage point and covered all tidal stages. Absolute abundance was recorded during periods of slack tide, while abundance estimates during ebb and flow tides was based on encounter rates of species crossing fixed sightlines. Birds observed during all tidal states were allocated to a series of distance bands which extended from the shoreline to a distance of 2km.		
		NIEA reviewed the survey results after 12 months and was content, on the basis of the low numbers of birds detected, supported by an assessment of numbers required for detection of a significant effect based on Potential Biological Removal (PBR) analysis, that this		

		period was sufficient for impact assessment. It would have been useful if the details of the PBR analysis had been included in the Environmental Statement		
		Recent research has assessed the vulnerability of seabird species to tidal turbines and has concluded that those at greatest risk are species which obtain their food principally from benthic habitats and those which dive in pursuit of prey (Furness *et al* 2012). The risk to diving species is proportionate to the degree of overlap between their diving depth and the sub-surface depth of the turbines. **There should therefore be little if any impact on surface-feeding species or shallow divers such as gulls and terns.**		
		Boat-based surveys recorded a total of 24 species (17 within the AfL). Of these, nine were assessed by Furness *et al* (2012) as being at "high" or "moderate" risk from tidal turbines on the basis of foraging behaviour. At risk species included Eider, Red-throated Diver, Great Northern Diver, Cormorant, Shag, Puffin, Black Guillemot, Razorbill and Common Guillemot. **All the above species were also recorded within the AfL by the land-based surveys.**		
		Black Guillemot is the only habitual benthic feeder amongst the "at risk" species and therefore the only one potentially vulnerable to direct habitat loss. Land-based observations indicated, however, that most Black Guillemot foraging activity occurred inshore of the AfL, where the sea-floor habitat would not be impacted by the development. Within the AfL only 2% and 3% of benthic habitats would be lost to turbine foundations and cabling respectively. **The loss takes no**		Noted Monitoring may provide clarification on increased Black Guillemot usage.

		account of the potential suitability of these installations and the turbines themselves as substrates for colonisation by benthic organisms, which may have a compensatory effect. It should be taken into account, however, that any increase in habitat quality that increases the attractiveness of the AfL to species such as Black Guillemot may be offset by an increased risk of collision with the turbines.		
		Disturbance, also potentially affecting non-diving species, is likely to be most prevalent during the construction phase when the largest number of ship movements and human activity will occur within the AfL and cable corridor. This may result in displacement, which has been defined as a reduced number of birds occurring within or immediately adjacent to a development (Furness *et al* 2012). This can be regarded as indirect habitat loss and may incur an energetic cost of obtaining food elsewhere which may be reflected in reduced survival and productivity. Vulnerability to such ship and helicopter traffic has been assessed by Garthe and Hüppop (2004) and Furness and Wade (2012). These authors determined that amongst the nine "at risk" species the divers and Cormorant were highly susceptible to disturbance, Eider, Shag, Black Guillemot, Razorbill and Common Guillemot were moderately susceptible and Puffin showed low susceptibility. Fulmars, gulls and terns were also considered to be at low risk. Disturbance during construction is likely to result only in short-term displacement of some species as boat activity is predicted to be at a much lower frequency during the operational when only the periodic presence of smaller vessels for maintenance purposes is anticipated.		Comment noted – Monitoring to be detailed in EMP Wildlife Licence will be under consideration by MARINE Conservation and Reporting.

		Underwater noise has the greatest potential for impact during construction, through shipping movements, piling operations and cable-laying.		
		Displacement of birds and/or prey species could also occur during the operational phase as a result of habitat modification due to increased turbidity, hydrodynamic changes or underwater noise. Persistent turbidity is highly unlikely due to the clearing effect of the dynamic tidal environment. It is conceivable that the installation and operation of up to 100 tidal turbines may alter the pattern of current flow within the AfL, which may have the potential to impact upon the ecology of prey species utilised by seabirds. This may, however, have as much potential to improve the resources available to birds as to damage them. Again, any potentially deleterious impact may be offset by "artificial reef" effects. Noise effects are likely to be substantially lower during operation than during construction. Turbine operation will produce continuous low-level background noise but it is considered likely that birds will habituate to this.		Comment noted.
		While it is likely that some species will tend to avoid areas of construction activity within the AfL, there is no indication that the development site is an especially favoured foraging area for any of the species recorded during surveys. The AfL constitutes a very small proportion, typically less than 1%, of the available foraging range of all species, based on mean maximum foraging range (Thaxter et al 2012). The proportion is larger for inshore foraging species such as Shag and Black Guillemot but is still minor. It is therefore unlikely, even allowing for patchiness in the		

		distribution of prey resources, that total displacement of foraging seabirds from the AfL during construction would have any significant impact on survival or productivity of seabird populations within the Rathlin Island SPA or any other regional designated site.		
		Seabird species which regularly dive below 8m will be exposed to a risk of collision with the turbines. At present there is no accepted method of directly quantifying this risk in a manner analogous to that routinely used for wind turbines. Indirect methods have been developed, such as the Exposure Time Population Modelling (ETPM) approach which estimates the collision rate necessary to cause significant additional mortality to result in a population decline (Trinder & Harding 2011). ETPM requires extensive data on colony-specific demographic rates and foraging behaviour, however, and this is not currently available for the relevant species on Rathlin.		Comment noted
		The developers have based their assessment of collision risk on usage of the AfL relative to the size of the Rathlin populations and those from other relevant sites. Peak numbers in the AfL for "at risk" species recorded from boat-based surveys (including birds in flight) were: Eider 1, Red-throated Diver 0, Great Northern Diver 0, Cormorant 1, Shag 6, Puffin 8, Black Guillemot 8, Razorbill 58, Common Guillemot 230. As not all auks could be identified to species, the combined Razorbill/Common Guillemot total was 608. It was possible to use the boat-based data to generate density estimates using DISTANCE for Razorbill and		Comment noted NIEA advice on EMP can consider monitoring post construction to assess any feeding behavioural changes from Environmental Statement assessment.

		Common Guillemot. This predicted peak numbers of 25 Razorbills and 406 Common Guillemots, though these figures are likely to be underestimates. Gannets only infrequently dive below 8m but can reach depths that encompass the entire rotor arc. Sixty Gannets were encountered in flight through the AfL during the survey programme but none were observed to feed there.		
		While it is not possible to obtain a precise estimate of overall exposure of seabirds from Rathlin to risk from the turbines, the proportion of the respective populations represented by the observed AfL peak counts can serve as a rough proxy. The recorded peaks for Puffin, Razorbill and Common Guillemot are equivalent to 0.6%, 0.3% and 0.2% respectively of the Rathlin populations at the time of the most recent census (Allen *et al* 2011). Given that the peak numbers include birds only seen in flight which probably did not forage in the AfL, a proportion of the birds observed are likely to have been non-breeders and that the exposure period during each foraging trip is likely to be, on average, very short, we concur with the developers assessment that the risk of collision to any of the above species is likely to be very low and the demographic consequences for the associated SPA populations correspondingly small. (Avoidance by pursuit divers?)		
		Black Guillemot will be a selection feature of the proposed Rathlin Island Marine Conservation Zone. The peak count of eight Black Guillemots in the AfL represents 4% of the Rathlin population censused during Seabird 2000 (203) and 6% of the most recent count (129). The latter census figure is likely to have		NIEA to advice through the science group and EMP of any monitoring requirements.

		been an underestimate of the true population. It is uncertain, however, how many of the Black Guillemots observed in the AfL actually originated from Rathlin. A figure of 12km is given as the mean maximum foraging range for this species, though the source of this is unclear. Much of the AfL would therefore be at extreme range for Rathlin birds and those recorded may have been local breeders on the coast adjacent to the development site. There are no records of Black Guillemots from this area in the Seabird 2000 database. NIEA recommended to the developer that surveys should be made of mainland breeding seabirds in the vicinity of the development but no data has been provided. Land-based observations indicate, however, that most Black Guillemot foraging activity occurs inshore of the AfL and therefore the risk of collision to this species is likely to be low.		
		Potential pollution issues associated with this project are principally the release of drill cuttings and lubricating fluids during construction and accidental spillage of fuel oil from vessels at all stages of the development. Susceptibility to marine pollution of species recorded in the AfL and wider area ranges from medium to very high, with diving species tending to be at greater risk. It is stated that any discharge of drilling by-products or lubricants will be in sufficiently small quantities to be rapidly dispersed by wave and current action without significant risk to seabirds. The likelihood of a significant discharge of fuel oil from a vessel associated with the project is assessed as very low. Mitigation against such an occurrence will be provided through development and implementation of an Emergency Response Corporation Plan. All large		

		vessels will be subject to Shipboard Oil Pollution Emergency Plans and all vessels will carry oil and chemical spill response kits. Construction activities will also only be carried out in safe weather conditions. CS is content that these measures will result in a very low risk of a pollution incident with the potential to significantly affect regional seabird populations.		
		Cumulative and in-combination impacts on seabirds have been considered with marine developments within an area defined by the mean maximum foraging ranges of potentially impacted species. These developments include other tidal energy projects and offshore windfarms. Analysis was limited to the six species occurring in the AfL that regularly dive below 8m. The numbers of projects potentially contributing to a cumulative impact on each species were: Gannet 11, Puffin 3, Common Guillemot 3, Cormorant 1, Black Guillemot 1 and Razorbill 1. CS is surprised that the analysis of impacts during the construction phase was restricted to only those projects undergoing construction at the same time. The cumulative impact at any stage of the project should include estimated mortality from any other projects with connectivity, irrespective of their stage of development. CS is, however, satisfied that the use of the above methodology does not affect the validity of the conclusions reached. Analysis suggests that the cumulative impact of other projects on the relevant regional SPA populations of the above species is likely to be very small. Given the relatively small numbers of birds exposed to risks associated with the Torr Head		

		project and the very low likelihood of a significant effect on local SPA populations, CS considers it highly unlikely that this development would make an appreciable contribution to any overall adverse cumulative impact at any stage of the project		
	NIEA Ornithology	**Conclusions:**		
		There is no evidence that the development site is of particular importance for foraging seabirds in general in any season or dispersing auks in the post-fledging period.		
		Any adverse impact of direct loss of benthic habitats due to this project will be negligible. There is a possibility that “artificial reef” effects may increase the attractiveness of the site to some prey species.		
		Diving seabirds considered at particular risk are present only in numbers that constitute only a very small proportion of the local breeding population. There is unlikely to be any significant risk to surface-feeding or shallow diving (<8m) species.		
		Seabirds present during the non-breeding season are an insignificant proportion of the relevant regional populations (Furness 2015)		

		Some displacement of seabirds or their prey may occur during the construction phase due to frequent vessel movements and installation activities. The effects are likely to be short-lived.		
		The site is very small in relation to the potential foraging ranges of "at risk" species. Alternative habitat would be available nearby and any displacement effect is very unlikely to result in an adverse impact on seabird survival or productivity.		
		Collision risk, either with turbines or associated vessels, cannot be quantified accurately but is unlikely to result in significant additional mortality to diving seabirds due to very low exposure rates per colony member.		
		The likelihood of a pollution incident causing significant additional seabird mortality is considered very low. Satisfactory mitigation measures are planned. The project is very unlikely to add significantly to any mortality associated with other ongoing and planned marine developments within seabird foraging range of regional SPAs		
		Monitoring: Section 11.14 of the Environmental Statement states that "no monitoring programmes are proposed for seabirds on the basis that no significant impacts have been identified...". CS is of the opinion that this is unacceptable. While it is considered very unlikely that there will be any significant adverse impacts on		Marine licensing and NIEA accept the Environmental Statement conclusions; however as an emerging industry validation will be required for Environmental Statement conclusions in relation to potential unknowns. TVL's provision of a draft EMP will offer a starting point on

		seabirds resulting from the project, this is a very new technology and, in the absence of generally applicable predictive models, the assumptions made regarding displacement and collision risk require to be verified. In the absence of baseline data on survival and productivity for the relevant species populations on Rathlin, it would not be feasible to attempt to determine changes in these parameters by direct measurement. CS therefore recommends that land-based surveys of usage of the development site by "at risk" seabird species (Cormorant Shag, Gannet, Puffin, Black Guillemot, Razorbill, Common Guillemot) are carried out during the breeding season (April to August) during the two years following construction (to be reviewed after one year). If boat-based monitoring for marine mammals is planned, the opportunity should be taken to collect additional bird data by this means. Consideration should also be given to carrying out regular searches for seabird carcasses on shorelines adjacent to the development site and in areas where local currents are considered likely to deposit carcasses to check for evidence of collision mortality.		monitoring discussions and the science group will through in-depth consideration, detail what monitoring will be required prior to build out. An adaptive management approach will enable any changes to monitoring to occur as required of what is required and warranted. As primary advisors to marine Licensing NIEA will have a significant role in detailing the monitoring required for the project.
		References: Allen, D., Archer, E., Leonard, K. & Mellon, C. (2011) *Rathlin Island Seabird Census 2011*. Report to Northern Ireland Environment Agency by Allen &		

		Mellon Environmental Ltd. Camphuysen, C.J., Fox, T., Leopold, M.F. & Petersen, I.K. (2004) *Towards standardised seabirds at sea census techniques in connection with environmental impact assessments for offshore windfarms in the UK.* Report to COWRIE Furness, R.W. (2015) *Non-breeding season populations of the seabirds in UK waters: Population sizes for Biologically Defined Minimum Population Scales (BDMPS)*. Natural England Commissioned Reports, Number 164 Furness, R. & Wade, H. (2012) *Vulnerability of Scottish seabird populations to tidal turbines and wave energy devices*. Report to Scottish Natural Heritage by McArthur Green Furness, R.W., Wade, H.M., Robbins, A.M.C. & Masden, E. A. (2012) Assessing the sensitivity of seabird populations to adverse effects from tidal stream turbines and wave energy devices. *ICES Journal of Marine Science* 69: 1466-1479 Garthe, S. & Hüppop, O. (2004) Scaling possible		

		effects of marine wind farms on seabirds: developing and applying a vulnerability index. Journal of Applied Ecology 41: 724-734 Trinder, M & Harding, N. (2011) *Development of a diving bird collision risk assessment for tidal turbines*. Report to Scottish Natural Heritage by RPS		
	DOE Marine Assessment Team	Please find below MAT teams response regarding marine licence application Having considered your information as supplied we thank-you for our inclusion in your consultation process. We have no further comments to add with respect to this consultation at this time	**N/A**	N/A
	NIEA Pollution Prevention	To avoid duplication pollution prevention will address this application through the planning process. Regards, Ian McCauley Northern Ireland Environment Agency *Tel: 028 92 623098*	N/A	N/A
	Causeway Coast and Glens Borough	**The following International/European Designations lie within the Study Area:**	**Offshore** Garron Plateau is referenced in the offshore application in Chapter 17 SLVIA in relation to the	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting

	Council	**RAMSAR sites:** • Garron Plateau	North Channel SCA (17.3.6 Seascape Character). Where potential impacts have been identified these are mainly in relation to vessel presence during installation, maintenance and decommissioning. However, the assessment concluded that, due to the low number of vessels involved in these activities, the localised nature of potential impacts and existing vessel presence in the area, potential impacts on the landscape and seascape character and visual amenity of the Torr Head area and the wider AONB would not be significant. Given that the tidal turbines will be fully submerged they will be required to mark the location of the tidal array during operation. However, this is subject to further consultation. Should it be determined that lit navigational buoys are required the assessment concluded that these are not expected to have a significant impact on landscape or seascape character or views from Torr Head. **<u>Onshore</u>** The Causeway Coast and Glens BC response will be issued to the consultants leading the onshore planning application and EIA for consideration. All relevant RAMSAR designations will be assessed where appropriate.	regimes which have an interlinked phased approach.
	Causeway Coast and Glens Borough Council	**Special Areas of Conservation (SACs)/Sites of Community Importance (SCIs):** 1. **Breen Wood –** Bog Woodland, Old sessile oak woods with Ilex and Blechnum. 2. **Garron Plateau (partial) –** Blanket Bogs, Marsh saxifrage, Alkaline fens, acid peat-	**<u>Offshore</u>** 1. Breen Wood is noted in Section 22.5.4 Terrestrial habitats and ecology of the 'Overview of onshore impacts' chapter. 2. Garron Plateau is referenced in the offshore application in Chapter 17 SLVIA in relation	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.

		stained lakes and ponds, Wet heathland with cross-leaved heath, Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels, transition mires and quaking bogs. 3. **North Antrim Coast –** fixed dunes with herbaceous vegetation (grey dunes), Species-rich Nardus grassland, on siliceous substrates in mountain areas (and sub mountain areas in continental Europe), Annual vegetation of drift lines, Atlantic salt meadows, Shifting dunes with marram, Vegetated sea cliffs of the Atlantic and Baltic coasts. 4. **Rathlin Island** - submerged or partially submerged sea caves, Annual vegetation of drift lines, Reefs, Subtidal sandbanks, Vegetated sea cliffs of the Atlantic and Baltic coasts. 5. **Red Bay cSCI –** Sandbanks which are slightly covered by sea water all of the time. 6. **Skerries and Causeway cSCI (partial)** - submerged or partially submerged sea caves, sandbanks which are slightly covered by sea water all of the time, Reefs, Harbour porpoise.	to the North Channel SCA (17.3.6 Seascape Character). No significant impacts in relation to the offshore works are concluded. 3. North Antrim Coast SAC is noted as a designated feature in Table 14.4 of the Coastal processes and Sediment Dynamics chapter with key impacts during the operation/maintenance phase considered to be hydrodynamics (14.8.1), wave regime (14.8.2), sediment dynamics (14.8.3) and the coastline of Antrim (14.8.4). The overall conclusion from the Coastal Processes assessment was as follows: *'Hydrodynamic modelling of the Project area with and without the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake effect current speed reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. These changes in current speeds are not likely to bring about any changes to the surrounding beaches or cliff coastline. The release of drill cuttings during turbine support structure installation will be quickly dispersed in this high energy environment and cause only a temporary increase in suspended sediment concentrations. All impacts to physical processes and sediment dynamics were assessed to be not significant.'* 4. Rathlin Island SAC is noted as a conservation designation in Table 9.7 in the Benthic and Intertidal Ecology chapter with the key impact during the	

			operation/maintenance phase considered for modified hydrodynamic regime and sediment dynamics (9.7.1). It is also noted as a designated feature in Table 14.4 of the Coastal processes and Sediment Dynamics chapter with key impacts occurring during the operation/maintenance phase considered to be hydrodynamics (14.8.1), wave regime (14.8.2), sediment dynamics (14.8.3) and the coastline of Antrim (14.8.4). The overall conclusion from the Coastal Processes assessment was as follows: *'Hydrodynamic modelling of the Project area with and without the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake effect current speed reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. These changes in current speeds are not likely to bring about any changes to the surrounding beaches or cliff coastline. The release of drill cuttings during turbine support structure installation will be quickly dispersed in this high energy environment and cause only a temporary increase in suspended sediment concentrations. All impacts to physical processes and sediment dynamics were assessed to be not significant.'* 5. Red Bay qualifying feature referenced here is noted under Red Bay SAC as a conservation designation in Table 9.7 in the Benthic and Intertidal Ecology chapter with the key impact during the operation/maintenance phase considered to	

			be for modified hydrodynamic regime and sediment dynamics (9.7.1). All impacts associated with physical processes and sediment dynamics were assessed to be not significant in the ES. 6. Skerries and Causeway qualifying features referenced are noted under Skerries and Causeway SAC as a conservation designation in Table 9.7 in the Benthic and Intertidal Ecology chapter with the key impact during the operation/maintenance phase considered to be for modified hydrodynamic regime and sediment dynamics (9.7.1). All impacts associated with physical processes and sediment dynamics were assessed to be not significant in the ES. This SAC is noted in the ES as the nearest SAC to the Project area where marine mammals are a qualifying interest and lies approximately 25 km North West of the AfL area. Harbour porpoise are a qualifying interest of this site. Impacts are assessed in Chapter 10 Marine Mammals. Overall there are predicted to be no significant impacts on marine mammals associated with the Project. However, TVL does acknowledge that there is still a lack of evidence and uncertainty around the potential for impacts from collision with operating turbines and recognises the need to implement an adaptive marine mammal monitoring programme to confirm the predictions made with regard to collision risk impacts. This monitoring programme will be developed in consultation with the regulator and other	

			relevant stakeholders. Skerries and Causeway SAC is also considered within the HRA with an Appropriate Assessment (3.7) carried out. Based on results from the assessment it was concluded that the Project, alone and in-combination, will not have a significant effect on the viability of the Skerries and Causeway SAC. Therefore there will be no significant effects on the conservation objectives of the SAC or the overall integrity of the SAC. **<u>Onshore</u>** The Causeway Coast and Glens BC response will be issued to the consultants leading the onshore planning application and EIA for consideration. All relevant SACs and SCIs will be assessed where appropriate.	
	Causeway Coast and Glens Borough Council	**Special Protection Areas (SPAs);** 1. **Antrim Hills** - nationally important populations of hen harrier and merlin. Coniferous plantations, blanket bog, wet and dry heath, grass moor, scrub, inland cliff and limited semi-improved agricultural grassland. The principal interests are the breeding populations of hen harrier and merlin. 2. **Rathlin Island** – qualifies by supporting important numbers of Peregrine Falcon. The site further qualifies by supporting internationally important breeding numbers of migratory species: Razorbill, Guillemot and Kittiwake. Additionally, Rathlin SPA regularly supports over 20,000 breeding seabirds.	**<u>Offshore</u>** 1. Antrim Hills SPA is noted under Section 11.4.6 Conservation designations in the Ornithology Chapter. Here, the ES notes, 'The Antrim Hills SPA lies within 2 km of the AfL area and is designated for breeding hen harrier and merlin, while peregrine is a qualifying interest for the Rathlin Island SPA in the breeding season. These species were considered not likely to forage within the AfL area and therefore not likely to be affected by the Project. These species were therefore not considered further in this assessment.'	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.

		Species include, fulmar, shag, eider, common gull, herring gull, lesser black-backed gull, black guillemot, puffin and Manx shearwater. 3. **Sheep Island –** nationally important breeding population of the Northern European sub-species of Cormorant. In addition, the population is the largest in the north of Ireland and thus makes an important contribution to the range of the sub-species.	The Antrim Hills is also noted under Section 22.5.4 Terrestrial habitats and ecology in the Overview of onshore impacts chapter. Antrim Hills SPA was screened out during the HRA as hen harrier and merlin were considered not likely to forage within the AfL area and therefore not likely to be affected by the Project and are therefore were not considered further in the assessment. A full list of birds recorded in the survey area is provided in the 12 month bird and marine mammal survey report (NPC, 2014a). 2. Rathlin Island SPA is noted in the baseline of the Ornithology chapter (Section11.4) and as a relevant conservation designation in Section 11.4.6. Impacts associated with Northern fulmar, puffin, razorbill, guillemot, kittiwake, common gull, lesser black backed gull and herring gull are assessed in Sections 11.8, 11.9 and 11.10 for all phases of the project. Cumulative impacts are assessed in 11.12.2. It was concluded in Section 2.5.1 of the HRA that it was not possible to conclude that there will not be any LSEs on the Rathlin Island SPA (Razorbill and Guillemot) therefore it was carried forward for Appropriate Assessment. However, it was concluded that on the basis that there will be no impacts on either conservation objectives in terms of disturbance to, or impact on the viability of, the population of Rathlin Island SPA (razorbill and guillemot) that there will	

			be no adverse effects on the integrity of the SPA. 3. Sheep Island SPA is considered within the HRA for cormorant, which is a qualifying interest species that is considered within foraging range of the project (18Km). Cormorants are closely linked to sheltered shallow waters usually less than 20 m depth where foraging birds can reach the seabed. The maximum dive depth for cormorant is 35 m with average dive depth of 12 m. A total of two cormorant were recorded during the surveys, one during the boat based surveys and one during the coastal VP surveys. Both were in flight. Although cormorant are a qualifying interest of the Sheep Island SPA (located 18 km from the AfL area) the mean extrapolated abundance estimate for cormorant is 0 (NPC, 2014a). It is therefore concluded that the AfL area is not an important foraging area for cormorants and there will be no likely significant effects on the Sheep Island SPA population from the Project due to collision risk during foraging or / displacement from foraging area due to turbine presence. This is on the basis that in 12 months only two birds were seen which would be 0.89% of the Sheep Island population (based on 118 breeding pairs assuming the worst case that pairs are counted as one on the basis that if you remove one of the pair, breeding of the pair would be affected). Due to expected low vessel numbers, small scale of Project and short installation period, displacement due to vessel presence / noise and pollution impacts will be minor and is also unlikely to lead to any significant effect on the Sheep	

			Island SPA breeding population **<u>Onshore</u>** The Causeway Coast and Glens BC response will be issued to the consultants leading the onshore planning application and EIA for consideration. All relevant SPAs will be assessed where appropriate.	
	Causeway Coast and Glens Borough Council	**Areas of Special Scientific Interest (ASSIs):**		
		Ballycastle Coalfield	Ballycastle Coalfield ASSI (maritime cliff and slopes, Upper Paleozoic palaeontology, Tertiary igneous, Carboniferous stratigraphy) is noted as a designated\sensitive site in Table 14.4 of the Coastal Processes and Sediment Dynamics chapter with key impacts during the operation/maintenance phase considered to be hydrodynamics (14.8.1), wave regime (14.8.2), sediment dynamics (14.8.3) and the coastline of Antrim (14.8.4). The overall conclusion from the Coastal Processes assessment was as follows: *'Hydrodynamic modelling of the Project area with and without the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake effect current speed*	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.

			reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. These changes in current speeds are not likely to bring about any changes to the surrounding beaches or cliff coastline. The release of drill cuttings during turbine support structure installation will be quickly dispersed in this high energy environment and cause only a temporary increase in suspended sediment concentrations. All impacts to physical processes and sediment dynamics were assessed to be not significant.' It is also noted under Sections 22.5.4 Terrestrial habitats and ecology and 22.5.11 Soils, geology and hydrogeology in the Overview of onshore impacts chapter and will be addressed as part of the environmental assessment of the onshore works.	
		Breen Wood	Breen Wood ASSI (sessile oak wood) is noted under Section 22.5.4 Terrestrial habitats and ecology in the Overview of onshore impacts chapter and will be addressed as part of the environmental assessment of the onshore works.	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.
		Capecastle	Capecastle ASSI (exposed chalk) is noted under Sections 22.5.4 Terrestrial habitats and ecology and 22.5.11 Soils, geology and hydrogeology in the Overview of onshore impacts chapter and will	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting

			be addressed as part of the environmental assessment of the onshore works.	regimes which have an interlinked phased approach.
		Carey Valley	Carey Valley ASSI (Fens, Pleistocene, Dalradian rock formations) is noted under Sections 22.5.4 Terrestrial habitats and ecology and 22.5.11 Soils, geology and hydrogeology in the Overview of onshore impacts chapter and will be addressed as part of the environmental assessment of the onshore works.	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.
		Carrick-a-rede	'Carrickarade' ASSI (Cretaceous stratigraphy, mass movement, tertiary igneous) is noted as a designated\sensitive site in Table 14.4 of the Coastal Processes and Sediment Dynamics chapter with key impacts during the operation/maintenance phase considered to be hydrodynamics (14.8.1), wave regime (14.8.2), sediment dynamics (14.8.3) and the coastline of Antrim (14.8.4). The overall conclusion from the Coastal Processes assessment was as follows: *'Hydrodynamic modelling of the Project area with and without the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake effect current speed reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. These changes in current speeds are not likely to bring about any changes to the surrounding beaches or cliff coastline. The release of drill cuttings during turbine support*	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.

			structure installation will be quickly dispersed in this high energy environment and cause only a temporary increase in suspended sediment concentrations. All impacts to physical processes and sediment dynamics were assessed to be not significant.'	
		Castle Point	Castle Point ASSI (Intertidal rock, cretaceous stratigraphy) is noted under Section 22.5.4 Terrestrial habitats and ecology in the Overview of onshore impacts chapter and will be addressed as part of the environmental assessment of the onshore works.	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.
		Church Bay	Church Bay ASSI (above sea level chalk gravel bar) is noted as a designated\sensitive site in Table 14.4 of the Coastal Processes and Sediment Dynamics chapter with key impacts during the operation/maintenance phase considered to hydrodynamics (14.8.1), wave regime (14.8.2), sediment dynamics (14.8.3) and the coastline of Antrim (14.8.4). The overall conclusion from the Coastal Processes assessment was as follows: *'Hydrodynamic modelling of the Project area with and without the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake effect current speed reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. These changes in current speeds are not likely to bring*	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.

			about any changes to the surrounding beaches or cliff coastline. The release of drill cuttings during turbine support structure installation will be quickly dispersed in this high energy environment and cause only a temporary increase in suspended sediment concentrations. All impacts to physical processes and sediment dynamics were assessed to be not significant.'	
		Cloghastucan	Cloghastucan ASSI (exposures of ulster white limestone) is noted as a designated\sensitive site in Table 14.4 of the Coastal Processes and Sediment Dynamics chapter with key impacts during the operation/maintenance phase considered to hydrodynamics (14.8.1), wave regime (14.8.2), sediment dynamics (14.8.3) and the coastline of Antrim (14.8.4). The overall conclusion from the Coastal Processes assessment was as follows: *'Hydrodynamic modelling of the Project area with and without the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake effect current speed reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. These changes in current speeds are not likely to bring about any changes to the surrounding beaches or cliff coastline. The release of drill cuttings during turbine support structure installation will be quickly dispersed in this high energy environment and cause only a temporary increase in suspended sediment concentrations. All impacts to physical processes and sediment dynamics were assessed*	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.

			to be not significant.'	
		Fairhead and Murlough Bay	Fairhead and Murlough Bay ASSI (Structural and metamorphic geology, carboniferous stratigraphy, Mesozoic palaeontology, tertiary igneous, mass movement) is noted as a designated\sensitive site in Table 14.4 of the Coastal Processes and Sediment Dynamics chapter with key impacts during the operation/maintenance phase considered to hydrodynamics (14.8.1), wave regime (14.8.2), sediment dynamics (14.8.3) and the coastline of Antrim (14.8.4). The overall conclusion from the Coastal Processes assessment was as follows: *'Hydrodynamic modelling of the Project area with and without the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake effect current speed reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. These changes in current speeds are not likely to bring about any changes to the surrounding beaches or cliff coastline. The release of drill cuttings during turbine support structure installation will be quickly dispersed in this high energy environment and cause only a temporary increase in suspended sediment concentrations. All impacts to physical processes and sediment dynamics were assessed to be not significant.'* It is also noted under Sections 22.5.4 Terrestrial	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.

			habitats and ecology in the Overview of onshore impacts chapter and will be addressed as part of the environmental assessment of the onshore works.	
		Galboly	Galboly ASSI (Cretaceous stratigraphy, mass movement, tertiary igneous) is noted as a designated\sensitive site in Table 14.4 of the Coastal Processes and Sediment Dynamics chapter with key impacts during the operation/maintenance phase considered to hydrodynamics (14.8.1), wave regime (14.8.2), sediment dynamics (14.8.3) and the coastline of Antrim (14.8.4). The overall conclusion from the Coastal Processes assessment was as follows: *'Hydrodynamic modelling of the Project area with and without the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake effect current speed reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. These changes in current speeds are not likely to bring about any changes to the surrounding beaches or cliff coastline. The release of drill cuttings during turbine support structure installation will be quickly dispersed in this high energy environment and cause only a temporary increase in suspended sediment concentrations. All impacts to physical processes and sediment dynamics were assessed to be not significant.'*	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.

		Garron Plateau	Garron Plateau is referenced in the offshore application in Chapter 17 SLVIA in relation to the North Channel SCA (17.3.6 Seascape Character). The ES concluded the following: '*Although Torr Head, and a large proportion of the north Antrim Coast, is included within the Antrim Coast and Glens AONB and is considered to be of very high landscape and seascape importance, potential impacts from the offshore aspects of the Project on seascape, landscape and visual amenity are assessed to be not significant. This is on the basis that all permanent offshore components of the Project will be fully submerged (e.g. there will be no surface piercing devices or other infrastructure). Where potential impacts have been identified these are mainly in relation to the vessels presence during installation, maintenance and decommissioning. However, the assessment concluded that, due to the low number of vessels involved in these activities, the localised nature of potential impacts and existing vessel presence in the area, that potential impacts on the landscape and seascape character and visual amenity of the Torr Head area and the wider AONB would not be significant.*' It will also be considered as part of the onshore assessment.	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.

		Giants Causeway and Dunseverick	Causeway Coast AONB (Unique landscape features incorporating ASSI) is noted as a designated\sensitive site in Table 14.4 of the Coastal Processes and Sediment Dynamics chapter with key impacts during the operation/maintenance phase considered to hydrodynamics (14.8.1), wave regime (14.8.2), sediment dynamics (14.8.3) and the coastline of Antrim (14.8.4). The overall conclusion from the Coastal Processes assessment was as follows: *'Hydrodynamic modelling of the Project area with and without the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake effect current speed reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. These changes in current speeds are not likely to bring about any changes to the surrounding beaches or cliff coastline. The release of drill cuttings during turbine support structure installation will be quickly dispersed in this high energy environment and cause only a temporary increase in suspended sediment concentrations. All impacts to physical processes and sediment dynamics were assessed to be not significant.'*	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.
		Glenariff	Glenariff ASSI will be considered as part of onshore assessment. There are no significant impacts associated with the offshore elements of the project.	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.

		Glenballyemon River	Glenballyemon River ASSI will be considered as part of onshore assessment. There are no significant impacts associated with the offshore elements of the project.	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.
		Rathlin Island – Ballygill North	Rathlin Island Coast ASSI (geological exposures and rock formations) is noted as a designated\sensitive site in Table 14.4 of the Coastal Processes and Sediment Dynamics chapter with key impacts during the operation/maintenance phase considered to hydrodynamics (14.8.1), wave regime (14.8.2), sediment dynamics (14.8.3) and the coastline of Antrim (14.8.4). The overall conclusion from the Coastal Processes assessment was as follows: *'Hydrodynamic modelling of the Project area with and without the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake effect current speed reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. These changes in current speeds are not likely to bring about any changes to the surrounding beaches or cliff coastline. The release of drill cuttings during turbine support structure installation will be quickly dispersed in this high energy environment and cause only a temporary increase in suspended sediment concentrations. All impacts to physical processes and sediment dynamics were assessed to be not*	The Licensing Authority notes the CCGBC comments and accepts the TVL response.

			significant.' Rathlin Island was also assessed for AONB, SPA, SAC designations within the ES and HRA (see previous comments)	
		Rathlin Island - Kebble	Covered below	
		Rathlin Island – Kinramer South	Covered below	
		Rathlin Island - Coast	Covered below	
		Rathlin Island – Ballycarry	Covered below	
		Sheep Island	Sheep Island ASSI incorporated and assessed under SPA designation as noted previously.	The Licensing Authority notes the CCGBC comments and accepts the TVL response.
		Slievanorra and Croghan	Slievanorra and Croghan ASSI will be considered as part of onshore assessment. There are no significant impacts associated with the offshore elements of the project.	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.
		Tievebulliagh	Tievebulliagh ASSI will be considered as part of onshore assessment. There are no significant impacts associated with the offshore elements of the project.	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.
		Torr Head	Torr Head ASSI (metamorphosed Dalradian limestone) is noted as a designated\sensitive site	The Licensing Authority notes the CCGBC comments and

			in Table 14.4 of the Coastal Processes and Sediment Dynamics chapter with key impacts during the operation/maintenance phase considered to hydrodynamics (14.8.1), wave regime (14.8.2), sediment dynamics (14.8.3) and the coastline of Antrim (14.8.4). The overall conclusion from the Coastal Processes assessment was as follows: *'Hydrodynamic modelling of the Project area with and without the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake effect current speed reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. These changes in current speeds are not likely to bring about any changes to the surrounding beaches or cliff coastline. The release of drill cuttings during turbine support structure installation will be quickly dispersed in this high energy environment and cause only a temporary increase in suspended sediment concentrations. All impacts to physical processes and sediment dynamics were assessed to be not significant.'* It is also noted under Sections 22.5.4 Terrestrial habitats and ecology and 22.5.11 Soils, geology and hydrogeology in the Overview of onshore impacts chapter and will be considered as part of the assessment for the onshore project.	accepts the TVL response.

		Tow River Wood	Tow River Wood ASSI (mixed ash woods) is noted under Section 22.5.11 Soils, geology and hydrogeology in the Overview of onshore impacts chapter and will be assessed in the onshore EIA. There are no significant impacts associated with the offshore elements of the project.	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.
		White Park Bay	White Park Bay ASSI (Listed for geology and coastal physiography, with sea-stacks and natural arches present.) is noted as a designated\sensitive site in Table 14.4 of the Coastal Processes and Sediment Dynamics chapter with key impacts during the operation/maintenance phase considered to hydrodynamics (14.8.1), wave regime (14.8.2), sediment dynamics (14.8.3) and the coastline of Antrim (14.8.4). The overall conclusion from the Coastal Processes assessment was as follows: *'Hydrodynamic modelling of the Project area with and without the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake effect current speed reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. These changes in current speeds are not likely to bring about any changes to the surrounding beaches or cliff coastline. The release of drill cuttings during turbine support structure installation will be quickly dispersed in this high energy environment and cause only a temporary increase in suspended sediment concentrations. All impacts to physical processes and sediment dynamics were assessed to be not*	The Licensing Authority notes the CCGBC comments and accepts the TVL response.

			significant.'	
		Onshore		
		The Causeway Coast and Glens Borough Council response will be issued to the consultants leading the onshore planning application and EIA for consideration. All relevant ASSIs will be assessed.		The licensing authority welcome this commitment from TVL which reflects the consenting regimes which have an interlinked phased approach.
	Causeway Coast and Glens Borough Council	**Areas of outstanding Natural Beauty (AONBs);** 1. Antrim Coast & Glens 2. Causeway Coast & Glens (partial)	**<u>Offshore</u>** 1. Antrim Coast and Glens AONB (Unique landscape features) is noted as a designated\sensitive site in Table 14.4 of the Coastal Processes and Sediment Dynamics chapter with key impacts during the operation/maintenance phase considered to hydrodynamics (14.8.1), wave regime (14.8.2), sediment dynamics (14.8.3) and the coastline of Antrim (14.8.4). The overall conclusion from the Coastal Processes assessment was as follows: *'Hydrodynamic modelling of the Project area with and without the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake*	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.

			effect current speed reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. These changes in current speeds are not likely to bring about any changes to the surrounding beaches or cliff coastline. The release of drill cuttings during turbine support structure installation will be quickly dispersed in this high energy environment and cause only a temporary increase in suspended sediment concentrations. All impacts to physical processes and sediment dynamics were assessed to be not significant.' The AONB is also referenced in Section 17.2.1 of the SLVIA chapter, as well as 17.3.3 & 17.3.4 (Baseline). The AONB is a material consideration in the assessment criteria outlined in 17.4.1. The assessment concluded the following with respect to SLVIA impacts on the AONB. *'Although Torr Head, and a large proportion of the north Antrim Coast, is included within the Antrim Coast and Glens AONB and is considered to be of very high landscape and seascape importance, potential impacts from the offshore aspects of the Project on seascape, landscape and visual amenity are assessed to be not significant. This is on the basis that all permanent offshore components of the Project will be fully submerged (e.g. there will be no surface piercing devices or other infrastructure). Where potential impacts have been identified these are mainly in relation to the vessels presence during installation,*	

			maintenance and decommissioning. However, the assessment concluded that, due to the low number of vessels involved in these activities, the localised nature of potential impacts and existing vessel presence in the area, that potential impacts on the landscape and seascape character and visual amenity of the Torr Head area and the wider AONB would not be significant.' The AONB is also addressed in Chapter 18 Socio-economics and looks at impacts on Tourism and recreation (18.6.2). The assessment concluded in this instance that *'overall the potential impact of construction and installation activities on tourism and recreation are assessed to be not significant.'* Antrim Coast & Glens AONB is also noted under Sections 22.5.6 Landscape and visual amenity and Table 22.4 Potential impacts in the Overview of onshore impacts chapter and will be addressed as part of the environmental assessment of the onshore works 2. Causeway Coast & Glens (partial) AONB (Unique landscape features) is noted as a designated\sensitive site in Table 14.4 of the Coastal Processes and Sediment Dynamics chapter with key impacts during the operation/maintenance phase considered to hydrodynamics (14.8.1), wave regime (14.8.2), sediment dynamics (14.8.3) and	

			the coastline of Antrim (14.8.4). The overall conclusion from the Coastal Processes assessment was as follows: *'Hydrodynamic modelling of the Project area with and without the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake effect current speed reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. These changes in current speeds are not likely to bring about any changes to the surrounding beaches or cliff coastline. The release of drill cuttings during turbine support structure installation will be quickly dispersed in this high energy environment and cause only a temporary increase in suspended sediment concentrations. All impacts to physical processes and sediment dynamics were assessed to be not significant.'* Causeway Coast & Glens AONB is also noted under Sections 22.5.6 Landscape and visual amenity and Table 22.4 Potential impacts in the Overview of onshore impacts chapter and will be addressed as part of the environmental assessment of the onshore works **<u>Onshore</u>** The Causeway Coast and Glens BC	

			response will be issued to the consultants leading the onshore planning application and EIA for consideration. All relevant AONBs will be assessed as part of the environmental assessment associated with the onshore works.	
	Causeway Coast and Glens Borough Council	**Nature Reserves (NRs):** 1. Breen Oakwood 2. Keeble 3. Slievanorra Forest	**<u>Offshore</u>** 1. Breen Wood NNR (sessile oak wood) is noted under Section 22.5.4 Terrestrial habitats and ecology in the Overview of onshore impacts chapter and will be addressed as part of the environmental assessment of the onshore works 2. Kebble NNR is a part of Rathlin ASSI. Impacts will be addressed as part of the environmental assessment of the onshore works. 3. Slievanorra Forest NNR impacts. Impacts will be addressed as part of the environmental assessment of the onshore works **<u>Onshore</u>** The Causeway Coast and Glens BC response will be issued to the consultants leading the onshore planning application and EIA for consideration. All relevant NNRs will be considered as part of the environmental assessment of the onshore	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.

			works.	
	Causeway Coast and Glens Borough Council	**Marine Conservation Zones (MCZs)** Two of four proposed NI Marine Conservation Zones (MCZs) lie within this Borough: 1. Rathlin Island 2. Waterfoot	1. Rathlin Island pMCZ is referenced in 9.2.2 benthic and intertidal ecology which outlines the relevant Priority Marine Features (PMFs) that were included the assessment. Rathlin pMCZ is also referenced under Section 9.4.5 Conservation Designations where it is noted that *'Rathlin pMCZ covers an area which extends north between the north coast of Rathlin Island and the North Channel. This site also incorporates the existing Rathlin Island SAC and SPA designations. The pMCZ supports the only known location of the broad scale habitat, Deep seabed (>200 m) in Northern Ireland waters (DoENI, 2014). This rare habitat is also associated with cold water coral (Lophelia) reefs although none have been recorded in Northern Ireland to date (DoENI, 2014).'* As a result of the small scale of the Project footprint, absence of PMFs, the high energy environment and widespread representation of the habitats found in the Project area throughout much of the surrounding area, all but one of the potential impacts has been assessed as not significant. The potential introduction of Marine Non-Native Species (MNNS) as a result of installation and maintenance vessels	The Licensing Authority notes the CCGBC comments and accepts the TVL response.

			entering the Project area has been identified as a potentially significant impact. This is on the basis that there is a high degree of uncertainty regarding the origin of the vessels transiting to the Project area, the type and quantity of MNNS that have the potential to be introduced from those locations, and the potential impact of those MNNS in local ecosystems. To avoid these significant impacts, any vessel involved in the Project will be subject to a full risk assessment to determine the potential for the introduction of MNNS. Any mitigation methods identified during this assessment will also be strictly adhered to. The residual impact is therefore predicted to be not significant. Rathlin Island pMCZ is referenced in Section 11.4.6 on conservation designations and impacts on black guillemot have been considered in the impact assessment. No significant impacts on this species are identified. 2. The Red Bay pMCZ (Waterfoot) was proposed in March 2015 following completion of the EIA and during its review by The Crown Estate immediately prior to submission. Consideration of this proposed protected area was therefore not considered in the original ES submitted (although the benthic impact	

			assessment did identify the presence of seagrass bed in Red Bay - page 9-14). Information on potential impacts of the scheme on this pMCZ was provided to the Regulator for consideration as part of response to comments on the application documents and is therefore considered as part of the environmental impact assessment. The Red Bay pMCZ is located approximately 20km from the Project area. The potential key impact on this habitat is from the release of drill cuttings during the installation of the turbine foundations. The worst case estimate of a total of 11,760 m^3 of drill cuttings is from the installation of 100 turbines using a monopile foundation. As installation will take place over a 3 year period, the total discharge will be spread over this period. Each monopile will result in the discharge of only 117 m^3 cuttings and this will take place over a number of days rather than instantaneously. A further discussion of the potential impacts is presented here. a) Likely initial tidal excursion distance is less than the distance to the pMCZ: As a coarse estimate, using an average flood tide current speed of 1 m/s (see Figure 14-8) and an approximate flood tide duration of 5 hours, a very conservative estimate of the tidal excursion for any discharged particulate matter released at the start of the flooding tide would be approximately 18 km. This implies that any drill cuttings in suspension would not reach the Red Bay MCZ on the first tide as it is located 20 km to the south east	

			of the AfL, and would instead be dispersed further to the north, to then return on the subsequent flood tide. b) Net sediment transport in the North Channel is northward. Once advected to the North Channel, any suspended particulate matter will tend to follow the net sediment transport direction in the North Channel which is northward (although there are small local reversals of this trend at certain locations dictated by complex interactions between tides, water depth and coastline (See Figure 14.19)). This suggests that any drill cuttings suspended in the water column will not be transported to Red Bay which is located ~20 km to the south east of the AfL. c) Any larger fragments of drill cutting are likely to settle out in the vicinity of the drill site. From Impact 14.1 , the drill cuttings are likely to consist of a fluid paste with larger fragments up to pebbled sized 'flakes', and the bentonite may form a very fine sediment suspension. The environment into which the drill cuttings will be released is highly energetic, so they will, for the most part, become widely dispersed into the surrounding waters, bringing about a localised and temporary increase in turbidity and very little in the way of perceptible sediment deposition. The larger debris generated during drilling, such as the pebble-sized flakes, is likely to settle within relatively close	

			proximity to the drilling site. d) At a radial distance of 20km and covering water depths of between 10 and 100m, any suspended fine drill cuttings are unlikely to contribute significantly above background levels of suspended sediment in the area at Red Bay pMCZ. An inspection of the seabed sediments in the vicinity of the pMCZ shows there to be "gravelly sand" present. This corresponds to a lower energy environment than that at the AfL, and implies that there are likely to be particles in suspension in the water column anyway. e) Existing assessment of waste water discharges in Red Bay provide reassurance that the environment is highly dispersive. The pMCZ document produced by DOENI for Red Bay mentions the wastewater outfalls in the vicinity of Red Bay. It states that "Waste water effluent is discharged from two sewage treatment works (outfalls) in Red Bay. Most waste waters from the Waterfoot area are pumped to Cushendall waste water treatment works. The screened effluent is discharged via a long sea outfall more than 2 km to the north east of the Waterfoot area. Although there is no secondary treatment for the discharge, the open condition of the Bay into the North Channel allows the effluent to disperse and water quality is in good condition."	

	Causeway Coast and Glens Borough Council	Council would highlight the potential impact that this proposal may have on the environmental designations listed above, and in particular the two candidate SCIs located at Skerries & Causeway and at Red Bay, as well as the proposed Marine Conservation Zones at Rathlin and Waterfoot. Council has particular concerns that due to the limited research and information provided in relation to the medium to long term impact the effect of the proposed development on the designated features of these environmental designations is uncertain.	EIA, including consultation with stakeholders, is an iterative process that will continue beyond ES submission. The primary mechanism for ensuring that the environmental assessment continues and that all environmental issues are addressed throughout the lifetime of the Project is through the Project Environmental Management Plan (EMP) which will be implemented as part of the overall Operational Management System for the Project. The EMP will provide the overarching framework for on-site environmental management for the protection of environmental interests. It will be a working document which details consent conditions, the commitments outlined in the ES and compliance monitoring requirements (i.e. monitoring required to assess the performance of mitigation measures and any monitoring required to confirm impact predictions). It will also highlight the parties responsible for the implementation of the contents of the EMP. The EMP will be developed and implemented in agreement with the relevant stakeholders, including the DoENI and their statutory advisors following the successful award of project consents. This is necessary to ensure that all ES mitigation commitments, consent conditions and environmental monitoring requirements are implemented as required.	The Licensing Authority notes the CCGBC comments and accepts the TVL response. The approach taken by TVL reflects the consenting regimes which have an interlinked phased approach.

			A Habitat Regulation Assessment has also been carried out for the offshore components of the Project in line with the requirements of Article 6 of the Habitats Directive, HRA Case Law and best practice guidance. The HRA was undertaken following completion of the EIA studies for marine mammals, ornithology, benthic habitat and fish. This was to ensure sufficient information is available to be able to make a judgement with sufficient certainty at HRA screening as to whether the Project is likely or not likely to have a significant effect on a European protected site. Results from the HRA are presented in the separate HRA Report which has been submitted with this ES. Carrying out the HRA towards the end of the EIA process meant that there was more information available to inform the assessment of the potential effects of the Project on a European site. This meant that those sites where significant effects are not likely to occur (conclusion no LSE) could be properly screened out from the HRA process thereby reducing the total number of sites identified as requiring an Appropriate Assessment. By taking into account all available data and project information this approach ensures that the HRA process is robust and that the Appropriate Assessment focuses on those sites where significant effects are most likely to occur. A description of the HRA methodology is	

			provided in the HRA Report. A HRA will also be required as part of the assessment for the onshore components and the details of this response along with the Scoping Opinion received from the Department of the Environment NI will inform the approach to such an assessment. TVL have engaged the services of suitable EIA consultants to carry out this assessment and we are committed to ensuring the all appropriate stakeholders are consulted as part of this process. This will ensure that all potential impacts on designated sites will considered for both the offshore and onshore components of this project.	
	Causeway Coast and Glens Borough Council	Council also has concerns that the project could result in a detrimental impact on or changes to the dunes and beaches along this coastline. The limited research does not clearly identify whether there is likely to be any medium to long term changes in terms of tidal energy and sediment deposit in the area and potential significant impact on tourist facilities and coastal erosion.	The seabed within the AfL area is made up of hard exposed rock outcrops with areas of cobbles and boulders, whereas the seabed along the export cable corridor is more varied with areas of exposed bedrock, coarse and sandy gravel and small areas of sand megaripples. The coastline surrounding the Project area is dominated by rocky cliffs interspersed with occasional headland bays with small beaches. Being located on the north east coast of Northern Ireland, the AfL area is sheltered by the mainland from the large swell waves that are found off the west coast of Ireland and by the Scottish mainland from waves coming from the north and east. Consequently wave height within the AfL area rarely exceeds 2 m. Tidal currents within the AfL area can reach an	The Licensing Authority notes the CCGBC comments and accepts the TVL response.

			average speed of 3 m/s on a spring tide and 1.5 m/s on a neap tide. There are a number of sites within 10 km of the AfL area designated as areas of national geological importance, including the adjacent Torr Head Area of Special Scientific Interest (ASSI) and the Fair Head and Murlough Bay ASSI. Detailed hydrodynamic modelling of the Project area within and outside the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake effect current speed reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. These changes in current speeds are not likely to bring about any changes to the surrounding beaches or cliff coastline. The release of drill cuttings during turbine support structure installation will be quickly dispersed in this high energy environment and cause only a temporary increase in suspended sediment concentrations. All impacts to physical processes and sediment dynamics were assessed to be not significant.	
	Causeway Coast and Glens Borough Council	**CURRENT SPEED/CHANGES** Council would have concerns that any change in the current speeds (even minor) could bring about adverse changes to the surrounding beaches or cliff coastline. Further information is necessary to make an informed decision.	Detailed hydrodynamic modelling of the Project area with and without the 100 turbine array has shown that the presence of the array creates a minor net reduction in current speeds where the turbines are dense, and very minor wake effect current speed reductions to the north-west and south-east of the array, extending to a maximum of 8 km from the AfL area. The ES assessment indicates that these changes in current speeds are not likely to bring about any changes to the	The Licensing Authority notes the CCGBC comments and accepts the TVL response.

			surrounding beaches or cliff coastline.	
	Causeway Coast and Glens Borough Council	MONITORING The potential impacts of this project may not be evident in the short term. However if DoE Marine Division is mindful to grant the licence it is critical that monitoring is continual, in the short medium and long term, to assess the impacts arising from this project. Should any negative impacts be found then Council would request that the licence is revoked immediately.	As stated in Chapter 21 of the ES, TVL is committed to the development of an appropriate environmental management plan which will include a detailed monitoring plan. The exact scope of the monitoring plan will be developed post consent in order to draw on the latest industry and OpenHydro data / information and guidance to ensure that any monitoring is appropriate and relevant to the issues needing to be monitored. This will be done in consultation with the project Science Group which will comprise DoE Marine Division and key statutory advisors. The following provision is proposed for inclusion in the marine licence: *If the Licensing authority has reason to believe that a significant environmental impact attributable to the operation of the array has occurred or is likely to occur, the licensing authority may require the licensee to comply with one of the following options; however in doing so, the licensing authority will take into consideration all available environmental information.* a. *Cessation of operation of the tidal array pending assessment of the situation.* b. *In the case of a permanent cessation, the licensee shall ensure that the tidal turbines are decommissioned and removed from*	The Licensing Authority notes the CCGBC comments and accepts the TVL response.

			the site in accordance with the decommissioning requirements of the licensing authority.	
	Causeway Coast and Glens Borough Council	In line with HRA legislation and guidelines, Council would recommend that a precautionary approach is adopted and a decision on this proposed development cannot be considered until such times as reasonable scientific information is available to determine the medium to long term impact of this project on the European designated sites in this area.	As stated in the ES (Section 21.3), TVL is committed to the development of an EMP that is relevant and appropriate for the project. It also recognises that due to the emerging and evolving nature of the tidal energy industry there are also some potential impacts that have yet to be verified by operational monitoring. Based on this current situation TVL has identified two approaches to monitoring: 'Where TVL identifies monitoring requirements for the project, specific issue monitoring protocols will be developed in consultation with the regulators and their advisors'. 'Where uncertainties in the assessment are identified that are considered of strategic importance to the development of the tidal industry, TVL would wish to engage with the wider industry, regulators, their advisors and stakeholders through involvement on working groups or similar forums in order to assist with developing strategic monitoring programmes for the benefit of future projects in Northern Ireland and elsewhere in the UK'. A HRA was carried out and concluded the following in relation to European designated sites relevant to the project:	The Licensing Authority notes the CCGBC comments and accepts the TVL response.

			SACs: Based on results from the assessment it was concluded that the Project, alone and in-combination, will have no significant effects on the conservation objectives of any SAC or the overall integrity of any SAC. **SPAs:** On the basis that there will be no impacts on either conservation objectives in terms of disturbance to, or impact on the viability of, the population of any SPA, it was concluded that there will be no adverse effects on the integrity of any SPA as a result of the development of the project alone and in combination with other known projects.	